

# **Integrated Natural Resources Management Plan**

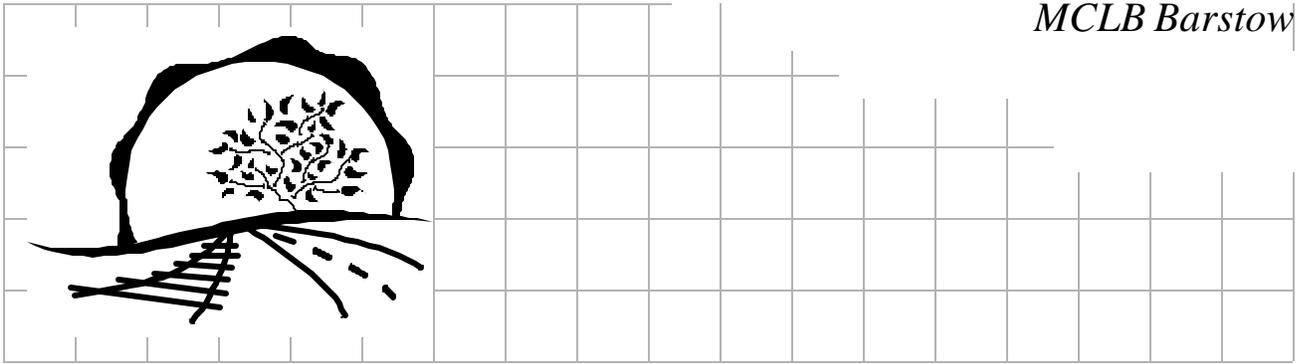
## **Marine Corps Logistics Base Barstow**

Final

September 2001







# **Integrated Natural Resources Management Plan**

*Marine Corps Logistics Base*

*Barstow*

FINAL  
September 2001

*Prepared for:*

U.S. Department of the Navy, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132 under Contract No. N68711-95-D-7605/0010 and N68711-00-D-4413/0008.

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# Integrated Natural Resources Management Plan

## Marine Corps Logistics Base Barstow

*This document fulfills the requirements for the Integrated Natural Resource Management Plan in accordance with MCO P5090.2.*

For Plan Period: 2001

To: 2006

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I.E. Bergman  
Colonel, USMC  
Commanding Officer  
Marine Corps Logistics Base, Barstow

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Date

Agreeing Agencies:

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Acting Office Manager  
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<sup>1</sup> See Appendix P for Chronology of contact with U.S. Fish and Wildlife Service.

<sup>2</sup> Endorsement on next page. See correspondence history in Appendix P.



# Annual Increment Reviews

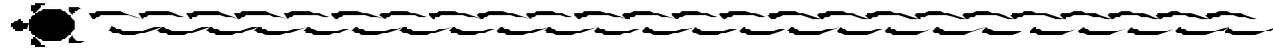
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Per MCO 5090.2A, this Integrated Natural Resources Management Plan must be reviewed annually to facilitate implementation. The annual increment provides detail and cost estimates of proposed work on projects to be accomplished during a fiscal year. Major revisions occur every five years.

<b>Date</b>	<b>Reviewer</b>	<b>Comments</b>
_____	_____	_____ _____ _____







- II. Implement eradication programs as needed, based on established criteria....3-8
- III. Monitor noxious weeds and those which have the potential to become noxious by remapping every three to five years....3-9

**3.1.5 Soil Erosion Prevention and Control ..... 3-9**

*Objective: Protect and restore soil productivity, watershed functioning, water quality, and wildlife habitat through effective implementation of Best Management Practices to prevent and control soil erosion. 3-10*

*Objective: Prevent degradation of Base facilities and equipment and protect the quality of life of personnel from the abrasive or otherwise destructive effects of wind and water erosion. 3-10*

- I. Provide overall management guidance for erosion prevention and control....3-10
- II. Implement erosion control measures based on the needs of each type of erosion source. (MCO P5090.2)...3-11
- III. Coordinate with other organizations to support the effective implementation of projects that involve multiple jurisdictions....3-13

**3.1.6.1 Water Supply ..... 3-13**

*Objective: Ensure the adequate supply and reliable delivery of water to support the domestic, landscaping, and environmental requirements of MCLB. 3-14*

- I. Participate in cooperative watershed planning with Federal, State, and local agencies to ensure that adequate water supplies are available to serve all the Base’s needs, now and in the future....3-14
- II. Reduce use of water for landscaping while continuing to provide a quality living environment to Base personnel....3-15
- III. Promote activities / measures that facilitate the reclamation and reuse of wastewater....3-15

**3.1.6.2 Water Rights ..... 3-15**

*Objective: Ensure protection of water rights to continue the beneficial uses of water on MCLB Barstow. 3-16*

- I. Protect and maintain local surface water rights....3-16
- II. Protect and maintain local ground water rights....3-16
- III. Participate in a regional DoD strategy to protect access of military installations in the desert to a reliable and adequate supply of quality water in the context of increased population growth....3-16

**3.1.6.3 Water Quality ..... 3-16**

*Objective: Protect the quality of MCLB’s surface water for consumptive and landscape uses. 3-17*

- I. Prevent nonpoint-source pollution from on-site sources....3-17
- II. Support all agencies in eliminating all sources of pollution which may contaminate water quality in the Mojave River system....3-18
- III. Cooperate and coordinate with all governmental agencies, including the RWQCBs, to apply measures which will prevent surface and groundwater pollution....3-18
- IV. Prevent point-source pollution from on-site sources....3-18



**3.1.7 Floodplain Management** .....3-18  
*Objective: Protect MCLB personnel and resources in the floodplain from the damaging effects of floods. 3-18*

- I. Accomplish protective measures to avoid or minimize the destructive effects of floods on Base personnel and resources....3-18
- II. Seek to reduce on-Base and off-Base causes of flood damage on MCLB, Barstow....3-18

**3.2.1 Habitat and Ecosystem Management** ..... 3-19  
*Objective: Enhance, restore, and protect the natural diversity and long-term viability of the ecological and evolutionary processes in all natural communities and wildlife habitats consistent with USDOD ecosystem management policy (USDOD 1994). 3-19*

- I. Define habitat values on the Base using ecosystem, landscape ecology, and multi-species concepts....3-20
- II. Establish prescriptions for specific habitat for each vegetation community type....3-20
- III. Consider habitat management and enhancement options....3-20

**3.2.2 Wildlife Inventories** .....3-21  
*Objective: Evaluate the sustainable status of wildlife populations through the gathering of sufficient information to understand the diversity, abundance, and condition of wildlife on the Base. 3-21*

- I. Inventory the diversity, abundance, location, and condition of wildlife species inhabiting the Base....3-21

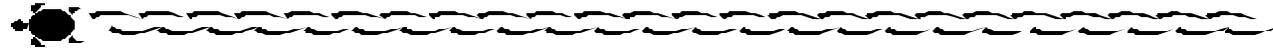
**3.2.3 Sensitive and Endangered Wildlife Species** .....3-21  
*Objective: Manage existing and potential habitat of sensitive wildlife species in order to support and maintain biological diversity and optimum wildlife population levels within areas of sensitive habitat. Strive for maintaining land use flexibility to fulfill mission requirements. 3-21*  
*Objective: Avoid and minimize losses of sensitive species. 3-22*

- I. Avoid impacts by avoiding occupied areas....3-22
- II. Perform site-specific studies prior to development activities to determine the precise mitigation necessary to preserve and enhance biological resources. Emphasis should be given to resources with high biological significance and sensitivity....3-22

**3.2.3.1 Desert Tortoise: Critical Habitat** .....3-22

- I. Protect and manage the creosote habitat preferred by the desert tortoise in the Rifle Range....3-27
- II. Rehabilitate degraded tortoise habitat with native vegetation....3-27
- III. Protect and monitor the status of the MCLB tortoise population....3-27
- IV. Aid environmental education programs on desert tortoise....3-30
- V. Administer the Desert Wildlife Management Area (DWMA) / Critical Habitat to protect desert tortoise habitat and populations....3-30

**3.2.4.1 Migratory Birds** .....3-30  
*Objective: Conserve viable populations of neotropical migratory birds and raptors using the Base for stopover nesting, feeding, and resting. 3-30*



- I. Determine the status, health, and habitat use of neotropical migratory birds and raptors, emphasizing certain target or indicator species not currently considered sensitive....3-30
- II. Protect the sustainability of these bird populations and their habitat....3-31
- III. Stimulate awareness of migratory bird stewardship strategies....3-31
- IV. Enhance suitable urban or native habitats to encourage migratory stopover. Be "migratory bird friendly."...3-31
- V. Preserve and maintain habitat for migratory birds....3-32
- VI. Cooperate with large-scale efforts to research, monitor and manage migratory bird populations....3-32

**3.2.4.2 Mammals.....3-32**

- I. Determine the status of the mammal populations and potential for harboring them....3-32
- II. Conduct general, periodic surveys of small mammals to obtain a comprehensive species list for the property. Gather information on the species as well as their relative abundance....3-32
- III. Ensure that pest management of mammals minimizes harm to the species' population....3-32

**3.2.4.3 Amphibians & Reptiles .....3-33**

- I. Conduct general, periodic surveys for herpetological fauna in order to obtain a more comprehensive list of the species using MCLB....3-33
- II. Determine the population status of listed and sensitive species to support management decisions that fulfill the needs of the military mission while protecting these species....3-33

**3.2.4.4 Invertebrates.....3-33**

- I. Determine the abundance and diversity of invertebrate species on MCLB....3-33

**3.2.5 Animal Damage Control, Feral Animal Removal, Urban Wildlife .....3-34**

*Objective: Protect the Base, its inhabitants, and native species from risk or loss due to wild or feral animal predation or damage. 3-34*

- I. Prevent the risks and potential losses and liabilities from wild or feral animal damage....3-34
- II. Anticipate problems by maintaining intervention protocols....3-34
- III. Educate the public about the damage that can be caused by feral animals....3-35

**3.3 Cultural Resources Management: Archaeological, Paleontological, & Historical .....3-35**

*Objective: Develop a legally defensible, scientifically sound program for stewardship of cultural resources. 3-37*

*Objective: Accomplish mission-related activities with a minimum of delay and maximum flexibility, while protecting the Bases's cultural heritage. 3-37*

- I. Identify and protect important archaeological and historic cultural resources....3-36



- II. Safeguard resources and information to preserve the cultural heritage of MCLB Barstow....3-36
- III. Determine stewardship responsibilities with respect to Native American values....3-36
- IV. Clarify when mission activities and preservation of an eligible or National Register-listed site may be in conflict, requiring an assessment of effects and mitigation measures....3-37
- V. Develop cultural resource outreach programs to enrich local communities and the general public....3-37
- VI. Ensure that significant resources exposed during grading for development and recovered and preserved for their scientific value....3-37

**GOAL 2: Ensure that all uses of MCLB Barstow land are compatible with the military mission and meet environmental compliance responsibilities.**

**4.1 Military Mission and Environmental Compatibility .....4-1**

*Objective: Ensure no net loss of available land and operational carrying capacity for military support while pursuing environmental protection needs.(USDOD 4715.DD-R 1996) 4-2*

- I. All infrastructure shall be aligned to contribute to military readiness....4-2
- II. Enhance planning that links support of the Marine Corps with environmental protection....4-2
- III. Pursue incentive-based conservation planning....4-2

**4.2.1 Construction .....4-3**

*Objective: Ensure military readiness by completing construction projects which enhance and support current or planned operations on MCLB, while minimizing adverse effects to the natural and human environments, to the maximum extent possible. 4-3*

- I. Fish and wildlife conservation shall be considered in all site feasibility studies and project planning, design, and construction. Appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications. (USDOD 4715.DD-R 1996)...4-3

**4.2.2 Routine Maintenance .....4-4**

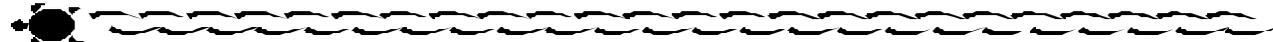
*Objective: Safeguard military readiness by maintaining access and operation of roads, utilities, and other infrastructure to their original design standard or better, while protecting wildlife habitat, sensitive species, soil productivity, watershed functioning, and water quality. 4-5*

- I. Infrastructure shall be aligned to contribute to military readiness and protection of environmental values....4-5
- II. Provide overall management guidelines for maintenance activities while preventing erosion and protecting sensitive natural and cultural resources....4-5
- III. Keep informed and up-to-date on improved methods for preventing environmental impacts during maintenance activities and on revisions in laws, regulations, and policies....4-6

**4.2.3 Emergency Maintenance .....4-6**

*Objective: Anticipate and prevent emergency infrastructure problems to ensure human health and safety while minimizing damage to sensitive resources. 4-6*

- I. As a first priority, prevent emergencies....4-6



**4.3 Landscaping and Grounds Maintenance.....4-7**  
*Objective: Conserve water, protect water quality, reduce runoff and erosion, and decrease plant nutrient loss by reducing the demand for water in landscaped settings. 4-9*

- I. Use landscaping to moderate environmental influences (e.g. solar heat gain, glare, dust, and wind), mitigate human activities (e.g. noise, construction), unify exterior spaces, enhance biological values, and enhance formal/ceremonial activities....4-10
- II. Reduce energy consumption through creativity and planning....4-10
- III. Strive toward an attractive, coordinated visual image of the base to improve morale and present a positive image to visitors and the community through effective landscape design....4-10
- IV. Incorporate water-conserving irrigation practices in landscapes, while controlling salt load in the soil profile. Continue to update and revise water-conserving operation and maintenance procedures....4-11
- V. Set state-of-the-art standards for landscape plant care and maintenance....4-12

**4.4 Leases .....4-12**  
*Objective: Ensure the long-term viability, compatibility and fair-market value of all leases, in conjunction with the military mission and natural resource protection. 4-12*

- I. Set criteria for establishing, continuing or cutting back lease agreements for agriculture....4-12
- II. Certain principles should apply to decisions about non-agency land uses:...4-13
- III. Provide oversight, inspection and monitoring of outgrants for compliance with environmental protection laws....4-14

**4.5.1 Encroachment.....4-14**  
*Objective: Anticipate and protect against additional encroachment on resources available for fulfilling MCLB’s mission and conserving environmental resources. 4-15*

- I. Protect the integrity of the property in consideration of MCLB Barstow’s military mission, natural resource, and economic requirements....4-15
- II. Review existing and anticipate potential conflicts of adjacent land uses with MCLB activities....4-15
- III. Seek public recognition and support for excellent stewardship of the property....4-15
- IV. Identify through markers, fencing, or signage all of MCLB’s boundaries with safety, security, or resource sensitivity concerns to prevent trespassing and other unlawful activities....4-15
- V. Enforce perimeter security....4-15

**4.6 Public Access .....4-16**  
*Objective: Restrict public access to temporary uses which are compatible with the military mission, natural resource responsibilities, safety, and security. 4-16*

- I. Establish clear, coherent policies and procedures for allowing temporary public access to the Base....4-16
- II. Planning for public access shall consider, but not be limited to, the following topics (USDOD4715.DD-R 1996):...4-17

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**4.7 Outdoor Recreation . . . . . 4-17**  
*Objective: Promote compatible, sustainable outdoor recreation opportunities which enhance quality of life for MCLB personnel, while conserving natural resources and accomplishing the military mission. 4-18*

- I. Identify and evaluate outdoor recreation opportunities on MCLB....4-19
- II. Establish strategies and standards for equitable recreational access and management, while protecting natural resources....4-19
- III. Develop, upgrade, and maintain recreational resources and facilities to ensure a safe and quality experience among users....4-19
- IV. Seek strategies for compatible use, sustained yield, and overall protection of natural, cultural and outdoor recreation resources....4-19
- V. Consider recreation opportunities for special interest natural areas that have exceptional resource values and that are otherwise encumbered or military use for other reasons....4-19

**4.8 Off-Road Vehicle Use. . . . . 4-19**  
*Objective: Ensure that off-road travel on MCLB is managed to protect natural resources, promote safety, and avoid conflicts with other property uses. 4-20*

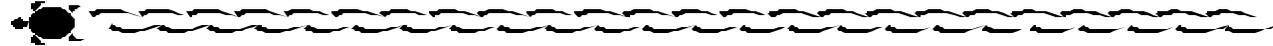
- I. Develop a system of designated routes which ensure that rare natural communities and desert habitat are not damaged....4-20
- II. Eliminate unauthorized off-road vehicle use....4-20

**4.9 Conservation Education and Awareness . . . . . 4-21**  
*Objective: Build a strong conservation ethic and personal commitment to natural and cultural resource stewardship by personnel through the promotion of education and awareness of MCLB’s unique environmental setting and history. 4-23*  
*Objective: Encourage community involvement in environmental education to support the conservation values of MCLB and convey them to visitors, neighbors, and outlying communities. 4-22*

- I. Identify the types of information and conservation practices that need to be communicated to military personnel in order to protect resources and build a conservation ethic....4-23
- II. Develop a multimedia educational program in support of the program objective....4-23
- III. Evaluate the effectiveness of the strategies adopted and adapt them as necessary....4-24

**4.10 Public Outreach . . . . . 4-24**  
*Objective: Showcase MCLB Barstow’s excellent stewardship of natural resources. 4-24*

- I. Become a model of excellence for the Marine Corps with respect to safety, quality, fire and environmental management by obtaining DoN level recognition for excellence....4-24
- II. Identify and evaluate settings and forums suitable for enhancing community involvement, compatible with the military mission and security....4-24



**GOAL 3: Provide the organizational capacity, support, and communication linkages necessary for effective strategic planning and daily administration of this Plan and MCLB’s natural resources.**

**5.1 Land Use and Environmental Planning .....5-1**

*Objective: Ensure land use planning decisions protect the mission of the Base by seeking to resolve land use conflicts. 5-2*

- I. Land use decisions to select among competing uses of Base property shall be based on these principles:...5-3
- II. Develop and sustain the land use planning capability....5-3
- III. Ensure land use plans and planning processes are relevant and useful for the Base’s needs....5-4

**5.1.1 NEPA Planning.....5-4**

*Objective: Conduct planning of mission activities having potential environmental effects by applying NEPA's requirements and policies to enhance the mission-related use and the stewardship of natural resources. 5-5*

- I. Assess the environmental consequences of each proposed action that could affect the natural environment, and address the significant impact of each action through analysis, planning, mitigation, and prevention....5-5
- II. The NEPA planning process should facilitate project planning and integrate project-specific plans with overall land use and natural resource management plans....5-6
- III. Seek categorical exclusions (CatExs) for actions which have been found not to have a significant effect on the human environment....5-7
- IV. Prepare a concise EA when a CatEx cannot be used, or the significance of the impacts are unknown. EAs will follow a generic format containing:...5-7
- V. Ensure the Environmental Impact Statement process is focused on major projects significantly affecting the quality of the human environment....5-8

**5.1.2 Cooperative Planning .....5-8**

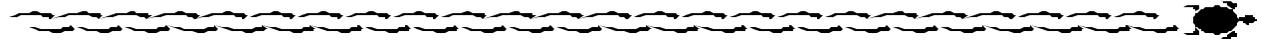
*Objective: Be proactive in cooperative resource planning partnerships to create regional conservation, ecosystem, and watershed solutions of mutual benefit while also protecting the military mission. 5-11*

- I. Encourage partnerships and volunteers to enhance conservation programs whenever practicable. Organize collaborative, environmental problem solving partnerships with non-military stakeholders....5-12
- II. Participate in regional conservation and ecosystem planning efforts, based on the following criteria:...5-12
- III. Support cooperative watershed planning and management through active membership or via coordination with Southwest Division NAVFACENCOM....5-12
- IV. Consult with USFWS and CDFG at least annually to fulfill Sikes Act provisions and related inter-agency cooperative agreements....5-12

**5.1.3 Environmental Permitting and Consultation .....5-13**

*Objective: Comply with all environmental permitting and consultation requirements to assure mission readiness and safeguard the Base’s natural resources. 5-14*

- I. Anticipate the need to consult with USFWS under Section 7(a) of the ESA for any proposed actions on MCLB that may affect listed species....5-14



- II. Ensure compliance with water quality permit requirements if a project may affect wetlands or watercourses....5-15

**5.2 Information Management .....5-15**

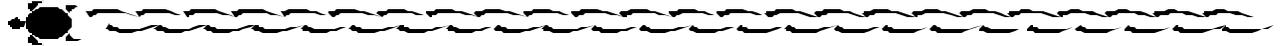
*Objective: Ensure the technically sound, practical and appropriate use of library and computer technology to manage, analyze, and communicate natural resource information in support of management decisions. 5-15*

- I. Seek out and use existing technology and make strategic investments in new technologies and creative, innovative management techniques to solve local or regional environmental problems....5-15
- II. Coordinate the integration of natural resource information with mission-related planning....5-16
- III. Develop procedures to ensure that incomplete information on natural resources does not lead to faulty decisions. Strengthen the scientific basis for natural resources management by integrating research and management....5-16

**5.3 INRMP Implementation .....5-16**

*Objective: Provide the organizational capacity, communications, planning functions, staffing, budgeting, and innovated technology support to ensure compliance with environmental laws, stewardship of natural resources, and continued use of the Base's lands by the Marine Corps. 5-17*

- I. Seek a balanced, multiple-use natural resources program through professional management....5-17
- II. Identify and ensure departments prioritize and allocate funding to support compliance requirements....5-17
- III. Rely on the best science available for understanding ecosystem composition, structure and function, and the impacts of land use....5-17
- IV. Encourage appropriate staff to participate in natural resources management job training activities and professional meetings....5-17
- V. Provide for enforcement of natural resource laws and regulations by professionally trained personnel....5-17
- VI. Provide a management framework to outline specific tasks or tactics in accomplishing the goals and objectives of this Plan, on an annual and quarterly basis. Provide a performance management system for organizing, tracking, measuring and reporting the progress of management efforts....5-17
- VII. Provide further strategic elements, as appropriate....5-17





# 1.0 Purpose and Background

*It is essential to protect the natural resources of Marine Corps Logistics Base (MCLB or Base), Barstow to ensure that it will continue to fulfill its duties as the West Coast Marine Corps Logistics Supply Center. This Integrated Natural Resources Management Plan (INRMP or Plan) is intended to provide the basis and criteria for sound land use and natural resource decisions in support of the mission.*

## 1.1 Purpose of Plan

- This INRMP sets the agenda for managing MCLB's natural resources for the next 5 years.

The purpose of this INRMP is to set the agenda for managing MCLB Barstow's natural resources for the next five years. This INRMP provides conservation and management recommendations within the scope of the military mission. It is written in support of the military mission and in accordance with Marine Corps Order P5090.2A, the *Environmental Compliance and Protection Manual*.

The Plan is intended to:

1. Provide a framework for daily land use and resource management decision-making.
2. Anticipate potential regulatory and management problems with respect to the environment.
3. Communicate land use and resource guidelines.
4. Provide an institutional memory.
5. Provide guidance for and a means of prioritizing annual tasks.

This Plan is set up to be a practical framework to support decisions of the Commanding Officer (CO). Specific management activities may be implemented by the Environmental Division of the Installation and Logistics Department and by various offices involved in MCLB's daily operations.

The INRMP integrates the requirements of natural resources legislation and regulations; Department of Defense (DoD), Department of the Navy (DoN), and Marine Corps policy, and all pertinent Memoranda of Understanding (MoUs) or Agreements (MoAs). It builds on and supersedes the 1982 Natural Resources Management Plan (USDoN, WESTDIV 1982) and integrates existing natural resources documents applicable to MCLB.

## 1.2 Military Mission and Strategic Vision

- MCLB Barstow serves as a primary west coast Marine Corps Logistics and Maintenance Center.

As one of only two logistics bases operated by the U.S. Marine Corps (USMC), MCLB Barstow serves an important role as a primary west coast Marine Corps Logistics and Maintenance Center. Its mission is twofold: to procure, maintain, store, and issue all classes of supplies and equipment; and to repair and rebuild Marine Corps-owned and other DoD equipment. MCLB furnishes supplies for Marine Corps facilities west of the Mississippi and in the Far East.

Secondarily, MCLB is responsible to assure the technical training of Marines, developing and maintaining their skills and job efficiency.



Photo 1-1. AAV Retriever being float-tested at the Nebo testing pond.

The *Strategic Plan* provides the Base's vision for environmental stewardship. Goal 5 of the strategic plan is to "attain full and sustained environmental compliance and protection of our natural, cultural, and historical resources" (USMC, MCLB 1996a). Five strategies outlined to achieve this goal are:

1. Develop and maintain beneficial relationships with the various environmental regulators and community groups.
2. Educate our workforce on the requirements of hazardous material management and on the benefits of waste management programs.
3. Include environmental concerns in all aspects of our decision making processes.
4. Reengineer our processes to prevent pollution and minimize the waste stream.
5. Comply with all applicable environmental laws and regulations within the framework of the Federal Facility Agreement.

## 1.3 Plan Goals

The goals set forth in this Plan are compatible and consistent with the Department of Defense's natural resources program goals (USDoD 4700.4; 32 CFR 190), the goals defined in the Department of Navy Natural Resources Conservation Strategic Plan (USDoN 1994; see Appendix A), and MCLB's *Strategic Plan* (USMC, MCLB1996a).

INRMP goals are addressed in Chapters 3, 4, and 5. They are as follows:

- Environmental Stewardship in Chapter 3.0

**GOAL 1:** Guarantee continued access to MCLB Barstow's land, water, vegetation, and wildlife resources for the military mission, while preserving, protecting, and enhancing natural ecosystems and biodiversity.

- Compatible Uses in Chapter 4.0

**GOAL 2:** Ensure that all uses of MCLB Barstow land are compatible with the military mission and meet environmental compliance responsibilities.

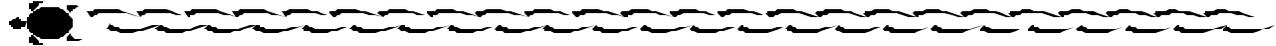
- Planning and Administration in Chapter 5.0

**GOAL 3:** Provide the organizational capacity, support, and communication linkages necessary for effective strategic planning and daily administration of this Plan and MCLB's natural resources.

## 1.4 Location

MCLB Barstow is located in western San Bernardino County, California less than six miles east of the City of Barstow. Map 1-1 depicts MCLB Barstow's regional location. MCLB property consists of approximately 6,165 acres (TDS 1997) in three parcels: Nebo, the Yermo Annex and the Rifle Range.

Nebo and Rifle Range are partially adjacent to one another, with Nebo located northwest of the Rifle Range. The Yermo Annex is less than three miles east of Nebo. The vicinity map (Map 1-2) shows the orientation of the parcels. Interstate 40 extends through Nebo and along the northern boundary of the Rifle Range, providing the primary access route. Yermo can be accessed by Interstate 40 from the south or Interstate 15 from the north, along Daggett-Yermo Road. Historic Route 66 parallels Interstate 40 and passes alongside Nebo, the Rifle Range, and Yermo boundaries.



There are three San Bernardino county communities near MCLB: the City of Barstow and the towns of Yermo and Daggett. Barstow is the largest city in the vicinity, providing the majority of the civilian work force and housing for MCLB and Fort Irwin to the north. Since 1975 the Barstow area has experienced rapid expansion, with the City of Barstow alone achieving a 26% increase in population since 1980. The City of Barstow's 1998 population approached 22,700 and is projected to grow 2 - 3% per year, reaching approximately 37,000 people in 2020 (City of Barstow 1997 citing California Department of Finance January 1, 1996). Future growth is contingent upon the City's ability to obtain additional water and the region's market conditions.

The towns of Yermo and Daggett are small communities with negligible growth potential. Yermo is northeast of the Yermo Annex, consisting of a few residences and some commercial buildings. Daggett is the smallest of the nearby communities, situated at the junction of Union Pacific and Burlington Northern & Sante Fe (BNSF) (formerly AT&SF) Rail Lines. This community is comprised of a few residences located off of old Route 66.

- As the West Mojave desert is increasingly used for commercial, industrial and urban development, preservation of the extensive existing natural resources will continue to be a high priority.

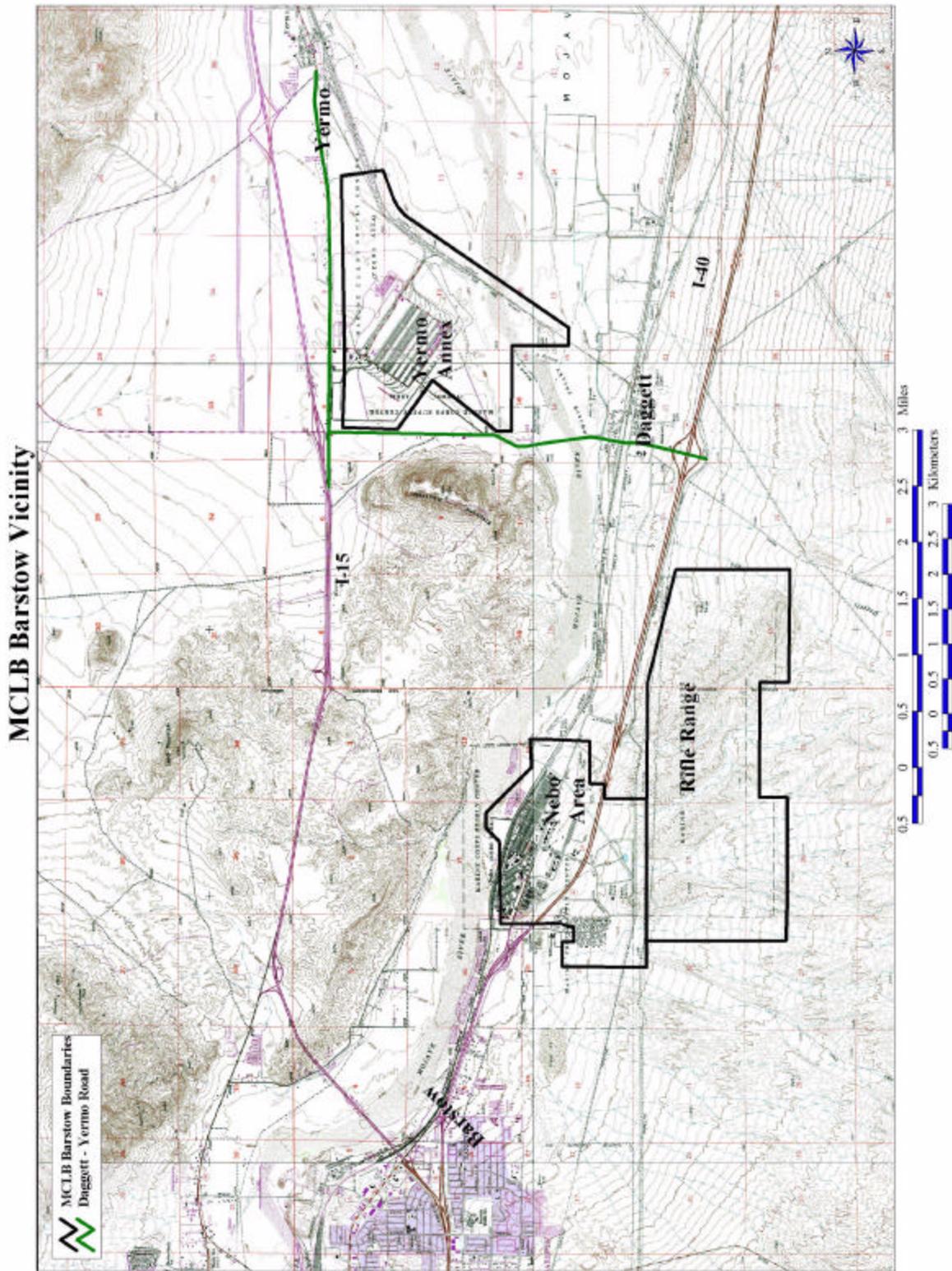
Emphasis for future development in west Mojave communities is on increasing density and in filling existing open spaces and undeveloped areas. With this region being a focus for desert recreation activities, preservation of extensive existing natural resources will continue to be a priority of governing agencies and the local population.

Adjacent open space lands are primarily administered by the U.S. Bureau of Land Management (BLM) and are used as open space reserve. Map 1-3 shows the property ownership of lands surrounding MCLB. Other nearby uses include a quarry near Nebo, older commercial development along the old Highway 66 west of the Nebo facility, and a county airport near the Yermo Annex.

### MCLB Barstow Regional Context



Map 1-1. MCLB Barstow's regional context.



Map I-2. MCLB Barstow vicinity map.

## 1.5 Historic Land Use

### 1.5.1 Pre-Military Use

#### *Indian and Immigrant Trails*

Early use of the lands that are now part of MCLB Barstow centered along the Mojave River. Trails which run through the Mojave desert and along the Mojave River have experienced a unique and evolving history of use. Native Americans developed an immense trail system through southern California, including a trail along the Mojave River which crosses Nebo and Yermo and probably predates the historic Ute, Mojave, Chemehuevi, and Paiute Indians. European occupation of coastal southern California in 1769 sparked an interest in the vast, unknown territories of the West. As a result, traders, trappers, and other travelers and explorers made their way through the area.

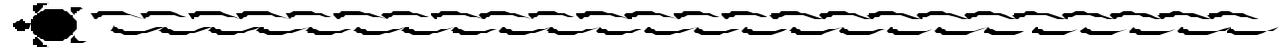
- Two well established routes passed through what are now MCLB lands, the Old Spanish Trail, later known as the Mormon Trail (or the Salt Lake route), and the old Indian Mojave trail, converted in the 1850s to the old Government Road of Fort Mojave.

The portion of the Mojave River that crosses through MCLB properties was heavily traveled by immigrants. Two well established routes passed through what is now MCLB land, the Old Spanish Trail, later known as the Mormon Trail (or the Salt Lake route), and the old Indian Mojave trail, converted in the 1850s to the old Government Road of Fort Mojave. The Old Spanish Trail/Mormon Trail extended southwest out of Nevada, crossing the southeast boundary of today's Fort Irwin, moving due south as it hugged the eastern border of the Calico Mountains, eventually crossing the Mojave River just a few miles east of Yermo to meet up with the Old Mojave/Government Road trail which ran along the south side of the river.

The Old Spanish Trail, which linked Santa Fe, New Mexico to Los Angeles, served as a major trading route during the period of European expansion into the West, crossing New Mexico, Colorado, Utah, Arizona, and southern Nevada before entering California. The trail was established in response to Spanish authorities' desire to link the new southern California settlements with their older colony in New Mexico. Between 1777 and 1829, a series of short cuts were developed to bypass the longer, less direct routes that spanned the six states. In 1830, George C. Yount and William Wolfskill traveled the entire length of the route that came to be recognized as the Old Spanish Trail. As a major trading route for New Mexican traders, pack trains with as many as one hundred traders would set out from Santa Fe in annual caravans to exchange woolen goods for the horses and mules of southern California's missions and ranchos.

The Old Spanish Trail was regularly used from 1830 to 1848 by New Mexican traders and occasional travelers such as fur trappers, entrepreneurs, government agents, and settlers. In 1848 the Mormons developed the western portion of the trail, from Salt Lake City to Los Angeles, for wagon use. Wagons began to replace the traditional caravans and parties of travelers that made up the majority of pack trail users. The Mormon Trail, as it came to be known, provided a route for wagon trains of American settlers moving west in the 1850s.

Following European arrival, the Mojave Indians used the route known as the Indian Mojave Trail for commercial expeditions. They also guided many travelers and explorers along this route, including a Franciscan priest, Francisco Garces, who made the journey in 1776. Francisco Garces' journal provides the



- Founded in 1865, Fish Ponds Station (located on present day Nebo) served as a stage stop for travelers of the old immigrant trails and remained active until about the turn of the century.

first documented evidence of exploration through the Barstow area, detailing his search for an immigration route from southern Arizona to the Spanish missions in California and a trading route to link the missions in New Mexico.

In the 1860s, Anglo pioneers settling along the Mojave River constructed way stations for stage lines, freighters, travelers, and miners. These stations were strategically located near the Mojave River at points where water was forced to the surface as a river or springs. Fish Ponds Station, located on present-day Nebo, was one of these infant establishments. Founded by Lafayette Meacham in 1865, Fish Ponds Station served as a stage stop for travelers of the old immigrant trails and remained active until about the turn of the century (Baltazar 1995). The flood of 1938 washed out many of the remaining structures erected along the Mojave river, including Fish Ponds Station.

From 1860 to 1871, a series of small forts were established along the Mormon Trail and the old Government Road to protect anglo travelers crossing the Mojave Desert and opened the desert to commercial developments. One of these forts, Camp Cady, located several miles downstream of Daggett, was used by an Army Battalion to ward off Indian attacks. In 1868 a new route to southern California was established north of Blythe, reducing traffic along Mojave Road.

### ***Railroads***

These early trails were essentially rendered obsolete for commerce with the coming of the railroads in the 1880s. Underscoring United States expansionist policies that arose in the mid-1840s, there was a push to develop rail lines that would span the continent from the Mississippi River to the Pacific Ocean. The first mainline to cross this area was built by the Southern Pacific Railroad in 1882-83, as part of its Colorado Division from Mojave to Needles. Tracks extended into Barstow (Waterman Junction) and Daggett (Calico Station) by 1882, linking up with Atlantic and Pacific Railroad Tracks at Needles in 1883.

- The introduction of rail lines in the region transformed commerce, mining, and other businesses and was a significant factor in the siting of the military base that is now MCLB, Barstow.

An important component in the area's growth and land use was the introduction of rail lines which connected Los Angeles and other southern California towns to the commerce, mining, and growing business ventures in the west Mojave. This was accomplished in 1889 as the Atchison, Topeka, and Santa Fe Railway Company joined its National City tracks, which wound north through Cajon Pass, with the transcontinental line in Barstow.

### ***Mining***

Prior to the establishment of the railroad, early prospectors of the region were making claims as early as the mid-1860s, but the cost and difficulty of mining coupled with a scarcity of water and food sources limited large scale mining ventures. It wasn't until the 1880s that silver mining and the resulting Calico Mining District became profitable, bringing in hundreds of prospectors to the region. Up to this time, the area was inhabited by only a few prospectors, farmers, and ranchers. This boom in silver mining lasted until 1893 when the Sherman Silver Purchase Act was revoked and the financial panic of 1893 contributed to a decline in silver prices (Baltazar 1995). When silver lost its value, the focus was shifted to the mineral wealth available from non-metallic minerals, specifically borax.

### *Grazing*

- It is believed that all three MCLB parcels were grazed by sheep at one time, but activity was probably concentrated near the Mojave River.

The Nebo Sheep Company was established over a century ago by Mormon settlers. It is believed that all three MCLB parcels were grazed by sheep at one time, but activity was probably concentrated near the Mojave River. Water diversion canals in the Nebo parcel, thought to be due to sheep ranching or mining activities east of the site (Gleason, pers. comm. 1996), have resulted in the collection of water and vegetation adapted to waterlogged conditions.

### **1.5.2 Historic Military Use**

Nebo was constructed in 1942 by the U.S. Navy. It was originally planned as a Naval Supply Depot but was turned over to the U.S. Marine Corps that same year, to be maintained as a supply staging site for Fleet Marine Forces as part of the war effort. By 1945 the Marine Corps Depot of Supplies had outgrown its facilities in the Nebo area. In 1946, two thousand acres belonging to the U.S. Army were annexed to the U.S. Marine Corps Depot of Supplies' Nebo facility becoming what is now the Yermo Annex. The Rifle Range was acquired in 1955 in three portions (USDoN, WESTDIV 1988). The purpose of this acquisition was for Marines to practice and improve their marksmanship skills.



*Photo 1-2. Nebo as seen from above in July 1943, built alongside old Highway 66.*

## 1.6 Facilities and Current Land Use

### 1.6.1 Facilities

MCLB Barstow facilities are used by approximately 230 military, 1,550 civilian, and over 150 tenant personnel with an annual budget of \$147 million (USMC, MCLB 2000). The Base supports a variety of land use functions, including the rifle range, administration, housing, community support, utilities, and supply, repair and maintenance facilities. In addition to permanent Base functions, MCLB provides facility support for 13 tenant activities and visiting rotational troops from other DoD bases.

Tenant commands at MCLB Barstow include (USMC, MCLB 1996b):

- Human Resources Office-West
- Defense Distribution Center
- Resident Officer in Charge of Construction
- Defense Reutilization & Marketing Office
- Branch Clinic Naval Hospital
- Dental Clinic
- Defense Commissary Agency
- Defense Automated Printing Service
- NASA
- Movement Control Center
- Southern California Veterinary Service Support District
- Naval Sea Systems Command

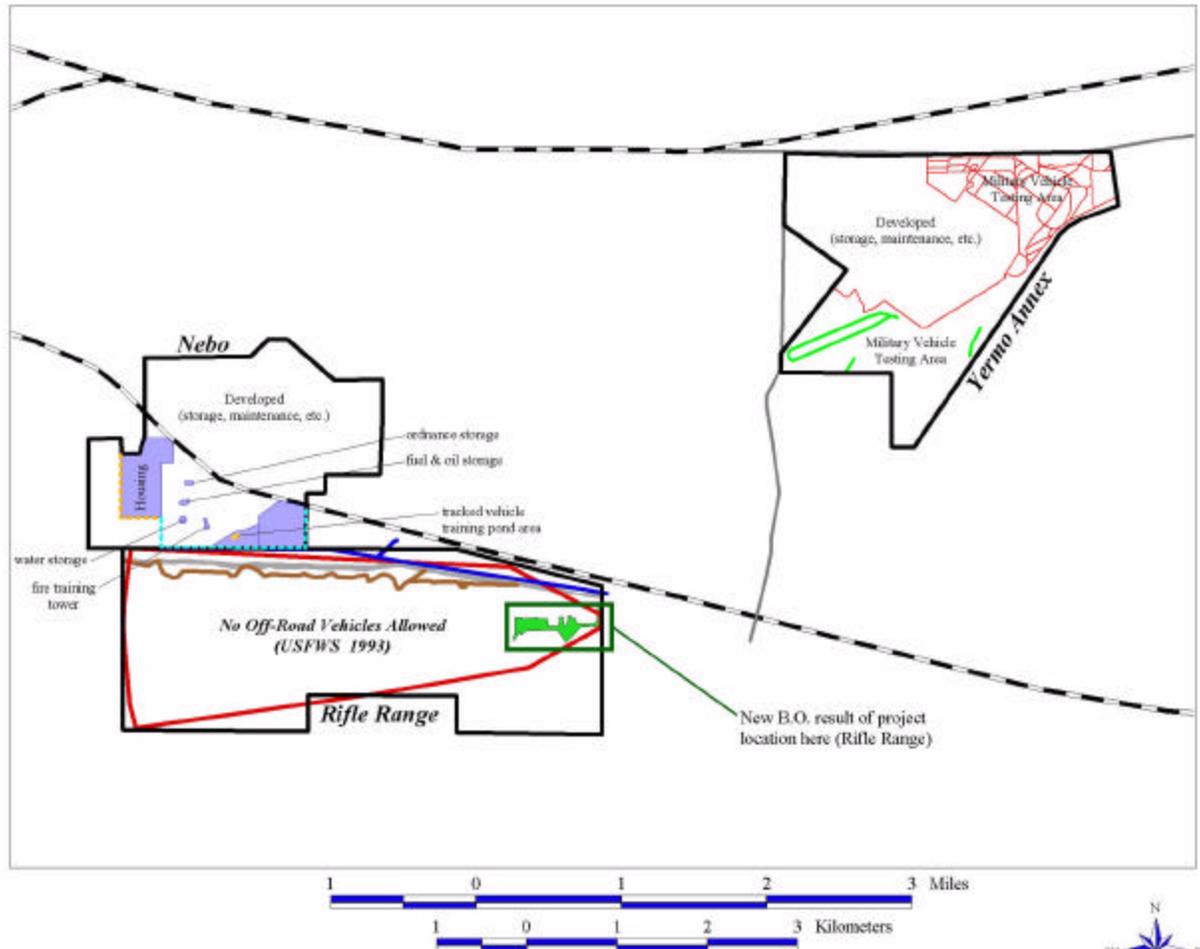
Nebo, Yermo Annex, and the Rifle Range properties cover 6,165 acres (TDS 1997) held in fee title by the Department of the Navy. (See Table 1-1 for a parcel acreage breakdown.)

*Table 1-1. Real Estate summary.*

Parcel	Acres
Nebo	1868.08
Yermo Annex	1859.42
Rifle Range	2438.30
Total Real Estate use by MCLB	6165.80

Source: Tierra Data Systems acreages generated from GIS coverages.

### MCLB Barstow Operations & Facilities



- |   |                                 |   |   |
|---|---------------------------------|---|---|
|  | Tracked vehicle test track      |  | MCLB Barstow Boundaries                     |
|  | Vehicle testing tracks          |  | Highways                                    |
|  | Trail                           |  | Daggett - Yermo Road                        |
|  | Rifle range                     |  | Rifle range access road                     |
|  | Range Safety Clear Zone         |  | Utility corridor                            |
|  | Nebo Facilities (south of I-40) |  | Proposed/recommended tortoise-proof fencing |
|  | Tracked vehicle training pond   |  | Existing Tortoise-proof Fencing             |

Map I-3. MCLB Barstow operations.

## 1.6.2 Current Use

MCLB's location makes it uniquely suited to serve its DoD desert counterparts. Logistically, MCLB Barstow is an important military hub because it is situated at the intersection of major rail lines and highways. Its capacity to handle materials and large vehicle repairs reinforces its usefulness to nearby MCAGCC Twenty-nine Palms and Fort Irwin National Training Center. Map 1-3 shows MCLB Barstow's current land use and operations.

- Logistically, MCLB Barstow is an important military hub because it is situated at the intersection of major rail lines and highways.

Desert conditions enhance MCLB's mission as a storage and warehousing facility. Low humidity and limited yearly rainfall significantly reduce mold, rust, and mildew damage to equipment. Most materials are stored outdoors, reducing the need for costly warehouses.

Nebo is used for storage, maintenance, and infrastructure support purposes such as administration, housing, and community facilities. Approximately 25% of Nebo is undeveloped open space (USDoN, WESTDIV 1988). Burlington Northern and Sante Fe Railroad runs east-west connecting Needles and Barstow, crossing the northern portion of Nebo. This route passes just north of the main warehousing facilities, south of the Mojave River (see Map 1-2).

Yermo supports two primary functions: storage and repair. The majority of Yermo acreage is used for warehousing and open storage facilities. It also supports a major maintenance depot, as well as administration and salvage operations. Outside the main gate is a military vehicle testing ground used in conjunction with the repair facilities. Union Pacific Railroad runs along the southeast boundary of the Yermo Annex, crossing the Mojave River. Yermo also has extensive rail facilities (approximately 25 track-miles) to transport supplies internally (USDoN, WESTDIV 1988).

The Firing Range is dedicated to range activities, with rifle and pistol ranges to train Marines in marksmanship. The majority of the Rifle Range is open space, serving as a range safety buffer zone. A utility corridor runs east-west along the northern boundary of the Rifle Range.

- The Army moves 12 troop unit rotations through the Yermo Annex each year. These rotations dramatically increase the number of personnel who require use of the Base's facilities and services.

Troop rotations through MCLB dramatically increase the number of personnel who require the use of Base facilities and services. The Army's National Training Center at Fort Irwin, 35 miles north of Barstow, is the only facility in the United States where Army and National Guard units have the space and topography for realistic battlefield training. In support of its mission, the Army moves 12 troop unit rotations through the Yermo Annex each year. Each unit arrives and is off-loaded for training, then backloads for transit back to its home base. A total of nearly 2,000 railcars and 8,000 vehicles move through the Yermo Annex annually. The rail cars use nearly all sidings, vehicles are off-loaded on the west end and are staged in convoys in the northwest corner of the base.

The conversion of Fort Irwin Military Reservation to a National Training Center for desert warfare had a significant impact on MCLB's activity levels. Increased rail traffic and bivouacking during the Army's troop rotations constitute MCLB's peak periods of operation. Troop rotations are anticipated to continue at current levels. If Fort Irwin fulfills its expansion plans, the traffic volume would probably increase by a third.

## 1.7 Land Use Planning and Decision-Making

### 1.7.1 Military Directives

- The Marine Corps is required by law to provide a balanced and integrated program of stewardship for its natural resources. The legal context under which natural resources are managed is becoming increasingly complex.

Marine Corps Order (MCO) P5090.2A, *Environmental Compliance and Protection*, requires the Marine Corps to use stewardship and ecosystem management principles as a basis for land use planning and management on Marine Corps installations. Marine Corps policy “shall be to act responsibly in the public interest to restore, improve, preserve, and properly use natural resources on Marine Corps-administered lands. There shall be a conscious and active concern for the inherent value of natural resources in all Marine Corps plans, actions, and programs” (MCO P5090.2A).

The Order stipulates that the contents of an Integrated Natural Resources Management Plan include management of land, forest, fish, wildlife, endangered species, outdoor recreation, migratory birds, wetlands, floodplains, and off-road vehicles. The plan must also conform with guidelines and standards of the Real Estate Procedure Manual (NAVFAC P-73, 50 CFR 17.11 and 17.12, 32 CFR 265, and 16 USC 703-711).

Other pertinent MCOs, Instructions and MOUs or MOAs which guide land use decision-making are cited in the References section and Appendix B. Some principle joint agreements governing Base land use are provided in Appendix C.

### 1.7.2 Federal Statutes

Table 1-2 describes the most pertinent Federal statutes which affect the operation of MCLB Barstow. Descriptions of these and other applicable laws as well as DoD and DoN regulations are included in Appendix B. These laws may constrain land use decisions on the Base.

Table 1-2. Pertinent Federal statutes.

Clean Air Act (42 USC §§ 7401 et seq.)
Clean Water Act (as amended; 33 USC §§ 1251 et seq.)
Endangered Species Act (as amended; 16 USC §§ 1531 et seq.)
Fish and Wildlife Conservation Act of 1980 (16 USC §§ 2901 et seq.)
Fish and Wildlife Conservation on Military Reservations Act (amended Sikes Act; 16 USC § 670)
Fish and Wildlife Coordination Act (16 USC §§ 661 et seq.)
Floodplain Management (Executive Order 11988)
Migratory Bird Treaty Act (16 USC §§ 703 et seq.)
Military Construction Authorization Act -Military Reservation and Facilities-Hunting, Fishing and Trapping (10 USC § 2671)
National Environmental Policy Act of 1969 (42 USC §§ 4321 et seq.)
Sikes Act (Conservation Programs on Military Reservations, 16 USC §§ 670 et seq.)

### 1.7.3 Roles and Responsibilities

- The CO is responsible for ensuring that activities and operations on Base fully comply with Federal, State, and local laws/regulations, and with written DoD, DoN, and Marine Corps policy.

The CO of MCLB Barstow reports to the Commander, MCLB Albany, Georgia for administrative and facilities support. Figure 1-1 shows the military chain-of-command for MCLB Barstow. The CO and Executive Officer administer the Facility, while other departments are involved in providing support to all users, including tenants and transients.

The CO is responsible for ensuring that activities and operations on Base fully comply with Federal, State, and local laws/regulations, and with written DoD, DoN, and Marine Corps policy. The CO is charged with 19 tasks under the *Environmental Compliance and Protection Manual* (MCO P5090.2A) to oversee the natural resources program and ensure the ability to carry out the military mission. The Environmental Division of the Installation and Logistics Department advises the CO and land managers on natural resources concerns.

Oversight of the Base's environmental excellence programs will be provided by a new Environmental Excellence Working Group (EEWG) that is being chartered. The EEWG will have approval authority for proposed environmental excellence projects and programs. The EEWG will:

- Increase organization efficiency by including pollution prevention in all aspects of our decision making.
- Ensure the environmental education of our workforce through the Comprehensive Environmental Training and Education Program (CETEP).
- Improve environmental relationships through effective communication.
- Enhance compliance with all applicable environmental laws and regulations.
- Produce and provide policy and guidance.
- Promote conservation of resources and preserve the reputation of the Marine Corps.

Membership includes personnel from the Installation and Logistics Department (Environmental and Fire Divisions), Fleet Support Division, Defense Reutilization and Marketing Office (DRMO), AFGE, and Resident Officer in Charge of Constructions (ROICC).

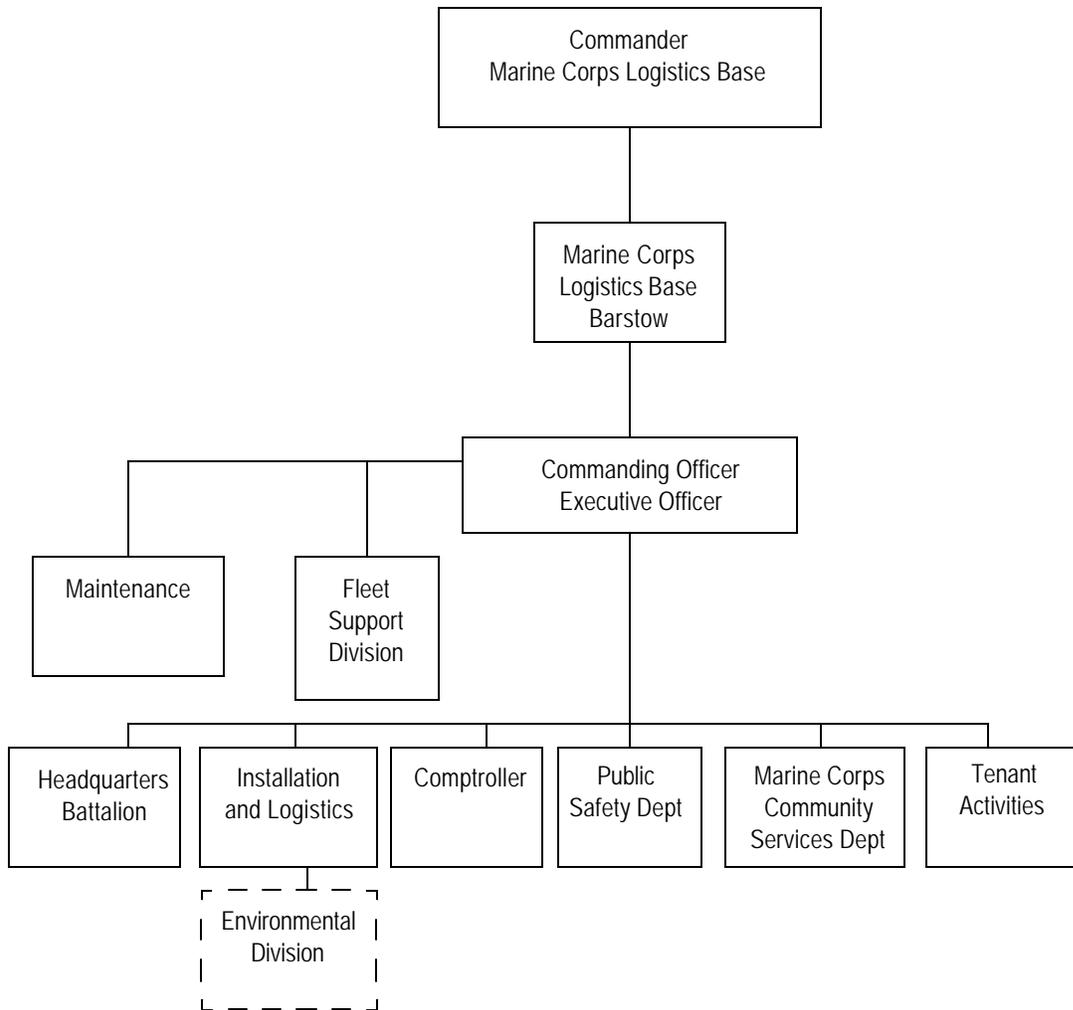


Figure 1-1. Relationship of the Environmental Division to other MCLB Barstow organizations.

## 1.8 Key issues

While this Plan covers a range of natural resources responsibilities, key issues will drive the degree of emphasis placed on components of the Plan. This list identifies those concerns that need special emphasis. These issues are not in any order of priority.

- See Desert Tortoise management strategies in Section 3.2.3.1.
- See Section 3.1.6.1 Water Supply and Section 3.1.6.3 Water Quality.
- See Section 3.2.4.1 Migratory Birds.
- Base planning strategies must consider the desert tortoise, a federally threatened species, to ensure that individuals and habitat are adequately protected. Critical tortoise habitat identified in the southern portion of the rifle range should be specifically addressed.
- Water resources management requires a regional approach to secure adequate water quality and supplies for MCLB's current and future needs.
- Migratory bird planning could be a focus for environmental excellence. Implementation of migratory bird management strategies would show MCLB's desire to protect and enhance regional and Base ecosystems.

## 1.9 Strategic Design of the Plan

### 1.9.1 Planning Definitions and Hierarchy

The overall strategy for resolving these key management issues, as well as other issues, is addressed throughout this Plan using a hierarchical format, starting with very broad, long-term statements and ending with specific, short-term methods. As depicted in Figure 1-1, the broadest statement is a GOAL, which is an enduring, visionary description of where one wants to go. The GOAL focuses on the 20-year horizon and beyond. A GOAL is not necessarily completely obtainable (see Table 1-3 definitions).

- The INRMP strategy for resolving key management issues is defined through a hierarchical format, starting with very broad, long-term statements and ending with specific, short-term methods.

Under each GOAL are many OBJECTIVES. An OBJECTIVE is a more specific statement that describes a desired condition which may or may not be measurable, and should last for at least five to ten years. Each natural resource subject discussed in the Plan usually has an objective for guidance.

