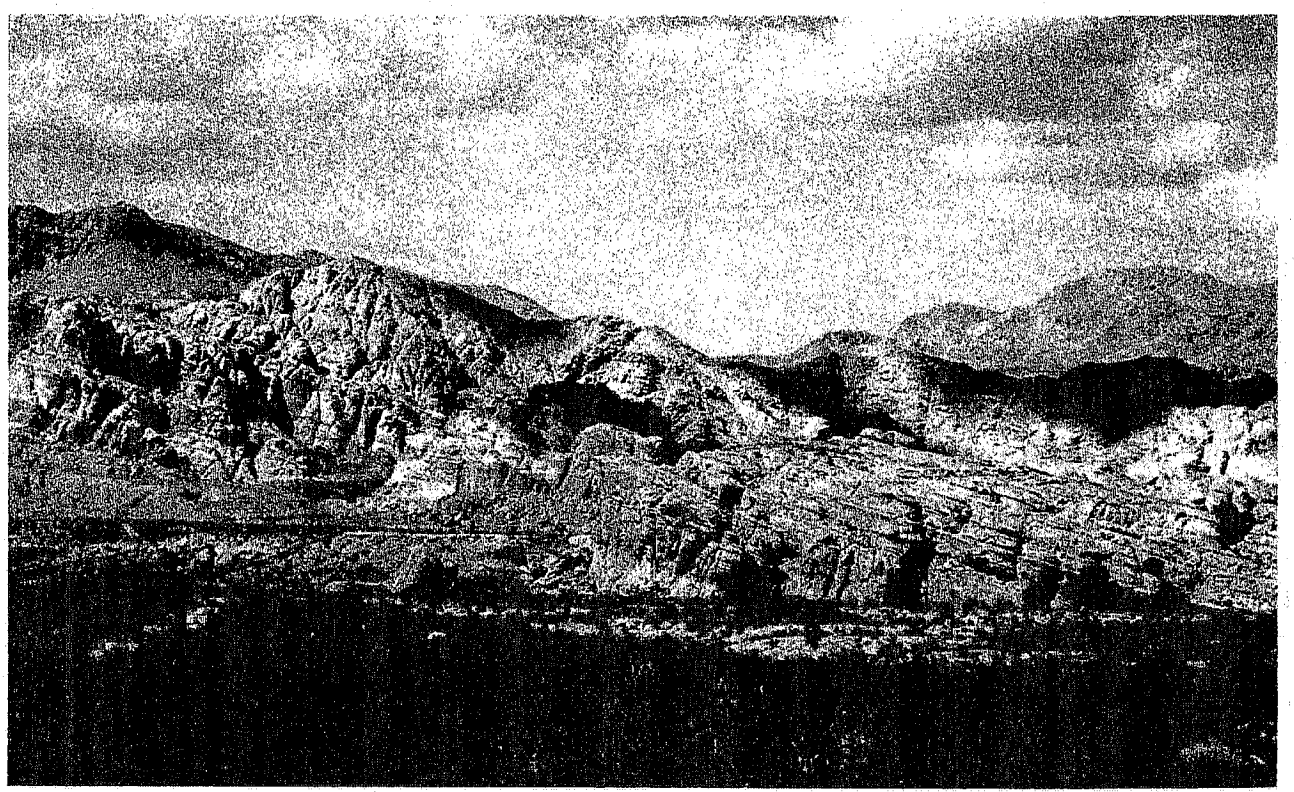
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Las Vegas Field Office
4765 Vegas Drive
Las Vegas, NV 89108

May 1998

PROPOSED
LAS VEGAS RESOURCE MANAGEMENT PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

Volume I : Summary, Purpose and Need, Alternatives, Affected Environment, Impacts, Consultation & Coordination, and Plan Implementation, Maintenance, and Amendment



MISSION STATEMENT

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, project, and improve these lands in a to manner to serve the needs of the American people for all times. Management in based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wilderness, air and scenic, scientific and cultural.

BLM/LV/PL-98/012+1791

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Nevada State Office
1340 Financial Blvd., P.O. Box 12000
Reno, Nevada 89520-0006

In Reply Refer To:
1610 (LVFO)
(NV930.1) (NV050)

JUN 15 1998

Dear Reader:

Enclosed for your review is the Proposed Las Vegas Resource Management Plan (Plan) and Final Environmental Impact Statement (FEIS). This proposed Plan outlines the various decisions for management of renewable and non-renewable resources on approximately 3.3 million acres of public land in Clark and southern Nye counties, Nevada. The Plan is open for a 30 day protest period beginning with the date of this letter.

This Proposed Plan and FEIS has been developed in accordance with the National Environmental Policy Act of 1969 and the Federal Land Policy and Management Act of 1976. This plan is a variation of Alternative E which was presented in the Supplement to the Draft Stateline Resource Management Plan released in May 1994 and as modified by public comment. This document contains a summary of the decisions and resulting impacts, an overview of the planning process and planning issues, the Proposed Plan, a summary of written and verbal comments received during public review of the Draft Plan and Supplement, and responses to the substantive issues raised during the review.

The proposed Plan may be protested by any person who participated in the planning process, and who has an interest which is or may be, adversely affected by the approval of the proposed Plan. A protest may raise only those issues which were submitted for the record during the planning process (see 43 Code of Federal Regulations 1610.5-2). Protests must be filed with the Director, Bureau of Land Management, Attn. Ms. Brenda Williams, Protests Coordinator, WO-210/LS-1075, Department of Interior, Washington, D.C. 20240.

All protests must be written and must be postmarked on or before July 14, 1998 and shall contain the following information:

- The name, mailing address, telephone number, and interest of the person filing the protest.
- A statement of the issue or issues being protested.
- A statement of the part or parts of the document being protested.
- A copy of all documents addressing the issue or issues previously submitted during the planning process by the protesting party, or an indication of the date the issue or issues were discussed for the record.
- A concise statement explaining precisely why the Bureau of Land Management, Nevada State Director's decision is wrong.

Upon resolution of any protests, an Approved Plan and Record of Decision will be issued. The approved Plan/Record of Decision will be mailed to all individuals who participated in this planning process and all other interested publics upon their request.

Sincerely,

Robert V. Abbey
State Director, Nevada

COVER SHEET

PROPOSED LAS VEGAS RESOURCE MANAGEMENT PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

( ) DRAFT (X) FINAL

Lead Agency:	U.S. Department of the Interior Bureau of Land Management
Project Location:	Clark and Southern Nye Counties, Nevada
For Further Information Contact:	Dan Morgan Assistant District Manager Renewable Resources Las Vegas Field Office Telephone (702) 647-5060

Abstract: The Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement provides a comprehensive framework for managing public lands administered by the Las Vegas Field Office, Las Vegas District, Bureau of Land Management.

The preparation of this document was coordinated with numerous individuals, Federal and State agencies, special interest groups, and County governments.

Date Proposed Plan Issued:	June 15, 1998
Protests, if any, are to be filed with:	Director, Bureau of Land Management Attn: Ms. Brenda Williams, Protests Coordinator WO-210/LS-1075 Department of the Interior Washington, D.C. 20240
Overnight Mail Address for Protests:	Director, Bureau of Land Management Attn: Ms. Brenda Williams, Protests Coordinator (WO-210) 1620 L Street, N.W., Rm 1075 Washington, D.C. 20036 Phone: (202) 452-5110
To expedite consideration, in addition to the original sent by mail or overnight mail, a copy of the protest may be sent by:	FAX to (202) 452-5112 or E-Mail to bwilliam@wo.blm.gov
Date Protests Must be Postmarked:	July 14, 1998

Responsible Official for Proposed Plan:

Robert V. Abbey
State Director, Nevada

6-15-98
Date

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SUMMARY

The Las Vegas Proposed Resource Management Plan/Final Environmental Impact Statement identifies future management in the form of objectives and management directions for 3.3 million acres of public land in Clark and Nye Counties, located in southern Nevada.

The following Summary Tables (S1 and S2) present a comparison of all the alternatives and impacts of each alternative as compared to the no action alternative. The components of the various alternative are summarized in Table S1 and are further described in Chapter 2. The impacts anticipated are summarized in Table S2 and are more fully detailed in Chapter 4.

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Air Resource Management	Compliance with Clean Air Act; project specific mitigation	Compliance with all Federal, State and local air quality standards and regulations, including Clean Air Act; Project specific mitigation	Same as A
Soil Resource Management	Maintain/improve watershed condition to reduce erosion and sedimentation and to enhance site productivity	Determine watershed potential; undertake actions to reduce erosion and sedimentation while enhancing site productivity	Same as A
	Project specific mitigation based upon soil surface factor classes	Project specific mitigation based on erosion condition classes and erosion susceptibility ratings	Same as A
	Develop watershed management plans for Virgin River, Muddy River and Meadow Valley Wash	Prepare watershed management plans where other management plans cannot adequately address the situation	Same as A
Water Resource Management	Maintain existing waters at the source; fence to prevent degradation of the source or associated riparian area;	Determine amount of water needed to meet management objectives. File for appropriative water rights on public and acquired lands, in accordance with State water laws, for those waters not federally reserved	Same as A
	Minimize non-point pollution from BLM- initiated and authorized actions; Where appropriate institute Best Management Practices to control non-point source pollution	Minimize both point and non-point sources of pollution following Best Management Practices	Not addressed
	Not addressed	Determine instream flow requirements and apply for necessary water rights on the Virgin River and in Meadow Valley Wash	Same as A
	Maintain or improve the water quality of streams and springs in accordance with State and Federal regulations.	Maintain the quality of waters presently in compliance and improve the quality of those waters found to be in non-compliance with State and/or Federal water quality standards	Same as A
	Not addressed	Not addressed	Not addressed

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	On those watersheds that exhibit good potential for recovery, prepare and implement watershed management plans or address in other activity plans
Same as A	Same as A	Obtain water rights to springs associated with the grazing privileges for allotments closed to grazing and maintain for wildlife, wild horses, burros, and riparian values; Determine amount of water needed to meet management objectives. File for appropriative water rights on public and acquired lands, in accordance with State water laws, for those waters not federally reserved	Determine water needs to meet objectives; file for water rights on public and acquired lands for sources not federally reserved
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A
Not addressed	Not addressed	Not addressed	Minimize the threat of flood and sediment damage on populated areas from public land management actions by providing lands necessary to construct flood-control structures

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Riparian Management	Ensure that 75% of riparian areas are in proper functioning condition by 1997	Same as No Action	Same as No Action
	Do not allow competitive off-road vehicle events within 1/4 mile of water sources	Same as No Action	Same as No Action
	Protect the Virgin River riparian zone from degradation	Modify grazing systems or use protective fences, as needed to prevent further degradation and to aid in recovery of the Virgin River riparian zone	Same as A
	Provide water for wildlife, wild horses and burros, and livestock; Fence riparian areas to exclude livestock and wild horses and burros; Provide water for livestock, wild horses and burros away from the source	Use protective fencing as needed and provide alternative water sources and/or locations to prevent further degradation of and to aid in the recovery of spring associated riparian areas	Same as A
	Retain all riparian areas in public ownership unless disposal would be in the public interest	Same as No Action	Same as No Action
	Give special attention to monitoring and evaluating management activities in riparian areas and revise management practices where site specific objectives are not being met	Same as No Action	Same as No Action
	Not addressed	Not addressed	Not addressed
Vegetation Management	Continue existing rangeland monitoring studies and establish new studies as needed	Determine ecologic status of plant communities on public lands and manage to achieve desired plant communities or potential natural community	Same as A

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as No Action	Same as No Action	Same as No Action; Complete inventory of riparian areas by 1995	Ensure that all riparian areas are in proper functioning condition; Complete assessments on all riparian areas; establish a schedule for actions necessary to achieve proper functioning condition
Same as No Action	Same as No Action	Same as No Action	Do not allow competitive off-road vehicle events within 1/4 mile of natural water sources associated with riparian areas
Same as A	Same as A	Same as A	Ensure that all riparian areas are in proper functioning condition
Same as A	Same as A	Same as A	Improve riparian areas with priority given to those that are functioning at risk with a downward trend; Use appropriate measures necessary for improvement, including fencing and/or alternate water sources away from the riparian area
Same as No Action	Same as No Action	Same as No Action	Retain riparian areas and mesquite woodlands in federal ownership, unless disposal is in the public interest
Same as No Action	Same as No Action	Same as No Action	Ensure that the minimum requirement of Proper Functioning Condition on all riparian areas is maintained or achieved during any planning process
Not addressed	Not addressed	Establish the following criteria for water utilization of springs and associated riparian areas; 50% for riparian; 25% for wildlife; 15% for wild horses and burros; and 10% for livestock (25% will be allocated for wild horses and burros if no livestock grazing occurs and visa versa)	Not addressed
Same as A	Same as A	Determine ecologic status, woodland index or forage value rating, as determined by plant community surveys, on Public land and manage to achieve desired plant communities or potential natural community	Maintain or improve the condition of vegetation on public lands to a desired plant communities or potential natural community

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Vegetation Management (con't)	Not addressed	Maintain or improve habitat of threatened or endangered plant species	Same as A
	Allow only minimal clearing of vegetation on project sites	Allow construction, mining activity or off-road vehicle activity on threatened or endangered, or candidate plant species habitat only after appropriate mitigation	Same as A
	Rehabilitate all disturbed sites where necessary and practical	Provide for rehabilitation of disturbed areas on public land to maintain or restore plant productivity	Same as A
Visual Resource Management	No Visual Resource Management classes; develop mitigation on a project specific basis	Designate and manage the following Visual Resource Management Classes: 1,125,415 acres class II; 1,867,657 acres class III; 678,055 acres class IV	Same as A
	Not addressed	Not addressed	Not addressed
Areas of Critical Environmental Concern	Not addressed	Designate 1,151,938 acres as areas of critical environmental concern	Designate 1,530,838 acres as areas of critical environmental concern
	Not addressed	Not addressed	Not addressed
	Not addressed	Not addressed	Not addressed
Fish, Wildlife and Special Status Species Management	Not addressed	Designate 970,160 acres as tortoise areas of critical environmental concern	Designate 1,346,200 acres as tortoise areas of critical environmental concern
	Provide special management consideration on Public lands within Clark County to protect and increase current populations of desert tortoise	Maintain or improve habitat conditions on 970,160 acres of tortoise habitat to support current population levels of desert tortoise	Maintain or improve habitat conditions on 1,346,200 acres of tortoise habitat to support current population levels of desert tortoise

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Inventory special status plant species; take appropriate action to protect their habitat.	See Fish, Wildlife and Special Status Species
Same as A	Same as A	Develop appropriate mitigation measures before allowing construction, mining activity or off-road vehicle activity on known habitat for special status plant species	See Fish, Wildlife and Special Status Species
Same as A	Same as A	When feasible, rehabilitate, reclaim or revegetate areas subject to surface disturbing activities;	Same as E
Same as A	Same as A	Same as A	Designate and manage the following: 968,890 acres class II; 1,727,870 acres class III; 635,135 acres class IV
Not addressed	Not addressed	Update visual resource inventory; Adjust designations through a plan amendment	Continue to refine the Visual Resource Management inventory to refine the database and ratings
Designate 1,538,298 acres as areas of critical environmental concern	Same as A	Designate 969,600 acres as areas of critical environmental concern	Designate 1,005,031 acres as areas of critical environmental concern
Not addressed	Not addressed	Not addressed	Withdrawn lands relinquished by other Federal agencies and located within these areas would attain designated status immediately upon administrative control by BLM. All ongoing management guidance, restrictions and directions would apply to relinquished lands.
Not addressed	Not addressed	Not addressed	Portions of wilderness study areas within areas of critical environmental concern would fall under management guidance, restrictions and directions for the area of critical environmental concern, when released by Congress
Designate 1,356,680 acres as tortoise areas of critical environmental concern	Same as A	Designate 797,730 acres as tortoise areas of critical environmental concern	Designate 743,209 acres as tortoise areas of critical environmental concern
Maintain or improve habitat conditions on 1,356,680 acres of tortoise habitat to support viable populations of desert tortoise as defined in the Recovery Plan	Same as A	Manage desert tortoise habitat to achieve the recovery criteria defined in the Tortoise Recovery Plan	Same as E

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Fish, Wildlife and Special Status Species Mgmt (con't)	Not addressed	Minimize impacts to tortoise habitat during fire suppression	Same as A
	Not addressed	Remove wild horses and burros which expanded beyond existing herd management areas or into Ash Meadows Natl. Wildlife Refuge	Same as A
	Encourage all public land users to travel only on existing roads or trails in crucial wildlife habitat; avoid new road or trail construction in crucial habitat	Designate all areas of critical environmental concern as limited to designated roads and trails	Same as A
	Not addressed	Not addressed	Not addressed
	Not addressed	Monitor tortoise populations, habitat, activity plans, management decisions and compliance with stipulations to determine effectiveness of desert tortoise mitigation measures	Same as A
	Not addressed	Not addressed	Not addressed
	Not addressed	Not addressed	Not addressed
	Not addressed	Not addressed	Not addressed
	Not addressed	Not addressed	Not addressed

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Manage for zero wild horses and burros in tortoise areas of critical environmental concern	Manage for zero wild horses and burros in tortoise areas of critical environmental concern
Same as A	Same as A	Same as A	Designate all tortoise areas of critical environmental concern as LIMITED to designated roads and trails for all motorized and mechanized vehicles
Not addressed	Not addressed	Not addressed	Do not allow commercial collection of flora in tortoise areas of critical environmental concern; Only allow commercial collection of fauna upon completion of a scientifically credible study that demonstrates commercial collection does not adversely impact affected species or their habitat. This action will not affect hunting or trapping and casual collection as permitted by the State
Same as A	Same as A	Implement monitoring and research dealing with management issues within desert tortoise areas of critical environmental concern	Same as E
Not addressed	Not addressed	Limit utility corridors to 3,000 feet or less in width within areas of critical environmental concern	Same as E
Not addressed	Not addressed	Allow no new landfills in tortoise areas of critical environmental concern. Close existing landfills by 1995	Do not allow new landfills in tortoise areas of critical environmental concern
Not addressed	Not addressed	Do not authorize military maneuvers in tortoise areas of critical environmental concern	Same as E
Not addressed	Not addressed	Require reclamation of activities which result in loss or degradation of tortoise habitat with areas to be reclaimed to pre-disturbance condition	Same as E

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Fish, Wildlife and Special Status Species Mgmt. (con't)	Not addressed	Prohibit off-road vehicle competitive events in tortoise areas of critical environmental concern	Same as A
	Not addressed	Allow other types of events and commercial activities on a case-by-case basis in tortoise areas of critical environmental concern	Same as A
	Not addressed	Allow no new road construction or siting of ancillary facilities in bighorn lambing habitat	Same as A
	Not addressed	Determine if predator control is necessary in tortoise habitat; minimize increase or spread of predator populations where they prey on tortoises	Same as A
	Develop habitat management plans for the Virgin River and Big Dune	Revise the Virgin River habitat management plan. Designate Big Dune, River Mts., and Amargosa Mesquite as areas of critical environmental concern	Same as A
	Implement the Ash Meadows Habitat Management Plan	Designate Ash Meadows as an area of critical environmental concern; Make BLM inholdings available for withdrawal by the U.S. Fish and Wildlife Service	Same as A
	Not addressed	Prohibit BLM authorized activities which would affect groundwater levels/spring flows in Ash Meadows and Moapa Valley	Same as A
	Do not develop new dual-use allotments in bighorn sheep habitat; Do not authorize domestic sheep in McCullough Allotment	Do not authorize domestic sheep grazing in allotments with bighorn sheep habitat	Same as A

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Do not allow speed off-road vehicle competitive events or off-road vehicle free play in tortoise areas of critical environmental concern	Prohibit off-road vehicle speed events, mountain bike races, horse endurance rides, hill climbs, mini events, publicity rides, high speed testing and similar speed based events in tortoise areas of critical environmental concern
Same as A	Same as A	Allow non-speed off-road vehicle events and commercial activities on a case-by-case basis in tortoise areas of critical environmental concern	Allow non-speed off-road vehicle events in tortoise areas of critical environmental concern consistent with restrictions in RC11
Same as A	Same as A	Same as A	Evaluate discretionary activities in bighorn sheep habitat. Grant authorization if consistent with goals and objectives of the Rangewide Plan
Same as A	Same as A	Not addressed	Animal damage control activities may be allowed on a temporary basis if necessary for reestablishment of native species or as a tool to allow recovery of decimated wildlife populations
Same as A	Same as A	Designate Virgin River, River Mts., Amargosa Mesquite and Big Dune as areas of critical environmental concern;	Same as E
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Prohibit BLM authorized land uses which would result in unmitigated, significant adverse impacts to ground water levels/spring flows in Moapa Valley and Ash Meadows area of critical environmental concern	Manage public lands adjacent to the Ash Meadows Area of Critical Environmental Concern and Moapa Natl. Wildlife Refuge to complement spring and aquatic habitat for special status species, including projects that may affect ground water level or spring flows
Same as A	Same as A	Do not authorize domestic sheep grazing in bighorn sheep habitat	In accordance with BLM guidelines, no domestic sheep grazing will be authorized in bighorn sheep habitat

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Fish, Wildlife and Special Status Species Management	All new livestock and wild horse and burro waters must not create new conflicts with fish or wildlife habitat	Allow new water developments for wildlife, livestock, wild horses and burros in tortoise areas of critical environmental concern only if these developments do not create conflicts with desert tortoise	Allow new water developments for wildlife, livestock, wild horses and burros in category I and II tortoise habitat only if these developments do not create conflicts with desert tortoise
	Impacts from mining to crucial bighorn sheep and desert tortoise habitat will be subject to mitigative measures during the plan of operations stage	Prevent undue and unnecessary degradation of bighorn sheep habitat due to mineral exploration and development	Same as A
	Identify habitat needs of wildlife and provide for these needs so as to attain population goals, mutually agreed to with NDOW for species.	Allow wildlife populations to reach levels consistent with habitat carrying capacity; adjust populations using monitoring data	Same as A
	Accomplish bighorn sheep introductions and permit natural expansion into historic habitat after preparation of a habitat management plan or release site description; Return native fauna to historic ranges and/or improve population numbers	Allow reintroduction of wildlife species into tortoise areas of critical environmental concern only if it will create no conflicts with tortoise	Same as A
	Not addressed	Inventory/monitor peregrine falcon habitat; prevent undue and unnecessary degradation of habitat; prepare a habitat mgmt. plan for occupied habitat; close areas within 1/2 mile of active nests between Feb.1-Sept.1; explore reintroduction of peregrine into suitable habitat	Same as A
	Not addressed	Manage mesquite habitats for wildlife habitat values; Develop a management plan for Amargosa Mesquite areas of critical environmental concern	Same as A
	Not addressed	Not addressed	Not addressed
	Provide and maintain sufficient quality and quantity of food, water, cover and space to satisfy demands of all wildlife species. Give special emphasis to Federal and State classified species and to BLM sensitive species	Maintain or improve the habitat of threatened, endangered or candidate plant species found on public lands (Vegetation Mgmt.)	Same as A
Forestry Resources Management	Allow greenwood cutting in the Spring, Virgin, and McCullough Mtns.	Allow firewood harvest in Pahrump and Amargosa Flat; Limit to one cord/household/year with maximum of 35 cords/year	Same as A

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Allow new water developments for wildlife and wild horses and burros in tortoise areas of critical environmental concern only if these do not create conflicts with desert tortoise	Same as C	Maintain existing wildlife waters; Construct new guzzlers as needed, consistent with other resource needs;	Same as E; Desgin new waters for livestock, and wild horses and burros to reduce potential conflicts with wildlife
Same as A	Same as A	Same as A	Evaluate discretionary activities in bighorn sheep habitat on a case-by-case basis. Authorize if consistent with the Rangewide Plan
Same as A	Same as A	Same as A	Support viable and diverse native wildlife populations by providing sufficient quantity and quality of habitat
Same as A	Same as A	Same as A	Cooperate with State and Federal wildlife agencies in implementing introductions, reintroduction and augmentation releases of native or naturalized species
Same as A	Same as A	Same as A	Protect key nesting areas, migration routes, important prey base areas, and concentration areas for birds of prey on public lands through mitigation of activities during National Environmental Policy Act compliance
Same as A	Same as A	Manage mesquite and Acacia habitats for wildlife habitat values	Same as E; Only allow woodcutting where consistent with sustaining a healthy, vigorous plant community and viable wildlife populations
Not addressed	Not addressed	Not addressed	Manage habitat to support elk which move onto BLM managed lands from the Spring Mts. in cooperation with Nevada Division of Wildlife
Same as A	Same as A	Same as A	Enter into conservation agreements with the U.S. Fish and Wildlife Service and the State of Nevada for management of special status species to prevent future federal listing of such species
Same as A	Same as A	Allow firewood harvest in Pahrump Valley; Limit to one cord per household/year	Allow harvest of dead or down, or BLM marked green trees for dwarf mistletoe control only in approved areas;

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Forestry Resources Management (con't)	Coordinate the removal of native desert vegetation with the Nevada Division of Forestry	Allow harvest of desert vegetation from areas subject to surface-disturbing activities	Same as A
	Not addressed	Maintain 138,000 acres of pinyon-juniper and conifer forest at late seral stage or full ecological potential	Same as A
Livestock Grazing Management	Allow livestock grazing on 2,237,478 acres of public lands; Close part of Spring Mountain Allotment and all of River Mt. Allotment	Allow livestock grazing on 2,036,933 acres of public lands;	Same as A
	Close the Ash Meadows Allotment to livestock grazing; do not authorize livestock grazing on the Carson Slough or Grapevine-Rock Valley Allotments until completion of Section 7 consultation	Manage livestock grazing under constraints of Section 7 consultation; Grazing prescription 1 in category I, II and intensive III tortoise habitat; prescription 2 in category IIIb habitat.	Same as A
	Close that portion of Red Rock Canyon within the Spring Mountain Allotment, and the River Mountain Allotment to livestock grazing	Allow no livestock grazing on 19 allotments including unalloted areas in Nye County and riparian zones along the Muddy and Virgin Rivers, and Meadow Valley Wash; Do not authorize livestock grazing in Planning Area B, Southern Nye county except within the Mt. Stirling and County Line Allotments	Same as A
	Develop allotment mgmt. plans for the 7 allotments in Clark County and one allotment in Southern Nye County	Develop allotment mgmt. plans for "I" and "M" allotments	Same as A
	Intensively manage 14 allotments, including Mt. Stirling; Manage 4 allotments in the maintain management category guidelines	Develop allotment mgmt. plans for "I" and "M" allotments	Same as A
	Determine proper long-term stocking rates of domestic livestock on allotments, desirable numbers of wild horses and burros in herd mgmt. areas, and populations of mule deer and bighorn sheep in their existing and potential habitat	Establish stocking level based on availability of ephemeral forage	Same as A

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Allow harvest of desert vegetation at those locations where surface disturbing activities will occur	Public lands in Las Vegas District will be assessed for salvage of desert vegetation where surface disturbance occurs
Same as A	Same as A	Maintain Pinyon Juniper woodland and conifer forest where possible for all aged stands	Same as E
Allow livestock grazing on 1,001,767 acres of public lands; limit livestock grazing in desert tortoise habitat	Allow livestock grazing on 1,902,881 acres of public lands	Allow livestock grazing on 692,844 acres of public lands;	Allow livestock grazing on 610,893 acres of public lands;
Same as A	Close allotments in tortoise areas of critical environmental concern to livestock grazing	In tortoise habitat outside of areas of critical environmental concern, manage for grazing prescription 2 on open allotments; eliminate livestock grazing in tortoise areas of critical environmental concern	Manage open allotments consistent with grazing prescription 2; eliminate livestock grazing in tortoise areas of critical environmental concern
Allow no livestock grazing on 19 allotments, Amargosa Valley/Crater Flat, the riparian zones along the Muddy and Virgin Rivers, and Meadow Valley Wash, and within allotments containing desert tortoise habitat	Allow no livestock grazing on 28 allotments; Do not allow grazing in these areas: Amargosa Valley/Crater Flat, along the Muddy and Virgin Rivers, and Meadow Valley Wash	Allow no livestock grazing on 40 allotments	Allow no livestock grazing on 38 allotments and all unalloted areas in Southern Nye County; Additional allotment closures could be approved based on voluntary relinquishment of grazing privileges, permits or leases
Same as A	Same as A	Completion of an allotment management plan and environmental assessment required to reactivate any inactive ephemeral-perennial or perennial allotment	Establish grazing systems, including rest and/or deferment principles as needed to meet specific resource objectives
Same as A	Same as A	Same as A	Drop existing categories from allotments closed to livestock grazing; Change Lower Mormon Mesa from C to I and Flat Top Mesa from C to M
Same as A	Same as A	Reclassify 21 allotments as ephemeral/perennial; Set a total of preference of 13,200 animal unit months; 33 allotments remain ephemeral	Livestock grazing on ephemeral allotments will be allowed if sufficient forage is available and use is consistent with the Standards and Guidelines, and allotment specific objectives

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Livestock Grazing Management	Manage perennial vegetation at a proper utilization rate to obtain a sustained yield and improve livestock forage condition	Maintain/improve condition of vegetation to desired plant community or potential natural community	Same as A
Wild Horse and Burro Management	Manage wild horses and burros in the Gold Butte, Muddy Mtns., Spring Mtns., and Eldorado Mtns. herd mgmt. areas	Maintain healthy, viable herds in thriving ecological balance in the herd mgmt. areas	Same as A
	Develop herd management area plans for the following herd mgmt. areas: Mt. Stirling, Amargosa, and Last Chance herd mgmt. areas; Maintain Ash Meadows Herd Management Area as a horse free area	Develop herd management area plans for each herd mgmt. area	Same as A
	Manage wild horse and burro numbers at current population levels unless monitoring indicates that adjustments are necessary	Develop Long-Term Management Levels for wild horses and burros	Same as A
	Not addressed	Realign herd mgmt. area boundaries in the following areas to gain more management control of populations: Red Rocks, Lucky Strike, Johnnie, and Trout Canyon herd mgmt. areas	Same as A
	Not addressed	Maintain or improve wild horse and burro habitat to desired plant community or potential natural community	Same as A
	Not specifically addressed	Develop dependable water sources for wild horses and burros	Same as A
Cultural Resource Management	Develop cultural resource management plans for Willow Springs and Muddy Mtns; prepare interpretive signs and a brochure for Willow Springs	Develop project plans for the following: Old Spanish Trail/Mormon Road; Las Vegas and Tonopah Railroad; Red Spring; Sandstone Quarry; Willow Spring; and Whitney Pockets sites to manage for public values	Same as A

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Same as A	Provide for increased plant vigor and reproductive capability of perennial forage; Maintain static to upward trend on key perennial species through livestock grazing management
Same as A	Same as A	In herd management areas which are not managed for zero appropriate management level, maintain healthy, viable herds in thriving ecological balance	Same as E
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Establish appropriate management levels for each herd mgmt. area; Establish an appropriate management level of zero for Gold Butte, Eldorado, Amargosa and Ash Meadows herd mgmt. areas	Establish appropriate management level for each herd mgmt. area; Establish an appropriate management level of zero for Eldorado, Ash Meadows and Amargosa mgmt. areas; Do not allow use by horses and burros in that part of the Gold Butte Herd Mgmt. Area which overlaps with the tortoise area of critical environmental concern
Same as A	Same as A	Combine Last Chance and Mt. Stirling herd mgmt. area into the Johnnie Herd Mgmt. Area; Realign the Spring Mt. Herd Mgmt. Area to create the Spring Mt Herd Mgmt. Area managed by the Forest Service and Red Rock Herd Mgmt. Area managed by BLM	Realign the following herd management areas to facilitate management considerations with distinct population units: Johnnie, Red Rocks and Wheeler Pass
Same as A	Same as A	Same as A	Limit utilization of current years production by all herbivores on key perennial species to 50% for grasses and 45% for shrubs
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Selected cultural resources should be designated as priorities for activity planning and to determine best use potential including: Gold Butte, Crescent, Goodsprings, Searchlight and Hidden Valley

Table S-1 Summary of the Alternatives

Program	No Action	Alternative A	Alternative B
Cultural Resources Management (con't)	Preserve a representative sample of line shacks, mining cabins, and other isolated historic structures	Designate 13 areas of critical environmental concern (20,020 acres) for identified National Register eligible or listed sites (cultural acreage in the following includes only 5,840 acres in Red Rock, 320 acres in Sunrise Mountain and 5,000 acres in Virgin River areas of critical environmental concern)	Same as A
	Not addressed	Research Virgin River Anasazi district	Same as A
	Provide fire protection for Mt. Potosi Cabin, Wheeler Pass Charcoal Kilns, Searchlight Mining District, Virgin Mountain Cabin, Goodsprings Mining District, Trout Canyon Cabin, Mt. Potosi Mines, South McCullough Wickiup, and the Crescent Peak District	Manage cultural resources at Red Rock and Stump Springs, Hidden Valley district, Bird Spring site, Sloan rock art site, Crescent; Gold Butte; Goodsprings; and Searchlight mining districts; and South Virgin Peak Ridge district for conservation of scientific or historic values	Same as A
	----------	Manage cultural resources within Arrow Canyon rock art district, Brownstone Canyon district, Keyhole Canyon, Frenchman Mine, and Gypsum Cave for public values	Same as A
	Initiate regular and systematic patrols of specific areas and/or sites with high cultural sensitivity	Use surveillance to monitor known cultural and paleontological sites; install protective devices as appropriate	Same as A
	Protect and preserve important paleontological sites	Designate 40 acre area of critical environmental concern within Arrow Canyon Bird Track paleontological district	Same as A
	Not addressed	Manage 12,000 acres within Muddy Creek and Eglingston Escarpment districts for information potential	Same as A
	Not addressed	Designate Gold Butte/Virgin Mountain traditional lifeway area	Same as A
	Determine sources of deterioration and priorities for preservation through field evaluations of all cultural resource sites	Same as A	Same as A

Table S-1 Summary of the Alternatives

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Designate 13 areas of critical environmental concern (20,650 acres) for identified National Register Eligible or listed sites (subtract 5,840 acres for Red Rock, add 150 acres to Crescent, add 6,320 acres for new Arden Historic area)	Designate 12 areas of critical environmental concern (20,520 acres) for identified National Register Eligible or listed sites (less 160 acres at Bird Spring in Red Rock Canyon, subtract 110 acres from Crescent, add 140 acres to Keyhole Canyon)
Same as A	Same as A	Same as A	Manage cultural resources on 1,500 acres of public land within the Virgin River Anasazi district for the potential to yield historic or scientific information
Same as A	Same as A	Same as A	Manage cultural resources on 11,759 acres at Red Rock Spring; Stump Spring; Hidden Valley district; Sloan Rock Art district; Crescent and Gold Butte, mining townsites; and S.Virgin Peak Ridge for conservation of scientific or historic values
Same as A	Same as A	Same as A	Manage cultural resources on 3,660 acres w/in Arrow Canyon rock art district; Keyhole Canyon; Frenchman Mine and Gypsum Cave for public values
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Not addressed
Same as A	Same as A	Designate Gold Butte/Virgin Mountain, Quail Spring/Bird Spring and Spirit Mountain traditional lifeway areas	Manage cultural resources on 200,000 acres of traditional lifeway areas for their sociological values by providing for their protection and preservation
Same as A	Same as A	Same as A	Utilize data recovery efforts through research designs to mitigate adverse effects to cultural resources and paleontological sites from proposed federal actions

Table S-1 Summary of the Alternatives (continued)

Program	No Action	Alternative A	Alternative B
Lands Management	Dispose of 163,673 acres of public lands by the most appropriate authority	155,258 acres are available for discretionary disposal through sale, exchange, color-of-title or recreation and public purpose patent	540,171 acres are available for discretionary disposal through sale, exchange, color-of-title or recreation and public purpose patent
	Grant leases/permits under Sec. 302 of the Federal Land Policy and Management Act (FLPMA) for private or commercial uses throughout the planning area on a case-by-case basis	Grant leases/permits (Sec. 302 of FLPMA) for private and commercial uses (areas of critical environmental concern excluded) on a case-by-case basis	Same as A
	Grant leases for agricultural uses throughout the planning area for the Muddy River and Virgin River floodplain	All public lands are closed to agricultural entry	Same as A
	Grant airport leases within Clark County	Grant airport leases (areas of critical environmental concern excluded) on a case-by-case basis in the following areas: within a 2 mile radius of Jean and Searchlight and within a 3 mile radius of Pahrump	Grant airport leases (areas of critical environmental concern excluded) on a case-by-case basis
Rights-of-Way Management	Designate 61 miles of utility corridors (for planning purposes) in Planning Area B of southern Nye County	Designate 590 miles of utility corridors (for planning purposes) in Clark and southern Nye counties	Same as A
	Not addressed	Exclusive of designated corridors, designate all areas of critical environmental concern, semi-primitive non-motorized Recreational Opportunity Spectrum areas (hereinafter referred to as semi-primitive, non-motorized areas), significant caves (within 1/4 mile), wilderness study areas, and Red Rock Canyon National Conservation Area (hereinafter referred to as Red Rock Canyon) as right-of-way avoidance areas (1,938,845 acres)	Exclusive of designated corridors, designate all areas of critical environmental concern, semi-primitive non-motorized areas, significant caves, wilderness study areas, and Red Rock Canyon as right-of-way avoidance areas (2,317,745 acres)

Table S-1 Summary of the Alternatives (continued)

Alternative C	Alternative D	Alternative E	Proposed
98,943 acres are available for discretionary disposal through sale, exchange, color-of-title or recreation and public purpose patent	540,171 acres are available for discretionary disposal through sale, color-of-title, or recreation and public purpose patent; all public lands (excluding areas of critical environmental concern and wilderness study areas) are available for exchange	111,563 acres are available for discretionary disposal through sale, exchange, color-of title or recreation and public purpose patent	175,314 acres are available for discretionary disposal through sale, exchange, color-of title or recreation and public purpose patent. Public lands outside of disposal ares would be considered for repositioning to consolidate BLM parcels and improve BLM management, if specific criteria are met
All public lands are closed to leases/permits (Sec. 302 of FLPMA)	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Public lands within the District are not suitable for entry under Indian Allotment, Desert Land Entry or Carey Act and would not be disposed of through those authorities
Same as A	Same as B	Same as B	Same as B
Designate 476 miles of utility corridors (for planning purposes) in Clark and southern Nye counties	Designate 536 miles of utility corridors (for planning purposes in Clark and southern Nye counties	Designate 538 to 560 miles of utility corridors (for planning purposes in Clark and southern Nye counties	Designate 538 miles of utility corridors (for planning purposes in Clark and southern Nye counties
Exclusive of designated corridors, designate all areas of critical environmental concern, semi-primitive non-motorized areas, significant caves, wilderness study areas, and Red Rock Canyon as right-of-way avoidance areas (2,325,205 acres)	Same as A	Exclusive of designated corridors, designate all areas of critical environmental concern and significant caves as right-of-way avoidance areas (971,231 acres)	Exclusive of designated corridors, designate all areas of critical environmental concern and significant caves as right-of-way avoidance areas. Under Interim Management Policy, wilderness study areas are managed as right-of-way avoidance areas (1,351,536 acres)

Table S-1 Summary of the Alternatives (continued)

Program	No Action	Alternative A	Alternative B
Rights-of-Way Management (con't)	Not addressed	Designate all areas of critical environmental concern as material site right-of-way exclusion areas (1,151,938 acres)	Designate all Category I tortoise habitat as material site right-of-way exclusion areas (364,000 acres)
Acquisitions	Acquire private and State of Nevada lands within Red Rock Canyon	Acquire private lands within designated areas of critical environmental concern (4,797 acres); and 7,882 acres conveyed to Aerojet	Acquire private lands within designated areas of critical environmental concern (9,049 acres)
	Not addressed	Obtain an easement on or across Pabco Tram Road	Same as A
Recreation Management	Manage Red Rock Canyon, Clark, and Spring Mtn. special recreation management areas, and the Stateline Extensive Recreation Management Area, for recreational values	Designate and manage 13 special recreation management areas, and 1 extensive recreation management area for their specific recreational opportunities	Same as A
	Manage the Las Vegas Dunes Off Highway Vehicle Play Area (9,180 acres) for intensive off-highway vehicle recreational use	Nellis Dunes Special Recreation Management Area,: Manage 9,180 acres for intensive off-highway vehicle recreational use	Same as A
	Not addressed	Stateline Extensive Recreation Management Area: Manage 2,661,907 acres for dispersed and diverse opportunities that meet Recreation Opportunity Spectrum objectives	Same as A

Table S-1 Summary of the Alternatives (continued)

Alternative C	Alternative D	Alternative E	Proposed
Designate all areas of critical environmental concern as material site right-of-way exclusion areas (1,538,298 acres)	Designate all areas of critical environmental concern as areal right-of-way exclusion areas (1,151,938 acres); designate Hidden Valley, Sloan Rock Art, and Big Dune areas of critical environmental concern as linear right-of-way exclusion areas (4,680 acres)	Designate all tortoise areas of critical environmental concern as material site right-of-way exclusion areas (968,031 acres)	Designate Hidden Valley, Sloan Rock Art and Big Dune areas of critical environmental concern as linear right-of-way exclusion areas (5,640 acres); With the exception of within 1/2 mile of Federal Aid Highways, designate all areas of critical environmental concern as areal right-of-way exclusion areas (approximately 953,000 acres)
Acquire private lands within designated areas of critical environmental concern and tortoise management areas (6,787 acres); in Ash Meadows, only acquire lands outside the refuge; and 7,882 acres conveyed to Aerojet	Same as B	Acquire undeveloped private lands within designated areas of critical environmental concern and the Aerojet area; and private lands along the Virgin River, south of Riverside	Acquire private lands within areas of critical environmental concern, wilderness study areas, Congressionally designated areas and habitat for special status species; including Aerojet, private lands along the Virgin River, south of Riverside and other lands not specifically identified which would provide resource protection, improve land ownership patterns or enhance public uses and values
Same as A	Same as A	Same as A	Secure on the ground access to otherwise inaccessible public lands
Designate 11 special recreation management areas, and 1 extensive recreation management area	Same as A	Same as A	Designate 8 special recreation management areas, and 1 extensive recreation management area as shown on Map 2-5
Same as A	Same as A	Same as A	Manage the Nellis Dunes Special Recreation Management Area, (10,000 acres) for intensive off-highway vehicle recreational use
Manage 2,753,732 acres of Stateline Extensive Recreation Management Area for dispersed and diverse opportunities that meet Recreation Opportunity Spectrum objectives	Same as A	Manage 1,277,133 acres of Stateline Extensive Recreation Management Area for dispersed and diverse recreation opportunities that meet Recreation Opportunity Spectrum objectives	Manage the Stateline Extensive Recreation Management Area (Map 2-5) for dispersed and diverse recreation opportunities that meet Recreation Opportunity Spectrum objectives

Table S-1 Summary of the Alternatives (continued)

Program	No Action	Alternative A	Alternative B
Recreation Management (con't)	Allow off-highway vehicle competitive events on 2,655,278 acres	Allow off-highway vehicle competitive events on 238,162 acres in special recreation management areas and in the Extensive Recreation Management Area in the following locations: Dry Lake Valley area; Pahrump to Beatty; Mt. Stirling/Mercury area; Highland Hills area; Laughlin area; Bitter Springs area	Allow off-highway vehicle competitive events on 238,162 acres in special recreation management areas and in the Extensive Recreation Management Area in the following locations: Dry Lake Valley area; Pahrump to Beatty; Mt. Stirling/Mercury; Highland Hills area
	Not addressed	Allow competitive and commercial events which do not involve off-highway vehicles ,and recreation concessions in Stateline Extensive Recreation Management Area, subject to conflict resolution	Same as A
	Not addressed	Prohibit recreational and target shooting in the Las Vegas Valley; Legal hunting appropriate per Nevada Division of Wildlife regulations.	Same as A
	Designate 2,900,998 acres as OPEN to all motorized and mechanized vehicles	Designate 9,180 acres as OPEN to all motorized and mechanized vehicles (Nellis Dunes Special Recreation Management Area)	Same as A
	Designate 696,175 acres as LIMITED to existing roads, trails, and washes for all motorized and mechanized vehicles	Designate 2,524,889 acres as LIMITED to existing roads, trails, and washes for all motorized and mechanized vehicles	Designate 2,136,029 acres as LIMITED to existing roads, trails, and washes for all motorized and mechanized vehicles
	Designate 70,641 acres as LIMITED to designated roads, trails, and washes for all motorized and mechanized vehicles	Designate 1,124,868 acres as LIMITED to designated roads, trails, and washes for all motorized and mechanized vehicles	Designate 1,513,728 acres as LIMITED to designated roads, trails, and washes for all motorized and mechanized vehicles
	Designate 3,313 acres as CLOSED to all motorized and mechanized vehicles: Hidden Valley	Designate 12,190 acres as CLOSED to all motorized and mechanized vehicles: Hidden Valley	Same as A
	In wilderness study areas all vehicle use is LIMITED to existing roads, trails, and washes unless current designations are more restrictive	Same as No Action	Same as No Action
	Not addressed	Determine primary resource value in each significant cave; Manage all caves and karsts as wild systems, free from commercial or show cave developments	Same as A

Table S-1 Summary of the Alternatives (continued)

Alternative C	Alternative D	Alternative E	Proposed
Allow off-highway vehicle competitive events on 238,162 acres in special recreation management areas and in the Extensive Recreation Management Area in the following locations: one designated course, Pahrump to Beatty	Same as A	Allow off-highway vehicle competitive events in special recreation management areas and in the Extensive Recreation Management Area in the following locations: Dry Lake Valley, Pahrump Valley to Beatty, Mercury area, Laughlin area, Muddy Mountains, and Meadow Valley Wash Road	Allow off-highway vehicle competitive events within specified special recreation management areas and the Extensive Recreation Management Area, exclusive of areas of critical environmental concern and wilderness study areas (Map 2-5)
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Designate 10,040 acres OPEN to all motorized and mechanized vehicles (Nellis Dunes, 1/2 Big Dune); Also, unvegetated portions of dry lake beds	Designate 24,600 acres OPEN to all motorized and mechanized vehicles (Nellis Dunes, parts of Big Dune, dry lake beds) Map 2-10
Designate 1,871,444 acres as LIMITED to existing roads, trails, and washes for all motorized and mechanized vehicles	Same as A	Designate the remainder of the planning area as LIMITED to existing roads, trails, and washes for all motorized and mechanized vehicles	Designate 2,186,483 acres as LIMITED to existing roads, trails, and washes for all motorized and mechanized vehicles
Designate 1,777,313 acres as LIMITED to designated roads, trails, and washes for all motorized and mechanized vehicles	Same as A	Designate 1,310,000 acres as LIMITED to designated roads, trails, and washes for all motorized and mechanized vehicles	Designate 1,117,252 acres as LIMITED to designated roads, trails, and washes for all motorized and mechanized vehicles
Designate 13,190 acres as CLOSED to all motorized and mechanized vehicles: Hidden Valley and Big Dune	Same as A	Designate approx. 19,200 acres as CLOSED to all motorized and mechanized vehicles: Hidden Valley, Virgin River and 1/2 of Big Dune	Designate approx. 3,560 acres as CLOSED to all motorized and mechanized vehicles: Hidden Valley and 200 acres at Big Dune
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Same as A	Same as A	Same as A	Same as A; If needed, implement seasonal closures to protect bats

Table S-1 Summary of the Alternatives (continued)

Program	No Action	Alternative A	Alternative B
Wild and Scenic River Management	Not addressed	Coordinate with the Cedar City and Arizona Strip Districts on a formal study of the Virgin River for eligibility	Same as A
Wilderness Management	Manage 21 wilderness study areas in accordance with the Interim Management Policy until designated or released by Congress	Same as No Action	Same as No Action
	Not addressed	Release the Logandale Unit from further consideration as wilderness	Same as A
	Not addressed	If released by Congress, manage wilderness study areas in accordance with applicable special recreation management area or area of critical environmental concern management direction	Same as A
Minerals Management, Fluid Minerals	All public lands within the planning area are OPEN for fluid mineral activities except for legislatively withdrawn areas and other withdrawn and segregated areas. Special stipulations may apply within crucial bighorn sheep habitat	Allow fluid mineral leasing, subject to standard terms and conditions, on 747,779 acres; Allow fluid mineral leasing, subject to seasonal and other minor constraints, on 3,205,952 acres; Allow fluid mineral leasing, subject to no surface occupancy and similar major constraints, on 15,133 acres; Do not allow fluid mineral leasing on 716,226 acres;	Allow fluid mineral leasing, subject to standard terms and conditions, on 1,833,000 acres; Allow fluid mineral leasing, subject to seasonal and other minor constraints, on 1,699,620 acres; Allow fluid mineral leasing, subject to no surface occupancy and similar major constraints, on 296,362 acres; Do not allow fluid mineral leasing on 856,108 acres
Minerals Management, Locatable Minerals	All public lands within the planning area are OPEN for locatable mineral activities except for legislatively withdrawn areas and other withdrawn and segregated areas	Allow locatable mineral activity on 3,703,833 acres Do not allow locatable mineral activity on 937, 100 acres	Allow locatable mineral activity on 3,158,567 acres Do not allow locatable mineral activity on 1,482,870 acres

Table S-1 Summary of the Alternatives (continued)

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Same as A	Participate in an eligibility determination of the Virgin River for Wild and Scenic River designation when initiated by either Arizona or Utah BLM
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Same as A	Same as A	Not addressed	Same as A
Same as A	Same as A	If released by Congress, manage wilderness study areas to maintain existing qualities of the areas through multiple use management	If released by Congress, manage wilderness study areas to maintain existing qualities of the areas through multiple use management and to provide for semi-primitive recreation opportunities.
Allow fluid mineral leasing, subject to standard terms and conditions, on 755,654 acres; Allow fluid mineral leasing, subject to seasonal and other minor constraints, on 1,886,509 acres; Allow fluid mineral leasing, subject to no surface occupancy and similar major constraints, on 9,558 acres; Do not allow fluid mineral leasing on 2,033,369 acres	Allow fluid mineral leasing, subject to standard terms and conditions, on 531,844 acres; Allow fluid mineral leasing, subject to seasonal and other minor constraints, on 3,936,500 acres; Do not allow fluid mineral leasing on 216,746 acres	Allow fluid mineral leasing, subject to standard terms and conditions, on 4,051,661 acres; Allow fluid mineral leasing subject to no surface occupancy and other major constraints on 81,405 acres, plus acreage within Meadow Valley Wash, Muddy River and Virgin River riparian zones and flood plains; Do not allow fluid mineral leasing on 552,024 acres	Allow fluid leasing subject to standard terms and conditions on 1,909,351 acres; Allow fluid mineral leasing subject to no surface occupancy stipulations on 866,067 acres; Allow fluid mineral leasing subject to Timing and Surface Use Constraints on 111,799 acres; Close Ash Meadows Area of Critical Environmental Concern to geothermal prospecting and leasing
Allow locatable mineral activity on 2,328,265 areas Do not allow locatable mineral activity on 2,312,668 acres	Allow locatable mineral activity on 4,008,868 acres Do not allow locatable mineral activity on 632,065 acres	Allow locatable mineral activity on 1,812,320 acres Do not allow locatable mineral activity on 2,828,613 acres, plus acreage in Meadow Valley Wash, Virgin River and Muddy River riparian zones	Allow locatable mineral activity on 2,135,146 acres Do not allow locatable mineral activity on 1,227,226 acres

Table S-1 Summary of the Alternatives (continued)

Program	No Action	Alternative A	Alternative B
Minerals Management, Salable Minerals	The Las Vegas Valley is CLOSED to sand and gravel sales except in established community pits; free use permits will be issued; Administer sand and gravel leases within and outside of the Las Vegas Valley Subunit consistent with the Clark County Management Framework Plan amendment; The remainder of the public lands are OPEN for saleable mineral activities except for legislatively withdrawn areas and other withdrawn and segregated areas	Deny existing sand and gravel applications; Close Las Vegas and Laughlin land disposal areas to mineral material disposal (65,993 acres); Sand and gravel leasing same as No Action Alternative; Allow saleable mineral disposal on 2,959,709 acres Do not allow saleable mineral disposal on 1,682,219 acres	Deny existing sand and gravel lease applications; Close Las Vegas and Laughlin land disposal areas to mineral material disposal (111,524 acres); Sand and gravel leasing same as No Action Alternative; Allow saleable mineral disposal on 2,561,798 acres Do not allow saleable mineral disposal on 2,080,130 acres
Minerals Management, Solid Leasable Minerals	All public lands within the planning area are OPEN for non-energy leasable mineral activities except for legislatively withdrawn areas and other withdrawn and segregated areas	Allow non-energy leasing on 3,943,316 acres Do not allow non-energy leasing on 721,759 acres	Allow non-energy leasing on 3,522,205 acres Do not allow non-energy leasing on 1,142,870 acres
Hazardous Materials Management	Not addressed	Not addressed	Not addressed
Fire Management	The entire planning area is a full suppression area	Same as No Action	Same as No Action
	Develop a county-wide program to utilize prescribed burning and hazard reduction burning to meet resource management needs as well as fire management goals	149,231 acres of public land are available for prescribed burning for resource enhancement; 232,109 acres available for prescribed burning for fuel hazard reduction	Same as A
	Not specifically addressed	Designate the following: 627,011 acres as 10-acre initial attack area; 1,921,794 acres as 100-acre initial attack area; 1,122,322 acres as 500-acre initial attack area	Same as A

Table S-1 Summary of the Alternatives (continued)

Alternative C	Alternative D	Alternative E	Proposed
Deny existing sand and gravel lease applications; Close Las Vegas and Laughlin land disposal areas to mineral material disposal (61,273 acres); Sand and gravel leasing same as No Action Alternative Allow saleable mineral disposal on 2,533,021 acres Do not allow saleable mineral disposal on 2,108,907 acres	Deny existing sand and gravel lease applications; Las Vegas and Laughlin land disposal areas are open to mineral material disposal (111,524 acres) Sand and gravel leasing same as No Action Alternative; Allow saleable mineral disposal on 4,035,390 acres Do not allow saleable mineral disposal on 606,538 acres	Do not approve or renew existing sand and gravel lease applications. Convert unrenewed leases to mineral material contracts within community pits; Do not allow the authorization or renewal of material site rights-of-way or mineral material disposal outside of community pits within the Las Vegas Valley non-attainment area; Allow saleable mineral disposal on 3,421,446 acres; Do not allow saleable mineral disposal on 1,220,482 acres, plus acreage within the riparian zones for Meadow Valley Wash, Virgin River and Muddy River	After June 1, 1999, do not renew sand and gravel leases within areas identified for land disposal Allow saleable mineral disposal outside of areas listed in Table 2-12 and outside of areas of critical environmental concern, except within 1/2 mile of Federal Aid Highways and specified County Roads in desert tortoise Areas of Critical Environmental Concern and in the Government Wash Community Pit on the east edge of Rainbow Gardens Area of Critical Environmental Concern Do not allow saleable mineral disposal on approximately 1,033,569 acres (Table 2-12)
Allow non-energy leasing on 2,660,386 acres Do not allow non-energy leasing on 2,004,689 acres	Allow non-energy leasing on 4,448,329 acres Do not allow non-energy leasing on 216,746 acres	Allow non-energy leasing on 1,481,625 acres; Do not allow non-energy leasing on 3,183,450 acres, plus acreage within the riparian zones for Meadow Valley Wash, Virgin River and Muddy River	Allow non-energy leasing on 1,872,673 acres outside of riparian areas, disposal areas and areas of critical environmental concern Do not allow non-energy leasing on 1,033,569 acres (Table 2-12)
Not addressed	Not addressed	Not addressed	Reduce risks associated with hazardous materials on public lands
Same as No Action	Same as No Action	Same as No Action	Provide fire suppression on 3,331,895 acres based upon suppression areas/zones and resource management needs
Same as A	Same as A	Same as A	Allow prescribed fire for resource enhancement on those areas identified in Map 2-11
Same as A	Same as A	Same as A	Provide fire suppression efforts commensurate with resource and adjacent property values at risk

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Air Resource Management			
From Vegetation	Not addressed	Not addressed	Not addressed
From Lands Management	Increases of between 907 and 2,384 tons per year in airborne particulates and 91 to 238 tons per year of carbon monoxide in the Las Vegas Valley Non-Attainment Area (Non-Attainment Area).	Same as No Action	Same as No Action
From Recreation Management	Off-highway vehicle events within or upwind of Las Vegas Valley could result in a temporary increase in airborne particulates in the Non-Attainment area.	Same as No Action	Same as No Action
From Minerals Management	Particulate emissions of 900 tons per year within the Las Vegas Valley Non-Attainment Area	Same as No Action	Same as No Action
Soil Resource Management			
From Livestock Grazing Management	Loss of 650,654 tons per year on critical condition and highly susceptible soils; loss of 114,080 tons per year of saline soils.	Same as No Action	Same as No Action

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Not addressed	Not addressed	Not addressed	Windblown particulates would be reduced through the improvement of protective ground cover.
Same as No Action	Same as No Action	Same as No Action, but no quantification given	Increases of 243 tons per year in airborne particulates, 1,750 tons per year of carbon monoxide, 370 tons per year of VOC and NO_x and 10.2 tons per year of SO_2
Proper meteorological conditions could potentially result in a temporary but significant increase in airborne particulates in the Non-Attainment Area, despite limitations on off-highway vehicle events	Same as No Action	Given proper meteorological conditions, air quality in the Non-Attainment Area could temporarily further degrade during off-highway vehicle events	Events, if held upwind of the valley, would potentially contribute to short term further degradation of the air quality in Las Vegas Valley
Same as No Action	Same as No Action	Mineral activities could create significant airborne particulates, especially in the Non-Attainment Area	Sand and Gravel operations in Las Vegas Valley would produce approximately 743 tons of PM_{10} annually.
Loss of 224,655 tons per year on critical condition and highly susceptible soils; loss of 1,905 tons per year of saline soils.	Loss of 590,512 tons per year on critical condition and highly susceptible soils; loss of 94,015 tons per year of saline soils.	Salt loading of the Colorado River drainage due to impacts from grazing would reduce significantly due to closure of many allotments containing saline soils.	Soil loss of 224 tons per year from allotments remaining open to grazing. This is a savings of 966 tons per year soil loss if all allotments remain open.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Soil Resource Management			
From Wild Horse and Burro	Not addressed	Not addressed	Not addressed
From Rights-of-Way Management	Loss of 31,414 tons/year of critical condition and highly susceptible soils; Loss of 28,594 tons/year of saline soils within the Colorado River drainage.	Loss of 4,463 tons/year of critical condition and highly susceptible soils; Loss of 6,541 tons/year of saline soils within the Colorado River drainage.	Loss of 4,463 tons/year of critical condition and highly susceptible soils; Loss of 6,591 tons/year of saline soils within the Colorado River drainage.
From Recreation Management	Loss of 128,357 tons per year of critical condition and highly susceptible soils; Loss of 89,353 tons per year of saline soils within the Colorado River drainage.	Loss of 55,347 tons per year of critical condition and highly susceptible soils; Loss of 33,348 tons per year of saline soils within the Colorado River drainage.	Loss of 81,027 tons per year of critical condition and highly susceptible soils; Loss of 28,061 tons per year of saline soils within the Colorado River drainage.
From Minerals Management	Loss of 47,118 tons per year of critical condition and highly susceptible soils; Loss of 28,171 tons per year of saline soils within the Colorado River drainage.	Loss of critical condition and highly susceptible soils; 11,936 tons per year from leasable mineral entry; 10,533 tons from mineral sales; 13,082 tons from non-energy leasables; annual loss of saline soils in Colorado River drainage: 7,975 tons from leasable mineral entry; 6,152 tons from mineral sales and 7,975 tons from non-energy leasables.	Loss of critical condition and highly susceptible soils; 12,192 tons per year from leasable mineral entry; 10,520 tons from mineral sales; 11,880 tons from non-energy leasables; annual loss of saline soils in Colorado River drainage: 6,392 tons from leasable mineral entry; 5,936 tons from mineral sales and 5,296 tons from non-energy leasables.