The ways and means chosen to achieve the OBJECTIVES are "strategies" in the narrowest sense. POLICIES are the formally-adopted strategies or decisions to carry out a course of action. Different levels of policy exist, ranging from broad (1st-level) to narrow (2nd- or 3rd- level) detailed statements of action. Under each OBJECTIVE are many POLICIES at each level.

Below the POLICY level are individual TASKS, which can describe the specific steps, practices or methods to get the job done. These statements are usually short-lived and need to be updated annually to tie into budgeting needs. To be effective, each task must be directed toward accomplishing a particular policy. TASKS should not be a "wish-list" of projects that do not fit in the Plan's scheme.

- The Plan's Goals, Objectives, and Policies should help provide the consistency and coordination needed among MCLB personnel involved at all levels of daily decision-making.

The purpose of this hierarchy is to give direction to everyday decisions about MCLB's use and management of its natural resources. The Plan's Goals, Objectives, and Policies should help provide the consistency and coordination needed among Base personnel involved at all levels of daily decision-making.

Table 1-3. Planning definitions.

Hierarchy	Definition
Goal	Broad statement of intent, direction and purpose. An enduring, visionary description of where you want to go. A goal is not necessarily completely obtainable.
Objective	Specific statement that describes a desired condition. Can be quantitative or qualitative. Should be good for five years or so.
Strategy	Explicit description of ways and means chosen to achieve objectives.
Policy	Formally-adopted strategy or decision to carry out a course of action.
Task/Activity/Method	Specific step, practice or method to get the job done, usually organized sequentially with time lines and duty assignments. These go out of date quickly, and should be updated annually.

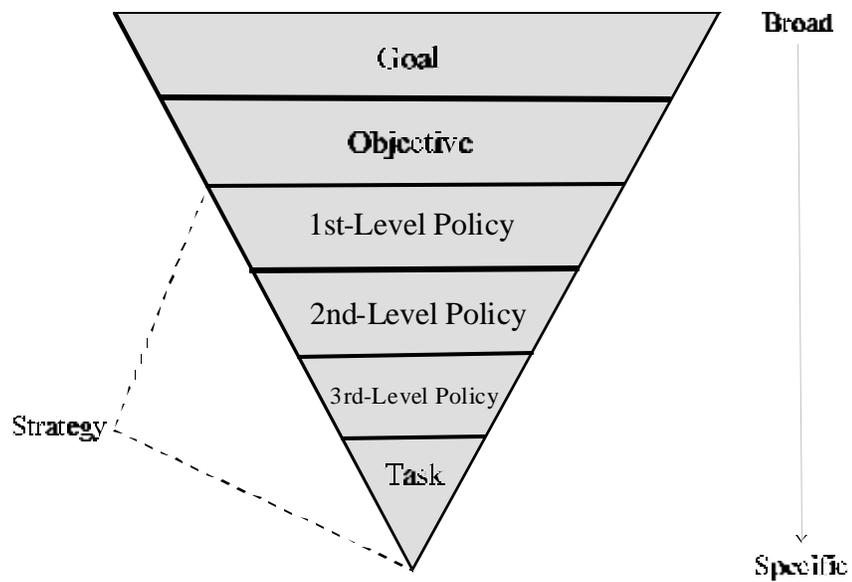
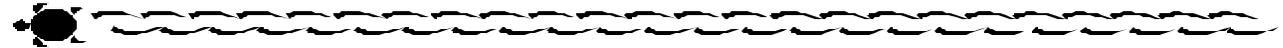


Figure 1-2. Management planning hierarchy and strategy development.



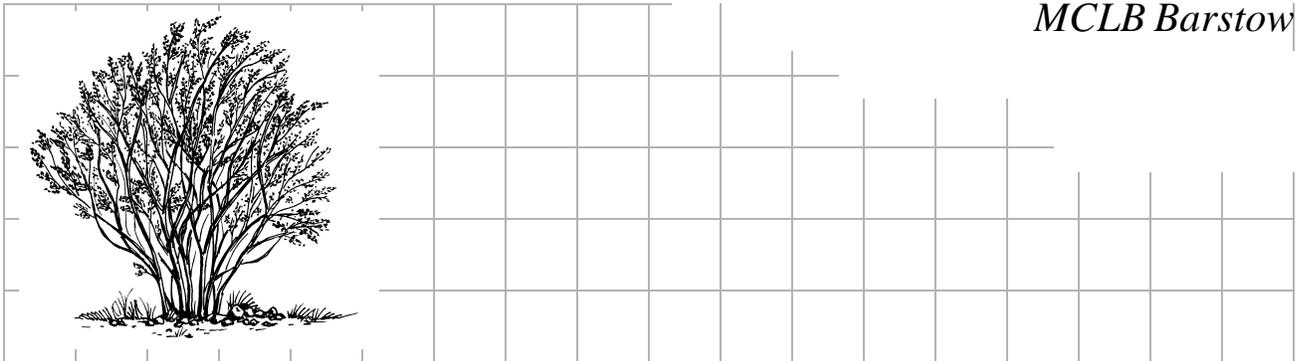
## 1.9.2 How to Use This Plan

- This INRMP will require regular revision to remain current and relevant.

This Plan is intended to be dynamic, and it will require regular revision to remain current and relevant. Its loose-leaf format provides for changing or updating as frequently as needed. Entire sections or individual pages can be removed and replaced. New sections can also be appended. Examples of updates include new mission activities, additional sensitive species listings, new laws and regulations, or revised management techniques.

This INRMP can also be used to provide off-Base agencies and organizations with an understanding and appreciation for MCLB's strategy for natural resource and land use issues of mutual concern.

While policies referenced in this document were derived from many sources, citations are only made for those directly derived from Federal or State laws; DoD, DoN, and Marine Corps policies; or Biological Assessments (BAs) and Opinions (BOs) for which conditions stand as of the date of this document.



## 2.0 Natural Resource Setting

*MCLB Barstow is distinguished by the unique combination of physical, biological, and cultural resources which make up its distinct, natural environment. A working knowledge of MCLB's natural resources is key to making sound land use and natural resources decisions.*

### 2.1 Regional Summary

MCLB Barstow lies on the western plain of the Mojave Desert which slopes gently eastward from the southern end of the Sierra Nevada Mountains toward the Colorado River. The western Mojave Desert is a wedge-shaped basin with boundaries roughly defined as lying between two major California fault lines, the San Andreas to the south and Garlock to the north. It is a shrub-dominated desert that is delineated floristically by the approximate range extension of the conspicuous, tree-sized yucca, the Joshua tree.

- Encompassing what may seem barren, uninhabitable lands, the Mojave Desert is actually host to over 750 plants, of which 22 are endemic to the Mojave.

Considered part of the high desert, the majority of the west Mojave lies at elevations ranging from 2,000 to 4,000 feet. The Mojave is a hot, arid desert which acquires precipitation primarily in the form of winter rain with higher elevations occasionally receiving snow. The area is a transitional zone between the hotter, more arid Colorado desert to the south and the cooler Great Basin desert to the north. Encompassing what may seem barren, uninhabitable lands, the Mojave Desert is actually host to over 750 plants, of which 22 are endemic to the Mojave.

The Mojave is an alluvial filled basin with a rich geologic history. The topography is characterized by low, isolated hills and mountain ranges separated by expanses of arid basins and valleys. Alluvial materials eroding from the upper regions of the desert mountains have contributed to the build-up of alluvial fans and bajadas at their bases. Dry washes are a common feature of the landscape, winding down the slopes of the desert ranges into adjacent valleys and basins.

- The dry climate, relative isolation, and strategic location have made the western Mojave Desert an ideal place for MCLB to fulfill its mission requirements.

- An estimated tripling of the population levels is expected in the West Mojave in the next 20 years, with future urban development concentrated in communities already established along the Mojave River such as Barstow.

- The Rifle Range of MCLB contains approximately 520 acres of designated critical desert tortoise habitat.

The dry climate, relative isolation, and strategic location have made the western Mojave Desert an ideal place for MCLB to fulfill its mission requirements. Low humidity and limited yearly rainfall significantly reduce mold, rust, and mildew damage to equipment, allowing most materials to be stored outdoors. Away from large urban centers and situated at the intersection of major rail lines and highways, MCLB is easily accessible and able to handle the frequent material shipments and equipment repairs for its DoD counterparts.

Lands of the west Mojave Desert support a variety of uses, including urban development, military training, grazing, agriculture, utility transmission corridors, alternative energy farms, mining, and recreation. Rapid growth in nearby Los Angeles, Orange, and Riverside counties has contributed to an increasing demand for community development and resource utilization in the west Mojave. An estimated tripling of the population levels is expected within the next 20 years, with future urban development concentrated in communities already established along the Mojave River, such as Barstow.

MCLB contains prime habitat for the federally threatened desert tortoise whose range extends through the Mojave and Sonoran deserts. A notable decline in numbers lead to the Mojave population of desert tortoise being listed as federally threatened in 1990. The decline of the population is mainly attributed to a loss of habitat, disease, and human predation. Loss of habitat is primarily a result of urbanization and agricultural development. The Rifle Range of MCLB contains approximately 520 acres of land designated as critical desert tortoise habitat.

## 2.2 Physical

### 2.2.1 Climate

- The rapid heating and cooling of desert soils allows for high temperatures by day and cool temperatures by night.

MCLB experiences an arid desert climate characterized by hot, dry summers, warm springs and autumns, and mild winters. Typical of a desert climate, the area is further distinguished by low yearly rainfall, high evaporation, and strong winds. Weather patterns are largely uniform except for differences in localized wind patterns.

The San Gabriel/San Bernardino Mountain Ranges prevent the intrusion of cool, damp air from the marine-influenced southern California coast. The desert's characteristic lack of cloud cover allows solar radiation levels to be extremely high, which contributes to the rapid heating of soils during the day. Clear skies also facilitate quick cooling of the desert surface at night, as thermal energy is readily radiated skyward. This rapid heating and cooling results in high temperatures by day and cool temperatures by night, with daytime and nighttime temperatures varying as much as 50 degrees or more.

In addition to daily temperature fluctuations, Barstow experiences seasonal and yearly variations. Daytime temperatures of at least 90°F occur most days from June through September, while winter temperatures average in the mid-40s and 50s. A record high of 116° F was registered in July 1972. The lowest temperature on record is 3°F in January 1963. Frosts are generally light and infrequent with an average of 58 days falling below freezing annually.

- Summer thunderstorms are generally brief, intense localized showers, creating rapid runoff which can result in flash flood conditions.

Precipitation is received primarily as winter rains, and rarely snow. In winter, storms originating from the Pacific Ocean dissipate as they move inland and eastward, losing energy as they come up against the rain shadow. Winter precipitation falls predominantly as low intensity, prolonged rainfall, extending over large areas at a time. Barstow averages 4 inches of precipitation annually, with the majority received between November and March. The greatest monthly total was 2.82 inches which fell in February 1980.

Summer rains are infrequent, occurring about three days each year, usually in the form of thunderstorms. The showers tend to be brief, intense and localized. They quickly wet the soil surface during the first few minutes, making the soil repellent to additional water. This rapid runoff may result in flashfloods, or a high level of erosion with an inability of water to get to the root zone to nourish plants. Periodically, these episodes of intense rainfall create flashflood conditions in the Mojave River and intermittent washes near MCLB. The heaviest one-day rainfall was 1.76 inches at Barstow on July 29, 1958.

Figure 2-1 illustrates the disparity between rainfall and evaporation in the nearby community of Victorville. Victorville precipitation is slightly higher than in Barstow, averaging 5 inches annually, with Victorville receiving more early-winter rains. The area between the two curves represents the moisture deficit that is characteristic of the Mojave Desert. Intense solar radiation, gusty winds, and hot temperatures are all factors which contribute to the high rate of evaporation.

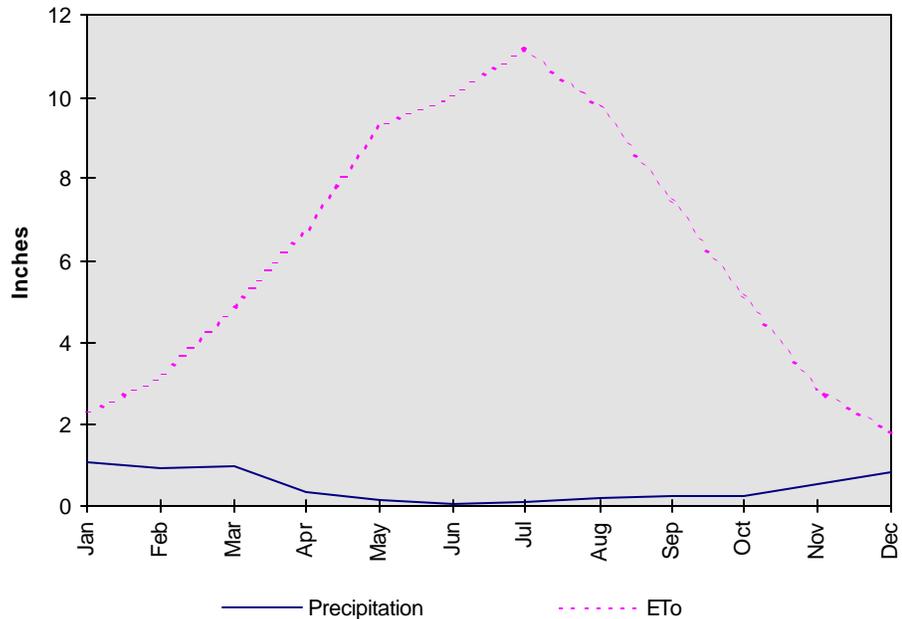


Figure 2-1. Rainfall vs. normal evapotranspiration for Victorville.

- MCLB experiences relatively strong winds throughout the year. Sand and dust churned into the air at these times cause air quality problems and are a nuisance to human activities.

MCLB experiences relatively strong winds throughout the year. Winds are predominantly from the west, products of storm fronts moving in from the Pacific Coast. Near Barstow, average annual windspeed approaches 11 miles per hour (mph) (Jacobs Engineering Group 1995 citing CARB 1975 and RADIAN 1988). Extreme winds exceeding 40 to 50 mph are not uncommon over the course of a year, with some gusts of up to 65 mph. Sand and dust churned into the air at these times cause air quality problems and are a nuisance to human activities.

Average windspeed is highest in summer. Strong summer winds are bolstered by the uneven heating of the desert floor and rapid temperature changes. The resulting atmospheric convection causes the desert air to move rapidly from place to place. This mechanism is less effective during cooler winter months when daily temperature ranges are smaller.

## 2.2.2 Topography

MCLB lies in a large, alluvial valley along the Mojave River that is surrounded by a series of low, desert mountain ranges. The Mojave River Valley, extending east and west of MCLB, is bound to the north and northwest by the Mitchell Range and Waterman Hills. The Calico Mountains, to the north and east, approach within a few miles of Yermo Annex's northern border. The southern margin of the valley is provided by the east-west trending Newberry Mountains.

A distinct feature of the local landscape is Elephant Mountain which is located between the Nebo and Yermo parcels. Elephant Mountain is the southern extension of the Mitchell Range, projecting out of the surrounding lowlands at a peak elevation of 2,674 feet.

Nebo and Yermo properties are mostly level, exhibiting very little local relief. The Rifle Range displays the most diverse topography, consisting of moderate to steep, low hills dissected by ephemeral washes. A number of dry wash systems run north from Daggett Ridge, descending through the Rifle Range and parts of Nebo to reach the Mojave River.

Elevations of MCLB properties range from a high of 2,650 feet in the Rifle Range to a mid-range of about 2,000 feet at Nebo, and a low of 1,940 feet at the Yermo Annex. The Mojave River flows down this gradient, dissecting Nebo and Yermo Annex boundaries. This large river generally flows underground at MCLB.

## 2.2.3 Geology

### 2.2.3.1 Historic Conditions

The Mojave Desert has experienced a diverse geologic history, contributing to the distinctive landforms and characteristics of the Barstow area. The emergence and departure of pluvial ice age events, volcanic activity, and geologic faulting have worked over time to produce the northwest-trending fault block mountains, intermontane basins, and playas in existence today. Table 2-1 summarizes key geological events in the Barstow region.

About 15,000 years ago, during the last ice age, the Mojave Desert was covered by a vast system of lakes and streams, coursing through what are now arid desert lands. Melting glaciers in the San Bernardino Mountains sustained perennial flows of the

Mojave River, moving through three large lakes before draining into Death Valley. This active water system contributed to the expanse of alluvium that fills the Mojave basin today. Manix and Afton basins just east of Barstow were inundated by waters of ancient Manix Lake, covering an area over 85 square miles.

As the cooler, wetter climate of the ice age began to warm approximately 10,000 years ago, Manix Lake began to dry up, first becoming brackish as evaporation left salts behind, then drying up completely and leaving behind a dry lakebed of fine deposits of clay and sand. The perennial flow of the Mojave River subsided as the glaciers feeding it melted away. The changing climate and landscape contributed to the formation of today’s hot, arid desert environment.

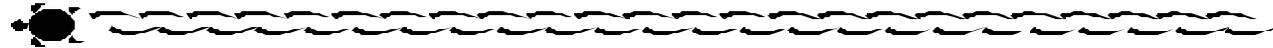
Table 2-1. Key geological stages in the formation of the Barstow area.

Present	Erosion continues to reshape the desert landscape. From 1956 to 1974, 25 cm of uplift occurred in the Barstow basin due to activity along the Harper Lake and Calico Faults. Between 1976 and 1978, 25 cm of subsidence were likely a result of fault activity.
Holocene (Present - 20,000 B.P)	Abundant activity along fault lines resulted in the uplift of many desert mountain ranges. Rain-shadow effects continued the drying of the Mojave Desert. Perennial flows of the Mojave River subside.
Late Pleistocene	Major uplifting of the coastal and transverse ranges imposed a rain shadow which contributed to the drying of desert lands to the east. Manix Lake achieved its highest shoreline approximately 20,000 years ago. Surfaces below this shoreline do not have a desert pavement; therefore, it is assumed that desert pavement surfaces at elevations above this shoreline are older than 20,000 years (USSCS 1978).
Pleistocene (20,000 - 1.9 MYBP)	Lakes abounded in the desert, supported by glacial melting and higher rainfall. Melting glaciers in the San Bernardino Mountains sustained perennial flows of the Mojave River. Large expanses of sediment were deposited into desert basins.
Pliocene and Miocene (1.3 - 23 MYBP)	Periodic volcanic episodes occurred throughout the desert. Andesite flows were common, often forming pink and light-gray mesas. Volcanic and metavolcanic basement rocks underlying Barstow were largely formed at this time.
Miocene	An early version of Elephant Mountain was formed as volcanic activity forced a rhyolitic plug to intrude into older sedimentary materials.
Sources: Jacobs Engineering Group 1995; Schoenherr 1992; USSCS 1978. MYBP = Million Years Before Present	

**2.2.3.2 Present Conditions**

The region surrounding MCLB Barstow is characterized by a geological layering of sediment and rocks. The upper geologic layer of alluvial fan and stream channel deposits is most evident in the Mojave River and desert wash channels. The unconsolidated to semi-consolidated deposits of the valley are a result of millions of years of deposition from the Mojave River and surrounding mountain ranges. Next are a series of volcanic flows which grade into older sedimentary layers of shales, limestones, and additional volcanics. The oldest layer is a combination of a massive granitoid batholith and metamorphosed sedimentary units. Exposed bedrock in the area is generally sedimentary and volcanic in origin.

Three major fault assemblages surround MCLB: Harper Lake-Camp Rock; Helendale, Lenwood, and Johnson Valley; and Emerson and Calico faults. The Harper Lake-Camp Rock series traverses Nebo and the Rifle Range. The Harper Lake fault extends under the oxidation ponds at Nebo.



The most recent earthquake in the area was the Hector Mine earthquake centered 47 miles ESE of Barstow on October 16, 1999 (USGS 2000). This quake measured 7.1 on the Richter scale but caused very little damage on MCLB or in the local community.

The broader, less rugged mountain ranges in the region generally result from uplift along the northwest-trending fault zones. These ranges are primarily underlain by granitic rock. Mountain masses of volcanic origin, such as Elephant Mountain, are a combination of rhyolitic and dacite flows which form a more rugged terrain.

## 2.2.4 Soils

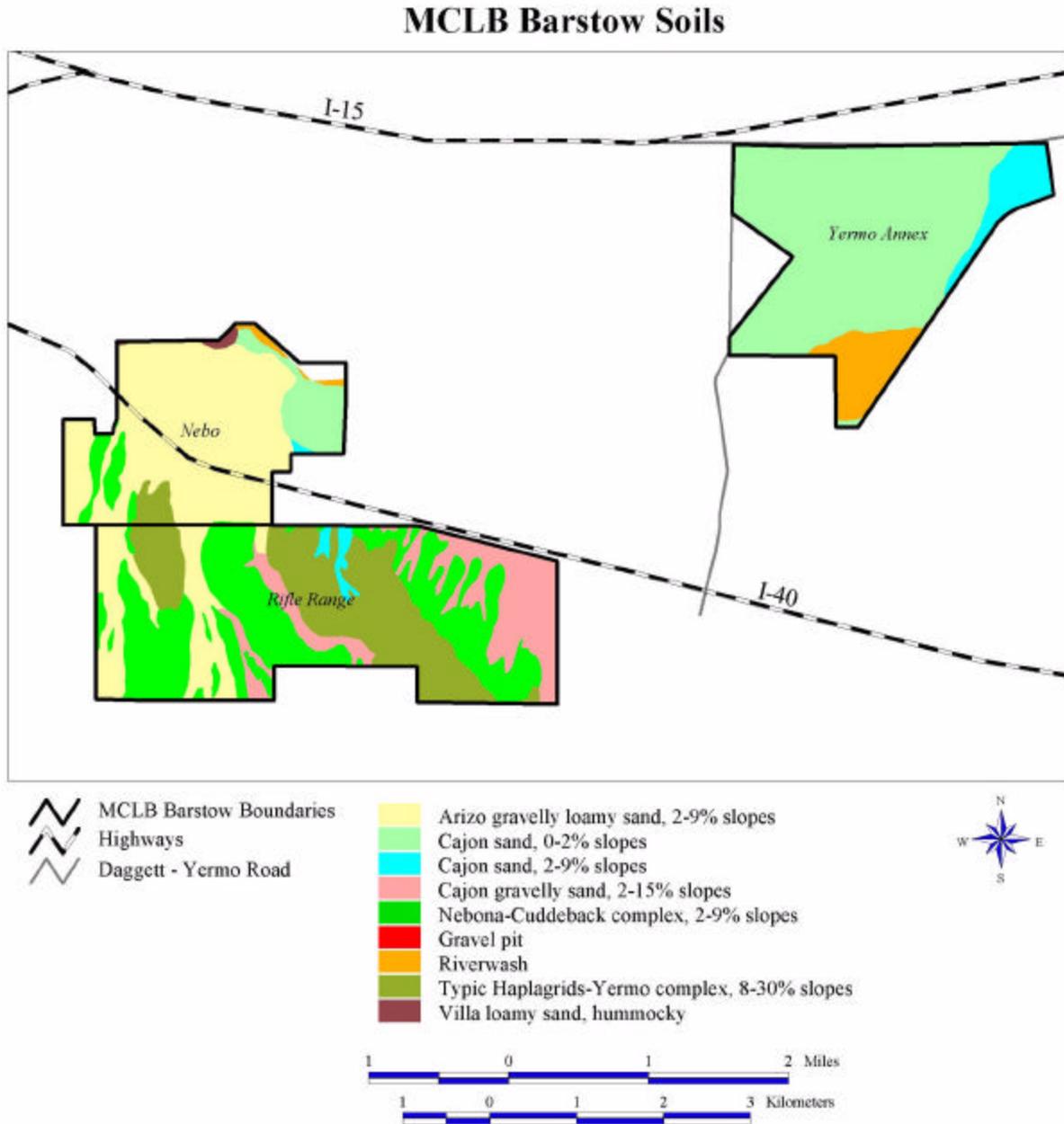
Low precipitation coupled with high evaporation substantially slow the soil-forming processes in the Mojave. As a result, more recent soils are typically immature and low in organic material. Soils at Nebo and Yermo are generally of this younger type. Older soils cover the majority of the Rifle Range on the alluvial fans and hills. Their strong profiles were developed during moist climatic periods when water was more plentiful. Both young and old soils are severely limited with respect to agricultural uses. The risk of erosion as well as the unsuitability of soils due to shallow, droughty, or stony characteristics are limiting factors.

Riverwash soils of the Mojave River floodplain consist of relatively unconsolidated, coarse sands and gravels that are typically moderately well-drained. Water percolates through this medium easily. Alluvial deposits are very deep and have excellent water storage characteristics. The nearly-level surface deposits of the river bed lie unconformably on the bedrock, confining water to the upper alluvial layer.

Finer texture soils found on low river terraces and recent alluvial fans include Cajon, Villa, and Arizo soil units. These young soils consist of a mixture of sands, gravelly sands, and loamy sands that formed in Holocene alluvium, derived primarily from granitic parent material. They are very deep, somewhat excessively drained to excessively drained and are characterized by low available water capacity, rapid permeability, and slow runoff.

Soils on old alluvial fans and terraces formed in alluvium are derived from mixed sources. On MCLB these soil types include Nebona-Cuddback and Typic Haplagrids-Yermo complexes. The soils of these complexes are generally older and more developed. They may support desert pavement of varnished gravel and cobbles on their surfaces. Varnished desert pavement has developed on the stable terraces of Pleistocene nonmarine deposits.

Map 2-1 depicts the soils of MCLB Barstow. A complete list of soil types and their acreages appear in Appendix D. These listings are to be used for planning purposes only; soil tests should always be conducted for site-specific projects.



Map 2-1. MCLB Barstow soils.

### 2.2.5 Erosion

- The Base's predominantly sandy soils and sparse vegetation in combination with powerful desert winds make wind erosion a concern, especially where native vegetation has been disturbed.

MCLB is subject to winds which circulate particles of sand, dust, and other debris, effectively relocating sediments in the region and acting to erode surfaces with their powerful abrasion. Windspeeds of more than 12 mph are sufficient to lift and carry sand (USSCS 1978). The majority of windspeeds in excess of 12 mph occur March through June. Windspeeds of more than 13 mph occur an average of 37 percent of the year in Barstow (Jacobs Engineering 1995). The sparse desert ground cover provides little resistance to surface winds, allowing desert soils to mobilize and contribute to conditions of extensive wind erosion and low visibility.

The Base's predominantly sandy soils and sparse vegetation in combination with powerful desert winds make wind erosion a concern, especially where native vegetation has been disturbed. The open ground surfaces at Yermo make it extremely susceptible to wind erosion and dust circulation.

Although the erosive effects of wind contribute to erosion year around, the infrequent periods of short, intense rainfall induce the most noticeable changes to the landscape. As precipitation falls on nearby ranges, water flows in broad, shallow sheets, transporting materials such boulders, rocks, sands, and gravels. It is during these periodic rainfall events that water flows in the normally dry streambeds.

On MCLB water erosion from mountain ridges and hills has built up a series of alluvial fans. The topography of Nebo and the Rifle Range lends itself to this type of erosion.

### 2.2.6 Hydrology and Watersheds

- The Mojave River is the primary feature of the watershed, coursing over 120 miles from its headwaters in the San Bernardino Mountains to its terminus near Baker, California.

MCLB Barstow lies within the Mojave River watershed which extends over the entire west Mojave Desert (see Map 2-2). The Mojave River is the primary feature of the watershed, coursing over 120 miles from its headwaters in the San Bernardino Mountains to its terminus near Baker, California. With its potential to support one of the largest streams of water in California (Natural History 1966), the Mojave River is an important water supply and source of groundwater recharge in the Mojave Desert.

The flow of the Mojave River is seasonal though it is regulated by the discharges from Lake Arrowhead, Silverwood Lake, and Mojave Forks Reservoir. Intermittent flows are fed by the winter rains and summer snowmelt of the San Bernardino Mountains. The mountains receive an average of 40 inches of precipitation annually, as both rain and snow. Only minor amounts of rain contribute to the streamflow once the river leaves the mountain influence and enters the arid desert landscape.

The Mojave River advances in a series of surface and subsurface streamflows. The river generally flows underground, moving slowly through its coarse-grained, porous channel. It resurfaces periodically as it is forced over impermeable clays or bedrock. Water is evident all year around in the Victorville narrows as a result of a layer of impermeable granite, after which the water usually retreats back underground for approximately 50 miles, reappearing as it reaches the bedrock-lined Afton Canyon.

- The Mojave River is the primary source of groundwater recharge to the subbasins of the Mojave watershed.

The Mojave River is one of a few California rivers that flows north with no outlet to the ocean. It streams north from the mountains, proceeds east as it nears the City of Barstow, and continues its progression until the flow discharges into the dry playas of Cronese and Soda Lake. At times of its fullest flow, the river will appear above ground over much of its course.

The Mojave River is the primary source of groundwater recharge to the subbasins of the Mojave watershed. As part of the Lower Mojave Subbasin, MCLB's groundwater is recharged from the river's subsurface flows. The configuration of the primary faults that traverse the area have augmented groundwater storage capacities in areas near Barstow.

Recharge fluctuations in local groundwater reserves are a result of variations in precipitation both locally and within the entire Mojave River watershed. Recharge at the City of Barstow is estimated at 9,000 acre-feet, annually (Jacobs Engineering 1995 citing DWR 1964 and Miller 1969).

Sediment load is a result of flooding from the San Bernardino Mountains and desert ranges. On MCLB, Daggett Wash transports sediment loads along the southeast corner of the Rifle Range.

In 1997, construction of the Mojave River Pipeline Project was started with the goal of replenishing groundwater levels in the Mojave River Basin using water from the California Aqueduct. The Mojave River Pipeline is part of the remediation for the overdraft of groundwater that has plagued the region for decades. The pipeline will be used to release water into percolation ponds where it will be recharged into the ground to augment the natural water supply provided by the Mojave River. Eventually, as much as 40,000 acre-feet of water per year could be placed into the river area via the pipeline. Funding to build the Mojave River Pipeline comes from grants and loans from the state and federal government (Mojave Water Agency 2000).

In November 1999, construction started on the second of five pipeline segments for Reach 3 of the Mojave River Pipeline Project which travels from Lenwood to Daggett and just barely crosses one corner of MCLB. The second segment will be completed in March 2000 and the entire Reach 3 segment is scheduled to be completed by the end of 2001 (Mojave Water Agency 2000).

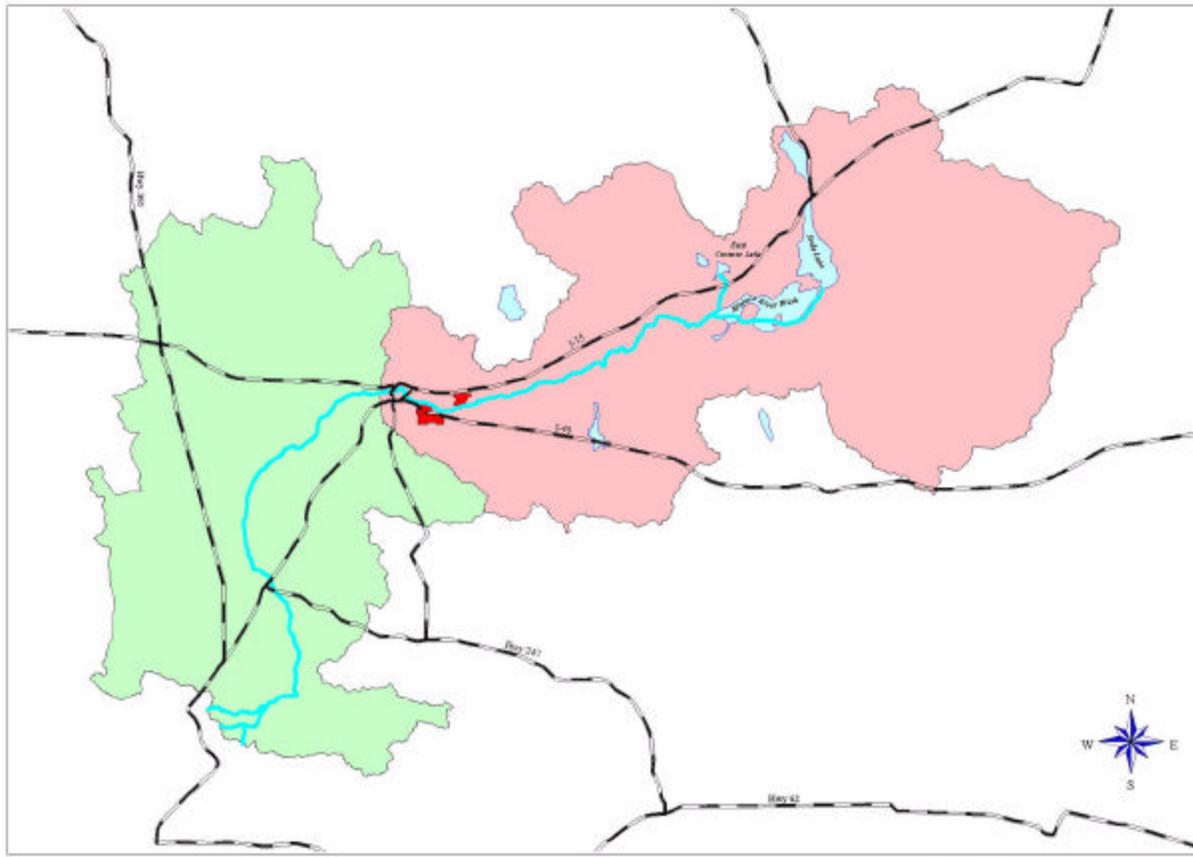
### **2.2.6.1 Precipitation and Runoff**

Fifty-six years of precipitation records (see Figure 2-2) for Barstow indicate an average of 4.3 inches per year, with a minimum of 1.08 inches (1953) and a maximum of 10.62 inches (1941).

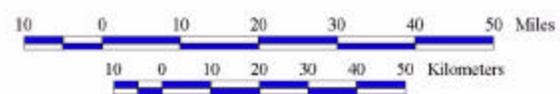
Seasonal flooding along the Mojave River is a result of accelerated snow melt, as unusually warm springs follow winters of heavy snow. These floods converge along the river's length, flooding adjacent communities. Waters that reach the river's terminus discharge into Soda Lake, which may hold several feet of water for most of the year.



### Mojave River Watershed Influence Zone



- Mojave River
- Upper Mojave Watershed (1,617,537 acres)
- Lower Mojave Watershed (1,864,975 acres)
- MCLB Barstow
- Dry lakes
- Highways



Map 2-2. MCLB Barstow watershed influence.

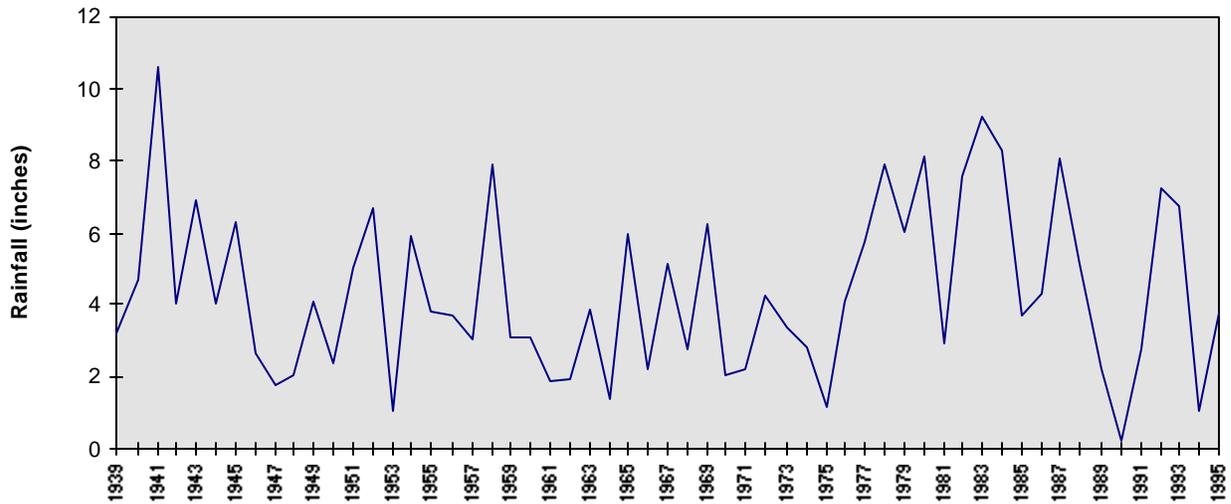


Figure 2-2. Annual rainfall for Barstow, California, 1939-1995. (Source: National Climatic Data Center, Digital Database TD3220, Stations 40519 and 40521 [Some data are missing for the years: 1939, 1944, 1957, 1964, 1985, 1990-91 and 1994].)

Mojave River runoff is measured by the U.S. Geological Survey (USGS) at two gaging stations near MCLB (see Table 2-2). At MCLB, surface water flow is generally only present for a few weeks during the winter months. USGS data show the variability of the river’s annual flow. For ten separate years between 1961 and 1994 the Barstow station received no surface flow, while 1969, 1980 and 1993 registered between 117,000 and 147,000 acre-feet. In Afton Canyon, where the river surfaces all year around, a minimum of 93 acre-feet and a maximum of 72,730 acre-feet were recorded in 1979 and 1969, respectively.

Table 2-2. Surface water flow measurements for Mojave River gaging stations near MCLB Barstow.

Gage Station	Period of Record	Minimum runoff acre-ft/year (Year)	Maximum runoff acre-ft/year (Year)	Average runoff acre-ft/year
Barstow	1961-1994	No flow (1961, 70, 71, 81, 85, 86, 89, 90, 91, 94)	146,600 (1969)	18,103 (33 years)
Afton	1961-1994	93 (1979)	72,730 (1969)	5,608 (33 years)

Source: Jacobs Engineering citing USGS 1995

Five severe floods with discharges over 50,000 cubic feet per second (cfs) were recorded between 1862 and 1938. The Mojave River generally discharges well below 25,000 cfs. The flood of March 3, 1938 had a significant impact on the region. Flowing at a peak discharge of approximately 64,000 cfs, this flood destroyed many of the structures built along the river. Several smaller flooding

events have transpired since the Base was established, some affecting Base structures, as in 1954 when floodwaters inundated the sewage plant at Nebo (see Photo 2-1 below).



*Photo 2-1. Flood at the old Nebo sewage plant, July 16, 1954.*

Drainage patterns on MCLB are influenced by the Mojave River valley. A system of normally dry washes originating from the valley's mountain and hills cut through the Base to empty into the Mojave River. Streambeds are carved during periods of intense rainfall, remaining dry most of the year with infrequent occasions of heavy, brief waterflow.

- Flash floods result from strong, localized rainstorms which are often accompanied by thunder and lightening. The local topography of Nebo and the Rifle Range lends itself to flash flood conditions.

The local topography of Nebo and the Rifle Range lends itself to flash floods during periods of high intensity rainfall. Flash floods result from strong, localized rainstorms which are often accompanied by thunder and lightening. These storms produce considerable rain in a short period of time, fueling a surge of runoff in the dry washes. Advancing waters, usually only a few inches in height, flow with tremendous force moving massive loads of sediment. The Yermo Annex is less susceptible to flash floods.

### 2.2.6.2 Floodplain

- Potential flooding from the Mojave River is limited to an area along the northernmost Nebo boundary, extending approximately 1,200 feet onto the Base.

The Mojave River zone is a broad, alluvial, dryland channel, supporting relatively unconfined waterflows. Areas immediately adjacent to the Mojave River are considered by the California Division of Mines to be natural floodplains. This designation includes small portions of Nebo and Yermo. The river channel reaches nearly one half mile at its widest point adjacent to MCLB, at the west end of the Nebo golf course.

The flood hazard at MCLB is relatively insignificant. The one hundred-year floodplain crosses only a small portion of Nebo. Potential flooding from the Mojave River is limited to an area along the northernmost Nebo boundary,

extending approximately 1,200 feet onto the Base. The area subject to flooding includes the golf course and sewage treatment ponds. The raised embankment of the BNSF railroad serves as a barrier between the river and other Nebo facilities.

## 2.3 Biological

- A total of 145 plant and 45 wildlife species have been recorded on MCLB Barstow.

The dry, sparse appearance of MCLB can be deceiving when considering the diversity of plant and animal species which occur there. A total of 145 plant species have been identified on MCLB, representing 39 families and 105 genera. Sixty species were found at the Nebo site, 59 at the Yermo Annex, and 88 at the Rifle Range. An inventory of plants sighted on MCLB Barstow is listed in Appendix E. A total of 45 animals have been recorded on Base. The wildlife inventory cataloged in Appendix F lists the 1 invertebrate, 49 bird, 18 mammal, 3 amphibian, and 9 reptile species which have been documented on MCLB. This list is not comprehensive, inventories are preliminary and need to be updated as future surveys are completed.

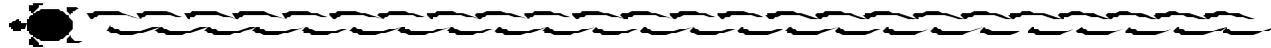
Biological components that make up the desert communities on MCLB are influenced by the Base's unique combination of climate, topography, soil, and runoff characteristics. Local differences in these factors influence the composition, cover, and distribution of plants that comprise the Base's five plant communities. Plant communities, along with physical substrate and climatic conditions, influence the distribution, abundance, and types of animals that live in this environment. Plants and animals exhibit a variety of mechanisms that allow them to survive and persist under harsh desert conditions.

Desert plants must adapt to what would seem unfavorable conditions for any plant, such as low and unpredictable rainfall, alkalinity or salinity, extreme temperatures, and intense light. The scarcity of water in this environment forces plants to react as soon as conditions are favorable for growth and reproduction. Ephemeral species respond to rains in either winter or summer with rapid seed germination, growth, and early flowering and fruiting, thereby avoiding the driest periods. Other plants adapt to desert conditions by having fewer leaves, dropping leaves during dry periods, conserving water in plant parts, developing extensive perennial underground parts or root crowns, or having underground organs that go dormant during drought.

Wildlife in the desert is forced to adapt to climatic extremes as well as a scarcity of drinking water. Many wildlife species are active only at night or during the cooler morning or evening hours, often remaining in their burrows or dens during the hottest part of the day. Some animals have special adaptations which allow them to survive in the desert, such as the ability to live on little or no water.

### 2.3.1 Plant Communities and Wildlife Habitats

Several plant communities that occur on base are considered to be rare natural communities by the Department of Fish and Game's Natural Diversity Data Base (NDDDB), particularly those associated with desert washes and wetlands. Five plant communities have been identified on MCLB Barstow: Creosote Bush Scrub, Desert Wash Scrub, Cottonwood-Willow, Desert Wash Thicket, and Desert Pavement. Acreages for each of these communities are presented in Table 2-3. Map 2-3 shows the vegetation community boundaries for MCLB Barstow.



The following series are described by Sawyer and Keeler-Wolf (1995), with Holland’s (1986) equivalent of each series provided in parentheses: Catclaw acacia series (Mojave Wash Scrub and Mojave Desert Wash Scrub), Creosote bush series (Mojave Creosote Bush Scrub), Creosote bush-white bursage series (Mojave Creosote Bush Scrub), Scalebroom series (Mojave Desert Wash Scrub), and Tamarisk series (Tamarisk Scrub).

Table 2-3. MCLB Barstow plant communities, total acreage, and acreage by land parcel.

Plant Community	Total Acreage	Acres By Parcel		
		Nebo	Rifle Range	Yermo
Creosote Bush Scrub	2809	N/A	2140	669
Desert Wash Scrub	107	N/A	11	96
Creosote/Desert Wash Scrub Mix	64	18	N/A	46
Cottonwood-Willow Desert Riparian	10	10	N/A	N/A
Desert Wash Thicket	18	18	N/A	N/A
Desert Pavement	185	N/A	185	N/A
Bare	124	N/A	N/A	124
Other (active wash, landfill, roads, tracks, rifle range)	175	N/A	103	72
Acreage covered by study	3492	46	2439	1007

Source: GIS vegetation community coverage created by Tierra Data Systems 1996.

### 2.3.1.1 Creosote Bush Scrub

Creosote Bush Scrub on MCLB is dominated by creosote bush (*Larrea tridentata*), cheesebush (*Hymenoclea salsola*), and white bursage (*Ambrosia dumosa*). Species commonly associated with this habitat include brittlebush (*Encelia farinosa*), all-scale (*Atriplex polycarpa*) and California tea (*Ephedra californica*) with annuals such as filaree (*Erodium cicutarium*), Mediterranean grass (*Schismus barbatus*) and buckwheat (*Eriogonum* spp.). Creosote Bush Scrub is found on the Yermo Annex and Rifle Range, making up MCLB’s largest plant community. The composition of species in this community varies by geographical location.

Creosote usually reproduces asexually by vegetative segmentation. It is rare to see a seedling. Clonal groups (same genetic material) may appear as rings from the air and can be thousands of years old. A clonal group near Yuma has been carbon dated at 18,000 years old, essentially as old as the desert itself. If we consider that the individual shrubs are actually one living plant, they are by far the oldest of living things, having germinated in the wet years following the last ice age! (Schoenherr 1992)

Yermo’s Creosote Bush Scrub is dominated by a creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) component with all-scale (*Atriplex polycarpa*) and desert tea (*Ephedra californica*) intermixed. Typical annuals include filaree (*Erodium cicutarium*), Mediterranean grass (*Schismus barbatus*) and buckwheat (*Eriogonum trichopes*). Plants that distinguish Yermo’s east side are minor amounts of silver cholla (*Opuntia echinocarpa*), buckwheat (*Eriogonum* spp.) and Indian rice grass (*Achnatherum hymenoides*).

- The topography of the Rifle Range supports Creosote Bush Scrub on two substrates, uplands and wash islands.

The topography of the Rifle Range supports Creosote Bush Scrub on two substrates, uplands and wash islands. The difference in substrate may have an effect on species cover and composition. Approximately 85% of the Rifle Range is Cre-

osote Bush Scrub. The cacti component in this area gives it a unique character among the three parcels. Cacti found there include many-headed barrel cactus (*Echinocactus polycephalus* var. *polycephalus*), hedgehog cactus (*Echinocereus engelmannii*), beavertail cactus (*Opuntia basilaris*), silver cholla (*Opuntia echinocarpa*), pencil cholla (*Opuntia ramosissima*) and rarely, fishhook cactus (*Mammillaria tetrancistra*).



Photo 2-2. Creosote bush scrub on a bajada in the Rifle Range.

Rifle Range Creosote Bush Scrub is dominated by creosote bush (*Larrea tridentata*) with common species: pima ratany (*Krameria erecta*), white bursage (*Ambrosia dumosa*), desert dandelion (*Malacothrix glabrata*), devil's lettuce (*Amsinckia tessellata*), Mediterranean grass (*Schismus barbatus*), filaree (*Erodium cicutarium*), pincushion (*Chaenactis* sp.), buckwheat (*Eriogonum* spp.), spotted langloisia (*Langloisia setosissima*), plantain (*Plantago ovata*), desert primrose (*Camissonia* spp.), chia (*Salvia columbariae*), Mojave yucca (*Yucca schidigera*) and many-headed barrel cactus (*Echinocactus polycephalus*).

Bajadas appear to have a more diverse species composition and more cover than either the wash or upland areas. They are characterized by the same general plant composition as upland and wash areas with the addition of cheesebush (*Hymenoclea salsola*), spiny senna (*Senna armata*), sand paper plant (*Petalonyx thurberi*) and pencil cholla (*Opuntia ramosissima*).

- Creosote Bush Scrub is habitat for the federally threatened desert tortoise.

Some of the wildlife inhabiting the Creosote Bush Scrub habitat on MCLB are desert cottontail (*Sylvilagus auduonii*), Merriam's kangaroo rat (*Dipodomys merriami*), antelope ground squirrel (*Ammospermophilus leucurus*), and the desert tortoise (*Gopherus agassizi*).

### 2.3.1.2 Desert Wash Scrub

Desert Wash Scrub describes the shrub habitats found in washes. These communities are a high priority for conservation due to their limited extent and the occurrence of diverse plants and animals in the area. There are two types of Desert

Wash Scrub on MCLB Barstow: *Tamarix-Lepidospartum-Chilopsis* and *Acacia-Psorothamnus-Chilopsis*. In addition, there is a transitional community, Creosote/Desert Wash Scrub Mix, which demonstrates elements of both Desert Wash Scrub and Creosote Bush Scrub.

***Desert Wash Scrub: Tamarix - Lepidospartum - Chilopsis***

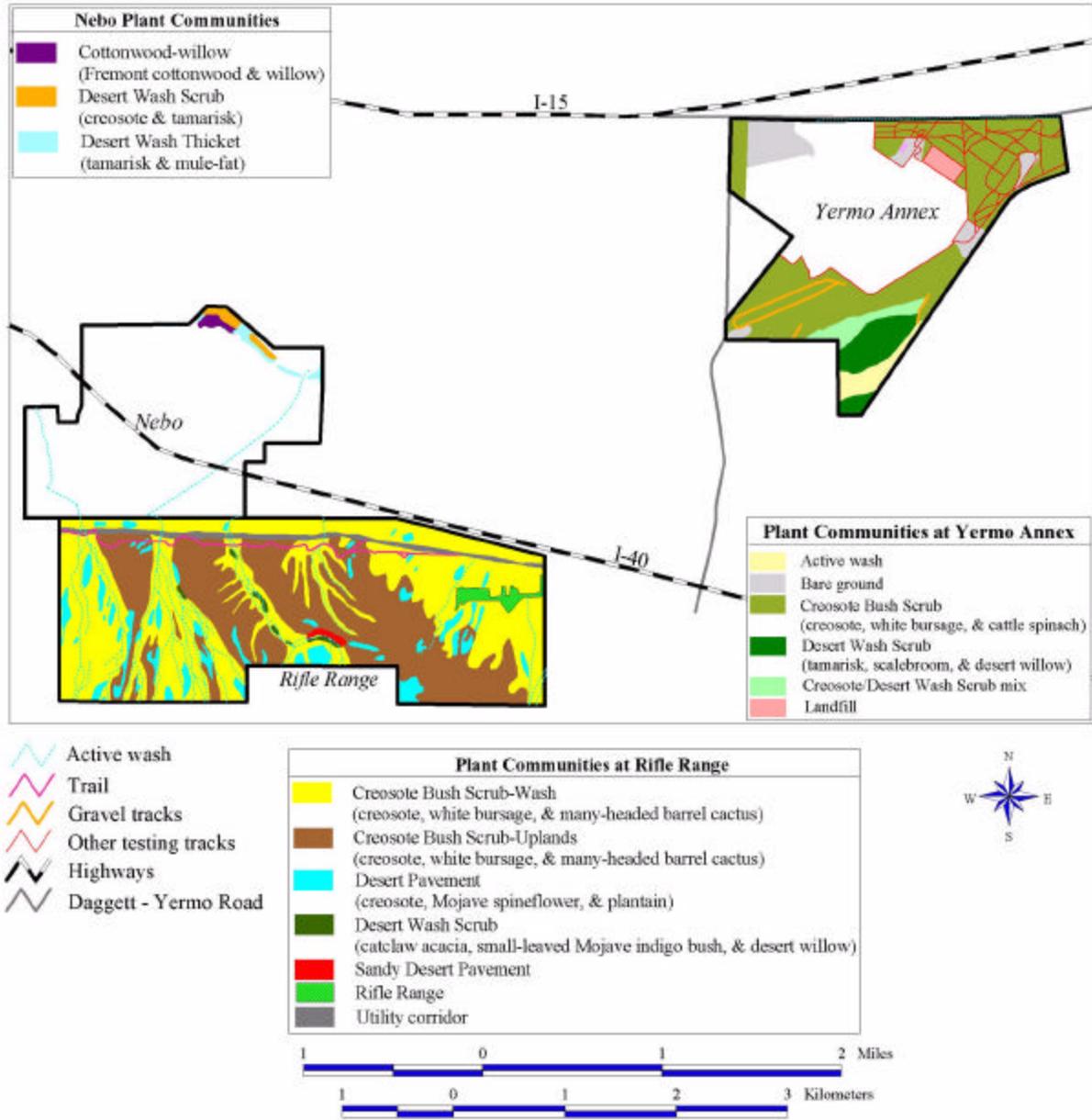
The *Tamarix - Lepidospartum - Chilopsis* Desert Wash Scrub is located in the Mojave River portion of the Yermo Annex (see Photo 2-3). It is a sparse community characterized by tamarisk (*Tamarix ramosissima*), scalebroom (*Lepidospartum squamatum*) and desert willow (*Chilopsis linearis*) with an understory of El Barbasco (*Croton californicus*), desert tea (*Ephedra californica*), tiquilia (*Tiquilia plicata*), Russian thistle (*Salsola tragus*), wire lettuce (*Stephanomeria pauciflora*), Mediterranean grass (*Schismus barbatus*), cryptantha (*Cryptantha* spp.), filaree (*Erodium cicutarium*), devil's lettuce (*Amsinckia tessellata*), desert primrose (*Camissonia* spp.) and panic grass (*Panicum urvilleanum*).

***Desert Wash Scrub: Acacia - Psorothamnus - Chilopsis***

*Acacia-Psorothamnus-Chilopsis* occurs in active washes on the Rifle Range, but not on the wash islands. Catclaw acacia (*Acacia greggii*), small-leaved Mojave indigo bush (*Psorothamnus arborescens* var. *minutifolius*) and desert willow (*Chilopsis linearis*) are dominant. Other typical species of this habitat are sweet bush (*Bebbia juncea*), brittlebush (*Encelia farinosa*), desert tea (*Ephedra californica*), cheesebush (*Hymenoclea salsola*), creosote bush (*Larrea tridentata*), and Anderson thornbush (*Lycium andersonii*) with an understory of annuals dominated by Mediterranean grass (*Schismus barbatus*), together with foxtail chess (*Bromus madritensis* ssp. *rubens*), fiddleneck (*Amsinckia* spp.), filaree (*Erodium cicutarium*), buckwheat (*Eriogonum* spp.) and cryptantha (*Cryptantha* spp.).

Desert wash scrub communities are considered sensitive and provide habitat for a variety of wildlife species, including the house finch (*Carpodacus mexicanus*), mourning dove (*Zenaidura macroura*), black-tailed jack rabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduonii*), antelope ground squirrel (*Ammospermophilus leucurus*), Merriam's kangaroo rat (*Dipodomys merriami*), cactus mouse (*Peromyscus eremicus*), grasshopper mouse (*Onychomys torridus*), white-throated woodrat (*Neotoma albigula*), canyon mouse (*Peromyscus crinitus*), long-tailed pocket mouse (*Perognathus formosus*), coyote (*Canis latrans*), and zebra-tailed lizard (*Callisaurus draconoides*).

### MCLB Barstow Parcels & Plant Communities



Map 2-3. MCLB Barstow vegetation.

### ***Creosote/Desert Wash Scrub Mix***

Creosote/Desert Wash Scrub Mix is a transitional community which occurs between Creosote Bush Scrub and Desert Wash Scrub with neither community dominating. It occurs on more stabilized areas of the washes where upland species have a chance to become established. These transitional communities are found at the Yermo Annex and Nebo. A *Larrea-Tamarix* combination is also evident in the Yermo Annex.



Photo 2-3. Desert willows on mounds surrounded by dry desert grasses in the Mojave river area of the Yermo Annex.

### **2.3.1.3 Cottonwood-Willow Desert Riparian**

Cottonwood-Willow occurs in the Mojave River portion of Nebo. It is also considered sensitive and a high priority for conservation. This community is distinguished by Fremont's cottonwood (*Populus fremontii*), narrow-leaved willow (*Salix exigua*), and arroyo willow (*Salix lasiolepis*). As a result of its position along the Mojave River wash, this community includes a large element of tamarisk (*Tamarix ramosissima*). Other species in this riparian zone are mulefat (*Baccharis salicifolia*), Russian thistle (*Salsola tragus*), croton (*Croton californicus*), heliotrope (*Heliotropium curassavicum*), Mediterranean grass (*Schismus barbatus*), melilotus (*Melilotus alba*) and filaree (*Erodium cicutarium*).

Within this community there is a small pond of water created by levee embankments. It is thought that the levee and adjacent ditch are possibly a result of the water diversion efforts of early sheep ranchers. The pond supports some unusual species such as escaped ornamentals and wetland species. Unique to the pond area are cattail (*Typha domingensis*), tule (*Scirpus acutus* var. *occidentalis*), athel (*Tamarix aphylla*), and Goodding's willow (*Salix gooddingii*). Other species along the levee include rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *ceruminosus*), screwbean mesquite (*Prosopis pubescens*), all-scale (*Atriplex polycarpa*), and four-wing saltbush (*Atriplex canescens*). Some *Opuntia basilaris* patches were noted in Nebo on a slope adjoining the riverwash.

The Cottonwood-Willow Desert Riparian community on MCLB serves as habitat for animals such as the coyote (*Canis latrans*), black-tailed jack rabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduonii*), antelope ground squirrel (*Ammospermophilus leucurus*), white-throated woodrat (*Neotoma albigula*), brush mouse (*Peromyscus boylii*), cactus mouse (*Peromyscus eremicus*), deer mouse (*Peromyscus maniculatus*), and desert spiny lizard (*Sceloporus magister*).

#### **Desert Wash Thicket**

Desert Wash Thicket is a very dense plant community dominated by tamarisk (*Tamarix* spp.) and mule fat (*Baccharis salicifolia*). It is found in the Mojave River area of Nebo. Understory plants include wire lettuce (*Stephanomeria* sp.) and croton (*Croton californicus*).

### **2.3.1.4 Desert Pavement**

Desert pavement is a veneer of gravel or larger stones that remain after wind has blown upper layers of silt and sand from an area. The soil surface becomes armored with pebbles left behind and cemented with calcium carbonate which results from water evaporation. Disturbance by vehicle traffic can break through the pavement surface, which appears deceptively strong, and initiate erosion channels. These surfaces are extremely hot because of their dark color, and few plants can tolerate living near them.

- Disturbance of desert pavement by vehicle traffic can break through the pavement surface, which appears deceptively strong, and initiate erosion.

The Desert Pavement plant community owes its name to the substrate on which it grows. It is a sparse community, likely due in part to the characteristics of pavement that adversely influence plant growth (Cooke *et al.* 1993). Desert Pavement is dominated by creosote bush (*Larrea tridentata*) with other typical plants: white bursage (*Ambrosia dumosa*), Mojave yucca (*Yucca schidigera*), plantain (*Plantago ovata*), Mediterranean grass (*Schismus barbatus*), filaree (*Erodium cicutarium*), foxtail chess (*Bromus matritensis*), devil's lettuce (*Amsinckia tessellata*), pincushion (*Chaenactis* sp.), chorizanthe (*Chorizanthe rigida*), and mirabilis (*Mirabilis bigelovii*). This community is only evident at the Rifle Range. A sandy version of this habitat has also been recorded on the Base.

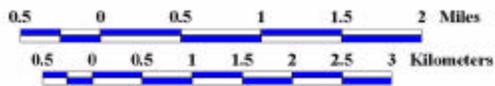
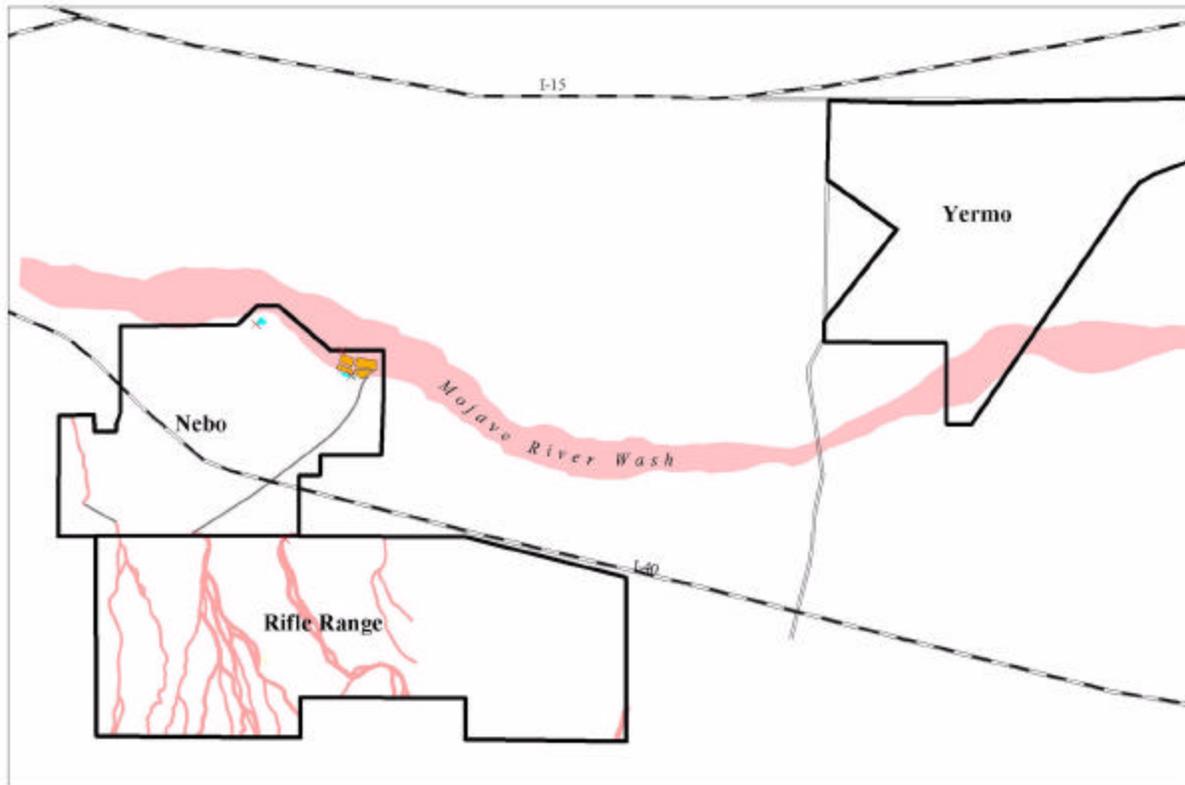
### **2.3.1.5 Sewage Ponds and Fish Pond**

The sewage treatment ponds located in Nebo along the Mojave River attract a variety of resident and migratory birds. The standing, open water serves as a resting place for a number of waterbirds such as ducks, teals, shovelers and coots. Two oxidation ponds and a series of effluent ponds are an important, though artificial, habitat for wildlife which may also be utilizing nearby cottonwood-willow communities, tamarisk thicket habitat, and the golf course for perching, feeding, nesting or breeding activities.

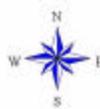
The amphibious vehicle testing pond, also known as the Fish Pond, is located in the southern portion of Nebo. It is used for float-testing amphibious vehicles. This concrete-lined pond is enclosed by a chain link fence. Access is limited to only those personnel involved in testing and repair activities. The pond is maintained, debris is kept clear of the area and the water is treated. Wildlife may be attracted to this area.

The location of the sewage ponds and Fish Pond are shown on Map 2-4.

### U.S. Jurisdictional Waters & Wetlands on MCLB Barstow



- MCLB Barstow boundaries
- Highways
- Daggett to Yermo Road
- Diversion Canals
- Settling Ponds
- Soil Test Pits



	Jurisdictional Waters
Rifle Range	98.1 acres
Yermo	113.9
Nebo	53.4
<b>Total</b>	<b>265.4 acres</b>

	Jurisdictional Wetlands
Nebo	0.9 acres

Map 2-4. Wetland and riparian areas on Nebo.

### 2.3.2 Wetlands

The Mojave River is a jurisdictional Waters of the U.S. and is, therefore, regulated by the Army Corps of Engineers (ACOE) under Section 404 of the Clean Water Act (CWA). Waters of the U.S. is the general category of regulated water bodies defined in the Clean Water Act, covering most natural bodies of water in California. Desert playas and arroyos, seasonal ponds, and reservoirs fed by direct rainfall or impoundment are included under this definition. Irrigation ditches, temporary sediment basins, drainage canals, and wastewater systems are specifically exempted from Section 404 regulation.



Photo 2-4. Pond north of the golf course on Nebo.

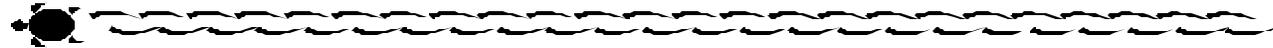
- MCLB harbors jurisdictional wetlands. A wetlands determination is scheduled for 1997 and will be provided in Appendix G.

MCLB harbors jurisdictional wetlands, a particular type of Waters of the U.S. Jurisdictional wetlands must meet three requirements as defined by ACOE: prevalence of hydrophytic vegetation, presence of hydric soils, and wetland hydrology. A jurisdictional wetlands determination has been completed for MCLB. The pond (Photo 2-4) at the northwest end of the golf course and the areas along the old canal which support reeds are jurisdictional wetlands and would, therefore, be subject to regulation by the ACOE as well as various other agencies which have oversight responsibilities. Map2-4 depicts Nebo's wetlands.

A wetlands determination was conducted in 1997 and is appended to this report (Appendix G).

### 2.3.3 Regional Biodiversity

Regional land development reduces habitat and restricts wildlife movement to smaller patches, or "islands," of habitat. As a result of this, it is increasingly important to maintain wildlife corridors for managing biological resources on a regional scale. Wildlife corridors provide protected pathways for wildlife move-



ment between these otherwise separated “islands.” Because of the trend of urbanization in the west Mojave Desert, it is imperative to identify and maintain key wildlife corridors.

The fragmentation of habitat has been shown, over time, to lead to a decline in the number of species and number of individual animals inhabiting them. The exact size of an isolated habitat, or the width and length of a corridor needed to preserve species diversity, is difficult to establish. Wildlife corridors can better be described by their functionality. Habitats and corridors function better as their size increases. The minimum size of appropriate habitats and corridors must be determined on a case-by-case basis.

- Two regional wildlife corridors have been identified which run adjacent to MCLB: the Mojave River from Victorville Narrows to Afton Canyon and the Desert Tortoise Critical Habitat areas.

Two regional wildlife corridors have been identified which run adjacent to MCLB: the Mojave River from Victorville Narrows to Afton Canyon and the Desert Tortoise Critical Habitat / Desert Wildlife Management Areas (DWMAs) (City of Barstow 1997).

The Mojave River functions as a travel corridor for a variety of resident and migratory wildlife species. It is a significant regional resource, encompassing the west Mojave’s prime riparian habitat and sustaining diverse biological resources. Wide ranging animals such as the bobcat, coyote, and gray fox are likely to use riparian habitats for cover while traversing their territories. Birds are also regular users of the river area. In addition to allowing movement of wildlife, the Mojave River corridor allows the transport of sand which is essential to many plants and animals who survive in dune and other sandy habitats.

The 80 mile stretch of river from Victorville Narrows to Afton Canyon is an important regional link between these exceptional natural areas. MCLB lies between these two areas and along the travel corridor. This stretch of corridor may be particularly beneficial for birds that have the ability to cover the long distance.

There is also a regional interest in maintaining a wildlife corridor between the Ord-Rodman and Kramer-Fremont Critical Habitat Units (Units). The purpose of these Recovery Units is to manage the recovery and delisting of tortoise populations in the west Mojave Desert. A link between these two Units is considered critical for the recovery of the desert tortoise and the maintenance of west Mojave Desert ecosystems. Over five hundred acres of the Rifle Range are designated critical habitat within the Ord-Rodman Unit.

### 2.3.4 Sensitive Species

MCLB must protect and manage any plant or animal species listed as endangered or threatened under the federal Endangered Species Act (ESA). Only one listed species is known to occur on MCLB properties, the federally threatened desert tortoise. Protection of state listed species on Marine Corps land is not required by legal mandate; however, the Marine Corps encourages cooperation with the state to protect such species. See Appendix H for a list of legal status category definitions.

Table 2-4 lists wildlife with the potential to occur on MCLB that have a Federal or State sensitive status designation. A 1992 search of the National Diversity Database documented 7 sensitive west Mojave species (Jacobs Engineering 1995). The desert tortoise is the only sensitive wildlife species documented on MCLB.

- The desert tortoise, a federally threatened species, is known to inhabit Nebo and the Rifle Range.

The desert tortoise, a federally threatened species, is known to occur on the Nebo and Rifle Range parcels. Efforts have been made through the use of tortoise fencing to restrict tortoise movement to the Rifle Range area to avoid the more developed, and more dangerous, Nebo area.

The desert tortoise is most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and after infrequent summer monsoons. Desert tortoises spend the remainder of the year in burrows, escaping the extreme weather conditions of the desert (USFWS 1993b).

- The lane mountain milkvetch is a federally listed endangered species.

One sensitive plant species has potential to occur on MCLB Barstow. The lane mountain milkvetch is a federally listed endangered species. Table 2-5 lists eight potential sensitive plants on MCLB based on a review of the California Native Plant Society Inventory (1994). The list is limited to sensitive plant species that have been found within a five-mile radius of MCLB. None of the eight potential sensitive species in Table 2-5 were found in the 1996 rare plant surveys. These results are preliminary due to the ephemeral nature of the desert flora and the below-average rainfall year in which the survey was conducted. More than half of the floral diversity of California deserts are annual species, and these may only appear when rainfall amounts and patterns are favorable; possibly once every few years.

Table 2-4. Sensitive wildlife species with the potential to be located on MCLB Barstow. Updated 4/00 (Source: Natural Diversity Database)

Species	Habitat	Status
Burrowing owl ( <i>Athene cunicularia hypugaea</i> )	Open, dry grasslands and desert habitats. Nests in burrows.	CSC
Prairie falcon ( <i>Falco mexicanus</i> )	Includes the open country of deserts, especially near mountain cliffs, gorges, and mesas where they nest in crevices.	CSC
Yellow-breasted chat ( <i>Icteria virens</i> )	Brushy open country, including desert thickets. Usually nests in dense riparian thickets.	CSC
Le Conte's thrasher ( <i>Toxostoma lecontei</i> )	Open desolate areas of desert scrub, alkali desert scrub, and desert succulent scrub. Usually nests in salt bush ( <i>Atriplex</i> spp.).	CSC
Mohave ground squirrel ( <i>Spermophilus mohavensis</i> )	Open desert scrub, alkali desert scrub, Joshua trees, and grasslands of the Mojave Desert.	FSC/ST
Mojave fringe-toed lizard ( <i>Uma scoparia</i> )	Restricted to fine, loose, windblown sand deposits of dunes, flats, riverbanks, washes, sparse alkali scrub, and desert shrub habitats.	CSC
Southwestern pond turtle ( <i>Clemmys marmorata</i> )	Ponds and small lakes with abundant vegetation. Also in marshes, slow moving streams, reservoirs, and occasionally brackish waters.	FSC/CSC
Desert tortoise ( <i>Gopherus agassizii</i> )	Generally found in creosote bush, burrobush, mojave yucca, blackbrush, joshua tree, and galata grass on flats, alluvial fans, bajadas, rocky terrain, and washes where soil is friable to dig burrows. New studies indicate they may be found on rocky mountainous areas with slopes of up to 38% (W. Fisher, <i>pers comm.</i> 1999).	FT/ST

**PFE** = Proposed Federal endangered; **FE** = Federally listed endangered; **FT** = Federally listed threatened; **CSC** = California species of concern; **SE** = State listed endangered; **ST** = State listed Threatened

Sources: Jacobs Engineering 1995 citing NDDB 1992.

Table 2-5. Sensitive plant species with the potential to be located on MCLB Barstow. Updated 11/97.

Species	Habitat <sup>1</sup>	Status <sup>2</sup>
Lane mountain milkvetch ( <i>Astragalus jaegerianus</i> )	Joshua Tree Woodland, Mojave Desert Scrub/granitic, sandy, or gravelly	FE / CNPS List 1B
Mojave spineflower ( <i>Chorizanthe spinosa</i> )	Chenopod Scrub, Mojave Desert Scrub	CNPS List 4
White-bracted spineflower ( <i>Chorizanthe xanti</i> var. <i>leucotheca</i> )	Pinyon and Juniper Woodland, Mojave Desert Scrub	CNPS List 4
Desert cymopterus ( <i>Cymopterus deserticola</i> )	Joshua Tree Woodland, Mojave Desert Scrub/sandy	FSC/CNPS List 1B
Howe's hedgehog cactus ( <i>Echinocereus engelmannii</i> var. <i>howei</i> )	Mojave Desert Scrub	FSC/CNPS List 1B
Barstow woolly sunflower ( <i>Eriophyllum mohavense</i> )	Chenopod Scrub, Mojave Desert Scrub, Playas	FSC/CNPS List 1B
Sand linanthus ( <i>Linanthus arenicola</i> )	Desert Dunes, Joshua Tree Woodland, Mojave Desert Scrub/sandy	CNPS List 2
Mojave monkeyflower ( <i>Mimulus mohavensis</i> )	Joshua Tree Woodland, Mojave Desert Scrub/ gravelly	FSC/CNPS List 1B
White-margined beardtongue ( <i>Penstemon albomarginatus</i> )	Desert Dunes (stabilized), Mojave Desert Scrub	FSC/CNPS List 1B

**FE** = Federal Endangered; **PFE** = Proposed Federal Endangered; **FSC** = Federal Species of Concern; **CNPS** = California Native Plant Society; **List 1B** = Rare or Endangered in California and elsewhere; **List 2** = Rare or Endangered in California, more common elsewhere; **List 4** = Plants of limited distribution.

Sources: 1/CNPS 1994; 2/California Department of Fish and Game (CDFG) 1997

## 2.4 Cultural

Cultural resources in areas surrounding MCLB provide an account of the unique history of the desert, its changing natural states and usage. Archaeological, paleontological, and historical resources near MCLB indicate a rich heritage, including that of early man, ancient flora and fauna, the coming of western settlers, and early industrialization.

Thousands of years before Europeans arrived in the southwest deserts, natives fished and hunted on the shores of the immense lakes and streams that once covered the desert landscape. Petroglyphs and artifacts indicate that man has long been a resident of the area. Archaeologists have uncovered evidence of ancient man's presence at the eastern foot of the Calico Mountains, northeast of the Yermo Annex. The Calico Early Man Site contains ancient artifacts reported to date back more than 50,000 years.

Rainbow Basin, eight miles north of Barstow, contains relics of much older life than man, that of prehistoric flora and fauna. Fossils such as bones, teeth, and tracks have been revealed for some species of primitive bears, pigs, camels, dogs, antelopes, rhinos, horses, mastodons, rodents, and oreodonts (resemble pigs). The remains of plants such as poison oak, palm, juniper, and oak trees have also been uncovered.

Early recorded history in the area was documented by missionaries, traders, and explorers as they traversed the area in the late 1700s and early 1800s. Later records were provided by military scouts, government officials, and railroad workers. By the turn of the century railroads had replaced most wagon transportation in the area, making desert commerce a viable option for many businessmen and families. The coming of the railroad enabled the founding of towns and cities throughout the region and opened the desert to business opportunities and the establishment of military reservations during the first half of the 20th century.

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Of the three bands of Indian tribes utilizing the river in historic times, it was the Vanyume Desert Serrano which resided in the Mojave River portion that is now MCLB Barstow.

#### **2.4.1 Archaeological and Historical**

Three archaeological sites and three lithic isolates were recorded on MCLB during the 1996 archaeological survey. Two of the recorded sites and the three isolates are located on the Rifle Range; the remaining site is located in Nebo (William Manley Consulting 1996; hereafter referred to as WMC 1996).

The petroglyph site on the Yermo Annex is located within the tracked vehicle test tracks. It is enclosed by a chain link fence in an effort to preserve the rock art as much as possible. The petroglyph is seriously disturbed by the carving of initials and dates, and particularly by the blasting away of portions of the rock.

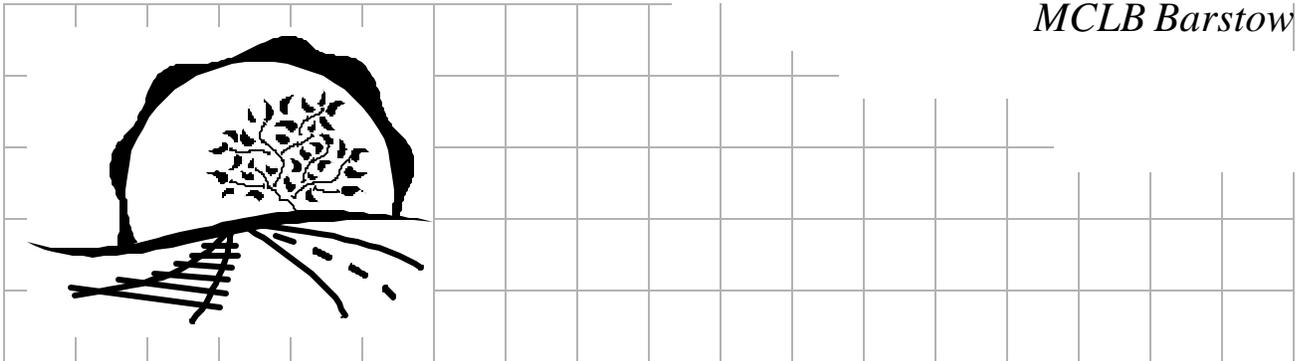
Historical research and architectural evaluations were conducted for approximately 100 properties in Nebo and the Yermo Annex. Archival research and on-site assessments were conducted for buildings and structures 45 years old or older. The goal of these assessments was to determine if any structures meet National Register criteria, either individually or as components of a historic district. No historic properties were found which meet the National Register criteria of eligibility based on the historical research and on-site evaluations (WMC 1996).

Though not eligible for the National Register, the gravesite of Walter Ross is an important cultural resource on MCLB. The grave, located in Nebo near Building 33 and north of Joseph Boll Avenue, is fenced and maintained by the Marine Corps in perpetuity. A portion of MCLB land was purchased from the Ross family.

#### **2.4.2 Paleontological**

To date no paleontological artifacts have been found on MCLB properties.





## 3.0 Resource Management

*GOAL 1: Guarantee continued access to MCLB Barstow's land, water, vegetation, and wildlife resources for the military mission, while preserving, protecting, and enhancing natural ecosystems and biodiversity.*

### 3.1 Land, Watershed and Vegetation Management

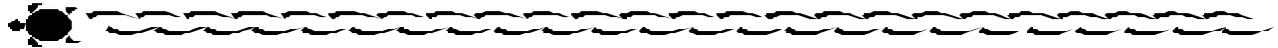
#### 3.1.1 Plant Communities

- Plant communities are indicators of ecosystem health. They provide the necessary components of wildlife habitat and support and contribute to biodiversity.

Plant communities are indicators of ecosystem health. They provide the necessary components of wildlife habitat, and they support and contribute to biodiversity. Along with water, soil, and wildlife, plant communities are one of the fundamental components of ecosystems.

The internal number and arrangement of species within plant communities is stable in some cases, dynamic in others. Within a short time frame annual plants, which are more responsive to seasonal weather variations than perennials, may not be apparent for years at a time, then appear profusely. The composition of shrubs, trees, and herbaceous plants may be stable or perturbed by natural or anthropogenic stimuli. Similarly, the boundaries among plant communities may be stable or in a state of flux, depending on soil types, fire, or flooding patterns and other factors.

In the west Mojave Desert, plant communities are affected by two primary factors: extreme weather (high temperatures and paucity of rainfall) and the introduction of exotic weeds. Plant community dynamics have been altered by the introduction and in many cases, dominance of exotic annual forbs and grasses from the Mediterranean at the expense of natives.



Desert shrub communities, except perhaps for those in washes, often lack any obvious seedlings or young individuals, consisting almost entirely of older, established plants. Restocking of populations occurs only after exceptional rainfall. Even plants that seed annually often lack the ability for seeds to survive long periods in the soil (Zedler 1981).

In the desert, the early pioneer successional role played by annuals in more mesic systems is usurped by short-lived perennials. As desert lands deteriorate, the proportion of weedy annuals and short-lived perennials increases in relation to long-lived plants. With ground disturbance, wind erosion and dust storms increase in frequency and intensity, physically removing the top, most fertile portion of the soil.

A botanical survey was conducted in the Spring of 1996 to inventory plant species and delineate plant communities on MCLB. The survey provided the first report of the Base's five plant communities' composition, cover, and distribution.

### *Policy Strategy for Plant Communities*

*Objective: Seek to protect a mosaic of plant communities to support biodiversity and ecosystem health.*

- I. Monitor the condition and trend of the Base's plant communities.
  - A. Use overall plant and soil cover condition as a primary indicator of a need for adjustments to management.
  - B. Use plant composition changes as the secondary indicator of a need to make management adjustments, such as the dominance of introduced or noxious species.
- II. Prevent unnecessary damage or disturbance to native plant communities.
  - A. Prevent encroachment of noxious weeds into wetlands (see Section 3.1.3).
  - B. To the extent that it is under MCLB's control, maintain or control water table depths to protect cottonwoods, willows, and other native plants in the riparian area.
  - C. As part of a regional strategy, control noxious weeds in riparian areas (see Section 3.1.4).
  - D. Prevent ground-disturbing activities in areas supporting the desert tortoise.

### **3.1.2 Sensitive Plant Species Management**

Lane mountain milkvetch (*Astragalus jaegerianus*) is a federally listed endangered species with potential to occur on MCLB Barstow. Lane mountain milkvetch and eight more potential sensitive species occur in surrounding areas and have California Native Plant Society designations (see Table 2-5). New information on plant distribution or taxonomy, the listing of a plant not previously designated with a sensitive status, sighting of a listed species not previously documented on MCLB, or discovery of a new species make planning for sensi-

*Policy Strategy for  
Sensitive Plant Species  
Management*

tive species difficult, at best. Although no sensitive plant species have been identified on MCLB, it is prudent to ensure that future changes can be accommodated under a sensitive species management program and policies of this INRMP.

*Objective: Provide for the recovery, enhancement and protection of all sensitive plant species and their respective habitats, as a proactive strategy to prevent federal listings of plants.*

- I. Continue to confirm the absence on MCLB property of each sensitive plant species with potential to occur.
  - A. Conduct rare plant surveys periodically. Target annuals in high rainfall years.
  - B. Keep an updated list of sensitive plant species with the potential to occur on MCLB and their sensitivity status.
- II. Implement a sensitive species management program upon the discovery of a sensitive plant on MCLB. Administer the program based on the following criteria:
  - A. As a first priority, protect enough habitat for rare plants to preserve essential ecological and evolutionary processes.
    1. Carry out programs to conserve and protect endangered and threatened plant species pursuant to the federal Endangered Species Act. Follow guidelines of the U.S. Fish and Wildlife Service (USFWS) in protecting endangered and threatened species as identified in 51CFR 106 (MCO P5090.2A).
  - B. Protect plants considered sensitive by the California Native Plant Society in addition to state and federally-listed plants.
    1. Establish the distribution and relative abundance for each species.
    2. Establish protection zones that buffer rare plants from ground disturbing activities and ensure that these areas do not become isolated from one another.
    3. Determine critical habitat for each sensitive plant species using the concept of minimal viable population size and the criteria that natural evolutionary and ecological processes continue intact.
  - C. Keep a cumulative map and record of surveys and findings on sensitive plants.

### 3.1.3 Wetland and Riparian Management

Wetlands provide many vital ecological functions that support resident and migratory wildlife with a habitat that is different from adjacent desert and upland habitat. Wetlands filter nutrients and sediments and are among the most impacted habitats in the world.

Base riparian areas are either jurisdictional Waters of the U.S. or wetlands (small areas). Both require permits for ground disturbing activities and possible mitigation under the authority of the ACOE and Section 404 of the CWA. Questions on site-specific impacts must be addressed to the ACOE.

A wetland delineation was conducted on MCLB in 1997 to determine jurisdictional status (see Appendix G). Jurisdictional delineations show which wetlands or water bodies are subject to regulatory jurisdiction under Section 404 of the CWA or Section 9 and 10 of the Rivers and Harbors Act of 1899. MCLB Barstow has approximately one acre of jurisdictional wetlands that are subject to regulation by the ACOE: the pond at the northwest end of the golf course, the areas along the old canal, and the old percolation ponds which support reeds.

The Executive Order, "Protection of Wetlands," (EO 11990) requires federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in:

1. Acquiring, managing, and disposing of federal lands and facilities;
2. Providing federally undertaken, financed, or assisted construction and improvements; and
3. Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Since the issuance of this Executive Order, the focus of national policy has shifted from "minimizing" destruction, loss, and degradation of wetlands to "no net loss" of wetlands in carrying out the above federal activities.

- There shall be "no net loss" of wetland habitat on MCLB, Barstow and impacts to wetlands will be avoided wherever possible.

Consistent with national and Marine Corps policy (MCO P5090.2A), there shall be "no net loss" of wetland habitat on MCLB Barstow and impacts to wetlands will be avoided wherever possible. The Marine Corps further strives to preserve and enhance the natural and beneficial values of wetlands while conducting its activities.

- See NEPA Planning in Chapter 4.

Any action significantly affecting wetlands shall require an environmental review. If it is demonstrated that wetlands impacts are unavoidable, then mitigation shall be required. Loss of wetland function shall be mitigated through wetlands enhancement, restoration, or creation.

#### *Policy Strategy for Wetland and Riparian Management*

*Objective: Protect and Restore the natural and beneficial functions of the Base's riparian vegetation, wetlands and Waters of the U.S. as part of appropriate permits with the ACOE.*

- 
- I. A current inventory of wetlands shall be maintained and net changes monitored annually (USDOD 4715.DD-R 1996).
    - A. Monitor the condition of wetlands and the effectiveness of management approaches.
      - 1. Monitor wetland community plant species composition and relative cover. Pay particular attention to exotics and invasion by noxious weeds.
  
  - II. Wetlands shall be managed to ensure no net loss or degradation.
    - A. Activities in the jurisdictional wetland and waters of the U.S. along the Mojave River must be permitted through the ACOE. This includes any movement or deposition of soil.
    - B. Any action affecting the Mojave River shall require an environmental review under the National Environmental Protection Act (NEPA).
  
  - III. Protect the natural ecological integrity, structure and functional values of wetlands.
    - A. Preserve the Mojave River. Exceptions should be part of an approved watershed management plan.
      - 1. Provide special protection consideration to wetlands which harbor sensitive species first.
      - 2. Prohibit practices which increase sedimentation of wetlands.
      - 3. Maintain hydrological processes and local ground water tables to protect wetland functional values.
    - B. Strive to maintain native riparian habitat and associated natural habitats along the Mojave River.
    - C. Control the spread and introduction of noxious plant species in wetland habitats.
    - D. Remove invasive tamarisk and giant reed.
  
  - IV. Preserve and protect riparian resources.
    - A. Establish a Base-wide policy of preserving riparian habitat to ensure against future losses.
    - B. Prevent dumping, filling or other contamination of the river bed and riparian habitat.
    - C. Identify riparian habitats in the master Plan and other Base planning documents.
    - D. Manage noxious weeds where determined to be a problem.

■ See Section 5.1. Land Use and Environmental Planning

■ See Section 3.1.4 Exotic Weed Control.



- V For all wetlands proposed for lease, easement, right-of-way, or disposal to non-federal public or private parties, MCLB will (Executive Order 11990):
  - A. Reference in the conveyance those uses that are restricted under identified federal, state, or local wetlands regulations: and
  - B. attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successor, except where prohibited by law; or
  - C. withhold such properties from disposal.

### 3.1.4 Exotic Weed Control

- Most exotic species do not require control. However, a few exotic weeds pose a serious long-term threat to desert habitats. Exotic species such as tamarisk and giant reed have the ability to completely change the structure of the vegetation, making it unsuitable to most native wildlife species.

Most exotic species do not require control. Either they are already so abundant and widely established that control efforts would be fruitless, or they lack the aggressiveness to cause real concern. An example throughout the California deserts is a low annual grass, *Schismus sp.*, introduced from Europe with the Spanish discovery of California. This grass, along with filaree (*Erodium sp.*) is so ubiquitous in the modern desert landscape that they must be considered permanently naturalized components of the community. These and other introduced annuals can change ecosystem dynamics by changing soil nitrogen cycling, out-competing natives for water, and predisposing an area to wildfire by providing fuel where there otherwise might not be enough to carry a fire.

A few exotic weeds pose a serious long-term threat to desert habitats. Several exotic species have the ability to completely change the structure of the vegetation, making it unsuitable to most native wildlife species. Sensitive and declining wildlife and plant species are particularly at risk from these weeds.

Some weeds that occur in very low numbers or seem innocuous for years may expand their range dramatically and become a difficult pest under the right environmental conditions. These conditions might be a year with very late rains, or a flood that results in heavy sedimentation of drainages in the case of riparian weeds.

Exotic weeds that invade and degrade sensitive habitats or directly impact endangered species should receive the highest priority for control measures. Table 3-1 describes criteria used by The Nature Conservancy (TNC) to prioritize pest plant problems.

Table 3-1. Prioritization of pest plant problems (adapted from TNC, no date).

<p>Set priorities in order to tackle the fastest growing and most disruptive problems first; in this way hoping to minimize the total long-term workload. First act to prevent new pest species from becoming established, then attack incipient problems and outliers of larger infestations. Next prevent the expansion of larger infestations and then work to reduce their size or, if possible, eliminate them, and finally, learn to 'live with' pests/infestations that cannot reasonably be controlled but keep our eyes out for innovations that might allow us to control them.</p> <ul style="list-style-type: none"> <li>■ Prioritize particular species or infestations as follows:             <ol style="list-style-type: none"> <li>1 Pest species with the ability to alter ecosystem functions.</li> <li>2 Pest species that move into and dominate undisturbed native communities.</li> <li>3 Pest species that overtake and exclude natives following natural disturbances.</li> <li>4 Pest species that prevent or depress regeneration by natives. This includes understory species that suppress seedling establishment and growth of overstory species thereby causing long-term changes in species composition.</li> <li>5 Small or otherwise easily eliminated pest populations. Avoid major problems by nipping them in the bud.</li> <li>6 Pest species that are increasing in number or extending their ranges, unless these changes are thought to be part of a well-known cycle or, temporary and due to unusual conditions.</li> <li>7 Pest species for which long-term control or elimination can be accomplished at reasonable expense.</li> <li>8 Pest species that are problems in nearby natural areas but are not thus far problematic [on the present site].</li> </ol> </li> <li>■ The following factors recommend <u>against</u> control:             <ol style="list-style-type: none"> <li>1 Species whose numbers are stable or decreasing.</li> <li>2 Non-natives that colonize only disturbed areas and do not move into undisturbed habitats.</li> <li>3 Pest species that will be pushed out by natives with succession or with the re-establishment of natural processes, e.g. fires, flooding.</li> <li>4 Pest species for which long-term control or elimination cannot be accomplished at reasonable expense.</li> </ol> </li> </ul>
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- The Noxious Weed Control Act requires federal land managers to cooperate with state and federal agencies to manage undesirable plants. It mandates that a program and a person be assigned to deal with unwanted plants, funding, cooperative agreements, and the use of integrated pest management systems.

The Noxious Weed Control Act requires federal land managers to cooperate with state and federal agencies to manage undesirable plants. It mandates that a program and a person be assigned to deal with unwanted plants, funding, cooperative agreements, and the use of integrated pest management systems. The military point of contact for the Act is the Armed Forces Pest Management Board (Established by OPNAVINST 6250.4A). OPNAVINST 6250.4A directs the DoN's pest management policy and requires a comprehensive Pest Management Plan, the contents of which are stipulated. The Instruction discusses the need to control pest outbreaks which affect the military mission, damage property or impact the welfare of people.

MCO P5090.2A requires Marine Corps installations to cooperate with state noxious plant programs provided that they are consistent with safety and security considerations and that control measures are acceptable and have been followed on privately owned lands. Installations may not deliberately introduce exotic species into any natural ecosystem, unless it is explicitly determined that such introduction will not have an adverse effect on those ecosystems, in accordance with NEPA.

- See Appendix I for details on tamarisk control and costs.

Tamarisk (*Tamarix* spp.) and giant reed (*Arundo donax*) are highly invasive exotics in desert riparian areas that have the ability to profoundly modify the structure and function of the ecosystem. Though difficult and expensive to control, efforts to eradicate and contain tamarisk are underway in the Mojave Desert as a result of the significant negative effects of tamarisk on natural ecosystems. See Appendix I for details on tamarisk control and costs.

*Tamarix ramossissima* is growing abundantly in the Mojave River areas of both Nebo and the Yermo Annex. It was noted from examination of historic aerial photos that the Nebo river area has much more cover now than it apparently has had this century due to the invasion of *Tamarix*. Water use by this plant may be affecting the river's groundwater level. Native riparian vegetation uses about 6 acre-feet of water per year while tamarisk uses 8 or more acre-feet per year. Due to the nature of tamarisk dispersal along the river and its extensiveness on MCLB, it will be difficult to control only those thickets which occur on the Base. However, MCLB may be able to control tamarisk through coordinated regional strategies with upstream and downstream land managers.

Giant reed (*Arundo donax*) is spotty in areas of the Mojave river on the Nebo parcel. Giant reed is present in amounts that could be treated for removal reasonably economically.

The Mojave River area at the Yermo Annex has an abundance of exotic weedy introductions due to the railroad passing through. Most are not especially noxious weeds. However, this site should be monitored for infestation by weeds that may be damaging to desert habitats and where they might be economically controlled, if discovered early.

*Policy Strategy for  
Exotic Weed  
Control*

*Objective: Eradicate or control the spread and introduction of noxious plant species with priority on those with greatest potential for sensitive species or habitat degradation.*

- I. Seek a commitment from USFWS and ACOE to gain mitigation credit for habitat enhancement through noxious weed control.
- II. Implement eradication programs as needed, based on established criteria.
  - A. Eradicate giant reed (*Arundo donax*) along the river area in Nebo.
  - B. Target tamarisk for removal.
    - I. Cooperate with other federal, state, and local interests along the Mojave river to design a comprehensive program of tamarisk removal. The following criteria should be considered in the design:
      - a. Efforts to control tamarisk are effective during the fall/winter when the species is in a non-growth phase and is more sensitive to herbicide applications.
      - b. Control the small number of young *Tamarix* spp. by hand grubbing.
    - C. Include contingencies for removing exotics as they first appear and for implementing new control measures as they become available into all restoration, mitigation, and management programs.
      - I. Use monitoring to detect new pest plants.

D. Ensure that control programs cause the least possible disturbance to indigenous species and communities and, for this reason, may be phased over time.

III. Monitor noxious weeds and those which have the potential to become noxious by remapping every three to five years.

### 3.1.5 Soil Erosion Prevention and Control

- The sparse vegetation, sporadic and intense rainstorms, loose alluvial soil, prevailing breezes, and location along the Mojave River make wind and water erosion concerns at MCLB.

Erosion is caused by the action of water and wind wearing away the land's surface. The sparse vegetation, sporadic and intense rainstorms, loose alluvial soil, prevailing breezes, and location along the Mojave River make wind and water erosion concerns at MCLB.

Federal land managers are required to control and prevent erosion by conducting surveys and implementing conservation measures (Soil Conservation Act PL 74-46; 16 USC 5901). This includes both point-source (originating from a single location such as a culvert) and nonpoint-source (originating from a dispersed area) erosion, especially that which may affect water quality.

In the desert, it is often air quality regulations that are challenged by soil erosion before water quality is affected. Throughout the Mojave desert wind represents a significant erosional force. Unconsolidated soils are the most susceptible, such as fine sands, or the silt-laden types at the margins of playas and underlying desert pavement. A portion of the eroded material enters suspension and becomes part of the atmospheric dust load, obscuring visibility and polluting the air. Disturbance, such as by vehicles, disrupts the pebble pavement surface or the biological crusts of filamentous blue-green algae that seal desert soil surfaces, exposing the soil below. Vehicular disruption of desert soils increases the severity and intensity of dust storms, being directly related to lowered threshold velocities for wind erosion of a given surface (Rowlands 1980). Loss of soil crust changes the nitrogen economy of a site, modifies soil temperature regimes, and affects water infiltration and penetration.

- Yermo is highly susceptible to sand and wind erosion problems. Areas of open and unimproved lands, disruption of the desert crust by vehicle testing, and the proximity of the Mojave River floodplain contribute to the severity of wind-related problems on the Yermo Annex.

Yermo is highly susceptible to sand and wind erosion problems. Areas of open and unimproved lands, disruption of the desert crust by vehicle testing, and the proximity of the Mojave River floodplain contribute to the severity of wind-related problems on the Yermo Annex. High velocity winds blow across the flat desert terrain picking up sand where the desert crust has been disturbed. Vehicles and equipment stored outdoors are subject to the often abrasive, sandblasting effect of these winds. In addition to this problem, drifts pile up on the west side of rows of stored equipment, requiring continued maintenance.

The effects of windblown sand and dust may be moderated by minimizing the disturbance of natural ground cover, covering the land to stabilize movement, or creating barriers to divert the wind or slow it down to about 12 mph (High Desert Resource Conservation *et.al* 1973). The most effective form of control is the prevention of conditions which promote wind erosion, such as by minimizing disturbance and protecting existing plant cover and soil crusts. Other means of control such as increasing plant cover and creating physical barriers are additional options for already impacted areas of the Yermo Annex. A combination of planting and walls or berms is effective and less watering is needed due to the shading



effect of these elements. Windbreaks on the west side of Yermo would serve to protect stored equipment from damage by the blowing and drifting sand of the prevailing winds.

Nebo is subject to the effects of water erosion. A water channelling system has been developed on Nebo to divert large quantities of surface run-off, which result from thunderstorms of short duration and high intensity, to the Mojave River. The diversion system is a combination of soil embankment and concrete lined channels. The major erosion problems occur in the soil embankment portions of the system (USDON, WESTDIV 1988).

- Preventing erosion is much more cost-effective than controlling erosion after the problem has begun. The best way to avoid erosion is not to disturb existing plants, soil crust, and the desert varnish.

Preventing erosion is much more cost-effective than controlling erosion after the problem has begun. The best way to avoid erosion is not to disturb existing plants, soil crust, and the desert varnish. Once the surface is broken by grading or traffic, wind and water will take their toll. Since avoidance is not always possible, measures for soil erosion prevention and control during routine maintenance activities, such as for roads, are discussed further in Chapter 4.0.

#### *Policy Strategy for Erosion Control*

*Objective A: Protect and restore soil productivity, watershed functioning, water quality, and wildlife habitat through effective implementation of Best Management Practices to prevent and control soil erosion.*

*Objective B: Prevent degradation of Base facilities and equipment and protect the quality of life of personnel from the abrasive or otherwise destructive effects of wind and water erosion.*

#### *I. Provide overall management guidance for erosion prevention and control.*

- A. The first priority shall be erosion prevention through proper planning, rather than to cure or correct conditions of accelerated or unnatural erosion. Destructive or unnatural erosion shall be prevented or controlled.*
  - 1. Generate Standard Operating Procedures (SOP) for soil disturbance.*
  - 2. Ensure NEPA review recommendations include mandate for erosion control.*
- B. Prioritize soil erosion control activities according to the seriousness of the degradation and potential impacts using the following parameters:*
  - 1. Safety, as for emergency or military vehicle access on secondary roads.*
  - 2. Potential impact on high-value facilities.*
  - 3. Damage to MCLB lands.*
  - 4. Likelihood of sediment entering a jurisdictional wetland, impacting a listed species, or affecting significant cultural resource.*
  - 5. Volume of potential soil loss.*
  - 6. Cost-effectiveness of the control measure.*

- See Appendix J for management and mitigation measures relating to soil erosion.

- C. Promote the innovative and effective use of Best Management Practices (BMPs) to prevent and control erosion.
    1. Implement strategies for measuring BMP performance as described in the *California Storm Water Best Management Practices Handbook*. Keep a record of the most effective BMPs for use in NEPA planning and mitigations.
    2. Facilitate coordination with other organizations when erosion concerns cross jurisdictional boundaries. Focus on the watershed as a whole.
    3. Keep informed and up-to-date on improved methods for preventing environmental impacts during maintenance activities and on revisions in laws, regulations and policies.
  - D. Facilitate cost-effective implementation of Best Management Practices erosion and control measures, using all resources available to the Base.
    1. Maintain an updated BMP list.
    2. Work toward State and EPA approval of specific BMPs in this INRMP and its updates.
- II. Implement erosion control measures based on the needs of each type of erosion source (MCO P5090.2A).
- A. Protect MCLB facilities from windblown sand through a combination of vegetative cover, windbreaks, and alternative physical measures in developed areas of the Base.
    1. Stabilize the source of sand through vegetation management.
      - a. Protect existing plant cover.
        1. Restrict off-road vehicle use.
        2. Develop a controlled vehicle testing program for Yermo.
        3. Replace testing in erosion prone areas on Yermo with man-made test facilities.
    2. Use windbreaks as barriers to manipulate the movement and distribution of sand.
      - a. Determine appropriate criteria for the installation of windbreaks on MCLB. Consider the following:
        1. Location in relation to other windbreaks, buildings, and changes on Base that will affect local wind patterns;
        2. Amount of effort that will be required to maintain the effectiveness of the windbreak. Windbreaks or other barriers will accumulate sand which necessitates periodic maintenance.
        3. Type of windbreak;

- See Appendix K for plants appropriate for use as windbreaks on MCLB.

- A. Vegetative windbreaks intended for sand barriers should be evergreen, have thick foliage from ground surface to top, be resistant to sand abrasion and have quick growth recovery from damage.
  - B. Vegetative windbreaks will require water to establish and maintain. Water needs will vary.
  - C. Windbreaks can consist of single or double rows of identical or compatible plants.
  - D. Walls, brush fences, or other mechanical barriers give effective control until deposited sand on the windward side overtops the barrier.
4. Equipment needed for maintenance; and
  5. Cost. The costs of sand removal around windbreaks are generally high.
3. Use chemical mulches where necessary. The use of chemical mulches and soil stabilizers are useful for control of small critical areas but are too expensive for widespread application.
  4. Regulate activities that contribute to sand blow. Adopt and enforce rules relating to off-road vehicle use, land use, and earth movement.
- B. Develop or use proven BMPs for controlling soil erosion from construction and landscaping sites.
1. Ensure incorporation of BMPs in the preliminary engineering, design, and construction of facilities involving ground disturbance.
    - a. Use the specific guidance for selecting BMPs as presented in the *California Storm Water Best Management Practices Handbooks*, and other proven techniques, with the following strategy:
      1. Minimize site disturbance;
      2. Stabilize site disturbance;
      3. Protect slopes and channels;
      4. Control site perimeter; and
      5. Control internal erosion.
      6. After construction, add source-control BMPs and treatment-control BMPs.
        - b. Prepare and submit an erosion control plan to be reviewed and approved by the Marine Corps and the USFWS (when listed species may be affected).
          1. Identify the types of BMPs used to control sediment.
        - c. Minimize disturbance caused by staging areas.
          1. Locate staging areas in disturbed areas only.
          2. Prohibit staging areas within sensitive habitat areas.

- Use the specific guidance for selecting BMPs as presented in the *California Storm Water Best Management Practices Handbooks*.

- See Appendix K for plants appropriate for erosion control on MCLB.

3. Delineate the staging area on the grading plans and allow review by the project biologist.
4. Monitor prior to start of construction.
- d. Plant disturbed sites with appropriate erosion control or landscape plants.
2. Adopt locally-proven revegetation practices with standards for:
  - a. ground preparation,
  - b. types of plants,
  - c. seed mixtures,
  - d. fertilization,
  - e. mulching,
  - f. irrigation,
  - g. timing,
  - h. maintenance,
  - i. landscaping,
  - j. cut/fill slope maximums, and
  - k. standards for compliance.

C. Develop a revegetation program for areas recently or in the past mechanically cleared for projects or improvements (e.g. reterrace and revegetate Radio Hill).

- See Section 5.1.2 Cooperative Planning.

*III.* Coordinate with other organizations to support the effective implementation of projects that involve multiple jurisdictions.

1. Pursue reasonable and cost-effective means to work with off-Base organizations, such as the BLM and the County, through Letters of Agreement, MOUs, and contracts.
2. Incorporate responsibilities for BMPs and sensitive resource protection in all Real Estate agreements (leases and easements) when they come up for renewal.

## 3.1.6 Water Resource Management

### 3.1.6.1 Water Supply

The water resources of MCLB are critical to all of the property's many uses. To maintain mission readiness, a reliable water supply must be available to meet present and future needs. An alternative source and a system to maintain water supply at all times is essential to ensure the operational capability of the Base. Currently the Base's potable water supply is pumped from production wells on Base or purchased from the Southern California Water Company.

Nebo obtains its drinking water through contract with the Southern California Water Company which extracts the water from wells in the Barstow and Lenwood areas. Production wells at Nebo have been inactive since about 1975. Yermo's potable water is derived from Marine Corps-owned wells at the Yermo Annex. There are three Yermo Annex production wells that have been in use since about 1960. Supplemental water for this parcel may be purchased from the Southern California Water Company and delivered through existing service lines which enter at the main gate. Potable water supplies for the Rifle Range are trucked-in and stored for use.

The growth and expansion of desert communities and the current overdrafting of groundwater basins have raised regional concerns over the west Mojave's collective water supplies. These issues directly affect MCLB because of its exclusive reliance on regional groundwater basins. Water supply and water rights concerns in the west Mojave have escalated in the past several years due to the severity of overdraft conditions and tenuousness of future supplies. A recent judgement adjudicated the rights to produce water in the Mojave Basin Area from the natural water supply and the obligations of the producers. The Final Judgement made in January 1996 stipulated a water quota system and a four-year water use reduction program (see Table 3-2 in Section 3.1.6.2 Water Rights). Producers that do not meet their water production obligations are required to pay the "make-up" water costs for downstream users. However, MCLB does not fall under the ruling's jurisdiction.

*Policy Strategy for Water Supply*

*Objective: Ensure the adequate supply and reliable delivery of water to support the domestic, landscaping, and environmental requirements of MCLB.*

■ See Section 5.1.2 Cooperative Planning.

- I. Participate in cooperative watershed planning with federal, state, and local agencies to ensure that adequate water supplies are available to serve all the Base's needs, now and in the future.
  - A. Cooperate with the MWA in monitoring water use in the Mojave River system.
  - B. Protect the water supply by working in cooperation with all water purveyors in the area to preserve, augment, capture, and purify all waters in the Mojave River system.
  - C. Protect the natural watershed by ensuring maximum recovery of natural groundwater supplies and plant and animal communities by recharging the Mojave River by whatever means are available.
  - D. Cooperate with the Mojave Water Agency, San Bernardino County Flood Control District and other agencies to consider long-term improvements and long-term maintenance within the Mojave River corridor which would capture storm runoff allowing percolation into the aquifer.

- 
- II. Reduce use of water for landscaping while continuing to provide a quality living environment to Base personnel.
    - A. Encourage the use of xeriscape landscaping.
    - B. Reduce water wastage on lawns.
      - 1. Designate lawn irrigation hours.
      - 2. Prohibit water runoff onto streets or sidewalks.
      - 3. Ensure lawns are watered only as much as needed.
      - 4. Convert lawns to attractive, drought-tolerant landscapes.
    - C. Meter water use to provide records of use and incentive for conservation.
  
  - III. Promote activities / measures that facilitate the reclamation and reuse of wastewater.
    - A. Use reclaimed wastewater and other non-potable water to the maximum extent feasible for: industrial uses, recreational uses, landscape irrigation, and groundwater recharge projects.
    - B. Apply water conservation and water reuse measures which are consistent with policies/regulations on water quality.

### 3.1.6.2 Water Rights

With the local waterbasin in overdraft since the 1950s, the rapid urban growth in the desert since that time has sparked a variety of concerns over the legal rights to dwindling water supplies of the west Mojave. In 1990, the City of Barstow and the Southern California Water Company filed a complaint which asserted that cumulative water production upstream of Barstow had overdrafted the Mojave River Basin. The complaint requested that the Superior Court guarantee an annual supply of at least 30,000 acre-feet to the City of Barstow and for the Court to mandate the MWA provide supplemental water pursuant to its statutory authority.

The MWA countered by filing a cross-complaint which requested a declaration that the available native water supply is inadequate to meet the demands of all its combined users. The complaint further requested a determination of all of the water production within the Mojave Basin. This shifted the focus of the litigation from the City of Barstow's conflict with upstream users to water supply issues of the entire Mojave Basin.

Good-faith negotiations began in 1992 between the numerous entities within the Mojave Basin Area. Their purpose was to find an equitable solution to the region's water supply problems and avoid extensive litigation. The result was a proposed Stipulated Judgement signed by approximately 80% of the verified water users. A Final Judgement was made January 10, 1996 which bound all Mojave Basin Area parties involved in water production to the Stipulated Judgement (see Table below). MCLB Barstow does not fall under the jurisdiction of this ruling.

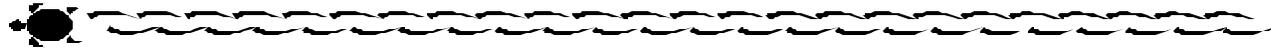


Table 3-2. Final Judgement to the Mojave Basin water supply overdraft.

Summary of the Final Judgement
<ul style="list-style-type: none"> <li>■ The Mojave Water Agency's Baja Service Subarea, which encompasses MCLB, was declared to be in overdraft.</li> <li>■ It is the responsibility of MWA to alleviate overdraft in this region.</li> <li>■ "Major" users (parties who use more than 10 acre-feet / year) will be charged a fee if they exceed the value of their highest usage between 1986 and 1990.</li> <li>■ "Free Production Allowance" is the base water quota allocated to each of the parties, annually, which will not incur extra fees or fines. The Free Production Allowance is scheduled to be reduced by each party by 5% each year for four consecutive years, beginning in water year 1993/94.</li> <li>■ Upstream users must pay costs for "make-up" water to downstream parties when the upstream party does not meet water obligations.</li> </ul>

Until the Mojave Water Agency undertook the adjudication and an independent court issued the Judgement in 1996, water production rights and obligations had never been defined in the Mojave Basin. The MWA is responsible for managing present and future water supplies and ensuring a stable, long-term supply of water for much of the Mojave Desert.

*Policy Strategy for Water Rights*

*Objective: Ensure protection of water rights to continue the beneficial uses of water on MCLB Barstow.*

- I. Protect and maintain local surface water rights.
  - A. Scrutinize proposed off-site actions in the upper Mojave watershed which could adversely impact streamflow conditions.
- II. Protect and maintain local ground water rights.
  - A. Evaluate the water rights implications before drilling any new well sites on Base.
- III. Participate in a regional DoD strategy to protect access of military installations in the desert to a reliable and adequate supply of quality water in the context of increased population growth.

**3.1.6.3 Water Quality**

Groundwater conditions at MCLB are monitored by an extensive network of shallow, intermediate, and deep monitoring wells installed during prior environmental and engineering studies. Groundwater conditions at the Yermo Annex vary significantly from the conditions at Nebo, in terms of depth, capacity, and quality. At Nebo, groundwater is encountered much shallower and is constrained by water quality problems.

The area surrounding the Base is experiencing a very special problem which directly affects its remaining deep well water reserves. Sludge encroachment into the water table by sewage discharges has destroyed any possibility for the captur-

ing of underground well water for domestic use at the Nebo facility. In a recent water test, this problem was not detected, however, this water is only used for agricultural purposes (M. Cox pers. comm. Mar. 2000). The Harper Lake earthquake fault between Nebo and Yermo has created a difference in water tables between these two facilities, such that the groundwater in the Yermo area is still of high quality (USDON, WESTDIV 1988).

Wastewater from the Base is discharged into the sewage collection system which transports domestic and industrial wastewater separately to treatment plants at Nebo and the Yermo Annex. The current Nebo sewage treatment plant is non-compliant for total dissolved solids and phenols. Yermo's sewage treatment plant is noncompliant for phenols and boiler operation discharges.

*Policy Strategy for Water Quality*

*Objective: Protect the quality of MCLB's surface water for consumptive and landscape uses.*

■ See Section 4.9 Conservation Education and Awareness.

- I. Prevent nonpoint-source pollution from on-site sources.
  - A. Provide an educational program for personnel to explain nonpoint-source concerns.
  - B. Initiate best management practices (BMPs) to prevent or treat nonpoint-source pollution.
    1. Focus on identified nonpoint sources initially.
    2. Implementation of BMPs will normally include:
      - a. design to meet specific site conditions,
      - b. monitoring to assure that practices are properly applied and are effective,
      - c. immediate mitigation of a problem where BMPs are not effective (including regulatory action, if necessary), and
      - d. improvement of an approved BMP when needed to resolve a deficiency.
  - C. Require wastewater collection and treatment systems which are consistent with the protection of public health and water quality.
    1. Plan and construct new wastewater treatment and collection facilities on the basis of the Base's expected growth.
    2. Ensure planned capacity increases in locations where sewage facilities are approaching capacity.



- See Section 5.1.2 Cooperative Planning and Section 5.1.3 Environmental Permitting and Consultation.

- II. Support all agencies in eliminating all sources of pollution which may contaminate water quality in the Mojave River system.
- III. Cooperate and coordinate with all governmental agencies, including the Regional Water Quality Control Boards (RWQCBs), to apply measures which will prevent surface and groundwater pollution.
- IV. Prevent point source pollution from on-site sources.
  - A. Investigate cross-connections and pretreatment solutions for phenols coming from industrial sources.
  - B. Investigate pretreatment for boiler discharges coming from heating plants.

### 3.1.7 Floodplain Management

- The Marine Corps is charged with providing leadership in avoiding direct or indirect development of floodplains, and in restoring and preserving the natural and beneficial values served by floodplains (MCO P5090.2A).

The flood hazard on MCLB is relatively insignificant, with only a small portion of Nebo located in the 100-year floodplain. However, incidents of flooding have occurred along the Mojave River, making effective floodplain management important in preventing damage to Base facilities and ensuring the safety of its personnel. In a recent episode, heavy flows from the April 1993 Mojave River flood destroyed two monitoring wells in the bed of the river at the Yermo Annex and damaged six wells at Nebo.

Executive Order 11988 regulates federal actions that may take place in the floodplain in order to reduce the risk of flood and minimize the impact of floods on human safety, health, welfare, and personal property. The Marine Corps is charged with providing leadership in avoiding direct or indirect development of floodplains, and in restoring and preserving the natural and beneficial values served by floodplains (MCO P5090.2A).

#### *Policy Strategy for Floodplain Management*

*Objective: Protect MCLB personnel and resources in the floodplain from the damaging effects of floods.*

- I. Accomplish protective measures to avoid or minimize the destructive effects of floods on Base personnel and resources.
  - A. Adopt the 100-year frequency flood as objective for providing flood protection.
- II. Seek to reduce on-Base and off-Base causes of flood damage on MCLB.
  - A. Challenge upstream development practices that may create injury to MCLB.
  - B. Minimize the construction of new permanent structures within the 100-year floodplain on MCLB.