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Not addressed	Not addressed	Not addressed	Horse and burro use at the appropriate management level would result in a reduction of 113 tons of soil loss per year (2,260 tons over 20 years)
Loss of 4,463 tons/year of critical condition and highly susceptible soils; Loss of 5,135 tons/year of saline soils within the Colorado River drainage.	Loss of 4,463 tons/year of critical condition and highly susceptible soils; Loss of 5,582 tons/year of saline soils within the Colorado River drainage.	Not addressed	Due to error in calculations used in the Draft Plan the impact is not addressed because it is not significant
Loss of 79,495 tons per year of critical condition and highly susceptible soils; Loss of 26,446 tons per year of saline soils within the Colorado River drainage.	Same as C	Not addressed	Soil losses resulting from continued off-road vehicle use in previously disturbed areas is approximately 2,650 tons per year.
Loss of critical condition and highly susceptible soils; 10,755 tons per year from leasable mineral entry; 18,807 tons from mineral sales; 9,876 tons from non-energy leasables; annual loss of saline soils in Colorado River drainage: 4,231 tons from leasable mineral entry; 4,556 tons from mineral sales and 4,175 tons from non-energy leasables.	Loss of critical condition and highly susceptible soils; 14,608 tons per year from leasable mineral entry; 14,206 tons from mineral sales; 13,669 tons from non-energy leasables; annual loss of saline soils in Colorado River drainage: 7,964 tons from leasable mineral entry; 8,996 tons from mineral sales and 7,964 tons from non-energy leasables.	Not addressed	From areas disturbed by mineral activities an estimated soil loss of 1,164 tons per year or a total of 23,280 tons over the life of the Plan would be expected.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Water Resource Management			
From Riparian	Not addressed	Not addressed	Not addressed
From Livestock Grazing Management	48,799 tons per year delivered to stream channels from critical condition and highly susceptible soils; 8,556 tons per year of saline sediments within Colorado River drainage.	Same as No Action	Same as No Action
From Wild Horse and Burro	Not addressed	Not addressed	Not addressed
From Lands Management	Annual increase of 1,512 to 3,974 acre-feet of water used per year within the Las Vegas Valley due to land disposal.	Same as No Action	Same as No Action
From Right-of-Way Management	2,356 tons per year delivered to stream channels from critical condition and highly susceptible soils; 2,145 tons per year of saline sediments within Colorado River drainage.	355 tons per year delivered to stream channels from critical condition and highly susceptible soils; 491 tons per year of saline sediments within Colorado River drainage.	355 tons per year delivered to stream channels from critical condition and highly susceptible soils; 494 tons per year of saline sediments within Colorado River drainage.

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Not addressed	Not addressed	Improved riparian areas would aid in soil stabilization, decreased water temperatures, moderate peak flows and stabilize base flows.	Improving riparian areas to proper functioning condition would result in improved water quality. Protection of springs in open allotments and herd management areas would improve water quality.
16,849 tons per year delivered to stream channels from critical condition and highly susceptible soils; 143 tons per year of saline sediments within Colorado River drainage.	42,288 tons per year delivered to stream channels from critical condition and highly susceptible soils; 7,051 tons per year of saline sediments within Colorado River drainage.	Long-term benefit could occur through the protection of approximately 2,925 acres along Meadow Valley Wash and Virgin River.	Water quality improvements on 117 spring sources would occur as a result of reduced grazing activity.
Not addressed	Not addressed	Not addressed	Water quality improvement would occur on 34 spring sources as a result of removal of horses from 3 of 6 herd management areas
Same as No Action	Same as No Action	Additional lands to be disposed of will increase the demand on available ground water.	Additional lands available for disposal will result in an increased demand for ground water (an additional 3,193 acre feet per year).
355 tons per year delivered to stream channels from critical condition and highly susceptible soils; 385 tons per year of saline sediments within Colorado River drainage.	355 tons per year delivered to stream channels from critical condition and highly susceptible soils; 419 tons per year of saline sediments within Colorado River drainage.	Not addressed	Minimal impact would result through implementation of mitigation measures such as reclamation and the avoidance of waters

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Water Resource Management			
From Recreation Management	9,627 tons per year delivered to stream channels from critical condition and highly susceptible soils; 6,701 tons per year of saline sediments within Colorado River drainage.	4,151 tons per year delivered to stream channels from critical condition and highly susceptible soils; 2,501 tons per year of saline sediments within Colorado River drainage.	6,077 tons per year delivered to stream channels from critical condition and highly susceptible soils; 2,105 tons per year of saline sediments within Colorado River drainage.
From Minerals Management	3,534 tons per year delivered to stream channels from critical condition and highly susceptible soils; 2,113 tons per year of saline sediments within Colorado River drainage.	Tons per year delivered to stream channels from critical condition and highly susceptible soils; 895 from leasable mineral entry, 790 from mineral sales, 981 from non-energy leasables. Tons per year of saline sediments within Colorado River drainage: 776 from leasable mineral entry, 1,064 from mineral sales, 837 from non-energy leasables.	Tons per year delivered to stream channels from critical condition and highly susceptible soils; 914 from leasable mineral entry, 789 from mineral sales, 891 from non-energy leasables. Tons per year of saline sediments within Colorado River drainage: 479 from leasable mineral entry, 445 from mineral sales, 397 from non-energy leasables.
Riparian Resource Management			
From Riparian Management	Long-term enhancement through maintenance, restoration or improvement of riparian values to healthy, productive ecological condition	Same as No Action	Same as No Action

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
5,962 tons per year delivered to stream channels from critical condition and highly susceptible soils; 1,983 tons per year of saline sediments within Colorado River drainage.	Same as C	Not addressed	The restriction of off-road vehicle activity to areas previously disturbed will benefit water resources through the preservation of presently undisturbed areas.
Tons per year delivered to stream channels from critical condition and highly susceptible soils; 807 from leasable mineral entry, 1,411 from mineral sales, 741 from non-energy leasables. Tons per year of saline sediments within Colorado River drainage: 317 from leasable mineral entry, 342 from mineral sales, 313 from non-energy leasables.	Tons per year delivered to stream channels from critical condition and highly susceptible soils; 1,096 from leasable mineral entry, 1,065 from mineral sales, 1,025 from non-energy leasables. Tons per year of saline sediments within Colorado River drainage: 579 from leasable mineral entry, 675 from mineral sales, 479 from non-energy leasables.	Not addressed	Potential sedimentation could occur to the 90 springs and approx. 12 miles of stream located in areas open to mineral activity.
Same as No Action	Same as No Action	Same as No Action	Measures would be taken to ensure all spring associated riparian areas and riparian areas associated with perennial streams would be in proper functioning condition

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Riparian Resource Management			
From Area of Critical Environmental Concern Management	Not addressed	Not addressed	Not addressed
From Fish, Wildlife and Special Status Species Management	Not addressed	Not addressed	Not addressed
From Livestock Grazing Management	Concentration of grazing in riparian areas on 10 active allotments would degrade those areas on 80 springs (approx. 40 acres of riparian) and the Virgin River (approx. 190 acres of riparian)	Concentration of grazing in riparian areas on 10 active allotments would degrade those areas on 80 springs (approx. 40 acres of riparian); No impact on the Virgin River	Same as A
From Wild Horse and Burro Management	Concentration of wild horses and burros in riparian areas on 5 herd management areas would degrade those areas on 58 springs (approx. 29 acres of riparian).	Same as No Action	Same as No Action
From Right-of-Way Management	Not addressed	Not addressed	Not addressed

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Not addressed	Not addressed	Not addressed	Designation of 1,016,709 acres as Areas of Critical Environmental Concern will help mitigate impacts to riparian areas on 106 springs and 1.7 miles of stream due to restriction of impacting activities.
Not addressed	Not addressed	Not addressed	Designation of 743,209 acres as Areas of Critical Environmental Concern for desert tortoise reduce impacts to riparian habitat at 82 springs and 1.7 miles of stream due to restriction of impacting activities.
Concentration of grazing in riparian areas on 2 active allotments would degrade those areas on 38 springs (about 19 acres of riparian); No impact on the Virgin River	Same as A	Closure to grazing plus fencing riparian areas where grazing remains will mitigate impacts to riparian areas.	Same as E
Same as No Action	Same as No Action	Removal of horses and burros in some herd management areas plus managing for the appropriate management level in the remaining herd management areas will help mitigate impacts to riparian areas.	Removal of horses and burros in some herd management areas plus managing for the appropriate management level in the remaining areas to ensure proper functioning condition will mitigate impacts to riparian areas.
Not addressed	Not addressed	Not addressed	Potential impacts to riparian areas would be minimized through avoidance and site specific mitigation.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Riparian Resource Management			
From Recreation Management	Not addressed	Not addressed	Not addressed
From Minerals Management	Not addressed	Not addressed	Not addressed
Vegetation Management			
From Vegetation Management	Long-term improvement of vegetative community due to management for desired plant community or potential natural community	Same as No Action	Same as No Action
From Livestock Grazing Management	Moderate to slight impacts from livestock grazing, by cropping of forage plants during the year.	Reduced impacts from livestock grazing based on closure of 14 allotments to livestock grazing	Same as A
From Wild Horse and Burro Management	Not addressed	Utilization of forage plants would be eliminated with removal of wild horses and burros from Amargosa Herd Management Area; Impacts would continue in other areas.	Same as A

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Not addressed	Not addressed	Not addressed	Limiting off-road vehicle activity to existing roads and trails would improve the riparian resource through the prevention of new soil disturbance and sediment production.
Not addressed	Not addressed	Not addressed	Closure to mineral activity, except fluid, within 1/4 mile of riparian areas would help mitigate impacts to riparian habitat.
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Decreased grazing impacts in designated Areas of Critical Environmental Concern where livestock grazing is removed	Reduced impacts from livestock grazing based on closure of 24 grazing allotments	Closure of 43 grazing allotments would increase above ground biomass with plant vigor and reproductive capability maintained or enhanced.	Closure of 42 grazing allotments would increase above ground biomass with plant vigor and reproductive capability maintained or enhanced.
Same as A	Same as A	Substantial decrease to elimination of use levels based upon setting appropriate management levels and managing herds and habitat would minimize or eliminate damage to vegetative resources.	Same as E

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Visual Resource Management			
From Visual Resource Management	Reduced impacts of projects	Reduced impacts by designation of visual resource management classes in planning area	Same as A
From Lands Management	Loss of natural landscape in Las Vegas Valley, Mesquite, Laughlin & Pahrump due to urban development	Same as No Action	Same as No Action
From Rights-of-Way Management	No corridors designated	Designation of corridors would help protect veiwsheds by concentrating impacts within specific geographic areas; Corridors would have moderate visual impacts.	
From Minerals Management	Impacts to form, line, color, and texture from mining; In some cases, would cause long-term scars to landscape	Same as No Action	Same as No Action
Fish, Wildlife and Special Status Species Management			
From Riparian Management	Enhanced habitat for wildlife and special status species	Same as No Action	Same as No Action
From Vegetation Management	Enhanced habitat as result of management to achieve full ecological potential or potential natural community	Enhanced habitat from management for potential natural community; management of mesquite stands	Same as A
From Areas of Critical Environmental Concern	No areas of critical environmental concern would be designated	Habitats for wildlife would be protected by the designation of 1,151,938 acres as areas of critical environmental concern	Habitats for wildlife would be protected by the designation of 1,530,838 acres as areas of critical environmental concern

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Same as A	Same as A
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Same as A	Same as A	Same as A	Same as A
Same as No Action	Same as No Action	Not addressed	Same as No Action
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Same as A	Same as A	Same as A	Same as A
Habitats for wildlife would be protected by the designation of 1,538,298 acres as areas of critical environmental concern	Same as A	Habitats for wildlife would be protected by the designation of 969,591 acres as areas of critical environmental concern	Habitats for wildlife would be protected by the designation of 1,005,031 acres as areas of critical environmental concern

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Fish, Wildlife and Special Status Species Management			
From Fish, Wildlife and Special Status Species Management	Habitat would be managed to sustain or increase existing wildlife populations	Same as No Action	Same as No Action
From Livestock Grazing Management	Wildlife habitat would improve as 2,795,792 acres open to grazing would be managed under Section 7 prescriptions and 875,335 acres would be closed to grazing.	Wildlife habitat would improve as 2,595,247 acres open to grazing would be managed under Section 7 prescriptions and 1,075,880 acres would be closed to grazing	Same as A
From Wild Horse and Burro Management	Managing wild horses and burros to maintain thriving ecological balance would improve habitat for some wildlife.	Same as No Action	Same as No Action
From Lands Management	Disposal of Category I and II tortoise habitat would fragment tortoise populations and reduce available habitat	970,160 acres of tortoise habitat within Areas of Critical Environmental Concern would not be available for disposal and would be protected for the long-term	1,346,200 acres of tortoise habitat within Areas of Critical Environmental Concern would not be available for disposal and would be protected for the long
From Rights-of-Way Management	Both direct and indirect impacts to wildlife from rights-of-way construction & maintenance	Impacts to wildlife from construction & maintenance; Habitat would be protected as Areas of Critical Environmental Concern would be closed to material site rights-of-way and be right-of-way avoidance areas, outside of corridors	Impacts to wildlife from construction & maintenance; Only Category I tortoise habitat would be closed to material sites rights-of-way resulting in continuing impacts to wildlife in other areas
	Not addressed	Impacts to wildlife from designation of 590 miles of corridors.	Impacts to wildlife from 590 miles of corridors.

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Wildlife habitat would improve as 1,001,767 acres open to livestock grazing would be managed under Section 7 prescriptions and 2,669,360 acres would be closed to grazing.	Wildlife habitat would improve as 2,341,875 acres open to livestock grazing would be managed under Section 7 prescriptions and 1,329,252 acres would be closed to grazing.	Habitat for wildlife would improve as 2,757,360 acres would be closed to livestock grazing; Open allotments would be managed under Section 7 prescriptions	Wildlife habitat would improve as 2,721,002 acres would be closed to livestock grazing. 11 allotments open to grazing would be managed under Section 7 prescriptions
Same as No Action	Same as No Action	Managing for zero animals in 4 herd management areas and for appropriate management level in other areas would improve habitat for wildlife	Managing for zero animals in 3 herd management areas and managing for appropriate management level in other areas would improve habitat for wildlife
1,356,680 acres of tortoise habitat within Areas of Critical Environmental Concern would not be available for disposal and would be protected for the long term	Same as A	797,938 acres of tortoise habitat within Areas of Critical Environmental Concern would not be available for disposal and would be protected for the long term	743,209 acres of tortoise habitat within Areas of Critical Environmental Concern would not be available for disposal and would be protected for the long term
Same as A	Same as A	Same as A	Impacts to wildlife from construction & maintenance; Areas of Critical Environmental Concern would be right-of-way avoidance areas, outside of corridors and would be closed to material site rights-of-way, except within 1/2 mile of highways.
Impacts to wildlife from 476 miles of corridors.	Impacts to wildlife from 563 miles of corridors.	Impacts to wildlife from 539 miles of corridors.	Same as E

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Fish, Wildlife and Special Status Species Management			
From Recreation Management	Impacts to wildlife from off-highway vehicle designations: 2,900,998 acres OPEN; 766,789 acres LIMITED; 3,313 acres CLOSED.	Impacts to wildlife from off-highway vehicle use would decrease: 9,180 acres OPEN; 3,649,757 acres LIMITED; 12,190 acres CLOSED.	Same as A
	Impacts to wildlife in areas open to competitive off-highway vehicle events; Most of the planning area is open.	Impacts to wildlife would be reduced as acreage open to high-speed competitive events would decrease.	Same as A
From Wilderness Management	Over the short-term wildlife habitat in wilderness study areas would be protected by Interim Management Policy	Same as No Action	Same as No Action
	Congressional release of study areas would impact long-term management of wildlife habitat.	Same as No Action	Same as No Action
From Minerals Management	Impacts to wildlife from mineral development on 4,412,940 acres open to fluid mineral leasing; 4,208,846 acres open to locatables; 4,496,342 acres open to saleables; 4,448,329 acres open to non-energy leasables	Impacts to wildlife from mineral development on 3,968,864 acres open to fluid mineral leasing; 3,703,833 acres open to locatables; 3,943,316 acres open to non-energy leasables; 2,959,709 acres open to saleables	Impacts to wildlife from mineral development on 3,828,982 acres open to fluid mineral leasing; 3,158,567 acres open to locatables; 2,561,798 acres open to saleables; 3,522,205 acres open to non-energy leasables

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Impacts to wildlife from off- highway vehicles would decrease: 9,180 acres OPEN; 3,648,757 acres LIMITED; 13,190 acres CLOSED.	Same as A	Impacts to wildlife from off- highway vehicles would decrease: 10,180 acres OPEN; 3,542,820 acres LIMITED; 4,360 acres CLOSED.	Impacts to wildlife from off- highway vehicles would decrease: 24,600 acres OPEN; 3,303,735 acres LIMITED; 3,560 acres CLOSED.
Same as A	Same as A	Same as A	Impacts to wildlife would be reduced as acreage open to high speed, competitive events would decrease.
Same as No Action	Same as No Action	Same as No Action	Same as No Action
Same as No Action	Same as No Action	Same as No Action	Study areas released by Congress would be managed to maintain their existing aesthetic qualities
Increased protection of wildlife from closure of 2,033,369 acres to fluid mineral leasing; 2,312,668 acres to locatables; 2,108,907 acres to saleables, and 2,004,689 acres to non-energy leasables	Impacts to wildlife from 4,468,344 acres open to fluid mineral leasing; 4,008,868 acres to locatables; 4,035,390 acres to mineral materials; 4,448,329 acres to non-energy leasables	Increased protection of wildlife from closure of 552,024 acres to fluid mineral leasing, 2,828,613 acres to locatables; 1,220,482 acres to saleables, and 3,183,450 acres to non-energy leasables	Increased protection of wildlife from no surface occupancy stipulations on 866,067 acres open to fluid mineral leasing, withdrawal of 1,227,226 acres to locatables; closure of 1,033,569 acres to saleables, and 1,443,799 acres to non-energy leasables

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Fish, Wildlife and Special Status Species Management			
	Not addressed	Additional protection of wildlife habitat as tortoise areas of critical environmental concern would be closed to mineral materials disposal and seasonal closures would be in effect for fluid mineral leasing	Same as A
Livestock Grazing Management			
From Riparian Management	Not addressed	Not addressed	Not addressed
From Fish, Wildlife and Special Status Species Management	Not addressed	Not addressed	Not addressed
	Decreased grazing from management actions and Section 7 consultation; season of use and utilization levels reduced	Same as No Action	Same as No Action
From Range Reclassification	Not addressed	Not addressed	Not addressed
Wild Horse and Burro Management			
From Air, Soil and Water Resource Management	Short-term possible reductions in horse and burro numbers from management actions; long-term improved condition of vegetation and water quality and quantity	Same as No Action	Same as No Action

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Impacts to wildlife tortoise areas of critical environmental concern would remain open to mineral material disposal; Increased protection from seasonal closure on fluid mineral leasing	Additional protection of wildlife as all areas of critical environmental concern would be recommended for closure to saleables, solid leasables and material site rights-of-way	Additional protection of wildlife as all areas of critical environmental concern would be recommended for withdrawal from the mining law and closed to saleables, solid leasables.
Not addressed	Not addressed	Livestock would be relocated or removed if utilization levels are exceeded.	Same as E
Not addressed	Not addressed	Protection of special status species could require a change in grazing systems or removal of livestock.	Same as E
Substantial decrease in forage use from closure of desert tortoise habitat to livestock grazing	Same as No Action	Substantial decrease in forage use from closure of tortoise areas of critical environmental concern to livestock grazing.	Same as E
Not addressed	Not addressed	Permittees could realize an economic benefit by setting of preference since a animal unit month has an implied value.	Not addressed
Same as No Action	Same as No Action	Wild burros would be removed from Gold Butte & Eldorado Herd Management Areas to implement Tortoise Recovery Plan.	Wild burros would be removed from Eldorado and part of Gold Butte Herd Management Areas to implement Tortoise Recovery Plan.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Wild Horse and Burro Management			
From Fish, Wildlife and Special Status Species Management	Competition from wildlife expanding into herd management areas; potential for reduced herd numbers in tortoise habitat	Same as No Action	Same as No Action
From Rights-of-Way Management	Not addressed	Not addressed	Not addressed
Cultural Resource Management			
From Fish, Wildlife and Special Status Species Management	Not addressed	Designation of 1,017,838 acres as areas of critical environmental concern aids in preserving 2,200 eligible sites	Designation of 1,404,358 acres as areas of critical environmental concern aids in preserving 2,800 eligible sites
From Forestry Management	Potential disturbance of 700 eligible sites from cutting in Virgin, McCullough, Spring Mountains	Potential disturbance of 300 eligible sites from wood cutting in Pahrump Valley and Amargosa Flat	Same as A
From Livestock Grazing Management	Potential disturbance of 5,200 eligible sites, 31,000 acres of Traditional Lifeway Area	Potential disturbance of 5,200 eligible sites, 31,000 acres of Traditional Lifeway Area	Same as A
From Lands Management	Potential disturbance of 6,300 eligible sites from availability for disposal of 3,140,585 acres	Potential disturbance of 3,300 eligible sites from availability for disposal of 1,603,885 acres	Potential disturbance of 2,500 eligible sites from availability for disposal of 1,224,985 acres
From Rights-of-Way Management	Potential disturbance of 6,500 eligible sites, 31,000 acres Traditional Lifeway Area from permits	Potential disturbance of 1,000 eligible sites from designated corridors on 540,247 acres	Same as A

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as No Action	Same as No Action	Wild burros would be removed from Gold Butte & Eldorado Herd Management Areas to implement Tortoise Recovery Plan.	Wild burros would be removed from Eldorado and part of Gold Butte Herd Management Areas to implement Tortoise Recovery Plan.
Not addressed	Not addressed	Fencing highways without installing under passes would hinder movement of animals as well as closing access to waters.	Same as E
Designation of 1,409,478 acres as areas of critical environmental concern aids in preserving 2,800 eligible sites	Same as A	Designation of 969,591 acres of areas of critical environmental concern aids in preserving 2,100 eligible sites.	Designation of 1,005,031 acres of areas of critical environmental concern aids in preserving 2,100 eligible sites.
Same as A	Same as A	Not addressed-	Potential disturbance of 300 eligible sites from wood cutting in Pahrump Valley.
Potential disturbance of 2,000 eligible sites, 31,000 acres of Traditional Lifeway Area	Potential disturbance of 4,600 eligible sites, 31,000 acres of Traditional Lifeway Area	Potential disturbance of 1,700 eligible sites.	Potential disturbance of 1,255 eligible sites.
Minimum of 2,000 eligible sites protected by closure of planning area to leases and permits	Potential disturbance of 3,500 eligible site from availability to disposal of 1,517,562 acres	Not addressed	Potential disturbance involving 2,100 eligible sites by the availability of 1,022,314 acres for disposal.
Potential disturbance of 1,000 eligible sites from designated corridors on 505,012 acres	Potential disturbance of 1,000 eligible sites from designated corridors on 531,148 acres	Not addressed	Potential disturbance of 200 eligible sites from designated corridors on 157,761 acres.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Cultural Resource Management			
From Recreation Management	Potential disturbance of 5,800 eligible sites from off-road vehicle use on 2,900,298 acres designated as OPEN	Potential disturbance of 20 eligible sites from off-road vehicle use on 9,180 acres designated as OPEN	Same as A
From Wilderness Management	Additional protection of cultural resources from restrictions on new access and limitations on other surface-disturbing activities in wilderness study areas	Same as No Action	Same as No Action
From Minerals Management	Potential disturbance of 7,500 eligible sites, 31,000 acres Traditional Lifeway Areas	Potential disturbance of 7,500 eligible sites from locatables; to 6,000 eligible sites from saleable minerals; 7,500 eligible sites from solid leasables; and 1,500 eligible sites from fluid mineral uses	Potential disturbance of 7,300 eligible sites from locatables; to 5,400 eligible sites from saleable minerals; 7,300 eligible sites from solid leasables; and 3,800 eligible sites from fluid mineral uses
Lands Management			
From Lands Management	Long-term encumbrances could occur on lands identified for disposal but also a part of the 3,140,759 acres available for Section 302 leases, permits, and airport leases; multiple use goals would be met	Long-term encumbrances could occur on lands identified for disposal but also a part of the 1,636,059 acres available for leases and permits; encumbrances lessened by limiting airport leasing to specific areas; multiple use goals would be met	Long-term encumbrances could occur on lands identified for disposal but also a part of the 1,257,159 acres available for leases, permits, and airport leasing; multiple use goals would be met

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Not addressed	Potential disturbance of eligible sites from off-road vehicle use on 24,600 acres designated as OPEN
Same as No Action	Same as No Action	Not addressed	Same as No Action
Potential disturbance of 5,000 eligible sites from locatables; 5,400 eligible sites from saleable minerals; 5,700 eligible sites from solid leasables; and 1,500 eligible sites from fluid mineral uses	Potential disturbance of 7,700 eligible sites from locatables; 7,700 eligible sites from saleables; 9,000 eligible sites from solid leasables; and 1,000 eligible sites from fluid mineral uses	Potential disturbance of 7,500 eligible sites from mineral exploration and development.	Same as C
Closing the planning area to leases and permits would prevent long-term encumbrances on lands valuable for disposal; some long-term encumbrances could occur from airport leasing limited to specific areas; multiple use management goals would still be met	Long-term encumbrances could occur on lands identified for disposal but also a part of the 1,657,514 acres available for leases, permits and airport leasing; multiple use goals would be met	Not addressed	Land would be available to enhance community growth and expansion.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
From Rights-of-Way Management	Public lands would be encumbered, establishing valid existing rights	Designation of 540,247 acres of utility corridors could lessen encumbrances on lands identified for disposal; potential loss of 37,372 acres identified for disposal throughout the planning area	Designation of 540,247 acres of utility corridors could lessen encumbrances on lands identified for disposal; potential loss of 77,124 acres identified for disposal throughout the planning area
Lands Management			
From Minerals Management	Impacts to lands disposal program could occur from "nuisance" claims, mineral entry, and development for locatable, leasable, and saleable minerals on 163,673 acres	Withdrawal of 65,998 acres from all mineral entry and development within the Las Vegas and Laughlin areas would limit long term or permanent encumbrances which could preclude disposal or lower appraisal values	Withdrawal of 111,524 acres from all mineral entry and development within the Las Vegas and Laughlin areas would limit long-term or permanent encumbrances which could preclude disposal or lower appraisal values
Rights-of-Way Management			
From Rights-of-Way	Long-term impacts could occur due to continued proliferation of randomly placed utility line and material site rights-of-way (mainly in Clark County)	Right-of-way corridors could reduce social, economic, and environmental impacts by confining similar uses to a specific area.	Same as A
	Not addressed	Right-of-way exclusion areas could constitute a loss of 31% of public land available for material site development; Right-of-way avoidance areas could constitute a loss of 53% of public land available for all types of rights-of-way	Exclusion areas could constitute a loss of 9% of public lands available for material site development; Avoidance areas could constitute a loss of 63% of public lands available for all types of rights-of-way

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Designation of 505,012 acres of utility corridors could lessen encumbrances on lands identified for disposal; potential loss of 19,375 acres identified for disposal throughout the planning area	Designation of 531,148 acres of utility corridors could lessen encumbrances on lands identified for disposal; potential loss of 179,953 acres identified for disposal throughout the planning area	Not addressed	Designation of 158,806 acres of utility corridors could lessen encumbrances incurred on Public lands by randomly placed lines.
Withdrawal of 61,278 acres from all mineral entry and development within the Las Vegas and Laughlin areas would limit long-term or permanent encumbrances which could preclude disposal or lower appraisal values	Withdrawal of 57,163 acres from locatable entry in the Las Vegas, Searchlight, Jean, Goodsprings and Laughlin areas would limit long-term or permanent encumbrances which could preclude disposal or lower appraisal values	Not addressed	Mineral entry and development encumbers land and lessens appraisal values.
Same as A	Same as A	Scenic values and integrity of the surrounding area would be better protected by designation of corridors.	Same as E
Exclusion areas could constitute a loss of 42% of public lands available for material site development; Avoidance areas could constitute a loss of 63% of public land available for all types of rights-of-way.	Exclusion areas could constitute a loss of 34% of public lands available for linear and areal rights-of-way (including material sites); Avoidance areas could constitute a loss of 53% of public lands available for all types of rights-of-way.	Not addressed	Exclusion areas could constitute a loss of 28% of public lands available for linear and areal rights-of-way (including material sites); Avoidance areas could constitute a loss of 29% of public lands available for all types of rights-of-way.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
	Delays in processing applications could occur due to continued authorization of communication (comm) site rights-of-way on crowded, multi-user sites operating without a site management plan	Management would be facilitated by limiting future comm site rights-of-way to established sites, until approval of a site management plan for each specific site	Same as A
Acquisitions			
From Acquisitions	Not addressed	Short-term administrative impacts could occur from acquisition of 12,679 acres of private lands	Short-term administrative impacts could occur from acquisition of 9,049 acres of private lands
Recreation Management			
From Water Resource Management	Not addressed	Minor impacts to avoid water sources, including rerouting of off-highway vehicle events; increased water source developments could increase visitor use by 10%	Same as A
From Areas of Critical Environmental Concern Management	Not addressed	Off-highway vehicle competitive events would be eliminated on 1,145,978 acres designated as areas of critical environmental concern	Off-highway vehicle competitive events would be eliminated on 1,530,838 acres of areas of critical environmental concern
From Fish, Wildlife and Special Status Species Management	Cancellation of competitive events in tortoise habitat resulted in impacts to participants and spectators; Closure of 996,400 acres to competitive off-highway vehicle use would increase use in Jean/Roach areas and Nelson Hills.	Cancellation of competitive events in tortoise habitat resulted in impacts to participants and spectators; Closure of 970,160 acres would increase use in Jean/Roach, Eldorado, Nelson Hills, and Nellis Dunes.	Cancellation of competitive events in tortoise habitat resulted in impacts to participants and spectators; Closure of 1,346,200 acres would increase use in Jean/Roach areas and Nelson Hills.

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as A	Same as A	Not addressed	Same as A
Short-term administrative impacts could occur from acquisition of 14,669 acres of private lands	Same as B	Not addressed	Any private lands acquired within areas of critical environmental concern would enhance the integrity of those areas
Same as A	Same as A	Not addressed	Minor impacts to avoid water sources, including rerouting of off-highway vehicle events.
Off-highway vehicle competitive events would be eliminated on 1,538,298 acres of areas of critical environmental concern	Same as A	Off-highway vehicle competitive events would be eliminated on 969,591 acres areas of critical environmental concern	Off-highway vehicle speed events eliminated from 1,005,031 acres of critical environmental concern; Minimal impact as limits are already in effect.
Cancellation of competitive events in tortoise habitat resulted in impacts to participants and spectators; Closure of 1,356,680 acres would increase use in Jean/Roach area and Nelson Hills.	Same as A	Cancellation of competitive events in tortoise habitat resulted in impacts to participants and spectators; Closure of 798,000 acres would increase use in Jean/Roach area, Pahrump Valley, Laughlin and Nellis Dunes.	Minimal impact. Users and use patterns have already adjusted to desert tortoise protection measures and limits.

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Recreation Management			
From Fish, Wildlife and Special Status Species Management	Approx. a 10% reduction in visitor use would be expected, based upon restrictions in tortoise habitat	Approx. a 6 % reduction in visitor use would be expected, based upon restrictions in tortoise habitat	Approx. a 10%reduction in visitor use would be expected, based upon restrictions in tortoise habitat
	Big Dune would be open to casual off-road vehicle use, except for five acres which would be closed	Same as No Action	Same as No Action
From Rights-of-Way Management	Construction of new projects could reduce semi-primitive and non-motorized opportunities; increased hunting and camping opportunities	Additional road rights-of-way in Sunrise Mtn. could increase visitor use by 10% but could reduce aesthetic value; Right-of-way construction could detract from semi-primitive and non-motorized opportunities	Same as A
From Recreation Management	Visitor use would increase by 10% or 144,810 visitor days	Visitor use would increase by 20% or 289,620 visitor days; Special Recreation Management Areas would be designated.	Same as A
From Minerals Management	Geophysical exploration and road construction could reduce water percolation into caves	Management actions to protect cave and karst resources would lessen impacts from minerals activities	Same as A
	Loss of 20% of semi-primitive non-motorized opportunities from mineral exploration and development.	Management actions to protect areas of critical environmental concern, caves, and semi-primitive areas would lessen impacts from minerals activities.	Same as A; Big Dune Special Recreation Management Area would be protected from minerals exploration and development.

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as B	Same as B	Approx. a 15% reduction in visitor use would be expected, based upon restrictions in tortoise habitat	Minimal impact. Users and use patterns have already adjusted to desert tortoise protection measures and limits.
With Big Dune closed, displaced recreationists would need to travel greater distances for similar opportunities	Same as No Action	Same as No Action	Off-highway vehicle enthusiasts would be displaced from about 10% of Big Dunes
Same as A	Same as A	Increased access could increase opportunities for hunting, camping and off-highway vehicle touring, racing and free-play	Same as A
Same as No Action; Big Dune and Desert View would not be designated as Special Recreation Management Areas.	Same as A	Same as No Action	Visitor use would increase by 20% or 289,620 visitor days due to increased population growth.
Same as A	Same as A	Not addressed	Same as A
Same as B	Protection of caves from locatable mineral entry; loss of 20% of semi-primitive non-motorized recreation opportunities from mineral activities over 10 year period.	Not addressed	Same as A

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Minerals Management			
From Riparian Management	Not addressed	Approx. 2,330 acres would be withdrawn from mining claim location, solid mineral leasing, and mineral material disposal; fluid mineral leasing would be allowed subject to major restrictions	Approx. 5,350 acres would be withdrawn from mining claim location, solid mineral leasing, and mineral material disposal; fluid mineral leasing would be allowed subject to major restrictions
From Areas of Critical Environmental Concern Management	No impacts	Areas of critical environmental concern would be designated, withdrawing 931,398 acres from mineral material disposal; 172,218 acres from mining claim location, solid mineral leasing, and fluid mineral leasing; 9,600 acres would be open to fluid mineral leasing, subject to major restrictions; 760,277 acres would be open to fluid mineral leasing, subject to minor restrictions	1,465,138 acres of areas of critical environmental concern would be withdrawn from mineral material disposal; 175,938 acres from mining claim location; 544,938 acres from solid mineral leasing; 10,000 acres would be open to fluid mineral leasing, subject to major restrictions; 956,580 acres would be open to fluid mineral leasing, subject to minor restrictions
From Fish, Wildlife and Special Status Species Management	----------	Approx. 634 acres would be withdrawn from mining claim location, mineral leasing, and mineral material disposal	Same as A
From Cultural Resource Management	----------	Approx. 31,000 acres would be withdrawn from mining claim location, mineral leasing and mineral material disposal	Same as A

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Same as B	Same as No Action	Not addressed	Approx. 9,000 acres would be withdrawn from mining claim location, solid mineral leasing, and mineral material disposal; fluid mineral leasing would be allowed subject to no surface occupancy
1,538,298 acres of areas of critical environmental concern would be withdrawn from mineral material disposal and solid mineral leasing; 1,474,658 acres from mining claim location; 1,483,258 acres from fluid mineral leasing; 1,000 acres would be open to fluid mineral leasing subject to major restrictions; 54,040 acres would be open to fluid mineral leasing subject to minor restrictions	Areas of critical environmental concern would be designated, withdrawing 139,658 acres from mineral material disposal and mining claim location	Not addressed	Areas of critical environmental concern would be designated, withdrawing 1,005,031 acres from mining claim location, mineral material disposal and mineral leasing. Fluid mineral leasing would be subject to no surface occupancy and timing and use constraints.
Approx. 11,600 acres would be withdrawn from mining claim location, mineral leasing, and mineral material disposal	Same as A	Increased costs of operation and reclamation of disturbed areas in areas of critical environmental concern	Same as E; Approx. 25% of the planning area would be withdrawn from mining claim, mineral leasing, and mineral material disposal.
Same as A	Approx. 12,570 acres would be withdrawn from mining claim location, mineral leasing and mineral material disposal	Approx. 12,400 acres would be withdrawn from mining claim location, mineral leasing and mineral material disposal	Approx. 12,185 acres would be withdrawn from mining claim location, mineral leasing and mineral material disposal

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Minerals Management			
From Lands Management	Disposal of 108,107 acres of public lands in Las Vegas Valley, including saleable mineral, would decrease the availability of silt, sand and gravel to construction industry	Disposal of 61,838 acres of public lands within Las Vegas Valley, including saleable minerals, would decrease the availability of silt, sand and gravel to construction industry	Disposal of 99, 391 acres of public lands within Las Vegas Valley, including saleable minerals, would decrease the availability of silt, sand and gravel to construction industry
From Lands Management	Existing classifications, withdrawals, and segregation affect 530,582 acres, limiting the availability of public lands for mining claim location, mineral leasing, and mineral material disposal	Same as No Action	Same as No Action
From Rights-of-Way Management	Existing material site rights-of-way would exclude 15,842 acres, from mining claim location	Same as No Action	Same as No Action
From Recreation Management	Approx. 3,308 acres would be designated as closed to all motorized vehicle use, restricting access for mineral-related activities	Approx. 12,190 acres would be designated as closed to all motorized vehicle use, restricting access for mineral-related activities	Same as A
	----------	Cave management actions would limit the availability of 3,200 acres of public lands to mining claim location, mineral materials disposal, solid mineral leasing and fluid mineral leasing.	Same as A

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Disposal of 59,998 acres of public lands within Las Vegas Valley, including saleable minerals, would decrease the availability of silt, sand and gravel to construction industry	Same as B	Disposal of 69,771 acres of public lands within Las Vegas Valley, including saleable minerals, would decrease the availability of silt, sand and gravel to construction industry	Disposal of 175,314 acres of public lands, including saleable minerals, would decrease the availability of silt, sand and gravel to construction industry
Same as No Action	Same as No Action	Not addressed	Existing classifications, withdrawals, and segregation affect 434,055 acres, limiting the availability of public lands for mining claim location, mineral leasing, and mineral material disposal
Same as No Action	Same as No Action	Not addressed	Same as No Action
Same as A	Same as A	Not addressed	Approx. 3,560 acres would be designated as closed to all motorized vehicle use, restricting access for mineral-related activities.
Same as A	Cave management actions would potentially limit the availability of 3,200 acres of public lands to mining claim location	Not addressed	Same as A

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Minerals Management			
From Minerals Management	----------	Acreage available for fluid mineral leasing would decrease by 11%, solid mineral leasing acreage by 11%, mining claim location acreage by 12% and mineral material disposal acreage by 34%	Acreage available for fluid mineral leasing would decrease by 14%, solid mineral leasing acreage by 20%, mining claim location acreage by 25%, and mineral material disposal acreage by 43%
Fire Management			
From Air Resource Management	Fire kept to a maximum of 10 acres 90% of the time in the Non-Attainment Area	Same as No Action	Same as No Action
From Soil Resource Management	Critical erosion areas would require the use of hand tools	Same as No Action	Same as No Action
From Riparian Resource Management	Limits on use of foams, penetrants or retardants within 100 yards of riparian areas, could lead to larger fires in some instances	Same as No Action	Same as No Action
From Wilderness Management	Prescribed burning for enhancement available on case-by-case basis, under approved burn plan	Minor impacts to fire program as prescribed burning for enhancement only allowed on 56,721 acres in specified wilderness study areas; burning for fuels reduction only allowed on 61,793 acres in specified wilderness study areas, subject to approved plan/environmental assessment	Same as A

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Minerals Management			
Acreage available for fluid mineral leasing would decrease by 40%, solid mineral leasing acreage by 40%, mining claim location acreage by 44%, and mineral material disposal acreage by 43%	Acreage available for mining claim location would decrease by 5% and mineral material disposal acreage by 11%	Not addressed	Acreage available for fluid mineral leasing would decrease by 45%, mining claim location acreage by 38% and mineral material disposal acreage by 39%
Same as No Action	Same as No Action	Not addressed	Same as No Action
Same as No Action	Same as No Action	Not addressed	Same as No Action
Same as No Action	Same as No Action	Not addressed	Same as No Action
Same as A	Same as A	Not addressed	Minor impacts to fire program as prescribed burning for enhancement allowed only on 56,721 acres in specified wilderness study areas; burning for fuels reduction only allowed on 44,343 acres in specified wilderness study areas, subject to approved plan/ environmental assessment

Table S-2 Summary of the Impacts

Program	No Action	Alternative A	Alternative B
Socio-Economic Values			
From Livestock Grazing Management	Withdrawal of 5,124 animal unit months as a result of Section 7 consultation; possible adverse economic impacts on 6 operators; lessor economic effects to 10 operators; net reduction of $128,000 in capital value of ranch assets; no significant impacts to overall economy of agricultural community.	Same as No Action	Same as No Action
From Lands Management	Total of 163,673 acres could be disposed of through sales, adding $1.2 billion assessed values to counties and $23.6 million in tax revenues	Total of 155,258 acres could be disposed of through sales, adding $1.1 billion assessed values to counties and $22.4 million in tax revenues	Total of 540,171 acres could be disposed of through sales, adding $2.3 billion assessed values to counties and $45.9 million in tax revenues
From Rights-of-Way Management	Continued high costs and lengthy processing times for rights-of-way; facilities not limited to designated corridors, lowering construction and operating costs	Lower processing costs and times; increased construction costs as facilities limited to designated corridors	Same as A
From Minerals Management	Potentially significant financial impacts to surface owners during extended mineral extraction where BLM administers minerals	Reduced mineral development potential; impacts cannot be estimated due to numerous uncertainties	Same as A

Table S-2 Summary of the Impacts

Alternative C	Alternative D	Alternative E	Proposed
Withdrawal of 13,477 animal unit months, net reduction of $393,757 in gross income from ranching activities; potential severe, long-term adverse economic effects on operators; no significant impact on regional economy	Same as No Action	Withdrawal of 7,427 animal unit months, net reduction of $36,000 in gross income from ranching activities; potential severe, long-term adverse economic effects on operators; no significant impact on regional economy	Withdrawal of 7,597 animal unit months, net reduction of $36,238 in gross income from ranching activities; potential severe, long-term adverse economic effects on operators; no significant impact on regional economy
Total of 98,943 acres could be disposed of through sales, adding $923.6 million assessed values to counties and $18.5 million in tax revenues	Same as B	Total of 111,000 acres could be disposed of through sales, adding $950 million assessed values to counties and $19 million in tax revenues.	Total of 175,314 acres could be disposed of through sales, adding 1.3 billion assessed values to counties and 24.5 million in tax revenues.
Same as A	Same as A	Same as A; Values of private lands would be decreased near corridors.	Same as E
Same as A	Same as A	Same as A; wilderness study areas released from wilderness consideration could provide opportunities for mineral development.	Same as E

Chapter 1 - Introduction

General Information

The Las Vegas District Proposed Resource Management Plan/Final Environmental Impact Statement, hereafter referred to as The Plan, will provide management guidance for approximately 3.3 million acres of public land administered by the Bureau of Land Management (BLM) (Maps 1-1 and 1-2). The Plan is prepared subject to Sections 102 and 202 of the *Federal Land Policy and Management Act* (FLPMA) of 1976 that require the Secretary of the Interior to develop land use plans for all public lands and to the *National Environmental Policy Act* (NEPA) of 1969 mandating that Federal agencies prepare Environmental Impact Statement (EIS) for major Federal actions. Since development of a Resource Management Plan is a large-scale Federal action, an Environmental Impact Statement was completed. The Plan conforms to the Council on Environmental Quality (CEQ) regulations for implementing National Environmental Policy Act requirements (40 Code of Federal Regulations 1500-1508).

Purpose and Need for Action

The Plan identifies and analyzes alternatives for long-term management of public lands and resources administered by BLM in the planning area, which is defined as the Las Vegas District excluding Red Rock Canyon National Conservation Area, and the Nellis Range. (*Note*: A General Management Plan is being prepared to outline specific management strategy for the Conservation Area.)

The Plan addresses seven management issues:
- Land tenure
- Desert tortoise protection
- Mineral availability
- Off-road vehicle use (ORV)
- Special management areas/Areas of Critical Environmental Concern (ACECs)
- Minerals Management after Congressional Designation of Wilderness Areas
- Utility corridors

These seven issues were identified during BLM's scoping process, which began March 29, 1990 with the *Federal Register* publication of a Notice of Intent to prepare a Resource Management Plan/Environmental Impact Statement. The process continued with scoping reports mailed to the public to present preliminary issues; to announce notices of public meetings; and to identify other issues to be considered in The Plan.

Present management direction for the Las Vegas District is in two existing plans:
- *Clark County Management Framework Plan* (MFP)(approved January 9, 1984)
- *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement- Planning Area B* (approved October 10, 1986).

The current planning effort was initiated due to the following factors:

- A regularly scheduled 5-year evaluation of the *Clark County Management Framework Plan* indicated the plan was not adequately addressing the rapidly changing public land use demands in Clark County.
- The two present land use plans did not anticipate listing of the desert tortoise as a threatened species and, therefore, did not provide for its recovery.
- Public land disposals and exchanges being accomplished by legislative action (such as Aerojet and Apex) generated public concern.

These factors led to the determination that both plans (in particular the *Clark County Management Framework Plan*) needed to be amended or revised. Plan amendments usually focus on resolving a single issue and, depending on the significance of the anticipated impacts, may require an Environmental Impact Statement. A plan revision, which is usually developed to resolve multiple issues, generally requires an Environmental Impact Statement. Rather than amend the *Clark County Management Framework Plan* and *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement-Planning Area B* on a single issue basis, the decision was made to prepare The Plan addressing the areas covered by both existing plans. This option was

projected to be the most cost-effective and efficient long-term solution to public land management concerns in southern Nevada. Management decisions in the *Clark County Management Framework Plan* and *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement* determined to be valid would be carried forward into The Plan.

Another factor supporting the current planning effort is that the planning area (where more than two-thirds of Nevada's population live) is experiencing rapid growth not only in the Las Vegas area but also in smaller communities including Laughlin, Mesquite, and Pahrump. This rapid growth, considered in conjunction with the intermingled land ownership pattern, necessitates that BLM respond to complex land use demands. Among those demands are:

- Public land for community expansion and industrial uses in the Las Vegas Valley and surrounding areas.
- Lands for open space recreation and public purposes.
- Resources, such as sand and gravel, in support of regional growth.
- Listing of the desert tortoise as a threatened species.

These demands make it imperative to provide for orderly disposal of public lands for community development; to provide areas for sand, gravel, and other minerals consistent with all laws and regulations; and to implement the goals and objectives of the *Desert Tortoise (Mojave Population) Recovery Plan* (USFWS 1994).

The planning process requires that a Resource Management Plan be a comprehensive document to address all resources and programs administered by BLM. Consequently, in addition to the seven identified issues, The Plan also addresses management of soil, air, and water resources, riparian areas, wild horses and burros, fire, cultural resources, wildlife, livestock grazing, visual resources, withdrawal review, and vegetation.

Public input, as well as the availability of pertinent new data and the release of the U. S. Fish and Wildlife Service's *Draft Recovery Plan for the Desert Tortoise (Mojave Population)* (1993) indicated the need to supplement The Draft Plan. The Supplement to the Draft Resource Management Plan, hereafter referred to as the Supplement to the Draft, focused on four issues:

- Issues that were either not included, or not analyzed adequately, in The Draft Plan and rangeland classification.
- Utility corridor locations and widths.
- Mineral management and/or Congressional release of Wilderness Study Areas.
- Desert tortoise habitat management in conformance with the *Tortoise Recovery Plan*.

The Plan's new alternative (Alternative E) identifies and analyzes management goals, objectives, and direction for these four issues, as well as all programs and resources managed by BLM. Based on public comment and internal review, The Plan uses Alternative E as its foundation, and includes portions of other alternatives where appropriate.

Description of the Planning Area

The planning area includes those lands in southern Nevada as identified on Map 1-1. The Las Vegas BLM District encompasses a total of approximately 3,332,000 acres of public lands in Clark County and a portion of southern Nye County (Map 1-2 and Table 1-1). In addition, the BLM is also manages one million acres of split-estate lands in the planning area. The split-estate lands are of two types, one where the subsurface or mineral estate or a portion thereof is owned by the Federal government and the surface is under private ownership, and another where the Federal government owns the surface and the subsurface minerals or a portion thereof are in private ownership (Table 1-2).

Southern Nevada is characterized by diverse geographical features. Landforms range from rugged mountain ranges, to sloping bajadas and broad valleys. The Colorado River and several of its tributaries flow through the eastern portions of the planning area. New communities and developments, such as Laughlin, are expanding along the Colorado River, providing jobs and recreational opportunities in previously undeveloped areas. The Las Vegas Valley portion of the planning area is a major topographic feature, trending north-south through the middle of the planning area. This valley has a burgeoning metropolitan area, consisting of the cities of Las Vegas, North Las Vegas, Henderson, and Boulder

Table 1-1. Surface Ownership of Lands in Las Vegas BLM District.

County	Acres Administered by BLM	Acres Administered by Other Federal Agencies	Total Patented Acres[1]	Planning Area Total Acres
Clark	2,596,348[2]	908,618	553,716	4,058,682
Nye	735,547	13,628	99,156	848,331
Totals	3,331,895	922,246	652,872	4,907,013

[1]/ Includes private lands and State of Nevada lands (source: Las Vegas Field Office files, 1991).
[2]/ Excludes Red Rock Conservation Area.

Table 1-2. Federal Ownership of the Mineral Estate in Las Vegas BLM District.

Type of Mineral	Acres
All Minerals	3,442,980
All Leasable Minerals	1,332
Oil and Gas	42,576
Sodium and Potassium	20,491
Sodium	2,139
Potassium	480
Geothermal	548
Coal	300
Locatable Minerals	220
Fissionable Minerals	80
Saleable Minerals	1,135
Salable Minerals (except for sand & gravel)	160
Total	3,482,960

Source: BLM, Las Vegas Field Office files, 1991)

City. Much of the planning area, however, remains remote and rural, with the population dispersed over large areas or clustered in small communities. The public lands in the planning area have important scenic, recreational, mineral, archeological, wilderness, wildlife, and vegetative values. Public uses of these resources often have an important role in the growth and development of local communities.

Planning Process Overview

The planning process enables BLM to address issues and concerns of the public, while complying with the laws and policies established by Congress and the Executive Branch of the Federal Government.

The Plan was prepared following the nine planning steps described below. These steps emphasize public participation at several key stages.

Step 1: Issue Identification

Issues determine the focus of the Resource Management Plan process and indicate specific concerns of BLM and the public regarding the planning area. An issue is defined as an opportunity, conflict, or problem pertaining to management of public lands and associated resources. The intent of issue identification is to direct interdisciplinary analysis towards issue resolution. Issue identification for The Plan was initiated by BLM managers and resource specialists.

A Notice of Intent was published in the *Federal Register,* inviting the public and other Federal, state, and county agencies to participate in the planning process. Scoping meetings were held in Beatty, Las Vegas, Laughlin, Mesquite, Pahrump, Searchlight, and Tonopah to receive public input.

Step 2: Development of Planning Criteria

After issues are identified, planning criteria are formulated to guide development of the Resource Management Plan. The criteria are derived from laws, Executive Orders, regulations, planning principles, BLM national and state office guidance, consultation with other agencies, public involvement, and resource data. The criteria help set standards for data collection, development of alternatives, and selection of the preferred alternative and final plan. Planning criteria ensure that the plan addresses identified issues and avoids unnecessary data collection and analysis.

Step 3: Inventory and Data Collection

This step involves collection and compilation of biological, physical, social and economic data in various forms from available sources to help resolve the planning issues. This data provides essential facts for making analysis, evaluations, and decisions.

Step 4: Analysis of the Management Situation

The *Analysis of the Management Situation* (AMS) is a concise assessment of the current situation. The AMS describes current BLM guidance, identifies existing problems and opportunities for their resolution, and consolidates existing data needed to analyze and resolve the identified issues. If sufficiently developed, the portion of the AMS describing present management (no action alternative) and affected environment may be used directly in the plan and environmental impact statement.

Step 5: Formulation of Alternatives

This step involves developing alternatives that consider the issues, planning criteria, and concerns raised during scoping. These alternatives will be presented for management consideration. The No Action Alternative (which represents continuation of present activities) is required. The purpose of the other alternatives is to resolve issues while emphasizing different levels of management intensity.

Step 6: Estimation of Effects of Alternatives

In accordance with the National Environmental Policy Act, the physical, biological, social, and economic effects of implementing each alternative are estimated to compare and evaluate impacts (See Summary Table, Table S-1). This step involves completing a general analysis of the issues and concerns for the planning area. (*Note*: Site-

specific environmental assessments (EAs) will be prepared for specific projects and proposals on an activity plan or project-specific basis.)

Step 7: Selection of Preferred Alternative

A Preferred Alternative is selected after completing the analysis and resolution of the issues, resources affected, and management guidance in the two existing land use plans . This alternative may combine elements from the other alternatives to achieve maximum management flexibility in lands-related actions while continuing to meet the goals and objectives of BLM's multiple-use mandate.

The Preferred Alternative, which will be recommended to the Nevada State Director, is determined based on the issues and concerns identified through the planning process; information obtained from public meetings and written comments; formal coordination and consultation with other agencies; decision criteria developed and considered by management; and impact analyses of the alternatives. The State Director reviews the selected alternative for approval. After State Director approval of the Preferred Alternative, the Draft Plan is distributed to the public, including other government agencies and interest groups, for a 90-day review and comment period.

Step 8: Selection of the Proposed Plan

The District Manager develops a proposed plan based on public comments and other data, including estimation of effects. Following the public review and comment period, the BLM's Las Vegas District Manager recommends a proposed plan to the BLM Nevada State Director for approval. After evaluating public comments, the BLM may retain the preferred alternative as the proposed plan, reassess and modify the preferred alternative to meet management needs, utilize portions of alternatives, or modify an alternative previously analyzed in detail.

The proposed plan should be within the range of alternatives previously selected for detailed study and analysis. After reviewing the recommended proposed plan, the Nevada State Director will issue a Notice of Availability through the *Federal Register*, file The Plan with the Environmental Protection Agency (EPA), and distribute the document to the public.

The Governor of the State of Nevada is given a 60-day consistency review to determine the consistency of The Plan with state and local government plans and policies. This review begins with the Governor's receipt of the document.

A 30-day protest period begins when The Plan is filed with the Environmental Protection Agency. If no protests are received during this time, the BLM State Director approves the plan and publishes an Approved Resource Management Plan/Record of Decision. Any protests that are received are resolved by the BLM State Director before the plan is approved and the Resource Management Plan/Record of Decision is published.

Within 90 days after Resource Management Plan approval, a specific Implementation Plan will be developed to identify program priorities for the Plan's decisions and to determine the sequence and costs associated with their implementation. Site-specific environmental assessments will be prepared prior to initiating resource projects and proposals to analyze potential environmental impacts. Mitigation measures will be developed and incorporated as special stipulations into authorization permits.

Step 9: Monitoring and Evaluation

Monitoring and evaluation is conducted at intervals not to exceed 5 years, for the following purposes:

- Determine effectiveness of the resource management plan in resolving issues.
- Ensure effectiveness of mitigation measures. Verify assumptions used in assessing impacts.
- Review whether changes have occurred in related plans of other Federal agencies, and state or local governments.
- Determine if implementation of The Plan is achieving desired results.

Information gained through this step is incorporated into future planning, including any amendments or revisions to the Resource Management Plan..

Planning Issues and Criteria

Draft Resource Management Plan/Environmental Impact Statement

Issue 1 - Land Tenure

Disposal of public lands through sale, exchange, or other methods was a major issue in the development of The Plan. During recent years, BLM received numerous requests for public land disposal. Many of the proposed actions were in conformance with current land use plans; however, some highly visible and politically sensitive proposals were not addressed in existing plans. Rather than wait for BLM to initiate a plan amendment, proponents of these non-conforming proposals sought legislative relief. Legislative disposals were successful in the case of Aerojet, Summa, Mesquite, Fort Mojave, and Apex. Numerous other legislative proposals were drafted, but not completed. This legislative activity highlighted the inadequacies of existing public land disposal decisions.

The existing land use plans for BLM's Las Vegas District identified public lands for disposal (transfer from Federal ownership). However, the size and location of the identified acreage has not met the demand for large tracts of land for industrial purposes or desired places for community expansion. This situation led to the following questions:

- Which public lands in the planning area should be identified for disposal and by what methods?
- Should BLM acquire non-federal lands in the Las Vegas District, and if so, for what purpose and where?
- How can BLM's planning system best provide for large-scale land transfers involving public lands?

Issue 2 - Desert Tortoise

Over three million acres of desert tortoise habitat occur within the Las Vegas BLM District. On August 4, 1989, the U.S. Fish and Wildlife Service, under its emergency authority, placed the desert tortoise on the Endangered Species List. On April 2, 1990, the U.S. Fish and Wildlife Service issued a final rule listing the desert tortoise as a threatened species. To comply with the *Endangered Species Act*, BLM must consult with the U. S. Fish and Wildlife Service on all Federal actions (including The Plan) that may affect a threatened or endangered species and take actions to aid in their recovery. Tortoise habitat comprises the overwhelming majority (in excess of 80 percent) of the planning area, affecting to some degree every program administered by the BLM. In some instances, it may be necessary to radically alter the current management situation to accommodate the biological needs of the desert tortoise.

Clark County's long-term Habitat Conservation Plan (HCP) known as the *Clark County Desert Conservation Plan* (CCDCP) was approved on July 12, 1995. The Habitat Conservation Plan was required under the Endangered Species Act to obtain a "Section 10a" permit allowing the "take" of desert tortoises on private lands in the county. The Habitat Conservation Plan propose mitigation for impacts to desert tortoise on, but not limited to, private lands through several means, including providing additional funding for management of "Desert Wildlife Management Areas" (DWMAs).

The BLM will use the term "Area of Critical Environmental Concern" in place of Desert Wildlife Management Area, on approximately 744,000 acres of public lands in the planning area. These Areas of Critical Environmental Concern would be managed to benefit the desert tortoise. Most other uses of the public lands would be strictly curtailed or eliminated. Both the Draft Plan and the Supplement to the Draft analyzed several different scenarios to protect and provide for recovery of the desert tortoise, including designation of Areas of Critical Environmental Concern.

Desert tortoise habitat comprises approximately 80 percent of the planning area; a majority of the programs administered by Las Vegas Field Office occur within that habitat. Listing of the desert tortoise as a threatened species requires management actions and changes in land uses not currently provided by the two existing land use plans. The Endangered Species Act requires that Federal agencies use their authorities to implement programs for the conservation of endangered and threatened species.

To determine which land designation would offer greatest protection for the desert tortoise, the BLM must resolve the following questions:

- Should Areas of Critical Environmental Concern be designated in the BLM Las Vegas District to assist implementation of the desert tortoise recovery plan? If so, what measures should

BLM take to ensure the integrity of the Areas of Critical Environmental Concern?