## 3.2 Wildlife Protection and Management

### 3.2.1 Habitat and Ecosystem Management

- The habitat or ecosystem (rather than individual species) focus of this plan is expected to result in integrated recommendations which will serve to protect MCLB's communities as a whole. The key is to strike the acceptable balance between natural habitat values and the Base's military mission.

Stewardship has been a conservation concept in use for decades. Newer conservation-related terms, some of which have yet to be defined in practice, include: ecosystem management, biodiversity planning, landscape or natural communities conservation, and multi-habitat and multi-species management. In practice, wildlife stewardship represents a wide spectrum of actions: preserve, protect, manage, mitigate, manipulate, rehabilitate, restore and enhance. Wildlife stewardship is also more than a collection of isolated recommendations for individual species, game and non-game animals, or sensitive species.

This section addresses the well-recognized principle that managing habitats and ecosystems is more prudent and scientifically sound than managing individual species one at a time. Ecosystem management focuses on the protection of sensitive species from further encroachment and degradation and the protection and restoration of the function, structure and species composition of the various ecosystems to enhance species survival.

More recently and among other agencies including DoD, ecosystem management is thought of as a means to view humanity as part of the environment: "a collaborative process that strives to reconcile the promotion of economic opportunities and livable communities with the conservation of ecological integrity and biodiversity." (Ecosystem Management Dialogue Group 1997)

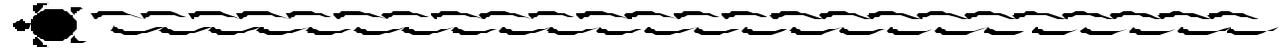
Some key concepts addressed in multiple-species or habitat conservation planning can be summarized as follows:

- Identify lands with high biodiversity or habitat value.
- Prevent habitat loss due to erosion, compaction, development, fragmentation, or other means.
- Maintain habitat quality and connectivity between patches. Habitat connections act as dispersal corridors, and link, for example, nesting and foraging areas.
- Create, restore or maintain buffer zones around high-value biological areas.
- Control introduction of exotic species and cultivars of native species.
- Foster physical and age-class structural diversity.

The habitat or ecosystem (rather than individual species) focus of this plan is expected to result in integrated recommendations which will serve to protect MCLB's communities as a whole. The key is to strike the acceptable balance between natural habitat values and the Base's military mission.

*Policy Strategy for Habitat and Ecosystem Management*

*Objective: Enhance, restore, and protect the natural diversity and long-term viability of the ecological and evolutionary processes in all natural communities and wildlife habitats consistent with USDoD ecosystem management policy (USDOD 1994).*



- See Section 3.2.3.1 Desert Tortoise: Critical Habitat.
- I. Define habitat values on the Base using ecosystem, landscape ecology, and multi-species concepts.
    - A. Begin with habitat values for the desert tortoise.
    - B. Integrate definitions with Multiple Species Management planning.
    - C. Map existing habitat values.
- See Section 3.1.1 Plant Communities.
- II. Establish prescriptions for specific habitat for each vegetation community type.
    - A. Protect and enhance landscape-level habitat values by adopting and implementing policies which protect large patch sizes, maintain connectivity and dispersal corridors, and establish buffer zones.
      1. Minimize habitat fragmentation by:
        - a. aligning roads to avoid fragmentation;
        - b. concentrating facilities; and
        - c. maintaining continuity with off-site open space.
      2. Delineate and maintain connectivity between habitat patches to link foraging and nesting areas, foster population dispersion and recolonization potential, and increase the area available for foraging.
      3. Promote quantity and quality of water for wildlife.
    - B. Protect and enhance community-level habitat values by adopting and implementing policies which preserve structural and species biodiversity.
      1. Ensure that plant communities on base, particularly wetland, wash communities and desert pavement areas are protected.
      2. Ensure that the Mojave River maintains spatial and structural diversity.
      3. Restore the Mojave River corridor by planting, erosion control, exotic plant eradication, and other management means.
    - C. Monitor habitat condition and the effectiveness of management activities.
  - III. Consider habitat management and enhancement options.
    - A. Establish windbreaks at Yermo which will:
      1. Serve as cover for wildlife and provide a source of food.
      2. Provide necessary nesting and roosting cover for resident and migratory birds.
      3. Provide shade and wind protection for many desert animals.
    - B. Ensure water supplies for wildlife. Establish guzzlers (watering systems for wildlife) as appropriate in coordination with CDFG. Avoid areas being managed for desert tortoise, due to safety and design concerns that can cause tortoise mortality.

- See Section 3.2.4.1 Migratory Birds.

### C. Improve habitat for resident and migratory birds.

## 3.2.2 Wildlife Inventories

Small mammal, reptile, and amphibian surveys were conducted on MCLB in the Spring of 1996. Incidental sightings of birds were recorded during the 1996 plant, small mammal, and herptile inventories. This has provided baseline information about the wildlife inhabiting the Base. In addition to these general surveys, specific surveys have been performed to assess the extent and condition of the federal threatened desert tortoise population on the Rifle Range.

### *Policy Strategy for Wildlife Inventories*

*Objective: Evaluate the sustainable status of wildlife populations through the gathering of sufficient information to understand the diversity, abundance, and condition of wildlife on the Base.*

- I. Inventory the diversity, abundance, location, and condition of wildlife species inhabiting the Base.
  - A. Monitor the status of wildlife species on the Base to help prevent their populations from becoming threatened or endangered.
  - B. Inventory and monitor species identified as endangered, threatened, candidate, or sensitive, as frequently as needed.
  - C. Perform studies on population condition, reproductive rates, age structure, and other necessary information on an annual or long-term basis.
  - D. If population or condition trends indicate a significant problem, identify probable cause(s) and pursue reasonable solutions.
  - E. Use scientifically valid and objective inventory techniques.
  - F. Conduct wildlife inventories to determine the presence or absence of sensitive species that may be present, but as yet undocumented, on Base.

## 3.2.3 Sensitive and Endangered Wildlife Species

MCLB must protect and manage any animal species listed as endangered or threatened under the federal Endangered Species Act. Only one listed species is known to occur on MCLB, the federal threatened desert tortoise. Other sensitive species such as state-listed or species of “special concern” may also inhabit the Base (see Table 2-4). DoN encourages cooperation with state protection programs. MCLB should be prepared to implement appropriate strategies to protect sensitive species and habitat once identified on Base.

### *Policy Strategy for Sensitive and Endangered Wildlife Species*

*Objective A: Manage existing and potential habitat of sensitive wildlife species in order to support and maintain biological diversity and optimum wildlife population levels within areas of sensitive habitat. Strive for maintaining land use flexibility to fulfill mission requirements.*



*Objective B: Avoid and minimize losses of sensitive species.*

- I. Avoid impacts by avoiding occupied areas.
- II. Perform site-specific studies prior to development activities to determine the precise mitigation necessary to preserve and enhance biological resources. Emphasis should be given to resources with high biological significance and sensitivity.

**3.2.3.1 Desert  
Tortoise: Critical  
Habitat**

The desert tortoise (*Gopherus agassizii*) occurs in portions of the Mojave and Sonoran deserts, throughout southeastern California, southern Nevada, southwest Utah, and south through Arizona and into Mexico. The Mojave population of the desert tortoise was federally listed as threatened on April 2, 1990. The Mojave population is considered to be tortoises found north and west of the Colorado River (USFWS, 1993a). This includes California, Nevada, and portions of Arizona and Utah that are north of the Colorado River.

The desert tortoise is primarily found on flats and bajadas with soil types ranging from sandy to gravelly-sand. They are also found in washes and canyon bottoms, and occasionally on rocky terrain and slopes in certain parts of the Mojave region. New studies indicate they may be found on rocky mountainous areas with slopes of up to 38% (Fisher, pers. comm). In the west Mojave (including MCLB Barstow), tortoises occur primarily in valleys, on alluvial fans, bajadas, and rolling hills in Saltbush, Creosote Bush and Scrub Steppe communities (USFWS 1993a). Characteristic vegetation of desert tortoise habitat includes creosote, cacti, and scattered shrubs with abundant inter-shrub space for growth of annuals and herbaceous plants.

Desert tortoises frequent substrate that is suitable for permanent or temporary burrows and spend much of their lifetime in these burrows. Desert tortoises dig their own burrows with spring and summer burrows usually differing from winter burrows (USBLM 1993). Winter burrows are usually longer and deeper under the surface and facilitate the hibernation of these reptiles for up to nine months each year. Communal winter burrows inhabited by dozens of hibernating tortoises are rare (very rare in western Mojave; USFWS 1993a). Desert tortoises usually have more than one burrow. In the western Mojave, burrows are deep and usually found at the bases of shrubs in bajadas, and rarely in washes (USFWS 1993a).

The life span of the desert tortoise is 50 -80 years. However, the mortality rate of pre-reproductive individuals averages 98% (Wilbur and Morin 1988; Turner *et al.* 1987). Once a tortoise reaches maturity, chances for long-term survival are quite good. Adult tortoises are well protected against most predators (except humans) and other environmental hazards and are consequently long-lived (Germano 1992; Turner *et al.* 1987). Their longevity helps compensate for their variable reproductive success, which is correlated with environmental conditions.

Eggs are vulnerable to predation as are hatchlings because of their soft shells (shells of juveniles remain soft for the first 5-6 years). Sexual maturity is reached between the ages of 12 and 20 years. Mating occurs during the spring months when plant

growth is abundant. During the late spring or early summer, the female digs a small funnel-shaped nest, where she lays 2-3 clutches of 1-14 eggs. The hatchlings appear 70 - 120 days later, or sometimes not until the following spring. Hatchlings must survive on their own as they do not receive any parental care. Following years of low rainfall, females may lay only a few eggs or none at all.

Desert tortoises feed on grasses, creosote, cacti, annual wildflowers, herbaceous perennials, and wild fruit. In the California deserts, they are most active during the spring and early summer months when annual plants are most common. In the western Mojave, above-ground activity occurs primarily in the spring when they feed on winter annuals, some perennial grasses, and cacti (USFWS 1993a).

Desert tortoises normally stay within a home range or activity area. Young tortoises may venture no more than 150 feet from their burrows, while older tortoises may have a network of burrows and can travel up to 3/4 of a mile in a day (USBLM 1993).



*Photo 3-1. Desert tortoise on MCLB. (Photo courtesy of Major Jones)*

The presence of the desert tortoise on MCLB was not formally realized until 1992. After that point, approximately 260 acres of MCLB were surveyed for desert tortoises in 1992, covering 170 acres of the Rifle Range, and about 90 acres within the Nebo area. Of the 30 desert tortoises identified during this survey, 26 were found at the Rifle Range. A majority of the remaining portions of the Rifle Range have since been surveyed, except for a portion in the middle of the Range Safety Clear Zone.

The desert tortoises found inside the Nebo area were relocated to the Rifle Range and desert tortoise proof fencing was constructed in 1994 along the Nebo Annex perimeter fence in compliance with the Biological Opinion (1993). This was done to prevent tortoises from migrating back onto the Nebo area as contaminant clean-up projects were in the planning stage and the area is used for testing military vehicles.



The 1993 BO addresses operations and maintenance activities (BO August 12, 1993) south of Interstate 40. It was determined that operations and maintenance activities in this area were not likely to jeopardize the continued existence of the desert tortoise. A second BO was issued on June 10, 1997 for proposed additional operations and maintenance activities on the Rifle Range. The USFWS determined that these new operations and activities would not pose a threat or jeopardize the desert tortoise population.

A Draft Recovery Plan for the desert tortoise was issued in 1993 by USFWS (USFWS 1993b) and a Final Recovery Plan was approved in June of 1994 (USFWS 1994). The final plan recommends the establishment of 14 Desert Wildlife Management Areas (DWMA). One of these areas, the Ord-Rodman DWMA, includes the southern boundary of the Rifle Range. If the DWMA's are approved, MCLB will cooperate with the USFWS to help desert tortoise recovery efforts.

Threats to the desert tortoise's existence in this area include collecting, vandalism, road kills, disease, off-road vehicle (ORV) activities, livestock grazing, mining, excessive raven predation due to development and human presence, and habitat loss and fragmentation due to development and human related activities. Threats to the desert tortoise south of I-40 on MCLB Barstow property are mainly from operations and maintenance activities on Nebo and the Rifle Range.

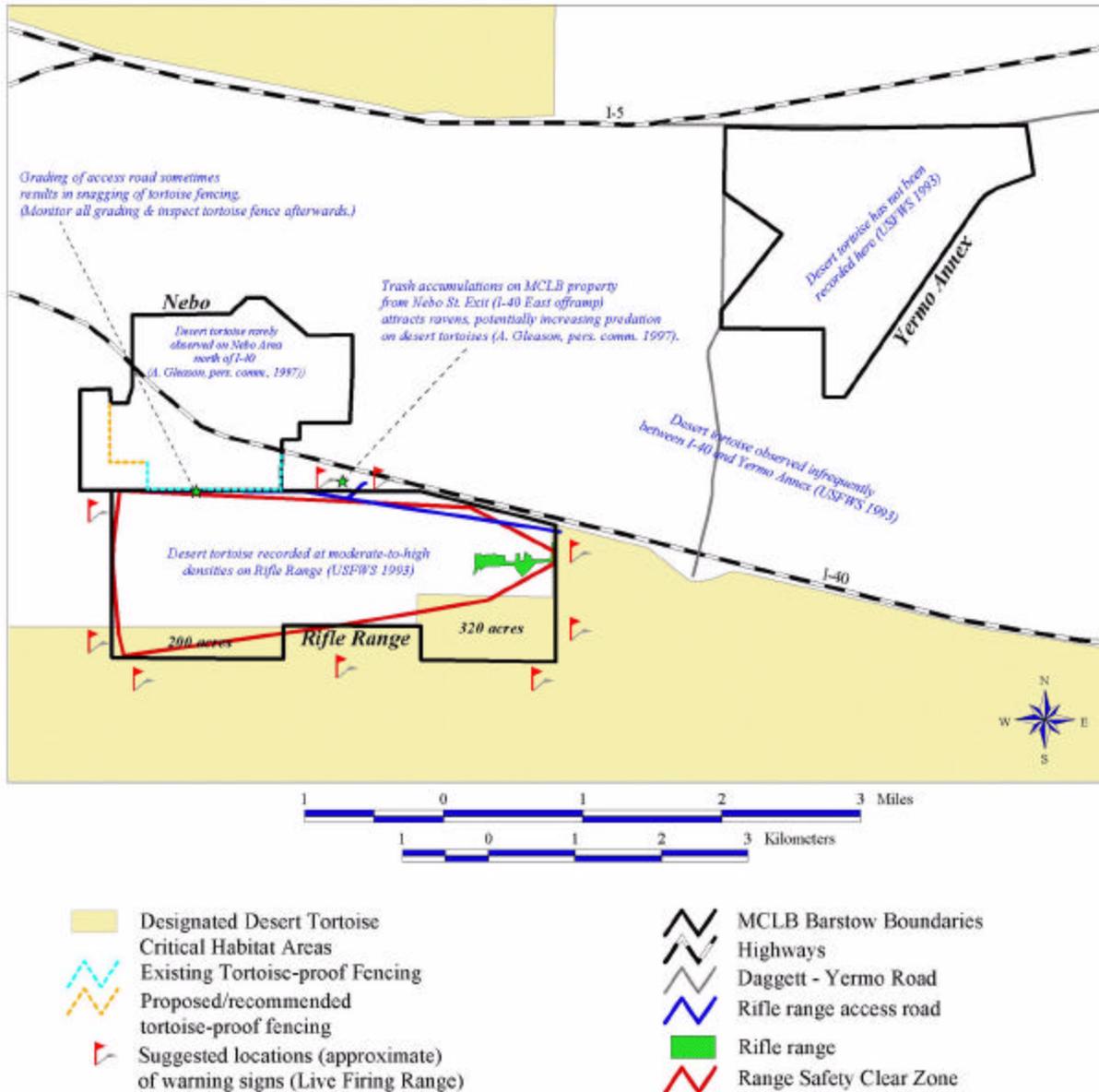
The actual rifle range is a small portion (29 acres) of the Rifle Range property (>2400 acres) and use is limited to approximately 12 weeks per year by the Marines, 60 days per year by the California Highway Patrol, and 12 times per year by a civilian gun club. Rifle Range maintenance is limited to grading the parking lot and access road semi-annually and as needed after severe storms. Also, maintenance of firing berms using hand tools to repair eroded sections and remove vegetation that impairs view is another activity that could harm desert tortoises (USFWS 1993b).

The 1997 BO was issued as a result of new construction and updated maintenance activities on the Rifle Range. The USFWS concluded that two acres of habitat would be lost during new activities, however, the loss would be largely temporary in nature. Following the completion of activities, the tortoises would likely use the area again (USFWS 1997).

Nebo operations that could threaten desert tortoises include testing of amphibious vehicles each month in the testing pond and driving vehicles along the perimeter road just inside the perimeter fence. Though the 1993 BO allows for up to 20 amphibious vehicles to be tested at the "fish pond" each month, actual testing is closer to about five per month (Gleason pers comm. 1997). Grading of roads within Nebo takes place on a regular basis, as needed. The perimeter road is graded monthly or as needed after severe storms. Security forces patrol the Nebo perimeter fence daily (USFWS 1993b).

Critical habitat has been proposed by the USFWS for this species. Approximately 520 acres of critical habitat occurs on MCLB property, all on the Rifle Range (see Map 3-1). Fortunately, the two areas of critical habitat that occur on MCLB property are the most remote and, most likely, the least used of any lands on MCLB. Most of the Rifle Range exists as a Range Safety Clear Zone for the actual rifle range (see Map 3-1).

## MCLB Barstow Desert Tortoise Locations, Critical Habitat, and Recommendations



Map 3-1. Desert tortoise locations, critical habitat, and recommendations.

*Policy Strategy for  
Desert Tortoise*

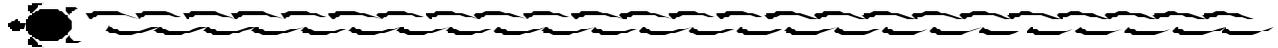
■ See the 1993 & 1997 Biological Opinions for a complete and detailed list of policies concerning the desert tortoise.

■ Consider the development of a desert tortoise management plan for the southern boundary of MCLB that would identify prohibitions and management actions necessary to maintain a viable population of desert tortoises.

■ See Appendix J for a more inclusive list of management and mitigation practices for the desert tortoise.

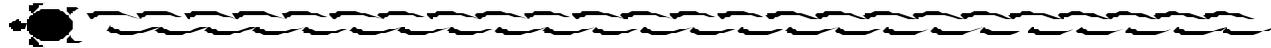
- I. Protect and manage the creosote habitat preferred by the desert tortoise in the Rifle Range.
  - A. Prohibit ORVs on the rifle range (USFWS 1993b).
  - B. Identify threats to this habitat. (ORVs, Operations and Maintenance of the Rifle Range, etc.)
  - C. Implement signage to indicate the presence of desert tortoise and appropriate activities in desert tortoise habitat (USFWS 1993b).
    1. Post signs stating NO ORVs are allowed on the Rifle Range except for the range parking lot and access roads themselves (USFWS 1993b).
    2. Post warning signs in strategic locations stating Live Firing Range to deter trespassers (see Map 3-1).
- II. Rehabilitate degraded tortoise habitat with native vegetation.
  - A. Coordinate all habitat improvement and enhancement activities with USFWS in accordance with the BOs.
- III. Protect and monitor the status of the MCLB tortoise population.
  - A. Develop a desert tortoise management plan by January 2002 for the southern boundary of MCLB that would identify prohibitions and management actions necessary to maintain a viable population of desert tortoises as requested by USFWS (1993b).
    1. Ensure that the tortoise management plan is updated regularly in order to maintain consistency with USFWS recovery efforts, new information on MCLB's tortoise population, and any additional biological information.
  - B. Ensure projects are planned and implemented to protect the tortoise population.
    1. Avoid use of pesticides or other chemicals that would potentially harm tortoises.
    2. Restrict projects that may inadvertently attract tortoise predators such as the raven. Ravens are attracted to refuse, water sources, and perching or nesting sites. Coyotes are also attracted to refuse and water sources.
  - C. Incorporate, to the maximum extent possible, the Reasonable and Prudent Measures listed in the 1993 and 1997 BOs into all remaining projects. These include:

- 
1. Worker education programs, defined work and construction areas (such as flagging areas to be graded, repaired, etc.) and well-defined operational procedures shall be implemented (USFWS 1993b).
    - a. Implement a worker/user education program concerning desert tortoises and BO mitigation measures with the cooperation of on-site qualified biologists (USFWS 1993b).
    - b. Observe 20 mph speed limit.
    - c. Only authorized biologists may handle tortoises.
    - d. No off road vehicles.
    - e. Prior to moving a vehicle, workers shall inspect for desert tortoises under the vehicle.
    - f. All trash and food items shall be promptly contained within closed, raven-proof containers.
  2. Take of desert tortoises, through injury or death, found within the proposed project area shall be reduced through establishment of clearly defined work areas (USFWS 1997). The boundaries of all construction areas shall be clearly marked with flagging, stakes, and temporary tortoise fence.
  3. Take of desert tortoises, through injury or death, found within the proposed project area shall be reduced through the removal of these animals to undisturbed areas adjacent to the construction site (USFWS 1997).
  4. Attraction of common ravens and other potential desert tortoise predators to project areas shall be reduced to the maximum extent possible (USFWS 1997).
  5. Observation of speed limits not to exceed 20 mph on roads to and from the rifle range shall be accomplished. (construction vehicles) (USFWS 1993b)
- D.* Establish a Desert Tortoise Program to track the MCLB tortoise population.
1. Complete the tortoise surveys in the middle of the Rifle Range to obtain important baseline information on population demographics. This information will be used in developing the desert tortoise management plan.
  2. Conduct surveys every three years using protocols defined by the USFWS. Anticipate the cost of these surveys in the Base's budgeting process.
  3. Monitor the movements, survivorship, and condition of relocated desert tortoises to evaluate the effectiveness of the relocation. This information could be used to develop more successful relocation techniques (USFWS 1993b).
  4. Establish study plots for measuring long-term population trends. Support Dr. Brody's desert study by allowing two or three permanent plots to be established on the Rifle Range.



5. Study the population using mark/recapture methods for more detailed information on the structure and composition of the populations.
  6. Evaluate the population dynamics of the species, including dispersal, colonization, correlation of occupied territory with human use factors, physical habitat, etc. Continue the radio monitoring program.
  7. Map all data resulting from surveys to be used in tracking this species' population.
  8. Prepare an annual monitoring report and deliver it to the USFWS on or before January 15 of each year (USFWS 1993b).
  9. Research sources of mortality. Consider the testing of desert tortoises accidentally killed by rifle and pistol range construction activities for heavy metal contamination (USFWS 1997).
  10. Conduct other research as necessary for management of the tortoise population on Base. Additional tortoise research recommended by the Draft Recovery Plan is listed below (USFWS 1993a):
    - a. Initiate epidemiological studies on the impacts of upper respiratory tract disease and other diseases.
    - b. Research recruitment and survivorship of younger age classes.
    - c. Conduct appropriately designed, long-term research on the impacts of grazing, road density, barriers, human-use levels, restoration, augmentation, and translocation on tortoise population dynamics.
    - d. Assess the effectiveness of protective measures in reducing anthropogenic causes of adult desert tortoise mortality and increasing recruitment.
    - e. Collect data on spatial variability of climate and productivity of vegetation.
    - f. Conduct long-term research on the nutritional and physiological ecology of various age-size classes of desert tortoises.
    - g. Conduct research on reproductive behavior and physiology, focusing on requisites for successful reproduction.
- E.* Gather natural history information on this species for use in surveying and developing management recommendations. For example: habitat use in the area, population dynamics, etc.
- F.* Reduce attraction of common ravens and other potential desert tortoise predators to the maximum extent possible (USFWS 1993b).
1. Implement trash clean-up program in chronic dump area at east-bound Nebo Street exit of I-40, where illegal trash dumping accumulates on Rifle Range property.

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- IV. Aid environmental education programs on desert tortoise.
- A. Distribute information to interested parties, e.g. the BLM pamphlet which contains information on status, management, significance, and what citizens can do to help.
1. Emphasize good stewardship responsibilities.
- a. Do not touch or harass the tortoise.
- b. Never take a wild tortoise home for a pet.
- c. Avoid picking up a tortoise unless it is in imminent danger.
- d. Drive slowly and alertly on desert roads to avoid accidentally injuring or killing tortoises crossing roads.
- e. Remain on existing roads.
- f. Move a tortoise to safety if it is in immediate danger such as crossing a busy road. Describe appropriate methods of relocating a tortoise.
- g. Do not litter as it attracts tortoise predators.
- h. Look under vehicles before leaving a location.
- i. Reporting information for sightings of dead tortoises, vandalism, and harassment.
- V. Administer the DWMA/Critical Habitat to protect desert tortoise habitat and populations.
- A. Prohibit the following activities in DWMA (USFWS 1994 Recovery Plan):
1. all vehicle activity off of designated roads;
2. military maneuvers and any other surface disturbance that diminishes the capacity of the land to support desert tortoises, other wildlife, and native vegetation;
3. domestic livestock grazing;
4. grazing by feral burros and horses;
5. vegetation harvest, except by permit;
6. collection of biological specimens, except by permit;
7. dumping and littering;
8. deposition of captive or displaced desert tortoises or other animals, except under authorized translocation research projects;
9. uncontrolled dogs out of vehicles; and
10. discharge of firearms.
- B. Control vehicular access to critical habitat areas.
1. Restrict establishment of new roads.



- C. Sign and/or fence critical habitat boundaries to discourage unauthorized use, as appropriate.

### 3.2.4 Wildlife Population Management

#### 3.2.4.1 Migratory Birds

Most native birds on the Base are neotropical migratory species, moving between California and countries to the south as part of their life cycle. As a result of obvious population declines, neotropical migratory birds are the subject of an international conservation effort. As an important biological resource and a good indicator of ecosystem health, MCLB's bird population must be managed effectively.

Department of Defense policy states that neotropical migratory bird programs shall be established in support of and consistent with the military mission. DoD's strategy will focus on inventory, on-the-ground management practices, education, and long-term monitoring (USDOD 4715.DD-R 1996). A means of achieving these strategies is offered through the Partners In Flight (PIF) cooperative program. PIF is an international effort involving partnerships among federal, state, and local government agencies, professional organizations, conservation groups, and all other interest parties to improve monitoring, research, management, and education programs involving birds and their habitats. PIF offers DoD the opportunity to participate in an international partnering effort to enhance stewardship of natural resources and implement conservation objectives on a landscape level.

The DoD is an active participant in the PIF Program. DoD's PIF policy is to promote and support a partnership role in the protection and conservation of neotropical migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems consistent with the military mission (USDOD n.d.).

#### *Policy Strategy for Migratory Birds*

*Objective: Conserve viable populations of neotropical migratory birds and raptors using the Base for stopover nesting, feeding, and resting.*

- I. Determine the status, health, and habitat use of neotropical migratory birds and raptors, emphasizing certain target or indicator species not currently considered sensitive.
  - A. Use cooperative assistance from wildlife agencies, organizations, and volunteers to help collect needed data.

**II. Protect the sustainability of these bird populations and their habitat.**

- A. Restrict access into and disturbance of nesting and breeding grounds during critical periods. Incorporate this restriction as a mitigation for proposed projects.
- B. Protect the populations from the lethal effects of human facilities and activities, where this does not conflict with safety concerns.
  - 1. Continue to limit the use of rodenticides. Remove any dead or dying rodents from a treated area to reduce the possibility of secondary poisoning through raptor predation of poisoned rodents.
- C. Take bird populations into consideration when reviewing projects on the Base.
- D. Support research and consider the needs of neotropical migrants wherever possible.

■ See Section 4.9 Conservation Education and Awareness.

**III. Stimulate awareness of migratory bird stewardship strategies.**

- A. Prepare educational materials regarding the Base's migratory birds and management practices. Include information on what personnel can do to help, species lists, and activities detrimental to the bird population.
- B. Promote activities aimed at increasing fledging success and decreasing overall bird mortality.
  - 1. Restrain household pets during the peak nesting season for those birds that nest on or near the ground.
  - 2. Report feral cats.
- C. Provide interpretive educational opportunities.
  - 1. Develop a "viewing station" and interpretive panel for unique habitat restoration and enhancement projects.

**IV. Enhance suitable urban or native habitats to encourage migratory stopover. Be "migratory bird friendly."**

- A. Consider the following opportunities for enhancement:
  - 1. Modify inactive sewage ponds to provide wildlife habitat. Establish appropriate vegetative cover to be more attractive and habitable by waterfowl.
  - 2. Convert the Tracked Vehicle Testing Pond to a wildlife stopover, contingent upon its retirement from military use. Fill and plant vegetation that will provide food and cover for a variety of animals including migratory birds.
  - 3. Rehabilitate the Mojave River area on Nebo by eradicating Tamarisk and establishing cottonwood-willow communities.

■ See Appendix I for Tamarisk removal strategies.



- See Appendix K for landscape plants which attract wildlife.
- B. Establish guzzlers to be used by MCLB's wildlife populations, including migratory birds. (Avoid areas being managed for desert tortoise.)
  - C. Consider use of artificial aids such as nest boxes.
  - D. Choose appropriate food plants for windbreaks.
- V. Preserve and maintain habitat for migratory birds.
  - A. Promote the Mojave River regional corridor link between Victorville Narrows and Afton Canyon.
  - B. Prevent noxious weeds from taking over native habitats.
  - C. Protect wetlands, ponds, and areas of dense vegetative cover.
- See Section 3.1.4 Exotic Weed Control.
- VI. Cooperate with large-scale efforts to research, monitor and manage migratory bird populations.
  - A. Participate in the PIF program.

### 3.2.4.2 Mammals

Mammals are well represented on MCLB by smaller species such as mice, squirrels, and rabbits as well as larger animals such as the bobcat and coyote. Informal inventories have taken place on each of the three parcels, but little is known about species abundance and interactions.

#### *Policy Strategy for Mammals*

- I. Determine status of the mammal populations and potential for harboring them.
  - A. Protect the migratory corridors, as determined by a study of movements, for moving within their large home ranges. Develop appropriate mitigation for access (e.g. crucial sections left open) in the design of any proposed perimeter security fence for the Base. Perimeter security fencing should be designed to ensure that tortoises and other reptiles can move about.
- II. Conduct general, periodic surveys of small mammals to obtain a comprehensive species list for the property. Gather information on the species as well as their relative abundance.
- III. Ensure that pest management of mammals minimizes harm to the species' population.
  - A. Inspect for presence of roosting bats before implementing any building and demolition projects.
  - B. Discourage habitation of occupied buildings through appropriate and biologically acceptable measures.

1. Exclude access to bat roosting sites after maternity season and before winter hibernation. No attempt to move animals shall be made during these vulnerable periods of seasonal occupancy.
  2. Explore potential for rodent exclusion devices for facilities as a priority to eliminate cost of cleaning and worker health risk.
- C. Encourage the relocation of bat colonies to alternative roosting sites.
  - D. Educate personnel about the need for non-lethal control measures and the benefits of sustaining bat populations.

### 3.2.4.3 Amphibians & Reptiles

Amphibians are not conspicuous inhabitants of MCLB, in fact only three amphibians have been identified to-date. Reptiles are more prevalent on Base. Lizards are often spotted darting from one shelter to another or resting in the shade. Snakes also occur on the Base though they are less likely to be seen. One reptile in particular has been studied in great detail on MCLB, the desert tortoise. Much is being learned about this federally listed species.

#### *Policy Strategy for Amphibians and Reptiles*

- I. Conduct general, periodic surveys for herpetological fauna in order to obtain a more comprehensive list of the species using MCLB.
  - A. Encourage study sites for research by local university professors and graduate students.
- II. Determine the population status of listed and sensitive species to support management decisions that fulfill the needs of the military mission while protecting these species.
  - A. Conduct periodic surveys, focusing on previous sites and using permanently established transects.
  - B. Develop and implement a study on habitat use and needs of each species.
  - C. If population declines are found, determine the cause and take appropriate action.

### 3.2.4.4 Invertebrates

Presently almost nothing is known of the invertebrate diversity on the Base, only one species of grasshopper has been recorded incidental to conducting other biological surveys. Native pollinators may be important to habitat and plant management.

#### *Policy Strategy for Invertebrates*

- I. Determine the abundance and diversity of invertebrate species on MCLB.
  - A. Conduct Basewide surveys to develop a baseline invertebrate species list, focusing on insects.

### 3.2.5 Animal Damage Control, Feral Animal Removal, Urban Wildlife

If wildlife species can find food, water or shelter in areas populated by humans, many will adapt to and even thrive in the new environment. Conflicts with humans can arise and range from simple nuisance cases, to damage to buildings or dwellings, or serious issues of disease transmission to people. Coyotes, ground squirrels, rats, swallows, sparrows, feral dogs and cats can become nuisances and occasionally a health hazard.

The laws regarding Animal Damage Control fall under CFR Title 14 Sections 251.5 and 671.6. Under the law, game species and fur-bearing mammals may be hunted and killed, or they may be trapped and released on-site. Removal or relocation of live animals requires a permit from CDFG, which reserves the right to decide which species of "special concern" should be relocated.

Animal damage control shall be implemented as justified by sound ecosystem management, health and safety considerations, conflicts with the military mission, and by the requirements of federal and state laws. Control should be limited to offending individuals or particular groups. Control based on habitat management is the preferred method. Other approaches of control include: deliberate removal of animals by shooting, or trapping; biological control by natural predators; chemical control by keeping animals away with a repellent; or, physical control by scaring away animals with various devices or excluding them from a site with fences.

Routine patrols on MCLB cover all buildings on a rotating basis with other problems handled on a complaint basis. It is standard practice to avoid use of pesticides and herbicides unless absolutely necessary.

#### *Policy Strategy for Animal Damage Control*

*Objective: Protect the Base, its inhabitants, and native species from risk or loss due to wild or feral animal predation or damage.*

- I. Prevent the risks and potential losses and liabilities from wild or feral animal damage.
  - A. Closely coordinate and cooperate with other Base offices in developing and implementing methods to reduce or eliminate facility damage and human conflicts related to wildlife.
  
- II. Anticipate problems by maintaining intervention protocols.
  - A. Control predation of endangered species from domestic, feral, and exotic animals.
  - B. Delineate protocols for protecting native wildlife from existing domestic, feral and exotic animals.
    - I. Consult the County Agricultural Extension and Commissioner's office about the use of poisons near rodent burrows (some poisoning can result in the mortality of nontarget species and should be avoided) or destroying them by other means.



2. Live trap feral animals as needed and turn them over to the County Animal Control Officer.

■ See Section 4.9 Conservation Education and Awareness.

*III.* Educate the public about the damage that can be caused by feral animals.

- A. Conduct educational programs for residents regarding controlling coyote attractants in the housing area.

### **3.3 Cultural Resources Management: Archaeological, Paleontological, and Historical**

Under the jurisdiction of the Marine Corps Logistics Base Barstow, the archaeological resources located on the Base are subject to federal regulations regarding management of Historic Properties. Relevant regulations include NEPA, the Archaeological Resources Protection Act (ARPA), the National Historic Preservation Act (NHPA), and the Native American Graves Protection and Repatriation Act (NAGPRA). Under Section 110 of the NHPA, federal agencies have the responsibility to locate, inventory and, nominate historic properties under their ownership or control which appear to qualify for the National Register. NAGPRA, in providing for the protection of graves as well as other cultural items within archaeological sites, promotes consultations with traditional users of the land whenever land disturbing activities are undertaken (WMC 1996).

Archaeological resources on MCLB include two widely dispersed lithic scatters, one sleeping circle site, a petroglyph site, and three prehistoric isolates. Analysis of artifacts recovered from the surface demonstrate no evidence of habitation activities; rather, the recovered materials support the interpretation that the area was used primarily for resource exploitation. The petroglyph and sleeping circle sites may reflect activity associated with a travel corridor through the region (WMC 1996).

A petroglyph site in Yermo contains rare remnants of the “written record” of prehistoric peoples in the Barstow region. Although the rock art site itself, as well as the surrounding archaeological deposits once reported to exist, have suffered from historic exploitation and disruptive land uses, it remains an important site. It is currently a California Point of Historical Interest. Focused research and evaluation could demonstrate that the site is eligible for the National Register of Historic Places (WMC 1996).

The sleeping circle site covers a small area, and it appears that, if it was once larger, the southern portion has been covered by construction of the mounded firing lines. Combined with the absence of both surface and subsurface artifacts, the disturbance of the site’s context severely limits research potential. The site appears to have no potential for meeting National Register eligibility criteria (WMC 1996).

No resources which meet National Register criteria have been identified on MCLB. However, some historic sites have been recorded on the property, including the Mojave Trail on the Yermo Annex, the Atlantic and Pacific Railroad, and National Old Trails Highway which traverses Nebo.

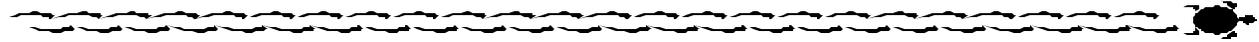
*Policy Strategy for  
Cultural Resources*

A number of cultural resources may be present but identified. The identification of cultural resources and determination of their importance is best done on a regional scale. When that is not feasible, it must be done on a project level, and measures taken to ensure that important sites are preserved, or that the information they contain is recovered prior to their disturbance by development activities.

*Objective A: Develop a legally defensible, scientifically sound program for stewardship of cultural resources.*

*Objective B: Accomplish mission-related activities with a minimum of delay and maximum flexibility, while protecting the Bases's cultural heritage.*

- I. Identify and protect important archaeological and historic cultural resources.
  - A. Collect and preserve available local historical resources.
  - B. Preserve and protect, to the greatest extent possible, archaeological sites and features.
  - C. When such resources cannot feasibly be preserved in place, preserve the information they contain through implementation of appropriate data recovery programs.
- II. Safeguard resources and information to preserve the cultural heritage of MCLB Barstow.
  - A. Manage the cultural resources in order that their quality and scientific and socio-cultural values are maintained and enhanced.
  - B. Ensure that the cultural resource base is given full consideration in land use planning and management decisions.
  - C. Develop and adopt policies, standards, and BMPs for protecting resources.
  - D. Support research on paleontological resources that is compatible with the military mission.
- III. Determine stewardship responsibilities with respect to Native American values.
  - A. Consider the concerns of the Native American community in the planning process.
  - B. Ensure that management objectives for cultural resources avoid or minimize potential conflicts with traditional native American beliefs and concerns.
  - C. Establish access criteria and communication protocols for Native American with interests in MCLB resources.



IV. Clarify when mission activities and preservation of an eligible or National Register listed site may be in conflict, requiring an assessment of effects and mitigation measures.

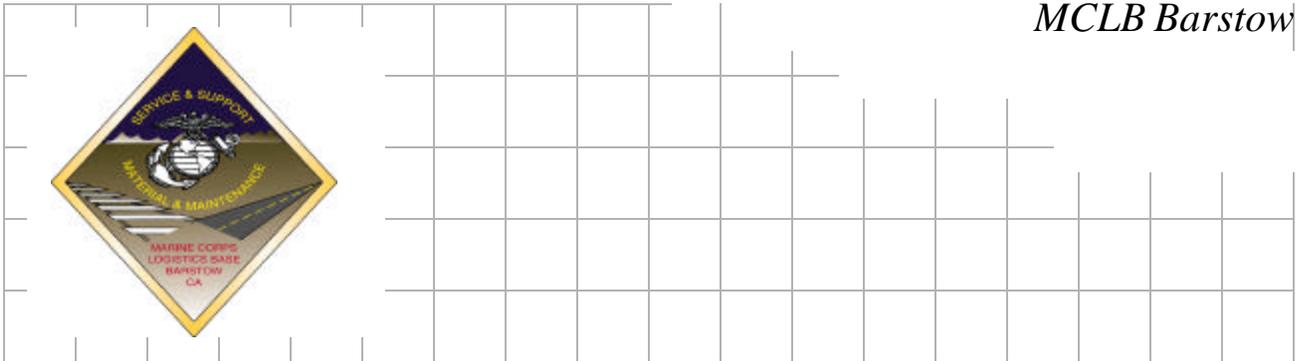
A. Consult with the SHPO regarding the management of historic properties, including the appropriateness of a Programmatic Agreement to expedite routine or repetitive actions.

V. Develop cultural resource outreach programs to enrich local communities and the general public.

■ See Appendix J for a list of project management and mitigation practices.

VI. Ensure that significant resources which are exposed during grading for construction are recovered and preserved for their scientific value.





## 4.0 Mission Management and Natural Resources Compatibility

*GOAL 2: Ensure that all uses of MCLB Barstow land are compatible with the military mission and meet environmental compliance responsibilities.*

### 4.1 Military Mission and Environmental Compatibility

- MCLB Barstow's mission has, overall, been compatible with natural resources management.
- This Plan is written under the premise that environmental compliance and the military mission can be fully accomplished with strategic, adaptive planning and management.

MCLB Barstow's mission has, overall, been relatively compatible with natural resources management. The requirement for a large safety buffer around the rifle range has precluded options for development, restricted off-road vehicle access, and left large, contiguous areas of native habitat largely intact. The smaller Nebo and Yermo parcels are more disturbed as a result of their mission-intensive functions, accommodating all measures of storage, community, and administrative activities.

It is the responsibility of the Base to assure the co-existence of MCLB facilities with the natural desert environment and surrounding communities. Any future changes in the Base's mission requirements should continue to provide sanctuary to wildlife and plant communities. This Plan is written under the premise that environmental compliance and the military mission can be fully accomplished with strategic, adaptive planning and management.

Marine Corps policy calls for natural resources to be managed to support the military mission while preserving, protecting, and enhancing these resources. Land use practices and decisions must coincide with the military mission, rely on scientifically sound conservation procedures and techniques, and employ scientific methods and an interdisciplinary approach (MCO P5090.2A).

The purpose of this section is to provide guidance for protecting the flexibility of the military mission and environmental compliance. Policies are enumerated which set a course for excellence in environmental stewardship and compliance at improved efficiency, timeliness, and reduced cost.

*Policy Strategy for  
Military Mission and  
Environmental  
Compatibility*

*Objective: Ensure no net loss of available land and operational carrying capacity for military support while pursuing environmental protection needs (USDoD 4715.DD-R 1996).*

- See Section 5.1.1 NEPA Planning.
- See Appendix J for a list of management and mitigation practices.

- I. All infrastructure shall be aligned to contribute to military readiness.
- II. Enhance planning that links support of the Marine Corps with environmental protection.
  - A. Continue to use the Strategic Plan as the primary vehicle by which the military mission and environmental compliance are integrated.
  - B. Use existing agreements and programmatic consultations with regulators to guide management.
  - C. Use NEPA documentation and mitigation policies to guide specific projects.
  - D. Use this Plan as a reference and keep on-hand Best Management Practices (BMPs) for projects and general land use and maintenance needs.
  - E. Minimize land use compatibility conflicts by maintaining communication with the City of Barstow and nearby communities of Daggett and Yermo.
    1. Establish protocol for collecting and informing Public Affairs and Command of land use development issues.
  - F. Develop policies to protect the integrity of important habitat areas while allowing projects that enhance the mission of supporting military readiness.
    1. New construction shall take place within existing developed areas whenever possible.
    2. Unneeded roads or other infrastructure should be permanently closed and the area restored, if necessary, to native habitat.
- III. Pursue incentive-based conservation planning.
  - A. Work with USFWS to arrive at a strategy for a mitigation banking-style, programmatic agreement that results in basic incentives for the Base to continue conserving and enhancing sensitive species habitat.

## 4.2 Construction and Maintenance

### 4.2.1 Construction

- The President has directed that Federal agencies shall design, use, and promote construction practices that minimize adverse effects on the natural habitat where cost-effective and to the extent practicable.

On occasion there is a need to build new facilities to fulfill MCLB's mission and military readiness. The DoD Military Construction (MILCON) budget is a primary source of funds for construction. However, recent budget cuts have limited the MILCON project roster.

The President has directed that Federal agencies shall design, use, and promote construction practices that minimize adverse effects on the natural habitat where cost-effective and to the extent practicable (U.S. White House 1994).

#### *Policy Strategy for Construction*

*Objective: Ensure military readiness by completing construction projects which enhance and support current or planned operations on MCLB, while minimizing adverse effects to the natural and human environments, to the maximum extent possible.*

- See Appendix J for a preliminary list of management and mitigation practices.

- I. Fish and wildlife conservation shall be considered in all site feasibility studies and project planning, design, and construction. Appropriate conservation work and associated funding shall be included in project proposals and construction contracts and specifications (USDOD 4715.DD-R 1996).
  - A. Develop or use proven Best Management Practices for controlling soil erosion from construction and landscaping sites.
    1. Ensure incorporation of BMPs in the preliminary engineering, design, and construction of facilities involving ground disturbance.
      - a. Use the specific guidance for selecting BMPs as presented in the *California Storm Water Best Management Practices Handbooks* (Camp Dresser & McKee *et al.* 1993), and other proven techniques, with the following strategy:
        1. Minimize site disturbance;
        2. Stabilize site disturbance;
        3. Protect slopes and channels;
        4. Control site perimeter; and
        5. Control internal erosion.
      6. After construction, add source-control BMPs and treatment-control BMPs.
    2. The selected construction contractor shall prepare and submit an erosion control plan that shall be reviewed and approved by the Marine Corps as well as the U.S. Fish and Wildlife Service (when listed species may be affected). This erosion control plan shall identify the types of BMPs used to control sediment.



- See Appendix K for landscaping guidelines.

3. Minimize disturbance by locating staging areas in disturbed areas only. Staging areas shall be prohibited within sensitive habitat areas. Staging areas shall be delineated on the grading plans and reviewed by the resource agencies and project biologist monitor prior to start of construction.
4. Plant disturbed sites with appropriate erosion control or landscape plants.
5. Adopt locally-proven revegetation practices with standards for:
  - a. ground preparation,
  - b. types of plants,
  - c. seed mixtures,
  - d. fertilization,
  - e. mulching,
  - f. irrigation,
  - g. timing,
  - h. maintenance,
  - i. landscaping,
  - j. cut/fill slope maximums, and
  - k. standards for compliance.

## 4.2.2 Routine Maintenance

- Routine maintenance of roads, utility lines, rifle range, and other infrastructure is important for safeguarding access to facilities and ensuring the safety of those involved in implementing the mission. Routine maintenance may be stymied by the need to comply with requirements to protect natural and cultural resources. With foresight and proper planning, delays and impacts can be avoided or minimized.

Routine maintenance of roads, utility lines, rifle range, and other infrastructure is important for safeguarding access to facilities and ensuring the safety of those involved in implementing the mission. Proper maintenance also prevents erosion and associated non-point source and air pollution. Guidelines for maintenance are needed that allow for protection of sensitive environmental resources and the timely, cost-effective completion of environmental documentation requirements, while ensuring full accomplishment of the military mission.

Of necessity, roads and other infrastructure will traverse sensitive environmental and cultural habitats. Routine maintenance may be stymied by the need to comply with requirements to protect these resources. With foresight and proper planning, delays and impacts can be avoided or minimized. However, this often requires a substantial change in the day-to-day business to which maintenance departments have become accustomed.

Several laws are pertinent: the Clean Water Act, Endangered Species Act, National Environmental Policy Act, and Soil Conservation Act. Routine maintenance activities that may affect drainages fall under the Natural Resource Conservation Service's permitting authority under the Food Security Act on agricultural lands, and on other lands under the ACOE authority from Section 404 of the Clean Water Act.

*Policy Strategy for  
Routine  
Maintenance*

■ See Section 4.1 Military Mission and Environmental Compatibility.

■ See Appendix J for a preliminary list of management and mitigation practices.

Routine Rifle Range maintenance consists of grading access roads and the parking lot semi-annually and after severe storms, repairing firing berm erosion, and trimming vegetation between berms in the live fire lanes. Nebo and Yermo maintenance activities include the grading of the parking lots and dirt access roads semi-annually and as needed after severe storms.

*Objective: Safeguard military readiness by maintaining access and operation of roads, utilities, and other infrastructure to their original design standard or better, while protecting wildlife habitat, sensitive species, soil productivity, watershed functioning, and water quality.*

- I. Infrastructure shall be aligned to contribute to military readiness and protection of environmental values.
  - A. Seek agreement between Public Works, Security, the Fire Department, and environmental staff on the minimum network of roads needed to meet requirements for military readiness, safety and security, fire control, and environmental protection.
  - B. Make rifle range clean-up a high priority for the protection of aesthetic and habitat values.
  - C. Develop a 5-10 year Long-term Maintenance Plan.
- II. Provide overall management guidelines for maintenance activities while preventing erosion and protecting sensitive natural and cultural resources.
  - A. The first priority shall be to prevent, through proper planning, losses of environmental values due to impacts to soils, watersheds, habitats or species.
    1. Develop a list of appropriate mitigation practices as a guide to maintenance practices.
      - a. Continue to revise and update the mitigation list with improved, practical approaches and costs.
    2. Mitigate for unavoidable impacts to sensitive species.
  - B. When repair work becomes necessary, it will be prioritized according to its seriousness and potential impact based on the following criteria:
    1. Safety or security, as for emergency or military vehicle access on secondary roads.
    2. Potential for affecting high-value facilities or areas crucial to the military mission.
    3. Likelihood of affecting a listed species (beneficially or otherwise), a jurisdictional wetland, or significant cultural resource.
    4. Volume of potential soil or habitat loss.
    5. Cost-effectiveness of the repair or control measure.

- 
- C. When repair work becomes necessary, environmental staff will be notified early enough so the needed review, surveys, documentation may be prepared without project delay.
  - D. Monitor resource condition and effectiveness of BMPs as mitigation.
    - 1. Monitor BMPs in terms of:
      - a. Implementation to specifications,
      - b. Having the desired management effect (Strategies for monitoring BMP performance are described in the *California Storm Water Best Management Practices Handbook*, [Camp Dresser and McKee et al. 1993]); and
      - c. Soundness in context of the overall management strategy.
    - 2. Keep a record of the most effective BMPs for use in NEPA and mitigation planning.
    - 3. Pursue reasonable and cost-effective means to perform erosion control work.
    - 4. Incorporate responsibilities for BMPs and sensitive resource protection in leases and easements when they come up for renewal.
  - III. Keep informed and up-to-date on improved methods for preventing environmental impacts during maintenance activities and on revisions in laws, regulations, and policies.

### 4.2.3 Emergency Maintenance

Emergency maintenance activities for major leaks, hazardous materials spills, fires, critical repairs, or other emergencies require immediate response from Base personnel. The need for quick decisions and action may conflict with paperwork, access, timing, sensitive resources, or numerous other routine Base requirements. Protocols are needed for emergency repair of infrastructure so that human life, health and safety are given precedence, but sensitive resources are also protected. Emergency repairs need to be anticipated so environmental damage, which is typically worse in an emergency than during a planned repair, can be reduced. The Base will need to develop a clear understanding with USFWS about the extent of environmental damage that may be expected from disturbances such as emergency repairs, spills, and fire control.

#### *Policy Strategy for Emergency Maintenance*

*Objective: Anticipate and prevent emergency infrastructure problems to ensure human health and safety while minimizing damage to sensitive resources.*

- I. As a first priority, prevent emergencies.
  - A. Implement a mishap root-cause analysis program to identify problems and correct them.

1. Identify prior emergencies and their causes.
  2. Assess the performance of the response team and feed results into making continuous improvements.
- B.** Develop and seek funding for an infrastructure replacement schedule.
1. Establish and maintain an equipment management program to ensure necessary items are procured and properly maintained.
    - a. Establish a complete inventory readiness list of all emergency response equipment with their location.
    - b. Develop a preventative maintenance schedule to ensure equipment readiness is maintained.

### 4.3 Landscaping and Grounds Maintenance

Landscaping benefits the human working environment by conserving energy, providing wildlife habitat, protecting watersheds, preventing soil erosion, reducing glare, buffering noise, improving visual aesthetics, creating wind buffers, and providing for heat control in recreation areas and around buildings. The importance of appropriate landscaping, both for visual and climate control reasons, cannot be underestimated in this desert environment.

Wind erosion, water erosion, extreme temperatures, heat and glare from the sun, and poor soil conditions are the main environmental constraints for landscaping at MCLB. These factors make implementing an effective landscape strategy very difficult. Selection of appropriate plant materials and, in some cases, modification of the physical environment will abate some of these limitations.

- The main *planning* constraint for landscaping on-Base is the inadequacy of current and projected water supplies.

The main *planning* constraint for landscaping on-Base is the inadequacy of current and projected water supplies. The use of extensive new plantings is not practical due to present water conservation guidelines. However, by utilizing native and other drought tolerant plants coupled with appropriate planting and irrigation methods, the Base can continue to upgrade its landscaping and still meet its water conservation goals.

Recent drought conditions and a growing awareness of the need to conserve water resources mandate the scrutiny and re-evaluation of planting and maintenance policies. Current water conservation efforts consist mainly of reducing irrigation without the benefit of a detailed analysis of specific area requirements. Over or underwatering could threaten the survival of the existing, well established trees and other plants which serve as a focal point for the Base's landscaping and provide protected areas for use by personnel (USDON, WESTDIV 1992; hereafter referred to as BEAP 1992).

Extensive landscaping is also difficult and costly to maintain due to the type of soils and soil erosion in the area. Wind erosion is a severe problem and current windbreaks and screen walls are inadequate. The use of gravel ground covering as an alternative to planting has not been successful overall in combatting erosion problems (BEAP 1992).



- Control of dust and maintenance of air quality is a particularly important function of a sound landscaping plan.

Control of dust and maintenance of air quality is a particularly important function of a sound landscaping plan. A “no dirt” policy would go far to reduce exposure of soil to wind erosion. Consideration should be given to covering large bare areas with drought/wind tolerant ground cover in combination with rocks/gravel. In addition, restoration of the desert crust or native vegetation will visually integrate the base with the surrounding environment.

### 4.3.1 Current Landscaping

- A coordinated “Mojave Desert” landscaping theme will improve the overall visual appearance of the Base and establish a coherent visual image which is more pleasing for residents and visitors.

There is a general lack of natural vegetation and landscaping throughout the developed portions of the Base. Though there are several pockets of landscaped areas with lawn, shrubs, and some mature trees, large portions of the Base show bare desert soil or are sparsely vegetated (BEAP 1992).

The Base lacks a consistent visual theme in its landscape design. A coordinated theme will improve the overall visual appearance of the Base and establish a coherent visual image which is more pleasing for residents and visitors. The visual theme recommended under the Base Exterior Architecture Plan (BEAP) for the Base is described as “Mojave Desert.” This architectural/landscape theme will reflect MCLB Barstow’s natural setting, history, mission, and physical characteristics.

Existing Base landscape consists of lawn, shade trees, shrubs, windbreaks, and ornamental desert cacti areas. The condition of the plants varies from excellent to poor. Some issues associated with the current landscape are over-pruning, incorrect planting techniques, inadequate irrigation, soil sterilant damage, and poor seasonal timing of planting (BEAP 1992).

### 4.3.2 New Landscaping

- New landscaping should consist mainly of drought tolerant and area-adapted native species, combined with rock mulches and boulders.

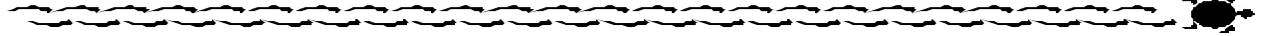
The highest priority should be given to the existing landscaping which is already threatened by present water conservation guidelines. All new planted areas must be justified by providing desert landscaping and/or new technologies for planting and maintenance of drought resistant species. The economic impact of maintenance should be assessed when new landscaping is considered (USDoN, WEST-DIV 1988).

New landscaping should consist mainly of drought tolerant and area-adapted native species, combined with rock mulches and boulders. The overall landscaping effect should be consistent with the surrounding desert environment. Any new landscaping and/or outdoor amenities must be designed within conservation and budgetary guidelines and should be virtually maintenance free.

New lawn areas are not encouraged except where functionally essential. Lawns require frequent watering because of desert conditions. Existing lawns can be maintained at “survival” level with careful measuring and scheduling of irrigation. Where permitted, reclaimed water should be used. Lawns should be restricted to: parade grounds, family housing, recreation fields, and tots play-ground areas (BEAP 1992).

The President has directed that Federal agencies shall implement the following policies where cost-effective and to the extent practicable:

- Use regionally native plants for landscaping;



- Design, use, or promote construction practices that minimize adverse effects on the natural habitat;
- Seek to prevent pollution by among other things, reducing fertilizer and pesticide use, using integrated pest management techniques, recycling green waste, and minimizing runoff. Landscaping practices that reduce the use of toxic chemicals provide one approach for agencies to reach reduction goals established in Executive Order No. 12856 “Federal Compliance with right-To-Know Laws and Pollution Prevention Requirements;”
- Implement water-efficient practices, such as the use of mulches, efficient irrigation systems, audits to determine exact landscaping water-use needs, and recycled or reclaimed and the selecting and siting of plants in a manner that conserves water and controls soil erosion. Landscaping practices, such as planting regionally native shade trees around buildings to reduce air conditioning demands, can also provide innovative measures to meet the energy consumption reduction goal established in Executive Order No. 12902, “Energy Efficiency and Water Conservation at Federal Facilities;”
- Create outdoor demonstrations incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of implementing this directive. Agencies are encouraged to develop other methods for sharing information on landscaping advances with interested non-federal parties.