Issue 3 - Mineral Development

An important component of Nevada's economy is mineral resource development, which is a principal use of the public lands. The extraction of sand and gravel in particular is critical to continued growth and development of the Las Vegas area and other southern Nevada communities. Sand and gravel deposits occur in large quantities throughout the planning area. Many factors (including proximity to developing or residential areas, cost of extraction and hauling, haul routes, and proposed duration of the operation) are involved in determining where sand and gravel can be mined. The rapid urban growth placing demands on the sand and gravel business may eventually extend to the area where such extraction is occurring. Public pressure may then be to relocate the sand and gravel operation away from the new residential area.

A management decision in the *Clark County Management Framework Plan*, which restricted the method of sand and gravel disposal in the Las Vegas Valley, has created a problem. Major producers of sand and gravel prefer to have independent sites that are not shared by competitors. The "community pit" concept forces these operators to share the same source location. Difficulties in managing large scale operations in community pits have resulted in significant mineral trespass and inability to identify trespassers.

Other types of mineral development (including gypsum and limestone mining, gold exploration, oil and gas leasing, and sodium and potassium leasing) have potential to impact sensitive biological and cultural resources and often result in conflicts with other land uses. The filing of mining claims on public lands identified for sale or exchange has become a common practice in southern Nevada, with many individuals making sizable incomes selling "mineral rights" to prospective surface owners. This document includes alternatives to resolve minerals-related conflicts in the planning area.

Although important in the growth of southern Nevada, mineral exploration and development often conflict with other land uses and can adversely impact other natural and recreational values.

The environmental concerns, as well as availability, of mineral resources were voiced by the public throughout the scoping process and require close consideration to ensure that the quality of life is not adversely affected by the continued growth of the Las Vegas Valley.

These mineral development concerns led to the following two questions:

- Which areas within Las Vegas BLM District should be withdrawn from mineral entry, and how should existing mineral operations be addressed if such withdrawals occur?

- How can reliable sources of sand and gravel be made available for local communities and industry?

Issue 4 - Off-Road Vehicle (ORV) Use

Off-road vehicles are commonly associated with desert areas and have traditionally been a major use of the public lands in the Southwest. In the planning area, individual casual off-road vehicle use likely accounts for the single greatest recreational use of public lands. Under existing management, competition off-road vehicle events comprise the largest organized recreational activity administered by the Las Vegas BLM Field Office. More than 50 percent of the planning area is "open" to unrestricted individual off-road vehicle use, and approximately 70 percent of the planning area is available for competitive off-road vehicle events.

These uses can significantly impact the area's physical, biological, and cultural resources. Such activities also often occur in areas believed essential to continued existence of the desert tortoise in Nevada. Various off-road vehicle designations and competitive use areas are proposed and analyzed in The Plan.

The current off-road vehicle use designations are often in direct conflict with management objectives for desert tortoise habitat, air and watershed management, non-motorized recreation, and protection of other resource values. Because of this conflict, the following questions must be resolved to ensure full compliance with all applicable laws and regulations:

- Should existing open, limited, and closed area designations be changed?

- Should competitive off-road vehicle use be restricted to certain areas, courses, and/or times of the year? If so, when and where?

Issue 5 - Areas of Critical Environmental Concern

Section 202(c)(3) of the Federal Land Policy and Management Act of 1976 directs BLM to give priority to designation and protection of areas of critical environmental concern. These areas contain significant physical, cultural, or biological values that are more than locally significant and warrant special management attention to prevent their degradation or loss. Currently, there are no designated Areas of Critical Environmental Concern in the planning area, although several areas were nominated for Area of Critical Environmental Concern status during the previous land use planning process.

Environmental organizations and many members of the general public are aware of the Congressional direction concerning Areas of Critical Environmental Concern. Many have become increasingly vocal in their demand for more BLM-designated Areas of Critical Environmental Concern. The scoping process for The Plan included a request for nominating Areas of Critical Environmental Concern. As a result, more than 80 nominations for individual Areas of Critical Environmental Concern were received. The Plan analyzes the impacts of designating the nominated areas that meet the designation's "relevance and importance" criteria and warrant special management attention.

Public attention has increasingly been directed toward protection of natural, recreational, and scenic values on public lands. Protection of these values often necessitates a special management designation, such as an Area of Critical Environmental Concern, to minimize or eliminate competing or conflicting uses and to manage for a dominant use. Therefore, a full analysis and identification of clear direction are necessary to ensure that resources are protected while an appropriate level of recreation occurs.

Due to the above reasons, the following questions require full attention during development of the Plan:

- Should existing special management areas be retained?

- Should additional special management areas be designated? If so, what special management is needed to protect the sensitive resource values?

Issue 6 - Utility Corridors

The Las Vegas area is a critical link in the complex network of interstate electrical transmission facilities and other utilities such as oil and gas pipelines and fiber-optic communication lines. Most facilities either provide services to the energy-consuming regions of southern California, or link southern California and the Las Vegas area with the energy-producing Intermountain and Rocky Mountain regions.

There are limited options to locate utility structures in the northeast and east portions of the Las Vegas Valley Land due to use restrictions in several areas (including Lake Mead National Recreation Area, Desert National Wildlife Range, Nellis Air Force Base, and the Sunrise Mountain Instant Wilderness Study Area). Another factor is the increasing public opposition from residents of Las Vegas, North Las Vegas, Henderson, and Clark County to locating additional powerlines within their communities. Future construction of any facility destined to serve southern California depends on the current limited options for their location.

Utility corridors in the planning area include legislatively designated utility corridors managed by BLM in the Aerojet and Apex areas. The *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement* provides for 61 miles of BLM-designated corridors in southern Nye County. The remainder of the planning area has no existing designated corridors. The Draft Plan proposed several possible utility corridors and analyzed the impacts associated with their designation and development.

Even though there is a continuing high demand for rights-of-way (ROWs), utility corridors were not designated in the Clark County Management Framework Plan. The need for corridors is evident,

however, considering the number of proposals identified over the past few years. This need for utility corridors points to a need to address the following questions in the analysis:

- Should utility corridors be designated only where interstate Rights-of Way currently exist, or should new areas be considered?
- What is the best method to achieve maximum consistency with designated corridors in adjacent planning areas, field offices, and states?

Supplement to the Draft Resource Management Plan/Environmental Impact Statement

Supplements to existing draft Environmental Impact Statements are prepared when additional environmental analysis is needed. A supplement is often used to address alternatives not previously analyzed and which may lead to a new decision. A supplement is generally prepared when there are significant new circumstances or facts relevant to environmental concerns and bearing on the proposed action or its impacts which were not addressed in the existing analysis.

In May 1994, the Supplement to the Draft was published to address new issues and expand on previously identified issues.

Issue 1 - Rangeland Classification

Due to comments from the public and other agencies, the rangeland classification was considered as an issue for the Supplement to the Draft. Although rangeland classification is an administrative action, the determination of grazing preference must be analyzed through the National Environmental Policy Act and the planning process. The BLM completed field evaluations of rangelands in its Las Vegas District to provide the technical basis for reclassification of many allotments currently classified as ephemeral range and managed under the Ephemeral Range Rule. Ephemeral range is considered to be predominantly composed of annual species, lacks perennial species, and is generally grazed in the spring. Some allotments that are grazed year-round result in substantial grazing of perennial vegetative species. In 1969, all of Clark County was classified as ephemeral rangeland. This included the highest mountains and areas with up to 800 pounds of perennial forage production per acre. These areas do not fully meet the criteria identified for ephemeral rangeland.

Issue 2 - Utility Corridors

Section 503 of the Federal Land Policy and Management Act (FLPMA) requires BLM to designate utility corridors to prevent their proliferation across public lands. All large utilities would be directed to use designated corridors, if possible. Smaller utilities would have the option to locate within or outside the corridors.

The Draft Plan proposed designation of a corridor network throughout the planning unit. Public input, re-evaluation of expected demand, and the need to resolve resource conflicts generated the identification and analysis of new corridors in the Supplement to the Draft.

Issue 3 - Mineral Management After Congressional Designation of Wilderness Areas

Management of Wilderness Study Areas released by Congress must be addressed in case Congress acts on the designation decision within the life of The Plan. Identifying management for these areas in this document eliminates the need for a future amendment to the Resource Management Plan.

Planning Criteria "J" of The Draft Plan required development of management goals and direction for all Wilderness Study Areas within the planning area in case of the areas' non-designation by Congress as wilderness areas and their release from further study. The Draft Plan identified the Wilderness Study Areas as having inherent semi-primitive non-motorized values for recreational activity. Protection and management of these areas to meet the recreation standards for semi-primitive values (see Glossary for definitions) were included in Wilderness recommendations for all alternatives, except the No Action Alternative. Public comments suggested that the alternatives did not analyze a full range of management options for minerals development within Wilderness Study Areas. Therefore, the Supplement to the Draft offered additional management objectives and direction for

Wilderness Study Areas released by Congress.

Issue 4 - Desert Tortoise Management in Conformance with the Recovery Plan

The U. S. Fish and Wildlife Service published the *Draft Recovery Plan for the Desert Tortoise (Mojave Population)* in April 1993, and on August 30, 1993 (*Federal Register*, Vol. 58, No. 166) proposed Critical Habitat for the desert tortoise. To protect desert tortoise habitat within the planning area, four alternatives in The Draft Plan included designations and management recommendations for Areas of Critical Environmental Concern, as derived from proposals in the *Clark County Habitat Conservation Plan* and in response to public input. These recommendations required evaluation for specific criteria and objectives included in the *Draft Tortoise Recovery Plan.*

Planning Criteria

The planning criteria for The Plan is listed below:

A. The planning area is defined as the Las Vegas District. The Plan will make planning determinations for all public lands located within the planning area boundary, including those public lands administered by other BLM offices.

B. The planning effort will rely on available inventories of the lands and resources in the planning area to reach sound management decisions. Decisions requiring additional inventories will be deferred until the inventories can be conducted.

C. In accordance with BLM Manual 1620.06A, The Plan will not analyze nor make determinations for the following resource:

   Coal - Although coal is potentially present in the planning area, it is not in sufficient quantity or quality to warrant demand or interest by industry or the public. If, in the future, new technology becomes available and/or demand increases, a plan amendment will be prepared before any coal-related activities can be authorized.

D. Valid existing management decisions from the *Clark County Management Framework Plan* and the *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement* will be brought forward into the Draft Resource Management Plan, with relevant objectives and management directions carried forward into The Plan.

E. Decisions about specific range, wildlife, and watershed improvements will not be included in The Plan, but instead deferred to activity-level plans (such as habitat management plans and allotment management plans) designed to implement Plan decisions.

F. Management use and protection of water, water resources, riparian zones, and other related values will be high priority.

G. When digitized information is available, the Geographic Information System (GIS) will be used.

H. Watershed determinations will be based on hydrographic basins.

I. The Plan will incorporate a method for being amended on a regularly scheduled basis.

J. Wilderness Study Areas not designated as wilderness by Congress will be "released" from further study. The Plan makes determinations concerning the management of all Wilderness Study Areas in the planning area, contingent on their release.

K. Approximately 15,000 acres of public lands near the Valley of Fire State Park and Overtone, which were not studied in the initial wilderness inventory, would be inventoried for wilderness values. In addition, any acquired lands or lands where protective withdrawals are removed would be inventoried to determine wilderness character. Any other lands not evaluated for wilderness character would be inventoried. Any areas designated as Wilderness Study Areas through the Resource Management Plan or plan amendment and subsequently recommended for wilderness designation will receive Interim Management Policy (IMP) protection until Congress either designates them as wilderness or releases them for other purposes.

Concerns Not Addressed

The Las Vegas Water District's water right applications and the proposed Yucca Mountain Project were identified as concerns by the public. Both topics are beyond the scope of BLM's planning process and, therefore, are not addressed in The Plan.

Consistency With Other Plans

Existing plans that address management of lands adjacent to the planning area are:

- *Caliente Management Framework Plan*
- *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement-Planning Area A*
- *California Desert Plan*
- *Shivwits Management Framework Plan*
- *Desert National Wildlife Range Refuge Management Plan*
- *Ash Meadows Refuge Management Plan*
- *Nevada Statewide Policy Plan for Public Lands (Senate Bill 40)*
- *Death Valley National Monument General Management Plan*
- *Lake Mead National Recreation Area General Management Plan*
- *Clark County Desert Conservation Plan.*

Continuing coordination and consultation occurred during the public comment period for the Draft Plan, followed by the Supplement to the Draft and The Plan. As noted above, the Governor of Nevada will have 60 days to review The Plan to determine its consistency with state plans.

Inconsistencies between adopted resource-related policies and programs of other Federal agencies and state and local governments are noted below. These inconsistencies are based primarily on differences in the quality of habitat and recovery of the desert tortoise.

Northeastern Mojave Recovery Unit

In addition, there are a few inconsistencies between other agency plans: however, the rationale described below supports their differences.

Livestock Grazing - The Plan would close the desert tortoise areas of critical environmental concern to livestock grazing. The Arizona Strip is closing the Pakoon Area of Critical Environmental Concern, but will allow winter grazing on the Virgin Slope and Beaver Dam Slope Areas of Critical Environmental Concern. This grazing closure will include livestock grazing in Nevada in the Mesquite Community Allotment (fenced). The Plan allows for retirement of allotments on a voluntary basis. In Ely, winter grazing will be allowed in the Beaver Dam Slope Area of Critical Environmental Concern on any allotments that are not purchased. Dixie will allow winter grazing on Beaver Dam Slope.

Based on the numerous grazing allotments being closed in Nevada, the U.S. Fish and Wildlife Service decided that allowing grazing in Utah and Arizona would still meet recovery objectives for the Recovery Unit.

Mining - Areas of Critical Environmental Concern in the Las Vegas BLM will be:

- Withdrawn from locatable entry.
- Closed to solid leasable.
- Have fluid minerals limited to no surface occupancy.
- Restrict salable minerals to expansion of existing pits within 0.5 mile of highways and certain county roads (Map 2-12 and 2-13).

This management varies slightly from Arizona strip and Dixie, which leaves areas of critical environmental concern open to locatables, has waivable no-surface occupancy and seasonal restrictions on fluids (no activity in tortoise active season), and closes areas of critical environmental concern to salable (except hand collection of rocks for personal use) and solid leasable. Ely will withdraw Kane Springs Area of Critical Environmental Concern from locatable entry; the other ACECs will be open. All Areas of Critical Environmental Concern in Ely BLM District are open to fluid and non-energy leasables subject to timing limitations and controlled surface use constraints. Salable mineral development is restricted to within 0.5 mile of highways and certain county roads.

Off-Road-Vehicles - Las Vegas BLM District will allow non-speed off-road vehicle events on designated roads and trails subject to restrictions, including size and number of vehicles and the season of use. Arizona Strip allows non-speed events on designated roads and trails during the tortoise inactive season. Ely will allow non-speed events within designated corridors with no seasonal restrictions. Dixie is similar to Arizona. Events crossing county or state lines will be consistent with the most restrictive office.

Wild Burros - The Arizona Strip will manage for an appropriate management level of zero for Tassi Wildhorse Herd Management Area. The Las Vegas BLM Field Office will manage Gold Butte for an Appropriate Management Level of 22-98. If Nevada numbers are managed at the Appropriate Management Level, animal drift into Arizona is not expected to occur.

Eastern Mojave Recovery Unit

The Needles BLM Field Office will designate two areas of critical environmental concern for desert tortoise adjacent to an area of critical environmental concern in Nevada. One wild burro herd area (Shadow Valley) will be zeroed out. Since the National Park Service manages most of the allotments, the allotments will not be closed to grazing. The National Park Service will manage for desert tortoise recovery. It appears that these two management plans will be consistent, with The Plan.

Chapter 2 - Proposed Plan and Range of Alternatives

Introduction

The Proposed Resource Management Plan/Final Environmental Impact Statement, often referenced herein as The Plan, was developed by a BLM interdisciplinary planning team. The Plan is based primarily on Alternative E presented in the Supplement to the Draft Resource Management Plan (May 1994), and in response to public and internal comments received during the first seven steps of the planning process. Also, some objectives and management directions from the Draft's other alternatives were incorporated, where appropriate, into Alternative E to develop The Plan.

The Plan is written to ensure compliance with provisions of the *Endangered Species Act* (ESA) and subsequent Biological Opinions, as well as the *Desert Tortoise (Mojave Population) Recovery Plan* (often referenced as *Tortoise Recovery Plan*). The Plan will guide future management of public lands in the Las Vegas BLM District.

The Plan consists of a combination of management directions, allocations, and guidelines that will direct where actions may occur, the resource conditions to be maintained, and use limitations required to meet management objectives.

Range of Alternatives

Six alternatives were analyzed in the Draft Resource Management Plan and the Supplement to the Draft Resource Management Plan. The alternatives were developed specifically to respond to issues identified by the public during the initial scoping process and to meet the requirements of the Supplemental Program Guidance. Although no single alternative satisfies all concerns expressed, the concerns are addressed in various ways in the six alternatives.

The alternatives were prepared within the following constraints:

- All alternatives are legally feasible and technically possible. The alternatives present a balance between legal requirements to protect, restore, and enhance natural resource values and to provide for the need to produce food, fiber, minerals, and services.
- The Stateline Draft Resource Management Plan and Supplement to the Draft Resource Management Plan alternatives were formulated to accommodate multiple-use management of resources in Wilderness Study Areas and Instant Study Areas, in the event those study areas are released from wilderness consideration by Congress.
- To provide for management of any new Wilderness Area designations by Congress, the Approved Plan/Record of Decision would be maintained and amended, where necessary, to meet objectives of wilderness management.

Plan Implementation

Land use actions would be implemented after the State Director approves The Plan's Record of Decision. The Plan's decisions become final with issuance of the Record of Decision. Actions immediately effective with the State Director's signature include designations of Areas of Critical Environmental Concern, utility corridors, off-road vehicle designations, and Visual Resource Management classes. Specific management prescriptions for Areas of Critical Environmental Concern and off-road vehicle designations would be implemented when activity-level management plans are developed and appropriate clearances are completed.

Actions that cannot be implemented immediately include mineral withdrawal revocations, which must be approved by the Secretary. Actions such as this that are recommended in this proposed Plan would not be valid until approved by the appropriate authority.

Other actions in The Plan, such as location of powerlines in corridors or location of flood control structures, require further detailed planning and environmental documentation before beginning any on-the-ground activities. For these actions, integrated activity plans would be developed through coordination with the public, other Federal agencies, and state and local agencies.

An example of an action requiring further public involvement and site-specific analysis is disposal of Federal land. Although The Plan establishes land disposal areas, land cannot be disposed until an environmental analysis is completed that determines its disposal is in the public interest and conforms with the approved Resource Management Plan.

Alternatives Considered but Dropped from Detailed Analysis

Winter Grazing in Desert Tortoise Areas of Critical Environmental Concern

Among the alternatives proposed was one with winter grazing by livestock in desert tortoise Areas of Critical Environmental Concern, contingent that grazing not exceed restrictive utilization levels. Based on the Desert Tortoise Recovery Plan, livestock grazing in desert tortoise Areas of Critical Environmental Concern is not compatible with recovery of the desert tortoise and should be prohibited. Therefore, this alternative was dropped from further consideration.

Range Reclassification

The proposed alternative of range reclassification of 21 ephemeral grazing allotments to ephemeral and/or perennial or to perennial was analyzed in the Supplement to the Draft Resource Management Plan. Since the majority of rangeland within allotments remaining open to livestock grazing is below 3,200 feet elevation and also below the 8-inch precipitation isoline, reclassification was dropped from further consideration.

Alternatives Considered in the Draft and Supplement to the Draft Resource Management Plan

The following six alternatives met the discretionary limits established through applicable laws, regulations, and policies. The alternatives were developed to provide management options that address issues important to the public and management concerns.

No Action Alternative

This alternative represents no change to the current management direction. Management of all resources would be accomplished by following the decisions and objectives in the *Clark County Management Framework Plan* and the *Esmeralda - Southern Nye Resource Management Plan, Planning Area B.*

Alternative A

This alternative provides for a full spectrum of public land uses in the traditional sense of multiple-use and sustained-yield; consumptive and non-consumptive uses would be balanced. Lands would be made available for expansion and development of growing communities.

Alternative B

This alternative provides for maximum opportunities for land-based growth and development needs of the State of Nevada, while continuing to provide for multiple-use and sustained yield of the public lands.

Alternative C

This alternative provides for managing public lands on an ecosystem basis, with an emphasis on biodiversity, non-consumptive uses, and protection and recovery of the desert tortoise in accordance with the *Clark County Habitat Conservation Plan* (Clark County HCP).

Alternative D

This alternative continues multiple use of public lands, permits maximum flexibility in disposal of public lands, and provides for protection and recovery of the desert tortoise.

Alternative E

This alternative provides for public land uses on the basis of multiple-use and sustained-yield, while emphasizing biodiversity and protection and recovery of the desert tortoise, in conformance with the U.S. Fish and Wildlife Service (USFWS) *Tortoise Recovery Plan.*

Changes from Draft to Final Resource Management Plan and Environmental Impact Statement

This section is included to describe the changes made in format or content due to public and other state or Federal agency comments and concerns, as well as BLM management review to ensure consistency with laws and regulations.

Format Changes Made in Chapter 2

- A specific code, consisting of letters and a number, was assigned for each resource to help identify specific resource sections.
- Specific resource sections were arranged to group similar resources. For example, Lands, Rights-of-Way, and Acquisition are located in sequentially to help locate these realty-related sections.

Resource-Specific Changes Made in The Plan

Air Resource Management

Language was added to ensure conformity with the Clean Air Act.

Soil Resource Management

The reference to completion of an Order III Soil Survey was deleted.

A watershed objective was adjusted to include the following statement: "Maintain those watersheds with a stable and slight erosion condition with a high erosion susceptibility." (The original management direction addressed improving such watersheds.) The wording is incorporated into SL-1-c. Also see Table 2-1.

Actions to maintain these watersheds will be sufficient to maintain or enhance vegetative cover that is key in erosion control.

Water Resource Management

Management direction for identifying native desert vegetation to aid in reducing water consumption was deleted. In the Forestry section, FR-2-a identifies salvage and harvest of desert vegetation from areas where surface disturbance occurs.

Management direction identifying rights-of-way for flood control developments was deleted . Flood control was added to RW-1.

Riparian Management

The objective was changed to read: "Ensure that all riparian areas are in proper functioning condition."

Ensuring that 75 percent of riparian areas is in proper functioning condition by 1997 was an interim goal of the Riparian-Wetland Initiative. The long-term goal is for all riparian areas to be in proper functioning condition, at a minimum. After proper functioning condition is achieved, then manage for an advanced ecological condition.

Reference to completion of a specific number of riparian projects per year was dropped. The BLM will still implement protection of riparian areas, where needed, as funding becomes available.

Reference to Potential Natural Community and Desired Plant Community was dropped, because the Vegetation section sets management objectives of plants for all programs.

Vegetation Management

Objectives and management actions pertaining to special status plant species were moved from the Vegetation Management section to the section on Fish, Wildlife, and Special Status Species. Plant objectives were combined with objectives for special status animals (SS-1 and SS-2) to avoid unnecessary duplication.

The objective to "maintain or improve habitat of threatened, endangered or candidate plant species found on public land" was dropped, because it was considered a management direction. The intent of the objective was incorporated into Objectives SS-1 and SS-2.

Management direction to "develop appropriate mitigation measures through mining plans of operation, Section 7 consultation, and other appropriate actions before allowing construction,

mining activity or off-highway vehicle activity on sites known to be habitat for threatened, endangered or special status species." was moved to the section on Standard Operating Procedures. This management direction is discussed in a general sense under the Fish, Wildlife, and Special Status Species section of the Standard Operating Procedures.

Management direction regarding development of a management plan for Nellis Dunes to address off-highway vehicle management and *Arctomecon californica* was changed to "implementing the Las Vegas Bear Poppy Habitat Management Plan" and moved to the Standard Operating Procedures section. The development of habitat management plans is identified in the Fish, Wildlife, and Special Status Species section of the Standard Operating Procedures.

Areas of Critical Environmental Concern

This section was moved to precede the Fish, Wildlife, and Special Status Species section, because this section is where areas of critical environmental concern are first referenced.

The title "Special Management Areas" was changed to "Areas of Critical Environmental Concern."

The proposed Arden Historic Sites Area of Critical Environmental Concern originally totaled approximately 6,320 acres, the majority of which overlapped the Desert Tortoise Conservation Center. Both areas are proposed for mineral withdrawal (subject to valid existing rights) from locatables, saleables, and leasables. The small portion of the proposed Area of Critical Environmental Concern to the north of the Desert Tortoise Conservation Center would not be afforded the same protection if the Area of Critical Environmental Concern was dropped from further consideration.

Based upon BLM site inventories, the significant sites within the proposed Area of Critical Environmental Concern are north of the Desert Tortoise Conservation Center. However, associated historic cultural resources in the form of contributing elements to the Arden Historic District are within the Desert Tortoise Conservation Center in Section 4 in the form of an historic railroad camp, water pipeline, a portion of a shoofly railroad alignment, and an historic railroad construction site. Therefore, redefining the Area of Critical Environmental Concern by including Section 4, along with that area to the north of the Desert Tortoise Conservation Center, will afford adequate protection for those sites in the Arden area. This modified Area of Critical Environmental Concern proposed boundary change would reduce the total acres of the Area of Critical Environmental Concern to approximately 1,480 acres.

This change would also allow for expansion of the Desert Tortoise Conservation Center and provide needed protection for cultural resources. The original boundary encompassed a few thousand acres of land that had no cultural significance.

Management directions were developed for Wilderness Study Areas within an Area of Critical Environmental Concern and also for those lands relinquished by another Federal agency that are within an Area of Critical Environmental Concern. The intent of these directions is to ensure appropriate protection for these areas.

The area referred to as Gold Butte Area of Critical Environmental Concern, parts A-C, resulted from individual nominations for several smaller areas, including critical tortoise habitat, cultural sites, a natural hazard area, and the Virgin Mountains. Because these nominated areas either overlapped, were located within larger areas, or were immediately adjacent to one another, they were combined into one large area of critical environmental concern and named as Gold Butte Area of Critical Environmental Concern. Management actions within Gold Butte will vary, depending on values in each part of the Area of Critical Environmental Concern (Tables 2-2, 2-4 ,and 2-5).

The Sunrise Mountain Research Natural Area was incorporated into the Rainbow Gardens Areas of Critical Environmental Concern, and the Virgin Mountain Outstanding Natural Area was incorporated into the Gold Butte Area of Critical Environmental Concern, Part C. The Pine Creek Research Natural Area is within the Red Rock Canyon National Conservation Area and is addressed in the Red Rock General Management Plan.

Fish and Wildlife Habitat Management

- The term "Desert Wildlife Management Area" was changed to "Area of Critical Environmental Concern."

- This section's name was changed to "Fish, Wildlife, and Special Status Species Management." Objectives and management direction for all special status species, including plants, were moved to this section. Objectives and management direction for fish and wildlife were labeled FW, and those for special status species were labeled SS.

- The terms "category 1 and category 2 candidate species" are no longer used. Species designated as candidate species by the U.S. Fish and Wildlife Service will be identified as "candidate species." Species of special concern identified by the BLM, including state-listed species, will be referred to as either "sensitive" or "special status" species.

- Management direction was included to allow for drift of elk onto BLM-administered lands. If elk do move onto BLM-administered land, habitat would be monitored to ensure the proper utilization of forage.

- Management direction was included to address development of Conservation Agreements with the U.S. Fish and Wildlife Service. Current policy encourages development of such agreements to reduce the likelihood of future Federal listing of BLM sensitive or State-listed species.

- Management direction was added to cooperate and collaborate with Clark County in development of a county-wide Multiple Species Conservation Plan. This planning effort is currently ongoing, with BLM as a cooperator.

- Boundaries for the Desert Tortoise Areas of Critical Environmental Concern were refined based on information gathered after issuance of the Supplement to the Draft. The area west of Searchlight was included in the Area of Critical Environmental Concern to ensure a protected corridor between Ivanpah and Piute valleys.

- Category 1 and 2 tortoise habitat is no longer used as a basis for management prescriptions. Instead, management actions focus on tortoise Areas of Critical Environmental Concern and/or designated critical habitat.

- References to "potential natural community" and "desired plant community" were removed because the Vegetation section sets management objectives of plants for all programs.

Forestry

Identification of a specific location for Mesquite wood harvest was dropped due to concerns expressed for the dwindling stands. Mesquite wood harvest could be considered in the future if management of the stands requires thinning or removal of dead trees for fire hazard reduction.

Livestock Grazing Management

This section was revised to reflect three main objectives, having associated management direction listed below each objective. Previously identified objectives were included in the management direction section.

The Maintain, Intensive, Custodial (MIC) selective management approach was completed after determining the total number of allotments remaining open to grazing. Any allotment closed to grazing was not categorized.

Revised regulations for grazing administration (43 CFR 4100) of public lands managed by the Bureau of Land Management became effective August 21, 1995. On February 12, 1997, the standards and guidelines for the Mojave-Southern Great Basin area in Nevada were approved by the Secretary of the Interior. These standards for rangeland health and guidelines for grazing administration will be applied to grazing management in the Las Vegas planning area (see Appendix L). (Reference: Published Conformance/Administrative Determination, 1997.) Terms and conditions of permits on allotments open to grazing will be in conformance with the appropriate standards and guidelines.

References to "potential natural community" and "desired plant community" were removed because the Vegetation section addresses management of plants for all programs.

Wild Horse and Burro Management

The format for this section was revised to clarify the actual proposed management.

Wild Horse and Burro Herd Management Areas were changed to include wild horse and burro use areas identified on the original 1971 field maps, and to existing roads and fences for ease of management. The BLM will work closely with Nevada Division of

Wildlife, other State and local agencies, and interested parties to properly manage wild horses and burros.

Reference to "potential natural community" and "desired plant community" was removed because the Vegetation section sets the management of plants for all programs.

Lands

The Las Vegas Valley disposal boundary has slightly changed numerous times due to coordination with congressional representatives, State and County agencies, and the general public.

A disposal area of approximately 985 acres was identified west of Las Vegas to allow exchange of public lands for Blue Diamond Cholla habitat (see Map 2-3).

Management direction was added to ensure that any existing Recreation and Public Purpose lease (located inside the existing disposal boundary but outside the proposed disposal areas) that is identified for sale prior to plan approval would be available for sale. Therefore, existing disposal actions would remain disposal actions.

A management direction was added to allow for repositioning of public lands outside the proposed disposal areas to consolidate public land patterns and to improve public services and BLM management. This direction would be accomplished on a case-by-case basis through exchange only and would be subject to meeting specific criteria identified in LD-1-b.

A management direction was added to terminate two outdated small tract classifications. The small tract lease/sale authority was repealed with the passage of the Federal Land Policy and Management Act of 1976.

A management direction was added to identify competitive bidding procedures and other criteria for processing requests involving new communication sites.

Rights-of-Way Management

The BLM will not designate a corridor on Moapa Indian Reservation lands. The proposed corridors will align with the area identified in the Moapa Legislation.

Recreation Management

Special Recreation Management Areas

Designation of Special Recreation Management Areas in the draft alternatives was not related to existing Special Recreation Management Areas designated in earlier decisions (No Action Alternative). Since none of the draft alternatives proposed to drop or modify existing Special Recreation Management Areas, there would be no Special Recreation Management Areas designated and also no indication of the most logical boundary.

Existing and proposed Special Recreation Management Areas were reviewed to delineate areas that were appropriate for concentrated recreation program efforts and resources. Areas such as Areas of Critical Environmental Concern where recreational uses are significantly restricted were deleted, and areas needing intensive management of recreation uses were better defined.

This review also resulted in designation of three Special Recreation Management Areas (Nelson Hills/Eldorado, Laughlin, and Vegas Valley). These area are remainders of two larger existing Special Recreation Management Areas (Clark County and Spring Mountains), which will be deleted. The three smaller Special Recreation Management Areas will allow for more appropriate management focus.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum inventory classes described in Chapter 3 of the Draft Environmental Impact Statement are used as management goals in several proposed decisions. However, the recreation opportunities and settings of the various Recreation Opportunity Spectrum classes were not included in the decision matrix. As a result of this omission, some decisions were based on goals not adopted as plan decisions. The problem was corrected by including the Recreation Opportunity Spectrum inventory findings as long-term management goals in the proposed plan.

Off-Highway Vehicle Management

Management Objectives and Recommendations for managing Off-Highway Vehicle uses were scattered throughout the draft document in different subject areas. In The Plan, all management decisions are summarized in the recreation section. The Off-Highway Vehicle section addresses motorized Off-Road Vehicle uses, as well as non-motorized uses. Although many people use the terms "Off-Highway Vehicle" and "off-road vehicle" interchangeably, off-road vehicle is the legal term for motorized vehicles (43 CFR 8340) subject to the BLM's vehicle management regulations.

Specific management direction for non-speed events within desert tortoise areas of critical environmental concern was developed with coordination of various user groups and the U.S. Fish and Wildlife Service

Minerals Management

The desert tortoise Areas of Critical Environmental Concern would be closed to mineral entry. Some smaller Areas of Critical Environmental Concern within the desert tortoise Area of Critical Environmental Concerns would also be closed to mineral entry as shown on Table 2-12.

Hazardous Materials Management

This section was not included in any of the draft alternatives, but was added to The Plan based on public comment and BLM guidance.

Fire Management

This section was revised to ensure that plan amendments would not be required for every adjustment of an initial attack area. The Draft approach for very specific initial attack areas is more appropriate at the activity plan level. Under the Draft approach, any future changes to initial attack areas required a plan amendment.

Other Changes

General editing was done to simplify management objectives, reduce duplication, and improve readability and presentation of information.

The Sunrise Mountain Special Recreation Management Area boundary was increased to match the Rainbow Garden Area of Critical Environmental Concern that covers the same area.

The administrative Virgin River Recreation Lands designation was replaced by the Virgin River Area of Critical Environmental Concern designation, to provide for more protection.

Specific management directions previously listed under most Special Recreation Management Areas have been dropped. These directions are more appropropriately developed in a site-specific recreation area management plan to be prepared for each Special Recreation Management Area.

Appendices A, B, C and D from the Draft Plan were incorporated into Appendix M (Standard Operating Procedures) of The Plan.

Proposed Plan

A code with 2 to 3 capital letters is used to designate each resource program (see list below). Objectives are designated by sequential numbers following the program code, such as AR-1. Management directions are identified by the objective designation followed by a lower case letter, such as AR-1-a. The AR-1-a management direction is linked directly to, and listed below, the AR-1 objective.

Objectives and management direction for the air, soil, water, and riparian resources that are impacted by other resource programs are included in those program sections. To avoid redundancy, these objectives and management direction are not repeated within the air, soil, water, and riparian sections.

Objectives and management direction denoted with an asterisk (*) are common to all alternatives.

Codes for Each Resource

Air Resource	AR
Soil Resource	SL
Water Resource	WT
Riparian	RP
Vegetation	VG
Visual Resource	VS
Areas of Critical Environmental Concern	AC
Fish and Wildlife Habitat	FW
Special Status Species	SS
Forestry	FR
Livestock Grazing	LG
Wild Horse and Burro	WHB
Cultural Resource	CR
Lands	LD
Rights-of-Way	RW
Acquisitions	AQ
Recreation	RC
Wild and Scenic Rivers	SR
Wilderness	WS
Minerals	MN
Hazardous Materials	HZ
Fire	FE

Air Resource Management

Objective
AR-1 - Ensure that actions occurring on BLM-administered lands do not violate local, state, tribal and Federal air quality laws, regulations, and standards. *

Management Direction
AR-1-a - Ensure that the planning process addresses air quality considerations by incorporating objectives and actions into resource activity plans, such as Allotment Management Plans, Habitat Management Plans, and Watershed Management Plans. Where applicable, include "conformity" demonstration in site-specific activity plans and/or National Environmental Policy Act documentation.

AR-1-b - Permit only those activities on BLM-administered lands that are consistent with Federal, State, and local air quality standards and regulations. Require that all appropriate air quality permits are obtained before BLM approval of an action is granted.* Where applicable, demonstrate how proposed management actions comply with local, state, tribal and Federal air quality laws, regulations, and standards (Conformity; per 40 CFR 93.100 et seq).

Soil Resource Management

Objective :
SL-1 - Reduce erosion and sedimentation while maintaining or where possible enhancing soil productivity through the maintenance and improvement of watershed conditions.*

Management Direction:
SL-1-a. On watersheds that exhibit good potential for recovery, implement protective measures, including but not limited to fencing and removal of tamarisk.

SL-1-b. Improve watersheds that have a critical erosion condition and a moderate erosion condition to have a high erosion susceptibility (See Table 2-1). Give priority to those watersheds within the Colorado River drainage system*.

SL-1-c - Maintain watersheds that have a stable and slight erosion condition with a low moderate or high susceptibility; and maintain watersheds that have a moderate erosion condition with a low or moderate erosion susceptibility (See Table 2-1).

Water Resource Management

Objectives
WT-1. Maintain the quality of waters presently in compliance with State and/or Federal water quality standards. Improve the quality of waters found to be in noncompliance.*

WT-2. Maintain or reduce salt yields originating from public lands to meet State-adopted and Environmental Protection Agency approved water quality standards for the Colorado River.

Management Direction
WT-1a,2a. Using Best Management Practices as identified by the State of Nevada, minimize contributions from both point and non-point sources of pollution (including salts) resulting from public land management actions.

Table 2-1. Erosion condition and susceptibility management objectives.

Condition Class	Susceptibility Class	Action Maintain	Action Improve
Critical	High		X
Critical	Moderate		X
Critical	Low		X
Moderate	High		X
Moderate	Moderate	X	
Moderate	Low	X	
Slight	High	X	
Slight	Moderate	X	
Slight	Low	X	
Stable	High	X	
Stable	Moderate	X	
Stable	Low	X	

(Source: BLM, Las Vegas District Office files 1991).

Objective
WT-3 - Ensure availability of adequate water to meet management objectives including the recovery and/or re-establishment of Special Status Species.*

Management Direction:

WT-3-a - Determine water needs to meet management objectives. File for appropriative water rights on public and acquired lands in accordance with the State of Nevada water laws for water sources that are not federally reserved.*

WT-3-b - Determine instream flow requirements and apply for necessary water rights on the Virgin River and Meadow Valley Wash.

Riparian Management

Objective
RP-1. Provide widest variety of vegetation and habitat for wildlife, fish, and watershed protection; ensure that all riparian areas are in proper functioning condition by achieving an advanced ecological status, except where resource management objectives require an earlier successional stage. Manage vegetation consistent with VG-1.*

Management Direction

RP-1-a. Complete assessments on all riparian areas, including development of actions necessary to achieve Proper Functioning Condition on all areas that are functioning at risk.*

RP-1-b. Improve riparian areas, giving priority to areas Functioning at Risk with a downward trend. Implement measures to protect riparian areas, such as fencing and/or alternate water sources away from the riparian area.*

RP-1-c. Ensure that the minimum requirement of Proper Functioning Condition on all riparian areas is maintained or achieved.

RP-1-d. Do not allow competitive off-road vehicle events within 0.25 mile of natural water sources and associated riparian areas.*

RP-1-e. Retain riparian and mesquite woodlands in Federal ownership, unless their disposal is in the public interest.

RP-1-f. Use integrated weed management techniques to control and eradicate tamarisk, such as burning, chemical, biological or mechanical treatments, where potential for treatment is good. Rehabilitate the area with native species to help reduce the potential for tamarisk re-establishment and improve ecosystem health.

Vegetation Management

Objective
VG1 - Maintain or improve the condition of vegetation on public lands to a Desired Plant Community or to a Potential Natural Community (see Appendix N for desert tortoise habitat guidelines for desired plant community).*

Management Direction:

VG1a - Manage to achieve a Desired Plant Community or a Potential Natural Community.

Objective
VG2. Restore plant productivity on disturbed areas of the public lands.*

Management Direction

VG2a. Rehabilitate, reclaim, or revegetate areas subjected to surface-disturbing activities, where feasible. When rehabilitating disturbed areas, manage for optimum species diversity by seeding

native species, except where non-native species are appropriate.*

Visual Resource Management (VRM)

Objective

VS-1. Limit future impacts on the visual and aesthetic character of the public lands.* (See Map 2-9)

Management Direction:

VS-1-a. Designate 968,890 acres of public lands as VRM Class II and manage to retain the landscape's existing character. In these areas, authorized actions may not modify existing landscapes or attract the attention of casual viewers.* (Map 2-9)

VS-1-b. Designate 1,727,870 acres of public lands as VRM Class III for partial retention of the existing character of the landscape. In these areas, authorized actions may alter the existing landscape, but not to the extent that they attract or focus attention of the casual viewer.* (Map 2-9)

VS-1-c. Designate 635,135 acres of public lands as VRM Class IV, which allows activities involving major modification of the landscape's existing character. Authorized actions may create significant landscape alterations and would be obvious to casual viewers.* (Map 2-9)

VS-1-d. Continue to refine the VRM inventory to refine the database, viewsheds, and scenic ratings.*

Areas of Critical Environmental Concern

Objectives

AC-1. Establish areas of critical environmental concern specifically for management of desert tortoise within the Northeastern Mojave and Eastern Mojave recovery units identified in the *Tortoise Recovery Plan* (SS-31a)(see Table 2-2). Manage a sufficient quality and quantity of desert tortoise habitat, which in combination with tortoise habitat on other Federal, State and private land, will meet recovery plan criteria. Maintain functional corridors of habitat between areas of critical environmental concern to increase the chance of long-term persistence of desert tortoise populations within the recovery unit.

AC-2. Protect areas with significant cultural, natural, or geological values by establishing areas of critical environmental concern shown in Tables 2-3 through 2-6.

Management Direction

AC-1a/2a. Designate areas shown in Tables 2-2 through 2-6 and on Map 2-7 as areas of critical environmental concern for a total of approximately 1,005,031 acres. Manage each area based on the specific resource constraints identified in Tables 2-2 through 2-6.

AC-1b/2b. Incorporate Areas of Critical Environmental Concern on lands relinquished from withdrawal to other Federal agencies into the Area of Critical Environmental Concern. Also apply the management guidance, restrictions, and directions appropriate to areas of Critical Environmental Concern to the relinquished lands.

AC-1c/2c. Manage those portions of an Area of Critical Environmental Concern within a Wilderness Study Area under the Interim Management Policy until such time Congress makes further determination on their status. For those areas released from wilderness consideration by Congress, manage under the appropriate Area of Critical Environmental Concern guidance, restrictions and directions.

Fish, Wildlife and Special Status Species Management

Fish and Wildlife

Objectives

FW-1. Maintain or improve approximately 869,800 acres of current and potential bighorn sheep habitat toward full ecological potential. Through management and habitat enhancement projects, allow desert bighorn sheep populations to reach levels consistent with the carrying capacity of their habitat, and consistent with other BLM policy. Table 2-7 shows the potential population estimates of bighorn sheep. Make adjustments to the population estimates as needed, based on the results of monitoring.

Table 2-2. Desert tortoise Areas of Critical Environmental Concern (ACEC).

ACEC Name		Piute/Eldorado	Coyote Springs	Mormon Mesa	Gold Butte, Part A
Acreage		329,440	75,500	151,360	186,909
Values		Critical tortoise habitat.			
Resource Constraints	Lands	Retain in federal ownership. Designate as ROW avoidance area except within corridors.			
	Minerals	Close to locatable minerals and solid leasables. Open to fluid mineral leasing subject to no surface occupancy stipulations. Allow material site ROW only within 1/2 mile of the centerline of Federal Aid Highways. Designate as a site type ROW exclusion area except within 1/2 mile of either side of Federal Aid Highways. Allow FUP only within 1/2 mile of the centerline of federal and state highways and specified county roads. Issue FUP to governmental entities only.			
	Range	Close to livestock grazing. Manage for zero wild horses and burros.			
	Roads	Require reclamation of temporary roads. Authorize new roads in response to specific proposed actions where no feasible alternative exists. Ensure access to private property.			
	Wildlife	Do not allow commercial collection of flora. Only allow commercial collection of fauna upon completion of a scientifically credible study that demonstrates commercial collection does not adversely impact affected species or their habitat. This action will not affect hunting, trapping or casual collection as permitted by the State.			
	OHV/ORV Designation and Recreation	Designate as "Limited to designated roads and trails" for all motorized and mechanized vehicles. Prohibit ORV speed events, mountain bike races, horse endurance rides, 4WD hill climbs, mini events, publicity rides, high speed testing and similar speed based events. Commercial activities may be permitted on a case-by-case basis if consistent with the recovery of the desert tortoise. Allow non-speed events subject to: 1) Recreation Use Permits shall be required for events with more than 25 vehicles; 2) Events with more than 100 vehicles must be held during the tortoise inactive season (11/1 to 2/28(29). There will be a cap of no more than 300 motorcycles or 300 four-wheeled vehicles on any event with the exception that if an alternative route is not found for the Barstow to Las Vegas, the number of entrants permitted in Nevada will be consistent with that permitted by California. 3) No off-highway vehicle events will be permitted from 4/1 to 6/1 and from 8/15 to 10/15 (dates will vary slightly annually to provide a full weekend if 4/1 falls during the weekend and to provide three full weekends prior to (or including) 11/1); 4) A maximum of 10 permitted non-speed events will be allowed annually during the tortoise active season (3/1 to 10/31) with no more than 3 events per ACEC, with the exception that an event based on historic use patterns will be allowed from Mesquite through the Mormon Mesa ACEC. This event may have 200 entrants, will count as 2 of the 3 events held annually and is limited to a one way route (north-south or south-north); 5) A maximum of 12 permitted non-speed events will be allowed annually during the tortoise inactive season with no more than 4 events per ACEC; 6) Vehicles shall not exceed the legal speed limit (posted or unposted) of the road(s) used during the event. Clark County speed limit for unposted roads is 25 MPH.			

Table 2-3. Archaeological and cultural resources ACECs (not shared with other ACECs).

ACEC Name	Stump Spring	Sloan Rock Art District	Hidden Valley	Keyhole Canyon	Bird Spring ***	Arden Historic Sites	Crescent Townsite
Acreage	641	320	3,360	361	161	1,480	437
Values	Prehistoric camp and historic trail/ camp).	Prehistoric habitation and rock art.				Historic railroad construction, and mining.	
Resource Constraints: Lands		ROW exclusion.					
	Retain in federal ownership. Designate as ROW avoidance areas. Close to mineral material ROWs.						
Resource Constraints: Minerals	Close to locatable minerals, salables and solid leasables. Open to fluid minerals subject to no surface occupancy stipulations.						
Resource Constraints: Range	Manage consistent with the surrounding allotment and herd management area, if applicable.						
Resource Constraints: Roads	Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.						
Resource Constraints: OHV/ORV Designations, Recreation	Limited designation, consistent with OHV designations of surrounding areas, except for Hidden Valley which is closed to OHV.						

Key:
***Within Red Rock Canyon NCA expansion; acreage not included in total ACEC calucations in plan. Already withdrawn from mineral entry under the Red Rock legislation.

Table 2-4. Archaeological and cultural resources ACECs and a Natural ACEC (shared with Gold Butte ACEC).

ACEC Name		Gold Butte ACEC, Part B		Gold Butte ACEC, Part A		
		Gold Butte ACEC, Part B	Gold Butte Townsites	Red Rock Spring	Whitney Pocket	Devil's Throat
Acreage		119,097*	***160	**640	**160	**640
Values		Cultural resources, scenic, wildlife habitat, sensitive species.	Historic mining	Prehistoric habitation and rock art.		Natural hazard area.
Resource Constraints	Lands	Retain in federal ownership. Designate as ROW avoidance area.	Retain in federal ownership. Designate as ROW avoidance area.			
	Minerals	Close to locatable minerals, salables and solid leasables. Open to fluid minerals subject to timing and special use constraints.	Close to locatable minerals, salables and solid leasables. Open to fluid minerals subject to no surface occupancy stipulations. Close to mineral material ROWs.			
	Range	Close to grazing. Manage wild burros at AML = 98.	Manage consistent with the surrounding allotment and herd management area, if applicable.			
	Roads	Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.				
	OHV/ORV Designations, Recreation	Limited to existing roads and trails. Do not allow speed ORV events. Other events allowed on case-by-case basis.		Limited designation; consistent with OHV designations of surrounding areas.		

Key:
*Includes 160 acres of Gold Butte Townsite; excludes Bureau of Reclamation withdrawn land
**Within Gold Butte ACEC Part A, acreage not included in totals calculations in plan.
**Within Gold Butte ACEC Part B; acreage not included in totals calculations in plan.

Table 2-5. Special wildlife and riparian ACECs.

ACEC Name		Amargosa Mesquite	Gold Butte ACEC Part C* (Virgin Mountains)	Big Dune	Ash Meadows
Acreage		6,891	38,431	1,920	37,152
Values		Neotropical bird habitat.	Wildlife habitat; scenic and botanical.	Special Status species habitat.	
Resource Constraints	Lands	Retain in federal ownership. Designate as an ROW avoidance area except within corridors. Close to mineral material ROWs.		(and) Designate as ROW exclusion area.	(and) Acquire private land on a willing seller basis.
	Minerals	Close to locatable minerals, salables and solid leasables.			
	Fluid Minerals	Allow fluid mineral leasing, subject to Timing and Surface Use Constraint special stipulations		Allow fluid mineral leasing subject to no surface occupancy stipulations.	Close to geothermal prospecting and leasing, including BLM lands inside the Ash Meadows NWR
	Range	Open to livestock grazing. AML for wild horses and burros = zero.	Close to livestock grazing. N/A for wild horses and burros.	N/A	Close to livestock grazing. AML for wild horses = zero.
	Roads	Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.			
	OHV/ORV Designations, Recreation	Designate as limited to existing roads and trails. No competitive ORV events.		Designate 10-15% as closed to OHV; designate 85-90% as open to OHV; no competitive ORV events.	Outside the Refuge boundary - Limit to existing roads and trails; within the Refuge boundary - limited, designated roads and trails. No competitive OHV events.
	Key	*Originally called Virgin Mountain ACEC, it was combined with the Gold Butte ACEC to form one contiguous ACEC.			

Table 2-6. Combination values ACECs

ACEC Name		Arrow Canyon	Rainbow Gardens	River Mountains	Virgin River
Acreage		2,084	37,620	5,617	6,411
Values		Paleontological (Miocene bird tracks); Geological (candidate for the mid-carboniferous boundary stratotype section); cultural (prehistoric rock art).	Geological; scientific; scenic; cultural (320 acres)); sensitive plants.	Bighorn sheep habitat; scenic viewshed for Henderson and Boulder City.	T&E; riparian habitat; cultural resources (5,000 acres only)..
Resource Constraints	Lands	Retain in federal ownership. Designate as ROW avoidance area except within corridors. Close to mineral material ROWs.			(and) Acquire private land w/riparian or aquatic habitat on a willing seller basis.
	Minerals	Close to locatable minerals, salables and solid leasables. Open to fluid minerals subject to no surface occupancy stipulations.			
	Range	Manage consistent with the surrounding allotment and herd management area, if applicable.	Close to livestock grazing. N/A for wild horses and burros.	N/A	Close to livestock grazing. N/A for wild horses and burros.
	Roads	Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.			
	OHV/ORV Designations, Recreation	Limited designation consistent with OHV designations of surrounding areas.	Designate as limited to designated roads and trails. No speed based vehicle events.	Designate as limited to existing roads and trails. No speed based vehicle events.	

Table 2-7. Bighorn sheep Habitat Management Areas.

Habitat Management Area	Potential population	Source of Potential Population
Arrow Canyon Range	391-431	MAD HMP
South Spring/Bird Spring Range	150-200	Draft S. Spring HMP
McCullough Mountains	734	Rangewide Plan
Highland Range	70-105	Highland HMP
Eldorado Mountains	400-450	census data
Muddy Mountains	500-550	census data
Newberry Mountains	169	Rangewide Plan
River Mountains	230-260	census data
Virgin Mountains	127-145	Draft Virgin/Gold Butte HMP
New York/Castle Peak	140	Rangewide Plan
Gold Buttes	228-252	Draft Virgin/Gold Butte HMP
Last Chance Range	129-157	Southern Nye HMP
Specter Range	116-142	Southern Nye HMP
Bare Mountains	86-105	Southern Nye HMP
Total	**3,470-3,840**	

(Source: *Rangewide Plan for Managing Bighorn Sheep on Public Lands* USDI, BLM 1988, habitat management plans and current population levels. Numbers were not provided by NDOW.)

Management Direction

FW-1-a. Maintain and improve bighorn sheep habitat by maintaining existing water developments, constructing additional water developments, and protecting/improving springs, seeps and riparian habitat, consistent with BLM policy for management of wilderness study areas, in the following areas:

- Arrow Canyon/Elbow Range
- South Spring/Bird Spring Range
- Gold Butte/Virgin Mountains
- Muddy Mountains
- Spring Range
- Eldorado/Newberry Range
- Specter Range/Last Chance Range/Bare Mountains McCullough Range/Highland Range/Crescent Peak.

Limit competition between bighorn, livestock, and wild horses and burros around spring sources by providing separate water sources for each type of user. When possible, provide water at the source for wildlife. If new data indicate that improvements are needed in other areas, do not limit activities to the areas listed above.

FW-1-b. Evaluate discretionary activities proposed in bighorn sheep habitat and on a case-by-case basis. Grant authorization if the proposed actions are consistent with goals and objectives of the *Rangewide Plan for Managing Desert Bighorn Sheep Habitat on Public Lands* (U.S. Dept. of Interior, BLM 1988) and other applicable policies.

Objective

FW-2. Re-establish native fauna (including naturalized species) to historic habitat and improve population numbers in current use areas.

Management Direction

FW-2-a. Cooperate with State and Federal wildlife agencies in implementing introductions, reintroduction, and augmentation releases of native and/or naturalized species (such as desert bighorn sheep, and chukar).

FW-2-b. Design new waters for livestock and wild horses and burros to reduce potential conflicts with bighorn sheep and other wildlife, consistent with BLM policy for management of wilderness study areas.

FW-2-c. Animal damage control activities may be allowed on a temporary basis if necessary for successful re-establishment of native species or to allow for recovery of decimated populations.

Objective
FW-3. Support viable and diverse native wildlife populations by providing and maintaining sufficient quality and quantity of food, water, cover, and space to satisfy needs of wildlife species using habitats on public land.

Management Direction

FW-3-a. Manage mesquite and acacia woodlands for their value as wildlife habitat in the following areas: Amargosa Valley, Meadow Valley Wash, Moapa Valley, Pahrump Valley, Stewart Valley, Hiko Wash, Piute Wash, Crystal and Stump Springs, or any other areas identified as being of significant wildlife value.

FW-3-b. Allow harvesting of green or dead and down Mesquite by permit only and in those areas identified in FW-3-a, where consistent with sustaining plant communities in a healthy and vigorous state and also consistent with sustaining viable wildlife populations.

FW-3-c. Manage habitat to support elk that move onto BLM-managed lands from U.S. Forest Service lands in the Spring Mountains. Determine needed adjustments to population levels through monitoring in cooperation with the U.S. Forest Service and Nevada Division of Wildlife.

FW-3-d. Allow construction and maintenance of additional upland game guzzlers, as needed, consistent with BLM policy, including placement in wilderness study areas.

FW-3-e. Protect artificial and natural waters that provide benefit to wildlife by providing a minimum buffer of 0.25 mile for permitted activities (such as for off-road vehicle events).

FW-3-f. Protect key nesting areas, migration routes, important prey base areas, and concentration areas for birds of prey on public lands by mitigating activities during National Environmental Policy Act compliance.

FW-3-g. Protect important resting/nesting habitat, such as riparian areas and mesquite/acacia woodlands. Do not allow projects that may adversely impact the water table supporting these plant communities.

FW-3-h. Improve disturbed non-game bird habitat, including the water table supporting these habitats, by emphasizing maintenance and enhancement of natural biodiversity.

Special Status Species

Special Status Species include all plant and animal species that are Federally listed as "threatened or endangered" under the Endangered Species Act of 1973, as amended, Candidate species under the Endangered Species Act, State listed species, or species otherwise identified by the BLM State Director.

Objective
SS-1. Manage special status species habitat at the potential natural community or desired plant community, according to the need of the species.

Management Direction

SS-1-a. Improve approximately 400 acres of aquatic and riparian habitat on the Virgin River, Muddy River, and Meadow Valley Wash from its existing poor-to-fair condition to good-or-better condition by replacing *Tamarix* with native species.

SS-1-b. Maintain or improve approximately 37,152 acres of spring, wet meadow, and desert habitats in Ash Meadows Area of Critical Environmental Concern to potential natural community or desired plant community.

Objective
SS-2. Manage habitat to further sustain the populations of Federally listed species so they would no longer need protection of the Endangered Species Act. Manage habitats for non-listed special status species to support viable populations so that future listing would not be necessary.

Management Direction

SS-2-a. Enter into conservation agreements with the U.S. Fish and Wildlife Service and the State of Nevada that, if implemented, could reduce the necessity of future listings of the species in question. Conservation agreements may include, but not be limited to, the following: Blue Diamond cholla, Las Vegas bearpoppy, white-margined penstemon, and *Phainopepla*.

SS-2-b. Manage public lands adjacent to the Ash Meadows Area of critical environmental concern and the Moapa National Wildlife Refuge to complement spring and aquatic habitat for special status species, including projects that may affect ground water levels or spring flows.

SS-2-c. Maintain approximately 1,920 acres of sand dune habitat on Big Dune in a natural condition to support all species dependent upon dune habitat, with emphasis on special status species.

Objective

SS-3. Manage desert tortoise habitat to achieve the recovery criteria defined in the *Tortoise Recovery Plan* (USFWS 1994) and ultimately to achieve delisting of the desert tortoise. When the population in a recovery unit meets the following criteria it may be considered recovered and eligible for delisting (for complete criteria see the *Tortoise Recovery Plan*).

Criterion 1: As determined by a scientifically credible monitoring plan, the population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years (one tortoise generation).

Criterion 2: Enough habitat must be protected within a recovery unit, or the habitat and desert tortoise populations must be managed intensively enough, to ensure long-term population viability. At least one area of critical environmental concern (Desert Wildlife Management Area) must be established in each recovery unit that is, except under unusual circumstances, at least 1,000 square miles in area.

Although the *Tortoise Recovery Plan* recommends establishment of at least one desert wildlife management area of 1,000 square miles in each recovery unit, it is not possible to achieve this on public lands in Nevada. The minimally acceptable situation identified in the *Tortoise Recovery Plan* is to establish several smaller desert wildlife management areas that are connected by corridors of functional tortoise habitat. This is the situation in both the Northeastern Mojave and Eastern Mojave Recovery Units.

In the Northeastern Mojave Recovery Unit, approximately 1,780 square miles of desert tortoise habitat are proposed to be managed for recovery of the desert tortoise. This area includes lands managed by the BLM, U.S. Fish and Wildlife Service, and National Park Service in Nevada, Arizona and Utah. Approximately 648 square miles of these lands are managed by the Las Vegas BLM Field Office. In the Eastern Mojave Recovery Unit, the 514 square miles proposed for designation as an area of critical environmental concern in the Las Vegas District would be combined with additional tortoise habitat in Lake Mead National Recreation Area and in California to meet recovery criteria.

Criterion 3: Provisions must be made for population management at each area of environmental concern (Desert Wildlife Management Area) so that discrete population growth rates (lambdas) are maintained at or above 1.0. A lambda of 1.0 indicates a stable or increasing population.