■ To the extent practical, MCLB must use regionally native plants for landscaping and other beneficial water conservation techniques.

■ Appendix K provides a list of plant materials and guidelines suitable for planting at MCLB. This list is not all-inclusive, many other plants can perform well and should be allowed if evidence of their suitability is documented.

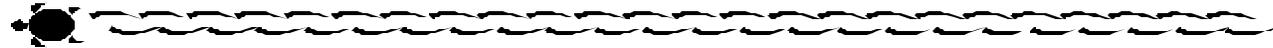
In keeping with these Federal standards, Marine Corps policy requires environmentally and economically beneficial landscaping to be practiced on all Marine Corps lands. To the extent practical, MCLB must use regionally native plants for landscaping and other beneficial water conservation techniques (MCO P5090.2A).

Landscape plants should be chosen according to the degree of drought resistance, availability, cost, ease of establishment and type of maintenance required. A limited variety of the most locally-adapted, drought resistant plants should be used. Appendix K provides a list of plant materials and guidelines suitable for planting at MCLB. This list is not all-inclusive, many other plants can perform well and should be allowed if evidence of their suitability is documented. Plants should also be selected with a theme and purpose in mind and spacing based on eventual size. Important uses such as shade, windbreaks, erosion control, recreation surfacing and reduction of heat and glare should be considered in addition to aesthetic effect.

*Policy Strategies for Landscaping & Grounds Maintenance*

*Objective A: Provide a sound basis for management and design of landscaping and grounds, particularly in consideration of their ability to enhance quality of life and foster a sense of community pride among those supporting and participating in activities at MCLB Barstow.*

*Objective B: Conserve water, protect water quality, reduce runoff and erosion, and decrease plant nutrient loss by reducing the demand for water in landscaped settings.*



■ See Appendix K for landscaping guidelines.

■ See Section 3.1.5 Soil Erosion Prevention and Control.

- I. Use landscaping to moderate environmental influences (e.g. solar heat gain, glare, dust, and wind), mitigate human activities (e.g. noise, construction), unify exterior spaces, enhance biological values, and enhance formal/ceremonial activities.
  - A. Use trees and shrubs to block all undesirable views, noise, and lights and provide privacy.
  - B. Plant deciduous trees for solar insulation/winter heat-gain screening at buildings.
  - C. Use plants that are useful to wildlife as a food source, where practicable.
  - D. Provide windbreaks to mitigate dust and wind.
- II. Reduce energy consumption through creativity and planning.
  - A. Minimize water use, maintenance, and fertilizers wherever possible through efficient irrigation systems, drought-tolerant plants, appropriate plant use, and effective plant establishment techniques.
    1. Conduct an irrigation system evaluation to determine water use efficiency on landscaped, irrigated plantings. The intent is to control the rate amount, and timing of irrigation to conserve water, protect water quality, reduce runoff and erosion, and decrease loss of plant nutrients.
  - B. Plant drought-tolerant plants from late fall to early spring.
  - C. Revegetate all disturbed slopes in landscaped areas with effective erosion control plants wherever soils are unnecessarily exposed.
- III. Strive toward an attractive, coordinated visual image of the base to improve morale and present a positive image to visitors and the community through effective landscape design.
  - A. Identify and prioritize landscape projects Base-wide. Some key landscape needs addressed in the 1992 Base Exterior Architecture Plan are:
    1. Upgrade the appearance of the major entrances to the Base as a means of presenting a more positive image to personnel, visitors, and the general public.
    2. Develop Obregon Park at Yermo to include landscaping, removal of the tanks, and installation of site furnishings.
    3. Improve curbs, barriers, and edge conditions to protect planting and landscaping from vehicle and foot traffic.
  - B. Use the Mojave Desert theme as described in the BEAP to guide future landscape design.

- 
1. Enhance the visual quality of the Base by insuring the survival of existing, mature landscaping and encourage the use of drought-tolerant, low maintenance plant materials for new plantings.
- C. Integrate landscaping plans with Capital Improvement Projects to maximize the practical, visual, environmental, and energy-saving benefits of vegetation.
1. Plan new facilities in coordination with existing and new landscaping to take advantage of building orientation, overhangs, trellises, etc.; reduce the need for large landscaped areas; and protect plantings where most effective.
- IV. Incorporate water-conserving irrigation practices in landscapes, while controlling salt load in the soil profile. Continue to update and revise water-conserving operation and maintenance procedures.
- A. Develop and evaluate water conservation guidelines and practices for maintenance and establishment of turf grass. Integrate these guidelines into Base policy.
1. Determine when sufficient irrigation has occurred on turf by estimating the water application rate per hour.
    - a. Use appropriate technology to ensure water application in the proper amounts.
  2. Designate lawn irrigation hours.
  3. Prohibit sprinkler runoff onto streets and sidewalks.
- B. Reduce areas in turf and replace with drought-tolerant shrubs, trees, and herbaceous perennials.
1. Design irrigation systems and schedules to better manage water use and provide constant plant growth. Separate systems and schedules should be designed for turf and other landscapes.
  2. Separate high and low water use plants.
  3. Use drip irrigation and low volume spray/bubblers for non-turf areas.
- C. Amend the soil to improve water retention, drainage, and aeration.
1. Amend or reclaim excessively compacted, heavy, saline, or sodic soils.
- D. Provide weed control.
1. Use mulches to reduce evapotranspiration and control weeds.
  2. Apply herbicides on an as-needed basis only.
- E. Adopt a “no dirt” policy. Reduce the exposure of soil to erosion and resulting atmospheric dust.
- F. Shade parking areas.

- See Appendix L for Barstow area agencies that can provide further assistance on landscaping plants, soil amendments, and maintenance/irrigation practices.

- V Set state-of-the-art standards for landscape plant care and maintenance.
  - A. Consult with the local Farm Advisor or local landscape contractors and nurseries about soil amendments needed for poor planting soils.
  - B. Institute an experimental program to reestablish desert landscaping (BEAP 1992).
  - C. Enforce strict planting, plant replacement, and irrigation design guidelines to minimize loss of materials.
  - D. Encourage use of organic and rock mulches.
  - E. Establish a comprehensive maintenance program, responsive to conservation, budgets, and realistic implementation goals for the high desert environment and the special conditions at MCLB Barstow.

## 4.4 Leases

- Often military land may be put to use for agricultural or grazing purposes and still be consistent with the military requirements of the installations.

The Marine Corps is authorized to outlease lands when it is compatible with the military mission under Title 10 Section 2667 of the US Code. In addition, DoD and DoN policy allow leasing of lands to reduce maintenance costs. Often military land may be put to use for agricultural or grazing purposes and still be consistent with the military requirements of the installations. Lease agreements are required to contain a Soil and Water Conservation Plan which dictates BMPs, or conservation measures for protecting the environment. The lessor may also be required to perform certain management activities or install improvements, such as fencing or watering devices or noxious weed control, on a cost reimbursable or cost sharing basis. The plan must include sound agricultural and pest management practices and be consistent with state and federal regulatory requirements and the overall goals of the installation.

In general, the small size of MCLB does not lend itself to the outleasing of its lands for agriculture or grazing purposes. However, the potential does exist for the future leases.

### *Policy Strategy for Leasing*

*Objective: Ensure the long-term viability, compatibility and fair-market value of all leases, in conjunction with the military mission and natural resource protection.*

- I. Set criteria for establishing, continuing or cutting back lease agreements for agriculture.
  - A. Military lands that meet the following criteria and that are capable of producing agricultural crops shall be considered for outleasing when:
    - 1. the proposed lease shall sustain and conserve the property for future military use;

2. the proposed lease shall not interfere with current or planned use of adjacent property;
3. the proposed lease does not represent a hazard to the premises;
4. a substantial benefit, such as reduced maintenance costs, cash rental for leased property, or improved property management shall accrue to the government; and
5. detrimental impacts to natural and cultural resources are not significant.

*B.* Aggressively promote agricultural outleases along with other secondary uses of land to the maximum degree compatible with operational requirements (NAVFAC P-73 1987).

*C.* Assure fair market value for all agricultural leases.

1. All new or revised land management plans will incorporate the potential for additional agricultural outleases, and related documentation. Outleases up for renewal will be reviewed for:
  - a.* cost of required improvements prior to and during outleasing;
  - b.* estimated fair market rental value;
  - c.* annual operating maintenance expenses;
  - d.* dollar value of conservation benefits; and
  - e.* advantages/disadvantages of a contract for more than the normal five-year maximum term (NAVFAC P-73 1987).
2. Since real estate is a valuable Federal asset, it is inappropriate for that asset to be transferred for less than its fair market value, unless directed by Congress.

*D.* Develop and implement a system to capture the full cost of supporting tenants.

1. Establish cost rates for all environmental categories with estimates corresponding to level of effort anticipated.

*II.* Certain principles should apply to decisions about *non-agency* land uses:

*A.* Unless Congress has provided funding for the planning of non-agency land uses, a non-agency land use proponent should pay the reasonable costs of review associated with their request. Real estate leases need to be reviewed through the NEPA process. A preliminary environmental assessment shall be made for each new or proposed agricultural outlease (NAVFAC P-73 1987).

*B.* Unless Congress directs otherwise, the Base may not assume the risks and liabilities arising from present and future non-agency uses. Such risks and liabilities should be identified during the planning process, and should assure appropriate accountability is placed on the proponent.

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- C. There shall be a detailed understanding of the management responsibilities of both the Base and the land user.
  - D. The Base shall avoid any unlawful discrimination in the consideration of non-agency uses of its lands.
- III.* Provide oversight, inspection and monitoring of outgrants for compliance with environmental protection laws.
- A. Review Soil and Water Conservation plans when outgrants come up for renewal.
    - 1. Implement and enforce a strict water conservation program.
    - 2. Require specific actions for soil erosion control and water quality protection in these plans.
  - B. Implement policies to include specific environmental compliance actions in all outgrants issued.
  - C. Work with Southwest Division (SWDIV), Real Estate, to ensure periodic inspections of all outgrants, and to implement an effective action plan to address violations.
  - D. Institute policies to ensure that present and future Base Instructions cover the activities of outgrantees, as appropriate.

## 4.5 Encroachment

- Encroachment pressures along MCLB's borders are minor, though the increasing development and use of west Mojave resources may affect the Base in the future. Even with moderate expansion in outlying regions, urban and commercial developments are not anticipated to encroach MCLB Barstow's boundaries in the foreseeable future.

Encroachment pressures along MCLB's borders are minor, though the increasing development and use of west Mojave resources may affect the Base in the future. The City of Barstow and unincorporated San Bernardino County areas are concentrating future development plans within current boundaries by infilling existing open spaces. Barstow is currently experiencing considerable growth and expansion. However, most land developments are directed toward the City's western boundary, leaving MCLB east of the general pattern of development. Even with moderate expansion in outlying regions, urban and commercial developments are not anticipated to encroach MCLB Barstow's boundaries in the foreseeable future.

For safety, security, and resource sensitivity reasons, MCLB cannot allow extensive encroachment along its borders now or in the future. Severe encroachment may constrain compatibility, safety, security, mission, or operational support requirements. Except for possible development of recreational uses in close proximity to the firing range or testing areas, the existing mission and functions of MCLB do not conflict with the overall goals for the region.

### 4.5.1 Illegal Dumping

- Illegal dumping of trash on the Rifle Range may attract predators of the desert tortoise. Elevated predation levels can cause a depression in local populations of desert tortoise.

Illegal dumping of trash occurs periodically on the Rifle Range and adjacent open lands. This activity is centered off the Nebo exit of I-40 (see Map 3-1 for common trash dumping locations). The location of the Rifle Range dumping site is particularly crucial because of its proximity to desert tortoise habitat. Clean-up and control of this situation is needed for more than aesthetic reasons; predator attraction above natural levels may be a result of the debris. The common raven (*Corvus corax*) is an efficient predator of the desert tortoise and is attracted to trash, water sources, and perching or nesting sites. Other predators, particularly the coyote (*Canis latrans*), are also attracted to refuse and water. Elevated predation levels can cause depressions in the local population of desert tortoise.

This activity is an illegal form of encroachment on MCLB Barstow's borders and requires containment.

#### *Policy Strategy for Encroachment*

*Objective: Anticipate and protect against additional encroachment on resources available for fulfilling MCLB's mission and conserving environmental resources.*

- See Section 5.1. Land Use and Environmental Planning
- See Section 4.10 Public Outreach.
- See Map 3-1 for trash dumping locations.

- I. Protect the integrity of the property in consideration of MCLB Barstow's military mission, natural resource, and economic requirements.
  - A. Maintain an open space buffer, to the extent possible, around the Base to ensure the safety, security, and quality of life of MCLB's personnel, visitors, and neighbors; and sustain the Base's natural resource and ecosystem values.
  - B. Anticipate future mission changes and any associated land use requirements.
- II. Review existing and anticipate potential conflicts of adjacent land uses with MCLB activities.
- III. Seek public recognition and support for excellent stewardship of the property.
- IV. Identify through markers, fencing, or signage all of MCLB's boundaries with safety, security, or resource sensitivity concerns to prevent trespassing and other unlawful activities.
  - A. Install appropriate signs to deter illegal trash dumping on the Rifle Range.
- V. Enforce perimeter security.
  - A. Concentrate security enforcement efforts toward recognized problems of access and encroachment which are detrimental to the health, safety, or well-being of personnel, visitors, natural and cultural resources, or equipment.
    - I. Prevent the illegal dumping of trash on-Base.

## 4.6 Public Access

- Marine Corps installations are to provide for sustained public access and use of natural resources for educational or recreational purposes when such access is compatible with mission activities, and with other considerations such as security, safety, and resource sensitivities.
- MCLB's small size coupled with safety, security, and resources sensitivities, make unrestricted access to MCLB's natural resources impractical.

Marine Corps installations are to provide for sustained public access and use of natural resources for educational or recreational purposes when such access is compatible with mission activities, and with other considerations such as security, safety, and resource sensitivities. When an installation is not suitable for public access, a specific determination must be made that the military mission prevents such use for safety or security reasons, or when such usage would cause substantial environmental degradation. Federal, State, and local officials are to be granted access to natural resources after proper safety and security measures are taken (MCO P5090.2A).

MCLB's small size coupled with safety, security, and resources sensitivities, make unrestricted access to MCLB's natural resources impractical. On the Rifle Range, access is constrained by the need for a large buffer area around the firing range and the presence of the federally threatened desert tortoise. In addition to safety and stewardship concerns, the liability associated with these two factors makes a policy of open access to this parcel inappropriate. Currently, community interest in this parcel is centered around use of the firing range itself, for pistol or rifle target practice. Two non-military groups are authorized special use of the range facilities under the 1993 Biological Opinion: California Highway Patrol weapons training is sanctioned four days per month and a civilian gun club is permitted one day per month (USFWS 1993b).

Nebo and the Yermo Annex are mostly developed lands, enclosed by security fencing and accessible only through designated gate entrances. These secured areas enable the safe storage and warehousing of supplies and equipment and the testing of military vehicles. Since most materials and equipment are stored outdoors, access is necessarily restricted. Public interest in accessing Yermo is for the educational study of the Rattlesnake Rock Petroglyph. Of primary recreational interest on Nebo is its golf course.

There is an opportunity for continued special access to MCLB's educational, natural, cultural, and recreational resources. Access to MCLB is approved on a case-by-case basis, upon request.

### *Policy Strategy for Public Access*

*Objective: Restrict public access to temporary uses which are compatible with the military mission, natural resource responsibilities, safety, and security.*

- See Section 4.7 Outdoor Recreation and Section 4.9 Conservation Education and Awareness.

- I. Establish clear, coherent policies and procedures for allowing temporary public access to the Base.
  - A. Allow temporary public access to all suitable educational and recreational facilities on the Base, including developed recreational opportunities.
    - I. Encourage viewing of the Rattlesnake Rock Petroglyph for educational purposes.

- 
- B.* Provide access for agencies and others to conduct natural resources research to the extent it does not interfere with the military mission.
- II.* Planning for public access shall consider, but not be limited to, the following topics (USDoD4715.DD-R 1996):
- A.* Eligible users of installation resources and facilities, including the installation's method of determining user eligibility and priorities.
  - B.* Procedures required for the public to gain access.
  - C.* Accessible and off-limits resources, areas and facilities.
  - D.* Areas designated for special use.
  - E.* Points of access and egress.
  - F.* Periods of access.
  - G.* List of permitted and prohibited activities.
  - H.* Schedule of applicable fees and charges.
  - I.* Safety precautions and installation emergency situation responses provided.
  - J.* Installation personal injury and property liability policy.
  - K.* Native American access to traditional cultural sites.
  - L.* Access agreements with agencies and organizations.
  - M.* Installation-established access quotas to reflect installation operational, outdoor recreation, and wildlife carrying capacity.

## 4.7 Outdoor Recreation

The Sikes Act requires that installations provide public access for natural resource uses to the extent that it is appropriate and consistent with the military mission. In response, a Memorandum of Understanding (MOU) between the DoI and DoD was signed which requires all military installations to develop outdoor recreation plans where there are suitable resources for such a program consistent with national security.

Department of the Navy policy is to permit access to outdoor recreation resources to the greatest degree possible, consistent with the installation's safety and security requirements and its available manpower and natural resources to support such activities without degradation or impairment of environmental qualities. If public use must be limited or regulated, the reasons and details of such limitation or regulation must be specified, e.g., limitation of the resource base, conflict with mission, security requirements, and safety requirements (NAVFAC P-73).

- The Marine Corps is required to provide outdoor recreation and interpretive opportunities to the public where and when it is compatible with military needs. Outdoor recreation activities are intended to support the wise stewardship of the DoD's natural resources.

- Outdoor recreation, as defined for the purposes of this section, is the active use of the Base's natural resources for recreation and physical exercise. It does not include the use of recreation facilities normally associated with urban development.

- MCLB is unable to sustain outdoor recreation opportunities to the public due to the presence of a federally threatened species, the restricted nature of the facilities, and safety and security issues.

### *Policy Strategy for Outdoor Recreation*

The Marine Corps, as an important occupier of federal lands, has various programs for outdoor recreation opportunities. These programs are designed to be compatible with national defense and security requirements and must ensure integrated multiple use management of natural resources. The Marine Corps is required to provide outdoor recreation and interpretive opportunities to the public where and when it is compatible with military needs. Outdoor recreation activities are intended to support the wise stewardship of the DoD's natural resources. In the event of potential conflicts of use, sound biological management practices shall prevail.

Current outdoor recreation activities on MCLB include picnicking, walking and jogging, biking, and wildlife watching. Outdoor recreation, as defined for the purposes of this section, is the active use of the Base's natural resources for recreation and physical exercise. It does not include the use of recreation facilities normally associated with urban developments such as playgrounds, golf courses, athletic fields/courts, fitness trails, riding stables, or swimming pools.

As a rule, outdoor activities on the Base are few due to climatic conditions and the relatively small military population as compared to civilian personnel living off-Base. Most are urban-style recreational uses, such as a large playing field near the Main Gate, a gymnasium, a golf course, small landscaped areas for protected outdoor picnics and other activities, and Obregon Park in Yermo, a section of which is used for display of old military equipment. There is also a riding stable on Yermo that suffers from a lack of funding and underutilization (BEAP 1992).

Though MCLB is naturally constrained by desert conditions, upkeep and establishment of outdoor recreation activities are important factors in maintaining morale and the quality of life for Base personnel. Public access to MCLB for outdoor recreation must be allowed whenever compatible with mission activities and other considerations such as security, safety, or resource sensitivity. Allowing access for outdoor recreation to the public can improve the Base's public image. It opens up opportunities to educate the public about the Marine Corps' mission and why certain restrictions on access are necessary.

Due to the presence of a federally threatened species, the restricted nature of the facilities, and safety and security issues, MCLB is unable to sustain outdoor recreation opportunities to the public. The Rifle Range is incapable of supporting any outdoor recreation activities because of safety requirements and the presence of the desert tortoise. Nebo and the Yermo Annex are mostly developed facilities, offering few opportunities for outdoor recreation. Both Nebo and Yermo's mission-intensive functions are additional constraints to outdoor recreation. Public access to Nebo or the Yermo Annex would conflict with security issues. This determination does not include urban recreational uses such as the golf course or interpretive and other educational activities.

*Objective: Promote compatible, sustainable outdoor recreation opportunities which enhance quality of life for MCLB personnel, while conserving natural resources and accomplishing the military mission.*

■ See Section 4.6 Public Access.

- I. Identify and evaluate outdoor recreation opportunities on MCLB.
  - A. Determine all current and potential recreation activities on the Base.
  - B. Recommend appropriate recreational uses.
    1. Promote self-service or volunteer-operated information and visitor services facilities and programs.
    2. Identify interest in outdoor activities.
- II. Establish strategies and standards for equitable recreational access and management, while protecting natural resources.
  - A. Determine maximum visitor use to provide a quality experience along with resource protection.
  - B. Establish criteria for when recreational opportunities should be curtailed, enhanced or expanded on the Base. Define a set of priorities for project selection.
    1. Provide new recreation opportunities only after full consideration of the opportunities provided by other public and private facilities in the region.
- III. Develop, upgrade, and maintain recreational resources and facilities to ensure a safe and quality experience among users.
  - A. Consider recreation improvement projects that will contribute to the convenience, comfort, and enjoyment of daily activities at MCLB.
    1. Extend and improve existing sidewalks, jogging trails, bike trails and par courses (BEAP 1992).
- IV. Seek strategies for compatible use, sustained yield, and overall protection of natural, cultural and outdoor recreation resources.
- V. Consider recreation opportunities for special interest natural areas that have exceptional resource values and that are otherwise encumbered or military use for other reasons.

## 4.8 Off-Road Vehicle Use

Public lands, including Marine Corps lands, are subject to pressure from individual and organized off-road vehicle (ORV) interests for access to land. This form of recreational use frequently conflicts with military land use requirements, wise land management practices, environmental values, and recreation activities.

- The term "off-road vehicle" refers to any motorized vehicle designated for or capable of cross-country travel on or immediately over any natural terrain. It excludes military vehicles which are specifically authorized for off-road travel in accordance with mission-related duties.

The term "off-road vehicle" refers to any motorized vehicle designated for or capable of cross-country travel on or immediately over land, water, sand, ice, marshes, swampland, or other natural terrain. This term excludes any registered motorboat; any military, fire, ambulance, or law enforcement vehicle when used for emergency purposes; any combat or combat support vehicle when used for national defense purposes; and any vehicle use that is authorized by Commandant of the Marine Corps for official use under a permit, lease, license, or contract.

Under Marine Corps policy, all land and water areas under Marine Corps control are closed to off-road travel by off-road vehicles except those areas specifically authorized by the installation Commanding Officer. Even with ORV approval, recreational off-road vehicle use on Marine Corps land is only permitted in areas and on trails designated by installation commanders.

As a trustee of public lands, the Marine Corps has a responsibility to protect and enhance environmental quality, conserve natural resources, and provide opportunities for public recreation. Off-road activity can cause habitat degradation. It damages root systems, above-ground portions of plants, and causes soil displacement and soil compaction. Soil compaction reduces the ability of plants to grow that supply seed to ants, as well as may hinder ants from digging burrows.

If the installation commander, or designee, determines that off-road vehicle use is causing or will cause considerable adverse effects to the soil, vegetation, wildlife, wildlife habitat, or cultural or historical resources, the installation commander will immediately prohibit such off-road vehicle use (MCO P5090.2A).

- Recreational off-road travel is prohibited on MCLB.

Recreational off-road travel is prohibited on MCLB. The lands of MCLB are unsuitable for use by recreational ORVs. Nebo and the Yermo Annex are mostly developed areas with little potential for ORV use. The presence of the desert tortoise precludes the use of ORVs on Rifle Range lands. However, some off-road travel is necessary for facilities maintenance and other military purposes. Consistent with official vehicle repair duties, military vehicles are being tested on a small portion of Yermo.

### *Policy Strategy for Off-Road Use*

*Objective: Ensure that off-road travel on MCLB is managed to protect natural resources, promote safety, and avoid conflicts with other property uses.*

- I. Develop a system of designated routes which ensure that rare natural communities and desert habitat are not damaged.
- II. Eliminate unauthorized off-road vehicle use.
  - A. Restrict off-road vehicle access in the following areas except in emergencies: zones restricted for reasons of safety or security; fragile soils or geology, sensitive flora or fauna, or otherwise significant natural resources; desert tortoise habitat; and significant archaeological, paleontological or historical resources.
  - B. Educate personnel about the policy restricting off-road vehicle use and the environmental damage it can cause.

- See Section 4.9 Conservation Education and Awareness.

- C. Communicate clear criteria for when off-road vehicle use is permitted in the line of duty, with maps of sensitive areas.
  1. Pursuit of unauthorized persons is an activity for which off-road use by Security may be permitted.
  2. Document off-road use during emergencies. This will be provided by Security or the Fire Department in a formal report.

## 4.9 Conservation Education and Awareness

The nature of military service entails a degree of transience in the resident population. Communicating how natural resources improve quality of life to residents can enhance pride and a feeling of ownership in natural resources even for those who stay only a short while. Appreciating the links between human land use and the native environment will lead to a more caring and responsible attitude by inhabitants of the ecosystem.

- It is the DoD's policy to encourage a conservation ethic by providing an understanding of the need to protect and conserve natural resources through good stewardship.

Some resource conservation measures have been incorporated into Base regulations, guidelines, and plans. However, these measures alone fall short of establishing an adequate degree of protection from the impacts of military use. Accordingly, regulations are supplemented with a formal program of conservation education, designed to instruct and motivate all military personnel in the elements of resource protection.

It is the DoD's policy to encourage a conservation ethic by providing an understanding of the need to protect and conserve natural resources through good stewardship. Marine Corps installations are to provide for sustained public access and use of natural resources for educational purposes when such access is compatible with mission activities, and with other considerations such as security, safety, and resource sensitivities. MCLB is well suited to provide a forum for a variety of environmental and historical education programs and community involvement strategies.

### 4.9.1 Interpretive Activities

Interpretive activities on the Base should provide a sense of MCLB's unique history, natural resources setting, and cultural resources. There are many opportunities available on MCLB to provide interpretive programs for Base personnel and visitors, including cooperation with San Bernardino County's regional historic trail system and displays or fact sheets on natural and cultural resources.

As part of its vision to provide public access to open space lands, the County of San Bernardino has proposed a regional system of trails that interconnects with existing and proposed federal, state, and local trail systems. Three of the proposed trails run adjacent to or near MCLB: Mojave Indian Trail, Old Government Military Trail, and Old Spanish Sante Fe and Morman Trail (see Table 4-1). These trails fall under the County's category of Historic/Desert trails. Trails under this category are not constructed trails, but are identified through signage or interpretive facilities and are consistent with low usage.

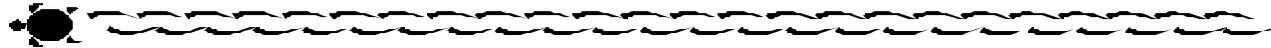


Table 4-1. Proposed regional historic trails of San Bernardino County near MCLB.

Trail Name	Approx. Length	Description
Mojave Indian Trail	100 miles	Historic trail from the Colorado River near Needles, traveling northwest to Piute Spring, west to Mail Springs, and southwest to Afton Canyon, Yermo, and the Mojave River. Ultimate connection with the Old Spanish Sante Fe and Mormon Trail.
Old Government Military Trail	Not Available	Historic trail from the site of Fort Mojave on the Colorado River west to Fort Piute, Government Holes, Mail Springs, fort Soda, Afton Canyon, and Yermo. Periodic connections with Mojave Indian Trail; also linked with the Colorado River Trail and Old Spanish Sante Fe and Mormon Trail.
Old Spanish Sante Fe and Mormon Trail	160 miles	Historic trail connecting Summit Valley via the Mojave river with the cities of Victorville, Hesperia, and Barstow. Ultimate connection to Inyo County.

Adapted from San Bernardino County General Plan, 1991.

The National Trails System Act promotes the development of recreational, scenic, and historic trails for people with diverse interests and abilities. Federal agencies have been directed to designate National Recreation Trails on public lands under their jurisdiction.

### 4.9.2 Nature Study

Nature study is an important component of the educational opportunities on MCLB. Birdwatching, observing wildflowers, collecting wild edibles, botanizing, tracking animals, wildlife photography, rock hunting, and butterfly collecting are among the numerous ways to study nature. Each of these uses require that essentially all subject species be present which are indigenous to the area. A birdwatcher, for example, wants to sight all indigenous birds, not just the common ones.

Watchable Wildlife programs and similar programs that facilitate the public’s ability to view wildlife in a natural setting are encouraged on Marine Corps lands. While other wildlife are present on-Base, birds are the most numerous and are often easier to view by casual observers. Birds use the Mojave River riparian areas and sewage ponds for feeding, nesting, resting during migration, and refuge during the hunting season. These areas are a potential focus for future migratory bird planning programs.

*Policy Strategy for Conservation Education and Awareness*

*Objective A: Build a strong conservation ethic and personal commitment to natural and cultural resource stewardship by personnel through the promotion of education and awareness of MCLB’s unique environmental setting and history.*

*Objective B: Encourage community involvement in environmental education to support the conservation values of MCLB and convey them to visitors, neighbors, and outlying communities.*

- 
- I. Identify the types of information and conservation practices that need to be communicated to military personnel in order to protect resources and build a conservation ethic.
    - A. Provide a clear, concise manual of environmental precautions and restrictions to be used by personnel. The manual should be reviewed annually.
      1. Integrate instruction on environmental precautions and restrictions into existing training opportunities.
    - B. Commands should encourage appropriate staff personnel to participate in natural resources management job training activities and professional meetings.
  
  - II. Develop a multimedia educational program in support of the program objective.
    - A. Commit to an environmental education program to increase sensitivity and awareness among Base personnel of natural and cultural resource constraints and measures of protection. Include desert planting, maintenance, and other urban-environmental considerations.
    - B. Support a natural resource orientation program for new personnel. Consider all educational media, including video tapes, written materials, or slide presentations.
    - C. Educate personnel about resources to support land management goals by way of classes, workshops, displays in communal areas, literature and signs. Write regular articles for the MCLB Barstow newsletter.
    - D. Identify and evaluate suitable interpretive opportunities on MCLB.
      1. Determine all current and potential interpretive activities on Base.
        - a. Potential opportunities include, but are not limited to, the following activities:
          1. Develop a wildlife viewing area at the Mojave River near the ponds.
          2. Locate interpretive displays on natural and cultural resources in the following locations:
            - A. the Rattlesnake Rock Petroglyph site;
            - B. along the Mojave River / golf course area;
            - C. picnic grounds.
          3. Install an interpretive display on MCLB's military history.



III. Evaluate the effectiveness of the strategies adopted and adapt them as necessary.

## 4.10 Public Outreach

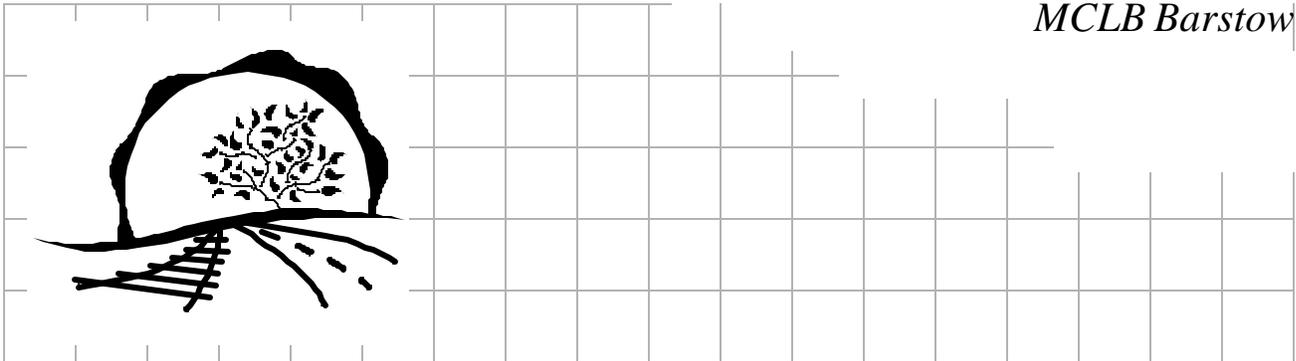
The Marine Corps seeks to earn public confidence in its stewardship of the nation's natural heritage. An important objective of such programs is to gain proper public recognition of excellent stewardship.

### *Policy Strategy for Public Outreach*

*Objective: Showcase MCLB Barstow's excellent stewardship of natural resources.*

- I. Become a model of excellence for the Marine Corps with respect to safety, quality, fire and environmental management by obtaining DoN level recognition for excellence.
  - A. Submit for DoD environmental awards.
  - B. Research potential awards, identify criteria and a schedule for submission.
- II. Identify and evaluate settings and forums suitable for enhancing community involvement, compatible with the military mission and security.
  - A. Establish criteria for successful public interpretive programs, with provisions to curtail, enhance or expand public activities as appropriate. Define a set of priorities for project selection.
  - B. Use a multimedia approach to developing interpretive programs giving priority to self-guided activities.
    1. Support and develop interpretive programs for local schools, museums, environmental, and other organized public groups.
    2. Emphasize MCLB's historical significance in interpretive programs.
    3. Integrate cultural resources information into interpretive activities.
  - C. Encourage partnerships and volunteers to enhance conservation programs wherever practicable, for example (DoD 4715):
    1. Bird box construction and placement.
    2. Weed eradication.
    3. Landscape planting.
  - D. Support Public Visitation Days by providing information, lectures, slide shows and tours, if appropriate.

■ See Section 4.9.1 Interpretive Activities.



## 5.0 Planning and Administration

*GOAL 3: Provide the organizational capacity, support, and communication linkages necessary for effective strategic planning and daily administration of this Plan and MCLB's natural resources.*

### 5.1 Land Use and Environmental Planning

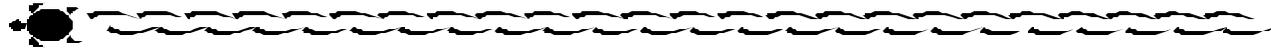
Department of Defense policy seeks to ensure that other current and planned installation activities (e.g. master plans, construction requests, site approval requests, host-tenant agreements, and outleases) are effectively coordinated and consistent with activities described in the INRMP.

- To minimize potential land use conflicts, Base land use and environmental planning need to be comprehensive and integrated.

To minimize potential land use conflicts, Base land use and environmental planning need to be comprehensive and integrated. Land use and environmental planning responsibilities are held by different departments at MCLB Barstow. In most cases, however, land use implementation lies within the Facilities and Services Division.

Land use and natural resources decisions are supported by various Base planning resources and guidelines: the Strategic Plan, Master Plan Update, the Base Exterior Architecture Plan (BEAP), and this Integrated Natural Resources Management Plan (see Table 5-1). Federal legislation, federal regulations, and DoD, DoN, and Marine Corps policy further guide land use management on the Base (see Appendix B). Though some direction is provided by existing laws and regulations, most decisions are made without such guidance. The title of this Plan, Integrated Natural Resources Management Plan, may imply that it is the umbrella to coordinate and guide all land use issues, but the scope of the INRMP is more narrowly defined in MCO P5090.2A. To be comprehensive, all of the existing planning-related documents should become integrated and missing planning components should be added. Future planning should examine these land use subjects together, not separately.

Identifying what a thorough land use plan should cover is the first step to resolving this problem. One approach to land use planning is that modeled by the State of California. State land use planning law requires that cities and counties adopt a compre-



hensive, long-term general plan for the physical development of their jurisdictions. The Plan is composed of mandated elements: land use, circulation, housing, conservation, open space, seismic safety, noise, scenic highways, and safety. The general plan and elements must be “integrated, internally consistent, and compatible statements of policies” (Calif. Govt. Code Sections 65300-65403). Amendments are allowed periodically in between major revisions or updates. This approach to land use decision-making has proven to be rational and comprehensive.

Initial planning stages of proposed DoD actions must also be integrated with the NEPA process “to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to preclude potential conflicts” (32 CFR Ch.1, Part 188). To accomplish this integration, land use and NEPA planning functions need to be assigned together, with as much accountability as possible.

- Planning should also be integrated with the Environmental Compliance Evaluation (ECE) process.

Planning should also be integrated with the Environmental Compliance Evaluation (ECE) process. This annual review, required by MCO P5090.2A, is meant to assist commanders in identifying and correcting compliance gaps. It is essentially an audit of the CO’s potential environmental compliance liabilities. The Commandant of the Marine Corps has issued policy which stresses the need to anticipate environmental issues and “take affirmative steps” to assure compliance (USMC White Letter 9-91). He brings the responsibility and need to limit liability back to the planning process by suggesting the following steps, among others:

- Consider environmental issues during planning;
- Clearly designate responsibility for compliance;
- Provide manning, organization and training of those responsible for compliance;
- Document environmental management efforts.

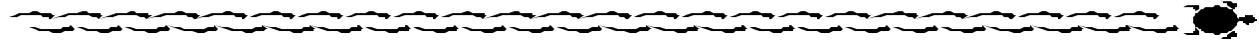
The documents listed in Table 5-1 guide land use and natural resources planning efforts.

*Table 5-1. MCLB documents related to environmental and land use planning.*

Title	Year	Purpose
Strategic Plan	FY 1996	Provide policy leadership, effective communication and adaptive oversight to support the military mission and compliance with laws and regulations.
Master Plan	1988	Provide a framework for future growth, including proper siting and allowance for long-range projects.
INRMP	In Progress	Guide compliance with environmental laws and stewardship of natural resources.
Base Exterior Architecture Plan	1992	Organize the functional and visual aspects of the built environment, including landscaping.
NEPA documents	various	Evaluate the environmental consequences of each MCLB action that has the potential to physically impact the human environment.

*Policy Strategy for Land Use Planning*

*Objective: Ensure land use planning decisions protect the mission of the Base by seeking to resolve land use conflicts.*

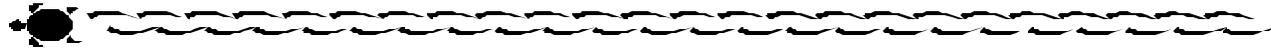


- I. Land use decisions to select among competing uses of Base property shall be based on these principles:
  - A. MCLB Barstow's statutory mission must receive great weight.
  - B. Important decisions should be preceded by careful planning, which considers alternative locations for competing uses and the relative impacts of each alternative.
  - C. Prior real estate encumbrances (leases, easements, licenses) and negotiated land use limitations made with other government agencies should be honored. Renegotiation may become necessary if mission needs change or impacts are detected which were not anticipated.
  - D. Local or State government requests for use of the property (as well as requests from other federal agencies) deserve careful attention in light of the public nature of the request.
  - E. Where the interest of any citizen may be affected by the planning decision, the affected citizen must be given reasonable notice of the proposed action and an opportunity to comment on the action.
  - F. All land use decisions should be supported by a concise record of the basis for the decision. NEPA documentation shall be used as this record.
  - G. Personnel who may have a personal interest in the outcome of a land use decision must excuse themselves from participating in the planning and decision-making process.
  - H. Where a particular land use serves a community or region, it may be inappropriate for MCLB to assume a disproportionate share of the real estate contribution for the project.
  - I. Environmental impacts shall be weighted equally with economics and public relations. Significant environmental impacts from land use planning can, at some point, inhibit military missions.

■ See Section 5.1.1 NEPA Planning.

## II. Develop and sustain the land use planning capability.

- A. Assign appropriate land use and natural resource personnel.
  - 1. Set a desired standard for expertise and training, and help provide any additional training needed to meet this standard.
  - 2. Determine where, organizationally, such individuals should reside.
  - 3. Formally identify who is responsible for natural resource and land use planning for MCLB Barstow.
  - 4. Impose as much accountability on those making and implementing actions as possible, providing for a well-reasoned approach for integrated and consistent determinations.
  - 5. Provide for enforcement of natural resource laws and regulations by professionally trained personnel (Draft DoD 4715).



**III.** Ensure land use plans and planning processes are relevant and useful for the Base's needs.

- A.** Evaluate MCLB's existing planning documents, particularly for their:
  - 1. Comprehensive coverage of essential planning elements;
  - 2. Level of integration, internal consistency, and compatibility;
  - 3. Gaps of policy direction.
- B.** Bring existing plans together and fill in identified gaps.
- C.** Allow for reasonable flexibility and regular updating of all plans.
- D.** Coordinate planning activities with the NEPA process to ensure they integrate.
- E.** Implement adaptive management to accommodate the evolution of scientific understanding of ecosystems, based on periodic review and adjustment to the standards and guidelines affecting management activities.
- F.** Incorporate a dynamic, continuous process for decision-making. Information useful in making future changes or additions to the INRMP should be included (Draft DoD 4715).
- G.** Develop criteria and procedures for monitoring the effectiveness of natural resources management (Draft DoD 4715). Use benchmarks to monitor and evaluate outcomes, with clear, specific accountability measurements.
- H.** Ensure self Environmental Compliance Evaluations (self-ECEs) are conducted annually. Develop tasks, time, and cost estimates.

■ See Section 5.1.1 NEPA Planning.

### 5.1.1 NEPA Planning

The National Environmental Policy Act (NEPA) is the basic national charter for the protection of the environment. It is a procedural planning tool which primarily requires a clear evaluation of all federal decisions potentially affecting the human environment. MCLB must consider the environmental consequences of its actions before a commitment is made to proceed. However, NEPA itself does not prevent activities from being implemented. Unlike many other environmental regulations, the act is not an enforcement tool punishable by fines for noncompliance.

■ The NEPA statute (as amended, 42 USC 4321-4370) and the Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500-1508) combine to represent the "letter and spirit" of NEPA.

The NEPA statute (as amended, 42 USC 4321-4370) and the Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500-1508) combine to represent the "letter and spirit" of NEPA. In addition, CEQ has issued some very helpful guidelines: "Forty Questions" (1981a); "Scoping Guidance" (1981b); and "Guidance Regarding NEPA Regulations" (1983) (Bass and Herson 1993).

To provide more specific implementation of the CEQ regulations, the DoD issued policy and procedures (32 CFR parts 188 & 214) for DoD components and also Directive 6050.1 (1979) on Environmental Effects of DoD actions in the U.S. A supplement by the DoN (32 CFR part 775) followed, providing policy and assigning responsibilities to the Navy and Marine Corps. It is these DoN proce-

- The CEQ regulations and guidelines intend federal agencies to use procedures which will reduce paperwork and delay.

dures which meet the NEPA requirement that every federal agency adopt procedures to supplement the CEQ regulations (40 CFR 1507.3(b)). Following the DoN directive, the Marine Corps issued its own policy for compliance with procedural requirements under MCO P5090.2A. The latter document tasks the MCLB with ensuring that Marine Corps actions (i.e. any action that spends federal money) are in accordance with the letter and spirit of NEPA.

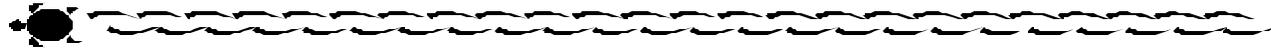
The Secretary of Navy has decided that NEPA implementation needs significant change. Currently, the issue is being evaluated by the Secretary's NEPA Process Action Team, which includes the Vice Chief of Naval Operations, Navy General Counsel, and other high level participants.

The CEQ regulations and guidelines intend that federal agencies use procedures which will reduce paperwork and delay (40 CFR 1500.4 -1500.5; CEQ, 1983). For example, expanding the number of projects or actions which deserve categorical exclusions (CatEx's) is one opportunity for improvement. While specific actions qualifying for CatExs are listed in DoD and DoN regulations, CEQ has observed that some agencies are "overly restrictive in their interpretations of categorical exclusions," and that "agency procedures to add categories of actions to their existing lists of categorical exclusions were too cumbersome." In particular, the Council believes that this list approach may stifle agency flexibility and, as an alternative, encourages agencies to "consider broadly defined criteria which characterize types of actions that, based on the agency's experience, do not cause significant environmental effects." A large number of EAs with findings of no significant impact may also be an indicator that some of these actions may fall within the categorical exclusion definition, or conversely, within full EIS treatment. Excessive documentation for CatEx projects is also discouraged. Since many regulatory layers are now added on to the original NEPA/CEQ regulations, a re-evaluation of the original intent is needed by the military.

### *Policy Strategy for NEPA Planning*

*Objective: Conduct planning of mission activities having potential environmental effects by applying NEPA's requirements and policies to enhance the mission-related use and the stewardship of natural resources.*

- I. Assess the environmental consequences of each proposed action that could affect the natural environment, and address the significant impact of each action through analysis, planning, mitigation, and prevention.
  - A. Ensure that any proposed MCLB action that has the potential for physical impact on the human environment undergoes the NEPA process.
    - I. Include new activities, substantive changes in continuing actions, specific actions, or adoption of programs, e.g. changes in routine grounds maintenance such as mowing or fertilizer use.
  - B. Conduct thorough scoping of a project to preclude preparation of NEPA documentation at an inappropriate level (i.e. CatEx, EA, EIS).



**II.** The NEPA planning process should facilitate project planning and integrate project-specific plans with overall land use and natural resource management plans.

**A.** Integrate NEPA planning with regular planning functions of each office.

1. Technical assistance should be provided by staff to support other offices, when needed, *before* and after a proposed action is submitted for NEPA review, giving guidance on:
  - a. Project design, site selection, and scope of work.
  - b. Development of reasonable alternatives, including alternative sites.
  - c. Selection of appropriate mitigations so the proposal integrates mitigation from the beginning; mitigation design should remain flexible and creative, and “not cookbook.”
  - d. Importance of implementing BMPs as mitigation measures for environmental protection.
2. Prepare and regularly update a NEPA Handbook which clearly and simply outlines step-by-step procedures for the management and preparation of NEPA documents.
3. Develop NEPA SOPs to guide Base activities that may affect the environment.
4. Develop a NEPA noncompliance notification system to correlate with other established Environmental non-compliance Command reports.

■ See Appendix J which provides a list of management and mitigation practices.

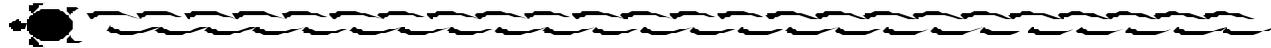
**B.** Design NEPA forms for project proponents which are understandable, are easy to complete, avoid extraneous background data, and provide sufficient data for project review and decision-making.

1. Maximize use of checklists and minimize lengthy descriptions.
2. Standardize terms and categories used in project descriptions, including types of military actions.
3. Provide list of approved mitigations for project proponents to select from.
4. Reference appropriate environmental protection and mitigation policies from this Plan. Also provide for creative and flexible mitigations.
5. Make available to project planners updated information on the Base’s sensitive resources to assist in evaluating potential impacts of proposed projects and in recommending appropriate mitigations.

■ See Section 5.2 Information Management.

**C.** Communicate directly with all affected parties during NEPA process to avoid misunderstandings and delays.





- V. Ensure the Environmental Impact Statement process is focused on major projects significantly affecting the quality of the human environment.
  - A. Reduce paperwork and delay during the EIS process:
    1. Follow CEQ requirements as well as CEQ's informal guidance for reducing excessive paperwork with EISs.
    2. Review existing DoN and Marine Corps orders for NEPA to determine how the procedures could be more efficient in the EIS process while emphasizing real environmental issues and alternatives.
    3. Use a structured scoping process to assure environmental documentation is sound from the beginning and the document will not have to be rewritten.

### 5.1.2 Cooperative Planning

The west Mojave Desert has experienced considerable growth since the 1950s. Growth is expected to continue with an estimated tripling of the population in the next 20 years. Partnerships among the various agencies, private interests, and individuals have been forged to shape a more unified vision of the Mojave Desert's future and address the need for integrated, region-wide planning that considers ecological, land development and land management implications (see Table 5-2). As an active participant in regional cooperative planning efforts, the DoD hopes to avoid future land use conflicts. Dealing with potential encroachment and regional land use issues now, may offset the effects of the increasing urbanization of the Mojave which could impair the mission, and in past experience, has allowed DoD land holdings to become defacto preserves.

Table 5-2. Summary of regional planning efforts related to MCLB.

Plan Title	Year	Purpose
Draft Recovery Plan for the Desert Tortoise	1993	Maximize habitat protection for the federally threatened desert tortoise through inter-agency cooperation.
West Mojave Coordinated Management Plan (WMCMP)	In Progress	Protect listed species and still allow economic development.
California Desert Conservation Plan (amended)	1985	Develop a unified planning strategy for California desert public lands.

- The Base intends to remain active in regional resource planning issues in order to ensure its military mission as well as its own natural resource management goals and objectives.

The Base intends to remain active in regional resource planning issues in order to ensure its military mission as well as its own natural resource management goals and objectives. "Partnerships" among private, local, state, tribal, and federal interests are one way to help realize ecosystem management, the basis for future management of DoD lands and waters (USDoD 1994).

Listings of animal and plant species in the Mojave under the federal and state Endangered Species Acts (ESAs) have contributed to the need for a more comprehensive, ecosystem management approach. Traditional species-by-species recovery planning has proved awkward in practice and is not very effective in restoring population levels. The new approach represents an ecosystem view

### 5.1.2.1 Regional Biodiversity and Conservation Planning

instead of the single-habitat one. Significant water supply, water quality, and flood control issues that go beyond any single jurisdiction also require a regional approach to planning.

A number of regional planning efforts have been undertaken to develop a common vision for the future of the Mojave Desert. In 1980 the California Desert Conservation Plan, the largest cooperative undertaking of its time, was developed with the purpose of balancing use and natural resources.

Two prominent cooperative resource planning efforts are actively underway in the Mojave desert region:

- West Mojave Coordinated Management Plan (WMCMP)
- Mojave Desert Ecosystem Initiative (MDEI) and Mojave Ecosystem Database Program (MEDP)

Terms commonly used are ecosystem management, landscape ecology, multi-species, or bioregional (biological diversity) planning. What they all represent are a way to address real biological and hydrological needs on natural scales instead of artificial, political ones based on ownership boundaries.

- Ecosystem management is one of the main motivations for federal agencies such as USFWS and the U.S. EPA. The new direction for management of DoD lands and waters is also based on the concept of ecosystems.

Federal, state, and local agencies, citizen groups, developers, and universities are included in the various conservation planning group memberships. The motives of the diverse participants, however, may also vary to the point of conflict. Some are searching to reach compromise between development and protection, some want to maximize urban development opportunities, and some want to preserve extensive acreages of habitat. Ecosystem management is one of the main motivations for federal agencies such as USFWS and the U.S. Environmental Protection Agency (EPA), based on recent administrative pronouncements urging its adoption. The new direction for management of DoD lands and waters is also based on this concept. DoN policy now calls for its installations to expand involvement in regional ecosystem planning, management and restoration initiatives.

In July 1997, Naval Air Weapons Station (NAWS) China Lake, Edwards Air Force Base (AFB), National Training Center (NTC) Ft. Irwin, Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, and MCLB Barstow signed a Planning and Coordination by Installation Defense Environmental Resources Managers (PACIDERM) charter. This joined West Mojave DoD Base natural resource and land management functions into a united DoD organizational representation in west Mojave planning efforts.

Mitigation planning seeks to “expedite” development projects on developable land by setting aside other lands for non-development or non-use through a network of wildlife preserves. The military is concerned that its lands will be used as such preserves in a regional scheme, which could essentially mean no use allowed for some military functions. The Marine Corps does not want its critical spaces to be viewed by others as the “solution” for regional land use requirements due to the perceived minimal economic and political cost of using military lands.

- The WMCMP is a multi-agency planning document intended to conserve species habitats and foster economic development of nearly 9.5 million acres of California desert lands.

### ***West Mojave Coordinated Management Plan***

The WMCMP is a multi-agency planning document intended to conserve species habitats and foster economic development of nearly 9.5 million acres of California desert lands. The WMCMP began in 1990 as a high desert planning document to allow continued development of West Mojave desert lands while still meeting ESA requirements for protection of the desert tortoise. September 1997, a plan was developing that was intended to function as a “catch-all” habitat conservation plan to meet state and federal endangered species conservation requirements, covering 93 plants and animals. The purpose of the WMCMP was modified to define a regional conservation strategy for the west Mojave that would:

1. Streamline the process in order to comply with the endangered species laws with more efficiency and equity;
2. Provide for community expansion and resource utilization in a manner compatible with regional species conservation; and
3. Maintain the long-term population viability and genetic diversity of animal and plant species in their natural habitat, recover state and federally-listed species, and minimize the need to list additional species in the future.

Conservation is proposed through a series of designated use zones that define the level of use within each area. The objective is to safeguard listed species by maximizing protection of the best habitat located on public lands. The WMCMP streamlines the environmental review process by establishing standard measures and criteria which participating agencies can use to make permitting decisions.

The WMCMP is being developed by a “Supergroup” consisting of all interested groups willing to participate.

The Plan area covers all DoD lands in the Mojave Desert in California, including NAWS China Lake, Edwards AFB, NTC Ft. Irwin, MCAGCC Twentynine Palms, and MCLB Barstow.

The PACIDERM position is to use individual INRMPs as the sole input to the WMCMP. This INRMP is to serve as input to the WMCMP, providing information on MCLB’s natural resources management programs as well as tortoise protection efforts.

### ***Mojave Desert Ecosystem Initiative***

The MDEI initiates the collection and dissemination of scientific, ecosystem-wide natural resources data in the Mojave desert to facilitate data driven management within the region. Data is to be presented as a series of Geographic Information System (GIS) layers, available to interested parties via the internet.

To meet MDEI’s objectives, the DoD established the Mojave Ecosystem Database Program (MEDP). This program is set up to accumulate scientific, natural, and cultural resources data to be used in land use decisions throughout the Mojave Desert ecosystem. Participants include the five Mojave desert DoD installations, U.S. Geological Survey, National Park Service, Biological Resources Division, Bureau of Land Management, USFWS, and U.S. Army Topographical Engineering Center. These parties have agreed to cooperate in the sharing and integration of data.

- The MEDP project supports the “continued capability of mission critical DoD installations within the Mojave Desert Ecosystem to achieve military preparedness and readiness while protecting the environment.”

The MEDP project supports the “continued capability of mission critical DoD installations within the Mojave Desert Ecosystem to achieve military preparedness and readiness while protecting the environment.” The goal is to develop a database which facilitates collection, storage, transfer, sharing and analysis of information regarding inventories, resource assessments, scientific documentation and land management by all federal, state, regional, and local agencies and other interested parties. The database is to serve as a tool for land managers to make land management decisions that will support the ecosystem as well as sustain economies, communities, and national defense preparedness.

The Mojave Ecosystem Database directly supports military readiness in the region by providing a framework for determining research strategies, mitigation measures, and long-term resource planning which enables installations to maintain their mission objectives.

- As one of the participating DoD installations, MCLB is responsible for sharing and updating the MEDP with the Base’s most recent natural resources data.

The first phase of this program was to develop a database framework that described the natural resources in the region with elevation, landform, and plant community data and conduct an ecosystem-wide literature review. These efforts are complete. Current phases focus on the collection of biological, historical trend, cultural, meteorological, and desert micro-habitat data useful in land use planning.

As one of the participating DoD installations, MCLB is responsible for sharing and updating the MEDP with the Base’s most recent natural resources data.

### 5.1.2.2 Fish and Wildlife Inter-Agency Coordination

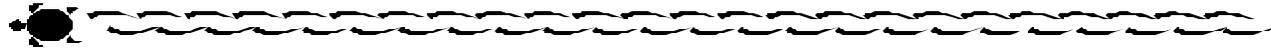
Cooperative management of MCLB’s wildlife is required under the federal Sikes Act and the Fish and Wildlife Coordination Act. Like NEPA, the Fish and Wildlife Coordination Act is essentially procedural –no specific outcome is mandated.

The Sikes Act provides a mechanism whereby the Department of Defense and the Department of the Interior and host States cooperate to plan, maintain, and manage fish and wildlife on military installations. Sikes Act provisions and cooperative agreements for outdoor recreation are implemented nationally by a Memorandum of Understanding (MOU) between the DoD and the Department of the Interior (DoI). The Navy has implemented a similar Memorandum of Agreement (MOA) under the Sikes Act to foster cooperative efforts between the USFWS and Naval Facilities Engineering Command (NAVFACENGCOM). A copy of this MOA is provided in Appendix C.

The Sikes Act is currently up for renewal in Congress. If the renewed law, the Sikes Act Improvement Act of 1997, passes in its existing form there will no longer be a Cooperative Agreement required as a separate document; however, INRMPs would require mutual agreement by USFWS and CDFG to be enacted. The Sikes Act Improvement further requires installations to provide the opportunity for public comment on the INRMPs.

*Policy Strategy for Cooperative Resource Planning*

*Objective: Be proactive in cooperative resource planning partnerships to create regional conservation, ecosystem, and watershed solutions of mutual benefit while also protecting the military mission.*



- I. Encourage partnerships and volunteers to enhance conservation programs whenever practicable. Organize collaborative, environmental problem solving partnerships with non-military stakeholders.
  