Criterion 4: Regulatory mechanisms or land management commitments have been implemented that provide for adequate long-term protection of desert tortoises and their habitat. Delisting would be followed by a loss of protection under the Endangered Species Act; therefore, adequate protection through alternative means is essential before delisting can occur. Reasonable assurance must exist that conditions which brought about population stability will be maintained, or as necessary, improved during the foreseeable future.

Criterion 5: The population in the recovery unit is unlikely to need protection under the Endangered Species Act in the foreseeable future.

Management Direction

SS-3-a. Manage 743,209 acres of the four desert tortoise areas of critical environmental concern specifically for desert tortoise recovery (Map 2-7). Implement the management actions listed below, and on Table 2-2, in these areas of critical environmental concern:

a. Minimize impacts to tortoise habitat during fire suppression by minimizing the use of mechanized equipment and, where possible, staying on existing roads and trails. However,

give priority to keeping the wildfire to an absolute minimum.

b. Manage wild horses and burros for zero appropriate management level within desert tortoise areas of critical environmental concern.

c. Implement inventory, monitoring, and research projects dealing with management issues within desert tortoise areas of critical environmental concern.

d. Limit utility corridors to 3,000 feet or less in width.

e. Do not allow new landfills.

f. Do not authorize military maneuvers.

g. Allow development of campgrounds only if consistent with the objectives of the *Tortoise Recovery Plan*.

h. On a case-by-case basis, support fencing of highways and moderately-to-heavily traveled dirt roads with tortoise-proof fencing and installation of culverts to allow tortoises to cross under the highway and roads.

i. Require reclamation of disturbed lands resulting from activities that result in loss or degradation of tortoise habitat with habitat to be reclaimed so that pre-disturbance condition can be reached within a reasonable time frame. Reclamation may include salvage and transplant of cactus and yucca, recontouring of the area, scarification of compacted soil, soil amendments, seeding, and transplant of seedling shrubs. Subsequent seeding or transplanting efforts may be required, if monitoring indicates that the original effort was not successful.

j. Commercial activities may be permitted, on a case-by-case basis, if not in conflict with recovery of the desert tortoise.

k. Designate as "limited to designated roads and trails" for all motorized and mechanized vehicles.

l. Allow non-speed off-highway vehicle events subject to restrictions identified in RC-11-f.

m. Prohibit off-road vehicle speed events, mountain bike races, horse endurance rides, 4-wheel drive hill climbs, mini events, publicity rides, high speed testing, and similar speed-based events.

n. Do not allow commercial collection of flora. Only allow commercial collection of fauna upon completion of a scientifically credible study that demonstrates commercial collection of fauna does not adversely impact affected species or their habitat. This action will not affect hunting or trapping and casual collection as permitted by the State.

o. In accordance with the BLM/Clark County Interlocal Agreement approved July 1, 1997, BLM will regulate and manage organized recreational activities on County RS2477 roads in accordance with 43 CFR, subpart 8372.

p. Campers may pull their vehicles off the edge of the road but must stay within 15 feet of the edge of the road, except in Wilderness Study Areas where the vehicle must remain within the berm of the road.

Objective

SS-4. Encourage the obtainment and dissemination of knowledge regarding the Mojave Desert ecosystem including desert tortoise biology.

Management Direction:

SS-4-a. Manage the Desert Tortoise Conservation Center Management Area (11,014 acres) to support desert tortoise research and other research associated with the Mojave Desert Ecosystem. When feasible, expand the function of the center to include an environmental education/awareness program in close coordination with other Federal agencies and State and local governments.

SS-4-b. If and when funding is available, expand the existing facilities at the Desert Tortoise Conservation Center Management Area as necessary to accommodate future research and educational needs.

Forestry Management

Objectives

FR-1. Maintain woodland and conifer forest where possible for all-aged stands, with an understory vegetation forage value rating at moderate or better.

Management Direction

FR-1-a. Firewood cutting and gathering is limited to approved areas subject to restrictions developed for protection of Threatened, Endangered and Sensitive species and other sensitive resources.

FR-1-b. Allow harvest of dead and/or down wood or BLM-marked green mesquite "trees" for dwarf mistletoe control only in approved areas.

Objective

FR-2. Limit collection or sale of desert vegetation and other vegetative resources for public use to approved areas including disposal areas, rights-of-way, and gravel pits.

Management Direction

FR-2-a. Assess the potential for salvage and/or harvest of desert vegetation at locations where surface-disturbing activities are authorized.

Table 2-8. Kind of livestock

Horses & Cattle	Cattle
Flat Top Mesa	Arrow Canyon
Lower Mormon Mesa	Jean Lake
Mesa Cliff	Hidden Valley
	Mt. Stirling
	Muddy River
	Roach Lake
	Wheeler Wash
	White Basin

Livestock Grazing Management

Objective

LG-1. Provide for continued grazing of domestic livestock on public lands, consistent with law, regulation, established standards and guidelines and policy on areas open to livestock grazing (see Map 2-8).

Management Direction

LG-1-a. Manage the range resource consistent with the phenological and physiological requirements of key perennial species.

LG-1-b. Livestock grazing on all ephemeral allotments will be permitted if on-the-ground evaluations determine that forage is available, and use is consistent with the Standards and Guidelines and allotment specific objectives.

LG-1-c. Provide for increased plant vigor and reproductive capability of perennial forage on the open allotments through livestock grazing management.

LG-1-e. Maintain static trend or achieve upward trend of key perennial forage species through livestock grazing management.

LG-1-e. Salt and mineral supplement will be placed a minimum of one mile from water.

LG-1-f. Manage grazing allotments outside the desert tortoise Areas of Critical Environmental Concern consistent with grazing Prescription 2 as identified in Biological Opinion File No.: 1-5-91-F-36 as amended: Livestock use may occur on open allotments in desert tortoise habitat outside Areas of Critical Environmental Concern/Desert Wildlife Management Areas from March 1 to October 14, as long as forage utilization does not exceed 40 percent on key perennial grasses, forbs, and shrubs. Between October 15 and February 28, forage utilization will not exceed 50 percent on key perennial grasses and 45 percent on key shrubs and perennial forbs.

The BLM will reinitiate formal consultation on a case-by-case basis if any change is identified to Prescription 2 in an allotment grazing system.

LG-1-g. Close all allotments to livestock grazing within the planning unit, with the following exceptions: Hidden Valley, Mount Stirling, Lower Mormon Mesa, Roach Lake, White Basin, Muddy River, Wheeler Wash, Mesa Cliff, Arrow Canyon in Battleship Wash, Flat Top Mesa, Jean Lake, and Arizona administered allotments (see Map 2-8 for locations and boundaries). That portion of the Jean Lake allotment within the desert tortoise Area of Critical Environmental Concern would be closed to grazing. Close all

land disposal areas to livestock grazing (See Map 2-3).

LG-1-h. Designate allotments that currently have an existing closure as permanently closed. Designate all unallotted areas within southern Nye County as permanently closed to livestock grazing.

LG-1-i. Additional allotment closures could be approved based on voluntary relinquishment of grazing privileges, permits, or leases.

LG-1-j. The type of livestock that will be authorized on each allotment is identified in Table 2-8. Changes to the type of livestock may be made following site-specific environmental analysis.

Objective
LG-2. Establish grazing management systems including rest rotation, deferred rest rotation, or other management approaches as needed to meet specific resource management objectives.

Management Direction
LG-2-a. Include water availability for all uses as part of any grazing system, considering riparian areas, livestock, wildlife, wild horses and burros.

LG-2-b. Develop range improvements, as needed, to reach more uniform distribution of livestock consistent with management objectives.

LG-2-c. Incorporate Standards and Guidelines into all livestock use authorizations, grazing systems, and management plans to ensure rangeland health improved or maintained (see Appendix L).

Objective
LG-3. Manage allotments open to grazing using the "selective management" approach (see Map 2-8 and LG-3-a for open allotments).

Management Direction
LG-3-a. Drop existing categories from allotments closed to livestock grazing. Other direction:

- Arrow Canyon and White Basin will remain "M."
- Hidden Valley, Jean Lake, Wheeler Wash, and Mount Stirling will remain "I."
- Mesa Cliff, Muddy River and Roach Lake will remain "C."
- Change Lower Mormon Mesa from "C" to "I."
- Change Flat Top Mesa from "C" to "M".
- The category for the three allotments administered by Arizona will not be changed.

Wild Horse and Burro Management

Objectives
WHB-1. In Herd Management Areas not constrained by desert tortoise restrictions (see Maps 2-1 and 2-7), manage for healthy, genetically viable herds of wild horses and/or burros in a natural, thriving ecological balance with other rangeland uses (see Table 2-9).

Management Direction
WHB-1-a. Establish Appropriate Management Levels within Herd Management Areas (see Table 2-9).

WHB-1-b. Adjust the Appropriate Management Level identified for each Herd Management Area when monitoring determines the animal population, forage, water, riparian, and other ecosystem management objectives are not being met.

WHB-1-c. Limit utilization of current year's production by all herbivores on key perennial forage species within Herd Management Areas to 50 percent for grasses and 45 percent for shrubs and forbs.

WHB-1-d. Develop and maintain dependable water sources, consistent with BLM policy for wilderness management, to allow more even distribution of horses and burros throughout the Herd Management Areas.

WHB-1-e. Use by wild horses and burros will not be allowed in that portion of the Gold Butte Herd Management Area that overlaps with the desert tortoise Gold Butte Area of Critical Environmental Concern (Gold Butte Part A).

WHB-1-f. No new wild horse or burro ranges will be recommended for approval by the Director.

Objective
WHB-2. Maintain the wild, free-roaming character of the wild horses and burros on the public lands.

Table 2-9. Wild horse and burro Herd Management Areas.

HMA	Initial Herd Size	Estimated AML
Eldorado	75 burros	0 burros
Gold Butte	600 burros	98 burros
Muddy Mountains	29 horses	0 horses
	110 burros	50 burros
Red Rocks	50 horses	50 horses
	130 burros	50 burros
Johnnie	125 horses	50 horses
	300 burros	75 burros
Amargosa	0	0
Ash Meadows*	0	0

Key:

* Ash Meadows HMA was inadvertently left out of previous planning documents.

Management Direction

WHB-2-a. To facilitate management consistent with distinct population units, realign the following Herd Management Areas (see Map 2-1):

- Red Rocks Herd Management Area (formerly part of Spring Mountains Herd Management Area).
- Wheeler Pass Herd Management Area (formerly part of Spring Mountains Herd Management Area).
- Johnnie Herd Management Area (formerly Last Chance and Mt. Stirling Herd Management Areas).

WHB-2-b. Adopt Herd Management Area boundaries to existing 1971 locations; this will increase the size of some Herd Management Areas but will not decrease any in size (see Map 2-1).

WHB-2-c. Develop/maintain memorandums of understanding for coordinated herd management with the National Park Service and U.S. Forest Service where Herd Management Areas extend across administrative boundaries.

WHB-2-d. Wild horses and burros that become problem animals or traffic hazards on Nevada State Routes 159 + 160 or in urban areas will be removed as soon as possible.

WHB-2-e. Wild horses and burros will be scheduled for removal as expeditiously as possible from fenced private lands within the planning area, after a request is made by the private landowner and reasonable efforts to restrict the animals from private property have failed.

WHB-2-f. Wild horses and burros will be removed when animals are residing on lands outside the Herd Management Area or when the Appropriate Management Level is exceeded.

WHB-2-g. Construct underpasses or other structures within highway rights-of-way to allow safe passage of wild horses and burros. Appropriate locations will be determined by BLM and the Nevada Department of Transportation in coordination with affected interests.

Cultural Resource Management

Objective

CR1. Identify and protect cultural and paleontological resources in conformance with applicable legislation and BLM policy.

Management Direction

The following management directions are based on a variety of attributes for those kinds of sites discussed in Table 2-10. The attributes include the potential for the extraction or preservation of scientific data, site integrity, the isolated nature of certain properties, and an assessed potential for impacts from recreational activities. Each site type possesses one or more uses with applicable prescriptions for management according to that displayed in Table 2-10.

CR-1a. Manage the following for information potential: roasting pit, camp/open lithic scatter, rock feature, and historic trash scatter site types. These kinds of sites should be subject to the following direction:

CR-1a-1. Utilize data recovery efforts through research designs to attempt to mitigate adverse effects to cultural resources and paleontological sites from proposed Federal actions.

CR-1a-2. Study known cultural and paleontological sites not expected to incur impacts from Federal actions as a result of using proactive

research designs. The designs may be initiated by BLM or independent researchers subject to the concurrence of BLM and the State Historic Preservation Office.

CR-1-a3. Representative samples of each site type will be preserved for conservation purposes.

CR-1-a4. Manage cultural resources on 1,500 acres of public lands within the Virgin River Anasazi prehistoric district for the potential to yield scientific or historic information.

CR-1-b. Manage the following for conservation potential: rockshelter, rock art locale, prehistoric and historic remains, mining sites, and historic road/trail site types, which are located in areas that do not receive intensive recreational uses. These kinds of sites should be subjected to the following direction:

CR-1-b1. Manage cultural resources on 11,759 acres of public lands at Red Rock Spring and Stump Springs, the Hidden Valley district, the Sloan rock art site, the Arden Historic Sites, the Crescent and Gold Butte mining town sites, and the South Virgin Peak Ridge District for conservation of their overriding scientific or historic importance.

CR-1-b2. Release cultural resource sites designed for "management for conservation" only after development of a memorandum of agreement between BLM, the State Historic Preservation Office, and the Advisory Council on Historic Preservation. This document would detail efforts to conduct intensive documentation or retrieve the physical remains of the property.

CR-1-b3. Manage paleontological resources on 40 acres of public lands within the Arrow Canyon Bird Track paleontological site for conservation of its overriding scientific or historic importance.

CR-1-b4. Release paleontological sites designated for "management for conservation" uses only after the development of a research design approved by BLM to remove the specimens, create casts of the objects, and provide interpretive exhibits.

CR-1-c. Manage the following for public uses: rockshelter, rock art locale, prehistoric and historic structural remains, mining sites, and historic road/trail site types located in areas that have sustained, or are projected to receive, intensive recreational uses.

CR-1-c1. Manage cultural resources on 3,660 acres of public lands within the Arrow Canyon Rock Art District, Keyhole Canyon, Frenchman Mine, and Gypsum Cave areas for public values that include sociocultural, educational, and recreational uses.

CR-1-c2. Develop programs that use surveillance to monitor resources with public value uses. Where analysis of monitoring results indicates a need for further protection, construct or install physical barriers, as appropriate.

CR-1-d. Manage cultural resources on approximately 200,000 acres of Traditional Lifeway Areas within the Las Vegas BLM District for their sociological values by providing for their protection and preservation (see Map 2-2).

This direction would primarily be accomplished by inviting Native American Traditional cultural groups to provide information to BLM concerning sensitivity of cultural values on Federal lands in Traditional Lifeway Areas. These lands are not available for disposal.

CR-1-e. Selected cultural resources should be designated as priorities for activity planning and determining best use potential. These include historic remains in Gold Butte, Crescent, Goodsprings, and Searchlight mining districts, as well as the Hidden Valley Archeological District in the Muddy Mountains. There are also special cultural resource considerations that may affect the location, timing, or method of development or use of other resources in the planning area. These resources include plants or animals essential to maintaining cultural integrity of a Traditional Lifeway Area.

Lands Management

Objective

Land Disposal Areas:

LD-1. Approximately 175,314 acres of public lands within the disposal areas identified on Map 2-3 are potentially available for disposal through sale, exchange, or Recreation and Public Purpose patent to provide for the orderly expansion and development of southern Nevada.

Table 2-10. Management direction for archaeological site types and cultural resources in LVD.

Site Type	Management Use	Prescription
Prehistoric		
Rockshelter[1]	Information	Data recovery plan
Rockshelter[2]	Conservation	Monitoring/protection
Rockshelter[3]	Public Uses	Activity plan
Roasting pit[4]	Information	Data recovery plan
Camp/lithic scatter[4]	Information	Data recovery plan
Rock feature[4]	Information	Data recovery plan
Structural remains[1]	Information	Data recovery plan
Structural remains[2]	Conservation	Monitoring/protection
Structural remains[3]	Public Uses	Activity plan
Rock art[1]	Information	Data recovery plan
Rock art[2]	Conservation	Monitoring/protection
Rock art[3]	Public Uses	Activity plan
Historic		
Structural remains[1]	Information	Data recovery plan
Structural remains[2]	Conservation	Monitoring/protection
Structural remains[3]	Public Uses	Activity plan
Trash/debris scatter[4]	Information	Data recovery plan
Road/trail[1]	Information	Recordation
Road/trail[2]	Conservation	Monitoring/protection
Road/trail[3]	Public Uses	Activity plan
Traditional Lifeway Areas	Conservation	Native American consultation Monitoring

Key:

[1] Located in area proposed for severe disturbance or total destruction from Federal actions.

[2] Located in relatively isolated area, not projected for intensive recreational uses or Federal actions.

[3] Located in area projected for intensive recreational uses.

[4] Located in any area; representative samples for conservation previously selected.

Management Direction

LD-1-a. Unauthorized use of public lands outside established disposal areas may be resolved through direct sale, if proven the action was not willful or was due to an erroneous survey; or if remediation of existing hazardous substances on the property would be too costly.

LD-1-b. Public lands located outside established disposal areas would be considered for repositioning to consolidate BLM parcels into a more contiguous land pattern and to improve public services and BLM land management. Repositioning would occur on a case-by-case basis, by exchange only, provided that:

1. The lands would serve the purpose of: a) community expansion and economic development, b) local government needs, or c) to facilitate Federal land management and minimize BLM administrative costs.

2. The lands are not adjacent to Congressionally mandated disposal boundaries.

3. Lands to be disposed are located outside any Area of Critical Environmental Concern, Traditional Lifeway Area, Special Recreation Management Area, Right-of-way corridor, Wilderness Study Area, active communication site, riparian site, or cultural sites eligible for inclusion on the National Register of Historic Places.

4. The public lands are not encumbered by an existing permit or lease that would preclude the disposal action.

5. The lands do not include habitat of Threatened, Endangered, and Special Status Species, or other crucial wildlife habitat.

6. Other public uses of the parcel are of less value.

7. The parcel of land is for a specific purpose and is no longer required for any other Federal purpose.

8. Local communities support the exchange, and there is close coordination with the U.S. Fish and Wildlife Service, the Nevada Division of Wildlife, and Clark County.

9. Public access would be improved.

10. Any other specific values or concerns not identified above would be analyzed at the time of the proposal to determine if the disposal would be in the public's best interest.

LD-1-c. Public lands within the Las Vegas BLM District are not suitable for entry under Indian Allotment, Desert Land Entry or the Carey Act, and would not be disposed of through those authorities.

LD-1-d. Recreation and Public Purpose leases identified for sale prior to approval of this plan, which were located inside a disposal area under the current management plan and are outside the proposed disposal areas, would remain available for sale to the current lessee or assignee.

LD-1-e. Approximately 9,423 acres of BLM inholdings within Ash Meadows National Wildlife Refuge are available for withdrawal by the United States Fish and Wildlife Service for inclusion in the refuge.

LD-1-f. Approximately 11,014 acres of the Desert Tortoise Conservation Center Management Area are available for withdrawal by other Federal agencies when such transfer would further objective SS-4.

Objective

Land Use Authorizations

LD-2. All public lands within the planning area, unless otherwise classified, segregated or withdrawn, and with the exception of Areas of Critical Environmental Concern and Wilderness Study Areas, are available at the discretion of the agency, for land use leases and permits under Section 302 of Federal Land Policy and Management Act and for airport leases under the authority of the Act of May 24, 1928, as amended.

Table 2-11. Disposal areas

Disposal Areas	Acres
Amargosa Valley	27,904
Goodsprings	915
Indian Springs South	1,302
Indian Springs North	420
Jean	2,445
Las Vegas Valley	52,021
Lathrop Wells	3,772
Laughlin	4,720
Mesquite/Bunkerville	14,460
Moapa/Glendale	40,950
Nelson	1,259
Pahrump	14,768
Sandy Valley	6,268
Searchlight	1,944
Primm*	1,181
Valley West	985
Total	**175,314**

*Includes acreage on the west side of the highway adjacent to existing development.
**See Appendix G for exact acreage total

Management Direction

LD-2-a. Land use lease or permit applications and airport lease applications will be addressed on a case-by-case basis, where consistent with other resource management objectives and local land uses. Special terms and conditions regarding use of the public lands involved will be developed as applicable.

Objective

Land Classifications/Segregations

LD-3. Terminate or modify any unused, outdated, or unnecessary classifications/segregations and withdrawals on public lands to reduce the area of segregation in the plan area.

Management Direction

LD-3-a. In consultation with the appropriate Federal agency or applicant, review existing and pending classifications/segregations and withdrawals to determine if there is a continued need for them. Consideration will be given to withdrawal of approximately 1,500 acres of public land adjacent to Nellis Air Force Base in support of the Department of Defense's Ammunition and Explosives Safety Program.

LD-3-b. The following small tract classifications will be terminated:

T. 25 S., R. 59 E. BLM, BLM Order 2/18/63, Small Tract Cl 1

T. 22 S., R. 60 E., BLM, BLM Order 4/28/72, Small Tract Cl 106

Rights-of-Way Management

Objective

RW-1. Meet public demand and reduce impacts to sensitive resources by providing an orderly system of development for transportation, including legal access to private inholdings, communications, flood control, major utility transmission lines, and related facilities.

Management Direction

RW-1-a. Designate the following corridors:

1. A corridor 1,400 feet wide from the north side of the Sunrise Instant Study Area south through Rainbow Gardens to the Lake Mead crossover.

   This corridor is described as west of the east boundary of the IPP-McCullough powerlines. Activation and use of this corridor is contingent upon Congressional action releasing the Instant Study Area from further wilderness consideration and study.

2. See Map 2-4 for the location of the proposed corridor designations in this alternative. An approximate total of 158,806 acres is involved, including legislative designations and the proposed Sunrise Mountain designation. The corridors range in width from 1,400 feet to 3,000 feet, for a total length of approximately 538 miles.

RW-1-b. Do not extend the following corridors :

1. The corridor entering Nevada at Nipton Road and designated as Contingent Corridor W in the California Desert Conservation Area Plan, dated 1980, will not be carried forward in this alternative. The 1988 *Mojave National Scenic Area Management Plan* recommended elimination of the corridor; this was accomplished by a plan amendment to the California Desert Conservation Area Plan.

2. Corridor K-G described and identified in the *Esmeralda-Southern Nye Resource Management Plan* (1986) will not be carried forward in this alternative. This area is constrained by natural and man-made features including mountains, the Amargosa River, the Low-Level Nuclear Waste Site, and the town of Beatty. An adjacent corridor to the east of this area has the capability to handle foreseeable future powerlines.

3. The corridor designated along the eastern boundary of U.S. Highway 93 between the Aerojet Conveyance Area and the Apex Project Area will not tie into the corridor designated inside the west boundary of the Apex project area. Per an industry request, the corridor will stop approximately 5 miles short of the project area, continue east, and tie into the corridor extending southwesterly from the Moapa Indian Reservation.

RW-1-c. When feasible, and where compatible, major pipeline rights-of-way will be placed within powerline corridors.

RW-1-d. Provide right-of-way access for local flood control agencies to develop or maintain flood control developments, consistent with right-of-way avoidance and exclusion areas.

RW-1-e. Except as identified in RW-1-f and RW-1-g, all Areas of Critical Environmental Concern and all lands within 0.25 mile of significant caves, *exclusive of any designated corridors,* are designated as right-of-way avoidance areas. This management direction also applies to RW-2 below.

RW-1-f. Linear right-of-way exclusion areas are limited to the Hidden Valley District, Sloan Rock Art, and Big Dune Areas of Critical Environmental Concern.

RW-1-g. Site type right-of-way exclusion areas are limited to all areas of critical environmental concern, except within 0.50 mile on either side of Federal Aid Highways. This management direction also applies to RW-2 below.

RW-1-h. All public land within the planning area, except as stated in RW-1-c through RW-1-g, are available at the discretion of the agency for rights-of-way under the authority of the Federal Land Policy Management Act.

Objective

RW-2. Maximize the use of existing communication sites and prevent the proliferation of scattered single user sites.

Management Direction

RW-2-a. See Map 2-4 for the present location of existing established communication sites that will be carried forward in this alternative.

RW-2-b. Authorization of future communication site rights-of-way would be handled as follows:

Communication Sites with a Site Management Plan:

1. Facilities authorized under new rights-of-way will be constructed in accordance with an approved Site Management Plan.

Communication Sites without a Site Management Plan:

2. New rights-of-way will be authorized within and on existing rights-of-way and facilities.

   This direction also includes communication site facilities not ordinarily located on a mountain top, such as AM radio facilities, personal communications service facilities, and cellular telephone sites. Personal communications service facilities will most likely occur along transportation corridors such as interstate highways.

RW-2-c. Requests for new communication sites will generally be processed as follows:

1. Competitive bidding procedures will be utilized.

2. Multi-user facilities will be constructed.

3. Site users will jointly form a committee and develop a Site Management Plan.

See **MN-1-n.** for Objectives and Management Direction regarding material site rights-of-way.

Acquisitions Management

Objective

AQ-1. To acquire private lands to enhance the recovery of special status species, protect valuable resources and facilitate the management of adjacent BLM lands. Secure legal and physical on-the-ground access to otherwise inaccessible public lands.

Management Direction

Land Acquisition Needs

Land acquisition needs will generally be processed through the land exchange program; however, if the opportunity arises lands may be acquired by donations, Congressionally appropriated funds, or compensation funds.

AQ-1-a. The following land acquisition priorities are based on finding willing sellers:

1. Private lands required to meet management objectives within designated Areas of Critical Environmental Concern, Wilderness Study Areas, recommended Wilderness Areas, Congressionally designated areas, Threatened and Endangered Species habitat, and areas containing special status species.

2. Lands located within the district, conveyed into private ownership to Aerojet Corporation through P.L. 100-275. The lands involved are located in Coyote Spring Valley and will be retained in Federal ownership as part of Coyote Springs Area of Critical Environmental Concern.

3. Private lands along the Virgin River, south of Riverside.

4. Lands not specifically identified for acquisition could be acquired on a case-by-case basis for the following reasons:
   a) protect Threatened and Endangered Species and Special Status Species.
   b) provide resource protection.
   c) facilitate implementation of the Resource Management Plan.
   d) provide a more manageable land ownership pattern.
   e) maintain or enhance public uses and values.

AQ-1-b. The BLM will not acquire contaminated property.

Recreation Management

Objective

RC-1. Ensure that a wide range of recreation opportunities are available for recreation users in concert with protecting the natural resources on public lands that attract users.

Management Direction

RC-1-a. Primary management emphasis will be on resource-based uses, not facility-based uses.

RC-1-b. Designate the following Special Recreation Management Areas as areas where BLM will concentrate the majority of its recreation management program effort (see RC-2 through RC-9).

- Muddy Mountains
- Nellis Dunes
- Sunrise Mountain
- Las Vegas Valley
- Nelson Hills
- Jean/Roach Dry Lakes
- Laughlin
- Big Dune

Lands outside the Special Recreation Management Areas will be included within the Southern Nevada Extensive Recreation Management Area (see RC-10 and Map 2-5).

RC-1-c. Limit recreation facility development and special designations to those necessary for resource protection.

RC-1-d. Retain the Recreation Opportunity Spectrum inventory classifications and opportunity settings as a long-term management goal for all actions.

Recreation Opportunity Spectrum designations (as described in detail in Chapter 3, See Map 3-17) include the following:

Designation	*Acres*
Semi-primitive Nonmotorized	276,570
Semi-primitive Motorized	651,414
Roaded Natural	1,928,640
Rural	350,626
Urban	124,645

RC-1-e. Support the Nevada Division of Wildlife in an effort to maintain and improve hunting opportunities in Clark County.

RC-1-f. Designate the desert tortoise Areas of Critical Environmental Concern as Special Areas under 43 CFR 8372 to provide improved management and coordination between recreational uses and tortoise habitat management.

Muddy Mountains Special Recreation Management Area

Objective
RC-2. Manage 123,400 acres of the Muddy Mountain area to provide semi-primitive recreation opportunities and integrated management of wildlife habitat, cultural resources, and other recreational uses. (See Map 2-5)

Management Direction
RC-2-a. Manage the majority of the area (78,480 acres) for semi-primitive non-motorized recreation opportunities.

RC-2-b. Manage the remaining area (44,897 acres) for semi-primitive motorized recreation opportunities.

Nellis Dunes Special Recreation Management Area

Objective
RC-3. Manage 10,000 acres of the Nellis Dunes as an open area for intensive off-road vehicle and other recreation opportunities, including organized off-road vehicle events, casual off-road vehicle freeplay, picnicking, photography, and other non-off-road vehicle commercial and competitive permitted activities. (See Map 2-5)

Management Direction
RC-3-a. Permit off-road vehicle free-play and high-speed, competitive Off-Highway Vehicle events of all types within the Special Recreation Management Area.

RC-3-b. Prohibit recreational and target shooting in the Special Recreation Management Area, to coincide with Clark County's shooting ordinance.

RC-3-c. Consider cooperative ventures, such as concession leases to enhance recreation opportunities.

Sunrise Mountain Special Recreation Management Area

Objective
RC-4. Manage 37,620 acres of the Sunrise/Frenchman Mountain/Rainbow Gardens Special Recreation Management Area for recreation opportunities in concert with sensitive plant, scenic, cultural, and geologic values of the concurrent Area of Critical Environmental Concern. (See Map 2-5).

Management Direction
RC-4-a. Prohibit speed based motorcycle/truck/buggy off-road vehicle events. Limit mountain bike events to designated roads and trails until completion of long-term planning in the Recreation Area Management Plan.

RC-4-b. Allow non-speed events (such as all terrain bicycle events, motorcycle trials, non-competitive off-road vehicle events, and commercial permitted events and activities) on designated roads and trails on a case-by-case basis until completion of long-term planning in the Recreation Area Management Plan .

RC-4-c. Encourage cooperative ventures, such as concession leases, to enhance recreation opportunities.

RC-4-d. Concentrate major powerline transmission rights-of-way within the confines of the designated utility corridor to reduce

conflicts with recreation and to reduce impacts to scenic resources, such as Rainbow Gardens and Lava Butte.

RC-4-e. This area will be closed to casual recreational shooting in accordance with Clark County's No-shooting for the Las Vegas Valley.

Las Vegas Valley Special Recreation Management Area

Objective

RC-5. Coordinate with county and city governments to manage 197,300 acres in the Las Vegas Valley to facilitate the provision of open space areas, recreational trails, and parks necessary for valley residents. (See Map 2-5)

Management Direction

RC-5-a. Identify land for reserve recreational trail, open space, parks, etc. as needed, prior to land disposals. Reservation should be done through Recreation and Public Purpose applications by local governmental agencies.

RC-5-b. Identify public lands on the perimeter and within the Special Recreation Management Area that are appropriate for recreational uses in support of local government land use plans.

RC-5-c. Prohibit recreational and target shooting on public lands within the Special Recreation Management Area, in accordance with the Clark County and local government shooting ordinances. Prohibit camping on public lands in the Special Recreation Management Area, except where specifically authorized and designated.

RC-5-d. Close the Special Recreation Management Area to individual, organized, and competitive off-road use and vehicle events including off-road casual use. An exception to this closure is the Nellis Dunes off-road vehicle Area and the "Nevada 400" course route to the north. Nevada 400 course limited to one event per year.

Nelson Hills/Eldorado Special Recreation Management Area

Objective

RC-6. Manage 81,600 acres for competitive off-road vehicle events on BLM-administered lands in the Nelson Hills/Eldorado Valley Special Recreation Management Area, in accordance with the applicable Biological Opinion(s) to protect desert tortoise habitat. (See Map 2-5)

Management Direction

RC-6-a. Authorize a maximum of nine speed based events yearly, including five motorcycle/All Terrain Vehicle and four buggy events.

RC-6-b. All permitted events must take place on existing previously used courses.

RC-6-c. Permitted speed-based off-road vehicle events are allowed only between November 1 and February 28 within the parts of the Special Recreation Management Area that are critical tortoise habitat.

Jean/Roach Dry Lakes Special Recreation Management Area

Objective

RC-7. Manage 216,300 acres in the Jean/Roach Dry Lakes area (Map 2-10) for intensive recreation opportunities, including competitive off-road vehicle (in accordance with the U.S. Fish and Wildlife Service Biological Opinion) and other recreational events, as well as dispersed recreational use and commercial activities. Minimize impacts to white-margined penstemon populations in accordance with policies regarding BLM sensitive species. (See Map 2-5)

Management Direction

RC-7-a. Permit high-speed, competitive off-road vehicle events, casual off-road vehicle uses, and other recreational and commercial activities.

RC-7-b. Permitted events will be allowed only on previously disturbed areas in tortoise habitat, existing roads, trails, and dry washes.

RC-7-c. Non-vegetated parts of the dry lake beds will be managed as Open to unrestricted Off-Highway Vehicle use.

Laughlin Special Recreation Management Area

Objective
RC-8. Provide a higher level of management emphasis through increased use monitoring, ranger patrols, increased BLM presence at permitted events, and increased coordination with local government and businesses for recreational uses on 25,600 acres of public lands around Laughlin, Nevada (See Map 2-5)

Management Direction

RC-8-a. Work closely with the Nevada Division of Wildlife to protect habitat areas and riparian resources of concern.

RC-8-b. Until completion of the Recreation Area Management Plan, allow up to two off-road vehicle events, with the following terms:
- Limit to 200 participants.
- Closed from May 1 to the Saturday following opening of upland game bird season (usually the second Saturday in October).

The seasonal restrictions and the number of events and participants may be modified as a result of the Recreation Area Management Plan process.

Big Dune Special Recreation Management Area

Objective
RC9. Manage 11,600 acres of the Big Dune area for moderate, casual off-road vehicle use, camping, and other casual recreation opportunities. (See Map 2-5)

Management Direction

RC-9-a. Prohibit all Off-Highway Vehicle use within the 200-acre beetle habitat in the Big Dune Area of Critical Environmental Concern (except on the designated route through the area), to ensure continued survival of the native beetle population. Prohibit speed-based competitive off-road vehicle events within the 1,920-acre Big Dune Area of Critical Environmental Concern.

RC-9-b. Allow commercial activities and other permitted events on a case-by-case basis.

RC-9-c. Establish long-term management goals and objectives including consideration of group camping areas. Long-term recreation management within the dunes would be based on the beetles' minimum habitat requirements.

Southern Nevada Extensive Recreation Management Area

Objective
RC-10. Manage public lands not included within Special Recreation Management Areas as the Southern Nevada Extensive Recreation Management Area, emphasizing dispersed and diverse recreation opportunities. (See Map 2-5)

Management Direction

RC-10-a. Manage permitted recreation and commercial events (outside Special Recreation Management Areas) as follows:

Areas of Critical Environmental Concern - Prohibit the following activities: off-road vehicle speed events, 4-wheel drive hill climbs, mini-events, publicity rides, and high speed testing.

Limit non-speed and non-off-road vehicle events to designated roads and trails in tortoise Areas of Critical Environmental Concern; and to existing roads and trails in Areas of Critical Environmental Concern designated for other purposes.

Allow other recreation and/or commercial events on a case-by-case basis. Seasonal restrictions may be imposed, based on tortoise activity.

Other Areas - Permit events on a case-by-case basis. Restrictions and stipulations necessary for protection of the desert tortoise may be imposed within desert tortoise habitat. Close land disposal areas to overnight camping.

RC-10-b. Allow recreation concession leases that enhance resource management objectives.

RC-10-c. As resource conditions and/or use levels warrant, inventory, designate, and manage mountain bicycle and equestrian trails throughout the Extensive Recreation Management Area to meet increasing public demand for these activities.

Off Highway/Road Vehicle Designations

Objective

RC-11. Provide opportunities for off-road vehicle use while protecting wildlife habitat, cultural resources, hydrological and soil resources, non-motorized recreation opportunities, natural/aesthetic values, and other uses of the public land (See Map 2-10).

Management Direction

RC-11-a. Designate following areas (see Map 2-10) as OPEN to all motorized and mechanized vehicles:

- Nellis Dunes Special Recreation Management Area (approx. 10,000 acres).
- Non-vegetated portions of Big Dune Special Recreation Management Area outside of designated beetle habitat (approx. 11,600 acres).
- Non-vegetated portions of dry lake beds (approx. 3,000 acres).

RC-11-b. Designate following areas (see Map 2-10) as CLOSED to all motorized and mechanized vehicles:

- Hidden Valley (3,360 acres) in the south Muddy Mountains.
- Approximately 200 acres of beetle habitat at Big Dune Special Recreation Management Area (that portion shown on Map 2-10).

The Mojave Road is closed to competitive events along or within the road alignment; however, a race course may cross the road alignment. Except for the Hidden Valley area, lands in Wilderness Study Areas are not included in this designation. This designation would apply to any areas designated by Congress as wilderness in the future. (See Map 2-10.)

RC-11-c. Designate the following areas (See Map 2-10) as LIMITED TO DESIGNATED ROADS AND TRAILS for all motorized and mechanized vehicles:

- Approximately 743,209 acres desert tortoise Areas of Critical Environmental Concern including the Piute/Eldorado, Mormon Mesa, Coyote Springs, and Gold Butte.
- Approximately 327,000 acres adjacent to the Red Rock Canyon National Conservation Area and the United States Forest Service Spring Mountain National Recreation Area (between State Highway 160 and U.S. Highway 95).
- Rainbow Gardens Area of Critical Environmental Concern (37,620 acres).
- BLM inholdings totaling approximately 9,423 acres in Ash Meadows National Wildlife Refuge.
- All land disposal areas.

RC-11-d. Designate approximately 2,186,483 acres as shown on Map 2-10 as LIMITED TO EXISTING ROADS, TRAILS AND DRY WASHES for all motorized and mechanized vehicles. This designation includes:

- All Areas of Critical Environmental Concern designated for purposes other than tortoise habitat protection and all lands not otherwise designated in RC-11-a, b or c.
- All Wilderness Study Areas (or portions) not included in RC-11-c.

Wilderness Study Areas are further limited to "existing trails and ways". This distinction is made because Wilderness Study Areas are by definition (and inventory) "roadless." However, some Wilderness Study Areas have 4-wheel drive jeep trails known as trails or ways that remain open to limited use. Wilderness Study Area Off-Highway Vehicle designations are interim, contingent on Congress making a final decision as to their designation as wilderness.

RC-11-e. *Management of Speed-Based Recreation Events* (See Appendix J.)

Within tortoise Areas of Critical Environmental Concern - Prohibit off-road vehicle speed events, mountain bike races, horse endurance rides, 4-wheel drive hill climbs, mini-events, publicity rides, high-speed testing, and similar speed based events.

Within other Areas of Critical Environmental Concern - Prohibit off-road vehicle speed events, 4-wheel drive hill climbs, mini-events, publicity rides and high speed testing. Mountain bike events and horse endurance rides may be allowed on a case-by-case basis and limited to existing roads and trails.

Within non-Area of Critical Environmental Concern Critical Habitat - Nine speed-based events can be allowed yearly in the Nelson Hills/Eldorado Valley on existing roads and trails; with racing allowed between November 1 and February 28, and the number of laps limited to a maximum of five. Additional specifics may be included in the U.S.Fish and Wildlife Service Biological Opinion. If the U.S Fish and Wildlife Service changes critical habitat following the designation of tortoise Areas of Critical Environmental Concern, the Off-Highway Vehicle designations and off-road vehicle restrictions will be reviewed and modified if appropriate.

Nellis Dunes and dry lakes - Allow off-road vehicle and other speed events subject to environmental protection and public safety stipulations.

Other Areas - Permit events on a case-by-case basis. No seasonal restrictions. No new courses in critical desert tortoise habitat. No new off-road vehicle events in crucial bighorn sheep habitat.

RC-11-f. Management of Non-Speed Based Recreation Events (including non-speed portions of speed events; See Appendix J and Map 2-10).

Within desert tortoise Areas of Critical Environmental Concern - Allow non-speed events subject to the following limitations:

1. Issue Recreation Use Permits for events with more than 25 vehicles.

2. Events involving more than 100 vehicles must be held during the tortoise inactive season from November 1 to February 28/29. To maintain consistency with California vehicle limit restrictions, there will be a cap of no more than 300 motorcycles or 300 four-wheeled vehicles (including all terrain vehicles) on all events. With the exception that if a alternative route for the Barstow-to-Vegas event is not found, resulting in the need to traverse the Piute Area of Critical Environmental Concern, the number of entrants permitted in Nevada will be consistent with that permitted by California.

3. No Off-Highway Vehicle non-speed events will be permitted between April 1 and June 1 and between August 15 and October 15 (Dates will vary slightly annually due to calendar shifts to provide a full Saturday and Sunday weekend if April 1st falls during the weekend and to provide three full weekends prior to, or including November 1st).

4. A maximum of 10 permitted non-speed events, with a limit of 100 vehicles, will be allowed annually during the tortoise active season (March 1st to October 31, except for dates allowed in #3 above). There will be no more than three events per Area of Critical Environmental Concern, with the exception that an event based on historic use patterns will be allowed from Mesquite through the Mormon Mesa Area of Critical Environmental Concern. This event, which may have 200 entrants, counts as two of the 3 events held annually and is limited to a one-way route (north-south or south-north).

5. A maximum of 12 permitted non-speed events will be allowed annually during the tortoise inactive season (November 1 to February 28/29) with no more than 4 events per Area of Critical Environmental Concern.

6. Vehicles shall not exceed the legal speed limit (posted or unposted) of the roads used during the event. Clark County speed limit for unposted roads is 25 miles per hour. These events include, but are not limited to motorcycle or buggy rallies and mountain bike rides.

7. Authorized non-speed events that cross the Lincoln/Clark County borders will only be allowed in accordance with corridors identified within the approved Caliente Management Framework Plan Amendment.

Within other Areas of Critical Environmental Concern - Non-speed uses such as non-speed off-road vehicle events (road rallies, dual sport rides, and non-speed transfer sections of speed events), mountain bike events, and horse trail rides are allowed on existing roads, trails, and dry washes (RC-11-d).

Within non-Area of Critical Environmental Concern Critical Habitat - Non-speed uses such as non-speed off-road vehicle events (road rallys, dual sport rides, and non-speed transfer sections of speed events), guided commercial scenic tours, and mountain bike tours are allowed on existing roads and trails. If the U.S Fish and Wildlife Service changes critical habitat following the designation of tortoise Areas of Critical Environmental Concern, Off-Highway Vehicle designations will be reviewed and modified if appropriate.

Nellis Dunes and Dry Lake Beds - Allow off-road vehicle and other events subject to environmental protection and public safety stipulations.

Other Areas - Permit events on a case-by-case basis. No seasonal restrictions. No new courses in critical desert tortoise habitat.

Cave Management

Objective
RC-12. Protect significant cave resources including cultural, scientific, biological, geological, hydrological, educational and recreational values; and manage each cave for its primary unique resource opportunity.

Management Direction
RC-12-a. Determine the primary values of each cave and set long-term management goals and objectives.

RC-12-b. Enlist local and national caving organizations to assist in assessment and management of cave resources. Restrict access to cave location data to bonafide scientific studies and experienced cavers.

RC-12-c. Manage all cave resources as wild systems, free from commercial or show cave type developments. Special Recreation Permits for commercially guided trips by qualified cave experts may be considered if environmental studies show that cave resources will not be impacted.

RC-12-d. Establish a registration system for cave entry, where needed.

RC-12-e. Designate all significant cave resources and newly discovered cave resources as right-of-way avoidance areas.

RC-12-f. If necessary, implement closures to protect breading, hibernating, or migrating bats from unnecessary disturbances.

RC-12-g. If necessary, gate cave entrances to protect unique and fragile cave resources from damage or overuse.

Wild and Scenic Rivers Management

Objective
SR-1. Participate in a study of the Virgin River for Wild and Scenic River designation when proposal is initiated by either Arizona or Utah.

Management Direction
SR-1-a. Provide interim management protection for the river by including the area in the Virgin River Area of Critical Environmental Concern and requiring any proposed action to consider the potential affect on the river's classification as Wild and Scenic.

Wilderness Management

Objective
WS-1. Ensure that characteristics on certain lands that caused them to be inventoried and designated as Wilderness Study Areas are maintained and not diminished or lessened in any way that might constrain or limit Congress' final wilderness designation decisions.*

Management Direction
WS-1-a. Manage Wilderness Study Areas in accordance with the Interim Management Policy for Lands Under Wilderness Review.

Objective
WS-2. Provide management direction for new wilderness areas and Wilderness Study Areas not designated as wilderness by Congress and released from interim management.

Management Direction

WS-2-a. Manage released lands to generally maintain the existing aesthetic qualities through multiple use management of those areas and to provide for semi-primitive recreation opportunities. Adopt limited use Off-Highway Vehicle, Visual Resource Management and Recreation Opportunity Spectrum designations consistent with designations already in place on adjacent non-Wilderness Study Area lands.

WS-2-b. Manage those lands released by Congress to allow opportunities for mineral exploration and development in accordance with current laws and regulations and consistent with decisions for minerals management on adjacent lands.

Objective

WS-3. Release from further wilderness review lands in the Logandale area that were omitted from the original wilderness review that do not meet Wilderness Study Area criteria.

During the BLM's wilderness study, there were 20,299 acres in several parcels inadvertently omitted due to a mapping error showing the lands as State of Nevada property. Because of this error, these lands were in an uncertain status. A subsequent field inventory determined that these lands do not meet the criteria necessary for Wilderness Study Area designation. This objective completes the inventory/decision process.

Management Direction

WS-3-a. Release the Logandale Unit from further consideration as wilderness due to the existing uses of the area as a roaded natural recreation area. These uses have impacted the area's naturalness and comprised its primitive and unconfined recreational opportunities potential.

Minerals Management

See Map 2-3 (Land Disposal Areas) and Map 2-7 (Areas of Critical Environmental Concern) for the locations of the mineral management areas described below.

Objectives

MN-1. Where lands remain open to entry provide for orderly exploration and development of valuable minerals on Federally owned mineral estate whether or not the surface estate is in Federal ownership.

MN-2. Use appropriate environmental safeguards to allow for the preservation and enhancement of fragile and unique resources.

Management Direction

Solid Leasable Minerals

MN-1-a. On split estate lands, private surface that is developed for non-mineral use will not be managed for solid mineral development.

MN-1-b. Allow solid mineral leasing on 1,872,673 acres, which are on lands outside identified disposal and administrative areas, outside riparian and natural spring areas, and outside Areas of Critical Environmental Concern, subject to standard lease terms and conditions (see Appendix M). Proposed Areas of Critical Environmental Concern, Disposal Areas, and Locations and Areas Closed to Authorization/Renewal of Material Site Rights-of-Way and to Mineral Materials Disposal and Locatable Minerals and Solid Leasables are listed in Tables 2-2, 2-3, 2-4, 2-5, 2-6, 2-11 and 2-12. See Maps 2-3 and 2-7.

MN-1-c. After June 1, 1999, do not renew sand and gravel solid mineral leases that lie within lands identified for disposal (Map 2-3). Except as otherwise provided, continued sand and gravel extraction would be considered under 43 Code of Federal Regulations Part 3600, subject to authorized officer approval. No sales under the 3600 regulations would be made until the leases expire.

MN-1-d. Solid mineral leasing will be allowed on lands released from Wilderness review that are not within Areas of Critical Environmental Concern, and not within areas described in MN-1-a, MN-1-b, MN-1-c, above.

Fluid Leasable Minerals

MN-1-e. Allow fluid mineral leasing subject to standard terms and conditions on 1,909,351 acres, which are outside identified disposal and administrative areas and outside Areas of Critical Environmental Concern. (See Appendix M and Maps 2-3 and 2-7.)

MN-1-f. Allow fluid mineral leasing on lands released from wilderness review, subject to the management direction in MN-1-e, MN-1-g, and MN-1-n. The total acreage released will not be known until Congress acts.

MN-1-g. Allow fluid mineral leasing, subject to No Surface Occupancy stipulations within areas having important cultural, geological, and riparian resources; special status species plant and animal habitat; Areas of Critical Environmental Concern; administrative sites; and Special Recreation Management Areas. The ACECs subject to this No Surface Occupancy provision total approximately 866,000 acres (see list of these ACECs and acreages of each below). For Areas of Critical Environmental Concern noted with **, the acreage *excludes* Bureau of Reclamation withdrawals.

ACEC	*Acres*
Piute/Eldorado Valley	329,440
Coyote Springs Valley	75,500
Mormon Mesa	151,360
Gold Butte, Part A (including Whitney Pockets, Devil's Throat, Red Rock Springs ACEC, Bureau of Reclamation lands.)**	185,469
Arden Historic Sites	1,480
Arrow Canyon	2,084
Ash Meadows (outside Ash Meadows National Wildlife Refuge)	27,729
Big Dune	1,920
Crescent Townsite	437
Hidden Valley	3,360
Keyhole Canyon	361
Rainbow Gardens **	37,620
River Mountains **	5,617
Sloan Rock Art District	320
Stump Spring	641
Virgin River	6,411
Desert Tortoise Conservation Center Management Area (excluding 475-acre overlap with Arden Historic Sites)	11,014
Nellis Dunes Recreation Area	10,000
Public Domain lands within Ash Meadows National Wildlife Refuge	9,423
Muddy River Riparian zone	205
Virgin River Riparian zone within 0.25 mile of natural springs (See Table 3-3).	805
	8,000
Total Acres:	866,067

MN-1-h. Close the Ash Meadows Area of Critical Environmental Concern, including BLM lands inside the Ash Meadows National Wildlife Refuge to geothermal prospecting and leasing.

MN-1-i. Allow fluid mineral leasing (subject to Timing and Surface Use Constraint special stipulations) on the four Areas of Critical Environmental Concern listed below totaling approximately 112,000 acres. These ACECs have special wildlife habitat, riparian, cultural, and geologic values.

ACEC	*Acres*
Amargosa Mesquite	6,891
Gold Butte, part B, outside of Wilderness Study Areas	66,477
Gold Butte, part C (Virgin Mountains)	38,431
Total acres:	111,799

Locatable Minerals

MN-1-j. An estimated 2,135,146 acres would remain open to the operation of the mining laws after existing withdrawals for military uses, industrial sites, and powersites (see Map 2-7).

MN-2-a. Withdraw the following urban disposal areas, BLM- administrative areas, special plant and animal management areas, sensitive cultural resource sites, and special geologic areas from the operation of the mining laws, subject to valid existing rights. Within desert tortoise areas of critical environmental concern, conduct validity determinations of mining claims prior to approval of a mine plan on pre-existing mining claims.

Areas to be Segregated and Withdrawn:

Urban Disposal and BLM Administrative Areas	Acres
Amargosa	27,904
Goodsprings	915
Indian Springs	1,303
Jean	2,445
Lathrop Wells	3,773
Las Vegas Valley	54,487
Laughlin	4,720
Mesquite	14,460
Moapa	40,950
Nelson	1,259
Pahrump	14,768
Primm	1,181
Sandy Valley	6,268
Searchlight	1,944
Three Lakes Valley	1,989
Valley West (Blue Diamond)	995
Desert Tortoise Conservation Center Management Area (excludes the 495-acre overlap with Arden Historic Sites)	11,014

Desert Tortoise Habitat Areas, Cultural Resource, and Special Geologic Areas:	*Acres*
Piute /Eldorado Valley ACEC	329,440
Coyote Springs Valley ACEC	75,500
Mormon Mesa ACEC	151,360
Gold Butte ACEC, Part A (including,, Devil's Throat*, Red Rock Springs*, and Whitney Pockets* Areas of Critical Environmental Concern, and Bureau of Reclamation lands.)	185,469
Amargosa Mesquite ACEC	6,891
Arden Historic Sites ACEC	1,480
Arrow Canyon ACEC	2,084
Big Dune ACEC	1,920
Ash Meadows ACEC(outside Refuge)	27,729
Crescent Mining Town ACEC	437
Devils Throat ACEC*	
Gold Butte, Part B (includes Gold Butte Townsite ACEC)	118,536
Hidden Valley ACEC	3,360
Keyhole Canyon ACEC	361
Rainbow Gardens ACEC	37,620
Red Rock Springs ACEC*	
River Mountains ACEC	11,095
Sloan Rock Art District ACEC	320
Stump Springs ACEC	641
Whitney Pockets ACEC*	
Virgin Mountains ACEC	38,341
Virgin River ACEC	6,411

Special Recreation Management Areas:	*Acres*
Nellis Dunes	10,000

Riparian Zones:	*Acres*
Muddy River riparian zone	205
Virgin River Riparian zone	805
Within 0.25 mile of natural springs (See Table 3-3).	8,000
Ash Meadows National Wildlife Refuge (BLM-administered lands)	9,423
ACEC and Special Recreation Management Areas (see Maps 2-7 and 2-5; also see Table 3-3 for spring areas.)	
Total acres:	1,227,226

Salable Minerals

MN-1-k. Allow salable mineral disposal outside the areas listed in Table 2-12, and outside Areas of Critical Environmental Concern (see Tables 2-2 through 2-6). Two exceptions are described below, one for highway maintenance use in desert tortoise management Areas of Critical Environmental Concern, and another for existing Clark County Free-Use and Government Wash Community Pit on the east edge of the Rainbow Gardens Area of Critical Environmental Concern. (*Note*: Legal descriptions are in Appendix M.)

1) Gold Butte A, Coyote Springs, Mormon Mesa and Piute/Eldorado desert tortoise Areas of Critical Environmental Concern remain open to issuance of free-use permits only within 0.50 mile to either side of the State highways and County Roads identified on Maps 2-12 and 2-13. These authorizations would only be issued to governmental entities. Grant permits only for a limited period of time. For expansions of existing pits exceeding a cumulative total of 1,000 acres of new disturbance, the applicant would be responsible for U.S. Fish and Wildlife consultation addressing possible impacts to the Desert Tortoise.

2) Allow existing free-use and community pit authorizations in Township 20 South, Range 64 East, within the Rainbow Gardens Area of Critical Environmental Concern, to

be re-authorized or renewed, but do not allow expansion of the sites.

MN-1l. Mineral material disposal determined to be detrimental to desert tortoise would not be authorized.

MN-1-m. Consultation with the affected town board or advisory council would occur prior to approval of salable minerals disposal that could impact an unincorporated town or community.

Material Site Rights-of Way

MN-1-n. Allow new material site rights-of-way designation outside Areas of Critical Environmental Concern listed in Tables 2-2 through 2-6 and shown on Map 2-7. An exception is described below for material site rights-of-way in desert tortoise Areas of Critical Environmental Concern.

Exception: Gold Butte A, Coyote Springs, Mormon Mesa, and Piute/Eldorado desert tortoise Areas of Critical Environmental Concern would remain open to the granting of material site rights-of-way only within 0.50 mile to either side of those federal aid highways identified on Maps 2-12 and 2-13. These authorizations would only be issued to governmental entities. Apply acreage limitations identified under MN-1-k.

Hazardous Materials Management

Objective
HZ-1. Prevent hazardous materials contamination of public lands.

Management Direction
HZ-1-a. Minimize releases of hazardous materials through compliance with current regulations. When hazardous materials are released into the environment, assess their impacts on each resource and determine the appropriate response, removal, and remedial actions to take.

Objective
HZ-2. Reduce risks associated with hazardous materials on public lands.

Management Direction
HZ-2-a. Evaluate all actions (including land use authorizations and disposals, mining and milling activities, and unauthorized land uses) for hazardous materials, waste minimization and pollution prevention.

HZ-2-b. Complete site-specific inventories when lands are being disposed or acquired. It is departmental policy to minimize potential liability of the Department and its bureaus by acquiring property that is not contaminated unless directed by Congress, court mandate, or as determined by the Secretary." (602 DM 2).

HZ-2-c. Inspect mining and milling sites to determine appropriate management for hazardous materials.

Fire Management

Objective
FE-1. Provide fire suppression on approximately 3,332,000 of public acres, based on suppression areas/zones and resource management needs (Map 2-11).

Management Direction
FE-1-a. Provide fire suppression efforts commensurate with resource and adjacent property values at risk.

FE-1-b. Prevent human-caused fires through an aggressive education, investigation, and public outreach effort.

FE-1-c. Provide for maximum fire protection through a comprehensive fire detection system using a multi-agency approach.

FE-1-d. Use approved fire suppression techniques in areas of critical environmental concern where there are concerns for habitat, cultural resources, threatened and endangered species, wilderness study areas, designated natural areas, and urban/rural/wildland interface zones.

FE-1-e. For fire suppression , follow specific guidance in the Fire Management Action Plan.

Objective
FE-2. Allow prescribed fire for resource enhancement purposes on those areas identified on Map 2-11.

Management Direction
FE-2-a. Determine specific hazard reduction priorities, including any noxious or invasive species infestations, and implement according to the existing budget.

Objective
FE-3. Provide fuels reduction management for resource protection on those areas identified on Map 2-11.

Management Direction
FE-3-a. Determine specific prescribed burn priorities annually, including any noxious or invasive species infestations, and implement where possible.

Objective
FE-4. Provide fire suppression assistance to other state and federal entities where formal agreements are in place.

Management Direction
FE-4-a. Provide, maintain, and/or upgrade fire management cooperative agreements, memoranda of understanding, and reciprocal agreements to provide maximum protection to resources and or adjacent property values.

Management Areas

Fire Suppression Areas/Zones
The planning area is subject to suppression for wildland fires in three suppression zones (see Map 2-11) based on site-specific resource management needs (such as critical desert tortoise habitat, Wilderness Study Areas and Areas of Critical Environmental Concern).

Develop specific tactics and initial attack schemes in subsequent activity plans.

Zone 1: General Characteristics
This area does not contain critical desert tortoise habitat. The dominant vegetation throughout most of the zone is perennial. There is high recreation and visitor use, high fuel carryover potential, high urban/wildland interface factor, and a high interagency mutual aid assistance factor. Unique vegetative communities exist throughout the zone. Non-attainment air quality is an issue. A higher percentage of human-caused and or related fires occur in Zone 1 than in other areas.

Zones 2A and 2B: General Characteristics
These areas contain critical desert tortoise habitat and bighorn sheep populations. There is a higher percentage of ephemeral/perennial plant communities, which can periodically produce heavy fuel loading of persistent annual species. Areas in these zones are mostly rural/wildland interface where a higher volume of fires are caused by lightening. Historic mining districts are more prevalent. These zones are generally more dry. Interagency mutual aid and assistance is necessary. Non-attainment air quality is an issue to a lesser degree, and unique vegetative communities exist throughout the zones.

Fire Use Areas - Prescribed burning for resource enhancement may occur in the Gold Butte Allotment (where important values are wildlife, watershed, wild horses and burros), South McCullough Range (for wildlife), Virgin River Floodplains (where important values are riparian, wildlife, water quality, and recreation), and the Ash Meadows/Amargosa Flat Area.

Fire Fuels Management Areas - The fuel hazard reduction for resource/property protection will occur in the Virgin Peak White Fir Stands (ladder fuel reduction), South McCullough Range Pinyon-Juniper Woodlands (shaded fuel break), and the Spring Mountain Woodlands (ladder fuel reduction).

Table 2-12. Locations and areas closed to authorization/renewal of material site rights-of-way and to mineral materials disposal, solid mineral leasing and subject to segregation and withdrawal of locatable minerals.

	Acres		Acres
Valid Existing Closures		River Mountains ACEC	5,617
Amargosa Mesquite ACEC	6,891	Sloan Rock Art Site ACEC	320
Arden Historic Sites ACEC	**1,595	Stump Spring Prehistoric/Historic Site ACEC	641
Arrow Canyon Paleontological Site ACEC	2,084	Virgin River Anasazi Prehistoric District ACEC	6,411
Ash Meadows ACEC	37,152	Whitney Pocket Archaeological Complex ACEC	*160
Big Dune ACEC	1,920		
Crescent Mining Townsite ACEC	437		
Coyote Springs ACEC	75,500		
Devil's Throat ACEC	*640		
Gold Butte ACEC, Part A	185,469	Desert Tortoise Conservation Center	11,489
Gold Butte ACEC, Part B (including Gold Butte Townsites)	118,937	Nellis Dunes Special Recreation Management Area	10,000
Gold Butte ACEC, Part C (Virgin Mts)	38,431		
Hidden Valley (Muddy Mountains) Archaeological District ACEC	3,360	Virgin River riparian zone	805
Keyhole Canyon Rock Art Site ACEC	361	Muddy River riparian zone	205
Mormon Mesa ACEC	151,360	Within 1/4 mile of natural springs and associated riparian zones	8,000
Piute-Eldorado ACEC	329,440		
Rainbow Gardens ACEC	37,620		
Red Rock Spring Archaeological Site ACEC	*640	Total Acres (excluding overlaps and existing Bureau of Reclamation withdrawals)	1,033,569

**Arden Historic Sites ACEC overlaps 475 acres within the Desert Tortoise Conservation Center.
* Gold Butte ACEC, Part A overlaps Devil's Throat ACEC, Red Rock Spring ACEC, and Whitney Pockets ACEC.

Chapter 3 - Affected Environment

Introduction

This chapter describes environmental components of the planning area potentially affected by implementation of the Proposed Resource Management Plan/Final Environmental Impact Statement. These include lands, minerals, soils, water resources, air quality, vegetation, wildlife habitat, wild horses and burros, livestock grazing, paleontological and cultural resources, visual resources, recreation, wilderness, natural areas, and socio-economic conditions. Much of the data contained within this chapter is drawn from the more detailed *Analysis of the Management Situation*. The existing data was updated where possible to reflect current conditions. The data is available for public review at the Las Vegas BLM Field Office.

Physical Description of the Planning Area

Physiography

The topography and drainage of Clark County and southern Nye County are characteristic of the Basin and Range Province, with internally draining basins separated by ranges, hills, and mesas. The trend of the ranges is not always uniform, but a general north-south orientation is apparent. The Las Vegas Valley cuts diagonally across much of Clark County, following a line of north-trending ridges that bend toward the west at the northern end of the valley and toward the east in the south. The Grand Wash Cliffs, a few miles beyond the eastern edge of Clark County, mark the boundary between the Basin and Range Province and the Colorado Plateau Province. Most of the planning area lies within the Colorado River Basin and is externally drained by the Colorado River and its tributaries. The remaining portions drain either to the Central Region or Death Valley.

The mountain ranges, generally composed of exposed bedrock, are steep and cut by deep ravines. They rise abruptly above smooth and gently sloping basin floors. Erosional forces transport materials downslope from the mountains. This alluvium coalesces into extensive fans along the margins of the valleys and basins. These deposits are now being actively eroded and dissected by many deep gullies. Elevations in the planning area range from approximately 11,900 feet above sea level at Charleston Peak, the fifth highest peak in Nevada, to approximately 500 feet in the vicinity of Laughlin.

Lowlands comprise a large percentage of the total surface area. A few of the large valleys, including the Muddy and Virgin Valleys, drain into the Colorado River system. Others (such as the Amargosa Valley, Indian Springs Valley, Dry Lake Valley, Eldorado Valley, and the upper portion of the Las Vegas Valley) are enclosed basins with no external drainage.

The geologic history of southern Nevada includes repeated periods of deposition, uplift, igneous activity, and erosion since the Paleozoic, which ended approximately 250 million years ago. Thick sequences of marine sedimentary deposits accumulated throughout Paleozoic and Mesozoic times; these strata are exposed in the vividly colored formations of the Red Rock Canyon National Conservation Area Lands, west of Las Vegas.

Approximately 50 million years ago, thick volcanic materials extruded over broad areas of the region, then were uplifted and deformed by faulting. Since the mountain-building periods, southern Nevada has been geologically quiet, with activity restricted largely to depositional and erosional forces.

Climate

The climate in the Las Vegas District is characteristic of southern Nevada. The Sierra Nevada Range of California and the Spring Mountains west of the Las Vegas Valley act as a barrier to moisture-laden storms moving inland from the Pacific Ocean. Air masses are cooled as they ascend the western slopes of these ranges. Precipitation is lost prior to descent of these masses into the warmer valleys. The average annual precipitation ranges from 4 to 8 inches at lower elevations, and from 12 to 20 inches at higher elevations. Maximum precipitation normally falls between November and March, when an average of 40 to 60 percent of annual amounts are received. Minimum precipitation occurs in May, June, September, and October. During July and August, thunderstorms are common, contributing between 25 and 30 percent of annual precipitation. These storms

are often of sufficient intensity to produce localized flash flooding.

Evaporation rates are extremely high in southern Nevada. The area's high temperatures, low humidity, abundant sunshine, and wind cause the amount of surface waters lost to exceed precipitation received. At Lake Mead, for example, the annual loss is nearly 20 times the annual gain from precipitation.

The lowest elevations of the planning area are in the Mojave Desert, one of the few genuine hot desert areas in the United States. The winters are mild, with daytime temperatures reaching an average maximum of 60 degrees Fahrenheit and nighttime temperatures averaging 35 to 45 degrees. Summers are hot, with daytime maximum temperatures averaging 95-105 degrees Fahrenheit and nighttime temperature minimums from 70 to 75 degrees. Southern Nevada also has a high percentage of sunny days per year; in Las Vegas, 85 percent of the year can be expected to be sunny.

Air Resource Management

Air quality is determined by several factors, including landform, amount of contaminants emitted into the atmosphere, and meteorological conditions. In southern Nevada, stable atmospheric conditions, low mixing heights, and light winds during night and morning hours provide opportunities for contaminants to accumulate. Atmospheric dispersion of pollutants generally improves by mid-afternoon.

The effects of ambient air quality within an air basin depend mainly on the characteristics of the receptors and the type, amount, and duration of exposure. As defined in 40 CFR 50.1(e), ambient air is "that portion of the atmosphere, external to buildings, to which the general public has access." As required by the Clean Air Act and established by the Environmental Protection Agency, National Ambient Air Quality Standards specify the concentration and duration for which pollutants may cause adverse health effects. National primary ambient air quality standards define levels of air quality, with an adequate margin of safety to protect the public health. National secondary ambient air quality standards define levels of air quality, with an adequate margin of safety, to protect the public welfare from any known or anticipated adverse effects of a pollutant. Where differences in local and national standards exist, the more stringent standards apply. The National Ambient Air Quality Standards shown in Table 3-1 were adopted by the State of Nevada and Clark County. The National Ambient Air Quality Standards were established for carbon monoxide, nitrogen oxides, ozone, particulate matter, sulfur oxides and lead.

Carbon monoxide is produced primarily by incomplete fuel combustion in motor vehicles. The major effects of carbon monoxide occur near its sources (busy streets and freeways). The highest carbon monoxide measurements usually occur in the winter when winds are light and temperature inversions trap air near the ground surface from early evening through mid-morning, preventing pollutant dispersal. Traffic peaks in early morning and late afternoon produce corresponding peaks in carbon monoxide concentrations, which is a reoccurring trend throughout the year. Although the 1-hour standard for carbon monoxide has never been exceeded, the 8-hour standard is exceeded on a seasonal basis. According to Clark County Comprehensive Planning, the overnight buildup of pollutants causes violations of the carbon monoxide 8-hour air quality standard in a limited area surrounding the East Charleston monitoring station. Carbon monoxide has a toxic potential to human health. When breathed, carbon monoxide impairs oxygen transport, sometimes adversely affecting the cardiovascular system and the central nervous system. The severity of health effects increases with the level and duration of exposure (Seinfeld 1986).

The primary contributor of PM_{10} throughout the Las Vegas BLM District is fugitive dust, both naturally occurring in a desert environment and human caused. The latter are largely responsible for excesses of the PM_{10} National Ambient Air Quality Standards within the Las Vegas Valley. The major sources of PM_{10} emissions in the valley are paved and unpaved roads, construction activities, industrial/commercial facilities, motor vehicle exhaust, and disturbed vacant land. Particulate matter less than 10 microns in size is of special concern because it is inhaled deep into the lungs. The ultimate effects of particles on human health are difficult to determine however. There is little data available regarding the effects of industrial particulates versus those of soil-related dust. Because most health studies have examined only fossil fuel generated particulates, and most of Las Vegas Valley's particulate concentrations are due to soil related dust, it is inappropriate at this time to estimate the health effects induced by particulate matter concentrations in the valley.

Table 3-1. Ambient air quality standards.

Pollutant	Averaging Time	Primary	Secondary
NATIONAL AMBIENT AIR QUALITY STANDARDS			
Carbon monoxide (CO)	8-hour concentration[a]	9 ppm	
	1-hour concentration[a]	35 ppm	
PM_{10}	Annual arithmetic mean	50 ug/m^3	50 ug/m^3
	24-hour concentration[a]	150 ug/m^3	150 ug/m^3
Sulfur dioxide (SO_2)	Annual arithmetic mean	0.03 ppm	
	24-hour concentration[a]	0.14 ppm	
	3-hour concentration[a]	0.5 ppm	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.053 ppm	0.053 ppm
Ozone (O_3)[b]	1-hour concentration	0.12 ppm	0.12 ppm
Lead (Pb)	Arithmetic mean per calendar quarter	1.5 ug/m^3	1.5 ug/m^3
NEVADA AMBIENT AIR QUALITY STANDARDS			
Total suspended particulates (TSP)	Annual mean	75 ug/m^3	75 ug/m^3
	24-hour concentration for Las Vegas Valley	260 ug/m^3	260 ug/m^3
	24-hour concentration elsewhere in Clark County	150 ug/m^3	150 ug/m^3
Hydrogen sulfide (HS)	1-hour concentration	0.08 ppm	0.08 ppm
Visibility		Maintain the prevailing visibility of greater than 30 miles.	

Key:
a Not to be exceeded more than once per year.
b The number of days with hourly concentrations greater than the standard are not to be exceeded more than once per year.
ppm Parts per million
ug/m^3 Micrograms per cubic meter

Ozone is produced through a series of chemical reactions. A reaction between reactive hydrocarbons and nitric oxides, both of which are primarily emitted by motor vehicles, forms nitrogen dioxide and other compounds. The formation of nitric oxide and an oxygen atom follows the photodissociation of the nitrogen dioxide by sunlight. The oxygen atom then combines with oxygen molecules to form ozone. Ozone is an irritant of the respiratory system. It inhibits proper functioning of the lungs and can cause symptoms of chest tightness, coughing, and wheezing. These symptoms can occur after short-term exposure of between 294 and 490 ug/m^3 (Clark County Comprehensive Planning 1980).

Lead is primarily emitted through combustion of leaded fuel in motor vehicles. Indications are, however, that lead emissions are on the decline due to reductions in the use of leaded fuel. Once absorbed by the respiratory tract and then into the blood stream, lead is accumulated in the kidneys and liver. The nervous system may also be effected through inhalation of lead in the air (Clark County Comprehensive Planning 1980).

Nitrogen dioxide forms in the high temperature combustion of fuels, motor vehicle exhaust and the burning of organic wastes. At high concentrations, nitrogen dioxide has been shown to cause lung damage. The effects at the current levels both indoors and outdoors are difficult to characterize (Seinfeld 1986).

Sulfur dioxide forms during the combustion of all sulfur-containing fuels, such as coal and oil. Effects of sulfur dioxide on human health is primarily associated with the upper respiratory system, particularly in asthmatics.

Air pollutants not only have the potential to affect humans but also other components of the environment including, wildlife, fish, and vegetation. Wildlife can be affected by air pollutants through inhalation, adsorption and/or ingestion. Their populations can be directly affected through injury or death or indirectly through contamination of their food chain or loss of habitat (USFWS 1980).

Among the several air pollutants that harm vegetation are sulfur dioxide, ethane, and peroxyacetyl nitrate. Chlorine, hydrogen chloride, mercury, and ammonia are also harmful but to a lesser severity. Pollutants enter the plant through the stomata during normal respiration. Once in the leaf, they destroy chlorophyll and disrupt photosynthesis, resulting in damage ranging from growth rate reduction to actual death of the plant (Cooper 1986).

Visibility is generally referred to as the relative ease with which objects can be seen through the atmosphere under various conditions. Particulate matter and gases introduced into the atmosphere either absorb or scatter the light, reducing the amount of light a person can receive from a viewed object. The effect is a degraded aesthetic value of surrounding landscape.

The Clean Air Act specifies preventing pollution that would interfere with visibility in the mandatory Federal Class I areas. Mandatory Federal Class I areas refers to international parks; national wilderness areas, and memorial parks greater than 5,000 acres in size; and national parks greater than 6,000 acres in size. Although there are no Class I areas within the Las Vegas BLM District, there are such areas located downwind. The closest to the planning area is the Grand Canyon National Park in Arizona. Others include Bryce Canyon National Park and Zion National Park , both located in the southern most portion of Utah. No current data definitively indicates that southern Nevada, and in particular the Las Vegas Valley, impacts these parks. The Grand Canyon Visibility Transport Commission, which is managed by the Environmental Protection Agency and the Western Governor's Association, is currently investigating visibility-impairing pollutants and their effect on these and other parks and wilderness areas of the Colorado Plateau (Shivley 1995).

According to the Clark County Health District, a haze day is classified as an average reading for one hour or more between 5:00 AM and 11:00 AM when the visual range is less than 12 miles. If the visual range for one hour is less than 4.8 miles, haze is considered to be intense. The highest haze levels tend to occur in late fall and winter when night and morning inversions are most frequent and stagnant conditions exist. Currently, visibility is measured in two locations in the valley (metropolitan Las Vegas and Henderson). The greatest number of haze days recorded at these locations for a one-year period was 194 and 157, respectively. The greatest number of intense haze days for a one -ear period was 93 and 30, respectively. Data gathered to date indicates visibility improvement in Henderson and a deterioration in Las Vegas. At this time, there is no visibility standard for the rest of Clark County.

Table 3-2. Las Vegas Valley estimated emissions (tons/year) by source categories for 1993.

Source Category	PM_{10}	CO	VOC	NO_X	SO_2
Stationary Point Sources[a]	23,456	4,344	1,011	4,654	1,049
Stationary Area Sources[b]	---	2,198	12,650	1,546	---
On-Road Mobile Sources[c]	1,770	156,777	20,317	22,564	---
Non-Road Mobile Sources[d]	---	16,767	3,883	9,515	---
Totals	**25,226**	**180,086**	**37,861**	**38,279**	**1,049**

Key:
PM_{10} Particulate Matter less than 10 microns in size.
CO Carbon monoxide
NO_X Oxides of nitrogen
VOC Volatile organic compounds
SO_2 Sulfur dioxide
a Generally, any stationary source for which individual records are collected and maintained. Point sources are usually defined as any facility which releases more than a specified amount of a pollutant.
b An aggregation of stationary sources too small, difficult, or numerous to classify as point sources. The area source emissions are assumed to be spread over a broad area.
c Any moving source of air pollutants utilizing roadways such as automobiles.
d Any moving source of air pollutants not utilizing roadways such as aircraft, locomotives, and construction equipment.
[Source: Clark County Health District, Hock, 1995; Clark County Comprehensive Planning, Cates, 1995; and Nevada Department of Environmental Protection, Branmueller, 1995]

Table 3-3. Estimated emissions (tons/year) of primary sources outside the Las Vegas Valley for 1993.

Source	PM_{10}	CO	VOC	NO_X	SO_2
Reid-Gardner Power Plant[a]	2,397.69	---	---	8,739.92	9,651.96
Mojave Generating Station[a]	2,505.21	---	---	21,703.87	35,852
Chemical Lime Company	272.3	259.5	7.8	363.3	138.6
PABCO Gypsum Wallboard Plant	157.5	261.3	7	93.4	3.4
LASCO Bathware	0.3	0	293.8	0	0
Gornowich Sand and Gravel	5	---	---	---	---
Royal Cement Co. Inc.	113.3	32	---	480	63.9
Charles C. Heisen Associates	7.5	---	---	---	---
Las Vegas Paving Corporation (APEX)	39.4	23.6	7.9	84.2	4.1
Western Ash Company	9.6	---	---	---	---
APEX Waste Mgnt. Center Environmental Technologies Solid Waste Landfill	1.4	1.8	0.3	2.4	0.2
APEX Waste Mgnt. Center Environmental Technologies Soil Remediation Facility	3.5	5.8	18.4	3.3	0.3
Kern River Gas Transmission Company	1.16	2.73	6.5	231.7	---
Georgia Pacific Mine	40.06	---	---	---	---
Georgia Pacific Wallboard Plant	10	227.1	---	63.9	8
Colorado Belle Hotel/Casino	0.2	0.75	0.3	3.5	0.1
Total	**5,564.1**	**814.6**	**342**	**31,769.49**	**45,722.56**

Key:
a 1994 emissions

PM_{10} Particulate Matter less than 10 microns in size.
CO Carbon monoxide
NO_X Oxides of nitrogen
VOC Volatile organic compounds
SO_2 Sulfur dioxide

[Source: Clark County Health District, Hoch, 1995; and Nevada Department of Environmental Protection, Brannmueller, 1995]

Air quality is generally considered acceptable if pollutant levels are less than or equal to established standards on a continuous basis, as is the case for those areas lying outside Las Vegas Valley. These areas are characterized by a sparse population and few pollution sources. The Las Vegas Valley, however, presently exceeds standards for inhalable particulate matter (PM_{10}) and carbon monoxide and, consequently, has been termed a non-attainment area (an area that exceeds any national ambient air quality standards). Map 3-4a identifies the boundary of the Las Vegas Valley Non-Attainment Area. Table 3-2 identifies source categories and amounts of emissions within the Las Vegas Valley.

Although air quality outside the Las Vegas Valley is in conformance with the National Ambient Air Quality Standards, there are several primary sources of pollutant emissions. These sources, along with the amounts of pollutants they produce are identified in Table 3-3. The largest contributors are the two power generating stations, Reid Gardner Power Plant in the northeastern part of the planning area at Moapa, Nevada and the Mojave Generating Station in the far southern part of the planning area at Laughlin, Nevada. According to 1994 data, the Reid Gardner Power Plant emits 2,398 tons of PM_{10}, 8,740 tons of NO_X and 9,652 tons of SO_2 annually. The Mojave Generating Station is the largest pollutant source with 2,505 tons of PM_{10}, 21,704 tons of NO_X and 35,852 tons of SO_2 emitted annually.

Soils Management

Throughout the Las Vegas District, there is a sharp contrast in physiography between mountainous areas and interior lowlands. Soils in the region developed under different environmental influences. Under the arid conditions that prevail at all except the highest elevations, the soil has little downward leaching. Most leaching is confined to the translocation of soluble material (usually lime) from the surface to the subsoil, with the resultant formation of a hardpan. These soluble salts are usually leached only to a depth of 1 to 2 feet.

In this climate, rocks tend to disintegrate rather than decompose. Mechanical breakdown (spalling) is more common than chemical action. As a result, mountains are covered with a thin veneer of rock fragments. Cloud bursts and showers sweep large quantities of this material into ravines and valleys, forming alluvial fans of the coarser material. Finer-grained sediments are washed into the lowlands.

Wind is also an active agent in soil movement. Wind-blown sand is common, with the greatest accumulations in the lower valleys, often forming dunes. Wind-blown silts, mixed with the fine alluvium washed down from the slopes, comprises the soil mantle of the valleys. The term "blow sand" arises from the fact that much of the surface soil is wind-deposited.

Organic matter in most desert soils is far less than the average 3 to 5 percent by weight contained in soils formed in humid regions. Even in a wet year when spring annuals are abundant, much of the vegetative matter is oxidized by summer heat before it can be turned into humus. A gravelly surface referred to as "desert pavement" is found throughout the planning area. This surface is stable and resistant to erosion. Erosion is normally active on surfaces lacking a desert pavement. The sparse cover of vegetation does little to reduce wind and water velocities. Wind erosion is a major factor in recharging surface soils with carbonates through the movement and deposition of calcareous dusts.

Soils in the Las Vegas BLM District are primarily Entisols and Aridisols; a few Mollisols occur at the upper elevation of mountain ranges and on high plateaus. These are described in detail below. The Entisols have little or no evidence of development of pedogenic horizons. They are located in areas where soils are actively eroding (steep slopes) or receiving new deposits of soil materials (alluvial fans and floodplains).

Aridisols have one or more pedogenic horizons that may have formed in the present environment, or that may be relics from a former pluvial period. These soils do not have water available to plants for long periods of time and the surface is generally bare. Aridisols are often associated with desert pavement.

Mollisols are the very dark colored, base rich soils of high elevations. A few Mollisols are found high in the Spring Mountains and the Sheep Range. They may also occur above approximately 5,000 feet in the Virgin Mountains, the Gold Butte area, and at other locations where environmental conditions permit accumulation of organic materials.

Soil Erosion

Soil erosion involves two processes: (1) a detachment or loosening influence, and (2) transportation by means of floating, rolling, dragging, and splashing. Freezing and thawing; flowing water; and rain impact provide the detaching agents. Raindrop splash and especially running water facilitate the carrying away of loosened soil. On comparatively smooth soil surfaces, the beating of rain drops results in most of the detachment.

During the high intensity, short duration thunderstorms common in the region, raindrop impact tends to destroy soil aggregates, enhance sheet and rill erosion, and encourage considerable transportation by splashing. A hard crust often develops upon drying. This crust impedes seedling emergence, greatly reduces infiltration for the next storm, and limits the possibilities for vegetative shielding which, by absorbing the energy of rain impact, prevents loss of both water and soil and reduces degranulation to a minimum. However, in some desert locations, this surface crust does cover loose, fine soil particles, resulting in limited protection from wind erosion. In the vegetation types offering generally sparse cover, little interception of precipitation or protection from overland flow of water occurs.

As is the case with water erosion, the loss of soil by wind movement also involves detachment and transportation. The abrasive action of the wind results in some detachment of tiny soil grains from the granules or clods of which they are a part. When the wind is laden with soil particles, its abrasive action is greatly increased. The impact of these rapidly moving grains dislodges other particles from soil clods and aggregates. The cutting and abrasive effects, especially of sand, upon tender leaves and vegetation is harmful.

Erosion susceptibility is a measure of the erosion potential of a soil whose surface has been disturbed. Wind and water erosion potential are used to determine susceptibility in an area. Soil surveys conducted by the Soil Conservation Service, now the National Resource Conservation Service, were used to develop erosion susceptibility ratings for the planning area (see Map 3-2).

All of the Las Vegas BLM District is within the low-to- moderate susceptibility range, with the exception of a few relatively small areas rated as high in the northeast. Approximately 90,550 acres in the planning area have a high erosion susceptibility rating; 1,306,620 acres have a moderate rating; and 1,480,440 acres have a low rating.

Wind erosion potential is classified as low, moderate, or high. Soils with a Natural Resources Conservation Service wind erodibility group rating of 1 or 2 are classified as high. A moderate rating is given to soils with a wind erodibility group rating of 3 or 4, and a rating of slight is given to soils with a wind erodibility rating of 5 or more.

Each soil also has a high, moderate, or low water erodibility rating. The "K" value is the soil erodibility factor used in the Universal Soil Loss Equation for estimating erosion. This value is derived from data collected in Natural Resources Conservation Service soil survey field notes and is primarily a combination of soil surface texture, structure, and organic matter content modified with cover such as rock fragments. It is always less than 1.0. Soils with a high "K" value have a soil texture that is more erodible than one with a low "K" value. In general, if the slope multiplied by the "K" value of a soil is 2.5 or less, the soil is in the slight erosion hazard category. If the slope times the "K" value is between 2.5 and 7.5, the soil is rated as having a moderate erosion hazard, and values above 7.5 will place the soil into the severe hazard category. It is emphasized that these break points are only general guidelines and are not the only factors used to place a soil in an erosion susceptibility class. For example, a soil with a slope times "K" value of 2.4 may be placed in either a slight or moderate erosion hazard class, depending on information provided in soil survey field notes. This soil would not, however, be classified as having a severe water erosion potential.

Erosion condition data was compiled from several inventories, including the BLM Watershed Conservation and Development program (1977) and the *BLM Clark County Range Survey* (1979). Determinations of a soil surface factor were used to portray the erosion condition of an area. Erosion condition ranges from slight to critical, with most of the area falling into the slight to moderate erosion condition classes (see Map 3-3). There are 96,994 acres in critical erosion condition; 1,137,968 in moderate erosion condition;1,286,420 in slight erosion condition; and 36,970 acres in stable erosion condition. The remainder is undetermined. These erosion condition classes are defined as follows:

Table 3-4. Erosion Susceptibility classes and acreage within Grazing Allotments, Herd Management Areas, Right-of-way Corridors and Competitive ORV Areas.

	EROSION SUSCEPTIBILITY CLASS			
GRAZING ALLOTMENT	Low	Moderate	High	Undetermined
Action Farrier	2,256	39,461		
Arrow Canyon	28,114	52,404	8,117	
Azure Ridge	3,175	4,161		
Billygoat Peak	23,574	25,304		
Black Butte	29,792	13,775		
Bunkerville	41,969	64,137	23,494	
Christmas Tree Pass	42,741	21,028		
Crescent Peak	62,450	54,517		
Dry Lake	17,474	19,267	270	
Flat Top Mesa	1,375	2,149	2,328	
Glendale	2,477	8,591	10,592	
Gold Butte	107,083	62,169		
Hen Springs	7,018	15,170		
Hidden Valley	18,109	43,258		
Ireteba Peaks	90,991*	119,421*		
Jackrabbit	47		2,596	
Jean Lake	56,320	75,852		
Kyle Canyon	11,941	13,171		
Lime Springs		4,119		
Lower Mormon Mesa		34,798	3,452	
Lucky Strike	72,973	26,910		
McCullough Mountain	113,385*	160,819*		
Mesa Cliff	1,060	6,464	3,980	
Mesquite Community	1,474	7,740		
Muddy Mountain	52,105	115,619	8,114	
Muddy River		1,244	1,018	
Newberry Mountains	18,137	13,140		
Overton Arm		1,723	153	
Pittman Well	25,547	3,209		
Pulsipher Wash		1,135	1,365	
Roach Lake	10,043	8,282		
Mount Stirling				122,163
Rox	529	17,155	8,019	
South Point	10,057	1,883		
Spring Mountain	171,834	104,656		
Stump Springs	47,612	2,895		
Sunrise Mountain	25,628	19,203		
Table Mountain	44,532	39,512		
Toquop Sheep	5,477	18,171	3,058	
Upper Mormon Mesa	9,679	34,443	1,217	

Table 3-4. Erosion Susceptibility classes and acreage within Grazing Allotments, Herd Management Areas, Right-of-way Corridors and Competitive ORV Areas (concluded).

	EROSION SUSCEPTIBILITY CLASS			
GRAZING ALLOTMENT	Low	Moderate	High	Undetermined
Ute	8,935	33,683	2,460	
Wheeler Slope	63,103	6,144		
Wheeler Wash	49,259	16,027		
White Basin	41,330	47,751	3,833	
Younts Spring	16,211			
5555 (Indian Springs)	38,711	2,844		10,530
6666 (River Mountains)	1,252	5,140		
7777 (Las Vegas Valley)	97,918	28,238		
9999 (Lake Mead NRA)	---	---	---	---
Virgin River Bottom	90			
Carson Slough				9,769
County Line				8,848
Grapevine-Rock Valley				13,171
Totals:	**1,473,787**	**1,396,782**	**84,066**	**164,481**
* Includes Eldorado Disposal Area				
HERD MANAGEMENT AREA				
Amargosa				9,428
Eldorado		15,492		
Gold Butte	103,642	66,425		
Johnnie	82,761	22,377		173,522
Muddy Mountains	41,962	34,352		
Ash Meadows				97,073
Totals:	**228,365**	**138,646**		**280,023**
RIGHT-OF-WAY CORRIDORS	72,485	40,505	1,793	40,553
Totals:	**72,485**	**40,505**	**1,793**	**40,553**
COMPETITIVE ORV AREAS	335,900	247,168	16,175	344,493
Totals:	**335,900**	**247,168**	**16,175**	**344,493**

Table 3-5. Erosion Condition classes and acreage within Grazing Allotments, Herd Management Areas, Right-of-way Corridors and Competitive ORV Areas.

	EROSION CONDITION CLASS				
GRAZING ALLOTMENT	Stable	Slight	Moderate	Critical	Undetermined
Action Farrier		3,167	18,658		20,060
Arrow Canyon		27,209	56,268	5,477	4,209
Azure Ridge		455	6,502		
Billygoat Peak		17,194	31,815		
Black Butte		31,786	14,421	5,814	2,272
Bunkerville		72,736	58,589	669	
Christmas Tree Pass		25,408	37,630		
Crescent Peak		113,909	9,756	319	
Dry Lake		17,119	13,787		5,627
Flat Top Mesa		2,800	833	1,860	
Glendale		6,193	11,677	4,448	
Gold Butte		74,717	77,636	2,489	
Hen Springs		12,153	9,271		
Hidden Valley	3,933	30,148	14,664		10,339
Ireteba Peaks*		68,115	120,550	5,681	6,419
Jackrabbit				4,266	
Jean Lake		73,146	45,083	16,529	2,739
Kyle Canyon		6,586	16,791		724
Lime Springs		4,119			
Lower Mormon Mesa		35,136	6,883	771	
Lucky Strike	2,343	79,223	15,014		3,249
McCullough Mountain*		123,012	76,659	1,148	21,039
Mesa Cliff		2,123	1,102	8,422	
Mesquite Community		7,448	4,745		
Muddy Mountain		68,735	54,807	8,302	33,194
Muddy River		6,167	4,119		4,080
Newberry Mountains		1,487	14,521	3,492	1,328
Overton Arm		2,763			
Pittman Well		16,084	11,025		
Pulsipher Wash		249		2,098	
Roach Lake		13,971	2,233	2,431	2,384
Mount Stirling					123,724
Rox			20,838		1,224
South Point		6,805	1,004	2,680	1,300
Spring Mountain	3,152	110,235	99,863		15,523
Stump Springs		17,174	34,334		
Sunrise Mountain		5,237			41,140
Table Mountain		33,303	50,409		4,347
Toquop Sheep		24,404			
Upper Mormon Mesa		14,824	23,501		7,952
Ute		21,821	14,023	653	7,762
Wheeler Slope	10,387		17,250		4,616

Table 3-5. Erosion Condition classes and acreage within Grazing Allotments, Herd Management Areas, Right-of-way Corridors and Competitive ORV Areas (concluded).

	EROSION CONDITION CLASS				
GRAZING ALLOTMENT	**Stable**	**Slight**	**Moderate**	**Critical**	**Undetermined**
Wheeler Wash		44,412	13,021		7,272
White Basin		11,659	33,250	4,117	40,336
Younts Spring		13,137	2,257		
5555 (Indian Springs)	2,490	24,966	10,833	2,364	10,749
6666 (River Mountains)					4,080
7777 (Las Vegas Valley)		6,947	19,921		99,288
9999 (Lake Mead NRA)**					
Virgin River Bottom					90
Carson Slough					10,236
County Line					9,438
Grapevine-Rock Valley					12,966
Totals:	**22,305**	**1,278,282**	**593,486**	**80,030**	**519,706**
* Includes Eldorado Disposal Area					
** All NPS administered					
HERD MANAGEMENT AREA					
Amargosa					9,460
Eldorado		3,165	10,615	1,469	348
Gold Butte		60,833	84,849	8,994	15,405
Johnnie		57,721	15,916		179,261
Muddy Mountains		13,671	35,866	3,416	19,727
Ash Meadows					98,419
Totals:		**135,390**	**147,246**	**13,879**	**322,620**
RIGHT-OF-WAY CORRIDORS					
	490	64,736	36,758	3,691	35,481
Total:	**490**	**64,736**	**36,758**	**3,691**	**35,481**
COMPETITIVE ORV AREAS					
	5,722	389,848	217,511	28,742	241,165
Totals:	**5,722**	**389,848**	**217,511**	**28,742**	**241,165**

Table 3-6 Potential Soil loss estimates (tons per year).

Grazing Allotment	Acres of Use	Soil Loss Natural	Soil Loss With Grazing	Soil Loss From Grazing
Acton Farrier	1,750	376	376	0
Arrow Canyon	1,320	194	194	0
Azure Ridge	---	---	---	---
Billygoat Peak	10,320	8,277	8,318	41
Black Butte	11,200	4,021	4,032	11
Bunkerville	37,840	17,709	17,747	38
Christmas Tree Pass	39,900	17,795	17,835	40
Crescent Peak	104,160	56,767	56,871	104
Dry Lake	7,360	2,517	2,524	7
Flat Top Mesa	5,000	705	705	0
Glendale	12,160	1,520	1,520	0
Gold Butte	74,440	58,138	58,287	149
Hen Springs	19,830	21,020	21,119	99
Hidden Valley	20,670	9,798	9,818	20
Ireteba Peaks	109,920	49,024	49,134	110
Jackrabbit	5,600	638	666	28
Jean Lake	88,320	40,362	40,451	89
Kyle Canyon	13,440	5,107	5,134	27
Lime Springs	---	---	---	---
Lower Mormon Mesa	31,360	4,829	4,829	0
Lucky Strike	39,200	74,206	74,206	0
McCullough Mountain	114,560	51,094	51,208	114
Mesa Cliff	6,500	1,879	1,885	6
Mesquite Community	---	---	---	---
Muddy Mountain	48,000	18,288	18,336	48
Muddy River	3,200	506	506	0
Mount Stirling	24,320	6,129	6,129	0
Newberry Mountains	18,600	14,899	14,936	37
Overton Arm	10,880	272	294	22
Pittman Well	13,440	5,174	5,188	14
Pulsipher Wash	3,300	432	446	14
Roach Lake	6,400	1,882	1,882	0
Rox	11,520	2,097	2,097	0
South Point	10,560	8,459	8,501	42
Spring Mountain	3,500	662	662	0
Stump Springs	19,840	5,277	5,277	0
Sunrise Mountain	---	---	---	---
Table Mountain	8,960	3,987	3,987	0
Toquop Sheep	4,480	977	981	4
Upper Mormon Mesa	20,200	12,282	12,282	0
Ute	10,880	2,307	2,307	0
Wheeler Slope	---	---	---	---

Table 3-6. Potential Soil loss estimates (concluded).

Grazing Allotment	Acres of Use	Soil Loss Natural	Soil Loss With Grazing	Soil Loss From Grazing
Wheeler Wash	51,200	78,746	78,848	102
White Basin	6,400	3,238	3,245	7
Younts Spring	8,320	2,213	2,230	17
5555 (Indian Springs)	---	---	---	---
6666 (River Mountains)	---	---	---	---
7777 (Las Vegas Valley)	---	---	---	---
9999 (Lake Mead NRA)	---	---	---	---
Virgin River Bottom	125	2	2	0
Carson Slough	---	---	---	---
County Line	---	---	---	---
Grapevine-Rock Valley	---	---	---	---
Totals	**1,038,975**	**593,805**	**594,995**	**1,190**

Herd Management Area	Acres of Use	Soil Loss Natural	Soil Loss W/WH&B (at AML)	Soil Loss From WH&B (at AML)
Amargosa	---	---	---	---
Eldorado	---	---	---	---
Gold Butte	112,149	87,588	87,701(87,588)	113(0)
Johnnie	108,874	27,436	27,436(27,436)	0(0)
Muddy Mountains	28,077	14,207	14,207(14,207)	0(0)
Ash Meadows	---	---	---	---
Totals	**249,100**	**129,231**	**129,344 (129,231)**	**113 (0)**

Competitive ORV Areas	Acres Disturbed	Soil Loss Natural	Soil Loss W/ORV	Soil Loss From ORV
	3,325	595	3,245	2,650

Mineral Development	Acres Disturbed	Soil Loss Natural	Soil Loss With Mineral Development	Soil Loss From Mineral Development
	1,461	262	1,426	1,164

Stable (0-20) - There are no signs of soil movement. Surface litter is usually accumulating in place. Surface rock, if present, will be evenly distributed over the area. No pedestaling, rills, or flow patterns are apparent. Gullies may be present in a stable condition.

Slight (21-40) - Some movement of soil particles and surface litter is apparent. Surface rock may be present but collection of small particles may be spotty. No pedestals are apparent. Rills less than one-half inch deep occur at infrequent intervals of more than ten feet. Visible flow patterns have been formed by surface water. Deposition of pavement particles may appear in flow patterns. Gullies may be present, but with little evidence of streambank or streambed erosion.

Moderate (41-60) - Moderate movement of soil is plainly visible and recent. Moderate movement can be recognized by slight terracing caused by the accumulation of material deposited against litter, vegetation or rocks. The terraces will generally be less than one inch in height. Moderate movement of litter is apparent. Some surface rock may be exposed in bare spots where fine soil particles have been recently removed by wind and/or water. Small rocks and plants on pedestals occurring in the flow patterns may be noticed. Small rills are apparent in exposed places. These rills will be between 0.5 and 6 inches deep at intervals of approximately 10 feet. Sediment deposits are visible intermittently in flow patterns and against small obstructions elsewhere.

Critical (61-80) - The soil mantle is in a critically eroded condition. Soil movement occurs with each runoff. Transported soil and debris caused by wind and water is deposited throughout the area against minor surface obstructions. Extreme movement of litter is apparent. Recent exposure of surface rock is common on gravelly and stony soils. Small rocks and plants on pedestals are generally evident and roots are exposed. Large rills are apparent on exposed areas. Flow patterns contain easily noticeable silt and sand deposits and alluvial fans. Actively eroding gullies are present on 10-50 percent of the area being considered.

Severe (81-100) - Subsoil is exposed over much of the area. Embryonic dunes and wind-scoured depressions may be evident. Only minimal traces of surface litter remain. Surface rock or fragments are dissected by rills and gullies. Most rocks and plants are pedestaled, and rocks are exposed. Flow patterns are numerous and readily noticeable, showing large barren fan deposits. Large rills are apparent on exposed areas at intervals of less than five feet. Actively eroding gullies are present on more than 50 percent of the area.

Tables 3-4 and 3-5 show the Erosion Susceptibility and Erosion Condition Classes within various use areas. These include grazing allotments, wild horse and burro Herd Management Areas, rights-of-way, and competitive off-road vehicle areas.

Soil loss, both naturally occurring and that resulting from land uses, was estimated using the Revised Universal Soil Loss Equation (see Table 3-6). This equation is a revision and update of the time tested Universal Soil Loss Equation. The equation is stated as **A = R K L S C P** where **A** is annual soil loss from sheet and rill erosion caused by rainfall and its associated overland flow, **R** is the factor for climatic erosivity, **K** is the factor for soil erodibility, **L** is the factor for slope length, **S** is the factor for slope steepness, **C** is the factor for cover management, and **P** is the factor for support practices. These factors represent the effect of climate, soil, topography, and land use on sheet and rill erosion.

Water Resource Management

The planning area contains portions of three hydrographic regions or basins: the Central Region, the Colorado River Basin, and the Death Valley Basin. As shown in Table 3-7, these three regions are further divided into 29 hydrographic areas that are totally or partially within the planning area (Map 3-4b).

The Central Region is a topographically closed drainage system primarily located in Nevada. The eight hydrographic areas within this region are, for the most part, internally drained.

All but three of the 15 hydrographic areas within the Colorado River Basin are tributary to the Colorado River. Garnet Valley (area 216) and Hidden Valley (area 217) are topographically closed, but are totally surrounded by areas that drain to the Colorado River. The southern part of Three Lakes Valley (area 211), the third non-contributing hydrographic area,

Table 3-7. Hydrographic areas.

Central Region		**Colorado River Basin**	
161	Indian Springs Valley	205	Lower Meadow Valley Wash
162	Pahrump Valley	210	Coyote Spring Valley
163	Mesquite Valley	211	Three Lakes Valley-Southern Part
164a	Ivanpah Valley - Northern Part	212	Las Vegas Valley
164b	Ivanpah Valley - Southern Part	213	Colorado River Valley
165	Jean Lake Valley	214	Piute Valley
166	Hidden Valley South	215	Black Mountains Area
167	Eldorado Valley	216	Garnet Valley
Death Valley Basin		217	Hidden Valley - North Part
225	Mercury Valley	218	California Wash
226	Rock Valley	219	Muddy River Springs Area
227a	Forty-Mile Canyon-Jackass Flats	220	Lower Moapa Valley
		222	Virgin River Valley
229	Crater Flat	223	Gold Butte Area
230	Amargosa Desert	224	Greasewood Basin
		228	Oasis Valley

discharges flood water out of Lee Canyon onto an alluvial fan. Depending on which channel the flood water enters, the flow goes either to the Colorado River or to the dry lake within the southern part of Three Lakes Valley.

Within the Las Vegas BLM District, six hydrographic areas occur within the Death Valley Basin. These are all tributary to Death Valley in California.

Surface Water

Surface water sources are far less abundant than groundwater in the planning area. There are only four major perennial streams (greater than 0.5 mile in length)on public lands: Meadow Valley Wash, Muddy River, Virgin River, and the Las Vegas Wash. All of these streams are in the Colorado River drainage. Meadow Valley Wash originates in Lincoln County and joins the Muddy River near Glendale, Nevada. It is characterized by peak flows in February and March when snow melt occurs. Mean annual flow, measured at the Rox gaging station, is recorded at 3.39 cubic feet per second (cfs) with a peak flow of 1,620 recorded in 1993 and a low flow of 0.14 cfs in 1987 for the period of record (Emett 1993).

Perennial flow in the Muddy River originates in springs located southeast of Arrow Canyon, a distance of approximately 25 miles from Lake Mead. Mean annual flow, measured at the Glendale gaging station, is 44 cfs, with a recorded low flow of 7.6 cfs (1964) and peak flow of 16,400 cfs in 1981 (Emett 1993).

The Virgin River is fed by tributaries from the Tule Desert, Beaver Dam, and Sand Hollow Washes, as well as many drainages in the Virgin and Mormon Mountains. Streamflow of the Virgin River is measured at a gaging station in Littlefield, Arizona and shows a mean annual stream flow of 241 cfs, peak flow of 61,000 cfs and a low flow of 38 cfs (Emett 1993). Within Nevada, the river is intermittent with no flow in some sections during certain times of the year. The gaging station at Riverside has minimal records but indicates a mean annual flow of 309 cfs and peak and low flows of 17,400 cfs and 0 cfs respectively (Emett 1993). The Virgin River, due to the amount of its flow as well as its proximity to Las Vegas Valley, is being considered as a possible water supply to help meet the ever growing water demands of the Las Vegas Valley.

Las Vegas Wash is supplied with water from springs, runoff channeled during rains, and water from the Las Vegas Sewage Treatment Plant. Heaviest flow occurs during the winter months, when the most precipitation falls and evapotranspiration rates are lowest. Mean annual flow has been measured at 57.6 cfs, with a peak discharge of 6,510 cfs recorded in 1975 and a low flow of 4.8 cfs in 1960 (Emett 1993).

Numerous ephemeral washes transect the planning area, conveying flows only after storms. High intensity thunderstorms often produce rapid runoff and "flash" flooding, which can result in floodwater and sediment damage within the region. Most damage on BLM-administered lands is in the form of gully cutting and sheet erosion. Destruction on state and private lands is more severe, including damage to roads and highways, croplands, and residential areas. Loss of life has occurred in some areas from the flooding.

Flash flooding, which is on the increase, usually occurs from tropical depressions out of the south or southwest. The increase in this flooding can be attributable to both increased recording of flood events, as well as a result of population growth expanding into previously undeveloped areas (USDI BLM 1990). In an effort to improve the long-term safety of the public and protection of property from flooding, the Clark County Regional Flood Control District is implementing a master plan program that includes siting, design and installation of flood control facilities. Most of the existing and proposed control facilities, including detention basins and conveyances, are located on public land.

Springs are important water sources in the Las Vegas BLM District. The Las Vegas District Water Resource Inventory identified 149 springs on public lands within the boundaries of the Las Vegas BLM District. Table 3-9 lists the locations and discharge for each spring source. The average flow of these springs is 5.5 gallons per minute (gpm), with some springs being nothing more than a seep area with no discernible flow, and others measuring as high as 75 gpm.

Ground Water

The importance of ground water is obvious in this region of few surface water sources. With the exception of communities that obtain water from major surface water sources such as the Colorado River, developments are restricted by the availability of suitable ground water supplies. Table 3-8 presents ground water statistics for the 29 hydrographic areas within the planning area, including recharge and interbasin flows. The most developed and utilized water-bearing stratum is valley fill alluvium. Although numerous springs are associated with carbonate rock or sandstone layers, development of these aquifers is relatively difficult. The carbonate rock system is composed of primarily limestone and dolomite deposited during the period that the area was covered by water. The rocks are usually very fractured and locally contain solution channels (openings that occur from the dissolving of soluble materials by water moving through pre-existing interstices or fractures). The carbonate system is regional in nature and provides an avenue for interbasin flow. The ability of the carbonate aquifers to store and transmit water is known to differ depending on location, but characteristics of the carbonate aquifers are largely undetermined at this time. The permeability of sandstone is much less than the valley fill alluvium releasing its stored water very slowly. The carbonate aquifer, as well as the alluvial aquifers of several hydrographic basins, are currently being reviewed by water purveyors within the Las Vegas Valley as an alternative to meeting future water demands.

Depth to water varies throughout the planning area, but can be generally characterized as ranging from at or near the surface to several thousand feet, as in the case of the carbonate system.

Most ground water recharge in southern Nevada is derived from winter and spring precipitation, which represents approximately 50 percent of the total annual precipitation. The moisture is stored in snowpack, at elevations of 7,000 to 8,000 feet and higher. Precipitation reaches the groundwater reservoirs by way of streams, which eventually discharge onto alluvial aprons, or by infiltrating directly into consolidated rock and percolating vertically and laterally to the valley fill aquifer. Additional inflow is received from localized intense storms and ground water discharge from adjacent areas. Such interbasin movement is described in Table 3-8. Natural discharge of ground water in the basins occurs as a result of transpiration from phreatophytes (deeply rooted plants that obtain water from the water table or the soil layer just above it), spring discharge, evaporation from bare soil, interbasin flow, and base flow to streams such as the Virgin River, Muddy River, and Las Vegas Wash.

As is the case throughout most areas of the arid West, water is a limited resource in southern Nevada and its availability is impacted by human population growth. Of the 29 hydrographic basins wholly or partially within the Las Vegas BLM District, all have committed resources which exceed perennial yield (Coche 1995). These basins, including Las Vegas Valley, are in a water overdraft situation.

Table 3-8. Groundwater Statistics.

		Groundwater Inflow		Groundwater Outflow	
Basin	**Recharge**	**AF**	**From**	**AF**	**To**
161	10,000	22,000	158,168,211	32,000	160
162	37,000	---	---	18,000	240,241
163	1,400	---	---	---	---
164	2,200	---	---	2,000	165
165	100	2,000	164	Minor	212
166	<100	---	---	Minor	167,212
167	1,100	Minor	166	1,000	213
205	1,500	Minor	203	700	218
210	2,100	35,000	209,169B 206,212	37,000	219
211	6,000	5,000	212	11,000	161
212	30,000	Minor	165,166	6,200	210,211
213	1,100*	1,000	167	Minor*	Colorado River
214	1,200*	---	---	1,000	213,CA
215	<100	1,200	212	---	---
216	400	Minor	217	1,000	218
217	<400	---	---	Minor	216
218	<100	8,000	216,205	Minor	220
219	<100	37,000	210	---	---
220	<100	Minor	218	---	---
222	3,600	?	221	?	Lake Mead
223	1,000*	---	---	1,000	Lake Mead
224	200*	---	---	600*	AZ
225	200	---	---	17,000	226
226	<100	Minor	227A	17,000	230
227	2,300	6,000	147,157	8,100	226,230
229	200	2,000	228	2,000	230
230	5,000	44,000	227A,229,228 225,226	3,500	242CA,243CA
228	1,000	3,000	147	2,000	229,230

Key:
(Source: Harrill, 1988.)
* Data from State of Nevada, 1971.

The Las Vegas Valley is currently experiencing rapid growth and development. Heavy demands are being placed on an already over-utilized water resource. Entities within the valley obtain water from both groundwater sources and the Colorado River. The groundwater system within Las Vegas Valley has been in an overdraft condition since 1945. In 1993, approximately 67,356 acre feet of groundwater was extracted from the principal aquifer, far exceeding the estimated recharge of 30,000 acre feet (Barrick 1995).

This overdrafting has resulted in most of the groundwater problems currently in the Las Vegas Valley including declining water levels, land subsidence, declining water quality by incursion of water possessing higher concentrations of dissolved solids and nitrate, and the loss of vegetation dependent on groundwater (Morgan 1994). These problems, resulting from overdrafting of the groundwater resource, are not limited to the Las Vegas Valley. Although not to the same degree as that occurring in the Las Vegas Valley, all overdrafted basins realize some if not all of the problems previously identified.

An artificial recharge project was initiated in 1987 and in 1993 resulted in the injection of 24,535 acre feet of Colorado River water back into the Valley's groundwater basin (Barrick 1995). The project offset some of the groundwater withdrawal, resulting in a net pumpage of 42,821 acre feet in 1993, still exceeding annual recharge. This groundwater withdrawal represents 13 percent of Las Vegas Valley's water withdrawals, with the remaining 87 percent (292,803 acre feet) obtained from surface waters, as Nevada's entitlement to waters of the Colorado River (SNWA 1995).

Of particular concern because of the damage caused to property is land subsidence. It is primarily associated with over pumping and resultant water level declines and has continued to be a problem in the Las Vegas Valley since the mid 1940s. The decline in water levels and consequential reduction in artesian pressure has resulted in an increase in the stresses imposed upon the sediments from which the water is extracted. In areas containing fine-grained deposits (silt and clay), the increase in effective stress has resulted in compaction of the sediments. This sedimentary compaction is seen on the land surface as subsidence. Although a good portion of the valley is sinking, it is at a uniform rate and most structures are not impacted. Where pre-existing faults occur, however, more damage results as fissures are formed and large differential settlement occurs (Bell 1991). Through artificial recharge, the rate of subsidence in the valley has decreased.

The BLM Water Resources Inventory identified 67 wells drilled on public lands within the boundaries of the Las Vegas BLM District. These wells provide permanent and reliable water in an arid environment where natural water sources, such as springs and seeps, are often unpredictable or intermittent. Since the inventory, the Las Vegas Valley Water District drilled production and/or recharge wells on public lands within Las Vegas Valley in an effort to optimize distribution of artificial recharge and pumpage in sufficient amounts to meet future demands.

Water Quality

In southern Nevada, one critical water resource problem is the poor quality of much of the surface and ground water. Several factors contribute to the high quantities of chemicals and solids in the regional water. High evaporation rates leave concentrations of salts at or near the soil surface after rainfall. Water quality is also affected by the composition of rocks and soils, including calcium, magnesium, carbonates, silicates, metallic and nonmetallic minerals. As it moves slowly into and through the soil profile, water dissolves and acquires these constituents. In addition, dust containing salts is blown from playas onto standing surface water and onto soil where it enters both surface and groundwater.

A water quality sampling program was initiated in 1979 to obtain baseline water quality data for Clark County. Samples were collected in spring, summer, and fall and analyzed for biological, chemical, and physical parameters. The primary and secondary drinking water standards (Appendix G), as defined by EPA, were applied to these samples. These standards refer to the maximum contaminant levels allowable for public water supplies, which if exceeded, could adversely affect public health. It is important to note that these drinking water standards are for public water supplies, not necessarily springs, seeps, and others found in the natural environment. These standards may, however, be used to evaluate the quality of naturally occurring untreated waters in terms of suitability for consumption by humans.

Results of the three sampling periods indicate that water at many springs does not meet the Federal Drinking Water Standards. The major contaminant in the water from 60 of the 64 springs was fecal

coliform bacteria, which is generally considered to be an indicator of fecal contamination. Fecal coliform bacteria, which form a portion of the total coliform group, are restricted to the intestinal tracts of warm-blooded animals and carry disease-causing organisms.

Levels for turbidity, total dissolved solids, sulfate, chloride, manganese, iron, and nitrate nitrogen also exceeded Federal standards in several springs. Many of these levels do not pose health hazards; only nitrate nitrogen is potentially dangerous. This chemical was found to react with hemoglobin in the blood to produce an anemic condition commonly known as "blue baby" in infants under three months of age.

In addition to the Federal Drinking Water Standards, the State of Nevada has established various water quality standards for designated beneficial uses within the planning area. As identified in Appendix H, quality standards and beneficial uses have been set for the Colorado, Virgin, Muddy Rivers, Meadow Valley Wash, Las Vegas Wash, and Lake Mead. Beneficial uses include irrigation; watering of livestock; recreation involving contact with the water; recreation not involving contact with the water; industrial supply; propagation of wildlife, aquatic life, aquatic life excluding fish, and aquatic life including a warm water fishery; maintenance of fresh water marsh; and municipal or domestic supply or both.

Water quality information for the Virgin River, Muddy River, Meadow Valley Wash, and Las Vegas Wash was collected by United States Geologic Service (Emett 1993). Of those constituents monitored, the Virgin River, Muddy River, and Las Vegas Wash were found to exceed Federal Drinking Water Standards for total dissolved solids and sulfate. The Virgin River also exceeded the standard for coliform bacteria. Coliform bacteria levels were not determined for Meadow Valley Wash, Las Vegas Wash, or the Muddy River but it is suspected that their waters probably exceed Federal Drinking Water Standards for this pollutant.

Salinity contributions to the Colorado River have become a concern both nationally and internationally. The Colorado River currently carries approximately 6.6 million tons of dissolved solids annually. Of this total load, only an estimated 38,000 tons come from the approximately 6 million acres of public lands within southeastern Nevada (Westenburg 1995). The contribution from the public lands within the Las Vegas District is a fraction of the 38,000 tons.

The quality of ground water varies throughout the planning area, as it does in the remainder of the state. In general, groundwater in areas of recharge has low chemical concentrations, but as it moves through the ground water system to discharge areas (such as valley bottoms), it dissolves sediments and rock materials. The extent to which chemical constituents are dissolved is largely determined by the following factors:

- Solubility, volume, and distribution of the materials.
- Length of time that water is in contact with the materials.
- Distance that water travels from point of recharge.
- Temperature and pressure within the ground water system.

Little is known about ground water quality in much of the Las Vegas BLM District. Several hydrographic basins were investigated at varying levels of intensity. Due to its large urban population, prior research focused primarily on the Las Vegas Valley. The shallow aquifers within the Las Vegas Valley are generally in poor quality. Total dissolved solids concentrations are as high as 8,000 milligrams per liter (mg/l). Such high concentrations are suspected to be the result of recharge from landscape irrigation and possible seasonal fluctuations in the water levels of the shallow aquifers. The concentrations of total dissolved solids have increased over the last few years.

High nitrate concentrations also contribute to the poor quality of the more shallow aquifers. In the deeper aquifers (200 to 450 foot depths) of Las Vegas Valley, water quality varies by geographic location. In the northern and western portions of the valley, the total dissolved solids concentrations range from 200 to 400 mg/l, with a calcium-magnesium-bicarbonate consistence. Groundwater in the southern and southwestern portions of the valley is a sodium-potassium-bicarbonate type with total dissolved solids concentrations ranging from 700 to 1,500 mg/l. A mixed-cation sulfate type water of generally poor quality characterizes the remainder of the deep aquifer system in the Las Vegas Valley. Further degradation of this system can be anticipated, as the lowering of the water table accelerates the infiltration of poor quality water into adjacent aquifers (USDI BLM 1990).

The other hydrographic basins in the Las Vegas BLM District exhibit groundwater quality characteristics similar to the Las Vegas Valley (that is, water quality

deteriorates from the higher areas to the valley bottoms). In the carbonate and volcanic rock aquifers to the northwest of Las Vegas, water quality is generally acceptable. Water of a calcium-magnesium-bicarbonate composition is found in the carbonate aquifers, whereas a sodium-potassium-bicarbonate composition is associated with the waters of the volcanic rock aquifer. East and southeast of Las Vegas there is unacceptable water with a mixed cation-sulfate composition. The area west of the Arrow Canyon Range shows a marked increase in water quality and with further investigation may be a good water supply. Although little or no data exists for it, the area west of the Sheep Range is assumed to generally possess good-to-fair water quality with the exception of isolated areas of poor quality water (Lyles 1987).

Riparian Resources

A riparian/wetland area is an area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lakeshores and streambanks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil. Such areas vary from one location to another, depending on water availability and quality, elevation, climate, soils, and topography. Despite this variability, all riparian areas share the following characteristics

- Small in comparison with the overall area.
- Create a well-defined zone within a much drier ecosystem.
- Support a great diversity of plant and animal species.

A riparian area in good condition can help moderate flows by reducing peaks and increasing minimum flows; improve water quality; stabilize soils; reduce sediment loads; and contribute a significant and critical component to ecological diversity and productivity.

Riparian areas in the Las Vegas BLM District are primarily associated with perennial streams and springs. Only four perennial streams (greater than 0.5 mile in length) are found on public lands in the planning area. These include the Muddy and Virgin Rivers, Meadow Valley Wash, and Las Vegas Wash. Of these four streams, only the Virgin River has a significant riparian area located on public lands. This area, totaling approximately 194 acres, covers 9 miles of the river's length. Conditions range from poor to fair, depending on the location along the river (USDI BLM 1988). Vegetation within the riparian area consists primarily of tamarisk (*Tamarix sp.)* and saltgrass (*Distichlis sp.*) Tamarisk, commonly known as salt cedar, is a problem within the Virgin River floodplain due to its high water consumption, salt concentrating abilities, and its characteristic rapid spread. Any control efforts of tamarisk would be tiered to the Final EIS *Vegetation Treatment on BLM Lands in 13 Western States.*

In 1989, an inventory was started on the current extent and condition of riparian areas associated with springs; to date, 50 springs have been inventoried. Under this inventory, condition was determined based primarily on existing riparian vegetation with condition classes defined as:

Excellent: There is little or no disturbance of the plant community and succession is progressing or stable. There is an abundance of both new and old plants.

Good Succession is progressing or is stable with new and old growth common. There is a potential for increased plant density. There are some patches of clipped vegetation; seedstalks are readily observable and some woody plants are hedged.

Fair There is noticeable disturbance with medium-to-high successional availability. Most woody plants are hedged; grass is clipped to the ground in places; and there is a fair possibility of riparian habitat regression.

Poor Extreme disturbance exists with large patches of bare soil and grass having a mown appearance. There is little or no production of key plant species. Woody species are hedged or broken, and riparian vegetation is regressing or nearly so.

Data from this inventory is presented in Table 3-10. These 50 springs comprise a total riparian area of 25 acres, with the average associated area comprising 0.5 acres. The condition of the springs ranges from poor to good, with 40 percent (20 springs) in poor condition and 30 percent (15 springs) in good condition.

A list of spring-associated riparian areas yet to be inventoried are included in Table 3-9. Given an average riparian area of 0.5 acres, it is anticipated that the remaining 99 springs will represent a total of approximately 49.5 acres. This, combined with those springs already inventoried (25 acres), indicates a total spring-associated riparian area of almost 75 acres. This is a relatively small figure, when compared to areas with ample water sources. This fact makes these spring-associated riparian areas extremely important in an area such as the Las Vegas BLM District, which has limited water resources and associated riparian ecosystems.