- II. Participate in regional conservation and ecosystem planning efforts, based on the following criteria:
  - See Section 4.5 Encroachment.
  - A. Avoid signing any agreements that may encumber land or resources now or in the future. Emphasize the critical importance of ensuring continuation of the military mission and its unique attributes which cannot be replaced.
  - See Section 4.10 Public Outreach.
  - B. Promote regional understanding and appreciation of the INRMP's goals, objectives and policies and excellent ecosystem management and stewardship.
  - C. Pursue pertinent DoD ecosystem management policies, including:
    - 1. Develop a collaborative vision of ecosystem health: what constitutes desirable future ecosystem conditions concerning sustainable health and biodiversity, including social and economic conditions.
    - 2. Maintain and improve the sustainability and biological diversity of the ecosystem at landscape and other relevant ecological scales.
    - 3. Develop priorities and reconcile conflicts, such as between development trends and ecosystem objectives.
    - 4. Support regional workshops and other means to share information and to improve mutual understanding of the issues.
  - D. Promote development of the best available scientific and field-tested information for use in making decisions. U.S. Navy and USFWS partnering efforts shall be supported through active participation.
  
- III. Support cooperative watershed planning and management through active membership or via coordination with Southwest Division NAVFACENGCOCOM.
  - A. Fully integrate the objectives of installation environmental programs into regional watershed plans and goals.
  - B. Provide for the military contribution to regional conservation goals without commitment of DoD lands, by recognizing the goals and aspirations of these efforts in this Integrated Natural Resource Management Plan.
  - C. Provide for continued coordination with federal and state fish and wildlife management agencies.
  
- IV. Consult with USFWS and CDFG at least annually to fulfill Sikes Act provisions and related inter-agency cooperative agreements.
  - A. Ensure compatibility with INRMP goals, objectives, and policies as well as internal consistency in future inter-agency agreements and plans.

- B. Involve state and federal resource agencies in the implementation of INRMP objectives and policies when practicable.
- C. Promote information sharing and scientifically-based, coordinated data collection and management planning.

### 5.1.3 Environmental Permitting and Consultation

#### 5.1.3.1 USFWS Consultation Under the ESA

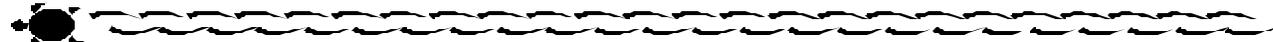
Coordination regarding federally listed threatened and endangered species protection is addressed in Section 7 of the ESA. In particular, Section 7(a) requires a federal agency to consult with USFWS on any proposed action if the agency has reason to believe that an endangered or threatened species could be directly or indirectly affected by the action. A biological assessment by the lead agency is required under Section 7(c) if listed species or critical habitat may be affected by a major construction activity. The purpose of a biological assessment is to evaluate potential effects of the action on listed species or critical habitat.

A consultation consists of one or more of these steps: 1) Informal; 2) Formal; or 3) Further Discussion. An informal consultation is an optional process that includes all discussions and correspondence between the USFWS and the federal agency to determine whether a formal consultation or conference is required. A formal consultation is a process between the USFWS and the federal agency that commences with a federal agency's written request for consultation and concludes with the USFWS's issuance of a biological opinion.

- Two biological opinions have been issued by the USFWS regarding the effect of MCLB's operation, maintenance, and repair activities on the desert tortoise.

Pursuant to Section 7 requirements, two biological opinions (BOs) have been issued by the USFWS regarding the effect of MCLB's operations and maintenance activities on the desert tortoise. The 1993 BO addressed routine operations and maintenance activities south of Interstate 40. The 1997 BO responded to specific proposals for improvement of the firearms ranges and installation of a desert tortoise fence around the MCLB housing area. In both cases, the opinion of USFWS was that the proposed actions were not likely to jeopardize the continued existence of the desert tortoise. Permission for incidental take of a limited number of tortoises was allowed, providing specific, mandatory "reasonable and prudent measures" and "terms and conditions" are complied with, and the suggested conservation recommendations are considered.

The BOs require the reinitiation of formal consultation if: 1) the amount or extent of incidental take is reached; 2) new information reveals adverse effects on the tortoise due to the agency action and which were not considered under the opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in the opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action (USFWS 1993b; USFWS 1997).



- See Map 3-1 for details on tortoise areas and critical habitat.

Critical habitat for the desert tortoise has been designated on the Rifle Range as part of the Ord-Rodman Unit. Any action with the potential to affect this habitat will require consultation with the USFWS.

### 5.1.3.2 Permitting Under the Clean Water Act

ACOE permitting authority under the CWA seeks to ensure that the environmental and cultural values of the nation’s water resources and wetlands are protected, and work which may affect them is performed in the best interest of the public. Under Section 404 of the Act, a set of 39 nationwide permits authorizes activities with minor impacts. General permits do not require an application, and most do not require notification of the ACOE. If a landowner follows the terms and conditions of the general permit, then the activity is automatically authorized. The complete list of general permits can be found in the Federal Register 33 CFR Part 330. Restoration of structures or utilities to their original design falls under a general nationwide permit. Also covered are road crossings, maintenance of structures, and fills in headwater areas and isolated waters, but these activities must be evaluated on a site-specific basis to determine if the nationwide permit applies. General permit application processing times average about 16 days. Few are denied (USACOE 1995).

- Certain maintenance activities that may affect water resources or wetlands come under the individual permitting authority of the ACOE via Section 404 of the CWA..

Certain maintenance activities that may affect water resources or wetlands come under the individual permitting authority of the ACOE. Examples are road or culvert work at stream crossings, placement of road fill or riprap, any grading or landleveling, dredging, excavating or backfilling, temporary stockpiling of material, or earth movement within stream channels or wetlands. Processing of individual permits is generally required within 90 days under the Clinton Administration’s Wetlands Plan, but may take four to six months.

A permit must be found not contrary to the public interest. Among the factors considered are: conservation, economics, aesthetics, general environmental concerns, wetlands, fish and wildlife values, navigation, shoreline erosion or accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production, and in general, the needs and welfare of the people. In addition and of equal importance to the public interest review is an analysis of alternative project designs that may avoid negative impacts to wetlands or water resources (USACOE 1993).

#### Policy Strategy for Environmental Permitting

*Objective: Comply with all environmental permitting and consultation requirements to assure mission readiness and safeguard the Base’s natural resources.*

- See Section 5.1.2.2 Fish and Wildlife Inter-Agency Coordination.

- I. Anticipate the need to consult with USFWS under Section 7(a) of the ESA for any proposed actions on MCLB that may affect listed species.
  - A. Continue open dialogue with the USFWS regarding desert tortoise issues.
  - B. Make USFWS aware of the mission requirements as well as the stewardship strategy of this INRMP.
  - C. Pursue “credit” for projects which enhance species recovery.

■ See Section 3.1.3. Wetland and Riparian Management

- D. Ensure USFWS involvement in project planning.
  - E. Work on a MCLB-specific common definition of “success” for species recovery and Biological Opinion requirements.
- II. Ensure compliance with water quality permit requirements if a project may affect wetlands or watercourses.
- A. Seek and obtain regional CWA Section 404 permits (four months in advance) from ACOE, if needed.

## 5.2 Information Management

Natural resource information management is complex because ecosystems and spatial data are complex. Computers have greatly enhanced access to land-based information. In particular, GIS and image-interpretation software help in the efficiency and effectiveness of environmental analysis and review. Technology has allowed managers to become more adaptive in their decision-making, providing a means to organize and update many types of resource data, as well as to test assumptions and play out management scenarios. This capability can play a critical role in helping land managers conceptualize problems at landscape or ecosystem levels.

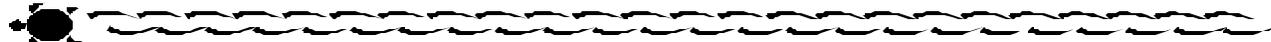
Even the cutting edge of information technology does not replace excellent field biology and analytical thinking. The power of the technology is its ability to enhance planning—to help uncover the range of strategic alternatives that should be considered during environmental review. Key to successful and accurate application of information is the explicit acknowledgment of the data’s uncertainty at every level of its use. Many types of problems will still require field verification, because the resolution of inventories, maps and aerial photos is often too coarse for site-specific decisions.

MCLB maintains compatible GIS technology which supports the continuing MDEI program. MCLB is responsible for sharing and updating the Mojave Ecosystem Database Program with the Base’s most recent natural resources data.

*Policy Strategy for Information Management*

*Objective: Ensure the technically sound, practical and appropriate use of library and computer technology to manage, analyze, and communicate natural resource information in support of management decisions.*

- I. Seek out and use existing technology and make strategic investments in new technologies and creative, innovative management techniques to solve local or regional environmental problems.
  - A. Facilitate better natural resource decisions by improving the capability to access, organize, analyze and reproduce maps, inventories, remotely-sensed data, and other natural resource planning documents.



1. Identify data needs and priorities. Document the current and future data needs for all MCLB land use functions, including why and when the information is needed, procedures for database development and prioritization of projects.
  2. Build and catalog a library of resource materials to enhance day-to-day capability and reporting of natural resource concerns.
  3. Do an inventory of past contracts let on behalf of MCLB and catalog them by subject matter, in order to support planning and management of new projects.
  4. Integrate Public Works drawings and specifications into the system so that they may be used for natural resource planning.
- B.* Periodically purchase aerial photos of the Base. Evaluate the need for photos during periodic reviews.
- II.* Coordinate the integration of natural resource information with mission-related planning.
- A.* Use installation master plans to integrate natural resources management objectives with mission activities and facilities development.
- B.* Write a policy for the sharing of data.
1. Develop provisions and policies for sharing appropriate natural resource information with federal and state agencies, nongovernmental organizations, researchers, and the general public consistent with the DoD's MDEI program.
- III.* Develop procedures to ensure that incomplete information on natural resources does not lead to faulty decisions. Strengthen the scientific basis for natural resources management by integrating research and management.
- A.* Use cooperative planning efforts with outside agencies as a means of sharing and gathering data to fill in data gaps and reduce MCLB's learning curve for unpracticed activities.

■ See Section 5.1.2 Cooperative Planning.

### 5.3 INRMP Implementation

The Assistant Secretary of Defense is charged with establishing and monitoring the implementation of this Plan and its policies. Installation Commanders are charged with (1) conducting integrated natural resources management programs as described in 32 CFR Part 190 and (2) entering into cooperative plans that may be developed on behalf of the Secretary of Defense pursuant to the Sikes Act.

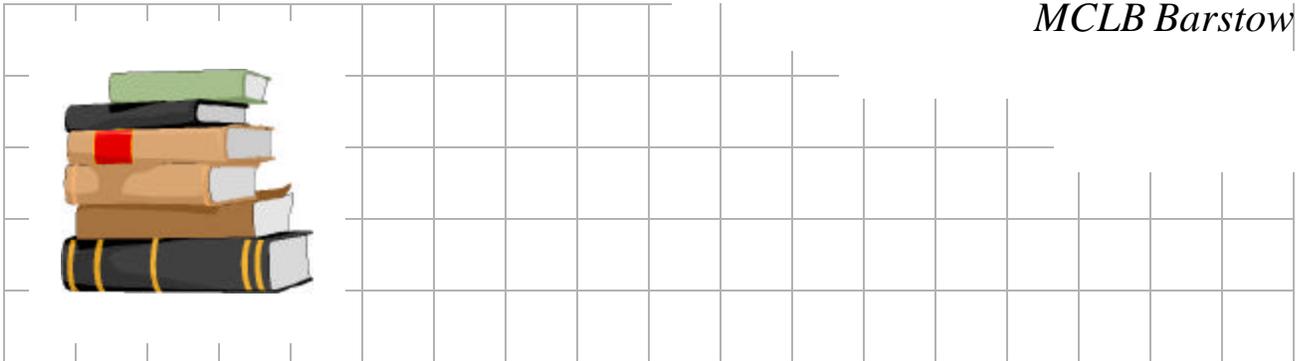
The Commanding Officer at MCLB has responsibility for implementation of the INRMP. The Facilities and Services Division at MCLB Barstow provides staff for implementing many functions of the INRMP, and Southwest Division, NAV-FACENCOM provides technical assistance on request.

*Policy Strategy  
for INRMP  
Implementation*

*Objective: Provide the organizational capacity, communications, planning functions, staffing, budgeting, and innovated technology support to ensure compliance with environmental laws, stewardship of natural resources, and continued use of the Base's lands by the Marine Corps.*

- I. Seek a balanced, multiple-use natural resources program through professional management.*
- II. Identify and ensure departments prioritize and allocate funding to support compliance requirements.*
- III. Rely on the best science available for understanding ecosystem composition, structure and function, and the impacts of land use.*
- IV. Encourage appropriate staff to participate in natural resources management job training activities and professional meetings.*
- V. Provide for enforcement of natural resource laws and regulations by professionally trained personnel.*
- VI. Provide a management framework to outline specific tasks or tactics in accomplishing the goals and objectives of this Plan, on an annual and quarterly basis. Provide a performance management system for organizing, tracking, measuring and reporting the progress of management efforts.*
- VII. Provide further strategic elements, as appropriate.*





## 6.0 References

This Chapter is a compilation of references relating to natural resources issues on MCLB, Barstow. It includes other reference materials in addition to those cited in the text in order to provide a more complete list of available resources.

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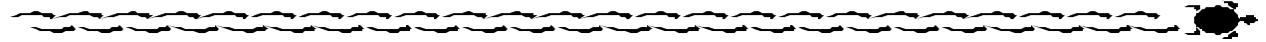
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# Appendix A: Department of the Navy Natural Resources Strategic Plan



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# Department of the Navy Natural Resources Strategic Plan

## ***We Are...***

the users, managers, and protectors of a significant portion of the nation's most ecologically important lands. Our area of operations includes the global air, land, marine and estuarine environments.

Natural resources conservation is a vital component of our nation's environmental agenda. Our continued mission access to domestic airspace, land, and coastal waters is dependent on public confidence that we are competent and conscientious stewards of resources entrusted to our use. We must earn this confidence on an installation by installation, and on an operation by operation, basis.

## ***Our Mission...***

is first and foremost "...to support the requirements of the Unified Commanders so that our nation can deter aggression, encourage political stability, provide forward presence, establish sea control, and project power from the sea against any threat and win." (see Note)

Implicit in this mission is a responsibility to deter aggression and encourage political stability by working to achieve ecologically sustainable development at home and abroad.

NOTE: Based on guidance contained in the Department of the Navy Strategic Plan for Fleet Support, the Department of the Navy Strategic Guidance, Vision and Guiding Principles, and the Department of the Navy white paper From the Sea.

## ***Our Vision...***

is to be a national leader in natural resources conservation and compliance. Natural resources stewardship is emphasized because we recognize that our national security is inextricably linked to local, regional, and global ecological integrity.

## ***Our Goals:***

Preserve our mission access to air, land, and sea resources.

Strengthen national security by strengthening conservation aspects of environmental security.

Preserve the opportunity for a high quality of life for present and future generations of Americans.

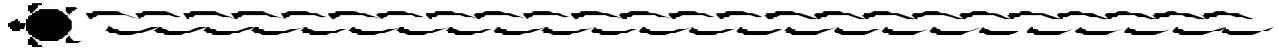
## ***Critical Success Factors:***

Visionary leadership.

Equitable allocation of staffing and funding.

Accessible and effective training.

Optimal organizational alignment.



***Strategies (We Will):***

***Emphasize Stewardship of Natural Resources***

***Objectives:***

- Build a strong conservation ethic throughout the Department of the Navy.
- Develop and sustain strong natural resources programs at installations.
- Earn public confidence in Department of the Navy stewardship of the nation's natural heritage.

***Processes:***

- Prepare and implement installation integrated natural resources management plans.
- Ensure optimum utilization of land and water resources while maintaining ecological integrity.
- Plan, program, and budget for natural resources projects and functions as a cost of doing business.
- Identify all natural resources project funding requirements via the OMB Circular A106 process.
- Ensure attention to natural resources conservation opportunities and constraints when formulating land use and management decisions.
- Use geographic information systems (where available) to integrate natural resources management objectives with mission requirements on Department of the Navy lands.
- Allow public recreational access to Department of the Navy controlled lands when there is no military mission or safety constraint and when environmental attributes will not be adversely affected.
- Ensure optimal natural resources program staffing, funding, and organizational alignment at each Department of the Navy activity.
- Provide training opportunities that meet the needs of professional natural resources specialists.
- Strengthen internal audit systems regarding natural resources issues and compliance requirements.
- Encourage a personal commitment to environmental stewardship by all Department of the Navy personnel.
- Implement meaningful measures of merit to ascertain success/failure of stewardship initiatives and mitigation (compliance) requirements.

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## ***Preserve Biological Diversity***

### ***Objectives:***

Preserve endemic, diverse natural habitats on Department of the Navy installations.

Protect threatened and endangered species.

Achieve an increase in net functional value of wetlands on Department of the Navy lands.

### ***Processes:***

Protect old growth forests ecosystems.

Establish ecological reserve areas and research natural areas warranting special protection because of their biological attributes.

Implement land-use policies to support diversity of biological species, consistent with mission requirements.

Participate in recovery efforts for threatened and endangered species.

Manage Department of the Navy land areas to support recovery of migratory songbirds populations (in partnership with the international Partners in Flight Program) and to recover waterfowl populations (in partnership with participants in the North American Waterfowl Plan).

Adopt an ecosystem management approach on all Department of the Navy lands.

Participate in the National Biological Survey as a federal partner.

Complete and maintain inventories of federally listed and proposed threatened and endangered species on all Department of the Navy lands.

Complete and maintain inventories of Department of the Navy legally defined wetlands.

Develop systems to track net gain/loss of wetland(s) functional value on each Department of the Navy installation.

Use U.S. Army Corps of Engineers approved hydrogeomorphic classification methodologies to address wetlands functional value determinations.

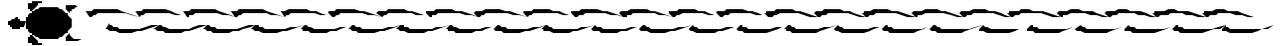
Implement/support initiatives to construct or enhance wetlands beyond permit mitigation requirements.

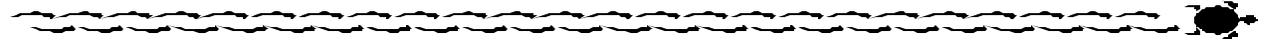
## ***Develop Partnerships for Conservation***

### ***Objectives:***

Solve conservation problems and enhance natural resources by interorganizational cooperation in the application of technology, expertise, and other resources.

Focus on ecosystem integrity issues (which may extend beyond installation boundaries).





## Appendix B: Legislation, Executive Orders, Regulations, and Instructions



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# Legislation, Executive Orders, Regulations, and Instructions

## Legislation Related To Natural Resources

- Antiquities Act of 1906** The Antiquities Act of 1906 (PL 59-209; 16 USC §§ 431 et seq., 1982) authorizes the President to designate as National Monuments historic and natural resources of national significance located on Federally owned or controlled lands. The act further provides for the protection of all historic and prehistoric ruins and objects of antiquity located on Federal lands by providing criminal sanctions against excavation, injury, or destruction of such antiquities without the permission of the Department having jurisdiction over such resources. The Secretaries of the Interior, Agriculture, and Defense are further authorized to issue permits for archaeological investigations on lands under their control to recognized educational and scientific institutions for the purposes of systematically and professionally gathering data of scientific value.
- Archaeological and Historic Preservation Act of 1974** The Archaeological and Historic Preservation Act of 1974 (Moss-Bennett Act; 16 USC §§ 469 et seq.) provides for the protection of historic and archaeological sites threatened by Federal or Federally funded or assisted construction projects.
- Archaeological Resources Protection Act of 1979** The Archaeological Resources Protection Act of 1979 (16 USC §§ 470 et seq., 1982) sets up penalties for destruction or removal of archaeological materials from Federal land without the proper permits. Requirements for obtaining these permits are also established by this regulation.
- Bald Eagle Protection Act** The Bald Eagle Protection Act (Bald and Golden Eagles Act; PL 95-616; 16 USC §§ 668 et seq.) provides for protection of the bald eagle and the golden eagle by prohibiting taking, possession, and commerce in the birds.
- California Water Code** The California Water Code Section 1243 declares the reservation of water for the enhancement and protection of fish and wildlife to be a beneficial use.
- Clean Air Act** The Clean Air Act (CAA; 42 USC §§ 7401 et seq.) mandates the prevention and control of air pollution from stationary and mobile sources. Requires the establishment of: National Ambient Air Quality Standards (NAAQS) to regulate primary and secondary concentrations for six priority air pollutants; New Source Performance Standards (NSPS) to provide ceiling emission standards for certain new industrial sources; and National Emission Standards for Hazardous Air Pollutants (NESHAP) to control pollutants, not covered under NAAQS, which may increase mortality rates or cause serious irreversible illness.

**Clean Water Act**

The objective of the Clean Water Act (PL 92-500, as amended; 33 USC §§ 1251 et seq.) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (Section 101a). The Clean Water Act has three major approaches to water pollution control:

1. Construction grants for reducing municipal discharges;
2. National Pollution Discharge Elimination System (NPDES) permits for control of point source (storm water and waste water) discharges; and
3. Water quality management planning for nonpoint source (NPS) control from diffuse natural origins such as sediment.

In 1972 Congress adopted a "zero-discharge" goal, and a focus on "preventable causes of pollution," to emphasize the source of contamination rather than controls at the outfall or water body itself. Water quality "standards" include a legal designation of the desired use for a given body of water and the water quality criteria appropriate for that use. The "criteria" are specific levels of water quality which are expected to make a water body suitable for its desired use. "Effluent limitations" are restrictions on quantities, rates, and concentrations in wastewater discharges measured at the discharger's outfall pipe. (Goldfarb 1984)

Administration of the Act is delegated to the State Water Resources Control Board (SWRCB) in California and, locally, to the San Diego Regional Water Quality Control Board (RWQCB). The Regional Board is responsible for setting water quality standards and criteria for water bodies in its regional plan, and for issuing and enforcing NPDES permits.

*Section 404* (33 USC Section 1344) deals with discharge of dredge or fill material into waters of the U.S. Regulatory authority has been delegated by the Environmental Protection Agency to the U.S. Army Corps of Engineers for Sec. 404. Discharges are any material that results in a change in the bottom elevation of a water body or wetland, including grading, road fills, stream crossings, building pads, and flood and erosion control on streambanks. Vernal pools are considered non-tidal waters that are isolated wetlands under Sec. 404. There are 26 more or less generic nationwide permits that preauthorize certain minor discharges as long as they meet certain conditions--e.g. construction of outfall structures, backfill or bedding for utility lines, fill for bank stabilization, and minor road crossings. The nationwide permit system is currently being modified. If a discharge would cause the loss of or substantially modify one to 10 acres of water, including adjacent wetlands, then the nationwide permit may not apply.

Penalties: A Class I or civil penalty may not exceed \$10,000 per violation, with the maximum amount of \$25,000. Class II civil penalty may not exceed \$10,000 per day as each violation continues, with the maximum amount not to exceed \$125,000.

**Comprehensive Employment and Training Act Amendments 1978**

The Comprehensive Employment and Training Act Amendments of 1978 (PL 95-524) extend and authorize the Young Adults Conservation Corps (YACC) which engages in conservation programs on federal lands.

<b>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</b>	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA; 43 USC §§ 9601 et seq.) establishes programs for the cleanup of hazardous waste disposal and spill sites to ensure protection of human health and the environment. Designates the President as trustee for Federally protected or managed natural resources.
<b>Conservation and Rehabilitation Program on Military and Public Lands</b>	The Conservation and Rehabilitation Program on Military and Public Lands (PL 93-452; 16 USC §§ 670 et seq.) amends PL 86-797 by providing for fish and wildlife habitat improvements, range rehabilitation, and control of off-road vehicles on Federal lands.
<b>Conservation Programs on Military Installations (Sikes Act)</b>	Conservation Programs on Military Installations (Sikes Act), (PL 93-452; 16USC §§ 670a et seq.) requires each military department to manage natural resources and to ensure that services are provided which are necessary for management of fish and wildlife resources on each installation; to provide their personnel with professional training in fish and wildlife management; and, to give priority to contracting work with Federal and State agencies that have responsibility for conservation or management of fish and wildlife. Authorizes cooperative agreements (with States, local governments, non-governmental organizations, and individuals) which call for each party to provide matching funds or services to carry out natural resources projects/initiatives.
<b>Conservation Programs on Military Reservations</b>	The Conservation Programs on Military Reservations (PL 90-465; 16 USC §§ 670 et seq.) amends PL 86-797 to include outdoor recreation programs on military lands.
<b>Defense Environmental Restoration Program</b>	The Defense Appropriations Act of 1991 Legacy Program (10 USC § 2701) provides for the stewardship of biological, geophysical, cultural and historic resources on DoD lands.
<b>Emergency Planning and Community Right-to-Know Act of 1986</b>	The Emergency Planning and Community Right-to Know Act of 1986 (EPCRA)(42 USC §§11001 et seq.) is also known as Title III of the Superfund Amendments and Reauthorization Act (SARA). EPCRA focuses on the hazards associated with toxic chemical releases. Most notably, specific sections of EPCRA require immediate notification of releases of oil and hazardous substances and CERCLA-defined hazardous substances to State and local emergency response planners. Requires State and local coordination in planning response actions to chemical emergencies. Requires certain industries to submit information on chemical inventories and fugitive emissions.
<b>Endangered Species Act</b>	The Endangered Species Act (PL 93-205; 16 USC §§ 1531 et seq.), ESA, of 1973 requires that all Federal agencies undertake programs for the conservation of endangered and threatened species. These agencies are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its "critical habitat" (Section 7). Critical habitat is usually des-



ignated concurrently with a listing. Section 9 prohibits the “taking” of endangered fish or wildlife, including direct killing, harming, harassing, or destruction of habitat that may be important to the species’ survival or recovery. Prohibitions against *threatened* species are discretionary on the part of the Secretary of the Interior, but can be as restrictive as those protecting endangered species. Lists are maintained by the Secretary of the Interior. Monitoring of candidate species (Category 1 and Category 2) is required, with adoption of emergency listing when there is significant risk (Section 4).

For plants, collection or removal of seed material or whole plants of a threatened or endangered species, even for revegetation or monitoring purposes, requires a USFWS collection permit. There is no general taking prohibition for plants that compares to that which applies to animals (See Bean et al. 1991).

If an area is designated “critical habitat,” physical and biological features of the environment must be protected for the purposes of conserving the listed species. “Incidental takes” are permissible only if an “incidental take statement” is issued by the Secretary of the Interior / USFWS with a biological opinion after agency consultation. Management options will likely be limited as a requirement for minimizing the taking.

Coordination regarding threatened and endangered species is addressed in Section 7 of this Act. In particular, Section 7(a) requires a Federal agency to consult with USFWS on any proposed action if the agency has reason to believe that an endangered or threatened species could be directly or indirectly affected by the action. Species under review and those of “special concern” are also included. A Biological Assessment (B.A.) by the lead agency is required under Section 7(c) if listed species or critical habitat may be affected by a major construction activity. The purpose of a B.A. is to evaluate potential effects of the action on listed species and/or critical habitat, and to assist USFWS in rendering a Biological Opinion.

A consultation consists of one or more of these steps: 1) Informal; 2) Formal; or 3) Further Discussion. An informal consultation is an optional process that includes all discussions and correspondence between the USFWS and the Federal agency to determine whether a formal consultation or conference is required. A formal consultation is a process between the USFWS and the Federal agency that commences with Federal agency’s written request for consultation and concludes with the USFWS’s issuance of a Biological Opinion.

A Biological Opinion must include: 1) a summary of the information on which the opinion was based (the information is to be provided by the Federal agency), 2) a detailed discussion of the effects of the action on listed species or critical habitat, and 3) the USFWS opinion on whether the action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat. The biological opinion may include an incidental take statement that specifies: 1) the amount of “take” that is allowed, 2) reasonable and prudent measures that the USFWS considers necessary or appropriate to minimize such a “take”, and 3) the terms and conditions that must be complied with to implement the reasonable and prudent measures.

The Marine Corps must take measures to assure that no irreversible or irretrievable commitment of resources is authorized, funded or carried out by them that will likely jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify designated critical habitat, until the Consultation process is complete. The Marine Corps is to provide leadership in identifying and protecting habitat that is critical for any threatened or endangered species.

Marine Corps installations are required to carry out the following:

1. Maintain liaison with local governmental agencies and organizations having an interest in endangered and threatened species protection;
2. Delineate boundaries of the habitat areas of endangered and threatened species on maps;
3. Initiate consultation with the USFWS or NMFS per cooperative agreement procedures when a proposed action or program has been identified that may affect listed species or their habitat;
4. Perform a B.A. for any action that may adversely affect the continued existence of endangered and threatened species or result in the destruction or adverse modification of habitat of such species (The EA should contain the final biological opinion of the USFWS or NMFS following the consultation process);
5. Cooperate with the USFWS or NMFS during development and implementation of a recovery plan for listed species occurring on the installation.

The California State Legislature has expressed its intent to protect, preserve and enhance endangered or rare species as issued in the Fish and Game Code (Div. 2, Chpt. 10 Native Plant Protection and Div. 3, Chpt. 1.5 Endangered Species). California Endangered Species Act (CESA) violations can result in a fine of up to \$5,000 and / or one year in prison. While this law does not apply to Federal actions, it does apply to State agencies and private landowners. In the spirit of the law and as a service to State agencies and private landowners, Federal agencies operate under these guidelines.

Penalties: Civil penalty of up to \$25,000 per violation or criminal penalty of up to \$50,000 and / or one year in prison, knowing violation for a take or damage / destruction of critical habitat of an endangered animal.

**Endangered Species  
Act 1973 Amendments**

The Endangered Species Act of 1973 (1978 Amendments), (PL 95-632; 16 USC §§1531 et seq.) provides for the conservation and protection of endangered and threatened species of fish, wildlife, and plants and expands the consultation process.

**Farmlands Protection  
Policy Act of 1981**

The Farmlands Protection Policy Act of 1981 (7 USC §4201) considers Federal activities which result in the conversion of farmlands. It requires Federal agencies to identify prime and unique farmland, take into account adverse effects of Federal programs on their preservation, and consider alternative actions to reduce these effects.



<b>Federal Facilities Compliance Act</b>	The Federal Facilities Compliance Act (42 USC § 6961) subjects Federal agencies to civil and administrative penalties for noncompliance with Federal, State, interstate, or local solid and hazardous waste requirements (Subtitles C and D of RCRA).
<b>Federal Flood Disaster Prevention Act</b>	The Federal Flood Disaster Prevention Act (PL 93-234; 42 USC §§ 4001 et seq.) established the Federal Flood Insurance Program, which has provided some incentives for construction outside flood-prone areas. To a limited degree, this has reduced destruction of riparian vegetation by developments. President Carter issued two executive orders in a related effort: E011988 (Floodplain Protection) directed Federal agencies to avoid construction in flood-hazard areas and to seek restoration and preservation of the natural and beneficial values of floodplains; E011990 (Protection of Wetlands) directed Federal agencies to minimize the destruction, loss, or degradation of wetlands.
<b>Federal Insecticide, Fungicide, and Rodenticide Act</b>	The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), (7 USC §§ 136 et seq.) provides the principal means for preventing environmental pollution from pesticides through product registration and applicator certification. The registration of all pesticide products by EPS results in label instructions on each container for use, storage, and disposal. Label instructions are legally applicable to all users. Under FIFRA, EPA is required to accept certain pesticides under recall for safe disposal. It is unlawful to purchase, distribute, or use any pesticide that does not have an EPA registration number or for which registration has been canceled or suspended, or to apply, store, or dispose of any pesticide or container in any manner inconsistent with applicable regulations.
<b>Federal Noxious Weed Act of 1974</b>	The Federal Noxious Weed Act of 1974 (PL 93-629; 7 USC § 2801) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.
<b>Federal Water Pollution Control Act Amendments of 1972</b>	The Federal Water Pollution Control Act Amendments of 1972 (see Clean Water Act; PL 92-500; 33 USC §§ 1251 et seq.) sets up a Federal permit and license system to carry out certain pollution discharge activities in navigable waters. Section 314 of this Act established the Clean Lakes Program (CLP). The purpose of the CLP is to develop a national program to clean up publicly owned freshwater lakes. In order to receive a grant for in-lake restoration under this Program, all point sources of pollution must be treated or have treatment planned under Section 201 and 402 of the Clean Water Act.
<b>Fish and Wildlife Conservation Act of 1980</b>	The Fish and Wildlife Conservation Act of 1980 (PL 96-366; 16 USC §§ 2901 et seq.) provides for conservation, protection, restoration and propagation of certain species, including migratory birds threatened with extinction.

**Fish and Wildlife  
Conservation and  
Military Reservations  
Act**

The Fish and Wildlife Conservation and Military Reservations Act (Sikes Act; 16 USC § 670) applies to any installation in the U.S. with land or water suitable for conservation of fish and wildlife. It requires that fish and wildlife be part of and integrated into a multiple-use program for managing natural resources. This includes a requirement to develop a cooperative management plan with State and Federal fish and wildlife conservation agencies. The law sets the guidelines for charging user fees and retaining the funds to benefit the activity, such as improving habitat or restocking a fish pond.

**Fish and Wildlife  
Conservation and  
Natural Resource  
Management Programs  
on Military  
Reservations**

The Fish and Wildlife Conservation and Natural Resource Management Programs on Military Reservations (PL 96-561) amends the Sikes Act above to require that trained professionals be used to integrate fish and wildlife into each base's resource program. This amendment allows net receipts from timber sales to be used for fish and wildlife management instead of going into the general treasury.

**Fish and Wildlife  
Coordination Act**

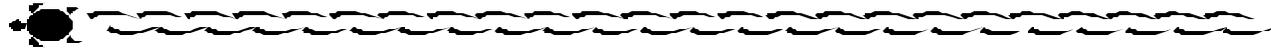
The Fish and Wildlife Coordination Act (PL 85-624; 16 USC §§ 661 et seq.) is a law which mandates that wildlife conservation receive equal consideration and be coordinated with other features of water resource development. The intent is to prevent loss or damage of wildlife and provide for development and improvement of wildlife in conjunction with water development projects. Federal agencies proposing to impound, divert or control surface waters are required to consult with the USFWS and CDFG, to include and give full consideration to the recommendations of these agencies, and to provide justifiable means and measures for benefiting wildlife in project plans. ACOE must coordinate permit applications with USFWS and CDFG. Like NEPA, implementation of this Act is essentially procedural in that no particular outcome is mandated. The Act authorizes project modification, land acquisition, and other measures necessary to protect wildlife.

**Historic Sites Act of  
1935**

The Historic Sites Act of 1935 (PL 74-292; 16 USC §§ 461 et seq., 1982) establishes as national policy the preservation for public use of historic resources by giving the Secretary of the Interior the power to make historic surveys and to document, evaluate, acquire, and preserve archaeological and historic sites across the country. The act led to the eventual establishment within the National Park Service of the Historic Sites Survey, the Historic Buildings Survey, and the Historic Sites Engineering Record.

**Migratory Bird Treaty  
Act**

The Migratory Bird Treaty Act (PL 65-186, as amended; 16 USC §§ 703 et seq.) protects most birds, whether or not they migrate. Birds, their nests, eggs, parts or products may not be killed or possessed. Game birds are listed and protected except where specific seasons, bag limits, and other features govern their hunting. Exceptions are also made for some agricultural pests, which require a USFWS permit (yellow-headed, red-winged, bi-colored red-winged, tri-colored red-winged, Rusty and Brewer's blackbirds, cowbirds, all grackles, crows and magpies). Some other birds that injure crops in California may be taken under the



authority of the County Agricultural Commissioner (meadowlarks, horned larks, golden-crowned sparrows, white- and other crowned sparrows, goldfinches, house finches, acorn woodpeckers, Lewis woodpeckers, and flickers). Permits may be granted for various non-commercial activities involving migratory birds and some commercial activities involving captive-bred migratory birds.

Controlled burns during the avian breeding season (approximately February through October) would violate this Act, according the USFWS Carlsbad Office.

Penalties: Violations of this act can cost an individual or organization up to \$5,000 and \$10,000, respectively, and up to six months imprisonment for a misdemeanor. Felony violations may result in fines of up to \$250,000 for individuals, \$500,000 for organizations, and up to two years' imprisonment.

**Military Construction Authorization Act- Leases; Non-excess property**

The Military Construction Authorization Act- Leases; Non-excess property (10 USC § 2667) provides for the outleasing of public lands.

**Military Construction Authorization Act - Military Reservation and Facilities-Hunting, Fishing and Trapping**

The Military Construction Authorization Act - Military Reservation and Facilities-Hunting, Fishing and Trapping (10 USC § 2671) requires that all hunting, fishing, and trapping on military installations follow Fish and Game laws of the state in which it is located, and be issued appropriate state licenses for these activities.

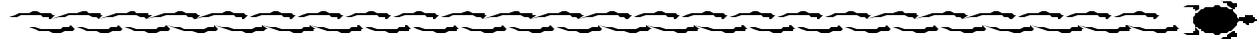
**National Environmental Policy Act of 1969**

The National Environmental Policy Act of 1969 (PL 91-190; 42 USC §§ 4321 et seq.), NEPA, evolved over 10 years from the desire of Congress to have a cohesive statement of the national environmental policy. Agencies must assess, in detail, the potential environmental impact of any proposal for legislation or other major Federal action that has the potential for significantly affecting the quality of the human environment. The Act is intended to help public officials and citizens make decisions that are based on understanding of environmental consequences and take action that protects, restores and enhances the environment.

NEPA mandates that agencies use a “systematic, interdisciplinary approach” that integrates the natural and social sciences and environmental design. The courts have interpreted this mandate to be essentially “procedural;” that is, environmental impacts must be considered, but proposals with environmentally damaging consequences need not necessarily be rejected.

The law requires a detailed statement of “significant” environmental impacts of “major” Federal actions. An action may be significant in terms of geographical extent, long-term impact, potential risk, or because of its effect on heritage resources or endangered species.

The process identifies reasonable alternatives to proposed actions to that might have less or no environmental effect. Individual and cumulative impacts must be considered. A three-tiered approach is used to evaluate impacts: 1) The Environmental Assessment (EA) is the analysis to be completed when the government is uncertain as to whether an action will significantly affect the environment or the



action is controversial. The result of an EA is either a Finding of No Significant Impact (FONSI) or a requirement to complete an Environmental Impact Statement (EIS); 2) The EIS is a full-disclosure document that presents a full and unbiased discussion of significant impacts, informing the public and decision makers of reasonable alternatives to the proposed action; and 3) A Categorical Exclusion is used for 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 the Department of Navy in implementation of Federal regulations and for which, therefore, neither an EA nor and EIS is required.

(PL 91-190; 42 USC 4321-4347, January 1, 1970, as amended by PL 94-52; July 3, 1975, PL 94-83, August 9, 1975, and PL 97-258, Section 4(b), Sept. 13, 1982)

**National Heritage  
Policy Act of 1979**

The National Heritage Policy Act of 1979 (HR 6502). Authorizes location and establishment of a register of natural land and cultural areas and requires consideration of alternatives prior to taking actions that would adversely affect them.

**National Historic  
Preservation Act of  
1966**

The National Historic Preservation Act of 1966 (PL 89-665; 16 USC §§ 470 et seq.) expands the National Register of Historic Places, provides a list of significant historic and prehistoric sites and districts, and gives them formal protection. Section 106 requires that Federal agencies with direct or indirect jurisdiction over such properties identify them for the Federal Register. It further directs agencies to consider historic and archaeological resources during planning, and allows the Advisory Council on Historic Preservation, established by this Act, an opportunity to comment when a Federal undertaking could affect historic properties.

**National Trails Systems  
Act of 1968**

The National Trail Systems Act of 1968 (16 USC § 1271) promotes development of recreational, scenic, and historic trails for persons of diverse interest and abilities.

**Native American  
Graves Protection and  
Repatriation Act of  
1990**

The Native American Graves Protection and Repatriation Act of 1990 (PL101-601; 25 USC §§ 3001 et seq.) provides requirements for treatment, determination of ownership, control of, and repatriation of human remains and cultural items on Federal or Tribal lands. The term "Indian Tribe" refers to any Tribe, band, nation, or other organized Indian group or community that is on the current list of recognized Indian Tribes published by the Bureau of Indian Affairs. "Human remains" refers to all Native American human remains.

**Noxious Plant Control  
Act**

The Noxious Plant Control Act (PL 90-583; 43 USC § 1241) provides for the control of noxious plants on lands under control or jurisdiction of the Federal government.



<b>Outdoor Recreation-Federal/State Program Act</b>	The Outdoor Recreation-Federal/State Program Act (PL 88-29; 16 USC §§ 460(L) et seq.) provides for the management of lands used for outdoor recreation. Requires consultations with U.S. National Park Service regarding management.
<b>Porter-Cologne Water Quality Control Act</b>	The Porter-Cologne Water Quality Control Act (California Water Code §§ 13000 et seq.) is the State's primary water law. It gives the State Water Resources Control Board (SWRCB) and the nine regional water quality control boards substantial authority to regulate water use.
<b>Resource Conservation and Recovery Act</b>	The Resource Conservation and Recovery Act (RCRA; 42 USC §§ 692 et seq.) establishes a comprehensive program which manages solid and hazardous waste. Subtitle C, Hazardous Waste Management, sets up a framework for managing hazardous waste from its initial generation to its final disposal. Waste pesticides and equipment/containers contaminated by pesticides are included under hazardous waste management requirements.
<b>Safe Drinking Water Act</b>	<p>The Safe Drinking Water Act (SDWA; 42 USC §§ 300(f) et seq.), SDWA, prescribes treatment and distribution control strategies for abating contamination of drinking water and also requires the establishment of a permit program to regulate injection of liquids into underground strata.</p> <p>The SDWA provides for direct control of underground injection of fluids that may affect groundwater supplies. States may assume the predominant role in executing groundwater protection programs. The EPA has direct responsibility only if a State chooses not to participate in an underground injection control (UIC) program.</p>
<b>Soil Conservation Act</b>	The Soil Conservation Act (PL 74-46; 16 USC § 590A) provides for application of soil conservation practices on Federal lands. Requires Federal agencies to control and prevent soil erosion and preserve natural resources in managing Federal lands.
<b>Stream Alteration Controls</b>	The Department of Fish and Game's authority over the use of suction dredges (Fish and Game Code, § 5653), alterations of fish spawning areas (Fish and Game Code, § 1505), and alterations of stream beds in general (Fish and Game Code, §§ 1601 et seq.) are all useful tools for the protection of instream resources (but generally not for riparian vegetation outside of the stream or overflow areas). The §§1601-1603 agreements (§1601 covers public projects, while §1603 addresses private work) do not have the status of State approvals under law, instead providing for a negotiation and agreement process.
<b>Wild and Scenic River Act</b>	The Wild and Scenic River Act (PL 90-542; 16 USC § 1274) requires identification and protection of any river or stream that qualifies under the act.

**Youth Conservation Corps Act of 1972**      The Youth Conservation Corps Act of 1972, amended (PL 93-408, as amended; 16 USC § 1701) expands and make a permanent the Youth Conservation Corps (YCC) program and establishes objectives for youth employment and conservation work on public lands.

## Executive Orders Relevant To Natural Resources

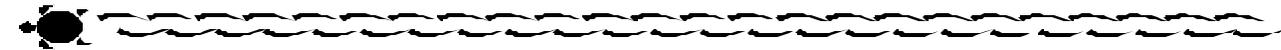
**Exotic Organisms**      The Exotic Organisms Executive Order (EO 11987) restricts Federal Agencies in the use of exotic plant species in any landscape and erosion control measures.

**Floodplain Management**      The Floodplain Management Executive Order (EO 11988) specifies that “Agencies shall encourage and provide appropriate guidance to applicants to evaluate the effects of their proposals in floodplains prior to submitting applications”. This order includes wetlands that are within the 100-year floodplain and especially discourages filling.

**Off-Road Vehicles on Public Lands**      The Off-Road Vehicles on Public Lands Executive Order (EO 11989) provides for closing areas to use where soil, wildlife, or other resources are adversely affected.

**Protection and Enhancement of the Cultural Environment**      Protection and Enhancement of the Cultural Environment (Executive Order No. 11503) directs Federal agencies to take a leadership role in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies must locate, inventory, and nominate to the National Register all historic resources under their jurisdiction or control. Until these processes are completed, agency heads must exercise caution to ensure that potentially qualified Federal property is not inadvertently transferred, sold, demolished, or substantially altered. When planning projects, agencies are urged to request the opinion of the Secretary of the Interior as to the eligibility for National Register listing of properties whose resource value is questionable or has not been inventoried. Agencies are directed to institute procedures, in consultation with the President’s Advisory Council on Historic Preservation, to ensure that Federal plans and programs contribute to the preservation and enhancement of non-Federally owned historic resources. Protection of National Register historic and Archaeological sources is achieved by the Marine Corps through implementation of the Historic and Archeological Resources Protection (HARP) Plan. The plan facilitates compliance by providing management goals, priorities, and standard operating procedures for site protection.

**Protection and Enhancement of Environmental Quality**      Protection and Enhancement of Environmental Quality (EO 11514) directs issuance of instructions and guidelines relative to preparation of environmental impacts. This order created the Council on Environmental Quality to oversee the implementation of NEPA, mediate disputes and develop environmental policy.



**Protection and  
Enhancement of  
Environmental Quality**

Protection and Enhancement of Environmental Quality (EO 11991) amends EO 11514 (March 5, 1970) to require Council on Environmental Quality to issue regulations to make environmental impact statements more effective. The CEQ was recently abolished by Vice-President Gore, and to date there is no replacement of the body.

**Protection of Wetlands**

The Protection of Wetlands Executive Order (EO 11990) directs all federal agencies to “take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands”. This applies to the acquisition, management, and disposal of federal lands and facilities; to construction of improvements undertaken, financed, or assisted by the federal government; and to the conduct of federal activities and programs which affect land use. Section 4 of the EO requires that when federally owned lands are leased and easement is assigned, or when disposed of to a non-federal party, a reference be included in the conveyance to identify any wetlands and indicate those uses which are restricted in such areas.

## Federal Regulations, Directives, And Instructions

**Federal Regulations**

**18 CFR 1312.** Archeological Resource Protection Act Regulations.

**32 CFR 188.** Environmental Effects in the United States of DoD Actions.

**32 CFR 190.** Natural Resources Management Program.

**32 CFR 775.** Procedures for Implementing the National Environmental Policy Act. Dept. of Navy policy to supplement DoD regulations (32 CFR 214) by providing policy and assigning responsibilities to the Navy and Marine Corps for implementing CEQ regulations and implementing NEPA.

**33 CFR 330.** Dredge & Fill Nationwide Permit Program.

**36 CFR 60.** National Register of Historic Places.

**36 CFR 65.** National Historic Landmarks Program.

**36 CFR 800.** National Historic Preservation Act (NHPA) Regulations for the Protection of Historic Properties.

**40 CFR 6.** EPA Regulations on Implementation of National Environmental Policy Act Procedures.

**40 CFR 122.** EPA National Pollutant Discharge Elimination System Permit Regulations.

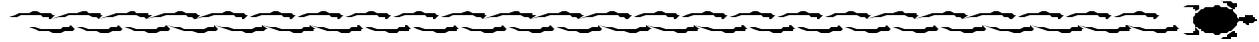
**40 CFR 125.** EPA Regulations on Criteria and Standards for the National Pollutant Discharge Elimination System.

**40 CFR 130.** EPA Requirements for Water Quality Planning and Management.

**40 CFR 141-143.** EPA National Drinking Water Regulations.

**40 CFR 150-186.** EPA Regulations for Pesticide Programs.

**40 CFR 162.** EPA Regulations on Insecticide, Fungicide, and rodenticide Use.



**40 CFR 230.** EPA Interim Regulations on Discharge of Dredged or Fill Material into Navigable Waters.

**40 CFR 1500.** Council on Environmental Quality Regulations. Defines the methods of implementing the National Environmental Policy Act (NEPA).

**43 CFR 7.** Archaeological Resources Protection Act of 1979; Uniform Regulations. **50 CFR 10.** Regulations Concerning Marine Mammals.

**50 CFR 10.13.** List of Migratory Birds.

**50 CFR 17.11 and 17.12.** Fish and Wildlife Service List of Endangered and Threatened Wildlife.

**50 CFR 402.** Interagency Cooperation - Endangered Species Act of 1973.

**Federal Register 58(188):51144-51190** (1990; also 50 CFR 17). Plant taxa for listing as endangered or threatened species; Notice of review.

**Federal Register 70(199): 800** (15 October 1985). Protection of historic and cultural properties.

**Department of Defense  
Directives and  
Instructions**

**DoD Directive 4150.7 of 24 October 1983.** DoD Pest Management Program (NOTAL).

**DoD Directive 4700.1 of 6 November 1978.** Natural Resources Conservation and Management (NOTAL). Provides for management of renewable natural resources on military lands.

**DoD Directive 4700.2 of 15 July 1988.** Secretary of Defense Award for Natural Resources and Environmental Management (NOTAL).

**DoD Directive 4710.1 of 21 June 1984.** Archeological and Historic Resources Management. Establishes policies, procedures, and assigns responsibilities for the management of archeological and historic resources located in and on waters and lands under DoD control. This Directive implements these guidelines consistent with Federal law, Executive orders, and other DoD directives that deal with archeological and historic preservation issues.

**DoD Directive 4715.DD-R. Draft April 1996.** Draft integrated natural resources management in the Department of Defense. Prescribes procedures for preparing integrated natural resources management plans for DoD lands.

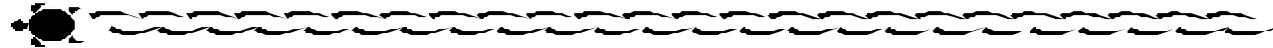
**DoD Directive 6050.1** (1979). Environmental Effects in the U.S. of DoD Actions.

**DoD Directive 6050.2 of 19 April 1979, as amended.** Use of Off-Road Vehicles on DoD Lands. Provides policy for use of off-road vehicles on DoD lands.

**DoD Instruction 4700.1.** Instructs the Department of the Navy to implement and maintain natural resource management programs.

**DoD Instruction 4715.1 of 24 February 1996.** Environmental Security.

**DoD Instruction 4715.3 of 3 May 1996.** Environmental Conservation Program. Implements policy, assigns responsibilities, and prescribes procedures under DoD Instruction 4715.1 for the integrated management of natural and cultural resources on property under DoD control.



**DoD Instruction 5000.13 of 13 December 1976.** Natural Resources- the Secretary of Defense Natural Resource Conservation Award (NOTAL). Delineates procedures for participating in completion for Secretary of Defense Conservation Award.

**Department of the Navy Manuals and Instructions**

**NAVFACP-73.** Real Estate Manual P-73. This manual sets forth the authority of the Commander, Naval Facilities Engineering Command (NAVFACENGCOM), for outgrant of Navy controlled real property. Responsibility for administration, management, and utilization of Navy real property lies with the Commanding Officer, and his superiors, of the installation to whose plant account the property belongs. NAVFACENGCOM does not have general responsibility for management of Navy real property, except for lands of installations under its command. However, NAVFACENGCOM has a technical responsibility for real estate action on lands which have been determined temporarily or partially excess.

**NAVFACINST 6250.3H.** Applied Biology Program Services and Training. Requires the use of an integrated pest management approach to minimize the use of herbicides.

**NAVFACINST MO-100.4.** Guidance on Special Interest Areas.

**NAVFACINST 11010.63B,** Planning Services for Navy and Marine Corps Shore Activities.

**OPNAVINST 5090.1B.** Department of the Navy Environment and Natural Resources Procedural Manual. Chapter 22, Natural Resources Management, describes requirements, guidelines, and standards for conserving natural resources on Navy lands. Summarizes the natural resources management (NRM) program to include management of waters, forests, fish and wildlife, and outdoor recreation.

**OPNAVINST 6250.4A.** Pest Management Programs. Requires Navy and Marine Corps to have a comprehensive Pest Management Plan. Discusses the need to control pest outbreaks which affect the military mission, damage property, or impact the welfare of people.

**SECNAVINST 6240.6E.** Implementation of DoD directives under DoD Instruction 4700.4 Assigns the responsibility of developing and implementing natural resources programs to the Chief of Naval Operations and the Commandant of the Marine Corps.

**Marine Corps Orders**

**MCO 1510.25C.** Implements the Troop Information Program which covers specific topics of information as well as general information and current topics of concern.

**MCO 5090.2.** Environmental Compliance and Protection Manual. Provides guidelines and specifies responsibilities for the administration of the Marine Corps program for protection of the environment and conservation of natural resources. This document pulls together the requirements of several acts, policies, executive orders, and other legislation which govern the natural and cultural resources on land under Marine Corps jurisdiction.

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**MCO 5090.2 Chapter 19.** Historic and Archeological Resources Protection. Establishes responsibilities for development and implementation of an archeological and historic resources protection program. Implements program consistent with DoD Directive 4710.1 (Archeological and Historic Resources Management) by providing policy, responsibilities, and guidance for all archeological and historic resources under the management of the Marine Corps. Establishes responsibilities of the Marine Corps under the National Historic Preservation Act. This Order supersedes MCO 11000.19.

**MCO P5090.2A.** Draft Update of P5090.2 Environmental Compliance and Protection Manual. 1996.



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# Appendix C: Joint Agreements

## **Cooperative Agreements**

Cooperative Agreement Between the Department of Defense and The Nature Conservancy

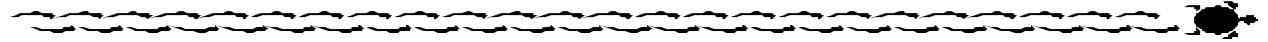
## **Memorandums of Agreement (MOAs)**

Memorandum of Agreement between the U.S. Fish and Wildlife Service, Department of the Interior and The Naval Facilities Engineering Command, Department of the Navy

## **Memorandum of Understanding (MOUs)**

Memorandum of Understanding to foster the ecosystem approach between the Council on Environmental Quality, Department of Agriculture, Department of The Army, Department of Commerce, Department of Defense, Department of Energy, Department of Housing and Urban Development, Department of The Interior, Department of Justice, Department of Labor, Department of State, Department of Transportation, Environmental Protection Agency, and Office of Science and Technology Policy.





# Appendix D: Barstow Soil Descriptions



# Barstow Soil Descriptions

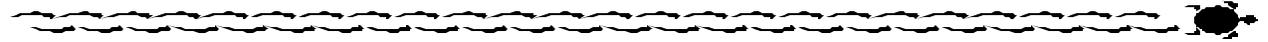
Soil Code	Description	Yermo	Nebo	RR	Wind Erodibility Group
100	Arizo gravelly loamy sand, 2-9% slopes		1017	327	8
112	Cajon sand, 0-2% slopes	1395	155		1
113	Cajon sand, 2-9% slopes	147	6	37	1
115	Cajon gravelly sand, 2-15% slopes			455	1
151	Nebona-Cuddeback complex, 2-9% slopes		76	914	5
155	Gravel Pit		0.1		
157	Riverwash	176	20		
168	Typic Haplagrids - Yermo complex, 8-30% slopes		46	662	7
172	Villa loamy sand, hummocky		13		2

Soil Code color corresponds to Soils map in Appendix F.

## Wind erodibility

Wind erodibility group applies only to the surface layer. Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in disturbed areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the amount and proportion of stable aggregates 0.84 millimeter in size and smaller. The groups are represented by USDA textural classes. Soils containing rock fragments can occur in any group. **1** = sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish. **2** = Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used. **3** = Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used. **4L** = Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used. **4** = Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used. **5** = Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used. **6** = Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown. **7** = Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown. **8** = Stony or gravelly soils and other soils not subject to wind erosion.





## Appendix E: Plants Confirmed on MCLB Barstow



# Plants Confirmed on MCLB Barstow

Family - Genus - Species - Sub Species	Common Name	Form	Herbarium (Y/N) or Photo	Nebo Mojave River	Yermo (All)	Rifle Range
<b>EPHEDRACEAE</b>						
G <i>Ephedra californica</i>	California tea	NPS	Y / Photo	X	X	X
G <i>Ephedra nevadensis</i>	Nevada tea	NPS				X
<b>ASCLEPIADACEAE</b>						
D <i>Sarcostemma cynanchoides</i> ssp. <i>hartwegii</i>	climbing milkweed	NPS	Y / Photo			X
<b>ASTERACEAE</b>						
D <i>Acamptopappus sphaerocephalus</i> var. <i>hirtellus</i>	goldenhead	NPS	Y			X
D <i>Adenophyllum cooperi</i> [= <i>Cyssodia</i> c.]	Cooper's dyssodia	NPS	Y			X
D <i>Ambrosia acanthicarpa</i>	annual bursage	NAF	Y	X		
D <i>Ambrosia dumosa</i>	burro-weed	NPS	Y		X	X
D <i>Ambrosia dumosa</i> × <i>Hymenoclea salsola</i> (1)	ambrosia-cheesebush hybrid	NPS	Y			X
D <i>Baccharis emoryi</i>	Emory baccharis	NPS	Y	X		
D <i>Baccharis salicifolia</i>	mule fat	NPS	Y / Photo	X		
D <i>Bebbia juncea</i> var. <i>aspera</i>	sweetbrush	NPS	Y			X
D <i>Brickellia incana</i>	wooly brickellia	NPS	Y			X
D <i>Calycoseris parryi</i>	yellow tack-stem	NAF	Y			X
D <i>Chaenactis carphoclinia</i> var. <i>carphoclinia</i>	pebble pincussion	NAF				X
D <i>Chaenactis fremontii</i>	Fremont's pincussion	NAF	Y			X
D <i>Chaenactis stevioides</i>	desert pincussion	NAF				
D <i>Chrysothamnus nauseosus</i> ssp. <i>ceruminosus</i>	rubber rabbitbrush	NAF	Y	X		
D <i>Conyza canadensis</i>	Horseweed	NAF				
D <i>Coreopsis bigelovii</i>	Bigelow coreopsis	NAF	Y			X
D <i>Dicoria canescens</i>	desert dicoria	NAF		X	X	
D <i>Encelia farinosa</i>	brittle-bush	NPS	Y			X
D <i>Encelia frutescens</i>		NPS		X	X	
D <i>Eriophyllum wallacei</i>	Wallace's wooly daisy	NAF				X
D <i>Geraea canescens</i>	desert sunflower	NAF	Y			X
D <i>Helianthus annuus</i>	helianthus	NAF		X		
D <i>Hymenoclea salsola</i> var. <i>salsola</i>	cheesbush/burrobrush	NPS	Y	X	X	X
D * <i>Lactuca serriola</i>	prickly lettuce	EAF		X		
D <i>Lepidospartum squamatum</i>	scale-broom	NPS	Y / Photo		X	
D <i>Malacothrix glabrata</i>	desert dandelion	NAF	Y		X	X
D <i>Palafoxia arida</i> var. <i>arida</i>	spanish-needle	NAF	Y		X	
D <i>Rafinesquia neomexicana</i>	desert chicory	NAF				X
D <i>Senecio flaccidus</i> var. <i>douglasii</i>	shrubby butterweed	NPS		X		X
D <i>Senecio flaccidus</i> var. <i>monoensis</i>	shrubby butterweed	NPS	Y	X		X
D * <i>Sonchus asper</i>	prickly sow-thistle	EAF		X		
D <i>Stephanomeria pauciflora</i> var. <i>pauciflora</i>	wire-lettuce	NPS	Y	X	X	X
D <i>Xylorhiza tortifolia</i> var. <i>tortifolia</i> [= <i>Machaeranthera</i> t.]	Mojave aster	NPS	Y / Photo			X

Code for major plant groups: D=Dicot, G=Gymnosperm, M=Monocot

Form: N = Native, E = Exotic; P = Perennial, A = Annual; S = Shrub, F = Forb, T = Tree, HS = herbaceous shrub, V = vine, G = Grass, P = Parasite

(1) = See Madrono 43(1) 1996 January - February.