In 1991, the *Riparian-Wetland Initiative for the 1990s* established national goals and objectives for managing riparian-wetland resources on public lands. A chief goal of this initiative is to restore and maintain riparian-wetland areas to proper functioning condition. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream energy associated with high waterflows, consequently reducing erosion and improving water quality.
- Filter sediment.
- Capture bedload.
- Aid floodplain development.
- Improve flood-water retention and groundwater recharge.
- Develop root masses that stabilize streambanks against cutting action.
- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity.

The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation. A proper functioning condition inventory of all riparian areas within the planning area was initiated.

Vegetation Management

All vegetation communities contain herbaceous species classified as annual (ephemeral), biennial, or perennial. Annual forbs and grasses are those species that complete their entire life cycle within one growing season. Seeds of annual species may lie dormant in the soil for years until the proper combinations of precipitation and temperature are present. When these conditions occur, a significant amount of growth can be produced in a very short time. Winter precipitation from Pacific frontal storms stimulates the widespread production of winter/spring annuals that stay green for several months, if temperatures remain cool. Summer thunderstorms generally result in scattered occurrences of annuals, which tend to dry out quickly due to higher temperatures.

Biennials are those species that complete their life cycle over two years; some produce vegetative growth during one season and seed during the second season while others produce seed at the end of each of the two growing seasons. Perennials are plants that are long-lived, producing both vegetative growth and seed each growing season, depending on temperature and precipitation.

Vegetation Communities

All vegetation communities in the Las Vegas BLM District are within the Sonoran Basin and Range Province or Mojave Desert Shrub Biotic Communities, with a small inclusion of the Colorado and Green River Plateau Biomes. Table 3-11 lists the communities and acreages in the Las Vegas BLM District that are described below.

Salt Desert Shrub

This vegetation community is found throughout the Las Vegas BLM District at lower elevations in valley bottoms, around playas, and on bajadas. Soils are saline or alkaline and fine-textured (silts and/or clays). Dominant species are four-wing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), green ephedra (*Ephedra viridis*), seep weed (*Suaeda torreyana* var. *ramosissima*), and bud sage (*Artemisia spinescens*). Common forbs and grasses include halogeton (*Halogeton glomeratus*), Russian thistle (*Salsola* sp.) and Indian rice grass (*Oryzopsis hymenoides*).

Southern Desert Shrub

This community occurs throughout the planning area, primarily at elevations below 4,000 feet where annual rainfall is unreliable and averages less than six inches. Temperature extremes range from over 100 degrees Fahrenheit in the summer, to 25 degrees Fahrenheit in the winter.

Table 3-9. Known springs within Las Vegas District.

Name	Township	Range	Section	Discharge (gpm)
Hough	15S	65E	11	1.0
Juanita	15S	69E	15	0.75
Seep	15S	70E	2	----
Rabbit	15S	70E	9	1.0
Government	15S	70E	9	2.4
Dud	15S	70E	12	----
Jumps	15S	70E	14	12.0
North Key West	15S	70E	16	0.1
South Key West	15S	70E	21	0.1
N. Fork/Nickel Creek	15S	70E	30	9.0
Cabin Canyon 2	15S	71E	4	10.0
Hen	15S	71E	6	----
Cabin Canyon 1	15S	71E	9	12.0
Unnamed	15S	71E	16	----
Wiregrass	15S	71E	16	2.0
Cedar	15S	71E	17	3.0
Nickel Creek	15S	71E	18	15.0
Black Rock	15S	71E	19	7.5
White Rock	15S	71E	19	1.0
Lime 2	15S	71E	21	75.0
Indian	15S	71E	33	10.5
Lime	15S	71E	34	37.5
Unnamed	16S	71E	8	----
Cabin	16S	71E	17	0.1
Unnamed	16S	71E	19	2.5
Billygoat	16S	71E	21	2.0
Rattlesnake	16S	71E	28	0.1
Pussy Willow	16S	71E	33	0.1
South	16S	71E	34	2.0
Ash Tree	17S	49E	35	3.0
Dozer	17S	50E	10	2.0
Soda	17S	50E	10	45.0
Artesian	17S	50E	14	10.0
Chalk	17S	50E	26	1.0
Scruggs 2	17S	50E	35	60.0
Scruggs 1	17S	50E	35	40.0
Unnamed	17S	50E	35	8.0
Marsh	17S	50E	35	50.0
Mexican Seep	17S	50E	35	0.1
School	17S	50E	35	5.0
Kwichup	17S	53E	17	0.4

Table 3-9. Known Springs within the Las Vegas District (continued).

Name	Township	Range	Section	Discharge (gpm)
Unnamed	17S	67E	2	0.1
Red Bluff	17S	69E	14	5.0
Red Rock	17S	70E	7	----
Salt	17S	70E	19	1.0
Jackrabbit	18S	51E	18	1.0
Unnamed	18S	51E	29	2.8
Bole	18S	51E	30	0.15
Unnamed	18S	51E	30	0.5
Last Chance	18S	51E	30	0.1
Unnamed	18S	51E	30	0.1
Horse	18S	70E	24	0.5
Grapevine	19S	50E	2	0.03
Bitter	19S	67E	16	5.0
Unnamed	19S	67E	18	0.1
Perkins	19S	69E	1	0.5
Maynard	19S	69E	20	2.0
Mockingbird	19S	69E	21	----
Quail	19S	69E	22	1.0
Agua Chiquita	19S	69E	29	1.0
Catclaw	19S	69E	30	1.0
Bills	19S	70E	10	----
Granite	19S	70E	17	0.1
Falls	19S	70E	33	2.2
Grapevine	19S	70E	34	0.5
Julie's	19S	71E	6	1.25
Summit	19S	71E	18	0.1
New	19S	71E	29	0.2
Connoly (Diamond)	19S	71E	30	0.5
Unnamed	19S	71E	31	2.0
Klup	20S	56E	31	6.0
Gypsum	20S	63E	14	1.0
Fairbanks	20S	69E	3	0.25
Cataract	20S	69E	6	----
Rattlesnake	20S	69E	13	----
Taylor	20S	69E	15	0.1
Gann	20S	69E	15	5.0
Walker	20S	69E	21	5.0
Turkey	20S	69E	24	----
Ruby	20S	69E	25	1.5
Willow	20S	70E	8	2.0
Jumbo	20S	70E	16	3.0

Table 3-9. Known Springs within the Las Vegas District (continued)

Name	Township	Range	Section	Discharge (gpm)
Twin	20S	70E	19	15.0
Unnamed	21S	53E	15	----
Appaloosa	21S	56E	19	60.0
Unnamed	21S	56E	19	11.0
Unnamed	22S	54E	15	----
Bighorn	22S	58E	29	0.1
Stump	23S	55E	5	----
Unnamed	23S	62E	27	----
Unnamed	23S	62E	27	----
Unnamed	23S	62E	27	----
Eagle Water	25S	63E	36	0.1
Forlorn Hope	25S	64E	1	0.1
Unnamed	25S	64E	34	0.2
Bridge	25S	64E	34	0.1
McClanahan	26S	61E	8	0.3
Catclaw	26S	61E	17	0.1
Mesquite	26S	61E	22	0.1
Lone Pine	26S	61E	22	----
McCullough	26S	61E	26	0.3
North Railroad	26S	61E	31	0.25
Unnamed	26S	61E	31	0.75
Rock	26S	62E	27	----
Horse	26S	62E	28	----
Rock Seep	26S	62E	34	0.1
Desert Queen	26S	63E	13	----
Huse	26S	64E	11	20.0
Prospect	26S	64E	22	0.1
Knob Hill	26S	64E	29	0.12
Unnamed	26S	64E	29	0.1
Tule	26S	64E	33	----
Unnamed	26S	64E	8	0.3
Lucy Grey 1	27S	60E	36	----
Unnamed	27S	61E	4	4.5
South Railroad	27S	61E	18	1.0
Tubbs	27S	61E	18	----
Granite	27S	61E	20	0.5
Pine	27S	61E	28	0.5
Big Pine	27S	61E	28	0.1
Lucy Grey 3	27S	61E	30	0.5
Unnamed	27S	61E	33	1.0
Ora Hanna	27S	62E	5	0.3

Table 3-9. Known Springs within the Las Vegas District (concluded).

Name	Township	Range	Section	Discharge (gpm)
Highland	27S	62E	16	0.75
Deadhorse	27S	62E	21	0.1
Thomas	27S	62E	23	0.1
Unnamed	27S	62E	23	0.1
Cow	27S	62E	26	0.1
Unnamed	27S	62E	26	0.1
Grasshopper	27S	64E	5	0.25
Unnamed	27S	64E	11	4.0
Unnamed	27S	64E	12	20.0
Unnamed	27S	64E	12	----
Jonah	27S	64E	14	15.0
Unnamed	27S	64E	14	10.0
Scotts Well	28S	60E	1	----
Bullion	28S	61E	20	0.1
Burro	28S	61E	26	----
Summit	28S	64E	31	----
Lewis Holes	30S	62E	15	0.1
Roman	31S	65E	4	1.0
Yellowstone	31S	65E	4	0.75
Unnamed	31S	65E	16	0.25
Rattlesnake	31S	65E	16	2.0
Cottonwood	31S	65E	17	6.0
Cottonwood	31S	65E	28	0.1
Hiko	32S	65E	12	3.0
Quail	32S	65E	14	0.5
Granite	33S	65E	15	0.25

Creosote bush (*Larrea tridentata*) is the dominant species of this community, occurring as a distinct community or as an understory species with yucca (*Yucca schidigera*), depending on elevation. White bursage (*Ambrosia dumosa*) is the usual co-dominant with creosote bush. Dry washes at lower elevations often support catclaw acacia (*Acacia greggii*). Common forbs and grasses include Indian ricegrass, Russian thistle, big galleta (*Hilaria rigida*), desert needlegrass (*Stipa speciosa*), and filaree (*Erodium cicutarium*).

Mojave Desert Shrub

This grouping consists of a mixture of shrubs characteristic of mid-elevations of the Mojave desert. These species generally occur on tuff or alluvial deposits at elevations between 4,000-5,000 feet throughout the planning area. Joshua tree (*Yucca brevifolia*) is a conspicuous overstory in this community. Common shrubs are smooth horsebrush (*Tetradymia glabrata*), spiny menodora (*Menodora spinescens*), burrobrush (*Hymenoclea salsola*), box thorn (*Lycium andersonii*), green ephedra, green rabbitbrush (*Chrysothamnus viscidiflorus*), Mormon tea (*Ephedra nevadensis*), and four-wing saltbush. Blackbrush (*Coleogyne ramossissima*) becomes the dominant shrub at higher elevations, often forming pure stands on drier south or southwest-facing slopes. Blackbrush intergrades with sagebrush (*Artemisia* sp.) at higher elevations. Common grasses are big galleta, Indian ricegrass, and fluffgrass. Cacti are also common in this community; conspicuous species are cottontop barrel cactus (*Echinocactus polycephalus*), prickly pear (*Opuntia echinocarpa*), and various cholla species (*Opuntia* sp.). When blackbrush is

Table 3-10. Riparian inventory.

Spring Name	Location	Acreage	Riparian Condition	Improvement Potential
Jackass	T.14S., R.65E. sec. 27 NW¼SW¼	2.0	Good	High
Juanita	T.15S., R.69E. sec. 15 NE¼ NE¼	0.7	Fair	Moderate
Seep	T.15S., R.70E. sec. 02 SE¼SW¼	0.1	Poor	High
Government	T.15S., R.70E. sec. 09 SW¼NW¼	0.01	---	Low
Jump	T.15S., R.70E. sec. 14 SW¼SE¼	2.0	Good	Low
Rabbit	T.15S., R.70E. sec. 09 NW¼	0.1	Poor	Low
No. Key West	T.15S., R.70E. sec. 16 SE¼SE¼	0.2	Poor	Low
So. Key West	T.15S., R.70E. sec. 21 NE¼SW¼	0.03	Poor	Low
Hen	T.15S., R.71E. sec. 06 NE¼	0.1	Poor	Low
Cabin Canyon	T.15S., R.71E. sec. 09 SE¼NW¼	3.0	Good	None
Cedar	T.15S., R.71E. sec. 16 NW¼NW¼	0.9	Good	None
Black Rock	T.15S., R.71E. sec. 19 NE¼NE¼	0.01	Good	None
White Rock	T.15S., R.71E. sec. 19 NW¼NW¼	0.02	Good	None
Salt*	T.15S., R.71E. sec. 19	0.05	Fair	High*
Kwichup	T.17S., R.53E. sec. 17 SE¼	0.1	Poor	Moderate
Red Bluff	T.17S., R.69E. sec. 14 NW¼NW¼	2.3	Fair	High
Red Rock	T.17S., R.70E. sec. 6,7,18	5.0	Fair	High
Mud*	T.17S., R.70E. sec. 25 SE¼SW¼	0.01	---	Moderate
Horse*	T.18S., R.70E. sec. 24 SW¼SE¼	0.1	Fair	Moderate
Bitter*	T.19S., R.67E. sec. 17 NE¼NE¼	1.0	Poor	Moderate
Maynard	T.19S., R.69E. sec. 20 NW¼SW¼	0.2	Poor	High
Quail*	T.19S., R.69E. sec. 22	0.01	Poor	High
Bill's	T.19S., R.70E. sec. 10 NE¼SW¼	0.01	Poor	Moderate
Granite	T.19S., R.70E. sec. 17 SE¼NE¼	0.0	---	Moderate
Falls	T.19S., R.70E. sec. 33 NW¼NW¼	0.05	Poor	Moderate
Grapevine	T.19S., R.70E. sec. 34 SW¼NW¼	0.02	Fair	Low
Julie's	T.19S., R.71E. sec. 06 SE¼	0.14	Good	None
Summit*	T.19S., E.71E. sec. 18 NW¼SW¼	0.4	Good	Moderate*
Connoly*	T.19S., R.71E. sec. 31 NE¼	0.01	Poor	Moderate*
Klup	T.20S., R.56E. sec. 31 SE¼SE¼	1.4	Good	Moderate
Cataract	T.20S., R.69E. sec. 06 NE¼NE¼	1.0	Fair	Low
Gann	T.20S., R.69E. sec. 15 NE¼SW¼	1.0	Good	Low
Taylor	T.20S., R.69E. sec. 15 NW¼	0.1	Poor	Low
Walker	T.20S., R.69E. sec. 21 SE¼NW¼	0.02	Poor	High
Ruby	T.20S., R.69E. sec. 25 NW¼NW¼	0.02	Good	Low
West Willow	T.20S., R.70E. sec. 08 SW¼SE¼	0.0	Poor	None
Twin	T.20S., R.70E. sec. 19 SW¼SE¼	0.07	Fair	Low
Forlorn Hope	T.25S., R.64E. sec. 01	0.2	Good	None

Table 3-10. Riparian Inventory (concluded).

Spring Name	Location	Acreage	Riparian Condition	Improvement Potential
McClanahan	T.26S., R.61E. sec. 08 SW¼	0.1	---	Low
McCullough	T.26S., R.61E. sec. 26 SE¼SW¼	0.1	Poor	Moderate
Willow	T.26S., R.61E. sec. 31 NE¼NE¼	0.1	Poor	Low
Ora Hanna	T.27S., R.62E. sec. 05 NE¼SE¼	0.2	Poor	Moderate
Highland	T.27S., R.62E. sec. 16 SW¼NW¼	0.5	Poor	High
Cow	T.27S., R.62E. sec. 26 NE¼SW¼	0.1	Poor	Moderate
Rattlesnake	T.31S., R.65E. sec. 16 SE¼NE¼	0.5	Good	None
Unnamed	T.31S., R.65E. sec. 16 SW¼	0.3	Good	None
Cottonwood	T.31S., R.65E. sec. 17 NW¼	0.2	Fair	High
Cottonwood	T.31S., R.65E. sec. 28 SE¼NW¼	0.01	Good	Low
Hiko	T.32S., R.65E. sec. 12 SE¼SE¼	0.4	Fair	High
Quail	T.32S., R.65E. sec. 15 SE¼NW¼	0	---	None

Key:
* Enclosure and/or development completed.

disturbed by fire, overgrazing, or other mechanisms, purple threeawn (*Aristida purpurea*) invades the site.

Mountain Shrub

The mountain shrub or northern desert shrub community occurs at elevations between 4,500-6,000 feet in the planning area. Common shrubs include mountain mahogany (*Cercocarpus ledifolius*), manzanita (*Arctostaphylos pungens*), desert bitterbrush (*Purshia glandulosa*), various sagebrush species, Mormon tea, and green rabbitbrush. Grass cover tends to be quite low in this group, with dominants being squirreltail (*Sitanion hystrix*) and Indian ricegrass. Several prickly pear species are common in this association.

At elevations above 5,000 feet where annual precipitation exceeds eight inches, the mountain shrub community is characterized by a mosaic of black sage (*Artemisia nova*), and big sagebrush (*Artemisia tridentata*), depending on soil types and aspect. Big sagebrush occurs on deeper, sandy soils on mesas and in drainages and valley bottoms. Black sagebrush prefers the shallower, rocky soils of ridges and hillsides.

Pinyon-Juniper Woodland

The state tree of Nevada, singleleaf pinyon pine (*Pinus monophylla*), and Utah juniper (*Juniperus osteosperma*) are the dominant components of this community which is found in the Newberry,

McCullough, Virgin, Mormon, and Spring Mountains. Pinyon-juniper woodland occurs at elevations above 6,000 feet, where average precipitation exceeds 8 inches. Understory shrubs are black sagebrush, big sagebrush, desert bitterbrush, green rabbitbrush, and cliffrose (*Cowania mexicana*). Grass species include black grama (*Bouteloua eriopoda*) and squirreltail.

Conifer

In the planning area, the conifer community has a very limited distribution, consisting of a remnant stand of white fir (*Abies concolor*), found near the summit of Virgin Peak at 8,000 feet, and relic stands of ponderosa pine (*Pinus ponderosa*) in isolated areas of Red Rock Canyon National Conservation Area. Also present in this community is singleleaf pinyon pine; the understory is dominated by big sagebrush, and, to a lesser extent, by muttongrass (*Poa fendleriana*).

Riparian: The riparian community is uncommon in the planning area, being restricted of areas of perennial water around springs, seeps, and along stream channels. Ash Meadows and the Virgin River floodplain support riparian vegetation. Typical species are willow (*Salix sp.*), cottonwood (*Populus fremontii*), ash (*Fraxinus* sp.), rushes (*Juncus sp.*), cattails (*Typha latifolia*), and inland saltgrass (*Distichlis* sp.). Saltcedar (*Tamarix pentandra*) has invaded many of the streambank riparian areas, displacing native plants.

Grassland: This community is extremely restricted in distribution within the planning area, occurring in Hidden Valley, the Las Vegas Dunes area, and Amargosa Valley. The grassland community is typified by native grass species, primarily big galleta and Indian ricegrass; shrubs are generally absent.

Mesquite: The mesquite (*Prosopis* sp.) community is found near springs and seeps and in areas where the water table is high enough to assure a reliable source of water. Large stands of mesquite occur in Meadow Valley Wash, north of Glendale, and in the Crystal area in the Amargosa Valley. Small, scattered stands or *bosques* grow in ephemeral drainages and on sand dunes throughout the Las Vegas BLM District.

Table 3-11. Vegetation communities in Las Vegas District.

Vegetation Community	Acres
Southern desert shrub	1,900,720
Mojave shrub	1,221,316
Pinyon-juniper	128,957
Salt desert shrub	55,115
Mountain shrub	10,872
Grassland	6,916
Mesquite	5,358
Conifer	678
Riparian	1,963
Total	**3,331,895**

(Source: BLM, Las Vegas District Office files, 1991; Range Survey, 1978, 1979.)

Vegetation Condition

Vegetation condition in the planning area was evaluated during past decades by several methods, with each method using different variables to determine vegetation condition. BLM traditionally selected forage species as indicators of condition and trend, using relative values such as "good" or "poor" range condition. Condition data is generally gathered only in areas where livestock grazing is permitted. Forage condition denotes the relative abundance of preferred forage species found in the vegetation type as compared to other vegetation types found throughout the public lands. For example, grasslands would always be evaluated in better "condition" than shrublands.

This method was primarily replaced by an examination of ecological condition or status, which is defined as the present state of the vegetation and soil protection of an ecological site in relation to the potential natural community. Ecological condition compares the present status to a standard for a specific "range site", rather than other vegetation types. Ecological condition is expressed in terms of four successional stages progressing from early seral stage to a potential natural community. A detailed soil survey (Order 3) is a prerequisite for such an analysis; this survey is complete for the Las Vegas Valley, the Virgin River Valley, the Eldorado Valley and southwest Nye County. Although the Order 3 soil survey is near completion for remaining areas in Clark County, it may not be finished due to a lack of funding.

A third method of assessing ecologic condition is based on professional judgement in interpreting the ecological site index. Staff specialists trained in range management, wildlife management, agronomy, or botany visually rate an area, using knowledge of the plant species, soil types, climatic factors and site index descriptions.

The BLM is required to report the condition of its rangelands on an annual basis. The 1989 the Las Vegas District report provided data on both range condition and ecological status; the acres reported were adjusted to reflect the actual acreage of the planning area (see Tables 3-12 and 3-13). Federally-managed acreage scheduled for disposal under Congressional mandate within the boundaries of the city of Las Vegas was not reported. BLM also provided data on ecological status (based on professional judgement) to the General Accounting Office in response to a request in 1990 (see Table 3-14).

Visual Resource Management

The planning area contains a variety of scenic values, which can be separated into seven distinct areas:

- Gold Butte area
- Mormon Mesa
- Muddy Mountains
- Spring Mountains
- Amargosa Valley
- South of Las Vegas Valley.

The Visual Resource Management program manages these values with the objectives of retaining the quality of the visual environment and reducing the visual impact of development activities. Scenic areas that warrant protection through special management attention are also identified.

Approximately 195,610 acres of highly scenic lands occur within Red Rock Canyon National Conservation Area and along the foothills of the Spring Mountains; this area is managed primarily for its visual resources. The remainder of the resource area (comprised primarily of desert, mountains, playas, and bajadas) are managed to avoid resource uses and surface disturbance from dominating the landscape.

The Gold Butte area (located south of Mesquite, Nevada and northeast of Lake Mead) is dominated by the Virgin Mountains and characterized by exceptional panoramic desert views. The northern portion of the area is covered by sparse creosote bushes, grasses, and shrubs. Dense stands of joshua trees, pinyon and juniper, as well as desert vegetation types, are found at the southern extreme of Gold Butte. There are few water sources and riparian areas. The proximity of the tree-clad Virgin Mountains to sandstone formations and desert vegetation creates a stark visual contrast.

The Mormon Mesa area is north of Interstate 15 and east of the Desert Wildlife Range. The predominate landscapes in the area are Mormon Mesa, Mormon Mountain, and the Arrow Range. The primary water sources in the area are the Muddy River and Meadow Valley Wash; both contain riparian vegetation and arable lands. Vegetation consists of creosote bush communities in the lower elevations and pinyon/juniper woodlands on Mormon Mountain. Scenic values are found in the transition between the Mesa's floor and Mormon Mountain and in the geologically unique Arrow Canyon.

The Muddy Mountains are south of Interstate 15, north of Lake Mead, and east of Las Vegas. The Muddy Mountains offer a backdrop of color and (from the top of Muddy Peak,)outstanding views of Lake Mead and nearby basins. Specific areas of high scenic quality in the area include Buffington Pockets, Anniversary Narrows, and Hidden Valley. A few springs with riparian vegetation intersperse the creosote bush communities of the lower elevation. The Valley of Fire State Park and Sunrise Mountain are other areas of scenic value in the region.

The Spring Mountains area includes all the landforms adjacent to Mount Charleston and the Toiyabe National Forest. The area is dissected with several moderate sized canyons, several major highways, and desert to mountain transition zone vegetation. The most dramatic feature is the back drop of Mount Charleston which dominates the entire landscape.

The Amargosa Valley area is found north and west of Las Vegas between the municipalities of Pahrump and Beatty. Most of the landscape is not remarkable, characterized by flat bajada type desert country with creosote bush communities and some minor hills and mountains. The eastern portion of the area borders NTS and exhibits colorful and rugged mountain ranges that breakup the monotony of the valley floor. Several cinder cones and Big Dune offer a unique scenic contrast to the Amargosa Valley.

Table 3-12. Range forage condition.

	Forage Condition				
Federal Acres	Excellent	Good	Fair	Poor	Not Classified
3,331,895	0	99,957	366,508	2,842,106	24,324

(Source: USDI, BLM 1989)

Table 3-13. Ecological status.

	Ecological Status				
Federal Acres	Potential Natural Community	Late Seral	Mid Seral	Early Seral	Not Classified
3,331,895	90,742	75,112	4,749	0	3,161,292

Unsurveyed acres: 3,352,747

(Source: USDI, BLM 1989)

Table 3-14. Professional judgement of ecological status.

	Ecological Status*				
Federal Acres	Potential Natural Community	Late Seral	Mid Seral	Early Seral	Not Classified
3,331,895**	899,612	2,199,050	199,914	33,319	0

* Derived from inventory data and professional judgement based on data from similar types
** Acreage reflects lands transferred to the U.S. Forest Service

(Source: USDI, BLM 1990).

Fish and Wildlife and Special Status Species Resources

The Las Vegas BLM District encompasses an ecologically diverse region with a variety of landforms, soil types, moisture regimes, and vegetation communities. This variability creates habitat for numerous wildlife species (see Appendix A). Appendix B lists special status species that may occur in the planning area. Species of concern include the following:

Desert Bighorn Sheep
(*Ovis canadensis nelsoni*)

Archeological evidence indicates that desert bighorn sheep have occurred in Nevada for the past 11,000 years (McQuivey 1978); the state currently supports one of the largest modern populations in the United States. In the planning area, bighorn sheep are found in 17 mountain ranges, with two additional ranges capable of supporting sheep herds (see Map 3-7). Table 3-15 lists historic and current bighorn sheep habitat and populations.

Over the past 12 years, bighorn numbers have stabilized or increased slightly as a result of reintroduction to former habitat, water developments, and favorable land use decisions. The apparent decline of bighorn sheep populations in some areas can be attributed to the recent drought, as well as the inability of the data to support a long-term downward population trend. In 1989, the McCullough and Highland ranges (Area 84) were reopened to hunting for the first time in several years. Bighorn sheep compete with domestic sheep, livestock, wild horses, and burros for forage and water. Urban growth is also impacting sheep habitat by reducing acreage and disrupting migration routes.

Mule Deer
(*Odocoileus hemionus*)

Historic evidence suggests that mule deer numbers were relatively low in Nevada prior to the turn of the century. In the Las Vegas BLM District, mule deer numbers have remained low and their distribution is limited by the amount of suitable habitat. Much of the planning area does not support the vegetation types preferred by mule deer. Water, too, is a limiting factor, with competition occurring at spring sources between livestock, wild horses and burros, and mule deer. Low density deer populations are restricted to several mountain ranges, including the Spring, McCullough, Newberry, and Virgin Mountains (see Map 3-8). Some deer use occurs in the Gold Butte area located south of the Virgin Mountains. Mule deer populations are so low in the planning area that Nevada Division of Wildlife does not conduct population census.

Gambel's Quail
(*Callipepla gambelli*)

In Nevada, good quail habitat is generally located on alluvial fans dissected by numerous washes, at elevations between 2,000-4,500 feet. Quail habitat totals approximately 3.4 million acres in Clark County; additional habitat is found in Nye County at the north end of the Spring Mountains and at Ash Meadows (see Map 3-9). Population density is difficult to estimate due to large annual fluctuations in quail numbers. Habitat conditions vary from excellent to poor, depending upon water availability, precipitation, and forage conditions. All springs, seeps, rivers, lakes, and water catchments are important use areas for these birds.

Special Status Animal Species

The Las Vegas BLM District is home for many special status species, which include Federally-listed threatened and endangered, candidate, state listed, and sensitive species (see Map 3-10). It is BLM policy to manage the habitats of all special status species, to prevent future listing of species, to ensure the recovery of listed species, and to ensure that any Federal actions authorized, funded, or carried out are not likely to jeopardize the continued existence of any such species (BLM Manual 6840).

Species lists and other information are included in the following appendices:

- Appendix A lists species found or potentially found in the Las Vegas BLM District.
- Appendix B includes special status species known to occur on BLM or adjacent lands.

The BLM conserves Federally listed species and their habitats and uses existing authorities to further the purpose of the Endangered Species Act. All actions authorized, funded, or carried out by the

BLM must comply with the requirements of the Endangered Species Act. Species proposed for Federal listing are managed with the same level of protection as listed species.

Further, the BLM policy requires management of habitats of candidate and BLM sensitive species in such a manner that Future federal listing will not be required. The planning unit supports numerous BLM sensitive species (see Appendix B).

Table 3-15. Current/historic bighorn sheep habitat and populations based upon data from 1976-1994.

Mountain Range	Population 1976	Estimates 1994	Total acres	Watered acres
Arrow Canyon Range	103	137	48,500	7,100
Las Vegas Range****	277	87	7,800	0
South Spring/Bird Spring Ranges	70	51	78,200	15,400
Red Rock/La Madre	162	73	116,100	49,600
McCullough Mountains	158	118	118,500	32,800
Highland Range	56	14	25,100	15,200
Eldorado Range	410	356	50,100	23,500
Muddy Mountains/N. Muddy Range	122	489	111,900	22,300
Newberry Mountains	55	26	29,200	10,900
River Mountains	210	257	12,700	200
Virgin Mountains	0	68	39,100	10,400
New York/Castle Peak	25*	25*	14,000	9,500
Gold Buttes	0	68	63,400	11,300
Last Chance Range**	0	141	38,000	7,000
Specter Range**	0	75	25,200	13,000
Bare Mountains**	0	60	8,200	7,200
Meadow Valley Mtns****	155	79	12,400	0
Mormon Mountains****	385	392	3,200	0
Dry Lake Range***	0	0	11,500	0
Lucy Grey Mountains***	0	0	17,300	0
North Spring Range***	0	0	39,400	10,600
Totals	**2,188**	**2,516**	**869,800**	**246,000**

Key:

* Watered habitat is within 2 miles of water. Acres are rounded to the nearest 100 acres. Nevada portion of the population only. Most of the New York Mountains are located in California. The animals move back and forth between California and Nevada.

** Recent transplant; estimate is based upon actual numbers released, and observed reproduction, less known mortality.

*** Unoccupied historic habitat.

**** Portions of the Mormon, Meadow Valley and Las Vegas (Elbow) Ranges are located in the planning unit. The majority of the habitat and all existing waters are located outside the Resource Area. Population estimates are for the entire mountain ranges.

(Source: NDOW survey data 1976-1994 and unpublished BLM data).

Special Status Fish

Several Federally-listed endangered fish are found in the Colorado River drainage system, which crosses the eastern edge of the Las Vegas BLM District. Each of these species is threatened by habitat destruction (such as water removal, sedimentation, pollution, and channelization) and predation, particularly from exotic species. These threats are magnified by the low population numbers and the limited range of each species. The *Recovery Plan for the Virgin River Fishes* (USDI USFWS 1995b) and the *Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem* (USDI USFWS 1995a), guide BLM management strategies for Federally- listed endangered species in the Muddy and Virgin rivers. Other BLM special status fish species in the Muddy River includes the Moapa Whiteriver springfish (*Crenichthys baileyi moapae*), Moapa speckled dace (*Rhinichthys osculus moapae*).

Woundfin - Federally-Listed Endangered (*Plagopterus argentissimus*). The woundfin was originally native to the Salt, Gila, Colorado, Moapa, and Virgin Rivers. Current distribution is limited to the Virgin River drainage in Arizona, Nevada, and Utah, from LaVerkin Springs and the lower portion of LaVerkin Creek near Hurricane, Utah down to Lake Mead, Nevada. The Las Vegas BLM District manages approximately 194 acres of riparian habitat along the Virgin River in Nevada.

Virgin River Chub-Federally-Listed Endangered (*Gila robusta*). The Virgin River population of the Virgin River chub was listed in August 1989. Historically, this species was endemic to the Virgin River system in southwestern Utah, northwestern Arizona, and southern Nevada and the Muddy River in southern Nevada. Its current distribution is limited to the mainstream Virgin River from Pah Tempe Springs down to the Mesquite Diversion and reaches of the Muddy River. At one time, it was thought that the chub in the Muddy River was a separate species from that in the Virgin River. Current research has shown that the Moapa River Chub is not a separate subspecies, but instead should be considered a distinct population segment of the Virgin River Chub. A large percentage of the chub's historic habitat has been eliminated, restricting its current distribution to 50 miles of the Virgin River between Mesquite, Nevada and LaVerkin Creek, Utah and the Muddy River between the Warm Springs Bridge and the Narrows.

Moapa Dace - Federally-Listed Endangered (*Moapa coriacea*). Moapa dace habitat is restricted to thermal springs at the headwaters of the Muddy River. While the Moapa dace do not currently occur on lands managed by BLM, their survival could be affected by activities that occur on BLM-administered lands in the Moapa Valley. Also, the Muddy River was identified as an area where BLM may acquire lands through exchange. Most of the springs that originally supported this species were extensively modified for private developments. The introduction of exotic fish and their associated parasites and diseases has also negatively impacted the Moapa dace population. Currently, the Moapa National Wildlife Refuge provides some spawning habitat for the Moapa dace. However, habitat for the adult fish is currently unprotected and occurs primarily on private property.

Virgin River Spinedace - BLM sensitive (*Lepidomeda m. mollispinis*). The Virgin River spinedace was proposed for listing as threatened (*Federal Register*, Vol. 59, No. 95, Wednesday, May 18, 1994). This species is endemic to the Virgin River drainage of southwestern Utah, northwestern Arizona, and southeastern Nevada. An estimated 40 percent of its historical habitat was degraded from human impacts, including habitat fragmentation, introduction of nonnative fishes, and dewatering. Recent surveys show that the species occurs in Nevada only in very low numbers. Because the state of Utah developed and began implementation of a conservation agreement for the spinedace, the USFWS has withdrawn the proposed rule to list the species as threatened (*Federal Register*, Vol. 61, No. 25, Tuesday, February 6, 1996).

Razorback sucker - Federally-listed Endangered (*Xyrauchen texanus*). The razorback sucker historically occurred in the Colorado River drainage (*Federal Register*, Vol. 56, No. 205, Wednesday, October 23, 1991). Its current distribution in the lower basin is limited to Lake Mojave and sporadic occurrences in Lake Mead, the Grand Canyon, and downstream on the mainstream and associated impoundments. No razorback sucker habitat occurs on BLM-managed lands.

Fishes of Ash Meadows National Wildlife Refuge and Devil's Hole National Monument. Four Federally-listed endangered species occur in Nye

County at the Ash Meadows National Wildlife Refuge and Devils Hole National Monument. The three species occurring on the refuge are the Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes*), Warm springs pupfish (*C. n. pectoralis*), and Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*). Devils Hole pupfish (*C.diabolis*) occurs on Devil's Hole National Monument, which is managed by the National Park Service. The BLM cooperatively manages several inholdings within the Ash Meadows National Wildlife Refuge with the U.S. Fish and Wildlife Service. Some of these inholdings provide habitat for endangered fish. However, the U.S. Fish and Wildlife Service has applied to withdraw the remaining BLM inholdings for inclusion within the refuge.

Special Status Birds

Peregrine Falcon - Federally-listed endangered (*Falco peregrinus*). The Peregrine falcon has been sighted along the Colorado River drainage from the Overton State Wildlife Management Area south to Lake Mead, in Red Rock Canyon, in the Pahrump Valley, the Desert National Wildlife Range, and the Christmas Tree Pass area. Preferred Peregrine habitat include regions of sheer cliffs located in close proximity to riparian zones or other water sources where prey are readily available. Some areas in the Las Vegas BLM District (especially the Spring, Virgin, and Newberry Mountains) contain potentially suitable habitat for this species.

In 1989, the Nevada Division of Wildlife established an Urban Peregrine Hack Program. Through this program, several nestling falcons were raised and released from a hack box on top the Las Vegas Hilton Hotel. These and subsequent hack-reared birds may select nesting sites on BLM-administered lands surrounding Las Vegas Valley, thus establishing a breeding Peregrine falcon population within the Las Vegas District.

Southwest Willow Flycatcher - Federally-listed endangered (*Empidonax trailii extimus*). The Southwest willow flycatcher was listed on February 27, 1995 (*Federal Register*, Vol. 60, No. 38). The breeding range of the species includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico. The species is restricted to dense riparian associations of willow, cottonwood, buttonbush, and other deciduous trees and shrubs although they will use Tamarisk habitat as well. The Southwest willow flycatcher was listed due to extensive loss and modification of habitat and brood parasitism by the brown-headed cowbird. Nesting habitat for the Southwest willow flycatcher is found along the Virgin River.

Western Burrowing Owl - BLM Sensitive (*Athene cunicularia hypugea*). Burrowing owls are found in suitable habitat throughout southern Nevada. The owls use burrows constructed by other animals, such as desert tortoise and badgers, for nesting. Available habitat for owls has declined in southern Nevada because of loss of habitat to urban expansion, particularly in the Vegas Valley.

Ferruginous hawk - BLM Sensitive (*Buteo regalis*). No suitable nesting habitat occurs in the planning area. However, ferruginous hawks may winter in the planning area.

Special Status Reptiles

Desert Tortoise - Federally-listed threatened (*Gopherus agassizii*).

Management Background. Approximately 3 million acres of tortoise habitat in Clark and Nye counties are administered by BLM. Tortoises are year-long residents of the planning area, generally inhabiting the creosote-bursage or creosote-yucca communities at elevations below 5,000 feet. Their forage base consists of native annuals, perennial grasses, cacti, shrubs, and some exotic species. Tortoises are a biologically sensitive species, being long-lived with a slow maturation rate and low reproduction rates. The species is unable to adapt to rapid environmental changes. Since tortoises spend the majority of their lives underground, they are particularly susceptible to surface-disturbing activities.

In 1988, BLM developed the *Desert Tortoise Habitat Management on Public Lands: A Rangewide Plan* (USDI BLM 1988) to improve the status of the tortoise on public lands and to maintain viable populations in perpetuity. Emphasis was focused on increasing public awareness of tortoise populations and habitats, and on the categorization of tortoise habitat. Other management objectives and goals of the *Rangewide Plan* emphasized research, inventory, and monitoring programs to enlarge the scientific data base relating to the desert tortoise. Under this plan, there is high priority to

consistency within BLM programs to achieve the objectives of tortoise habitat management and coordination with other agencies. This plan categorized tortoise habitat into category I, II and III habitat areas. This categorization of habitat was a method of identifying which areas were most important for desert tortoise and which areas had the most potential for long-term management of desert tortoise populations. The intent of the *Rangewide Plan* was to prevent the Federal-listing of the desert tortoise as threatened or endangered. However, the plan was unsuccessful in this regard.

Under its emergency authority, the U.S. Fish and Wildlife Service placed the desert tortoise on the Endangered Species List on August 4, 1989 (*Federal Register*, Vol. 54. No. 149 Friday Aug 4). On April 2, 1990, the U.S. Fish and Wildlife Service issued a final rule listing the desert tortoise as a threatened species under the provisions of the Endangered Species Act. This act requires that the BLM not authorize, fund, or conduct any activity that threatens the continued existence of a listed species.

After listing of the desert tortoise, Clark County prepared a *Short-Term Habitat Conservation Plan* for desert tortoise in conjunction with other local governments to obtain a Section 10 (a)(1)(B) permit allowing incidental take of desert tortoise on private land. As mitigation for incidental take on private land, the Piute Valley/Eldorado Tortoise Management Area was established in the southern part of Clark County. The Section10 (a) Permit associated with the *Short-Term Habitat Conservation Plan* expired July 31, 1995 and was replaced by a long-term plan and associated permit. The *Clark County Desert Conservation Plan* addresses implementation of the *Tortoise Recovery Plan* in Clark County. For the most part, the *Desert Conservation Plan* does not depend on the Las Vegas BLM District Resource Management Plan for implementation of mitigation measures. Those mitigation measures of the *Desert Conservation Plan* dependent on approval of the Las Vegas BLM District Resource Management Plan are incorporated into the proposed decision.

In 1993, several environmental groups sued the Department of Interior to compel designation of critical habitat for desert tortoise. Final critical habitat designation for the Mojave population was published in the Federal Register on February 8, 1994 (*Federal Register* Vol. 59, No. 26). Three areas of critical habitat were designated in the Las Vegas BLM District

- Piute/Eldorado, Nevada Critical Habitat Unit
- Gold Butte, Nevada Critical Habitat Unit
- Mormon Mesa Critical Habitat Unit.

The *Tortoise Recovery Plan*, finalized in 1994, identifies several recovery units for desert tortoise. The Eastern Mojave Recovery Unit and the Northeastern Mojave Recovery Unit are located partially within Nevada. The *Tortoise Recovery Plan* recommends establishment of Desert Wildlife Management Areas to be managed for recovery of the species. (*Note*: The BLM is using the term Area of Critical Environmental Concern rather than a Desert Wildlife Management Area.)

At least one Area of Critical Environmental Concern should be established in each recovery unit. These Areas of Critical Environmental Concern would be managed for recovery of the desert tortoise. Each Area of Critical Environmental Concern should be 1,000 square miles in extent. Multiple smaller and more intensively managed Areas of Critical Environmental Concern with a combined 1,000 square miles may be necessary in recovery units where individual Areas of Critical Environmental Concern of 1,000 square miles are not possible.

Tortoise Areas of Critical Environmental Concern should be designed to meet the established principles of reserve design discussed below (USFWS 1994).

Reserve Design

1. Reserves should be well distributed across a species' native range.

2. Large blocks of habitat containing large populations of the target species are superior to small blocks of habitat containing small populations.

3. Blocks of habitat that are closer together are better than blocks that are far apart.

4. Habitat that occurs in less fragmented, contiguous blocks is preferable to fragmented habitat.

5. Habitat patches that minimize edge-to-area ratios are superior to those that do not.

6. Interconnected blocks of habitat are better than isolated blocks, and corridors or linkages function better when the habitat within them is represented by protected, preferred habitat for the target species.

7. Blocks of habitat that are roadless or otherwise inaccessible to humans are better than roaded and accessible habitat blocks.

Tortoise Population Status. One method of surveying desert tortoise habitat is to walk standard tortoise transects. Standard tortoise transacts consist of a 1.5 mile triangular transect (0.5 mile per side). All sign of tortoise within five meters of either side of the transect is counted. Tortoise sign includes tortoises (alive or dead), burrows, scat, egg shells, tracks, and courtship rings. The amount of sign per transect can be correlated with tortoise abundance by conducting transects on areas with known population levels. The relative abundance of tortoises in other areas can then be estimated by conducting tortoise transects.

Since 1979, more than 2,000 standard tortoise transects have been conducted in southern Nevada. The transect technique generally indicates the relative abundance of larger tortoises and their sign. Transects tend to underestimate tortoise density for a specific location, although they clearly can differentiate good habitat from poor habitat (Turner et al. 1982).

A second method of estimating tortoise densities and population trend is to conduct mark-recapture studies. In the Las Vegas BLM District, a total of eight permanent, one square mile study plots were established between 1979 and 1994 (two more were established in Caliente). These plots are read about every four years. Plot surveys consist of a 30 field-day capture period followed by a 30 field-day recapture period, for a total effort of 60 field-days per study plot. The *Tortoise Recovery Plan* (USFWS 1994) recommends the removal method of population estimation (Southwood 1978; Zippin 1956, 1958) for assessing density of large immature and adult tortoises. Surveys would be conducted on kilometer square plots for 3 to 7 days. Improved survey techniques will be tested in future studies. The most appropriate method will be used to monitor tortoise populations in the future.

Between 1990 and 1992, five permanent study plots were resampled. Data was analyzed using the Bailey binomial method outlined by Caughely (1977). Of the five plots resampled between 1990 and 1992, the data indicates the following:

- Two populations of adult tortoises have remained relatively stable or increased slightly (Sheep Mountain and Coyote Springs)
- Two populations declined slightly (Christmas Tree Pass and Trout Canyon)
- One populations dramatically declined (Gold Butte).

In 1994, four existing plots were resampled (Piute Valley, Christmas Tree Pass, Mormon Mesa and Gold Butte). Using the Chi Square Test at the 0.01 level, the population on the Piute Valley plot appears to have increased slightly. Data indicates that populations remained relatively stable on the other three plots between 1992 to 1994.

The Piute Valley study plot was surveyed five times between 1979 and 1994. The data indicate that a significant decrease in the number of adult tortoises occurred between 1979 and 1983, likely due to drought conditions. Between 1983 and 1987, numbers of adults remained constant, but the number of tortoises with less than 180 millimeter mid-carapace length declined by approximately 50 percent. The total estimated number of tortoises on the plot decreased between 1987 and 1989, although the actual numbers of subadult and adult tortoises captured were approximately the same. By 1989, it appeared that the density of tortoises on the Piute Valley Study plot had begun to stabilize. Data from 1994 further supports a stable population, but at a lower population density than that estimated in 1979.

Since 1990, signs of upper respiratory tract disease were documented on five permanent study plots (Coyote Springs, Christmas Tree Pass, Piute Valley, Mormon Mesa and Gold Butte). None of the animals observed showed chronic signs of the respiratory disease, and none were tested for the presence of *Pasteurella* or *Mycoplasma*.

Osteoporosis is described as the thinning of bone and is exemplified by the concavity of tortoise scutes. Sunken scutes in young tortoises is generally considered to be a sign of malnutrition. This condition was documented on all permanent study plots sampled between 1990 and 1994. Shell disease was documented on all permanent study plots sampled between 1990 and 1994.

Proposed Areas of Critical Environmental Concerns. One goal of the Proposed Resource

Management Plan/Final Environmental Impact Statement is to manage for the recovery of the desert tortoise, as defined in the *Tortoise Recovery Plan* (USFWS 1994). As outlined in the *Tortoise Recovery Plan,* Desert Wildlife Management Areas were proposed. Because this is not an official BLM designation, they were identified as Areas of Critical Environmental Concern.

The proposed Areas of Critical Environmental Concern were developed to closely coincide with proposed critical habitat for desert tortoise, the Piute-Eldorado Tortoise Management Area identified in the *Clark County Short-Term Habitat Conservation Plan* and the recovery areas outlined in the *Tortoise Recovery Plan.*

Densities of tortoises within the Areas of Critical Environmental Concern were estimated using strip-transect data and study plot data. The following assumptions were made:

1. Estimated densities were based on methods described by Karl (1981) for Lincoln and Nye counties, and selected sites in Southern Nevada (Schneider and Turner 1982). The strip transect methods cited above use the total adjusted sign values shown in Table 3-16.

2. A high and low density estimate was calculated based upon strip-transect data.

3. For analytic purposes, a range of 140 to 160 tortoises per square mile was assigned to transects with total adjusted sign of greater than or equal to 12.

Table 3-17 displays proposed Areas of Critical Environmental Concern, adjacent habitats, and estimated tortoise densities within those areas.

"The desert tortoise spends approximately ninety eight percent of its life in a subterranean environment where the burrow protects it from the cold winters, hot summers, and predators (Nagy and Medica 1986). During its active periods, the desert tortoise requires vegetation for forage and cover. Certain plants provide forage and nutritive requirements and surface cover for protection from the hot summer sun and predators (Jennings 1993; Weinstein et al. 1987). The soil and vegetation and their related properties including microenvironment are expected to play an important role in the density and distribution of tortoise within an area (Wilson and Stager 1992; Weinstein et al. 1987; Woodbury and Hardy 1948; Miller and Stebbins 1964).

Table 3-16. Estimated densities of tortoise, based on total adjusted sign.

Total Adjusted Sign	Estimated Density Per Square mile
0	1-10
1-3	10-45
4-7	45-90
8-11	90-140
12	>140

[Methodology: Karl (1981), Schneider and Turner (1982)]

It is likely that a combination of soil temperature, soil properties, landform/micro environment, and vegetative community characteristics offer a method to interpret habitat suitability and quality for the desert tortoise (Lato and Stager 1997). Soil temperature is measured at a depth of 20 inches, which is the average depth of a tortoise winter burrow. A soil that is too cold or too hot on an average annual basis for a reptile such as the tortoise to regulate its body temperature would not offer a suitable habitat for large populations and could be restrictive. Soil properties that would be considered include rock (gravel) content and size, soil texture, consistence, pH, color, effervescence, cementation, and depth to a restrictive layer. These properties could restrict or enhance burrowing or digging by the tortoise providing more or less habitat, respectively.

The landform and associated micro environments would also effect habitat. Whether a landform is dissected or non-dissected by drainages (the dissected landform would offer more micro environment potential than the non-dissected), north or south facing slopes on a macro or micro-environment basis (a south slope being hotter and drier), presence of coppice dunes or boulders with underground pockets for burrowing etc. would be important considerations.

Table 3-17. Estimated tortoise numbers in proposed ACECs and adjacent habitats.

Area Landowner or Manager	Square Miles of Habitat	Relative Density (Adults)	Estimated Number of Tortoises (Adults)	Median Number of Tortoises (Adults)
Mormon Mesa Clark County BLM	236	25-45	5,900-10,620	8,260
Mormon Mesa Lincoln County BLM	154	10-20	1,540-3,080	2,310
Total - Mormon Mesa	**390**		**7,440-13,700**	**10,570**
Arrow Canyon Clark County BLM	118	25-75	2,950-8,850	5,900
Coyote Spring/Kane Spring Lincoln County BLM	105	25-75	2,625-7,875	5,250
Coyote Spring Aerojet	63	25-75	1,575-4,725	3,150
Coyote Spring USFWS	115	10-45	1,150-5,175	3,163
Total -Coyote Spring	401		8,300-26,625	17,463
Gold Butte NV BLM	293	10-20	2,930-5,860	4,395
Gold Butte AZ BLM	319	1-20	319-6,380	3,350
Gold Butte AZ BLM	144	20-50	2,880-7,200	5,040
Gold Butte NPS	130	10-20	1,300-2,600	1,950
Total - Gold Butte	**886**		**7,429-22,040**	**14,735**
Piute Valley NV BLM	358	40-63	14,320-22,554	18,437
Eldorado Valley NV BLM	156	6-17	936-2,652	1,794
Lake Mead NRA	293	10-20	2,930-5,860	4,395
*Piute/Eldorado Valley CA, CHU, CA BLM	709	40-90	28,360-63,810	46,085

Table 3-17. Estimated tortoise numbers in proposed ACECs and adjacent habitats (concluded).

Area	Square Miles of Habitat	Relative Density (Adults)	Estimated Number of Tortoises (Adults)	Median Number of Tortoises (Adults)
*Ivanpah CHU CA BLM	988	15	14,820	14,820
Boulder City Conservation Easement	133	6-17	798-2,261	1,530
Total - Eldorado/ Piute Valley	**2,637**		**62,164-111,957**	**87,061**
Totals	**4,314**		**85,333-174,322**	**129,829**

* Square miles of habitat for California based on designated critical habitat and may include acreage within the Western Mojave RU.

Existing plant community characteristics (such as canopy cover, perennial grass composition by air dry weight, species diversity, and nutritional value.) would play a role in habitat assessment.

It should be clarified that the potential vegetation in a particular location depends on the soils present there while the reverse does not hold true. This equates to vegetation being the dependent variable. Additionally, soils and landforms are considered stable factors that do not vary in their inherent characteristics under normal circumstances. Therefore, the soil temperature, soil properties, and landform/micro environment would receive a heavier weighting or consideration in habitat consideration for burrowing animals. Vegetation characteristics (such as cover, production, nitrogen content, rare elements present) would be used to understand when soils of similar characteristics have significantly different measured populations of desert tortoise and/or overall animal health and fitness."

Special Status Reptiles: Others

Chuckwalla - BLM sensitive: (*Sauromalus obesus*). Chuckwallas are a large, herbivorous lizard. They are generally found below 5,000 feet in elevation, in rock outcrops and rocky slopes. Chuckwallas generally are not found on the valley floors. Detailed geographic distribution within the Las Vegas District is not well described and is generally patchy, based upon suitable habitat. Suitable habitat may be found in most mountain ranges in the Las Vegas BLM District.

Gila Monster (*Heloderma suspectum cinctum*). The gila monster is a State of Nevada protected, and rare species (NAC 503.080 and 503.090). The gila monster inhabits the Colorado River Basin and Central Region Hydrographic units (See Map 3-4a). Within the Las Vegas District, gila monsters are known to occur in the Spring Mountains, McCullough Mountains, Highland Range, River Mountains, Eldorado Mountains, Newberry Mountains, Arrow Canyon Range, North Muddy Mountains, Nelson Hills, the Virgin River floodplain, and Meadow Valley Wash.

Gila monsters are often found in association with springs and major ephemeral and perennial tributaries of the Colorado River. It is found primarily below 5,000 feet in elevation, particularly near the interfaces of complex rocky slopes, washes, riparian-xerophyll woodland and loose textured soils. These areas provide the biotic productivity necessary for prey availability during the spring and early summer, and also nesting sites and thermal cover. The gila monster spends up to 90 percent of its time underground and thus is not often observed.

Special Status Mammals

Bats. The U.S. Fish and Wildlife Service identified 12 special status bat species as potentially occurring in the planning area (USDI USFWS, File no. 1-5-95-SP-066, February 9, 1995). Generally, very little information is available on the distribution, abundance, or habitat needs of these species within Nevada. Potential nesting and roosting habitat occurs sporadically throughout the Las Vegas BLM District in caves, crevices, and abandoned mine tunnels. The species of bats are listed in Appendix B.

Special Status Invertebrates

Numerous invertebrate species are found on Ash Meadows National Wildlife Refuge. However, BLM has little management authority for the area. Currently, the U.S. Fish and Wildlife Service is working to withdraw the remaining BLM inholdings in the refuge.

Four special status invertebrates species occur on Big Dune and Lava Dune in Nye County. These are all BLM sensitive species and include:

- Giuliani's dune scarab beetle (*Pseudocotalpa giulianii*)
- Aegialian dune scarab beetle (*Aegialia magnifica*)
- Big Dune aphodius beetle (*Aphodius* sp.)
- Rulien's miloderes weevil (*Miloderes rulieni*).

Lava Dune is partially located on patented land while Big Dune is public land.

Two special status invertebrates occur in the Muddy River system:

- Moapa pebblesnail (*Fluminicola avernalis*)
- Moapa Warm Springs riffle beetle (*Stenelimis calida moapa*).

The Moapa Warm Springs riffle beetle is a BLM sensitive species. Both are located primarily in the springs at the headwaters of the Muddy River. Currently, BLM has no management responsibility for habitat for these species.

Special Status Amphibians

The Virgin and Muddy rivers contain potential habitat for the Arizona southwestern toad (*Bufo microscaphus*), a BLM sensitive species; and the relict leopard frog (*Rana onca*). The relict leopard frog was considered to be extinct. However, this classification is currently under investigation after discovery of what appears to be relict leopard frogs in two springs on Lake Mead National Recreation Area.

Special Status Plant Species

The Las Vegas BLM District is home for many special status species that include Federally-listed threatened, endangered, candidate, state-listed and BLM sensitive species (Map 3-6). It is BLM policy (BLM Manual 6840) to:

- Manage the habitats of all special status species.
- Prevent future federal listing of species.
- Ensure the recovery of listed species.
- Ensure that any federal actions authorized, funded or carried out are not likely to jeopardize the existence of any such species

Seven plant species known to occur in the planning area were designated as Federally-listed threatened or endangered; all of these species are found in the Ash Meadows area. Table 3-18 lists these special status plants.

Table 3-18 also documents the species within the Las Vegas BLM District that are officially recognized by the U.S. Fish and Wildlife Service as candidates for listing as threatened or endangered species (*Federal Register, Notice of Review*, 2/28/96).

Table 3-19 lists other special status species that are of special management concern due to restricted habitats, limited distribution, or lack of information. Special status species include those listed by the Nevada Division of Forestry as critically endangered. Map 3-6 shows the general locations for special status plant species within the Las Vegas BLM District.

Forestry Resources

Woodland Products

As a result of the *Forest Enhancement Act* of 1989, the number of acres of harvestable woodlands in the Las Vegas BLM District was greatly reduced. All pinyon-juniper woodlands in the Spring Mountains are now included in the Charleston District of the

Table 3-18. Federally listed threatened and endangered, and candidate plants. Note: all species listed below are also listed as Critically Endangered by the State of Nevada.

Endangered	Ash Meadows niterwort	*Nitrophila mohavensis*
Threatened	Ash Meadows milkvetch	*Astragalus phoenix*
	Spring-loving centuary	*Centaurium namaphilum*
	Ash Meadows gumplant	*Grindelia fraxino-pratensis*
	Ash Meadows ivesia	*Ivesia kingii var. eremica*
	Ash Meadows blazing star	*Mentzelia leucophylla*
	Ash Meadows sunray	*Enceliopsis nudicaulis var. corrugata*
Candidate	Blue Diamond Cholla	*Opuntia whipplei multigeniculata*

(Source: File No. 1-5-95-SP-066 USFWS, Nevada Ecological Services, Office, 2/13/95 and Federal Register Notice of Review, February 28, 1996, pp 7596. See also State of Nevada NRS 527.260-.300 for Critically Endangered Flora.)

Table 3-19. BLM special status plant species, including those listed as Critically Endangered by the State of Nevada Division of Forestry (marked with (*)) .

Scientific Name	Scientific Name
Angelica scabrida	*Epilobium nevadense*
*Arctomecon californica**	*Erigeron ovinus*
Arctomecon merriamii	*Eriogonum bifurcatum*
Astragalus aequalis	*Eriogonum corymbosum* var. *aureum*
Astragalus anphioxys var. *musimonum*	*Eriogonum heermannii var. clokeyi*
Astragalus funereus	*Eriogonum viscidulum**
Astragalus geyeri var *triquetrus**	*Glossopetalon pungens* var *glabra*
Astragalus mohavensis var *hemigyrus**	*Ionactis caelestis*
Astragalus mokiacensis	*Ivesia jaegeri*
Astragalus remotus	*Lomatium graveolens* var. *clarkii*
Botrychium crenulatum	*Penstemon albomarginatus*
Calochortus striatus	*Penstemon bicolor* ssp *bicolor*
Chrysothamnus eremobius	*Penstemon fruticiformis* ssp *amargosae*
Cordylanthus tecopensis	*Phacelia parishii*
Cryptantha insolita+*	*Salvia dorrii* var *clokeyi*
Cymopterus ripleyi var. *saniculoides*	*Spiranthes infernalis*
Didymodon nevadensis	*Townsendia jonesii* var *tumulosa*
Enceliopsis argophylla	
Epilobium nevadense	

Key:
+ Presumed extinct in Nevada
(Source: Nevada BLM Special Status Species list March 1997, and State of Nevada NRS 527.260-.300 for Critically Endangered Flora).

Toiyabe National Forest. The Virgin Mountains support pinyon-juniper woodland, but a lack of roads make the areas inaccessible for harvesting. Pinyon-juniper stands in the planning area are decadent, even-age stands, with minimal evident regeneration. Very little understory is present due to shading and competition for nutrients and available moisture. The Virgin Mountains contain a small, relict stand of white fir; no harvest of this species is permitted in the Las Vegas BLM District.

Mesquite wood was harvested in an area located approximately 70 miles west of Las Vegas, in the eastern Amargosa Desert. This area partially surrounds a large playa and has little potential for additional production or improvement. The mesquite "stands" are thin and uneven-aged, with little or no regeneration. The stand was closed to wood harvest due to the conflict with identified sensitive resources.