\* = exotic (non-native)

Family - Genus - Species - Sub Species	Common Name	Form	Herbarium (Y/N) or Photo	Nebo Mojave River	Yermo (All)	Rifle Range
<b>BIGNONIACEAE</b>						
D <i>Chilopsis linearis</i> ssp. <i>arcuata</i>	desert willow	NPT	Y		X	X
<b>BORAGINACEAE</b>						
D <i>Amsinckia menziesii</i> var. <i>intermedia</i>	rancher's fireweed	NAF			X	
D <i>Amsinckia tessellata</i> var. <i>tessellata</i>	devil's lettuce	NAF	Y	X	X	X
D <i>Cryptantha angustifolia</i>	narrow-leaved cryptantha	NAF	Y	X	X	X
D <i>Cryptantha circumscissa</i>	greeneocharis	NAF		X	X	X
D <i>Cryptantha micrantha</i>	eremocarya	NAF	Y	X	X	X
D <i>Cryptantha pterocarya</i>	wing-nut cryptantha	NAF			X	X
D <i>Heliotropium curassavicum</i>	Chinese pusley	NPS	Y / Photo	X	X	
D <i>Tiquilia nuttallii</i>	Nuttall coldenia	NAF	Y	X	X	
D <i>Tiquilia plicata</i>	plicate coldenia	NPS	Y	X	X	
<b>BRASSICACEAE</b>						
D <i>*Brassica tournefortii</i>	mustard	EAF	Y	X	X	
D <i>Descurainia pinnata</i> ssp. <i>glabra</i>	western tansy mustard	NAF	Y	X	X	
D <i>*Descurainia sophia</i>	Eurasian tansy mustard	EAF or EPHS	Y	X	X	X
D <i>Lepidium fremontii</i> var. <i>fremontii</i>	Fremont's pepper-grass	NPS	Y			X
D <i>Lepidium montanum</i>		NPHS				
D <i>*Raphanus raphanistrum</i>	jointed charlock	EAF or EPHS			X	
D <i>*Raphanus sativus</i>	radish	EAF or EPHS	Y	X		
D <i>Streptanthella longirostris</i>	long-beaked twist-flower	NAF	Y		X	
D <i>*Sisymbrium irio</i>	London rocket	EAF	Y		X	
<b>CACTACEAE</b>						
D <i>Echinocereus engelmannii</i>	hedgehog or calico cactus	NPS	Photo			X
D <i>Echinocactus polycephalus</i> var. <i>polycephalus</i>	cotton top or many headed	NPS	Photo			X
D <i>Mammillaria tetrancistra</i>	fishhook cactus	NPS				X
D <i>Opuntia basilaris</i> var. <i>basilaris</i>	beavertail cactus	NPS				X
D <i>Opuntia bigelovii</i>	Teddy-bear Cholla	NPS				
D <i>Opuntia echinocarpa</i>	silver cholla	NPT	Photo		X	X
D <i>Opuntia ramosissima</i>	pencil cholla	NPT	Photo			X
<b>CAMPANULACEAE</b>						
D <i>Nemacladus glanduliferus</i> var. <i>orientalis</i>	thread plant	NAF				X
<b>CAPPARACEAE</b>						
D <i>Isomeris arborea</i>	bladderpod	NPS			X	X
<b>CARYOPHYLLACEAE</b>						
D <i>*Polycarpon tetraphyllum</i>	four-leaved allseed	EAF	Y		X	
<b>CHENOPODIACEAE</b>						
D <i>Atriplex canescens</i>	four-winged saltbush	NPS	Y	X		
D <i>Atriplex hymenelytra</i>	desert holly	NPS	Y			X
D <i>Atriplex polycarpa</i>	all-scale	NPS	Y	X	X	X
D <i>*Salsola tragus</i> [= <i>S. iberica</i> ]	Russian thistle, tum-bleweed	EAF	Y	X	X	X
D <i>Suaeda moquinii</i>	bush seepweed	NPS		X		

Code for major plant groups: D=Dicot, G=Gymnosperm, M=Monocot

Form: N = Native, E = Exotic; P = Perennial, A = Annual; S = Shrub, F = Forb, T = Tree, HS = herbaceous shrub, V = vine, G = Grass, P = Parasite

(1) = See Madrono 43(1) 1996 January - February.

\* = exotic (non-native)

Family - Genus - Species - Sub Species	Common Name	Form	Herbarium (Y/N) or Photo	Nebo Mojave River	Yermo (All)	Rifle Range
<b>CUCURBITACEAE</b>						
D <i>Cucurbita palmata</i>	coyote melon	NPV or NAV	Y			X
<b>ELAEAGNACEAE</b>						
D * <i>Elaeagnus angustifolius</i>	oleaster; Russian olive	EPS or EPT	Y	X		
<b>EUPHORBIACEAE</b>						
D <i>Chamaesyce albomarginata</i> [= <i>Euphorbia a.</i> ]	white-margined spurge	NPHS				X
D <i>Chamaesyce serpyllifolia</i> [= <i>Euphorbia s.</i> ]	thyme-leaved spurge	NAF	Y		X	
D <i>Croton californicus</i>	desert croton	NPS	Y / Photo	X	X	
<b>FABACEAE</b>						
D <i>Acacia greggii</i>	catclaw acacia	NPT or NPS	Y			X
D <i>Astragalus lentiginosus</i>	freckled milkvetch	NPS		X		X
D <i>Lupinus arizonicus</i>	Arizona lupine	NAF		X		X
D <i>Lupinus shockleyi</i>	desert lupine	NAF	Y		X	
D * <i>Medicago polymorpha</i>	California burclover	EAF	Y	X		
D * <i>Melilotus alba</i>	white sweetclover	EAF		X		
D <i>Prosopis glandulosa</i> var. <i>torreyana</i>	honey mesquite	NPS or NPT		X		
D <i>Prosopis pubescens</i>	honey mesquite	NPS or NPT	Y	X		
D <i>Psoralea argophylla</i> var. <i>minutifolia</i>	small-leaved Mojave indigo bush	NPS	Y			X
D <i>Senna armata</i> [= <i>Cassia armata</i> ]	spiny senna	NPS	Y / Photo			X
<b>GERANIACEAE</b>						
D * <i>Erodium cicutarium</i>	red-stemmed filaree	EAF	Y	X	X	X
D <i>Erodium texanum</i>	desert heron's-bill	NAF or NPHS	Y			X
<b>HYDROPHYLLACEAE</b>						
D <i>Phacelia crenulata</i> var. <i>ambigua</i>	notch-leaved phacelia	NAF	Y			X
D <i>Phacelia distans</i>	fat-leaf phacelia	NAF	Y			X
<b>KRAMERIACEAE</b>						
D <i>Krameria erecta</i>	Pima rhatany	NPS	Y			X
<b>LAMIACEAE</b>						
D <i>Salazaria mexicana</i>	bladder sage	NPS				X
D <i>Salvia columbariae</i>	chia	NAF	Y			X
<b>LOASACEAE</b>						
D <i>Mentzelia albicaulis</i>	white-stemmed mentzelia	NAF	Y		X	X
D <i>Petalonyx thurberi</i> ssp. <i>thurberi</i>	common sandpaper plant	NPS	Y			X
<b>MALVACEAE</b>						
D <i>Eremalche exilis</i>		NAF	Y		X	
D <i>Eremalche rotundifolia</i>	desert five-spot	NAF			X	X
D <i>Sphaeralcea ambigua</i> var. <i>ambigua</i>	apricot mallow	NAF or NPHS	Y / Photo			X
<b>MYRTACEAE</b>						
D * <i>Melaleuca armillaris</i>	drooping melaleuca		Y	X		
<b>NYCTAGINACEAE</b>						
D <i>Allionia incarnata</i>	windmills	NAF				X
D <i>Mirabilis bigelovii</i> var. <i>retrorsa</i>	wishbone bush	NPS	Y			X
D <i>Mirabilis multiflora</i>		NPS				

Code for major plant groups: D=Dicot, G=Gymnosperm, M=Monocot

Form: N = Native, E = Exotic; P = Perennial, A = Annual; S = Shrub, F = Forb, T = Tree, HS = herbaceous shrub, V = vine, G = Grass, P = Parasite

(1) = See Madrono 43(1) 1996 January - February.

\* = exotic (non-native)

Family - Genus - Species - Sub Species	Common Name	Form	Herbarium (Y/N) or Photo	Nebo Mojave River	Yermo (All)	Rifle Range
<b>ONAGRACEAE</b>						
D <i>Camissonia boothii</i> var. <i>condensata</i> [= <i>Oenothera b.</i> ]	Booth's east Mojave evening primrose	NAF				X
D <i>Camissonia brevipes</i> var. <i>brevipes</i> [= <i>Oenothera b.</i> ]	desert primrose	NAF	Y			X
D <i>Camissonia cardiophylla</i> ssp. <i>cardiophylla</i> [= <i>Oenothera c.</i> ]	heart-leaved primrose	NAF or NPHS			X	
D <i>Camissonia chamaenerioides</i> [= <i>Oenothera c.</i> ]	willow-herb primrose	NAF				X
D <i>Camissonia claviformis</i>		NAF	Y		X	
D <i>Oenothera deltooides</i> ssp. <i>deltooides</i>	devil's lantern	NAF	Y		X	
<b>PAPAVERACEAE</b>						
D <i>Eschscholzia minutiflora</i>	pygmy poppy	NAF	Y			X
<b>PLANTAGINACEAE</b>						
D <i>Plantago ovata</i> [= <i>P. insularis</i> var. <i>fastigiata</i> ]	island plantain	NAF	Y		X	X
<b>POLEMONIACEAE</b>						
D <i>Gilia latiflora</i>	broad-flowered gilia	NAF or NPHS	Y	X	X	X
D <i>Gilia micromeria</i>	gilia	NAF or NPHS		X		
D <i>Langloisia setosissima</i> ssp. <i>punctata</i>	spotted langloisia	NAF				X
D <i>Loeseliastrum mathewsii</i> [= <i>Langloisia m.</i> ]	desert calico	NAF				X
<b>POLYGONACEAE</b>						
D <i>Chorizanthe brevicornu</i> var. <i>brevicornu</i>	brittle chorizanthe	NAF or NPHS				X
D <i>Chorizanthe rigida</i>	rigid chorizanthe	NAF or NPHS	Y			X
D <i>Eriogonum deflexum</i> var. <i>deflexum</i>	flat-topped buckwheat	NAF	Y	X	X	X
D <i>Eriogonum fasciculatum</i> var. <i>polifolium</i>	oblanceolate-leaved Calif. buckwheat	NPS	Y			X
D <i>Eriogonum inflatum</i> var. <i>inflatum</i>	desert trumpet	NAF or NPHS	Y	X		X
D <i>Eriogonum maculatum</i>	buckwheat	NAF	Y		X	
D <i>Eriogonum nidularium</i>	whisk broom	NAF	Y			X
D <i>Eriogonum reniforme</i>	kidney-leaved buckwheat	NAF	Y			X
D <i>Eriogonum trichopes</i> var. <i>trichopes</i>	yellow trumpet	NAF	Y		X	X
<b>RANUNCULACEAE</b>						
D <i>Delphinium parishii</i>	Parish larkspur	NPHS	Y			X
<b>SALICACEAE</b>						
D <i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont's cottonwood	NPT	Y	X		
D <i>Salix exigua</i>	narrow-leaved willow	NPS	Y	X		
D <i>Salix gooddingii</i>	Goodding's willow	NPT		X		
D <i>Salix lasiolepis</i>	arroyo willow	NPS		X		
<b>SCOPHULARIACEAE</b>						
D <i>Antirrhinum filipes</i>		NAF				
<b>SOLANACEAE</b>						
D <i>Lycium andersonii</i>	Anderson thornbush	NPS	Y / Photo			X
D <i>Lycium cooperi</i>	Cooper's desert-thorn	NPS			X	X

Code for major plant groups: D=Dicot, G=Gymnosperm, M=Monocot

Form: N = Native, E = Exotic; P = Perennial, A = Annual; S = Shrub, F = Forb, T = Tree, HS = herbaceous shrub, V = vine, G = Grass, P = Parasite

(1) = See Madrono 43(1) 1996 January - February.

\* = exotic (non-native)

Family - Genus - Species - Sub Species	Common Name	Form	Herbarium (Y/N) or Photo	Nebo Mojave River	Yermo (All)	Rifle Range
D <i>*Nicotiana glauca</i>	tree tobacco	EPT		X		
D <i>Physalis crassifolia</i>	thick-leaved ground-cherry	NPS	Y			X
<b>TAMARICACEAE</b>						
D <i>*Tamarix aphylla</i>	athel	EPT		X	X	
D <i>*Tamarix chinensis</i>		EPT				
D <i>*Tamarix ramosissima</i>	tamarisk	EPT	Y / Photo	X	X	
<b>ULMACEAE</b>						
D <i>*Ulmus pumila</i>	siberian elm	EPT		X		
<b>VISCAEAE</b>						
D <i>Phoradendron californicum</i>	desert mistletoe	NPS	Y			X
<b>ZYGOPHYLLACEAE</b>						
D <i>Larrea tridentata</i>	creosote bush	NPS	Y		X	X
<b>CYPERACEAE</b>						
M <i>Scirpus acutus</i> var. <i>occidentalis</i>	tule	NPS	Y	X		
<b>LILIACEAE</b>						
M <i>Dichelostemma capitatum</i>	blue dicks	NPS	Y		X	
M <i>Yucca schidigera</i>	Mohave yucca	NPS	Photo			X
<b>POACEAE</b>						
M <i>Achnatherum hymenoides</i>	Indian rice grass	NPS	Y		X	
M <i>*Arundo donax</i>	giant reed	EPS		X		
M <i>*Bromus diandrus</i>	ripgut grass	EAF		X		
M <i>*Bromus madritensis</i> ssp. <i>rubens</i> [= <i>B. rubens</i> ]	foxtail chess	EAF	Y	X	X	X
M <i>*Bromus tectorum</i>	cheat grass	EAF		X	X	X
M <i>*Cynodon dactylon</i>	Bermuda grass	EPS		X		
M <i>Distichlis spicata</i>	saltgrass	NPS	Y	X		
M <i>Erioneuron pulchellum</i>	fluff grass	NPS	Y			X
M <i>*Hordeum murinum</i>	barley	EAF	Y		X	
M <i>Panicum urvilleanum</i>	panicgrass	NPS	Y	X	X	
M <i>*Polypogon monspeliensis</i>	annual beard grass	EAF	Y	X		
M <i>*Schismus arabicus</i>	Mediterranean grass	EAF	Y		X	
M <i>*Schismus barbatus</i>	Mediterranean grass	EAF	Y	X	X	X
<b>TYPHACEAE</b>						
M <i>Typha domingensis</i>	southern cattail	NPS		X		

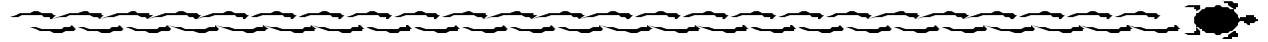
Code for major plant groups: **D**=Dicot, **G**=Gymnosperm, **M**=MonocotForm: **N** = Native, **E** = Exotic; **P** = Perennial, **A** = Annual; **S** = Shrub, **F** = Forb, **T** = Tree, **HS** = herbaceous shrub, **V** = vine, **G** = Grass, **P** = Parasite

(1) = See Madrono 43(1) 1996 January - February.

\* = exotic (non-native)

Sources: 1/TDS 1996; 2/USDON, WESDIV 1982





## Appendix F: Wildlife Observed On MCLB Barstow



# Wildlife Observed On MCLB Barstow

## AMPHIBIANS

### Order Salientia

#### Family Bufonidae

*Bufo boreas*: Western toad

#### Family Hylidae

*Pseudacris regilla*: Pacific treefrog

#### Family Ranidae

\**Rana catesbiana*: bullfrog

## BIRDS

### Order Anseriformes

#### Family Anatidae

*Anas clypeata*: northern shoveler

*Anas crecca*: green-winged teal

*Anas cyanoptera*: cinnamon teal

*Anas discors*: blue-winged teal

*Anas platyrhynchos*: mallard

*Aythya affinis*: lesser scaup

*Branta canadensis*: Canada goose

*Bucephala albeola*: bufflehead

*Oxyura jamaicensis*: ruddy duck

### Order Apodiformes

#### Family Apodidae

*Aeronautes saxatalis*: white-throated swift

#### Family Trochilidae

*Archilochus alexandri*: black-chinned hummingbird

### Order Caprimulgiformes

#### Family Caprimulgidae

*Chordeiles minor*: nighthawk

*Phalaenoptilus nuttallii*: common poorwill

### Order Charadriiformes

#### Family Charadriidae

*Charadrius vociferus*: killdeer

#### Family Recurvirostridae

*Himantopus mexicanus*: black-necked stilt

*Recurvirostra americana*: American avocet

#### Family Scolopacidae

*Catoptrophorus semipalmatus*: willet

*Gallinago gallinago*: common snipe

### Order Ciconiiformes

#### Family Ardeidae

*Ardea herodias*: great blue heron

#### Family Threskiornithidae

*Nycticorax nycticorax*: black-crowned night-heron

### Order Columbiformes

#### Family Columbidae

*Zenaida macroura*: mourning dove

*Zenaida asiatica*: white winged dove

### Order Coraciiformes

#### Family Picidae

*Colaptes auratus*: northern flicker

### Order Falconiformes

#### Family Accipitridae

*Accipiter cooperii*: Cooper's hawk

*Aquila chrysaetos*: golden eagle

*Buteo jamaicensis*: red-tailed hawk

*Parabuteo unicinctus*: Harris's hawk

#### Family Falconidae

*Falco sparverius*: American kestrel

#### Family Cathartidae

*Cathartes aura*: turkey vulture



## Order Galliformes

**Family Phasianidae**

*Lophortyx gambelii*: Gambel's quail

## Order Gruiformes

**Family Rallidae**

*Fulica americana*: American coot

## Order Passeriformes

**Family Alaudidae**

*Eromophila alpestris*: horned lark

**Family Corvidae**

*Corvus corax*: common raven

**Family Emberizidae**

*Amphispiza bilineata*: black-throated swallow

*Dendroica coronata*: yellow rumped warbler

*Pipilo fuscus*: canyon towhee

*Sturnella neglecta*: western meadowlark

*Zonotrichia atricapilla*: golden crown sparrow

**Family Fringillidae**

*Carpodacus mexicanus*: house finch

*Guiraca caerulea*: blue grosbeak

**Family Hirundinidae**

*Tachycineta bicolor*: tree swallow

**Family Mimidae**

*Oreoscoptes montanus*: sage thrasher

**Family Muscicapidae**

*Polioptila caerulea*: blue-gray gnatcatcher

**Family Tyrannidae**

*Myiarchus cinerascens*: ash-throated flycatcher

*Pyrocephalus rubinus*: vermilion flycatcher

*Sayornis nigricans*: black phoebe

*Tyrannus verticalis*: western kingbird

## Order Podicipediformes

**Family Podicipedidae**

*Aechmophorus occidentalis*: western grebe

*Podilymbus podiceps*: pied-billed grebe

## Order Strigiformes

**Family Tytonidae**

*Tyto alba*: barn owl

**Family Strigidae**

*Bubo virginianus*: great horned owl

*Athene cucularia*: burrowing owl

## MAMMALS

## Order Carnivora

**Family Canidae**

*Canis latrans*: coyote

*Urocyon cinereoargenteus*: gray fox

*Vulpes macrotis*: kit fox

**Family Felidae**

*Felis concolor*: cougar

*Felis rufus*: bobcat

**Family Mustelidae**

*Taxidea taxus*: badger<sup>1</sup>

## Order Lagomorpha

**Family Leporidae**

*Lepus californicus*: black-tailed jack rabbit

*Sylvilagus auduonii*: desert cottontail

## Order Rodentia

**Family Cricetidae**

*Onychomys torridus*: s. grasshopper mouse

*Neotoma albigula*: white-throated woodrat

*Peromyscus boylii*: brush mouse

*Peromyscus crinitus*: canyon mouse

*Peromyscus eremicus*: cactus mouse

*Peromyscus maniculatus*: deer mouse

**Family Heteromyidae**

*Dipodomys merriami*: Merriam's kangaroo rat

*Perognathus formosus*: long-tailed pocket mouse

*Perognathus penicillatus*: desert pocket mouse

**Family Sciuridae**

*Ammospermophilus leucurus*: white-tailed antelope squirrel

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## REPTILES

### Suborder Lacertilia

#### **Family Iguanidae**

*Callisaurus draconoides*: zebra-tailed lizard

*Crotaphytus insularis*: desert collared lizard

*Dipsosaurus dorsalis*: desert iguana

*Gambelia wislizonii*: leopard lizard

*Sceloporus graciosus*: sagebrush lizard

*Sceloporus magister*: desert spiny lizard

*Uta stansburiana*: side-blotched lizard

#### **Family Teiidae**

*Cnemidophorus tigris*: western whiptail

### Suborder Serpentes

#### **Family Colubridae**

*Masticophis flagellum*: red coachwhip

#### **Family Viperidae**

*Crotalus cerastes*: sidewinder

*Crotalus scutulatus scutulatus*: Mojave green rattlesnake

### Order Testudines

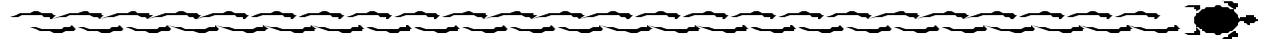
#### **Family Testudinidae**

*Gopherus agassizi*: desert tortoise

## INVERTEBRATES

*Trimerotropis pallidipennis*: pallid-winged grasshopper





# Appendix G: Wetlands Survey



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# Wetland Delineation

## Marine Corps Logistic Base, Barstow

### 1.0 Introduction

Wetland delineation is necessary for land owners and managers to comply with the Clean Water Act and other laws, which require that these ecologically valuable areas be protected.

Ecosystem functions in Wetlands belie their small area. They can profoundly affect the natural vitality of an entire region. The reason there has been such a national focus on Wetlands is at least in part because so few remain from pre-settlement times. In California, 91 percent are estimated to be lost to conversion to farmland, flood control, water diversion and urban development (Dahl 1990). This has been detrimental to bird, mammal, and other wildlife populations. Also, Wetland degradation can be caused by seemingly unrelated or indirectly connected activities, such as changes in upstream drainage contours, increased runoff from upslope developments, pumping, or plowing too deeply in a claypan that supports vernal pools. Effects originating off-site have necessitated comprehensive regulation in order to adequately manage resources.

Interpretation of the field data collected and conclusions about jurisdictional status in this report are subject to confirmation and review by the U.S. Army Corps of Engineers (USACOE or Corps). They make the final jurisdictional determination, and should be contacted in cases where site-specific projects are being considered.

This report is an Appendix to the 1997 Integrated Natural Resource Management Plan for the Marine Corps Logistics Base (MCLB) at Barstow.

### 2.0 Objective

The objective of the wetlands inventory is to provide sufficiently detailed and accurate jurisdictional delineations to support the subsequent assessment of impact, permit processing and mitigation planning. The “integrated” inventory addresses all potential regulatory boundaries and identifies other regulated water bodies and wetland-associated habitats (Cylinder et al. 1995). These include separately mapped:

- Jurisdictional wetlands (Section 404)
- Waters of the United States (Section 404).

### 3.0 Federal and California Wetland Regulation

Section 404 of the Clean Water Act (CWA) gave regulatory authority over Waters of the U.S., which includes Wetlands, to the Environmental Protection Agency (EPA). The EPA delegated this authority to the USACOE, but retains veto power over permit decisions. The agencies and jurisdictions involved in Barstow, California Wetland regulation are listed in Table G-1.

“Waters of the U.S.” is the general category of regulated water bodies defined in the Clean Water Act (see Table Table G- 2). Discharges of dredge or fill into these water bodies, which include Wetlands, are regulated under Section 404 of the Act. The limits of Army Corps jurisdiction in nontidal waters extend to the “Ordinary High Water Mark.” This is defined in federal regulations as:

that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. (33CFR 328.3[c])

Wetlands are more highly scrutinized than most other types of Waters of the U.S. with respect to their delineation, and mitigation measures and ratios applied to them. Some types of Waters of the U.S. are not intuitive, but are in fact regulated. These include desert playas, desert arroyos, vernal pools, ephemeral swales, seasonal ponds, reservoirs, farm or stock ponds fed by direct rainfall or impoundment (not by pumped water), artificial wetlands that receive water without artificial controls (such as pumps, valves, or gates), and farmed wetlands.

Table G-1. Jurisdictional authorities over Wetlands and other regulated Waters. (Adapted from Cylinder et al. 1995)

Agency	Regulation	Authority	Jurisdiction
U.S. Environmental Protection Agency	Clean Water Act	Enforcement; veto power over a Corps-issued permit.	Waters of the U.S., including wetlands
	NEPA, CEQA	Comment only.	
U.S. Army Corps of Engineers	Clean Water Act, Section 404 Rivers and Harbors Act, Section 10	Regulates dredge and fill.	Waters of the U.S., including wetlands Navigable Waters (subject to ebb and flow of the tide and could be used for interstate or foreign commerce)
		Regulates construction of structures, dredge and fill.	
U.S. Fish and Wildlife Service	Fish and Wildlife Coordination Act	Review and comment only.	Waters of the U.S., including wetlands
	Endangered Species Act	USACOE must consult with USFWS on 404 permits if endangered species on site.	
	CEQA, NEPA	Comment only.	
Natural Resource Conservation Service	Food Security Act, 59 CFR 12, January 19, 1994	Regulates activities in agricultural areas.	Farmed Wetlands associated with agricultural lands.
California Department of Fish and Game	CDFG Code, Sec. 1600-1607	Regulates projects that alter stream or lake flow, bed, channel or banks.	California streams and lakes, and riparian and lakeside vegetation
	CEQA, NEPA	Comment only.	
State and Regional Water Quality Control Boards	Clean Water Act, Section 401	Issues water quality certification, which is required for 404 permit.	Waters of the U.S., including wetlands Waters of the U.S., including wetlands
	Clean Water Act, Section 402 CEQA, NEPA	Regulates discharge of waste. Comment only.	

Table G- 2Regulatory terminology addressing Waters of the United States. (Adapted from Cylinder et al. 1995)

TERMS AND DEFINITIONS
<p>Waters of the U.S. (Clean Water Act, Section 404):</p> <ol style="list-style-type: none"> <li>1. Special Aquatic Sites <ul style="list-style-type: none"> <li>• Wetlands (seasonally or perennially waterlogged, and supporting specially adapted plants; usually in the transition zone between uplands and deep water habitats)</li> <li>• Sanctuaries and Refuges (federal, state, or locally designated)</li> <li>• Mudflats (periodically inundated, unvegetated tidal flats, or inland lake/pond/stream margins)</li> <li>• Vegetated Shallows (permanently inundated with rooted, submerged plants)</li> <li>• Coral Reefs (invertebrate deposits in warm oceans)</li> <li>• Riffle and Pool Complexes (alternating turbulent and calm portions of streams over coarse substrate that provide high quality fish and wildlife habitat)</li> </ul> </li> <li>2. Territorial Seas - Zero Ordinary Low Tide and seaward three nautical miles</li> <li>3. Tidal Waters - High Tide Line (includes spring and other periodic high tides but not storm surges)</li> <li>4. Nontidal Waters - Ordinary High Water Mark</li> </ol> <p>Navigable Waters (Rivers and Harbors Act, Section 10): These waters are subject to tidal influence, or could be used for interstate or foreign commerce. Usually the same boundary as Waters of the U.S. Clean Water Act regulations normally supersede Rivers and Harbors Act regulations.</p> <ol style="list-style-type: none"> <li>1. Tidal - Mean High Water Mark</li> <li>2. Nontidal - Ordinary High Water Mark</li> </ol> <p>Water bodies specifically excluded from Section 404 regulation:</p> <ol style="list-style-type: none"> <li>1. Irrigation ditches</li> <li>2. Drainage ditches excavated in uplands</li> <li>3. Temporary sediment basins on construction sites</li> <li>4. Reflecting pools</li> <li>5. Wastewater systems, including treatment ponds and lagoons</li> <li>6. Ponds and wetlands that are part of an ongoing mining operation, unless created as mitigation for past impacts</li> </ol>

## 4.0 Methods

The methods used to delineate Wetlands on MCLB Barstow are outlined below.

- A. Compile and review existing resources:
  1. MCLB Vegetation Survey; SCS Soil Survey for identification of hydric soils; USGS 1:24,000 topographic maps for hydrologic "blue lines;" and aerial photos [1996].
  2. Classify hydric vegetation based on USFWS classification of wetland and deepwater habitats (Reed 1988).
- B. Determine areas supporting or with the potential to support hydrophytic vegetation, or sites adjacent to these (Federal Interagency Committee for Wetlands Delineation [FICWD] 1989).

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1. Record evidence supporting the three-parameter criteria for Section 404 wetlands on data forms from the 1987 Corps Wetlands Delineation Manual (USACOE 1987). In each location, a number of indicators are evaluated to determine if a site qualifies as a legal wetland. Each of three criteria must be satisfied:
    - a. Predominance of vegetation adapted to an anaerobic soil environment. Transects will cross suspected wetland areas and points will be established in all vegetation communities and near the wetland boundary in sufficient quantity to determine the wetland boundary. Areas estimated visually to have 50 percent or more cover obligate, facultative-wetland, or facultative plants are considered to have met the hydrophytic vegetation criterion of the three-criterion method set forth in USACOE (1987).
    - b. Presence of hydric soils, that is, evidence of an anaerobic soil environment in the upper portion of the soil profile due to ponding, flooding, or saturation. Dig sample soil test pits to a depth of 30 cm (18"). Check Munsell color charts, vertical streaking, high organic matter, mottling, and for spodic and organic pans. Indicate whether soils are similar or dissimilar to soil mapping unit from the Soil Survey. Observe the hole for standing water or seepage from nearby areas. This criterion is fulfilled if there is evidence of long-term reducing conditions.
    - c. Presence of regular inundation or saturation for a sufficient duration to cause anaerobic conditions in the soil root zone, based on flow pattern, scouring, ponding and accumulation of debris and sediment.
  - C. Map jurisdictional Wetlands, jurisdictional non-Wetland waters of the United States, CDFG riparian zones not already covered by federal regulations for compliance with Section 1600-1607, nearby non-Wetlands, and locations of test pits.

## 5.0 Site Description

### Location, Climate, and Hydrology

A detailed discussion of site location, climate, topography and hydrology is presented in the Integrated Natural Resource Management Plan, to which this Delineation is appended.

## Hydric Soils

The level of soil resolution for Soil Survey maps is appropriate for planning purposes only. For activities where soil properties are important, such as construction projects, testing should be done to confirm the nature of the soil on site. For Wetland delineation, the soil on site does not always match the mapping unit for the type, and this is noted on the data sheet.

The following soils are potentially hydric according to the California State list of hydric soils (USDA 1992).

*Riverwash*: This mapping unit in the Mojave River channel represents soils that are intermittently flooded during the growing season. They naturally support woody vegetation on the banks, but many areas are barren, with patches of forbs and shrubs. The substrate is typically sandy, gravelly, or cobbly.

*Cajon Sand*: This mapping unit underlies the sheep pond and the two cat-tail wetlands to the south of the percolation ponds. It is an old alluvial fan derived from decomposed granite. The natural vegetation includes yucca, shrubs, grasses and forbs.

## Vegetation

Several types of communities were classified by the USFWS National Wetlands Inventory and mapped on the Base. The definition used to classify "wetlands" by the USFWS is much broader than that appropriate for mapping jurisdictional status under the Clean Water Act. The vegetation classification includes the following types on MCLB Barstow:

*Palustrine Emergent Wetlands*: Seasonally or temporarily flooded riparian areas with herbaceous, perennial hydrophytes most of the growing season in most years. The cat-tail depression in the canal south of the percolation ponds are in this category.

*Palustrine Forested Wetlands*: Seasonally or temporarily flooded riparian areas with woody shrubs, trees or saplings more than 6 m (20 ft) tall. These are the trees around the sheep pond.

## 6.0 Results

The field evaluation of Wetland communities occurred in November and December 1997.

Map 0-1 shows the locations visited during field surveys, the sites of four soil test pits dug to determine wetland status, and the wetland delineation. Details of the field evaluation can be found on the attached data sheets.

***Triangular-shaped sheep pond***. This jurisdictional wetland has several plant species that have special physiological adaptations to waterlogged conditions, including cat-tails, Goodding's willow, and seep willow. While the soil is mapped as Cajon sand, the actual profile revealed a surface of heavily matted roots and organic material, and a subsurface of silty clay with sand or fine gravel inclu-

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sions. Apparently, the soil profile has been modified due to its hydrologic position and periods of inundation. This pond and the diversion ditch described below were constructed in the 1920's to provide water to sheep herds.

***Sheep diversion ditch along the margins of the Mojave River.*** A mix of facultative and upland species characterizes the plant community of the diversion ditch. Berms alongside the ditch were built in the 1920's.

***Percolation ponds.*** The percolation ponds meet wetland criteria for plants and soils, but not hydrological status. They receive essentially 100 percent of their water from effluent only, and are hydrologically disconnected from the Mojave River, outside the Ordinary High Water Mark. Evidence of this comes from a 10-foot deep monitoring well located downslope and about 75 feet east of the ponds' southwest corner records a water level of seven to nine feet, well below the bottom of the ponds (Gleason, pers. comm. 1997). Percolation ponds excavated in upland areas (naturally discontinuous from the stream hydrology) are explicitly exempted from Army Corps jurisdiction.

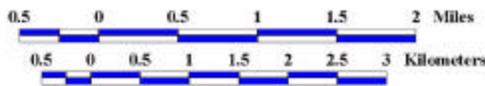
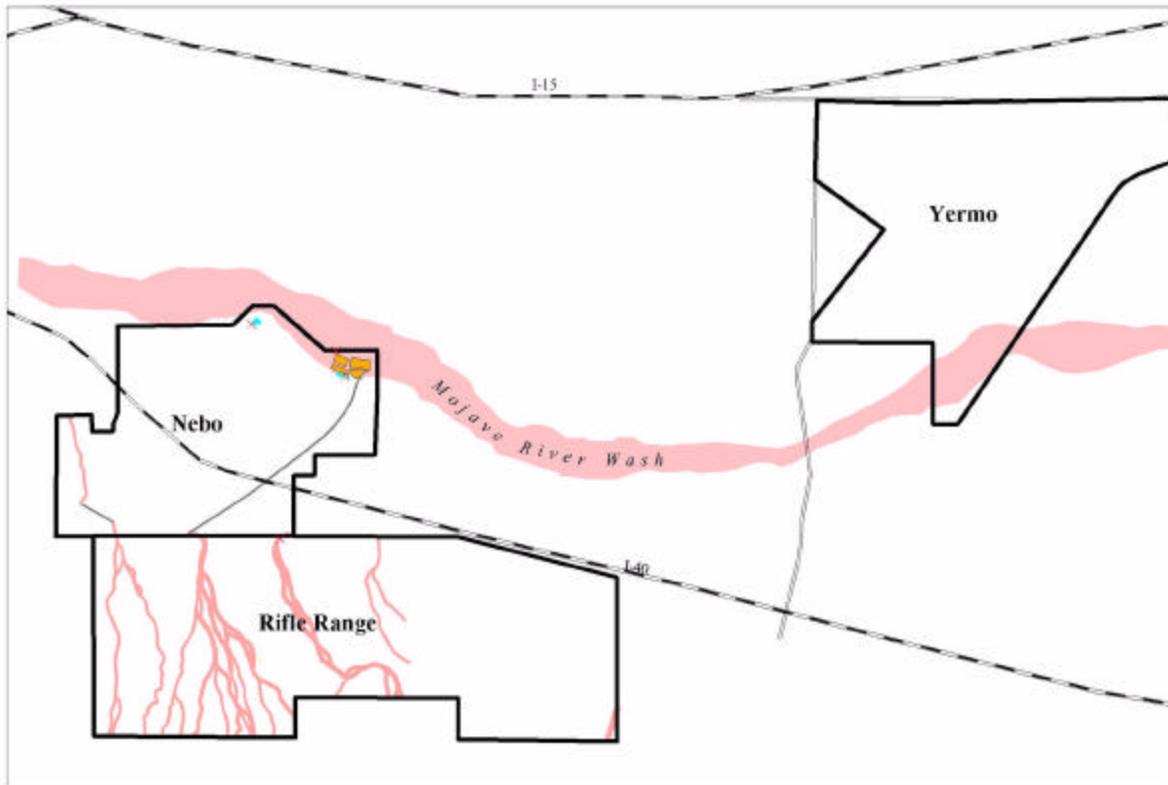
***Ditch depression on the south side of the percolation ponds.*** Two separate depressions along the diversion ditch apparently accumulate enough water for long enough duration to allow cat-tails to grow, an "obligate" species in that it requires such wet conditions. These small areas are jurisdictional wetlands.

***Desert washes.*** To be regulated, desert washes must be hydrologically connected to a larger stream system rather than, for instance, disappear into a playa. Also, they must have characteristic shrubs or trees that support migratory birds. Use by migratory birds is considered an indicator of interstate commerce, a requirement for jurisdiction under the Clean Water Act. Washes of the Rifle Range are hydrologically connected to the Mojave River by way of a concrete-lined canal that diverts the runoff around the Base. They also contain plants that support migratory birds: desert willow (*Chilopsis linearis*), catclaw acacia (*Acacia greggii*), and Mojave indigo bush (*Psoralea arborescens* var. *minutiflorus*). By virtue of meeting these two criteria, the Mojave River on both Nebo and Yermo and washes of the Rifle Range are considered jurisdictional waters of the U.S. within the area where a distinct bed and bank can be defined.

***Riparian habitat under State protection.*** Areas along the margins of the Mojave River and the diversion ditch that contain willows and cottonwoods, whether designated wetlands or not, are regulated by the California Department of Fish and Game as riparian habitat (Sections 1600-1607 CDFG Code). Any project that might alter stream flow or the configuration of the bed, channel or banks should be done under a Streambed Alteration Agreement with that Agency.

Approximate acreages are listed in Table Table G-3.

### U.S. Jurisdictional Waters & Wetlands on MCLB Barstow



- MCLB Barstow boundaries
- Highways
- Daggett to Yermo Road
- Diversion Canals
- Settling Ponds
- Soil Test Pits



	Jurisdictional Waters
Rifle Range	98.1 acres
Yermo	113.9
Nebo	53.4
<b>Total</b>	<b>265.4 acres</b>

	Jurisdictional Wetlands
Nebo	0.9 acres

Map G-1. Jurisdictional Waters and Jurisdictional Wetlands, MCLB Barstow.

Table G-3. Wetlands and Waters of the U.S. acreages on MCLB Barstow. Areas regulated only by CDFG Code were not separately mapped.)

Description	Surface Area (Acres)
Jurisdictional Wetlands	0.9
Jurisdictional U.S. Waters	265

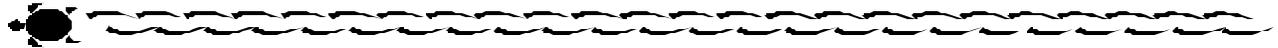
## 7.0 Discussion

The results of this field survey are preliminary and will require verification by USACOE for questions on site-specific impacts. Sufficient information is laid out so that if impacts to Wetlands need to be addressed, these may be recognized in the field by their plant community, then checked to confirm jurisdictional status.

Some ponds may eventually have their Wetland status masked as they continue to fill in with sediment.

## 8.0 References

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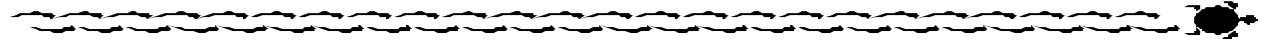


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# Appendix H: Federal and State Protection Categories for Wildlife and Plant Species



# Federal and State Protection Categories for Wildlife and Plant Species

## Federal

### *Endangered Species Act (ESA)*

<b>Endangered</b>	Species or subspecies in danger of extinction throughout all or a significant portion of its range.
<b>Threatened</b>	Species or subspecies likely to become endangered in the foreseeable future throughout all or a significant portion of its range.
<b>Note:</b>	The term “species” includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature. A species may not be considered endangered if it is a pest insect which would present an overriding and overwhelming risk to man.

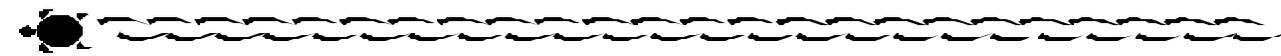
### *Migratory Bird Treaty Act (MBTA)*

Most birds are protected under this Act, whether or not they migrate. Birds, their nests, eggs, parts or products may not be killed or possessed. Game birds are defined and protected except where specific seasons, bag limits, and other features govern their hunting. Exceptions are also made for some specific agricultural pests, which require a permit from USFWS (yellow-headed, red-winged, bi-colored red-winged, tri-colored red-winged, Rusty and Brewer’s blackbirds, cowbirds, all grackles, crows and magpies). Some other birds that injure crops in California may be taken under the authority of the Agricultural Commissioner (meadowlarks, horned larks, golden-crowned sparrows, white- and other crowned sparrows, goldfinches, house finches, acorn woodpeckers, Lewis woodpeckers, and flickers).

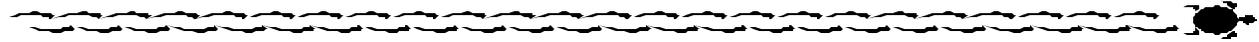
## California

### *California Fish and Game Code*

<b>Endangered</b>	A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant (including varieties of plants) which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.
<b>Threatened</b>	A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant (including varieties of plants) which, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.



<b>Rare (plants only)</b>	A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant (including varieties of plants) which, although not presently threatened with extinction, is present in such small numbers throughout their range that they may become endangered if the present environment worsens.
<b>Candidate (animals only)</b>	A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant (including varieties of plants) which the Fish and Game Commission has formally noticed as being under review by the Department for addition to the list of threatened or endangered species, or a species for which the Commission has published a notice of proposed regulation to add the species to either list.
<b>General Protection of Vertebrates</b>	Wild birds, mammals, fish, reptiles and amphibians in general may not be captured, possessed, or taken without a permit. Exceptions are for those typically in the retail or breeding trade. The Department may take any mammal which, in its opinion, is unduly preying upon any bird, mammal or fish.
<b>Fully Protected Animals</b>	These animals or their parts may not be taken or possessed at any time: American peregrine falcon, brown pelican, California black rail, California clapper rail, California condor, California least tern, Golden eagle, Greater sandhill crane, Light-footed clapper rail, Southern bald eagle, Trumpeter swan, White-tailed kite, Yuma clapper rail, Morro Bay kangaroo rat, Bighorn sheep except Nelson bighorn sheep, Northern elephant seal, Guadalupe fur seal, Ring-tailed cat, Pacific right whale, Salt-marsh harvest mouse, Southern sea otter, and Wolverines.
<b>Specially Protected Animals</b>	Mountain lions may not be taken without imminent danger to livestock or domestic animals. Taking of Antwerp or homing pigeons is a misdemeanor.
<b>Game Animals</b>	These animals may be taken with restrictions associated with a permit or license: Chinese spotted doves, ringed turtledoves, all varieties of California quail, Gambel or desert quail, all varieties of mountain quail, all varieties of sooty or blue grouse, ruffed grouse, sage hens, sage grouse, Hungarian partridges, red-legged partridges including the chukar and other varieties, wild turkeys, all ducks and geese, coots and gallinules, jacksnipe, western mourning doves, white-winged doves, band-tailed pigeons, deer, elk, prong-horned antelope, black and brown or cinnamon bears, mountain lions, jackrabbits or varying hares, cottontails, brush rabbits, pygmy rabbits, and tree squirrels, and Nelson bighorn sheep (this latter with special restrictions). A civil law suit may be instigated for the willful or negligent take of these animals.  Fur-bearing mammals (pine marten, wolverine, mink, river otter, gray fox, cross fox, red fox, kit fox, raccoon, beaver, badger and muskrat) have a season and restrictions on method of take. A permit is required for poisoning them. Fur-bearing and nongame mammals, when involved in dangerous disease outbreaks, may be taken by federal and state officers assigned that task.
<b>Nongame Animals</b>	Nongame birds not covered under MBTA that are injuring growing crops or property may be taken by the owner or tenant of the premises, or by federal or county officials. Nongame mammals (any mammal that is not a game mammal, furbearer or fully protected) and nongame birds (any bird not covered by MBTA) may be taken with some restrictions (no poison, recorded bird or mammal calls, and restrictions on use of weaponry and traps). Nongame mammals, black-tailed jackrabbits, muskrats, and red fox squirrels damaging property may be taken by



the owner or tenant of the premises or their employees, or state officers. A permit or license is required to kill deer, elk, bear, beaver, wild boar, wild pig, gray squirrels, burros that are or are in danger of destroying land or property. Taking cottontail or brush rabbits that are destroying crops does not require a permit.

**No Protection**

English sparrows and starlings may be taken at any time.

***California Administrative Code on Vertebrate Pest Control (Title 14)***

Permits are required to kill deer, bear, elk, wild pig, gray squirrel, and beaver that are causing damage. Mountain lions may not be taken unless there is imminent danger to livestock or domestic animals. Fisher, Marten, River Otter, Desert Kit Fox and Red Fox may not be taken at any time. There are seasons, area restrictions or bag limits on the badger, gray fox, musk rat, mink, beaver (may not be taken in San Diego County), raccoon, and bobcat. Permits are required to kill fur-bearing mammals except on agricultural lands. American crows have a season and bag limit where they are causing a health hazard or nuisance.

***California Natural Diversity Database (NDDB)***

**Species of Special Concern (animals only)**

A species considered to be of unique value or its status needs to be followed to see if it needs protection. The intent of the designation is that since such species lacked legal protection other than bag restrictions, giving them consideration wherever possible might help avert costly recovery efforts that would otherwise be required to save such species. The category was defined to alert reviewers of projects under the California Environmental Quality Act (CEQA). There is no penalty associated with designation. However, there is a risk of challenge by citizen lawsuit if ignored in Environmental Impact Report (EIR).

***California Native Plant Society***

**Lists**

- 1A: Presumed Extinct in California
- 1B: Rare or Endangered in California and Elsewhere
- 2: Rare or Endangered in California, More Common Elsewhere
- 3: Need More Information
- 4: Plants of Limited Distribution

**R-E-D Code**

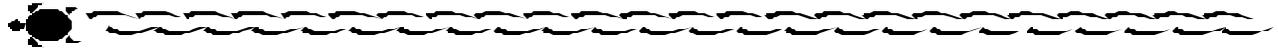
Rarity-Endangerment-Distribution Code

R (Rarity)

1 - Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time.

2 - Occurrence confined to several populations or to one extended population.

3 - Occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported.



E (Endangerment)

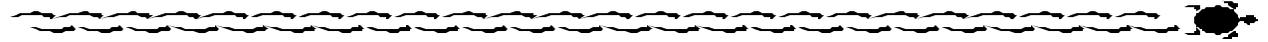
- 1 - Not endangered
- 2 - Endangered in a portion of its range
- 3 - Endangered throughout its range

D (Distribution)

- 1 - More or less widespread outside of California
- 2 - Rare outside California
- 3 - Endemic to California

**Note:**

Plants on CNPS list 1B meet California Department of Fish and Game Criteria for Rare or Endangered listing. Lists 1A and 1B are the priority lists often recognized under California Environmental Quality Act (CEQA).



# Appendix I: Tamarisk Control



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# Tamarisk Control

## Tamarisk Biology

Tamarisk (saltcedar) is a non-native shrub/tree that has invaded many areas of the west, particularly desert riparian systems. There are several species of saltcedar. *Tamarix ramosissima*, *T. chinensis* (probably the same as *T. ramosissima*), and *T. parviflora* are the most common species found in the desert. They are shrubs to small trees and spread aggressively. *Tamarix aphylla* is a tree (up to 12 m height) that is mainly found in areas where it has been planted, often as a wind break. It does not spread as aggressively as the other tamarisk species. The following discussion is based on *T. ramosissima*, *T. chinensis* and *T. parviflora*.

There are several key biological characteristics of tamarisk that have contributed to its rapid spread. It produces large quantities of small, easily dispersed seed (e.g. by wind) over long periods of time (generally from April to October). Seeds germinate within 24 hours from when wetted and can tolerate highly saline soils. Following seedling establishment there are high root growth rates. In addition to prolific sexual reproduction, tamarisk is also able to reproduce vegetatively and is a vigorous resprouter after damage by flooding or fire. Mature tamarisk plants are tolerant of heat, cold, drought, flood damage and submergence, and high concentrations of dissolved solids (Everitt 1980). They are also flexible in their source of water since they are facultatively phreatophytic (Jackson et al. 1992). This means that when they are able to reach groundwater they use large quantities and form dense, lush stands. However, they are not dependent on groundwater, and if it is not available tamarisk will just grow slower and generally not produce such dense stands. Native species such as cottonwoods are obligate phreatophytes.

## Effects of Tamarisk

### *Native Vegetation Displacement*

The characteristics of tamarisk allow it to develop quickly into extensive stands once it is present within a system (Sala et al. 1996). The proliferation of tamarisk is a concern because it displaces native woody riparian vegetation such as willows and cottonwoods, and forms dense thickets that extend out beyond the boundaries of native phreatophytes. Once tamarisk establishes it makes the habitat less suitable for native salt-sensitive species. Salt secretion from salt glands on the leaves of tamarisk increases soil surface salinity (Sala et al. 1996). Jackson et al. (1992) found that *Populus fremontii* and *Salix gooddingii* seedlings had virtually no salinity tolerance, whereas *Tamarix chinensis* grew under highly saline conditions.

### *Increased Water Use*

Another concern of tamarisk infestation is the potential increase in water use, which in an arid riparian system may be very significant. Tamarisk is generally considered to use large quantities of water, however, Sala et al. (1996) found that transpiration rates of *T. ramosissima* individuals measured on a leaf-area or dry-mass basis were no greater than those of sympatric native phreatophytes. How-



ever, they found that mature, dense stands of tamarisk can lose very high quantities of water due to the maintenance of high leaf area. This high evapotranspiration reduces the amount of water available for wildlife and native riparian plant species (Van Cleve et al. 1989). Management practices aimed at conserving water should be geared towards avoiding the development of dense tamarisk thickets along arid water courses.

### ***Wildlife Use***

Riparian habitat is used by many species of birds (both migrant and permanent residents) and desert riparian vegetation supports more species of rodents and greater densities of some species than surrounding uplands (Stamp and Ohmart 1979, Doyle 1990). Anderson et al. 1983) found that relatively few species of riparian birds used tamarisk habitat in a one year study along the lower Colorado river. Frugivores and insectivores are almost completely absent in tamarisk, probably because desert mistletoe, a main food source, does not grow on tamarisk (Cohan et al. 1978, Anderson & Ohmart 1984). Insectivores may not use tamarisk because insect biomass on tamarisk has been found to be significantly less compared to native vegetation, and insect production to fluctuate dramatically (Cohan et al. 1978). However, tamarisk does provide an early source of pollen for overwintering bees (Affleck 1975).

Rodents appear to use tamarisk habitat more readily than bird species, particularly widespread species such as *Peromyscus leucopus*. Rodent communities were monitored in two cottonwood sites and two tamarisk sites in the Middle Rio Grande Valley of central New Mexico, and species richness was found to be greater in the tamarisk. However, this was due to the addition of rodent species typically associated with dry upland or grassland conditions, which reflects the proximity of the tamarisk to source habitats. The predominant species in both habitat types was *Peromyscus leucopus*, which did not differ in terms of abundance estimates, reproductive data or sex ratios between the two types. Some researchers have described tamarisk stands as being ecotonal - including components of both upland and riparian vegetation. (Ellis et al. 1997) Further research on wildlife use of tamarisk stands is needed.

### ***Increased Fire Frequency***

The invasion of tamarisk has been accompanied by an apparent increase in fire frequency in riparian ecosystems. Wildfire in southwestern riparian habitat is thought to have been infrequent prior to tamarisk invasion (Dobyns 1981, Bahre 1985, Swetnam 1990), and still seems to be uncommon in systems where tamarisk is not present. Tamarisk leaf litter is flammable and thought to cause episodic fires about every 16 - 20 years (Kerpez and Smith 1987). The introduction of fire into tamarisk infested riparian systems only increases its abundance. After a fire the salinity and boron content in the alluvium usually increase, both of which tamarisk is tolerant of and native woody species are not. Tamarisk resprouts profusely after fire, whereas native species such as cottonwoods and willows are not adapted to fire due to their thin bark and apparent lack of efficient post-fire resprouting mechanisms. (Busch and Smith 1993) After a fire the native riparian vegetation is usually replaced by tamarisk (Horton 1977).

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### ***Changes in System Properties***

The seriousness of tamarisk invasions into riparian systems is beyond changes in individual properties of the system. Whole ecosystem properties, such as nutrient dynamics and alluvial hydrology, have been altered by tamarisk invasion (Vitousek 1986, 1990). For example, tamarisk increases sedimentation and decreases channel width. Blackburn et al. (1982) have shown on the Brazos river in Texas that between 1941 and 1979 three meters of sediment were deposited in a tamarisk infested channel and the river channel's width was reduced by 89 meters.

### ***Management Implications***

An area that is dominated by tamarisk will remain so unless it is altered by a natural disaster or human intervention (Horton 1977). However, even a large flood will probably not remove established stands of mature individuals since they can survive flood damage by resprouting. If dense stands of tamarisk are present they should be removed to re-create the conditions that favor the natural establishment of native species and natural flow regimes. Due to the changes in soil and other properties that tamarisk can cause, the re-establishment of native species may not occur readily by natural mechanisms and some planting may be required.

### **Methods for Controlling Tamarisk**

There are several techniques that have been attempted for tamarisk control: mechanical methods, root plowing, and chemical methods. No biological control agents have been identified yet.

Mechanical removal does not actually kill the tamarisk plants, but may be useful in removing biomass. It involves severing tamarisk about 25 cm above the ground by mowing (works best on plants less than 5 cm in diameter), or shearing trunks near ground level or uprooting plants by pulling a heavy chain between two tractors (works best on plants 10 to 46 cm in diameter). Since it would be hard avoid native species, this method may only be useful in areas that are almost exclusively composed of tamarisk. Since tamarisk resprouts readily, the resprouts would need to be treated to actually kill the plants.

Using a root plow the vegetation can be sheared below the soil surface. If the plant is cut below the root crown the lower roots will not sprout and form new plants (Horton 1960). If properly done this method can be 90 to 100% effective (Horton 1960, Anderson and Ohmart 1979). To ensure cutting below the root crown the root plow must be between 31 and 46 cm below the ground. The above ground vegetation can be removed before or during root plowing.

Herbicides can be applied to the foliage, to the base of the plant, or to the stump of cut plants. Generally application to cut stumps has been the most successful. Cut tamarisk branches can sprout if they are in moist conditions, but otherwise they can be left in place and will dry, or stacked to dry. Cut biomass should be removed from the site if it is thought to be a fire hazard, or if it is so thick as to impede the re-establishment of native species. Many herbicides have been tested on tamarisk. Garlon-4 applied to cut stumps has been found to be fairly effective, and Rodeo (Roundup) applied either to cut stumps or foliage, less so. Van Cleve et al. (1989) reported a 95% mortality rate after two seasons of treatment with

Garlon-4 to cut stumps. Garlon-4 cannot be used in standing water or immediately adjacent to water. Rodeo is approved to use in wetland areas. Cost for chemical control of tamarisk is approximately \$3,000 to \$5,000 per acre, depending on the density of tamarisk, the access to the site, and if the cut biomass is removed off site (G. Omori, pers. comm.).