Other Vegetative Resources

Although the Las Vegas BLM District has no formal program for harvest of desert vegetation, many species are made available to the public when destruction of plants is imminent as a result of construction or development (such as powerline installations and mining activities). Salvage permits are issued to individuals, nursery owners, and landscapers for collection of Joshua trees, barrel cactus, beavertail cactus, prickly pear, and other small cacti. Free-use permits authorizing collection of desert vegetation have also been issued for educational or scientific research purposes.

Non-sale Disposals-Recreation Use

Recreationists collect limited amounts of vegetative products for personal use, including but not limited to dead and downed timber for campfires, flowers, berries, nuts, seeds, cones and leaves, in accordance with 43 CFR 8000 and BLM Manual 5500.

Livestock Grazing

The Las Vegas BLM District is divided into 53 grazing allotments comprising approximately 2,867,508 acres of public lands (see Map 2-8), with 689,852 acres of unalloted public lands. Of that total, only 19 allotments could be considered active over the past seven years. Grazing allotments were originally delineated in 1934; allotment boundaries, grazing preference (number of animal unit months), season of use, and base property (private land or water rights) were established. Active grazing use was authorized through Term Desert Permits, generally issued for a period of 10 years.

In 1969, all grazing allotments in Clark County were designated as ephemeral in response to the Ephemeral Range Rule of 1968. This rule provides a description of rangelands characterized as ephemeral or annual in nature, as well as special rules for administering those ephemeral rangelands. The complete text of the Ephemeral Range Rule is provided in Appendix E. The special rules in the Ephemeral Range Rule take precedence over certain requirements in the grazing regulations in 43 CFR 4000. On the ephemeral allotments, grazing preference was totally eliminated and season of use became contingent on the availability of ephemeral forage.

As a result of development of Clark County's *Short-Term Habitat Conservation Plan* for the Desert Tortoise (1991), six active grazing allotments were purchased in cooperation with or by The Nature Conservancy. Additional allotments may be purchased by The Nature Conservancy in cooperation with Clark County in the future.

The U.S. Fish and Wildlife Service issued a Biological Opinion (File No. 1-5-91-F-36), which identified restrictions on livestock grazing throughout the Las Vegas BLM District. These restrictions are, and will remain, in effect until the BLM reinitiates consultation with the U.S. Fish and Wildlife Service. Each allotment was divided into prescription areas based on the importance of the tortoise habitat. On all Prescription 1 areas, grazing is not allowed from March 1st to June 14th. On Prescription 2 areas, grazing use can be season-long with restrictions on the utilization level of key forage species. On the Prescription 3 areas, which do not have any restrictions based on desert tortoise, grazing occurs contingent on existing livestock grazing management practices.

Allotments range in size from 90 to 312,000 acres. Ten allotments contain lands within the Lake Mead National Recreation Area; grazing is administered by BLM on public lands and on Lake Mead National Recreation Area, under a cooperative agreement with the National Park Service. The *Clark County Management Framework Plan* and *Esmeralda-Southern Nye Resource Management Plan* designated the types of livestock authorized to graze each allotment within the planning areas.

Table 3-20 provides additional information on the status of the allotments.

Revised regulations for grazing administration (43 CFR 4100) of public lands managed by the Bureau of Land Management became effective August 21, 1995. Subpart 4180 of the regulations requires the BLM State Directors, in consultation with Resource Advisory Councils, to develop standards for rangeland health and guidelines for grazing administration for BLM lands within a region or state. Standards and guidelines are developed to identify characteristics of healthy ecosystems on public lands and the management actions to promote them. Standards and guidelines for a region or state must be approved by the Secretary of the Interior.

On February 12, 1997, the standards and guidelines for three regions in Nevada were approved by the Secretary of the Interior. The standards and guidelines developed through the Resource Advisory Council process for the Mojave-Southern Great Basin Area apply to livestock grazing in the Las Vegas BLM Resource Management Plan planning area. These standards for rangeland health and guideline for grazing administration are in Appendix L of this document.

Grazing allotments were categorized according to their potential to respond to management. The three categories of management priority for allotments include:

- "I" for improve - These allotments have the highest need and priority for intensive management.
- "M" for maintain - These are allotments where present conditions and management are satisfactory
- "C" for custodial - These allotments, for a variety of reasons, have low management priority.

Most livestock operators in the planning area have breeding herds rather than stocker-feeder operations. Numbers of livestock ranged from as few as 12 cows, to as many as 625. All permittees were dependent on Federal range for grazing, because the majority of use occurred on water-leased allotments. Notable exceptions are Mt. Stirling, Bunkerville, and Upper Mormon Mesa, which are land base allotments.

The season of grazing use (authorized grazing period) is normally designated through land use planning and can range from a few days to a full year. On ephemeral range, however, the season of use depends on the production of ephemeral forage, which can change from year to year. A season of use is not, therefore, formally designated on ephemeral range. In the planning area, 15 allotments were grazed year-long with the permittees making applications to graze at regular intervals throughout the year. Range inspections are made prior to grazing authorizations to determine if adequate forage is available, or if the potential to produce forage exists. Measurements of soil moisture and volume of forage produced provide the basis for issuing a grazing authorization.

Activity level planning, in the form of Allotment Management Plans, is undertaken to ensure that land use planning decisions are correctly applied on a site-specific basis. An Allotment Management Plan generally establishes a formal grazing system, designating the type and number of livestock and the season of use.

Management of grazing use on the non-Allotment Management Plan allotments generally occurs through an informal system by which the permittee uses the location and availability of water to control the movement of livestock within the allotment. Weather conditions can also influence the location and movement of the animals. During the summer, for example, high temperatures and the lack of shade in some areas will cause livestock to seek cover and forage at higher elevations. Range improvements such as fences, spring developments, wells, pipelines, and troughs can be owned either by the permittee or the BLM. In many cases, BLM furnishes materials and the permittee provides labor for construction of projects under a cooperative management agreement.

The National Park Service issued a two-year notice closing National Park Service administered lands in the Gold Butte Allotment. The U.S. Forest Service did not renew grazing permits/leases for the Wheeler Wash and Mt. Stirling allotments.

Monitoring and evaluation of the effects of livestock grazing occurred on 18 allotments. Only those allotments placed in the "Improve" or "Maintain" categories have intensive monitoring studies at this time. Other allotments have minimal studies are conducted (example: use pattern mapping)

Table 3-20. Livestock allotment use.

Allotment Name	Class	Average Licensed Use (AUMs) 1984-93*1	Operator(s)	Period of Use *2	Kind of Livestock	Acres (BLM)
Acton-Farrier	C	39	C.A. Lewis	Mar-May Sep-Nov	Cattle	41,465
Arrow Canyon	M	225	G. Perkins	Mar-May Sep-Nov	Cattle	88,108
Azure Ridge*3	I	240	J. Whitmore	Y/L	Cattle	7,295
Billy Goat Peak	I	1515		Y/L	Cattle/Horses	48,962
Bunkerville*5	I	2180	M. Jensen C. Adams Hughes Bros.	Y/L	Cattle Cattle	118,298 (P) 16,120
Dry Lake	C	0	J. Hendricks	Mar-May	Cattle	43,873
Flat Top Mesa	C	76	H. Wittwer	Mar-May Sep-Nov	Cattle Horses	5,338
Glendale	C	0	C. Hester	No Use	Cattle	23,595
Gold Butte*5/*9	I	3297	TNC	Y/L	Cattle	172,859 (P) 92,264
Hen Springs	M	723	R. Jensen J. Wittwer	Mar-May Sep-Nov	Cattle	21,330
Jack Rabbit	C	51	L. Hardy V. Knight C. Simmons W. Pulsipher	Mar-May Sep-Nov	Cattle	2,000
Lime Spring	C	0	B. Jensen	No Use	Cattle	3,140
Lower Mormon Mesa	C	0 404	D. Whitney	Mar-May Sep-Nov	Cattle Horses	37,048 (R) 8,077
Mesa Cliff	C	87	J.-J. Hayworth	Mar-May	Cattle/Horses	13,681
Mesquite Community*3	I	1440	B. Jensen	Y/L	Cattle	8,702
Muddy Mtns.*5/4	C	0	P.Clough K. Searles	Mar-May	Cattle Horses	157,451 (P) 45,545
Muddy River	C	0	P. Lewis	No Use	Cattle	17,888
Overton Arm*5	C	0	P. Lewis	No Use	Cattle	1,822 (P) 2,716
Pittman Well	C	0	K. Searles	No Use	Cattle	34,192
Pulsipher Wash	C	0	B. Hafen	No Use	Cattle	3,451
Rox	C	191	Keith Cutler	Oct-May	Cattle	18,062
Sunrise Mt.	C	0	Unalloted	No Use	---	34,272
Toquop Sheep	C	634	E. Larson R. Lundgren D. Lamoreau	Mar-May	Sheep	24,557
Upper Mormon Mesa	I	372	J. Riggs D.- M. Gates P. Lewis	Mar-May Sep-Nov Oct-May	Cattle	46,325
Ute*4	C	0	G. Perkins K. Searles	Mar-May	Cattle	45,231

Table 3-20. Livestock allotment use (concluded)

Allotment Name	Class	Average Licensed Use (AUMs) 1984-93*1	Operator(s)	Period of Use *2	Kind of Livestock	Acres (BLM)
White Basin*5	M	498	E. Leavitt L. Leavitt	Mar-May Sep-Nov	Cattle	97,454 (P) 78,631
Virgin River Bottom	C	0	V. Knight C. Simmons	Y/L	Cattle	90
Mt. Stirling	I	517	Bow and Arrow Cattle Co.	Y/L	Cattle	126,888
Ireteba Pks.*5/*9	I	1455	TNC	Y/L	Cattle	201,544 (P)109,332
Hidden Valley	I	438	Leon Sprouse	Mar-May Nov-Feb	Cattle	63,621
McCullough Mtns.*9	I	-----	TNC	-----	Cattle	169,175
Christmas Tree*5/*9	I	-----	TNC	-----	Cattle	69,233
Newberry Mtn*5	C	0	-----	No Use	-----	31,764 (P) 37,981
Jean Lake	I	-----	TNC	-----	Cattle	141,082
South Point*4	C	0	E. Soto	No Use	-----	16,739
Crescent Peak*9 (AMP)	I	-----	TNC	No Use	Cattle	119,320
Roach Lake	C	195	Whipple,Davis Dawson	Y/L	Cattle	20,752
Kyle Canyon	C	0	K. Kindred	No Use	Cattle	17,514
Black Butte	C	0	R. Spurlock	No Use	Cattle	40,861
Table Mountain	C	0	Whipple-Davis	No Use	Cattle	83,102
Stump Springs*4	C	0	R. Wiley	No Use	Horses	49,557
Younts Spring	C	0	BLM	No Use	---	14,502
Lucky Strike*10	M	187	V. Young	Y/L	Horses	99,839
Wheeler Wash	I	670	P. Bowman	May-Nov	Cattle	64,701
Spring Mtn*6	C	0	-----	-----	-----	237,890
Wheeler Slope*7	C	0	-----	-----	-----	72,277
Unallotted	C	0	-----	-----	-----	3,732
Unallotted	C	0	-----	-----	-----	6,786
Unallotted	C	0	-----	-----	-----	62,243
Ash Meadows*8	C	0	-----	-----	-----	120
Carson Slough	C	0	-----	-----	-----	13,842
County Line	C	0	-----	-----	-----	6,720
Grapevine-Rock*8	C	0	-----	-----	-----	6,844
Totals						**2,867,508** **(P/R) 411,576**

Key: Allotment Classes: I-Improve, M-Maintain, C-Custodial; (P) LMNRA acres; (R) BOR withdrawal.

*1 Numbers fluctuated due to ephemeral classification averages used.

*2 Not formally designated; categories reflect past 10 years use.

*3 Administered by Arizona Strip District.

*4 Used only 1 year since 1976.

*5 Includes acreage inside Lake Mead NRA.

*6 No operator, base owners not in livestock business.

*7 Grazing not allowed; base waters not on allotment.

Table 3-21. Livestock-range studies.

Allotment Name and Category	Dates Studies Established	Number of Years of Data	Types of Studies
Arrow Canyon (M)	1986	3	U, UM,A,EPT
Azure Ridge (I)	1981(AZ)	6	U,PT,PACE FREQ,5'x5'PT
Billy Goat Peak (I)	1987	2	EP,EPT,U,UM,A
Bunkerville (I)	1982	4	U,PT,F,EPT,A,UM,Veg. T.
Christmas Tree Pass (I)	1985	4	U,F,EP,EPT,A,PT,CC,UM
Crescent Peak (I)(AMP)	1972	16	U,EP,A,PT,PPT,CC,F,EPT
Gold Butte (I)	1982	5	F,U,PT,EP,EPT,A,UM,Veg. T.
Hen Springs(M)	1987	2	U,UM,A,EP
Hidden Valley (I)	1987	2	U,EP,A,PT,UM
Ireteba Peaks (I)	1982	5	F,PT,EPT,EP,A,UM
Jean Lake (I)	1977,82	7	U,F,EP,A,EPT,CC,PT,UM
Lucky Strike (M)	1988	1	U,UM,A
McCullough Mtn (I)	1982	5	U,EP,A,PT,CC,F,EPT,UM
Mesquite Community (I)	1981(AZ)	7	U,PT,A,Pace Freq.,5'x5' PT
Spring Mtn.	1988	2	F,PPT,UM
Upper Mormon Mesa (I)	1987	2	EP,EPT,U,UM,A
Wheeler Wash (I)	1988	1	EP,U,UM,A
White Basin (M)	1988	1	U,UM,A,EP
Mount Stirling (I)	1988	1	U,UM,A

Note: Only those allotments categorized as "Improve" or "Maintain" have studies.
Key:

U	Key area utilization.
EP	Ephemeral Production, Allotments evaluated upon receipt of grazing application.
EPT	Ephemeral production for crucial tortoise habitat.
PT	Photo Trend, usually in a key area at trend or frequency plot.
CC	Cover Composition, percent cover and plant composition based on transects.
F	Frequency Trend.
A	Actual Use.
PPT	Precipitation.
UM	Use Map.
Veg. T.	Vegetation Trend Plot other than 5'x5'.

(Source: BLM, Las Vegas District Office files, 1991.)

Monitoring includes the following range studies: current year's utilization, condition and trend, cover composition, frequency, actual use, and ephemeral production. Table 3-21 indicates which allotments have been monitored and the types of studies conducted.

Wild Horse and Burro Management

Background

On December 15, 1971, Congress enacted the *Wild and Free-Roaming Horse and Burro Act*, authorizing BLM to manage wild horses and burros on public lands. The *Act* mandated that wild and free-roaming horses and burros be protected from unauthorized capture, branding, harassment, or death. These animals are to be considered an integral part of the natural system, based on their distribution at the time the law was enacted.

Wild horses and burros are found in eight Herd Management Areas throughout the Las Vegas BLM District, including the Spring Mountains, the Muddy Mountains, the Eldorado Mountains, and in the Gold Butte region (see Map 2-1). Management of six Herd Management Areas is identified in this plan, with Wheeler Pass Herd Management Area managed by the U.S. Forest Service. The Red Rocks Herd Management Area will be analyzed in the Red Rock Canyon National Conservation Area, General Management Plan. The wild horse population is estimated at approximately 65 animals. In addition, the planning area supports approximately 108 burros. The number of wild horses and burros occurring within the Las Vegas BLM District represents less than one percent of Nevada's wild horse population and approximately 20 percent of the state's burro numbers.

Burros inhabit the lower desert areas throughout the year. Wild horses are found at lower elevations during the winter, then retreat to the mountains during the summer months. Both wild horses and burros have been observed at distances over 10 miles from permanent water sources. In the Spring Mountains, waters are found high in the foothills, allowing wild horses and burros year-round use of the same sources. Burros found in the Muddy Mountains, Eldorado, and Gold Butte Herd Management Areas have historically used Lake Mead and Mohave as the most reliable water sources during the summer months.

It is assumed that the wild horses and burros in the planning area were influenced by the domestic animals that either escaped from, or were released by, their owners, possibly dating back to those animals brought by the Spanish.

Many of today's wild horses were altered by registered animals released by local ranchers to "upgrade" the wild herds by introducing new genetic characteristics into the gene pool of the herd. The object of this upgrading was to produce better wild horses for eventual capture and sale or for use by the ranchers.

The colors of wild horses in the Las Vegas BLM District range from white or light gray to black, with all colors except appaloosa represented. Most of the wild horses are bay, brown, or sorrel, but other colors such as chestnut, pinto, roan, palomino, grulla, and buckskin are well represented in the various herds. Some color patterns are beginning to emerge among herds in the Spring Mountains. A larger proportion of pintos are found near the west end of this range, and more buckskins and palominos occur in the wild horse herds in the eastern Spring Mountains. Burro colors grade from tan or gray to black, brown, red or pink, and occasionally white. The gray or fawn color is predominant, with brown, black, pink/red, and white found in decreasing percentages. Gray or fawn burros have a black dorsal and shoulder stripe, with a few showing leg stripes as well. Some of the brown burros also have a faint shoulder and dorsal stripe.

The diets of wild horses and burros show a moderately low degree of overlap, with wild horses consuming more grasses and burros utilizing more shrubs. Both species consume forbs when these plants are available, although burros tend to eat more dry forbs, and wild horses prefer more dry grasses. The diets of both have a moderate-to-high overlap with cattle. Burros compete more directly than do wild horses with wildlife for forage.

Urban expansion and increased recreational use of Red Rock Canyon National Conservation Area and Lake Mead National Recreation Area are impacting wild horse and burro herds in the Spring Mountains and the Muddy Mountains Herd Management Areas.

Table 3-22. Wild horse and burro herd management areas.

Herd Area Name	Current Population Estimate Horses	Burros	Current Herd Area Status	BLM Acres	Other Federal Acres
Ash Meadows	0	0	HMA	90,466	24,512
Amargosa*	0	0	HMA	8,489	0
Eldorado Mtns.	0	10	HMA	15,568	79,188
Gold Butte	0	26	HMAP	177,871	93,303
Johnnie	49	37	HMA	177,662	34,908
Muddy Mtns.	16	35	HMA	77,040	100,865
Totals	**65**	**108**		**547,096**	**332,776**

Key:
* Amargosa is retained as an HMA, but with 0 animals due to a lack of forage and water on the public lands.
(Source: BLM, Las Vegas District Office files 1991).

Table 3-22 shows wild horse herd information and includes the Ash Meadows Herd Management Area, which was inadvertently omitted from prior planning documents. Due to conflicts with private lands and Federally-listed threatened and endangered species, the Appropriate Management Level was set at zero for this Herd Management Area. Any wild horses or burros that move into this Herd Management Area will be scheduled for removal. In 1985, approximately 215 horses (which represents the entire population at that time) were removed from the Ash Meadows Herd Management Area. Subsequent wild horse and burro removals will maintain Herd Management Area at the Appropriate Management Level.

The National Park Service recommended that all wild burros be removed from the Eldorado Herd Management Area to lessen impacts on the environment and conflicts with developments within Lake Mead National Recreation Area. Through a cooperative agreement with the BLM, the U.S. Forest Service manages the Wheeler Pass Herd Management Area, which includes lands of both agencies.

State Route 160 was fenced in 1995 to provide additional safety for the public, as well as the wild horses and burros along the route. BLM coordinated with the Nevada Department of Transportation to ensure that underpasses were constructed where horses and burros could access the Herd Management Area on both sides of the right-of-way fence.

Cultural and Paleontological Resources Management

Cultural Resources

Cultural resources are the tangible remains of past human activities. The Las Vegas BLM District encompasses a unique region, being located at the interface of three distinct geographical zones:

- Colorado Plateau
- Mojave Desert
- Great Basin.

Each zone shows evidence of the distinctive cultural groups who adapted to the natural resources of the area. All prehistoric Native Americans employed hunting and gathering methods to acquire at least some of their foods; these resource collection practices are reflected in the archeological record. Seeds, nuts, roots, and pods were collected from a variety of plants, including cacti, agave, yucca, grasses, mesquite, and pinyon pine. Stone tools such as manos and metates used to grind the seeds and nuts, knives, sharpened stone flakes, and chopping

tools are found in archeological sites that record these plant procurement and processing activities.

Rabbits, desert tortoises, coyotes, rodents, bighorn sheep, and mule deer were prey for prehistoric hunters. The atlatl, a wooden device used to throw long, stone-tipped darts, was used prior to A.D. 500. After that time, the bow and arrow was the preferred hunting weapon. Projectile points, associated debris from stone tool making, and hunting blinds mark the locations of these past events.

Hunter-gatherers moved seasonally within a series of environmental zones, living in open camps, brush structures, and caves. Extended family groups collected maturing plant resources and hunted seasonally abundant game. This adaptation to arid land resources is placed by archaeologists within the period called the Archaic. Such hunter-gatherer occupations in southern Nevada begin about 11,000 B.C., as documented by the prehistoric site of Tule Springs in the northwest Las Vegas Valley (Wormington and Ellis 1967). Heaviest use of the region occurred within the last 5,000 years. Gypsum Cave, located northeast of Las Vegas, has yielded evidence of continual use by different cultural groups from about 3,000 B.C. into historic times (Harrington 1933). Due to the variety of resources, availability of water, and the accessibility of shelter caves, Red Rock Canyon was also extensively used.

Specific artifacts and features indicate the kinds of activities that occurred in the process of the seasonal round. Roasting pits, which are circular pits used primarily to roast bulbs from the agave plant, are common in limestone geologic zones. In addition to agave, Blair (1986) notes that other plants and animals were cooked in these pits. Roasting pits are often associated with milling stones or other food processing equipment, lithic materials, and sometimes ceramics. Excavations were conducted at several roasting pits in Hidden Valley, west of Valley of Fire. These field investigations yielded numerous artifacts, but problems with their internal stratigraphy makes dating of these features difficult.

Roasting pits are often found in association with caves or rockshelters. Aboriginal peoples commonly used these natural formations as shelters and as storage areas for small quantities of collected resources, tools, and other personal possessions. Evidence of their fires can be found in the blackened staining on the walls and ceilings of such caves. The remnants of food processing equipment and toolmaking activities, as well as seeds, baskets, sandals, and other perishable items, are often preserved within habitation sites.

Large numbers of rockshelters and caves have been recorded in the Muddy Mountains and the Arrow Canyon Range. Shelters that were extensively used often contain layers of organic deposition, called midden, within the floor and surrounding the entrance. This midden usually shows blackened soil and is filled with artifacts; a midden that has not been disturbed has excellent potential for yielding significant information on the prehistory of the region.

A campsite is an area that possesses quantities of lithic material such as stone flakes or formed tools, ceramics, animal bone or plant materials, milling equipment, and often the remains of a cooking fire within a hearth. These are generally reflective of temporary locations, on a path from spring to spring or resource to resource. Campsites are found in all areas, but are most prevalent on terraces overlooking major drainages and surrounding springs.

Other types of prehistoric archeological sites include stone features such as rock rings and rock art locales. Rock art is defined as the modification of a rock face by pecking (petroglyphs) or painting (pictographs) figures or designs. Rock art panels are common in certain areas, generally near water sources, along game trails, or near resource procurement locations. Sandstone with a stained or patinated surface is perhaps the best medium for illustrating this kind of aboriginal visual creativity, but limestone, basalt, and other volcanic materials were also commonly used. Although rock art designs have been attributed to all prehistoric groups, there is presently no positive method for dating these kinds of sites. Keyhole Canyon is one site complex within the Las Vegas BLM District that was fenced for protection and signed for interpretation.

This portion of southern Nevada was utilized by three later distinctive groups (Lower Colorado or Yuman, Virgin Anasazi, and Southern Paiute peoples). Lower Colorado tribes such as the Mojave conducted floodwater farming along the Colorado River south of Las Vegas Valley. They also exploited resources in the surrounding ranges and

Table 3-23. Distribution of the numbers of presently identified archaeological sites in LVD considered eligible.

Zones	Site Types								
	RP	RS	RA*	RA	CP	ST	HT	RR	Total
Muddy Mountains	1	13	1	3	4	0	2	1	25
Las Vegas Valley	0	1	0	0	9	0	4	1	15
Arrow Canyon Range	1	10	1	0	2	0	9	1	24
Virgin Mountains	3	6	1	2	1	0	4	1	18
Indian Springs V	0	1	0	0	2	1	9	1	14
Muddy River	0	2	0	1	2	4	3	1	13
Meadow Valley Mtns	0	0	0	1	4	0	0	0	5
Virgin River	0	1	0	0	1	9	1	1	13
Meadow Valley Wash	0	1	0	1	2	0	1	1	6
Goodsprings V	1	2	1	0	1	0	5	1	11
Newberry Mtns	0	1	0	1	2	0	1	0	5
McCullough Mtns	0	1	0	1	2	0	3	1	8
Mormon Mesa	0	1	0	0	2	0	1	1	5
Pahrump Valley	2	1	0	1	1	0	1	1	7
Roach/Jean Lakes	0	1	0	0	2	0	2	1	6
Eldorado Valley@	0	1	0	1	2	0	3	1	8
Piute Valley	0	1	0	0	1	0	4	1	7
Rainbow Gardens	0	1	0	0	1	0	1	0	3
Totals	**8**	**45**	**4**	**12**	**41**	**14**	**54**	**15**	**193**

Key:

RP	Roasting Pit	ST	Prehistoric structural remains
RS	Rockshelter	HT	Historic remains
RA*	Rock Art component at Rockshelter	RR	Rock ring/feature
CP	Camp site	@	40% of acreage sold in 1995 sale

valleys, including the Piute, Eldorado and Las Vegas valleys. The Lower Colorado peoples lived in open camps and rancherias, which is why their sites appear in the archeological record much like those of the earlier Archaic hunter/gatherers. The Lower Colorado people made pottery.

The Virgin Anasazi were concentrated along the Muddy and Virgin Rivers to the north of Las Vegas. Their population increased after A.D. 500, which coincides with the beginning of farming and the introduction of the bow and arrow in this region. The Virgin Anasazi lived in isolated hamlets or small villages, with semi-permanent sedentary pithouses or pueblo structures constructed of rock rubble and adobe. Although they supplemented their diet with hunted animals and gathered wild seeds from the region, much of their staple food came from corn, beans, and squash grown in the floodplains of the rivers. This cultural group abandoned the region around A.D. 1150. Although the reasons for this abandonment are not conclusive, archaeologists hypothesize that a number of factors (including an increased population size, a heavy dependence on farming, and a long drought) may have forced the Virgin Anasazi from the area.

The contemporary southern Paiute are considered the descendants of the Archaic hunter-gatherers in southern Nevada. When the first Anglo-European explorers reached this area in the late 18th-early 19th century, they observed small groups of

Table 3-24. Estimated numbers of identified and unidentified archaeological sites in LVD.

Zones	Site Types								
	RP	RS	RA*	RA	CP	ST	HT	RR	Total
Muddy Mountains	17	217	17	50	67	0	33	17	418
Las Vegas Valley**	0	1	0	0	10	0	4	1	16
Arrow Canyon Range	13	125	13	0	25	0	113	13	302
Virgin Mountains	60	120	20	40	20	0	80	20	360
Indian Springs Valley	0	100	0	0	200	100	900	100	1400
Muddy River	0	100	0	50	100	200	150	50	650
Meadow Valley Mtns	0	0	0	17	67	0	0	0	84
Virgin River	0	50	0	0	50	450	50	50	650
Meadow Valley Wash	0	14	0	14	28	0	14	14	84
Goodsprings Valley	100	200	100	0	100	0	500	100	1100
Newberry Mtns	0	100	0	100	200	0	100	0	500
McCullough Mtns	0	50	0	50	100	0	150	50	400
Mormon Mesa**	0	1	0	0	2	0	1	1	5
Pahrump Valley	200	100	0	100	100	0	100	100	700
Roach/Jean Lakes	0	33	0	0	66	0	66	33	198
Eldorado Valley@	0	50	0	50	100	0	150	50	400
Piute Valley	0	50	0	0	50	0	200	50	350
Rainbow Gardens	0	50	0	0	50	0	50	0	150
Totals	**390**	**1361**	**150**	**471**	**1335**	**750**	**2661**	**649**	**7767**

Key:

RP	Roasting Pit	HT	Historic remains
RS	Rockshelter	RR	Rock ring/feature
RA*	Rock Art component at Rockshelter	**	Estimated number of eligible sites in zone calculated using 90% survey
CP	Camp site		
ST	Prehistoric structural remains	@	40% of acreage sold in 1995 sale

Southern Paiutes living in temporary brush structures and foraging among the diverse environmental zones of the region. Mesquite flowers, agave "hearts", small grass seeds such as Indian rice grass, berries, roots, and pinyon nuts formed the staples of their diet. Animal protein came from small game, especially rabbits, desert tortoise, rodents, and lizards. Bighorn sheep, deer, and pronghorn were hunted by individuals and as group activities. The artifacts associated with Paiute sites are reminiscent of Archaic campsites, consisting of milling stones, stone tools, and projectile points. Basketry and fiber cordage, rabbitskin robes, snares, and sandals have also been observed in dry shelters where preservation of these organic materials was possible. Brownware pottery was manufactured by the Southern Paiute; sherds of this type are used to identify archeological sites associated with this cultural group. The Southern Paiute were observed to practice limited horticulture around spring sources and along river bottoms such as the Muddy and Virgin Rivers. They grew a variety of crops, including corn, beans, squash, sunflowers, and amaranths, often constructing small dams and channels to divert water to their garden plots.

Historic use of southern Nevada began with the exploration of routes such as the *Old Spanish Trail/Mormon Road* (1844 to the early 1900s).

Potosi Mine, the first mine in the region, dates back to 1861. Ranching was well underway by the late 1800s; completion of railroad construction in 1905 established Las Vegas as a vital Nevada community.

Historic foundations from mining sites, ranches, and quarries are found within the planning area. These site types are often difficult to identify and interpret; a trash heap and fragments of tent platforms are the only remnants of the mining tent town at Gold Butte. What appears as an old dirt road crossing the southern Nevada desert is the rutted path of the *Old Spanish Trail/Mormon Road.* These historic resources have the potential to document adaptations and technological changes not often recorded in the archival record of this region.

A Class I Cultural Resource Inventory was conducted in 1990. The research resulted in the orderly listing of identified archaeological sites in the Las Vegas BLM District. The inventory included Red Rock Canyon National Conservation Area, a zone in the planning area in 1990. The data for Red Rock is not reflected in the following discussion, but is considered in the Red Rock General Management Plan. Because the 1990 data reflected a minimal amount of surveyed acreage, as well as recorded sites, for the Eldorado Valley zone, the 1995 sale of the Eldorado Valley Sale lands also had minimal adjustments on results in the zone and planning area. Consequently, the Eldorado Valley zone data was not recalculated.

Two of the 18 geographic zones described in the inventory document, with Red Rock Canyon zone removed, had sufficient inventory to make the determination that most eligible sites have already been recorded. These zones are Mormon Mesa (61 percent surveyed) and Las Vegas Valley (18 percent surveyed). The data on percentage of acreage inventoried and the results of the reviews in the inventory report discussed above are used as a basis to argue that most eligible sites have already been identified in these two zones. A proposal (Myhrer 1991) to limit survey in all but two subzones in Las Vegas Valley was reviewed and accepted by State Historic Preservation Office in 1991. With the exception of Mormon Mesa and Las Vegas Valley zones, the percentage of acreage surveyed and the number of recorded properties was used to estimate the number of eligible sites, known and unknown, in the Las Vegas BLM District. For example, a total of 10 eligible rockshelter sites have been recorded from survey of 8 percent of acreage in the Arrow Canyon Range zone. To determine the estimated number of undiscovered eligible rockshelter sites in that zone, a calculation using percentages was used ($10/X = 8/100$ or $1000 = 8X$ or $X = 1{,}000$ divided by $8 = 125$). The number of presently identified eligible sites in the Mormon Mesa and Las Vegas Valley zones are considered to represent 90 percent of the total potential. Table 3-23 lists the number of known eligible sites in the Las Vegas BLM District, and Table 3-24 lists the number of known and projected eligible sites in the Las Vegas BLM District.

Of the 855 archaeological sites recorded on BLM-managed land in the Las Vegas District, 193 are considered to be eligible for nomination to the National Register of Historic Places or are at present listed on the Register. Based on the calculations using the percentage of surveyed acreage times the number of known sites considered to be eligible in each zone, an estimated total of 7,767 eligible sites are present within the Las Vegas BLM District.

At present, 31,000 acres have been determined as potential Traditional Lifeway Areas and it is expected that within the life of the Resource Management Plan, an additional 150,000 acres will be identified. Portions of these areas would be subject to treatment as Traditional Cultural Properties and eligible for nomination to the National Register of Historic Places.

A Traditional Cultural Property refers to a more specific location, in contrast to the general nature of a Traditional Lifeway Area where a community has traditionally conducted exclusive or special activities, or has a unique value in its spiritual or religious world. A Traditional Cultural Property may be encompassed by a Traditional Lifeway Area. The Traditional Cultural Property concept was developed by the Advisory Council on Historic Preservation, an agency created by the National Historic Preservation Act, as a method to evaluate intangible cultural properties such as ceremonial areas. Native Americans are historically recognized as the original traditional users of the public lands.

Paleontological Resources

Paleontological resources (fossils) are remains or traces of plants and animals that existed during the 600 million year geological history of southern Nevada. Fossils are unique, non-renewable resources that provide clues to the history of life on earth and, as such, have scientific value. A minimal

amount of Paleontological research has been conducted in this region. In the 1930s, the Southwest Museum conducted an excavation of Gypsum Cave, located northeast of Las Vegas, recovering the skeletal remains of an extinct ground sloth and horse (Harrington 1933). The early 1960s scientific explorations at the Tule Springs locality (northwest of Las Vegas) yielded data on archeology, the Quaternary geology of the area, and specimens of extinct Pleistocene vertebrates (Wormington and Ellis 1967). These specimens comprised the fossilized bones of camel, horse, mammoth, and bison. Since all of the recovered species would have utilized abundant grasses and brush in open country, this information provided important clues about past environmental conditions in the Las Vegas Valley.

A recent Paleontological survey on the Eglington Escarpment (in the north Las Vegas Valley, about five miles east of the Tule Springs investigations) discovered one significant Paleontological site. This site contained numerous specimens, including a camel jaw. In 1991, construction activities along the Kern River pipeline uncovered a mammoth tusk and tooth in this escarpment. Other potential areas for paleontological finds are the dry lake beds and shorelines of Pleistocene age Ivanpah and Roach Lakes, located southwest of Las Vegas.

Trace fossilized imprints in limestone sediment at the north end of the Arrow Canyon Range are considered evidence of 20 million year old large birds (pers. comm., Don Higgens 1990). There are also unconfirmed reports of fossilized mammoths in this area. The complete skeleton of a 20,000-year-old Shasta ground sloth was discovered in May 1991 near the California-Nevada border. A scientific data and specimen recovery was conducted by Robert Reynolds of the San Bernardino County Museum. A cast of the skeletal materials is on display at the Nevada State Museum in Las Vegas.

Invertebrate fossils occur in several limestone formations, including the Spring, Dry Lake, Arrow Canyon, Las Vegas, Mormon and Virgin Mountain ranges. Fossilized trees in the form of petrified wood are found at the base of the Aztec Sandstone in the Chinle Formation outcrops; the east base of the Red Rock Escarpment and in the Muddy Mountains adjacent to Valley of Fire State Park.

Lands Management

Land Status

The planning area for the Las Vegas BLM District Resource Management Plan/Environmental Impact Statement comprises approximately 3.3 million acres of public lands managed by BLM in southern Nevada. Of that total, approximately 2.6 million acres are in Clark County and 700,000 acres in southern Nye County (see Map 1-2).

Clark County contains 5,173,760 acres and is the sixth largest county in Nevada. It is the state's most populated county, with two-thirds of Nevada's population living within its boundaries (USDI, BLM 1990a). Las Vegas Valley is the site of explosive development, with approximately 4,900 people moving into the urban area monthly. The cities of Henderson, Las Vegas, North Las Vegas, and the unincorporated areas surrounding these municipalities comprise one of the fastest growing metropolitan areas in the United States. The remainder of Clark County continues to be predominantly rural, typified by a number of small communities. Several outlying "boom towns," such as Laughlin and Mesquite, are now experiencing dynamic population growth. The problems with rapid urbanization, formerly applicable only to the Las Vegas Valley, are now affecting these new cities. Sixty-seven percent of Clark County is public land administered by the BLM.

Nye County consists of 11,560,960 acres and is Nevada's largest county. Although BLM manages a total of 6,697,321 acres of public land in Nye County, only 696,421 acres, outside of Nellis and the Nevada Test Site, located in the southern portion of the county, are administered by the Las Vegas BLM Field Office.

Most public lands in southern Nye County occur in large blocks; private holdings are relatively small. The population of the county is concentrated at four locations: Pahrump, Amargosa, Ash Meadows, and Lathrop Wells. The two largest communities are Pahrump, population approximately 17,500 with a 15% annual growth rate (Pahrump Valley Chamber of Commerce, 1994), and Amargosa with approximately 1,800 inhabitants. Historically, the lands have been used for grazing, mining, and agricultural purposes; modern use is generally restricted to agriculture and private residences

(USDI BLM 1984), although some mining still occurs. Other Federally-administered lands situated either within or contiguous to the Las Vegas District include those in Nellis Air Force Base, Nellis Air Force Range, Nevada Test Site, Lake Mead National Recreation Area, lands managed by the Bureau of Reclamation, Death Valley National Park, Toiyabe National Forest, Moapa Indian Reservation, Desert National Wildlife Refuge, and Ash Meadows National Wildlife Refuge.

Public Land Disposal

Land Available for Recreation and Other Public Purposes

Since passage of the *Recreation and Public Purposes Act* in 1926, local governments and non-profit organizations may acquire Federal land at minimal cost for various purposes. Within the Las Vegas BLM District, common Recreation and Public Purpose uses are parks, community centers, schools, libraries, fire stations, public golf courses, law enforcement facilities, correctional institutions, and water and sewage treatment facilities.

Land Exchanges

Section 206 of the Federal Land Policy and Management Act provides for the exchange of public lands administered by BLM and may involve private landowners, non-Federal entities, and Federal departments or agencies. In recent years, eight private exchanges occurred within the planning area. There were 21 exchanges proposed to the BLM as of March 26, 1996. Selected lands are limited to existing disposal areas.

Public lands were acquired by the U.S. Forest Service for the Tahoe National Forest in the Lake Tahoe area. The Howard Hughes Properties Exchange added lands to the BLM-administered Red Rock (now Red Rock Canyon National Conservation Area) in exchange for adjacent public lands more appropriate for development. The American Land Conservancy exchanges acquired lands for the U.S. Forest Service in the Pyramid Lake and Galena Creek areas in Carson City. The Olympic Management and Mary's River exchanges added to BLM-administered riparian areas along the Virgin River, and lands within the Red Rock Canyon National Conservation Area. Lands in Tonopah were acquired by BLM for a resource area office through the Gilbert Exchange, and the Rhodes Exchange added lands to BLM-administered Calico Basin within the Red Rock Canyon National Conservation Area.

Other exchanges in the Las Vegas BLM District were processed through legislative action. The Aerojet Exchange involved exchange of public lands within Las Vegas Valley for riparian lands in Florida that are administered by the U.S. FISH and Wildlife Service. There are exchange proposals pending evaluation that would add public lands to the U.S. Forest Service-administered lands, Ruby Lake Wildlife Refuge, Red Rock Canyon National Conservation Area, or to other BLM districts.

The Las Vegas BLM District has exchanged approximately 31,400 acres over the past 24 years.

Land Sales

The sale of public lands can occur by two methods: through legislative action or as a result of land use planning. Legislative actions to sell public lands are usually in response to special circumstances and are site-specific with strictly identified goals, procedures, and duration. Public land sales that result from land use planning must meet specific criteria identified in Section 203 of the Federal Land Policy and Management Act and the tracts of public lands must be specifically identified by legal description or on a map.

Public land sales were conducted under the authority of the *Small Tract Act* of 1938 during the 1950s and 1960s; BLM disposed of several thousand acres of public land throughout Las Vegas Valley. All the 1.25, 2.5, and 5 acre tracts were not sold, resulting in a severely fragmented ownership pattern that precludes efficient and effective public land management. This situation has affected the orderly growth of the metropolitan area. This land ownership problem in Las Vegas Valley, in concert with the rapid growth of the area, are the major influences on the public land disposal program in the Las Vegas BLM District.

On December 23, 1980, Congress enacted Public Law (PL) 96-586, commonly known as the *Santini-Burton Act*, which provides for the disposal of certain public lands in Clark County (Las Vegas Valley), thereby generating revenues, 85 per cent of which are deposited in the General Fund. Congress has discretionary power to appropriate these funds and to reimburse the Soil and Water Conservation Fund for the acquisition of environmentally sensitive lands in the Lake Tahoe Basin. Other

distribution of the funds would include 10 percent to the county or city in whose jurisdiction the lands are located and 5 per cent to the state. The Act requires that both BLM and the local governmental entity having jurisdiction on the land agree on those lands to be offered for sale; without agreement, the land cannot be offered. The Act also required that the first sale offering occur within one year of enactment of the law.

The BLM and local governmental entities affected by Santini-Burton (Clark County, City of Las Vegas, City of North Las Vegas) adopted the regulations promulgated for Section 203 of the Federal Land Policy and Management Act to implement the provisions of PL 96-586. At the time of enactment, there was in excess of 9,300 acres of public land identified for disposal.

The *Clark County Management Framework Plan* provides for disposal of approximately 108,107 acres of public land within the Las Vegas Valley, with priority to the *Santini-Burton Act* area. It provides for disposal of all public parcels of land (totaling 3,494 acres) within the settled limits of the communities of Indian Springs, Goodsprings, Searchlight, Nelson, and Laughlin. All isolated parcels of public land of 640 or less coterminous acres (totaling 11,851 acres) in the general settlement areas of Eastern Pahrump Valley, Mountain Springs Community, Sandy (Mesquite Valley) Community, Jean, Sloan, Blue Diamond, Moapa Valley Area, Virgin Valley Area, and Kyle Canyon Road Small Tract Area were also designated for disposal.

Under the Management Framework Plan, 1,754 acres of public land in Las Vegas Valley were sold through Federal Land Policy and Management Act sale and 3,597 acres through Recreation and Public Purpose sale. Since the enactment of the *Santini-Burton Act*, 2,700 acres of public land were sold through Santini-Burton sale. The majority of the 1,280 acres of public land identified for sale in Laughlin (1,210 acres) is under Recreation and Public Purpose lease or right-of-way to different Clark County entities. The uses are varied and include sewage treatment facilities, a fire station, school site and a public golf course.

The *Nevada Land Transfer and Authorization Act* of 1989 (PL 101-67-Apex Project) provides for the sale of certain public lands in Clark County to meet national defense and heavy-use industrial purposes. There were 21,000 acres of public land originally withdrawn for the sale. Kerr-McGee Chemical Corporation purchased approximately 3,351 acres of these lands for an ammonium perchlorate production facility, and Silver State Disposal purchased 2,185 acres for a sanitary landfill. Clark County zoned the area as a heavy-use industrial zone.

On November 27, 1990, BLM approved the conceptual Master Plan for the Apex Heavy Industrial Park, fulfilling the requirement of the Apex legislation. The Secretary of the Interior is in the process of establishing a sales agreement, not to exceed 10 years, for disposal of the remaining lands.

Public Law 85-339 (dated March 6, 1958) provided for and directed the sale of certain public lands within Eldorado Valley to the Colorado River Commission, acting for the State of Nevada. On July 9, 1995, the Colorado River Commission received patent to 107,412 acres, and simultaneously transferred title to the lands to the City of Boulder City. Exhibit C in the patent and subsequent title reserved to the United States certain right-of-way corridors for transportation and public utilities.

Public Law 99-548 (October 27, 1986) withdrew for a period of ten years, all public lands within the city limits of Mesquite from all forms of entry and appropriation under the public land laws, including the mining laws, and from operation under the mineral leasing and geothermal leasing laws. The act provided a six-year exclusive right to the City of Mesquite to identify which lands it wished to purchase. Prior to expiration of the exclusive right to purchase, the City of Mesquite received patent to approximately 2,750 acres.

The Record of Decision for the *Esmeralda-Southern Nye Resource Management Plan-Planning Area B* (October 9, 1986) identifies a pool of 47,200 acres of public land for disposal during the life of the plan. This land is to meet urban-suburban expansion or agricultural development needs for the communities within the Resource Management Plan area. The 47,200 acres identified for disposal includes 26,880 acres in Amargosa, 5,240 acres in Lathrop Wells. and 15,080 acres in Pahrump.

Leases/Permits

Private and commercial use of public lands administered by BLM are provided for under

Section 302 of the Federal Land Policy and Management Act. This section addresses leases for long-term use of public lands, including development and amortization of capital investment; permits for short-term use and little or no development of lands; and easements to assure that uses of public lands are compatible with non-federal lands. Land uses authorized within the Las Vegas District included a motor-cross site in Eldorado Valley, an apiary site in Searchlight, and geotechnical and groundwater study sites in the Moapa, Dry Lake Valley, Blue Diamond, and Goodsprings areas.

Land use authorizations are processed on a case-by-case basis as proposals are received. The authorization process involves analysis of potential impacts to the environment that could result from the proposed action. An Environmental Assessment or an Environmental Impact Statement, if appropriate, is prepared and resource protection stipulations are developed prior to the approval of such uses.

Airports

Several airports and numerous airstrips within the planning area are located on public lands under lease agreements authorized pursuant to the *Airport Act* of 1928. The Las Vegas area is serviced by three private airports (McCarran, North Las Vegas, and Sky Harbor).

Landing strips or smaller airports with limited facilities, authorized under the Airport Act of 1928, are found on public lands within the planning area in both Clark and Nye counties. Public airport facilities are located in Searchlight, Mesquite, Sandy Valley, Ash Meadows, and Lathrop Wells. Within Clark County, airport lease applications are pending for use of public lands to expand the Sky Harbor airport and the existing airport at Jean, to modify the existing airport in Searchlight to exclude the private lands within the runway area and for airport facilities in North Las Vegas and Cal-Nev-Ari. Nye County has expressed a need for additional airport facilities and has filed an application to expand an existing facility in Pahrump.

Lands Cases Pending and Authorized

The Las Vegas BLM District currently has 855 pending case actions and 2,258 authorized case actions. These actions include applications for rights-of-way, Recreation and Public Purpose leases/sales, airport leases, color-of-title, desert land entries, Indian allotments and Section 302 permits, as well as trespass actions, exchange and sale proposals, and amendments and modifications to existing grants and permits.

Classifications, Withdrawals, and Segregations

Classifications, withdrawals, and segregations place restrictions on the use of the public lands. Appendix D contains the legal description of the existing Public Land classifications, withdrawals, and segregations in effect as of May 31, 1990.

Rghts-of-Way Management

Right-of-Way Development

The BLM authorizes rights-of-Way on public lands for a variety of uses including roads, electrical transmission lines, telephone lines, sewer lines, culinary water lines, natural gas pipelines, communication sites, electrical power plants and substations, and related power distribution lines. Material site rights-of-way are authorized to the Nevada Department of Transportation, providing sand and gravel for road maintenance and construction. Right-of-way authorizations are processed on a case-by-case basis as proposals for use are received.

The authorization process involves analysis of potential impacts to the environment as a result of the proposed action and preparation of an Environmental Assessment or Environmental Impact Statement if appropriate; resource protection stipulations are developed prior to approval.

Right-of-Way Corridors

The only BLM-designated corridors within the planning area are in Nye County (see Map 2-4). The ROD for the *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement*, Planning Area B, approved in 1986, designated 61 miles of utility corridors on public land, including existing facilities and/or rights-of-way. The designations consist of a corridor running north-south, which encompasses a right-of-way held by Western Area Power Administration for a 750-kV direct current line and corridors running north-south along U.S. 95, containing existing facilities not included in the Western Area Power Administration right-of-way corridor.

In Clark County, the only corridors reserved for the U.S. Government are the result of special legislation (see Map 2-4). Public Law 101-67, the Apex legislation, reserved numerous corridors within the sale area, including existing powerline rights-of-way, ranging from 300 to 1,800 feet in width, for a total length of approximately 32 miles. The Aerojet legislation established a corridor in Coyote Springs Valley, with a total length of 4 miles.

This plan proposes modification to the *Esmeralda-Southern Nye Resource Management Plan/Environmental Impact Statement,* Planning Area B corridors and designates a network of additional corridors throughout the planning area. The corridors follow the routes of numerous large (345-kV to 500-kV) electric transmission lines, which began to traverse the region as early as the 1940s following completion of Hoover Dam and the rapid population growth in California. The Mead substation, which was established for Hoover Dam, was subsequently followed by the McCullough and Eldorado substations in Eldorado Valley.

In recent years, the difficulty of locating sites for new power plants in California, coupled with the cost efficiency of locating power plants closer to western coal sources in Utah, has spawned numerous power projects and a proliferation of large transmission lines in southern Nevada. There are nine major utility projects (including the multiple 345-kV lines constructed by the Bureau of Reclamation) in the Las Vegas BLM District, which were either constructed or authorized for construction. In addition, there are four major power projects pending either completion of the environmental analysis process or the approval and issuance of a right-of-way.

Cogeneration power plants were completed at Apex and Pabco; other proposals are being considered for pumped storage and gas-fired plants within the city of Las Vegas. These facilities would require new lines ranging from 69 kV to 230 kV, or access to existing systems. Where feasible, such smaller utilities would be encouraged to use designated corridors. Other regional utilities are preparing to or currently constructing new 230-kV lines: Valley Electric will build from Pahrump to Mead substation; Overton Power from Overton to Mesquite.

Nevada Power Company, in cooperation with Los Angeles Department of Water and Power, completed an initial analysis of the Marketplace-Allen 500-kV transmission project. This project would consist of two 500-kV transmission circuits from the Harry Allen substation near Dry Lake to a new substation called Marketplace, near the Eldorado/McCullough substation in Eldorado Valley. The Marketplace substation would be interconnected to the proposed Mead-Phoenix and Mead-Adelanto 500-kV projects and to the existing McCullough substation. The Harry Allen 500-kV substation would be interconnected with the proposed Southwest Intertie Project and Utah/Nevada 500-kV (second IPP line). The White Pine Power Project (two 500-kV lines) could also participate in the project, as well as other interested companies. This interconnection would replace lines through the area, with two larger (3,500 megawatt each) transmission lines.

Natural Areas Management

The areas described below are shown on Map 2-6 as Instant Study Areas, which were designated as "Natural Areas" in 1970. Each contains special values in wildlife, recreation, and other resources. Section 603 (a) of the Federal Land Policy and Management Act mandated areas designated as natural or primitive prior to November 1, 1975, be studied for wilderness values.

Virgin Mountains Natural Area

This area encompasses 6,560 acres at the upper elevations of the Virgin Mountains, south and east of Mesquite, Nevada. The Virgin Mountains are of particular scientific interest since their features are representative of three major North American desert life zones. The southern Great Basin, eastern Mojave, and northern Sonoran deserts merge within the boundaries of the Natural Area. Several vegetation communities combine in this range and plant species considered to be at the outer edges of their ranges are found in this natural interface zone.

Sunrise Mountain Natural Area

The Sunrise Mountain Natural Area is comprised of 10,240 acres, located 8 miles east of Las Vegas. The area was designated for its unique geologic values. Frenchman Mountain, a widely recognized landmark on the eastern Las Vegas horizon, forms a

dominant feature of this Natural Area. Lyndon Limestone and Pioche Shale deposits are exposed along the slopes of Sunrise and Frenchman Mountains. The olive green, brown, and reddish purple beds of Pioche Shale contain fossil trilobites of the Lower Cambrian genus *Olenellus*. Two candidate plants, the bear paw poppy (*Arctomecon californica*) and Utah agave (*Agave utahensis* var. *eborispina*) are present in the area.

Recreation Management

Public lands within the planning area contain ecologically diverse landscapes that include mountains, dry lake playas, joshua tree forests, sand dunes, sandstone bluffs, and riparian areas. This diversity offers outstanding opportunities for casual and organized recreational activities. Demand for such opportunities is increasing due to the expansion of the Las Vegas metropolitan area.

Casual or dispersed recreation, the principal opportunities available to visitors within the planning area, require a variety of sites yet need no special facilities. These opportunities include caving, photography, automobile touring, backpacking, birdwatching, hunting, primitive camping, hiking, rock climbing, and competitive and non-competitive off-road vehicle events. Water-based recreation is limited to a few desert streams and springs. Table 3-25 provides the best available estimates for these activities in the planning area, and Table 3-26 lists the number and types of Special Recreation Permits issued each year.

Organized competitive events include model airplane fly-ins, model rocketry launches, dog field trials, horse endurance rides, and all-terrain bicycle events. Off-road vehicle use accounts for the greatest single recreational use of the public lands. Competitive off-road vehicle events are the largest organized recreational activity managed in the planning area.

Table 3-25. Estimated visitor use in LVD (1994).

Activity	Visits	Visitor Hours
ORV Travel	73,300	4,088,000
Other Motorized	665,000	2,450,000
Non-Motorized	260,000	2,080,000
Camping	13,300	478,800
Hunting	32,800	393,600
Site Based	106,400	1,276,800
Totals	**1,150,800**	**10,767,200**

(Source: BLM, Las Vegas District files, 1994.)

Areas of Recreational and Scenic Importance

The areas described below are recognized for their recreational values.

Red Rock Canyon National Conservation Area

Red Rock Canyon, formerly Red Rock Canyon Recreation Lands, was designated in 1990 as a Natural Conservation Area. It is located on the eastern slope of the Spring Mountains approximately 15 miles west of Las Vegas (see Map 1-2). The Red Rock Canyon National Conservation Area General Management Plan, which is in preparation, will identify management goals and objectives within the National Conservation Area.

Virgin River Recreation Lands

In 1970, the 4,930-acre Virgin River Recreation Lands were designated for their open-space, wildlife, and river access values. The area contains scenic sandstone bluffs, flowing water, riparian vegetation, and important waterfowl and fish habitats. Recreational opportunities include camping, photography, rock climbing, nature study, and hiking. Several species of native fish and waterfowl depend on the habitat provided by the Virgin River, which is the focal point of the recreation area. These wildlife resources are managed under a Habitat Management Plan that limits off-highway vehicle use to existing roads, trails, and washes and restricts competitive events to non-speed events throughout the area. (*Note*: This area is being included in the larger Virgin River Area of Critical Environmental Concern.)

Las Vegas Dunes Recreation Lands

Las Vegas Dunes Recreation Lands, also known as Nellis Dunes, encompasses approximately 10,000 acres formally designated as an Off-Road Vehicle play area (see Map 2-5). This area, located 15 miles northeast of Las Vegas, is easily accessible from that metropolitan area.

The topography of the Las Vegas Dunes Recreation Lands is comprised of rolling sand dunes, small limestone bluffs, and numerous washes. The area is extensively used for recreational off-road vehicle riding, 4x4 touring, and competitive events. Approximately four all-terrain vehicle events, two motorcycle events and two buggy events use all or portions of the off-road vehicle area yearly.

Back Country Byways

Two nationally designated back country byways have been designated in the planning area. Back Country Byways are a component of the National

Scenic Byway system and are located along back country roads that offer scenic and recreational opportunities. The range of road types may vary from a single track bike trail to a narrow, low speed, paved road that traverses back country areas of high scenic and public interest value. The two byways have entrance, interpretive, and directional signs and are regularly patrolled.

The Gold Butte Back Country Byway contains approximately 60 miles of paved, graded dirt, and jeep trail roads within an area of highly scenic desert landscapes. Recreational opportunities include pleasure driving, hiking, rock climbing, camping, photography, and nature study.

The Bitter Spring Back Country Byway includes 28 miles of high clearance/four-wheel drive road located in highly scenic geologic formations, and abandoned historic mining sites. Recreational opportunities include exploring, hiking, camping, hunting, nature study, and pleasure driving.

Caves

The resource area has approximately 12 caves of regional or national importance. The most significant is Gypsum Cave, which is eligible for nomination to the National Register of Historic Places based on the important information on prehistory of the region previously obtained. An archaeological excavation of the cave was conducted by Southwest Museum in the 1930s. The research yielded information concerning continuous aboriginal hunter-gatherer uses for about 3,000 years. The scientific data that the cave yielded continues to be important in reconstructing the prehistory of the region.

Table 3-26. Special Recreation Permits (1994).

Activity	Visits	Visitor Hours
Motorcycle Races	8	.16
ATV Races	13	.26
Truck & Buggy Races	8	.16
Dual Sport Touring	2	.04
Motorcycle Rally	1	.01
Gyrocopter Rides	1	.01
Black Powder Shoots	2	.04
Guides & Outfitters	2	.04
Model Airplane Fly-In	3	.05
Horse Endurance Rides	2	.04
Dog Field Trials	3	.05
Ultralight Flying	1	.01
Commercial Photography	2	.04
Jeep Tours	2	.04
Model Rocketry	3	.05
Totals	**53**	**100**

(Source: BLM, Las Vegas District files, 1994.)

Devil's Throat is an unusual geologic formation, located near Gold Butte (see Map 2-7). Devil's Throat is regarded as a collapsed sink, a type of sinkhole. The sink is approximately 120 feet wide and 130 feet deep.

Recreation Management Areas

The planning area has two previously designated Special Recreation Management Areas and one Extensive Recreation Management Area. These Recreation Management Areas are described below.

Clark County Special Recreation Management Area: This area encompasses 1,326,864 acres in southern Nevada south of Las Vegas, between the California border and Lake Mead National Recreation Area. Its primary purpose for being designated was to provide for off-road vehicle recreation opportunities with the following management objectives:

- Manage Off-Road Vehicle events in a manner that reduces impacts to other resource values such as wilderness, desert

tortoise and bighorn sheep habitat, and cultural resources.

- Provide a wide variety of recreation opportunities, including Off-Road Vehicle freeplay and touring, hunting, camping, landsailing, picnicking, hiking, and sightseeing.

- Monitor and mitigate the effects that Off-Road Vehicle activities have on other resources and values.

- Educate the public with regard to the appropriate uses of the Public Land including Off-Road Vehicle etiquette.

The primary management issues in this Special Recreation Management Area include resource protection, visitor safety, impacts to the local and regional economy, and area administration and use supervision.

The viability of the Special Recreation Management Area as an area of recreation program emphasis has been seriously eroded over the last few years due to use limits and restrictions imposed as part of the desert tortoise management and protection program. Large areas are now virtually off limits to Off-Road Vehicle events, and other users are restricted to designated roads to protect tortoise habitat.

Due to the above management objectives and concerns, the proposed Resource Management Plan designates three smaller Special Recreation Management Areas. These areas are where more intense recreation use occurs, and the BLM is concentrating its manpower and funding. Long-term monitoring of the desert tortoise areas will be a function of the wildlife program in concert with Clark County and the U.S.Fish and Wildlife Service.

Spring Mountain Special Recreation Management Area: This area encompasses approximately 566,701 acres in southern Nevada, west of Las Vegas and southeast of the Nevada Test Site. Its primary purpose for designation was to provide both extensive and intensive recreation opportunities in the Desert View National Environmental Area and around the Spring Mountains with the following management objectives:

- Provide for a wide variety of recreation opportunities, including off-road vehicle touring, hunting, camping, picnicking hiking, horseback riding, and sightseeing.

- Educate the public with regard to appropriate uses of the public land including off-road vehicle etiquette and appreciation of desert resources.