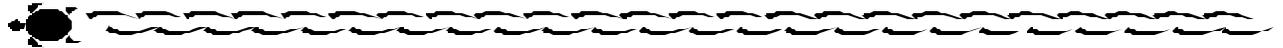
## Prevention of Re-invasion

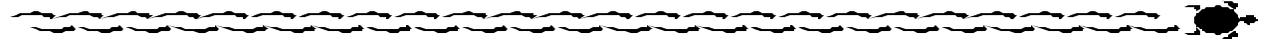
Once tamarisk has been removed from an area, the re-introduction from surrounding areas is a concern. Once native vegetation re-establishes this will help prevent tamarisk establishment, but until this occurs new tamarisk recruits must be removed. Annual surveying and hand removal of tamarisk seedlings in riparian areas would help eliminate this problem. Tamarisk seedlings require moisture during the first two to four weeks of growth and cannot survive without moist soil during this period (Kerpez and Smith 1987). Although the seedlings can survive submergence for several weeks, they are easily pulled up by even a weak current. To avoid removing tamarisk seedlings that may not even survive, seedling removal should be carried out during a time when the seedlings have already survived through the natural control mechanisms of flooding and drying.

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# Appendix J: Suggested Management and Mitigation Practices on MCLB Barstow





# Suggested Management and Mitigation Practices on MCLB Barstow

These specific management and mitigation measures were gleaned from: USFWS Biological Opinion 1993, USFWS Biological Opinion 1997, and other off-Base plans. This list is meant to provide a basis from which a useful set of practices can be built and drawn on to support NEPA and other types of planning. Excellent references for additional practices are listed at the end of this Appendix. Mitigation measures are not listed in any order of priority.

## **Cultural Resources**

- Careful site-specific investigations and testing should be accomplished to determine the existence and quality of any cultural resources prior to implementation of any proposed projects.
- Limit activities that could degrade cultural resources.
- Maintain communication and cooperate with other agencies working on similar issues.
- Maintain confidentiality of cultural resources site locations.
- Construction activities shall be carefully designed to avoid, or allow for mitigation of, archeological sites.
- Projects in areas of known fossil occurrences should have all rough grading (cuts greater than three feet) monitored by trained paleontologic crews working under the direction of a qualified professional, in order that fossils exposed during grading can be recovered and preserved.
- All recovered specimens should be prepared to the point of identification and adequately curated into retrievable collections of an institution with appropriate staff and facilities of their scientific information potential to be preserved.

## **Desert Native Plants**

- Harvesting or removal of desert native plants, on MCLB any species of *Prosopis* (mesquites) or *Yucca* (Mojave Yucca) and Creosote rings ten feet or greater in diameter, should undergo the Base's NEPA review process.

## **Fugitive Dust Control**

### *Unpaved Roads*

- Pave.
- Apply Physical/Chemical Stabilization as directed by product manufacturer.
- Apply Gravel, recrushed/recycled asphalt or other material of low silt (<5%) content to a depth of three or more inches.
- Reduce vehicle speeds by 50%.
- Reduce vehicle trips by 50%.

- 
- Apply water one or more times daily.
  - Pave, chemically stabilize, or gravel (using gravel or other low silt (<5% content material), 50 or more consecutive feet at access points where unpaved roads adjoin paved roads.

### **Landscaping and Grounds Maintenance**

- Revegetate areas with effective erosion control plants wherever subsoils are exposed due to human activity.
- Provide for adequate cover (mulch & vegetation) on bare surfaces.
- Landscape to moderate environmental influences (e.g. heat, wind), mitigate human activities (e.g. training, construction), unify exterior spaces, and enhance formal/ceremonial activities.

### **New Construction**

- The length of trench open at any given time shall not exceed that distance which will remain open for one week or less in duration.

### ***Sensitive Species and Habitats***

- Strict erosion control measures shall be implemented during and after construction to preclude adverse effects to adjacent wetlands.
- A biologist shall inspect any trenches daily while construction is underway, and safely remove any sensitive species. A final inspection of the open trench shall be made immediately prior to backfilling.
- Worker education programs and well-defined work operational procedures shall be implemented with the cooperation of on-site qualified biologists, to avoid the take of desert tortoises and minimize loss of their habitat during construction activities. (USFWS 1993b)
- Take of desert tortoises, through injury or death due to the straying of construction equipment beyond the project area, shall be reduced through the establishment of clearly defined work areas. (USFWS 1993b)
- Take of desert tortoises, through injury or death, found within the proposed project area shall be reduced through the removal of these animals to undisturbed areas adjacent to the construction site. (USFWS 1993b)
- Construction vehicles shall observe speed limits not to exceed 20 miles per hour on access roads to the rifle range. (USFWS 1993b)
- The boundaries of all construction areas shall be clearly marked with flagging or stakes. All construction workers shall strictly limit their activities and vehicles to marked areas to eliminate adverse impacts to desert tortoises. All workers shall be instructed that their activities are restricted to marked areas.
- Construction areas shall be modified, if possible, to avoid direct impacts to desert tortoises and their burrows. If a desert tortoise or its burrow is found in an area to be disturbed by construction, the qualified or authorized biologist shall work with the construction supervisor take steps as necessary, including

minor relocation of project features, to avoid damaging a burrow or disturbing a desert tortoise. (USFWS 1993b)

- If desert tortoises are found above ground or within burrows in areas to be disturbed by construction, operations, or maintenance activities, and it is not possible to avoid such disturbance, these desert tortoises shall be relocated by an authorized biologist a short distance away from the construction zone to habitat which will not be disturbed by further activities. (USFWS 1993b)
- All relocated desert tortoises shall be marked for future identification. (USFWS 1993b)
- All trash and food items shall be promptly contained within closed, raven-proof containers. The containers shall be regularly emptied and/or removed from the project site to reduce attractiveness of the area to ravens and other desert tortoise predators. (USFWS 1993b)
- Upon locating dead, injured, or sick desert tortoises, initial notification must be made to the USFWS' Law Enforcement Office in Torrance, California within three working days of its finding. (USFWS 1993b)

### **Roads and Access**

- Motor vehicle access shall be limited to maintained roads and designated routes.
- No off-road vehicles shall be allowed on the Rifle Range. To the extent possible, vehicles shall be restricted to existing roadways within MCLB south of Interstate 40, including the fenced Nebo Annex. (USFWS 1993b)
- Where temporary access off a maintained road or designated road is permitted, impact to habitat must be minimized to ensure that all sensitive species and their burrows are avoided.
- Should unforeseen circumstances require expansion beyond the right-of way, these areas shall be surveyed for sensitive species and written approval given before its use.
- All vehicle tracks which might encourage repeated use shall be obliterated after temporary use.

### **Soil Erosion**

- Inspect roads and construction sites for drainage and erosion problems.
- Strict erosion control measures shall be implemented during and after construction to preclude adverse effects to the adjacent wetland habitat.
- Project designs for new construction should consider preservation of existing streams and drainage course in their natural condition in order to retain their ability to accommodate runoff and water drainage with a minimum of erosion.
- Keep land clearing to a minimum. Vegetation removal should be limited to that amount necessary for building, access, fire protection, and construction.

- 
- Disturbed surfaces should be maintained to control erosion and establish vegetative growth compatible with the area. Control method may consist of a combination of the following:
    - Effective temporary planting of a fast-germinating native seed, and/or mulching with straw, chippings or other slope stabilization material.
    - Permanent planting of drought resistant species of groundcover, shrubs, trees, or other vegetation.
    - Mulching, fertilizing, watering or other methods necessary to establish new vegetation.

### **Utilities, Pipelines and Underground Cables**

- Repair and maintenance activities shall disturb the least ground possible, covering the narrowest possible width.
- To the maximum extent possible, access for transmission line construction and maintenance shall occur from public roads and designated routes.
- Utilities, construction signs, or other hardware should not be attached so as to penetrate or abrade any live native tree or plant.
- Maintenance personnel shall be instructed on the identification of desert tortoise burrows by a qualified biologist. To the extent possible, maintenance activities shall avoid disturbance to desert tortoises and their burrows. If disturbance to desert tortoises and their burrows is unavoidable, an authorized biologist(s) shall be on-site during such disturbance to ensure compliance with these terms and conditions. (USFWS 1993b)
- If desert tortoises are found above ground or within burrows in areas to be disturbed by maintenance activities, and it is not possible to avoid such disturbance, these desert tortoises shall be relocated by an authorized biologist a short distance away from the maintenance zone to habitat which will not be disturbed by further activities. (USFWS 1993b)

### **Vertebrate Pests**

- Prohibit the use of rodenticides or any other chemical that would potentially harm sensitive wildlife species.

### **Wetlands**

- Strict erosion control measures shall be implemented during and after construction to preclude adverse effects to the adjacent wetland habitat.

### **Wildlife**

- Do not chase or intentionally disturb wildlife.
- Intimidating, harassing, or killing wildlife is prohibited.
- Personnel shall be notified that they are not authorized to handle any sensitive species on site.

### ***Desert Tortoise***

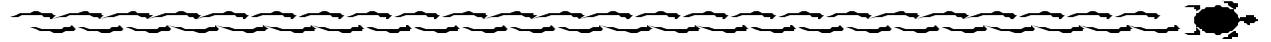
- Attraction of common ravens and other potential desert tortoise predators shall be reduced to the maximum extent possible. (USFWS 1993b)
- Personnel shall be advised that handling, harming, or harassing desert tortoises without specific authorization is a violation of the Act. Personnel shall also be advised of the penalties of up to \$25,000 and six months in prison for taking a listed species without a permit. Handouts summarizing this information shall be provided to all personnel implementing actions which may result in the taking of desert tortoises. (USFWS 1993b)
- Do not move or collect parts of dead tortoises. Even dead tortoises are protected from “take” by the law.
- No off-road vehicles shall be permitted on the Rifle Range. (USFWS 1993b)
- Only biologists authorized by the USFWS shall handle desert tortoises.
- Prior to moving a vehicle, workers shall inspect for desert tortoises under the vehicle. If a desert tortoise is present, the authorized biologist shall carefully move the desert tortoise out of harm's way. (USFWS 1993b)
- Construct and maintain desert tortoise barrier fencing and underpasses to protect desert tortoises and their habitat from traffic on well-used roads.
- Drive slowly and alertly on desert roads so that tortoises are not accidentally crushed. Observe speed limits not to exceed 20 miles per hour on roads to and from the Rifle Range.
- Stay on existing routes of travel so you don't crush a tortoise's burrow, the food that he eats, or the bush under which he is resting.
- Personnel should be advised that if they see a tortoise on a busy road or otherwise in immediate danger, they are authorized to move him to safety.

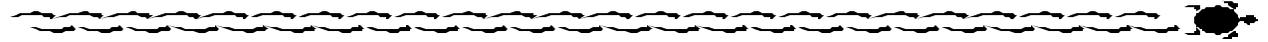
### **Other Sources Of Information:**

Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates and Resources Planning Associates for the Stormwater Quality Task Force. 1993. California Storm Water Best Management Practice Handbook Series: Volume 1 Municipal BMP Handbook, Volume 2 Commercial/Industrial BMP Handbook, and Volume 3 Construction BMP Handbook. March 1993.

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University of California Cooperative Extension, Agronomy and Range Science Department, Davis and U.S. Soil Conservation Service. 1992. Management practices for California's privately owned rangelands. Working draft. Updated 3 August 1992. Davis, CA.





# Appendix K: Landscape Guidelines



# Landscape Guidelines

The climate of the Barstow area is characterized by wide swings in temperature - hot summer days are followed by cool nights, and daytime temperatures of 60°F can be followed by freezing nights. Some of the characteristics of the Barstow area that can be a challenge for planting are the freezing nights in the winter, very hot temperatures in the summer, low rainfall, and high winds, often carrying dust and sand that can be abrasive to plants.

Table K-1 is a list of plants that should specifically be avoided in the Base's landscape. These are invasive non-native plants that can take over natural areas, forcing out native species. This can have a serious effect on the surrounding native vegetation.

Table K-1. Invasive, exotic plants to be avoided for landscaping.

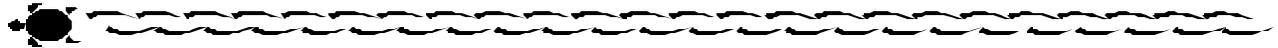
Scientific Name	Common Name
<i>Arundo donax</i>	giant cane
<i>Carpobrotus edulis</i>	freeway iceplant
<i>Cotoneaster</i> (all species and hybrids)	contoneaster
<i>Cortaderia jubata</i>	Andean pampass grass, jubata grass
<i>Cortaderia selloana</i>	pampass grass
<i>Cytisus scoparius</i>	Scotch broom
<i>Cytisus scoparius</i>	Portuguese broom
<i>Eucalyptus globulus</i>	Tasmanian blue gum
<i>Genista monspessulana</i> (= <i>Cytisus monspessulansus</i> )	French broom
<i>Hedera helix</i>	English ivy
<i>Nerium oleander</i>	oleander **
<i>Pennisetum setaceum</i>	fountain grass
<i>Retina monosperma</i>	bridal broom
<i>Rubus discolor</i>	Himalaya berry, blackberry
<i>Senecio mikanoides</i>	German ivy
<i>Tamarix chinensis</i> (and all spp. except <i>T. aphylla</i> )	tamarisk, salt cedar
<i>Vinca major</i>	periwinkle

\* Based on California Exotic Pest Plant Council (1994), Invasive Wildland Pest Plants: Regional

\*\* Included in California Exotic Pest Plant Council

Table K-2 lists plants that are recommended for arid climates. They are divided up into three forms (tree, shrub, and ground cover) and native/non-native status. Native species are further broken up into species that are native to the Barstow area and species that are native to other parts of California.

Suggested species for windbreaks are *Calocedrus decurrens* (incense cedar), *Chamaerops humilis* (Mediterranean fan palm), *Cupressus arizonica* (Arizona cypress), *Eucalyptus microtheca* (Coolbah eucalyptus), *Juniperus osteosperma* (Utah juniper), *Pinus eldarica* (Afghan pine), *Pinus halepensis* (Aleppo pine), and *Ulmus pumila* (Siberian elm). There are many juniper species and hybrids available, some of which may also be good desert windbreaks. *Tamarix aphylla*



(athel) has also been used extensively as a windbreak in the desert, but use of this plant should be tempered. Though it does not spread as aggressively as the other problem tamarisk species, it is uncertain how 'benign' this species is.

Plants that are attractive to birds, other animals, and insects are identified in the Notes column of Table K-2. Plants may be attractive because of flowers or edible fruits. All of the plants that are native to the Barstow area will attract local wild-life and insects. Plants that are appropriate for aiding in erosion control and for planting in disturbed areas with poor soil conditions are indicated in the Notes column.

Table K-2. Suggested plant species for landscaping at MCLB Barstow.

Scientific name	Common name	Form	Height	CA Native?	Barstow area native?	Evergreen / Deciduous	Needs	Notes
TREES								
Native								
<i>Calocedrus decurrens</i>	Incense cedar	Tree	75 - 90 ft	Yes	No	Evergreen	Tolerates heat and poor soils.	Native to mountains of southern Oregon, California, western Nevada. Fragrant, rich green foliage. May be slow growing at first. <u>Good windbreak</u>
<i>Cercidium floridum</i> <sup>1</sup>	Blue palo verde	Tree	30 ft	Yes	Yes	Deciduous	Tolerates aridity. Little or no watering required after it is established.	Native to deserts of southern California. Bright yellow flowers. Slow growth rate.
<i>Chilopsis linearis</i>	Desert willow	Large shrub to small tree	25 ft	Yes	Yes	Deciduous	Tolerates some aridity.	Fast growing at first. Pretty flowers in spring and often through fall. <u>Attracts birds and insects.</u>
<i>Fraxinus velutina</i>	Modesto Ash	Tree	30-40 ft.	Yes	No	Deciduous	Regular watering	Good shade tree. Moderate growth rate.
<i>Juniperus osteosperma</i>	Utah juniper	Shrubby tree to tree	30 ft	Yes	No	Evergreen	Needs good drainage.	<u>May be a good windbreak.</u> Yellowish green foliage. Native to desert mountains, high desert.
<i>Populus fremontii</i>	Fremont or western cottonwood	Tree	60+ ft	Yes	Yes	Deciduous	Weekly watering needed during hot weather until roots reach groundwater.	Female trees bear masses of cottony seeds that can become a nuisance - plant males if wish to avoid. Invasive roots, form suckers - Do not plant near pavement, sewer lines, septic tanks or their leach lines, lawns, etc.
<i>Yucca brevifolia</i>	Joshua tree	Tree	15-30 ft	Yes	No	Evergreen	Best in dry, well-drained soil	Slow growth. Flowers in long clusters, <u>attract birds and insects.</u>
Non-native								
<i>Chamaerops humilis</i>	Mediterranean fan palm	Tree	20 ft	No	No	Evergreen	Hardy, summer water speeds growth.	Makes impenetrable hedge, wind resistant. <u>good wind-break</u>
<i>Chitalpa tashkentensis</i>	Chitalpa	Tree	20-30 ft	No	No	Deciduous	Tolerates aridity.	Fast growing. Showy flowers over long season. <u>Attract birds/insects.</u>
<i>Cupressus arizonica</i> <sup>1</sup>	Arizona cypress	Tree	40 ft	No	No	Evergreen	Little or no water required once established.	<u>Good windbreak.</u> Quick growing.
<i>Eucalyptus microtheca</i>	Coolibah Eucalyptus	Tree	30-40 ft.	No	No	Evergreen	Infrequent watering once established.	<u>Good windbreak.</u>
<i>Gleditsia triacanthos</i>	Thornless Honeylocust	Tree	25-35 ft	No	No	Deciduous	Regular watering.	Good for light shade. Moderate growth rate. Use thornless and podless variety.
<i>Lagerstoemia indica</i>	Crape myrtle	Tree to shrub	6-30 ft	No	No	Deciduous	Infrequent deep watering.	Showy pink flowers. <u>Probably attract birds and insects.</u>
<i>Morus alba sibirlingi</i>	Fruitless Mulberry	Tree	25-35ft	No	No	Deciduous	Regular watering required.	Fast growing. Provides dense shade.
1 = Highly recommended under the Base Exterior								

Table K-2. Suggested plant species for landscaping at MCLB Barstow.

Scientific name	Common name	Form	Height	CA Native?	Barstow area native?	Evergreen / Deciduous	Needs	Notes
<i>Pinus eldarica</i> <sup>1</sup>	Afghan Pine	Tree	25 - 35 ft	No	No	Evergreen	Infrequent watering after establishment.	Moderate growth rate. <u>Good windbreak</u>
<i>Pinus halepensis</i>	Aleppo pine	Tree	50 ft	No	No	Evergreen	Thrives in desert heat, aridity and wind. Can be tender when young.	<u>Good windbreak</u> . Moderate to fast growth.
<i>Prosopis alba</i>	Argentine Mesquite	Tree	25-30ft.	No	No	Semi-evergreen	Infrequent watering once established.	Fast growing. Provides light shade.
<i>Sophora japonica</i>	Japanese pagoda tree	Tree	40 ft	No	No	Deciduous	Tolerates most soils, little water.	Fast growth to 20 ft, slower to 40 ft. Good shade tree. 'Regents' is a vigorous variety.
<i>Tamarix aphylla</i>	Athel tee	Tree	50 ft	No	No	Evergreen	Infrequent watering once established.	<u>Excellent windbreak</u> . Fast growth from cuttings. Competitive roots. Does not spread as aggressively as other tamarisk species.
<i>Ulmus pumila</i>	Siberian elm	Tree	40 ft	No	No	Deciduous/partially evergreen	Hardy and tough. No water once established.	Fast growing, <u>good windbreak</u> . Roots problematic in small areas.
SHRUBS								
Native								
<i>Ambrosia dumosa</i>	Burro bush	Shrub	0.7-3 ft	Yes	Yes	Drought deciduous	Adapted to desert habitat.	
<i>Arctostaphylos species</i>	Manzanita	Shrubs and ground covers	vary	Yes	No	Evergreen	Usually need watering first summer after planting and infrequently thereafter.	<u>Attracts birds</u> .
<i>Artemisia californica</i>	California sage-brush	Shrub	5 ft	Yes	No	Drought deciduous	Drought tolerant once established.	Native to coast from northern CA to Mexico.
<i>Atriplex canescens</i>	Four wing saltbush	Shrub	4-8 ft	Yes	Yes	Drought deciduous	Tolerant of alkaline soils, needs little water.	Attractive grey foliage. <u>Flowers and seeds attract birds</u> .
<i>Baccharis sarothroides</i>	Desert broom	Shrub	6-7 ft	Yes	Yes	Evergreen	Can take good or poor drainage.	<u>Good for erosion control and disturbed lands</u> .
<i>Echinocactus polycephalus</i>	Many headed barrel cactus/ cotton-top	Shrub	3 ft	Yes	Yes	Cactus	Intolerant of frequent summer water. Needs good drainage.	Forms attractive clumps of stems.
<i>Echinocereus engelmannii</i>	Hedgehog cactus	Shrub	3 ft	Yes	Yes	Cactus	Intolerant of frequent summer water. Needs good drainage.	Showy purple to pink flowers. Forms clumps or mounds.
<i>Encelia farinosa</i>	Brittle-bush	Shrub	0.9-5 ft	Yes	Yes	Drought deciduous	Needs good drainage. Best in full sun.	Attractive silver gray leaves. <u>Yellow flowers attract insects</u> .
<i>Ephedra californica/ nevadensis</i>	California/nevada tea	Shrub	5 ft	Yes	Yes	Evergreen	Intolerant of frequent summer water. Needs good drainage.	Interesting form.
1 = Highly recommended under the Base Exterior								

Table K-2. Suggested plant species for landscaping at MCLB Barstow.

Scientific name	Common name	Form	Height	CA Native?	Barstow area native?	Evergreen / Deciduous	Needs	Notes
<i>Fallugia paradoxa</i>	Apache plume	Shrub	3-8 ft	Yes	No	Partially evergreen	Needs well-drained soil. No water needed once established.	Native to mountains east of San Bernardino mtns. Blooms in April to May - flowers like single white rose.
<i>Fremontodendron species</i>	Flannel bush, Fremontia	Shrub - small tree	vary	Yes	No	Evergreen	Needs no dry season water	<i>F. californicum</i> - native to Sierra Nevada and coast ranges, southern CA mountains. <i>F. mexicanum</i> - native to San Diego county and Baja, 18 ft, flowers longer.
<i>Fouquieria splendens</i>	Ocotillo	Shrub	8-25 ft	Yes	No	Deciduous	Needs excellent drainage and no water once established.	Native to Colorado desert. Interesting form of thin, unbranched stems. <u>Red flowers attract birds</u>
<i>Heteromeles arbutifolia</i>	Toyon, christmas berry	shrub to small tree	25 ft	Yes	No	Evergreen	Tolerates aridity - looks better if watered. Full sun or partial shade.	Native to Sierra Nevada foothills, southern California to Baja coast ranges. <u>Birds attracted to red berries, insects to flowers.</u>
<i>Isomeris arborea</i>	Bladderpod	Shrub		Yes	Yes	Evergreen		Bright yellow flowers.
<i>Larrea tridentata</i>	Creosote bush	Shrub	4-8 ft	Yes	Yes	Evergreen	Taller, denser growth with water.	Small yellow flowers on and off all year.
<i>Opuntia basilaris</i>	Beavertail cactus	shrub	1.3 ft	Yes	Yes	Cactus	Intolerant of frequent summer water. Needs good drainage.	Showy pink flowers.
<i>Opuntia bigelovii</i>	Teddybear cholla	Shrub	3-6 ft	Yes	Yes	Cactus	Intolerant of frequent summer water. Needs good drainage.	Segments fall off and start growing. do not plant adjacent to walkway where segments may fall/tumble to.
<i>Opuntia echinocarpa</i>	Silver cholla	Shrub	< 9 ft	Yes	Yes	Cactus	Intolerant of frequent summer water. Needs good drainage.	Segments fall off and start growing. do not plant adjacent to walkway where segments may fall/tumble to.
<i>Opuntia ramossisima</i>	Pencil cholla	shrub	< 5 ft	Yes	Yes	Evergreen	Intolerant of frequent summer water. Needs good drainage.	Segments fall off and start growing. do not plant adjacent to walkway where segments may fall/tumble to.
<i>Prosopis pubescens or glandulosa</i>	Honey mesquite, screw bean	Shrub to tree	25 ft	Yes	Yes	Deciduous	Desert plant - tolerates some water, alkalinity.	In poor, rocky soils will be shrubby. <i>P. pubescens</i> good as a barrier.
<i>Senna armata</i>	Spiny senna	Shrub		Yes	Yes	Loses leaves, but green stems		Bright yellow flowers.
<i>Simmondsia chinensis</i>	Jojoba, goatnut	shrub	6+ ft	Yes	Yes	Evergreen	Young plant can be tender.	Native to deserts of southern CA, Arizona and Mexico. Dense vegetation, inconspicuous flowers. Can be clipped into hedge. <u>Need male and female plants to produce fruit, which is edible and would attract wildlife.</u>
<i>Yucca schidigera</i> Non-native	Mojave yucca	Shrub		Yes	Yes	Evergreen		
<i>Buddleia davidii</i>	Butterfly bush	Shrub	10 ft	No	No	Deciduous or semi-evergreen	Needs good drainage and enough water to maintain growth.	<u>Attracts butterflies.</u> Spikes of flowers in midsummer.

1 = Highly recommended under the Base Exterior

Table K-2. Suggested plant species for landscaping at MCLB Barstow.

Scientific name	Common name	Form	Height	CA Native?	Barstow area native?	Evergreen / Deciduous	Needs	Notes
<i>Cordia parvifolia</i>		Shrub	8 ft	No	No	Evergreen	Hardy to 15 F - leaves freeze, plant recovers.	Clusters of white flowers in spring and sometimes fall.
<i>Cotinus coggygria</i>	Smoke tree	Shrub to tree	25 ft	No	No		Does best under stress in poor or rocky soil, well drained	Urn-shaped . Dramatic puffs of lavender 'smoke' from flower clusters.
<i>Elaeagnus pungens</i>	Silverberry	Shrub		No	No	Evergreen	Tolerates heat and wind. No water once established.	Makes effective barrier planting. Slightly spiny.
<i>Leonotis leonurus</i>	Lion's tail	Shrub	3-6 ft	No	No	Evergreen	Little or no dry-season watering.	Blooms summer to fall - deep orange tubular flowers. <u>Probably attract hummingbirds.</u>
<i>Leucophyllum species</i>	Texas ranger, silverleaf	Shrub	3-5 ft	No	No	Evergreen	Tolerate heat, wind.	Silvery foliage, showy flowers. <u>Probably attract hummingbirds.</u> Can clip into hedges.
<i>Punica granatum</i>	Pomegranate	Shrub to tree	10 ft	No	No		Little water once established. Tolerates great heat and alkalinity.	Showy red flowers ( <u>attract hummingbirds</u> ), <u>some varieties produce edible fruit that would attract wildlife.</u>
<i>Pyracantha coccinea</i>	Pyracantha	Shrub	8-10 ft	No	No	Evergreen	Little water once established.	Showy red berries. Thorny.
<i>Rosa rugosa</i>	Ramanas rose, sea tomato	Shrub	3-8 ft	No	No	Deciduous	Extremely tough - tolerates wind, aridity, hard freezes.	Bright red edible tomato shaped fruits, <u>attract wildlife.</u> Make good hedges.
<i>Rosmarinus officinalis</i>	Rosemary	Shrub/ ground cover	2-6 ft	No	No	Evergreen	Endures hot sun, poor soil - needs well drained soil. Little or not water once established.	Fragrant leaves. Small clusters of flowers winter-spring. <u>Good for erosion control</u>
GROUNDCOVER								
Native								
<i>Baccharis pilularis</i>	Dwarf coyote bush	Ground cover	8-24 in	Yes	No	Evergreen	Looks best with monthly watering.	One of best desert groundcovers-makes dense mat. Makes dense mat. <u>Good for erosion control.</u>
Non-native								
<i>Cerastrium tomentosum</i>	Snow-in-summer	Ground cover	6-8 in	No	No	Evergreen	Best with light shade. Good drainage. Water often for fast growth.	Spreading, dense, tufty mats of silvery gray leaves. Masses of snow white flowers in early summer. Spreads 2-3 ft per year.
<i>Euonymus fortunei</i>	Winter creeper	Vine to shrub		No	No	Evergreen	Full sun, moderate water	<u>Seeds attract birds.</u> Trails or climbs by rootlets.
<i>Gazania species</i>	Gazania	Ground cover		No	No	Evergreen	Occasional dry season watering.	Bright daisy flowers bloom in late spring/early summer. Trailing or clumping forms.

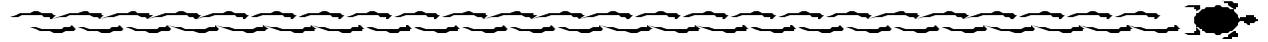
1 = Highly recommended under the Base Exterior

Table K-2. Suggested plant species for landscaping at MCLB Barstow.

Scientific name	Common name	Form	Height	CA Native?	Barstow area native?	Evergreen / Deciduous	Needs	Notes
<i>Juniperus species</i>	Juniper	Ground cover	2 in - 3 ft	No	No	Evergreen	Some may need water in summer.	Several species to choose from. <u>Good for erosion control.</u>
<i>Lonicera japonica 'Halliana'</i>	Hall's honeysuckle	Vine		No	No	Evergreen	Tolerates dryness once established.	<u>White fragrant flowers attract flowers and insects.</u> <u>Good for erosion control</u> Can become a weed if not checked.
<i>Phyla nodiflora</i>	Lippia	Ground cover		No	No	Evergreen	Looks best with regular water.	<u>Flowers attract bees.</u> Forms ground hugging mat sturdy enough to serve as a lawn. Can be somewhat unattractive during winter.
<i>Santolina chamaecyparissus</i>	Lavender cotton	Ground cover	2 ft	No	No	Evergreen	Needs little or no water	Good cover. Pretty leaves and flowers. Looks best if clipped to 1 ft or less.
<i>Thymus species</i>	Thyme	Ground cover or small shrubs	4-12 in	No	No	Evergreen	Likes well-drained, dryish soil. Some summer water.	<u>Attract bees</u> , fragrant.

1 = Highly recommended under the Base Exterior





# Appendix L: Barstow Area Points of Contact



# Barstow Area Points of Contact

Table L-1. Barstow area agency, description and information availability.

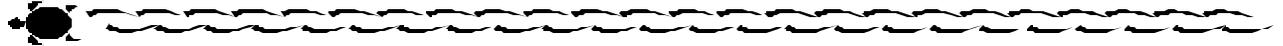
Agency/Organization	Description and Types of Information Available
<b>Local/Regional Organizations</b>	
City of Barstow Chamber of Commerce 222 E. Main Street Barstow, CA 92311 (760)256-8617	Information available: Economic profile (socio-economic status/projections for area, general business info); local business concerns; local recreation and facilities;
City of Barstow Planning Dept. 220 E. Mountain View St. Barstow, CA 92311 (760)256-3531 (760)256-3225	Information available: City of Barstow General Plan; currently revising and in Draft stage (1997).
City of Victorville Mojave River Task Force 14343 Civic Drive Victorville, CA 92392-2399	
California Regional Quality Control Board South Lahontan Regional Board 15428 Civic Drive, Suite 100 Victorville, CA 92392-2383 (760)241-6583	The SLRB is currently working with state agencies, San Bernardino County and watershed cities, Victor Valley Wastewater Reclamation Authority and the Mojave Water Agency to better protect the Mojave River Watershed.
Mojave Desert Information Center P.O.Box 241 Interstate 15 Business Route Baker, CA 92309 (760)733-4040	
West Mojave Coordinated Management Plan 2601 Barstow Rd. Barstow, CA 92311-3221 (760) 252-6080	The West Mojave Coordinated Management Planning Team is preparing a broad, regional plan for the Western Mojave Desert. This plan will include all lands, both public and private.
<b>County Agencies</b>	
San Bernardino County Planning Dept. 385 N. Arrowhead Ave, Third Floor San Bernardino, CA 92415-0182 (909)387-8311	Information available: San Bernardino County General Plan for unincorporated, privately-owned lands of San Bernardino County; population & housing statistics; and county ordinances.
San Bernardino County Agricultural Commissioner (County Office) 777 E. Rialto Ave. San Bernardino, CA 92415 (909)387-2105	The Ag. Commissioner enforces County regulations as they apply to farmers and ag. production and conducts a variety of inspections. Information available: regulations on dust (PM10); anything requiring a permit; climate as applies to ag. needs; information on problematic weeds and weed control; pest control; chemical applications; marketing orders; roadside sales; food pkg; monitoring of pests
San Bernardino County Agricultural Commissioner (Local Office) 301 East Mountain View Barstow, CA 92311 (760)256-4861 242-2906	See above.
San Bernardino Flood Control District Hydrological Section, Rm. 142 825 E. 3rd St. San Bernardino, CA 92415-0835	Information available: Historical floods of the Mojave River (cubic feet / sec.); 100 year flood boundaries.

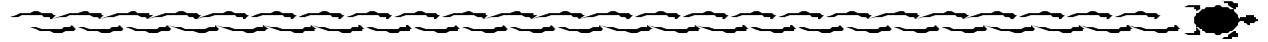
Table L-1. Barstow area agency, description and information availability.

Agency/Organization	Description and Types of Information Available
U.C. Agriculture Cooperative Extension 777 E. Rialto Ave. San Bernadino, CA 92415 (909)381-2171 or 2165?	UC Extension serves as a Farm Advisor to convey research and technology information to farmers. Information available: CIMIS data (Evapotranspiration; precipitation data; etc.); irrigation technology
<b>State Agencies</b>	
California Dept. of Parks & Recreation (CDPS) Mojave Desert Sector 1051 West Ave. M. Suite 201 Lancaster, CA 93534	CDPR implements statewide parks and recreation planning in accordance with the Statewide Comprehensive Outdoor Recreation Plan. Information available: technical assistance on outdoor recreational opportunities.
Mojave Water Agency (MWA) P.O. 1089 Apple Valley, CA 92307 www.mojavewater.org	The Mojave Water Agency is the governmental body with primary responsibility for the management of water resources over a 4,900 square mile area of the Mojave Desert. Authorized in 1959j by a Special Act of the California State Legislature and activated by voters in 1960, the Mojave Water Agency's purpose as defined by the Act is to assure that sufficient water will be available for any present or future beneficial use within its jurisdiction. It is the Agency's mission to implement future water management policies and programs that will insure a stable, long-term, supply of water for the Mojave Water Agency service area.
<b>Federal Agencies</b>	
Mojave National Preserve 222 East Main Street Suite 202 Barstow, CA 92328 (760)255-3400	The preserve protects the fragile habitat of the desert tortoise, vast open spaces, and historic mining scenes, such as the Kelso railroad depot.
U.S. Army Corps of Engineers (ACOE) Operations Branch 300 North Los Angeles Street P.O. Box 2711 Los Angeles, CA 90053-2325	The Corps regulates activities involving the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to Section 404 of the Clean Water Act.
U.S. Bureau of Land Management (BLM) Barstow Resource Area 2601 Barstow Rd. Barstow, CA 92311-3221 (760)252-6000	The BLM administers public lands within a framework of numerous environmental and land use laws. The most comprehensive of these is the Federal Land Policy and Management Act of 1976. The agency's mission is to sustain the health, diversity and productivity of the public lands for the use and enjoyment of present and future generations.
U.S. Bureau of Land Management (BLM) California Desert District 6221 Box Springs Blvd. Riverside, CA 92507-2497 (909)697-5200	The California Desert District of the BLM encompasses the Mojave, Sonoran, and Colorado deserts in California.
U.S. Bureau of Land Management (BLM) California Desert Information Center 831 Barstow Rd. Barstow, CA 92311 (760)255-8760; FAX (760)255-88766	The California Desert Information Center is dedicated to assisting the public in recreational and safety needs. Explore a very unique and sometimes unforgiving region filled with history and scenic beauty. Interpreters are available at the Center to answer your questions and you can browse in the bookstore for additional information. Information available: Exhibits, films and special programs provide a peek into the past and inform visitors about off-roading, camping, sight seeing, and hiking opportunities.
U.S. Fish & Wildlife Service (FWS) Office of Migratory Bird Management Maryland (703) 358-1711	The Office of Migratory Bird Management maintains several databases on migratory birds. Information available: Pacific Flyway waterfowl;
U.S. Natural Resource Conservation Service (NRCS) Mojave Desert Resource Conservation District 18484 Hwy. 18 Suite 195 Apple Valley, CA 92307 (760)242-2906	
<b>Other Organizations</b>	
California Exotic Pest Plant Council (CalEPPC) www.aix.calpoly.edu/~dchippin/exotic.html	CalEPPC is dedicated to finding solutions to problems caused by non-native pest plant invasions of the state's natural areas. The organization proposes and facilitates solutions to pest plant problems. Information available: wildland weed lists; methods for controlling certain pest plants;

Table L-1. Barstow area agency, description and information availability.

Agency/Organization	Description and Types of Information Available
California Native Plant Society (CNPS) 2155 4th Avenue Sacramento, CA 95818-3107	The mission of CNPS is to increase understanding and appreciation of California's native plants and to preserve them in their natural habitat through scientific activities, education, and conservation. dedicated to the preservation of California native flora. The organization maintains an inventory of the rare and endangered vascular plants of California. Information available:
The Institute for Bird Populations Mapping Avian Productivity and Survivorship (MAPS) P.O. Box 1346 Point Reyes Station, CA 94956-1346	MAPS is a cooperative effort among public agencies, private organizations and the bird banders of North America to provide long-term data on the productivity, survivorship and population sizes of target landbird species through constant-effort mist netting, banding and point counts during the breeding season.
Joshua Tree National Park Center for Arid Lands Restoration 74485 National Park Drive Twentynine Palms, CA 92277 (760) 367-4528 (760) 367-6392 FAX	Joshua Tree National Park has its own nursery for native Mojave and Sonoran desert restoration projects. Help on growing methods and other restoration techniques is available.
National Audubon Society 2024 Orange Tree Lane Redlands, CA 92373	The mission of the National Audubon Society is to conserve and restore natural ecosystems, focusing on birds and other wildlife for the benefit of humanity and the earth's biological diversity.
Southern California Water Company 630 E. Foothill Blvd. San Dimas, CA 91773 (909) 394-3600 (909) 394-1382	The Southern California Water Company is the primary water purveyor in the west Mojave desert.





# Appendix M: MCLB Barstow Acronyms



# MCLB Barstow Acronyms

Acronym	Description
ACOE	Army Corps of Engineers
AFB	Air Force Base
AFGE	1-17
AT&SF	Atchison, Topeka and Santa Fe
BA	Biological Assessment
BEAP	Base Exterior Architecture Plan
BEQ	Bachelor Enlisted Quarters
BLM	Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern and Santa Fe
BO	Biological Opinion
CalEPPC	California Exotic Pest Plant Council
CatEx	Categorical Exclusion
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CETEP	Compliance Environmental Training and Education
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CIP	Capital Improvement Plans
CNPS	California Native Plant Society
CO	Carbon Monoxide
CSC	California Species of Concern
CWA	Clean Water Act
DoD	Department of Defense
DoI	Department of Interior
DoN	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DWMA	Desert Wildlife Management Areas
DWR	Department of Water Resources
EA	Environmental Assessment
ECE	Environmental Compliance Evaluation
EEWG	Environmental Excellence Working Group
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
F&S	Facilities and Services
FMF	Fleet Marine Force
FSC	Federal Species of Concern
FT	Federal Threatened Species
FY	Fiscal Year
GIS	Geographic Information System
INRMP	Integrated Natural Resources Management Plan
MCAGCC	Marine Corps Air Guard Combat Center
MCLB	Marine Corps Logistics Base, Barstow
MCO	Marine Corps Order
MDEI	Mojave Desert Ecosystem Initiative
MEDP	Mojave Ecosystem Database Program
MHE	Material Handling Equipment

Acronym	Description
MILCON	Military Construction Funds
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MWA	Mojave Water Agency
MYBP	Million Years Before Present
NAVFACENGCOM	Naval Facilities Engineering Command
NDDB	Natural Diversity Database
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NRMP	Natural Resources Management Plan
NTC	National Training Center
OPNAVINST	Navy Operations Instruction
ORV	Off-road Vehicle
P&A	Personnel and Administration
PACIDERM	Planning and Coordination by Installation Defense Environmental Resources Managers
PEA	Preliminary Environmental Assessment
ppb	parts per billion
RCRA	Resources Conservation and Recovery Act
ROICC	1-17
RWQCB	Regional Water Quality Control Board
SCE	Southern California Edison Company
ST	State Threatened Species
SWDIV	Southwest Division
TDS	Tierra Data Systems
TMO	Traffic Management Office
USC	United States Code
USBLM	U.S. Bureau of Land Management
USDOD	U.S. Department of Defense
USDON	U.S. Department of the Navy
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMC	United States Marine Corps
USSCS	U.S. Soil Conservation Service
WESTDIV	Western Division
WMC	William Manley Consulting
WMCMP	West Mojave Coordinated Management Plan



# Appendix N: Glossary of Terms



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# Glossary of Terms

<b>Annual Increment</b>	A management section addendum prepared annually, to facilitate implementation of a NRM Plan section. The annual increment concisely provides detail and cost estimates of proposed work or projects to be accomplished during a fiscal year.
<b>Archaeological Resources</b>	Material remains of past human life that are capable of contributing to scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques.
<b>Best Management Practices (BMP)</b>	Within the scope of this chapter, BMPs are practical, economical and effective management or control practices that will reduce or prevent water pollution. Usually BMPs are applied as a system of practices based on site-specific conditions rather than a single practice. BMPs are usually prepared by State agencies for land disturbing activities related to agriculture, forestry, and construction.
<b>Biodiversity</b>	The diversity of life and its processes: living organisms, the genetic differences among them and the communities and ecosystems in which they occur.
<b>Biological Assessment</b>	A biological evaluation conducted as part of the interagency regulations under the ESA. The purpose of the assessment is to allow the regulatory agency to determine whether or not the proposed action is likely to adversely affect the continued existence of a species listed as endangered or threatened, or proposed for listing.
<b>Candidate Species</b>	Any species being considered by the Secretary of Interior or Commerce for listing under the Endangered Species Act as an endangered or a threatened species, but not yet the subject of a proposed listing.
<b>Categorical Exclusion</b>	A category of actions that do not have, under normal circumstances, individually or cumulatively, a significant effect on the human environment or that have been previously found to have no such effect as a result of procedures adopted by the DoN for implementing the CEQ regulations and for which, therefore, neither an EA nor an EIS is required.
<b>CESA</b>	California Endangered Species Act, which expanded on but did not replace NPPA. The CESA grandfathered all rare animal species into threatened animal species under the Act, but did not do the same for plant species. Thus there are three categories for plants in California: endangered, threatened, and rare. There are two federal categories: endangered and threatened.
<b>Conservation</b>	The prudent care, protection, and management of natural resources that best reflect sound resources stewardship for present and future generations.
<b>Cooperating Agency</b>	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. 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.



<b>Critical Habitat</b>	The geographic area on which are found those physical or biological features essential to the conservation of a species listed and published by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) under the authority of the ESA.
<b>Cultural Resources</b>	A generic term commonly used to include buildings, structures, districts, sites, objects of significance in history, architecture, archeology, engineering, or culture. The term also includes associated documents and records.
<b>Dredge and Fill Operations</b>	Dredge and fill operations encompass construction or other work involving excavation or discharge of dredged or fill material in waters of the U.S.
<b>Ecosystem</b>	A system formed by the interaction of a community of organisms with each other and the environment.
<b>Ecosystem Management</b>	Ecosystem management in DoD draws on a long-term vision of desired future ecological conditions, integrating ecological, economic and social factors. The goal of ecosystem management is to maintain and improve the sustainability and native biological diversity of ecosystems while supporting human needs, including the military mission.
<b>Encroachment</b>	Any legal or illegal land uses which cause trespass or intrusion of the Base's borders, natural resources, or any other resources available for fulfilling the installation's military mission.
<b>Endangered or Threatened Species</b>	A species of fauna or flora that has been listed by the USFWS or the NMFS for special protection and management under the FESA.
<b>Environmental Assessment (EA)</b>	A concise public document that: a) briefly provides sufficient evidence and analysis for determining whether to prepare an EIS or a Finding Of No Significant Impact (FONSI); b) aids the Marine Corps' compliance with NEPA when no EIS is necessary; c) facilitates preparation of an EIS when one is necessary.
<b>Exotic Species</b>	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, and for which introduction has permitted the species to cross a natural barrier to dispersal.
<b>FESA</b>	Federal Endangered Species Act.
<b>Environmental Impact Statement (EIS)</b>	A completed statement that incorporates all pertinent comments and information made as a result of review of the DEIS. The FEIS is filed with EPA and distributed to recipients of the DEIS.
<b>Finding of No Significant Impact (FONSI)</b>	A document, in which the Marine Corps briefly presents the reasons why an action not otherwise categorically excluded will not have a significant effect on the human environment, and for which an EIS will not therefore be prepared. The FONSI shall note any other environmental documents related to it. If the EA is included, the finding need not repeat any of the discussion but may incorporate it by reference. A FONSI may be one result of review of an EA.
<b>Fish and Wildlife Management</b>	A coordinated program of actions designed to preserve, enhance and regulate indigenous wildlife and its habitats, including conservation of protected species and non-game species, management and harvest of game species, bird aircraft strike hazard (BASH) reduction, and animal damage control.
<b>Grounds</b>	Managed landscaping areas on the installation.

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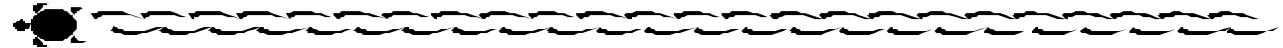
<b>Habitat</b>	An area where a plant or animal species lives, grows, and reproduces, and the environment that satisfies their life requirements.
<b>Injury</b>	Any adverse change in a natural resource or impairment of a service provided by a resource relative to baseline, reference, or control conditions. Injury incorporates the concepts of “destruction,” “loss”, and “loss of use.”
<b>Integrated Natural Resources Management Plan (INRMP)</b>	An integrated plan based on ecosystem management that show the interrelationships of individual components of natural resources management (e.g. fish and wildlife, forestry, land management, public access) to mission requirements and other land use activities affecting an installation’s natural resources.
<b>Land Management</b>	Programs and techniques to manage lands, wetlands, and water quality, including soil conservation, erosion control and nonpoint source pollution, surface and sub-surface waters, habitat restoration, control of noxious weed and poisonous plants, agricultural outleasing, range management, identification and protection of wetlands, watersheds, floodplains management, landscaping, and grounds maintenance.
<b>Landscape</b>	This term is gaining increasing importance in conservation planning. The landscape contains more than one natural community or habitat and allows attention to be paid to both biodiversity and the need to link natural communities and habitats to support biodiversity. The term linkage is sometimes used to mean to link.
<b>Listed</b>	A plant or animal species that had been determined by the state or federal government to be threatened with extinction.
<b>Major Federal Action</b>	Any proposed Marine Corps action that has the potential for physical impact on the human environment. Actions include, but are not limited to: a) new activities, including projects entirely or partly funded, assisted, conducted, regulated, or approved by the DoN; b) substantive changes in continuing actions, such as substantial changes in operational tempo, areas of use, or in methodology/equipment; c) approval of specific projects, such as construction or management activities located in a defined geographic area, e.g., MILCON projects, public/private venture projects, unspecified minor construction projects, natural resources management projects, special projects, land acquisition, and locally funded projects; and d) adoption of programs, such as a group of concerted actions to implement a specific policy or plan.
<b>Mitigation</b>	A lessening, or alleviation, of adverse effects from Marine Corps undertakings on resources.
<b>Multiple Use</b>	The sustainable use of natural resources for the best combination of purposes to meet the long-term needs of the DoD and the public.
<b>National Historic Landmark</b>	A National Register resource designated by the Secretary of the Interior as having exceptional significance in the nation’s history and which is subject to the most stringent preservation requirements.
<b>National Register Resource</b>	Broad concept that includes all resources that meet National Register significance criteria, even if the resources have not been formally registered, identified or acknowledged as significant. Current Federal regulations use the term “historic property” as a synonym for National Register resource. Regulations set the criteria for definition of a historic property. Structures 50 years old or more should be considered potentially eligible for listing on the National Register.



<b>Natural Areas</b>	Managed areas suitable for demonstrations, education, and research. Sites should demonstrate the computability of different resource uses and sustained yield production.
<b>Natural Community</b>	This term generally refers to a vegetation community, such as creosote bush scrub, but it is used to encompass all of the habitat, ecosystems, and plant and animal species found within the community.
<b>Natural Resources</b>	Landforms, soils, waters, and their associated flora and fauna.
<b>Natural Resources Management (NRM) Plan</b>	A five-year planning document that guides legally and ecologically sound, cost effective management of natural resources to maximize benefits for the installation and neighboring community. The NRM Plan addresses all land, agriculture, for est, fish, and wildlife and outdoor recreation resources of the installation.
<b>Nonpoint Source (NPS) Pollution/Polluted Runoff</b>	Pollution caused by diffuse sources that are not regulated as point sources and normally associated with runoff from construction activities, urban, agricultural and silvicultural runoff, and other land disturbing activities such as military training and operations that disturb lands, soils, and waters. NPS pollution can result form land runoff, precipitation, atmospheric deposition, or percolation. This definition is necessarily general, legal and regulatory decisions have sometimes resulted in certain sources being assigned to either the point or NPS categories because of considerations other that their manner of discharge. For example, irrigation return flows are designated and “non-point source” by Section 402(1) of the CWA, even though the discharge is through a discrete conveyance.
<b>Noxious Weeds</b>	Plant species identified by Federal or State agencies as requiring control or eradication.
<b>Native Plant Protection Act (NPPA)</b>	California has two laws that specifically protect rare plant species: the Native Plant Protection Act (1977) and the California Endangered Species Act (1984). These statutes protect only species recognized on specific lists as rare, threatened, or endangered. The NPPA enabled the state Department of Fish and Game to designate native California plants species as rare or endangered and to require permits for collection, transporting, or selling listed plants. It affords protection to listed plants by prohibiting take and requiring salvage.
<b>Off-Road Vehicle</b>	A vehicle designed or used for recreational travel on natural terrain. The term excludes a registered motorboat confined to use on open water and a military, emergency, or law enforcement vehicle during use by an employee or agent of the government or one of its contractors in the course of carrying out their tasks.
<b>Outdoor Recreation</b>	Program, activity, or opportunity dependent on the natural environment. Examples are picnicking, bird-watching, off-road vehicle use, hiking, wild and scenic river use, and primitive camping. Developed or consorted facilities such as golf courses, tennis courts, riding stables, lodging facilities, boat launching ramps and marinas are not included.
<b>Outdoor Recreation Management</b>	Management of natural resources to provide recreation opportunities that are sustainable, within the military mission, within established carrying capacities, and consistent with the natural resources upon which they are based. Outdoor recreation shall be predominantly muscle powered activities that will not impair or degrade natural resources.

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<b>Projects</b>	Includes studies, plans, surveys, inventories, and land/water treatments as well as physical improvements.
<b>Proposed Species</b>	Any species of fish, wildlife or plant that is proposed in the Federal Register to be listed under Section 4 of the ESA.
<b>Riparian Areas</b>	Areas closely related to or bordering rivers, streams, lakes, arroyos, playas, ravine bottoms, etc.
<b>Section 7</b>	Section 7 of the Federal Endangered Species Act specifies that federal agencies must consult with the U.S. Fish and Wildlife Service regarding activities that could affect listed species.
<b>Section 9</b>	Section 9 of the Federal Endangered Species Act prohibits violations of the act, including take of listed fish and wildlife species. It prohibits the destruction of listed plant species on federal land or on private land when done in knowing violation of a state law.
<b>Section 10(a)</b>	Section 10(a) of the Federal Endangered Species Act. This section provides for permits to take listed species under certain conditions.
<b>Section 106</b>	Section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effects of their actions on historic properties and seek comments from an independent reviewing agency, the Advisory Council on Historic Preservation.
<b>Sensitive</b>	Highly responsive or susceptible to modification by external agents or influences.
<b>Sensitive Habitat</b>	Land, water and vegetation needed to maintain one or more sensitive species.
<b>Sensitive Species</b>	Those species Federally listed as endangered or threatened under the Endangered Species Act, proposed for listing, or candidate status. Also, those plants with California Native Plant Society designations.
<b>Significant</b>	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.
<b>State Listed Species</b>	Any species of fish, wildlife or plant that is protected by an appropriate State agency as issued in a State's endangered species law and other pertinent regulations.
<b>Stewardship</b>	The responsibility to inventory, manage, conserve, protect, and enhance the natural resources entrusted to one's care in a way that respects the intrinsic value of those resources, and the needs of present and future generations.
<b>Take</b>	The Federal Endangered Species Act defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."
<b>Watchable Wildlife</b>	Recreational viewing of wildlife.
<b>Watershed</b>	The ridge or crestline dividing two drainage areas: the area drainage by a river or stream.
<b>Wetlands</b>	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, such as swamps, marshes, and bogs.



**Wildlife Management**

The practical application of scientific and technical principles to wildlife populations and habitats so as to manage such populations essentially for ecological, recreational, and/or scientific purposes.

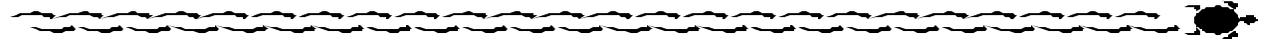
**Undertaking**

Any Federal, Federally assisted, or Federally licensed action, activity, or program, new or continuing, that may have an effect on National Register resources and therefore triggers Section 106 consultation responsibilities.

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# Appendix O: Small Mammal Survey and Anecdotal Herpetological Survey 1996





# Appendix P: A Development History of the MCLB Barstow Integrated Natural Resources Management Plan



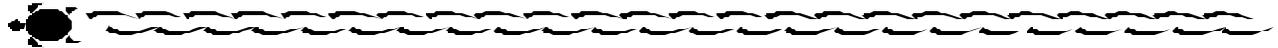
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# A Development History of the MCLB Barstow Integrated Natural Resources Management Plan

During the drafting and review of this INRMP, MCLB sought coordination with the US Fish and Wildlife Service (USFWS), but was unable to obtain concurrence because USFWS was not responsive to requests to consult. This appendix provides a history of the actions taken in preparation of the INRMP. To meet the 17 November 2001 deadline imposed by the Sikes Act Improvement Act of 1997, MCLB has completed and approved this INRMP. Resolution of any remaining issues with the USFWS will occur when their resources and time allow.

The following documents the chronology of development and correspondence on this INRMP.

1. March 5, 1996. Initiated preparation of an IINRMP for MCLB Barstow.
2. November 17, 1997. The Sikes Act Improvement Act (SAIA) was passed. It required agency agreement with the INRMP.
3. March 18, 1998. The Commanding Officer signed the Draft INRMP.
4. March 24, 1998. The Draft INRMP was forwarded to the US Fish & Wildlife Service (USFWS) Ventura Office and the California Department of Fish & Game (CDFG) Long Beach Office for review. The USFWS did not respond and eventually stopped returning phone calls. (See enclosed letter 5731.WF/175)
5. September 21, 1998. Deputy Under Secretary of Defense (Environmental Security) memo on implementing SAIA. Subsequent interpretation added a NEPA requirement to the INRMP. MCLB prepared separate NEPA documentation to avoid completely rewriting the basic document.
6. October 5, 1998. A letter to the USFWS stated that the requested 60-day response had stretched to six-months, and “assumed” that failure to respond by October 31 would signify concurrence. The USFWS never responded. (See enclosed letter 4PLN.WF/422).
7. November 1998-August 2000. Several additional Drafts and Final Drafts were staffed with CDFG.
8. November 10, 1999. Issuance of a USMC Handbook for Preparing INRMPs.
9. August 7, 2000. A new Final Draft was forwarded to CDFG for agreement.
10. August 9, 2000. At a joint meeting between USFWS, CDFG, Edwards AFB (Edwards had also been trying to get it’s INRMP through for three years), and MCLB, it was agreed that we needed a fresh approach. USFWS and CDFG would review the INRMPs and set up a meeting with DoD to discuss their findings before responding in writing. CDFG had been mailed a copy of the August Final Draft, and a copy was hand delivered to USFWS on November 1, 2000.



11. October 24, 2000. Public review was completed and the Commanding Officer, MCLB Barstow, signed a FONSI for the INRMP.
12. November 20, 2000. Letters were sent to both USFWS and CDFG, which briefly reviewed the history of this project, stated that their people had copies of the current INRMP, and asked for a face-to-face meeting in December to identify any remaining obstacles to completion of this INRMP. There was no response to the requested meeting.
13. April 24, 2001. Another copy of the August 2000 Draft Final INRMP was provided to USFWS to replace their missing copy.
14. June 8, 2001. USFWS published its Guidance for Coordination on DoD Sikes Act INRMPs, which requires that 10 copies of the locally-approved Final Draft INRMP be forwarded to the USFWS Regional Office for review.
15. August 23, 2001. The MCLB Barstow INRMP was finalized for publication in order to meet the Congressionally-mandated November 17, 2001 completion date.