- Reduce conflicts between users seeking a variety of recreational opportunities.

- Reduce conflicts and impacts to other resources caused by recreation-related activities.

The primary management issues in the Spring Mountain Special Recreation Management Area include environmental education, resource protection, and area administration and use supervision.

This area is no longer viable as a management unit. All of the Desert View Natural Environment Area is included within either the expanded Red Rock Canyon National Conservation Area or the Spring Mountain National Recreation Area (U.S. Forest Service). The Las Vegas Valley Special Recreation Management Area includes lands formerly within this Special Recreation Management Area.

Stateline Extensive Recreation Management Area: The Extensive Recreation Management Area encompasses approximately 2,243,358 acres of public land in southern Nevada, to the east and west of Las Vegas. It essentially includes all lands not covered by Red Rock Canyon Special Recreation Management Area, Clark County Special Recreation Management Area, and Spring Mountain Special Recreation Management Area. The primary management issues in the Stateline Extensive Recreation Management Area include resource protection, visitor safety, monitoring, area administration and use supervision, and meeting recreation opportunity demands. Originally, its primary purpose for designation was to provide for suitable recreation opportunities dispersed throughout the planning area with the following objectives:

- Manage Off-Road Vehicle events in a manner that reduces impacts to other resource values such as wilderness, desert

tortoise and bighorn sheep habitat, and cultural resources.

- Manage and protect cultural resources in Arrow Canyon through interpretation, site protection, and user awareness.

- Manage the Las Vegas Dunes and Big Dune for Off-Road Vehicle free-play opportunities.

- Manage the Gold Butte area, including Whitney Pockets and Virgin Mountain, for semi-primitive recreation opportunities including hiking, camping, vehicle touring, and sightseeing.

- Manage the Muddy Mountains for primitive and semi-primitive recreation opportunities including hiking, camping, sightseeing, and interpretation.

- Manage the Sunrise Mountain area for its natural values and to modify visitor use to protect natural values.

- Provide a wide variety of dispersed recreation opportunities throughout the Extensive Recreation Management Area, including off-road vehicle free-play, touring, hunting, camping, picnicking, hiking, and sightseeing.

- Inventory and plan for additional back country byways.

The Extensive Recreation Management Area mapped in the proposed plan is substantially larger than the one currently designated. This enlargement is due to the addition of desert tortoise Areas of Critical Environmental Concern and other lands where recreation management emphasis is being reduced due to restrictions on recreational activities.

Conversely, several areas within the original Extensive Recreation Management Area are now designated as Special Recreation Management Areas due to shifting visitor use and program emphasis.

Recreation Opportunity Spectrum

All public lands in the planning area have inherent recreational value and offer some level of opportunities for recreational activity. The Recreation Opportunity Spectrum process identifies recreation opportunities on the basis of the area's setting and activities. Five recreation opportunities are available in the planning area: semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and modern urban.

Semi-Primitive Nonmotorized

Eleven areas were identified as having Semi-Primitive Nonmotorized recreation opportunities. These areas are primarily wilderness study areas that have retained a predominantly unmodified environment. The areas do not receive high visitor use and therefore have few managerial controls or restrictions. Motorized use does not occur because of ruggedness of terrain. Recreational activities in these areas include hiking, camping, climbing, enjoying scenery, nature study, and hunting.

Semi-Primitive Motorized

Semi-Primitive Motorized recreation opportunities have been identified in 18 areas, including some that are remote. These areas primarily include Wilderness Study Area or adjacent acreage and locations that have a high degree of naturalness and lack roads. Because these areas receive low to moderate visitor use, few managerial controls and restrictions apply. Motorized use occurs in these areas to a limited degree. Recreational activities that occur include off-road vehicle touring on existing roads, trails, and dry washes, hiking, camping, enjoying scenery, climbing, nature study, and hunting.

Roaded Natural

The majority of the planning area was identified as having Roaded Natural recreation opportunities. These areas include most of the valleys and basins such as the Jean and Roach Dry Lake area, Eldorado Valley, the northern portions and along the Gold Butte Road in the area south of Mesquite, below the sandstone escarpment along State Route 160 in Red Rock Canyon National Conservation Area, and the majority of the Amargosa Valley. Visitor use can be moderate to high with managerial controls being low to high. Specific opportunities include picnicking, hiking, Off-Road Vehicle touring, free-play, and events, camping, nature study, enjoying scenery, and interpretive activities.

Rural

Five areas have Rural Recreation opportunities. These are areas where group affiliation is prevalent, recreation facilities are more available, and the natural environment is less important. Characteristic of these areas are the Pahrump Valley, Sandy Valley, and the Sunrise Mountain/Rainbow Gardens/Nellis Dunes area. These areas are characterized by a modified environment where the sights and sounds of humans are readily available. Visitor use can be moderate to high. Recreational activities can include picnicking, hiking, off-road vehicle touring and free-play, target shooting, enjoying scenery, bicycling, spectator sports, competitive games and events, and interpretive activities.

Modern Urban

The two areas that have Modern Urban recreational opportunities are Las Vegas Valley and lands near Laughlin. These areas offer opportunities to experience affiliation with individuals and groups. To these users, experiencing the natural environment and using outdoor skills is not important. These areas have highly modified environments where the sights and sounds of human use predominate. Generally, modern facilities (such as those found in a county or city park) are provided for the convenience of large groups of people.

Wild and Scenic Rivers Management

No wild and scenic rivers are designated in the planning area. The Virgin River through Utah, Arizona and Nevada has, however, been identified as having outstandingly remarkable scenic, geologic, fisheries and wildlife values. Although the river was removed from the National Park Service National Rivers 1982 Inventory, the values for which it was originally included are considered in this eligibility and classification process.

The Virgin River traverses three states, originating north and east of Zion National Park and flowing through southwestern Utah, the Virgin River Gorge in Arizona, and finally entering Lake Mead in Nevada. The total river segment covers 76 miles (from just above Hurricane, Utah to Lake Mead), with a 25-mile section in Nevada. Table 3-27 lists land tenure for the Virgin River by agency; data in the table were obtained from *Virgin River Habitat Management Plan* (USDI BLM 1984), Las Vegas BLM District.

Study Process - The wild and scenic river study process consists of three steps:

- Determine if the river segment is eligible for wild and scenic river designation.
- Determine the potential classification of the river segment as wild, scenic, recreational, or any combination thereof.
- Conduct a suitability study/legislative Environmental Impact Statement To determine if the river segment is suitable for designation to the Wild and Scenic Rivers System.

Specific study procedures are found in BLM Manual 8351, in the final revised U.S. Departments of Agriculture and Interior Guidelines, and in *Federal Register,* Vol. 7, No. 173, September 7, 1982. The guidance recommends that all three steps be completed during development of a Resource Management Plan. If this evaluation cannot be completed during the identified time period, the study/Environmental Impact Statement step may be deferred for up to five years. Minimum determinations in a Resource Management Plan involving a potential wild and scenic river must include decisions on eligibility and classification.

Study Criteria - To be eligible for inclusion in the national system, a river segment must be free-flowing, and the river and its adjacent area must possess at least one outstandingly remarkable value. There are no specific requirements regarding the length or flow of an eligible river segment. Length and flow are sufficient if they sustain or complement the outstandingly remarkable values for which the river would be designated. The minimum study corridor includes the river and the adjacent lands to 0.25 miles from the river's edge. A wider corridor may be studied if inclusion could facilitate resource management in the river area. If a river segment is determined to be noneligible during the planning process, further study should be discontinued. Planning records must document the basis for determination of a lack of eligibility. A river segment's potential classification depends on the condition of the river and adjacent lands as they exist at the time of the study.

Table 3-27. Land status within the Virgin River habitat management area.

Status	Acres	Percent
Private	6,923	41
Nevada Department of Wildlife	2,323	14
BLM-Virgin River Recreation Lands	4,582	27
BLM-Other	1,934	12
Lake Mead National Recreation Area	827	5
Bureau of Reclamation	206	1
Total	**16,795**	**100**

(Source: BLM, Las Vegas District files, 1995.)

The *Wild and Scenic Rivers Act* specifies three classifications for eligible rivers: wild, scenic and recreational.

- To be classified wild, a river segment must be free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and water unpolluted.

- To be classified scenic, a river segment must be free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. The area must not show substantial evidence of human activity.

- To be classified recreational, a river segment may be readily accessible by road or railroad, may have some development along the shoreline, and may have undergone some impoundment or diversion in the past.

The *Arizona Statewide Wild & Scenic Rivers Final Legislative Environmental Impact Statement* (USDI BLM 1994), the *Arizona Strip District Resource Management Plan/Environmental Impact Statement* (USDI BLM 1990), and the *Virgin River Habitat Management Plan* (USDI BLM 1984) identified the Virgin River as possessing remarkable scenic, geologic, fisheries, and wildlife values. Each of these documents stipulates special management considerations be applied; none of the recommendations have been implemented for the Nevada portion as of this date.

Wilderness Management

Background

In compliance with the Federal Land Policy and Management Act, BLM evaluated lands within the planning area for the presence of wilderness characteristics (Map 2-6). Recommendations as to the suitability of those lands for inclusion in the National Wilderness Preservation System were forwarded in a report to the President in 1991, and subsequently, to Congress in 1992. Lands identified through the inventory process as Wilderness Study Areas, listed in Table 3-28, are managed according to the *Interim Management Policy for Lands Under Wilderness Review* (IMP), BLM Manual H-8550-1.

Management according to these guidelines requires non-degradation of wilderness values and, thus, imposes constraints on the types of activities that can occur in Wilderness Study Areas. There is no specific timeline under which Congress must act on the wilderness recommendations. A more complete discussion of the wilderness values of each Wilderness Study Area is described in the *Clark County Final Wilderness Recommendations/Environmental Impact Statement* (USDI BLM 1987) and the *Nevada Contiguous Lands/Final Environmental Impact Statement* (USDI BLM 1990c).

Table 3-28. Wilderness Study Areas.

Wilderness Study	Acreage	Acres Recommended Suitable
Arrow Canyon Range	32,853	0
Muddy Mountains	96,170	36,850
Mt. Stirling	5,600	750
No. McCullough Mtns.	47,166	0
So. McCullough Mtns.	56,623	19,558
Resting Spring	3,850	0
Fish & Wildlife 1,2,3	50,334	0
Lime Canyon	34,680	13,895
Million Hills	21,296	0
Garrett Buttes	11,835	0
Quail Springs	12,145	0
Eldorado	12,290	0
Ireteba	14,994	0
Jumbo Springs	3,466	0
Nellis ABC	5,718	0
Sunrise Mountain	10,240	0
Virgin Mountain	6,560	0
La Madre Mountain	41,306	23,050*
Pine Creek	19,722	18,344*
Total	**425,820**	**71,053**

*Managed under the Redrock Canyon National Conservation Area Management Plan. Not part of total acreage

Arrow Canyon Range Wilderness Study Area

Arrow Canyon Range Wilderness Study Area (NV-050-215) is located in the northern extremity of the narrow, north-south trending Arrow Canyon Range. The 32,853-acre Wilderness Study Area is located 35 miles north of Las Vegas, Nevada and is approximately 12 miles long and 6 miles wide.

Energy and Mineral Resource Values

The Arrow Canyon Range shows no evidence indicating metallic mineral favorability. It has moderate-to-high favorability for nonmetallics, including silica, montmorillonite, gypsum, diatomite, limestone, dolomite, and aggregate The eastern portion of the Wilderness Study Area has been identified by the U.S. Geological Survey (1979) as moderately favorable for potential geothermal resources.

The favorability for oil and gas resources is moderate because this area is part of the Overthrust Belt. Although no wells have been drilled in the study area, several that have been drilled to the south have been unsuccessful. Development of energy resources is not expected because of a history of nonproduction.

Eldorado Wilderness Study Area

Eldorado Wilderness Study Area (NV-050-423) lies in the southeastern portion of

Clark County, Nevada, approximately one hour's drive from Las Vegas. The Eldorado Wilderness is located immediately north of the old mining town of Nelson, Nevada. The study area contains 12,290 acres of public land and surrounds a private inholding of 87 acres in a roughly rectangular configuration. It is 5 miles long and 4 miles wide and is contiguous with the Lake Mead National Recreation Area.

Energy and Mineral Resource Values

Based upon available data, the entire El Dorado Wilderness Study Area is classified as having low favorability for metallic and non-metallic minerals and moderate favorability for the occurrence of uranium (GEM 1083). There are no known deposits of these resources in the study area. The entire Wilderness Study Area has a low favorability for occurrence of sand and gravel (USDI BLM 1983c). No material sites occur within the study area at present.

Fish and Wildlife No. 1, 2, 3 Wilderness Study Areas

Fish and Wildlife Nos. 1, 2 and 3 Wilderness Study Areas (NV-050-201, 216, and 217) are located in northern Clark and southern Lincoln counties, approximately 35 miles north of Las Vegas. To their west is the Desert National Wildlife Refuge, and to their east is U.S. Highway 93.

The Wilderness Study Area total 50,334 acres:
No. 1 - (11,090 acres)
No. 2 - (17,242 acres)
No. 3 - (22,002 acres)

This Wilderness Study Area has a long, narrow configuration, running north-south for about 45 miles in length, and measuring 3 miles in width at the broadest point. Two heavily traveled roads divide the three individual Wilderness Study Areas. However, for the purpose of this report, they are being considered as one unit.

Energy and Mineral Resource Values

Fish and Wildlife Nos. 1, 2, and 3 have high nonmetallic mineral potential for sand and gravel through the entire Wilderness Study Areas, and have two existing Nevada Department of Transportation sand and gravel pits within them. The availability of increasingly fewer, favorable locations for sand and gravel closer to the Las Vegas market, or along State Highway 93, has created some demand for materials within and immediately adjacent to the Wilderness Study Areas. Because of these conditions, these deposits may be economic for commercial exploitation. All three Wilderness Study Areas have low-to-moderate potential for metallic and other nonmetallic minerals. All of Fish and Wildlife Nos. 1 and 2, and the portion of Fish and Wildlife No.3 in Clark County, have moderate potential for oil and gas.

Garrett Buttes Wilderness Study Area

Garrett Buttes Wilderness Study Area (NV-050-235) is located in eastern Clark County, approximately 45 miles due east of Las Vegas. The study area contains approximately 11,835 acres of public land. The boundary begins at the intersection of the Catclaw Road and the Scalon Ferry Road. It proceeds to the west along the Catclaw Road to the boundary of the Lake Mead National Recreation Area and heads south along this boundary for almost four miles. It then meets land reserved by the Bureau of Reclamation and follows the northern edge of this land in a southeasterly direction until it meets the Lakeside Mine Road. The boundary then follows this road easterly to the Scalon Ferry Road and then to the north until it meets the Catclaw Road, the starting point. The Wilderness Study Area is square in shape, measuring approximately 5 miles each side.

Energy and Mineral Resource Values

Available data for the 1983 Geology and Energy Minerals assessment indicate that approximately 55 percent of the Wilderness Study Area (6,509 acres) has moderate potential for nonmetallic minerals (sand and gravel). The entire study area has low favorability for precious metals, but moderate favorability for accumulation of base metals. There are indications that the area has moderate favorability for accumulation of uranium and thorium in the northern portion and moderate favorability for titanium along the southeast corner of the study area. Although a few mining claims have been staked within the Wilderness Study Area, intensive exploration of and development for potential minerals is not expected to occur within the Wilderness Study Area due to the remoteness of the region, lack of good transportation routes, and distance from possible markets.

The Wilderness Study Area is rated as having low potential for energy resources. Neither exploration nor development of potential energy resources is projected to occur, because the rock strata of the Wilderness Study Area are not suitable reservoirs for hydrocarbon accumulation.

Ireteba Peaks Wilderness Study Area

Ireteba Peaks Wilderness Study Area (NV-050-438) is located south of the old mining town of Nelson in Clark County, Nevada, approximately an hour's drive south of Las Vegas. The study area contains approximately 14,994 acres of public land in a rectangular configuration nearly 7.5 miles long and 3.5 miles wide and is contiguous with the Lake Mead National Recreation Area.

Energy and Mineral Resource Values

Approximately 6 percent (900 acres) of the Wilderness Study Area is considered to have moderate favorability for occurrence of metallic minerals and has four known occurrences of precious metals at the study area perimeter; the remaining portion is considered to have low favorability for metallic minerals. Ireteba Peaks Wilderness Study Area is classified as having low favorability for non-metallic minerals and moderate favorability for occurrence of uranium. There are no known deposits of non-metallic or uranium resources in the study area (USDI BLM 1983c). The entire Wilderness Study Area is a continuous exposure weathered bedrock that could be used for

stone or aggregate. There is low potential for energy resources.

Jumbo Springs Wilderness Study Area

Jumbo Springs Wilderness Study Area (NV-050-236) is located in eastern Clark County, near Lake Mead National Recreation Area, approximately 50 miles east of Las Vegas and encompasses approximately 3,466 acres of public lands. The Wilderness Study Area boundary is defined by physical features and common boundaries with the Lake Mead National Recreation Area to the east and Bureau of Reclamation-withdrawn lands to the south. The western and northern boundaries are defined by a progression of peak to peak lines and ridgelines. Section lines common with Lake Mead National Recreation Area define the east boundary. A section line common with Bureau of Reclamation-withdrawn land, immediately south of the Wilderness Study Area, is the southern boundary. Jumbo Springs Wilderness Study Area is approximately 3.5 miles long in a north-south direction and 1.5 miles in an east-west direction.

Energy and Mineral Resource Values

Based upon available information, the study area has moderate potential for occurrence of metallic minerals (titanium) in a narrow strip on the western edge of the Wilderness Study Area, which is roughly 25 percent of the area (866 acres). The entire area has moderate favorability for accumulation of uranium or thorium. The favorability for other base metals and precious metals is low. Intensive exploration for, or development of, potential metallic or nonmetallic minerals is not expected to occur due to the remoteness of the region, lack of good transportation routes, and a generally depressed market situation for titanium, uranium, and thorium. The Wilderness Study Area has a low favorability for occurrence of energy resources.

La Madre Mountains Wilderness Study Area

The La Madre Wilderness Study Area (NV-050-412) encompasses approximately 41,306 acres of public land, with no split estate or private inholdings. It is located on the east side of the Spring Mountains, approximately 12 miles west of Las Vegas within the Red Rock Canyon National Conservation Area. The Wilderness Study Area is generally rectangular in shape, ranging from 2 to 8 miles north-south to approximately 17 miles in the east-west dimension. The Pine Creek Wilderness Study Area (NV-050-414) is immediately adjacent to the southern border of the Wilderness Study Area, separated by the Red Rock Summit road, an improved dirt road in the bottom of the canyon between the two Wilderness Study Areas.

The recommendation was to designate 23,050 acres as wilderness. Due to the fact that all but approximately 200 acres of the Wilderness Study Area is within the Toiyabe National Forest and the Red Rock Canyon National Conservation Area, outside the planning area, the La Madre Wilderness Study Area is discussed in and is managed through the Interim General Management Plan for the Red Rock Canyon National Conservation Area.

Energy and Mineral Resource Values

A geology and energy minerals assessment was prepared in 1983. Later, between 1985-87, the U.S. Geological Survey and Bureau of Mines surveyed 34,010 acres of the La Madre Mountain Wilderness Study Area recommended for wilderness and prepared a mineral assessment. According to their report no mineral or energy resources were identified within the study area.

U.S. Geological Survey *Bulletin* 1730-A, the assessment of the mineral potential for that portion of the La Madre Mountain Wilderness Study Area recommended for wilderness, noted that geochemical sampling of stream sediments within the Wilderness Study Area delineated a zone of slight silver, lead and zinc anomalies. However, the report concluded that the entire area recommended for wilderness designation had low mineral resource potential for silver, lead, and zinc. No known deposits of nonmetallic minerals occur within the recommended wilderness area, and a discovery of significant near-surface deposits would be unlikely. Sand and gravel and limestone suitable for construction materials are abundant within the area recommended for wilderness designation. Since similar materials are available closer to major markets, occurrences in the area recommended for wilderness were not classified as resources. The potential for petroleum resources is rated as low.

Lime Canyon Wilderness Study Area

Lime Canyon Wilderness Study Area (NV-050-231) is located in the Overton Arm region, near Lake Mead, northwest of Gold Butte in eastern Clark County, Nevada. The study area includes 34,680 acres of public land and surrounds 838 acres of patented mining claims. The Wilderness Study Area has a generally elongated shape that is north-south oriented. It is about 13 miles long and varies between 3 and 7 miles wide. Lake Mead National Recreation Area borders the Wilderness Study Area on the west and the boundary is the western boundary of the Wilderness Study Area. The recommendation was to designate 13,895 acres as wilderness.

Energy and Mineral Resource Values

Energy and mineral potential of the Wilderness Study Area was rated using the following information:

- Mineral report submitted by the U.S. Bureau of Mines (MLA 34-88), which studied 9,599 acres of the Wilderness Study Area.
- Literature search.
- Evaluation of the mineral setting.
- Field verification by BLM and Bureau of Mines geologists (included chemical analysis of rock samples).
- GEM Report of 1983 (USDI BLM 1983e).
- Past and/or present mining activities.

A small portion of the Wilderness Study Area has moderate potential for occurrence of gypsum. The remaining area is moderately favorable for deposits of industrial limestone and dolomite, although they have low development potential due to the remote aspect of the area. The study area is classified as moderately favorable for uranium and thorium in all but the southwestern part. The Lime Canyon Wilderness Study Area has low favorability for occurrence of energy resources.

Million Hills Wilderness Study Area

Million Hills Wilderness Study Area (NV-050-233) is located in northeastern Clark County, approximately 45 miles east of Las Vegas, across Lake Mead in an area known as Gold Butte. Although relatively close to Las Vegas, Million Hills Wilderness Study Area is more than two hours driving time away. The study area contains 21,296 acres of public land.

Energy and Mineral Resource Values

Energy and mineral potential of the Wilderness Study Area was rated using the following information:

- Mineral report submitted by the U.S. Bureau of Mines (MLA 34-88).
- Literature search.
- Evaluation of the mineral setting
- Field verification by BLM and Bureau of Mines geologists (included chemical analysis of rock samples).
- GEM Report of 1983 (GRA No. NV-35).
- Past and/or present mining activities.

The entire Wilderness Study Area has moderate nonmetallic mineral potential (dolomite and limestone), and 20 per cent of the Wilderness Study Area has moderate metallic mineral potential (base metals). Field review of the area by the U.S. Bureau of Mines identified the presence of cobalt (strategic mineral) associated with manganese deposits. The presence of cobalt is of special significance, because the grade is comparable to that in the Blackbird Mining district in Idaho (the nation's only primary cobalt deposit). Million Hills Wilderness Study Area is considered to have low favorability for the occurrence of energy resources.

Mount Stirling Wilderness Study Area

Mount Stirling Wilderness Study Area (NV-050-401) is located 45 miles west of Las Vegas,, in Clark and Nye counties. Encompassing the northern most portion of the Spring Mountain Range, the Wilderness Study Area contains 69,650 acres of U.S. Forest Service and BLM lands.

The *National Forest and Public Lands of Nevada Enhancement Act* (Public Law 100-550) adjusted the administrative boundaries for the Toiyabe National Forest, placing approximately 91 percent of the Mount Stirling Wilderness Study Area within the new Forest boundary, leaving only 750 acres under BLM administration.

Approximately 50,000 acres of the total 64,000 within the Wilderness Study Area that is managed by the United States Forest Service is now part of

the Spring Mountains National Recreation Area and is withdrawn from mineral entry.

Energy and Mineral Resource Values

Between 1983-85, U.S. Geological Survey and Nevada Bureau of Mines prepared a mineral assessment for the 40,275 acres of the Mount Stirling Wilderness Study Area recommended for wilderness. According to the report (USDI GS 1987), a high resource potential for gold was assigned to the Grapevine fault system, running north-south along the Wilderness Study Area's western border. Moderate potential for gold was assigned to the Wheeler Pass thrust system along the eastern boundary of the study area. The area south of Big Timber Spring has an unknown mineral resource potential for gold along a poorly exposed normal fault system.

The area northwest of Gold Spring and along the crest of the range south of Mount Stirling, and east of Mount Stirling has low potential for accumulation of base metals such as lead, zinc, manganese, and copper. Extensive exposures of limestone and dolomite in the area result in a classification of moderate favorability for non-metallics. Potential for oil and gas within the study area is low.

Muddy Mountains Wilderness Study Area

Muddy Mountains Wilderness Study Area (NV-050-229) is located in Clark County, approximately 20 miles northeast of Las Vegas. The study area includes 96,170 acres of public land. It is irregular in shape, approximately 14 miles across in a north-south direction at its widest point, and approximately 18 miles from east to west.

Energy and Mineral Resource Values

Energy and mineral potential of the Wilderness Study Area was rated using the following information:

- Review of existing documentation and mine production records.
- Reconnaissance sampling and analysis of selected areas within the Wilderness Study Area.
- Geologic setting of the area.

The U.S. Geological Survey and U.S. Bureau of Mines cooperated in preparing a *Mineral Resource Potential of the Muddy Mountains Wilderness Study Area, Clark County, Nevada* (1982). The report identified the Muddy Mountains Wilderness Study Area as having high potential for mineral deposits of calcium borates and lithium. Known and potential mineral deposits are concentrated in the east-central and south-central parts of the study area. Zeolites (in particular clinoptilolite) are present in some tuff beds throughout much of the study area, with the majority of the deposits external to the Wilderness Study Area in the northeast, suggesting a moderate to high mineral potential. Stream-sediment sampling indicates that the Muddy Mountains area has little potential for mineral deposits of metals other (than lithium). Building stone and silica sand have moderate to low potential.

Oil and gas potential within the study area is low. Five exploratory oil and gas test holes have been drilled in the vicinity of the Wilderness Study Area, one within the cherry-stem road in the Buffington Pockets area in the north end of the Wilderness Study Area. None of the explorations encountered producible amounts of petroleum. The local tertiary stratigraphic section within the Wilderness Study Area is not considered to have good potential for oil exploration (USGS 1982). These rocks are not part of the Overthrust belt, were deposited in closed evaporitic basins, and contain little or no organic matter. The high degree of structural complexity of the study area suggests there are probably no buried Overthrust-related traps that are undisturbed by tertiary structures. The U.S. Geological Survey determined that the petroleum potential for the study area is regarded as poor, chiefly because of the lack of known potential source rocks.

Nellis ABC Wilderness Study Areas

Nellis ABC Wilderness Study Area (NV-050-04R-15) is located at the north edges of the cities of Las Vegas and North Las Vegas, within the corporate boundary of the city of North Las Vegas. The study area is divided into three small sub-areas separated by roads. For the purpose of this report, all of the sections will be considered as one. The study area has a combined total of 5,718 acres, with sub-areas as follows:

- Sub-area A (1,971 acres)
- Sub-area B (2,713 acres)
- Sub-area C (1,024 acres)

The Wilderness Study Area was originally inventoried as part of a 13,400-acre parcel. The study area comprises the natural portion of the original parcel that was contiguous to the U.S. Fish and Wildlife Service Desert National Wildlife Refuge.

Energy and Mineral Resource Values

The entire Wilderness Study Area (5,718 acres) was rated as having moderate potential for nonmetallic minerals (sand and gravel) and low potential for oil and gas. Moderate potential for geothermal resources exists within the Wilderness Study Area.

North McCullough Mountains Wilderness Study Area

North McCullough Wilderness Study Area (NV-050-425) is located in the south-central portion of Clark county, Nevada, less than 15 miles south of Las Vegas and includes 47,166 acres. The entire Wilderness Study Area is comprised of public land with no private in-holdings and is roughly rectangular in shape, approximately 9-10 miles on the north-south axis and 7-8 miles on the east-west axis. The eastern boundary is located at the base of the escarpment, slightly west of a large utility corridor in Eldorado Valley. An additional 640 acres within the Eldorado Valley Lands Act that was not acquired by Boulder City will be managed under the IMP until those lands have been evaluated and released.

Energy and Mineral Resource Values

Energy and mineral potential of the Wilderness Study Area was rated using the following information:

- Literature search.
- The 1982 *Barringer Report* (a federally contracted mineral survey of the Wilderness Study Areas to identify mineral resources and incorporating extensive sampling).
- The *Geology, Energy, and Minerals Report* (1983).
- Evaluation of the geologic setting and consultation with energy and mining companies as well as local prospector.
- Minor field verification by BLM geologists.
- Past and present mining activities.

The Wilderness Study Area was evaluated as having low favorability for accumulation of metal and nonmetal resources, except at the edges of the Wilderness Study Area, which have moderate to high potential for sand and gravel. Energy resources were of low potential. The area is not favorable for oil and gas and geothermal resource accumulation.

Pine Creek Wilderness Study Area

The Pine Creek Wilderness Study Area (NV-050-414) is located approximately 15 miles west of Las Vegas. The Wilderness Study Area contains approximately 19,722 acres of public lands, with no split estate or private inholdings. The Wilderness Study Area is roughly rectangular in shape, approximately 11 miles long and 5 miles wide. Immediately adjacent its northern border is the La Madre Wilderness Study Area (NV-050-412). The two Wilderness Study Areas are separated by the Red Rock Summit road, an improved dirt road in the bottom of the canyon.

The recommendation was to designate 18,344 acres as wilderness. Due to the fact that all of the Wilderness Study Area is contained within the Toiyabe National Forest and the Red Rock Canyon National Conservation Area, outside the planning area, the Pine Creek Wilderness Study Area is discussed in and is managed through the Interim General Management Plan for the Red Rock Canyon National Conservation Area.

Energy and Mineral Resource Values

The "La Madre Mountains/Pine Creek G-E-M Resource Area (GRA No. NV-32) Technical Report" classified the Wilderness Study Area as having moderate favorability for oil and gas, low favorability for geothermal, and low favorability to unfavorable for metallic minerals. The entire Wilderness Study Area is moderately favorable for sand and gravel resources.

The geology of the area is primarily Paleozoic and Mesozoic carbonate units, which are known regionally to be hosts for replacement lead-zinc-copper deposits. Overall, the mineral potential of the area is low.

Quail Springs Wilderness Study Area

Quail Springs Wilderness Study Area (NV-050-411) is located in northwestern Clark County, at the north edge of the city of Las Vegas. The study area includes 12,145 acres of public land. The boundary is a combination of roads, a shared boundary with Floyd Lamb State Park, the Desert National Wildlife Refuge, corporate boundary for the City of Las Vegas, a common border with the Moapa Indian Reservation, and an abandoned railroad grade.

Energy and Mineral Resource Values

All of the Wilderness Study Area was rated as having moderate nonmetallic mineral potential for sand and gravel (USDI BLM 1983g). Geologic formations are not considered to be favorable for location of metallic minerals or energy resources.

Resting Spring Wilderness Study Area

Resting Spring Range Wilderness Study Area (NV-050-460) is approximately 15 miles west of Pahrump and 60 miles west of Las Vegas, along the California-Nevada border, in Nye County, Nevada. Access is via Ash Meadows Road several miles to the east. Except for the western boundary, which is the Nevada-California border, the boundaries of the Wilderness Study Area are poorly defined. Boundaries meander along the base of the foothills of the Resting Spring Range, set back from the effects of the Ash Meadows and Stewart Valley Roads. The 3,850-acre Wilderness Study Area is divided into two unequal parts by a maintained dirt road which branches off the Ash Meadows Road. The northern portion is 1,050 acres, and the southern portion is 2,800 acres.

Resting Springs Wilderness Study Area is contiguous to the California Desert Conservation Area's Resting Spring Range Wilderness Study Area #145, which covers 89,772 acres in California. The 1980 Wilderness Inventory determined that the Nevada portion of the Wilderness Study Area did not meet wilderness criteria for size, solitude, and primitive recreation, except when considered in conjunction with the California Wilderness Study Area. California BLM has recommended that the California Desert Conservation Area Resting Springs Wilderness Study Area not be designated for wilderness status.

Energy and Mineral Resource Values

Resting Spring Wilderness Study Area is largely composed of Precambrian and Cambrian marine sediments, which have been displaced by normal faults, usually less than 1 mile in length. Quaternary alluvial fan deposits cover much of the lower slopes. Miocene tufaceous lake beds occur north of the Wilderness Study Area and in small areas inside the north boundary.

Although the rock units within the Resting Spring Wilderness Study area are known to be favorable for metallic mineral deposits elsewhere in the region, the entire Wilderness Study Area is classified as having low favorability for metallic mineral resources due to the lack of known mineral deposits in the area. Nonmetallic minerals resources also have low favorability due to the geology of the area. The United States Geological Survey *Open File Report* 90-638 indicated that the Wilderness Study Area has high mineral potential for industrial clay deposits and moderate potential for geothermal resources. The Wilderness Study Area has no favorability for oil and gas, or uranium, based on a lack of source rocks.

South McCullough Mountains Wilderness Study Area

South McCullough Mountains Wilderness Study Area (NV-050-435) is located approximately 35 miles south of Las Vegas, just north of the California-Nevada border, and 13 miles west of Searchlight, Nevada. Encompassing the southern portion of the McCullough Mountain Range, the Wilderness Study Area is approximately 15 miles long and 6 to 9 miles wide. It encompasses 56,623 acres.

Energy and Mineral Resource Values

A report on the mineral potential of the Wilderness Study Area was published in the United States Geological Survey *Bulletin* 1730-C (1989). According to that report, the Wilderness Study Area contains no identified mineral resources and has no areas of high mineral resource potential. Five areas that make up 20 percent of the study area have a moderate potential either for undiscovered silver, gold, lead, copper, and zinc resources in small vein deposits, for lanthanum and other rare-earth elements, uranium, thorium, and niobium in medium-size carbonatite bodies and dikes, for

tungsten and copper in small to medium size vein deposits, or for silver and gold in small vein or breccia-pipe deposits. There is moderate favorability for sand and gravel and stone, although the area is some distance from any markets. The entire study area has no resource potential for oil and gas or coal, as well as a low resource potential for geothermal resources, and for nonmetallic pegmatite minerals such as feldspar and mica.

Sunrise Mountain Instant Study Area

The Sunrise Mountain Instant Study Area (NV-050-420) is located at the eastern edge of Las Vegas and was designated in 1970 as Sunrise Mountain Natural Area. The area was identified as having unique geologic, biologic, and aesthetic values. Section 603 (a) of the Federal Land Policy and Management Act directed that all areas designated as "natural or primitive areas" prior to November 1, 1975 be studied for their wilderness values. A total of 29,475 acres were studied, and the area determined to lack wilderness characteristics.

The BLM recommended that the study area be dropped from the wilderness review process. The original 10,240 acres of the Natural Area continues to be managed as an Instant Study Area until the non-wilderness recommendation is adopted by Congress.

No specific mineral study was done for the Sunrise Mountain Instant Study Area due to the earlier recommendation that the area be dropped from further wilderness review.

Virgin Mountain Instant Study Area

The Virgin Mountain Instant Study Area (NV-050-222) is located approximately 85 miles northeast of Las Vegas, and southeast of Mesquite, Nevada. The Instant Study Area encompasses 6,560 acres. This range is of particular scientific interest because it encompasses features representative of three North American desert life zones. The dense vegetation, in conjunction with the steep gradients of the terrain, limit access roads to two four-wheel drive roads, one from the south and one from the northeast. Recreational activities occurring in the Instant Study Area include hiking, camping, hunting, off-road vehicle touring, and nature study.

Logandale Supplemental Inventory Area

The Federal Land Policy and Management Act of 1976 mandated that the BLM inventory all public lands for possible inclusion in the National Wilderness Preservation System. Initial inventories were undertaken from 1976 to 1979 to identify areas for further study. However, certain parcels of land near Logandale, Nevada were left out of the inventory due to a base mapping error that showed most of the lands to be the property of the State of Nevada or private. The State had applied for lands near the Valley of Fire State Park under the Recreation and Public Purposes Act and although the case was not (and has yet to be) adjudicated, someone had changed the base map to indicate the lands were State property. This error was not discovered until the late 1980s. To complete the review process, these lands are included in this plan for final decision.

The omitted lands are in seven parcels totaling approximately 20,299 acres. Six scattered parcels, including approximately 6,400 acres, do not meet the minimum acreage requirement (5,000 acres) and lack wilderness characteristics of outstanding solitude or primitive and unconfined recreation opportunities. These areas were not studied further following this assessment.

The remaining 13,899 acres are evaluated as follows.

Description

The lands are located in a roughly rectangular shaped area north of the Valley of Fire State Park and west of Logandale, Nevada. The area is encircled by roads that vary from well maintained gravel to rough dirt and rock trails. Several dead-end roads penetrate the unit. There is a gypsum mine and County flood diversion structure adjacent to the northwest corner.

Naturalness

The area exhibits a generally natural aspect. Most notable impacts are the roads that surround the area. The area is not well known to the public although use is increasing.

Outstanding Opportunities for Primitive and Unconfined Recreation

The area offers many opportunities for recreational activities in an undeveloped area with minimal management control and limitations. The size of the area does not lend itself to multi-day uses; however, day trips, short hikes and short off-road-vehicle routes are available. Because these opportunities are not unique or rare to the general area, they are not rated as outstanding.

Outstanding Opportunities for Solitude

It is possible to escape the sights and sounds of civilization in parts of the area. However, the size, shape and influence of surrounding roads and nearby uses, opportunities for solitude are not outstanding.

Summary Evaluation

The area is largely in a natural condition, but is influenced by adjacent human impacts. The area's limited size prevents it from offering outstanding opportunities for primitive and unconfined recreation or solitude.

Minerals Management

Federally-owned minerals in the public domain fall into one of the following categories (as defined by the Supplemental Program Guidance - BLM Manual 1624), depending on the kind of mineral:

Locatable Minerals (disposal is nondiscretionary)
- Uncommon varieties of sand, gravel, stone, pumice, pumicite, cinders, and exceptional clay.
- All "valuable mineral deposits" are locatable under the General Mining Law of 1872, except those specifically excluded below.

Leasable Minerals (disposal is discretionary)
- *Fluid Minerals*
  - Geothermal resources and associated by-products.
  - Oil and gas
  - Oil shale, native asphalt, solid and semi-solid bitumen, and bituminous rock, including oil impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined or quarried.
- *Solid Minerals*
  - All minerals on acquired lands, except saleable minerals.
  - All minerals on the outer continental shelf.
  - Coal and phosphate.
  - Chlorides, sulfates, carbonates, borates, silicates, and nitrates of sodium and potassium.
  - Sulphur in the states of Louisiana and New Mexico.

Salable Minerals (disposal is discretionary)
- Petrified wood and common varieties of sand, gravel, stone, pumice, pumicite, cinders, and clay.
- All minerals not defined as locatable or leasable.

Metallic mineral commodities currently being produced or processed in the planning area are gold and silver. Other metallic minerals known to occur include cobalt, copper, lead, manganese, mercury, nickel, palladium, platinum, thorium, tungsten, uranium, vanadium, and zinc.

Nonmetallic mineral production now exceeds metallics in both tonnage and value within the Las Vegas BLM District. These commodities include alum, alunite, barite, bentonite, industrial and common clays, borates, feldspar, fluorspar, glauberite, gypsum, limestone, dolomite, magnesite, marble, mica and beryl, nitrate, perlite, quartz, salt, silica, sand and gravel, stone, turquoise, vermiculite, and zeolite. Among the commodities that are currently or have been commercially extracted are: Bentonite, borates, feldspar, fluorspar, gypsum, limestone, and dolomite, magnesium bentonite clays, magnesium hormite clays, marble, mica and beryl, perlite, turquoise. salt, silica, stone, sand and gravel, vermiculite, and zeolite. Only those commodities having commercial production history are detailed in the following.

Portions of southern Nevada are classified as prospectively valuable for deposits of oil, gas, sodium, and potassium. Occurrences of coal, phosphate, and oil shale are not known in the Las Vegas BLM District.

Leasable Minerals

The *Minerals Leasing Act* (1920) as amended, the *Acquired Lands Act* (1947), the *Geothermal Steam Act* (1970), and 43 CFR 3100-3599 provide the

legal and regulatory framework for issuance and management of mineral leases. These regulations apply where public interest exists for development of oil, gas, geothermal, coal, and non-energy leasable mineral resources. Stipulations are attached to leases and permits to assure protection of nonmineral resources that are susceptible to impacts resulting from the exploration and development of leasable mineral resources. In response to the desert tortoise being listed as a threatened species in 1990, no new leases have been issued in Clark County since 1990, pending completion of this Resource Management Plan.

Fluid Leasable Minerals

Oil and Gas - The first known exploration well drilled in Clark County occurred in 1929 near Arden, 15 miles southwest of Las Vegas (Garside et al. 1988). An area near Mesquite in the northeastern part of the county was touted as a prospective oil area, but no known wells were drilled on the Nevada side of the Utah-Nevada border as a result of the promotion.

Some sporadic drilling occurred in the 1940s, but more serious efforts began in 1950 when exploration throughout Nevada increased significantly. Although numerous wells have reported oil shows, the lack of a discovery and the general decrease in Nevada drilling in the late 1960s and early 1970s resulted in few wells being drilled in Clark County until the early 1980s. Some of these recent wells were drilled to test the possibility of "overthrust belt" oil fields like those in western Wyoming and northeastern Utah.

The deepest well drilled in Nevada is in Clark County on Mormon Mesa. In 1980, the Virgin River U.S.A. No. 1-A was drilled by Mobil Oil Corporation in SE¼SW¼, Sec. 9, T. 15 S., R. 68 E., to a depth of 19,562 feet. It was an unsuccessful overthrust test. Map 3-11 shows those areas within the Las Vegas BLM District classified as having high, moderate, and low potential for development of oil and gas. To date, 70 permits for drilling of oil and gas wells have been issued and 65 wells have been drilled. A total of 33 geophysical exploration permits, totaling 33 have been issued in the planning area. There has been no oil and gas production within the Las Vegas BLM District.

Geothermal Resources - Based upon available data, southern Nevada contains no known favorable locations for development of geothermal energy. A water temperature of 145 degrees Fahrenheit (the hottest water in Clark County) occurs at Black Canyon Springs near Hoover Dam. Commercial development requires temperatures of at least 194 degrees Fahrenheit. Higher temperatures of not less than 350 degrees Fahrenheit are needed for direct application uses (such as power generation). The low temperatures of waters in southern Nevada preclude their use as a geothermal energy source, except for small scale uses (such as space heating, swimming pools, and spas). There are no existing geothermal leases within the planning area.

Solid Leasable Minerals

Map 3-12 displays those areas within the Las Vegas BLM District classified as having moderate and low potential for development of sodium and potassium. However, there are no existing leases for these two compounds within the Las Vegas BLM District, and no areas are classified as having high potential for their development.

Salable Minerals

The *Materials Act* (1947), as amended, and 43 CFR 3600-3622 provide for regulation and disposal of mineral materials. Disposal is administered on a case-by-case basis.

Salable minerals are sold at fair market values. Free use permits are issued to Federal and state agencies, local communities, and nonprofit groups as the need arises. Map 3-13 shows those areas within the Las Vegas BLM District classified as having high, moderate, and low potential for development of mineral materials.

Locatable Minerals

Exploration for and development of locatable mineral resources is authorized by the *General Mining Law* of May 10, 1872, as amended. Federal regulations (43 CFR 3802 and 3809) provide protection to nonmineral resources, provide for reclamation of disturbed areas and for mineral exploration and development, while assuring that activities are conducted in a manner that prevents unnecessary or undue degradation.

Currently, approximately 95 percent of the planning area is open to entry under the locatable minerals laws. Map 3-14 shows those areas within the Las Vegas BLM District classified as having high, moderate, and low potential for development of locatable minerals. Maps 3-15 and 3-16 show areas where Plans of Operation and Mining Notices have been filed, respectively.

Many mining districts in southern Nevada have yielded significant production in the past, and some are currently producing large quantities of material. It is difficult to give a general description of these deposits, because of their variety and number and also the diversity of geological settings in the various districts. Deposits are therefore divided into two groups, metals and nonmetals. The metals are discussed by separate districts. The nonmetals are discussed by commodities, because kindred deposits are not confined to districts (see Mineral Potential Report for details).

Mining in southern Nevada began in 1857 with discovery of lead ore at the Potosi mine, which later became the area's second largest producer of zinc (Hewett 1931). In 1892, the discovery of gold in the Keystone mine greatly stimulated activity in the Goodsprings district and southern Nevada. Subsequent development of metallic and nonmetallic deposits continues, but nonmetallic mineral production in the area far exceeds metallic mineral production in both tonnage and value.

Mining Districts

The principal mining districts of the Las Vegas BLM District are described below, including a brief overview of the history, production, and resources of each district.

Ash Meadows District - The Ash Meadows bentonite district has the largest clay production of any clay district in Nevada. Production began about 1918, and an estimated $3 million worth of clay was extracted during the first 50 years of the district (Kral 1951). Clays were used to filter and clarify mineral oils and also used as an absorbent. In the 1960s, interest in the bentonite deposits dropped significantly, although major oil companies still retained mineral rights for portions of the district. In the early 1970s, Industrial Mineral Venture, Inc. (IMV) began to produce bentonite clays from the district. This operation continues clay production under new management as IMV/Florida.

Bare Mountain (Fluorine) District- The Bare Mountain Fluorine district is located in the extreme northern portion of the planning area and extends beyond the boundary of the Las Vegas District. Gold was discovered in 1905, and the early limits of the district were confined to the northern part of Bare Mountain. In the 1950s, the district expanded to include the southern part of Bare Mountain (Kral 1951). This district is best known for its production of fluorspar. In the late 1970s, new production within the district shifted from fluorspar to gold when the Sterling Mine opened. Until this time, gold was known to occur within the district, but only limited production occurred. The Sterling Mine is the only active large-scale heap leach operation in the Las Vegas BLM District.

Eldorado Canyon District - The Eldorado Canyon district, located in the Eldorado and Opal Mountains, is one of the oldest in Nevada. Mining began in the area in 1857, with discovery of gold ore on the Honest John claim. Reports indicate that old arrastras and prospect pits, dating prior to the 1860s, were found in the area. Estimates of production between 1861 and 1906 totaled between $2 and $5 million (Ransome 1907). Significant production from the district ended in 1942 with closure of the Techatticup Mine. Since then, limited exploration and production has taken place in the district.

Goodsprings (Potosi, Yellow Pine) District - The Goodsprings (Potosi, Yellow Pine) district was the principal source of zinc in Nevada during World War I and II. Located in the Spring Mountains, the district was first described in 1856 by Nathaniel Jones, who was verifying Indian reports of a lead occurrence for the Mormon Church (Hewett 1931). The Potosi Mine was the first Nevada mine, with ores smelted by Jones in 1857; production has been intermittent since that date. Significant production in the district occurred from 1912 to about 1920, and at a reduced rate by steady pace until the 1950s.

Today, interest in the district continues with limited exploration and processing of tailings from the Keystone Mine by Durvada, Inc. Zinc, lead, copper, cobalt, silver, gold, and other minerals were extracted between 1856 and 1957, for an estimated value of $31,000,000.

Searchlight District - The Searchlight district was discovered in 1897 and has a recorded production of over $6 million. The district lies in the western

Opal Mountains and has yielded gold, silver, copper, and lead. Since the early 1950s, interest in the district has been intermittent with some exploration and limited production at the older mines.

Other mining districts with lesser productions within the planning area include the Bare Mountain (Fluorine), Bunkerville (Copper King), Big Dune (Lee), Charleston, Crescent, Dike, Gass Peak, Gold Butte, Johnnie, Las Vegas, Newberry, Railroad Pass, and Sunset districts. Minerals extracted were alunite, copper, gold, lead, manganese, silver, and zinc, as well as minor amounts of other materials. Map 3-19 depicts general locations of mineral activities conducted under the auspices of the 1872 *Mining Law* during the last 10 years in the Las Vegas District.

Nonmetallic Mineral Deposits

Nonmetallic mineral production now exceeds metallics in both tonnage and value within the Stateline Resource Area. These commodities include alum, alunite, barite, bentonite and clay, borates, feldspar, fluorspar, glauberite, gypsum, limestone and dolomite, magnesite, marble, mica and beryl, nitrate, perlite, quartz, salt, silica, sand and gravel, stone, turquoise, and vermiculite. vermiculite. Among the commodities that are currently or have been commercially extracted are bentonite, borates, feldspar, fluorspar, gypsum, limestone and dolomite, marble, mica and beryl, perlite, turquoise, salt, silica, stone, sand and gravel. Only those commodities with a commercial production history are detailed in the following.

Alunite - The Railroad Pass (Alunite) district is located approximately 5 miles east of Boulder City. The Alunite Mining Company was organized in 1908, but company operations ceased after a short period of activity. The area was considered as a possible source of potash and alumina during the two World Wars, but the grade and distribution of the alunitized rock proved unfavorable for commercial exploitation.

The Quo Vadis Mining Company began operation in 1915, but has had only intermittent activity. Little production has been recorded for the district (Vanderburg 1937). Figures from the *Minerals Yearbook* of 1936 show production of 925 ounces of gold, 749 ounces of silver, and 1,832 pounds of lead, valued at $33,035.

Bentonite - Several deposits of bentonitic type clay occur in Clark County, but only a small amount of clay has been mined from them. Richfield Oil Company mined 2,960 tons of the clay in 1929, presumably from altered rocks near Las Vegas (Fulton and Smith 1932). Clay has been mined near the Wall Street mine (T. 26 S., R. 64 E.,Section 4) and trucked to Whitney, for use in making bricks. Bentonite has also been located in the vicinity of Overton, Moapa, and Searchlight. Some development has been done on these deposits, and small quantities are occasionally mined. No recent exploration or development for bentonite are known from Clark County.

Borate - Borate deposits occur in White Basin in the central part of the Muddy Mountains in northeastern Clark County. A large group of patented mining claims, including the Anniversary Mine and the old workings of the American Borax Company, are located in the eastern part of White Basin.

Feldspar - Feldspar of commercial quality is abundant in the Virgin Mountains and in the ranges of the southern part of Clark County; these deposits have received slight attention due to inaccessibility and distance from markets. The only production reported is from a deposit located on the west slope of Crescent Peak with an estimated 1,000 tons of feldspar having been mined and shipped (Hewett et al. 1936).

Fluorspar - Fluorspar veins occur in the McCullough Range. Development work, consisting of a short adit and several open cuts, has explored the veins, but only a few tons of fluorspar have been shipped (Vanderburg 1937).

Gypsum - Extensive deposits of gypsum occur in the Virgin Mountains, in the Muddy Mountains southward to Frenchman Mountain and vicinity, and in the Spring Mountains west and southwest of Las Vegas (Longwell et al. 1965). Five mines are currently producing gypsum from private and public lands within the Las Vegas District. Significant exploration for gypsum is also occurring.

Limestone and Dolomite - Deposits of carbonate rocks are widely distributed in all parts of southern Nevada, with the exception of a wide belt west of the Colorado River south of Lake Mead. The carbonate rocks range in age from Early Cambrian to Tertiary. To date, the only extensively developed sites are the Devonian limestone at Apex

(high calcium limestone) and the Mississippian dolomite at Sloan (dolomitic limestone).

Chemstar, Inc. owns and operates a limestone quarry and a crushing, and calcining plant at Apex, 19 miles northeast of Las Vegas and one mile northeast of the Georgia Pacific gypsum plant. Limestone and dolomite have been mined since 1910 at Sloan, which is approximately 19 miles south of Las Vegas. Dolomite was not mined commercially before 1928, but since then has become the principal product. The main markets for limestone and dolomite products are sugar beet, oil, and iron industries in southern California. Potential for development of limestone and dolomitic deposits within the Las Vegas District is quite high. Production could be for lime or portland cement. Other development work includes the current construction of a Portland cement plant near Logandale. The plant is anticipated to be producing cement within the next 2 years.

Marble - Marble has been quarried at the south end of the Las Vegas Range, 14 miles north of Las Vegas (Burchard 1914). The marble is derived from limestone of Mississippian Age, recrystallized during secondary dolomitization. According to Cornwall (1972), unsuccessful attempts have been made to quarry marble at Carrara Canyon, 7 miles southeast of Beatty.

Magnesium Bentonite Clays, Magnesium Hormite Clays - Clay is currently mined at two sites in the Ash Meadows region in southern Nye County. The company's annual production ranges from 25,200 to 45,500 tons of clay per year. Clays also occur in abandoned clay mines in the Clay Camp, Nevada area, in the central portion of the Ash Meadows wetlands area.

Mica and Beryl - Deposits of mica and beryl occur in pegmatite dikes in the Virgin Mountains, 9 miles southeast of Bunkerville; in the South Virgin Mountains east and south of Gold Butte; in the Opal Mountains; and in the southern McCullough Range. Production of mica and beryl has been small, although a few shipments of mica were made from properties in the South Virgin Mountains at the turn of the century (Parker 1894); the principal property is the Santa Cruz mine.

Perlite - The perlite deposits developed in southern Nevada are in the McCullough and Highland Spring Ranges in the southern part of the Spring Mountains (Cochran 1951). The majority of these deposits are interlayered with other volcanic rocks such as dacite and obsidian.

Quartz - Some optical quality quartz crystals occur in pegmatite dikes of the Gold Butte District. No production figures are available, although a small amount of quartz was produced from mines in the region.

Salt - Large deposits of rock salt once cropped out in the Virgin River Valley in eastern Clark County. Except for several small domes near Salt Cove, all the outcrops were covered when Lake Mead was filled in the 1930s. Common salt was one of the earliest materials mined in Nevada. Prehistoric Indians are known to have mined rock salt, creating the remarkable "salt cave" with two large underground chambers observed by Harrington in 1926. The Virgin Valley salt was later mined by white settlers.

Silica - According to Longwell et al. (1965), the high purity silica raw materials of economic significance are the Eureka Quartzite, Supai Formation, Aztec Sandstone, Baseline Sandstone, and recent deposits of eolian sand. Although practically all of these materials have been exploited, only the Baseline Sandstone and eolian sand are currently used. Simplot Silica Products in Overton ships both crude and dry finished products that are utilized by the foundry, glass, and chemical industries.

The most commonly used high purity silica raw materials are: sand, sandstone, gravel, quartzite, conglomerate, and massive quartz that contain 95 percent SiO_2 or better. Market specifications favor the present utilization of Clark County sands for glass melting, but a substantial tonnage is consumed by the West Coast foundry trade. The Eureka Quartzite may be considered a potential source for refractory and metallurgical use.

Stone, Sand, and Gravel - Deposits of stone, sand, and gravel for use as construction and building material have been developed throughout the planning area (Maps 3-20 and 3-21). The most significant development of sand and gravel deposits is in the greater Las Vegas area to support the building boom that started about 1984. Production of sand and gravel from non-Title 23 sources in the Las Vegas District is in excess of 1.2 million cubic yards of material. Another significant development of sand and gravel is the Nevada Department of

Transportation, which currently maintains 181 material site rights-of-way.

Dimension stone has been quarried in the vicinity of the Red Bluff Mine and Rainbow Quarries since the late 1940s. Recent production at this site has been significant, with current operations being conducted by the Las Vegas Rock Shop. Dimension stone has also been produced from other quarries in the Las Vegas BLM District, but the Rainbow Quarries site is the only active area in the planning unit.

Turquoise - The Crescent district is in the extreme southern part of the McCullough Range about 12 miles west of Searchlight, Nevada. Turquoise was prehistorically mined in the this area by Indians. In 1894, the deposits were rediscovered and have been intermittently active since. A considerable amount of turquoise was produced, especially from 1894 to 1906, but recorded production figures are lacking. The turquoise is light to dark blue and has a dense texture. Vanderburg (1937) reports that in 1906 a single specimen was found in the Toltec mine that weighed 320 carats and was valued at $2,600.

Vermiculite - A vermiculite mine is located in T. 19 S., R. 70 E., Sec. 35, approximately 0.5 mile north of the Snowflake mica mine. Deposits occur as veins, stringers, pockets, and scattered flakes. The vermiculites are considered to have been formed when biotite was altered by action of hydrothermal solutions (Leighton 1954). Remains of a mill are on the property, but no record of production or recent activity is available.

Zeolite - An active zeolite mine and other known zeolite resources are present in the Ash Meadows area in southern Nye County, Nevada near the California border. The zeolites are used for industrial applications in odor control, heavy metal ion removal, agricultural use, and sewage and waste treatment. In addition, zeolitized rhyolitic tuffs have been quarried for many years for use in stone and lightweight aggregate industries. Increases in domestic sales and production of natural zeolites were seen between 1988 to the present largely due to growth in pet litter, agricultural and odor control products, and locally due to continued rapid population growth and booming construction industry.

Hazardous Materials Management

The Hazardous Materials Program has the responsibility for compliance with Federal, State, interstate and local management requirements. All non-Interior groups whose activities are on BLM-managed lands and facilities (such as claimants, concessionaires, contractors, permittees, and lessees) will be held responsible for compliance with Federal, State, interstate, and local waste management requirements. Waste is defined to include solid and hazardous waste, hazardous materials, and hazardous substances, as defined by the statutes referenced in 518 DM 2.3.

The Hazardous Materials Program is also responsible for aggressively pursuing potentially responsible parties to correct their contamination of BLM lands and facilities or to recover the costs of cleanup. Land use decisions incorporate consideration whether hazardous materials would be used. Site-specific hazardous material inventories are completed when lands are either acquired or disposed. BLM cannot acquire contaminated lands unless directed by Congress, court mandate, or as determined by the Secretary (602 DM 2). Land disposal actions must comply with disclosure requirements found in 40 CFR 373. Mining and milling sites are inspected to determine appropriate management for hazardous materials. Knowledge of the locations of these activities alerts the agency concerning existing and potential problems. The agency attempts to minimize releases of hazardous materials through compliance with current regulations. When hazardous materials are released into the environment, impacts on resources are assessed and appropriate response, removal or remedial actions are taken.

Fire Management

Fire management activities are conducted under an Initial Attack Management system, which links the level of fire fighting response to the resource values within a specific geographic area or suppression area/zone (refer to Map 2-11). The designations developed for initial attack response will be used to efficiently organize and distribute fire personnel and equipment to those areas of highest resource priority. Baseline management goals are suggested for the following Initial Attack Management Levels:

1. Suppress all wildfires at 500 acres or less 90 percent of the time.

2. Suppress all wildfires at 100 acres or less 90 percent of the time.

3. Suppress all wildfires at 10 acres or less 90 percent of the time.

If future resource needs change, initial attack management levels may require adjustment. This could be accomplished through coordination with fire management.

Between 1978 and 1988, approximately 78,212 acres of BLM-managed land burned within the old Stateline Resource Area. A total of 64 percent of all wildfires that were greater in size than 100 acres occurred in the Spring Mountains. A fire occurrence map is available at the Las Vegas BLM Field Office. Table 3-29 summarizes the 11-year fire history.

From 1988 through 1994, fire occurrence was documented for the Las Vegas BLM District. The frequency of fires in the Gold Butte and Searchlight areas increased considerably. The increase warrants concern over impacts to critical desert tortoise habitat.

The public lands managed by the Las Vegas BLM District have numerous rural/urban/wildland interface zones, defined as those areas where both rural and urban sprawl has occurred in wildland areas. These zones require a special response mode that includes as a priority the immediate protection of life and property until arrival of a structural fire agency. Then, the fire reverts to a wildland priority, that of protecting the natural resources.

The use of certain fire suppression techniques are incorporated into pre-attack scenarios so that fire suppression strategies and tactics are acceptable to protect the various special environments. These special areas include riparian areas, designated natural areas, Wilderness Study Areas, mining districts, cultural resource districts including both prehistoric and historic, desert tortoise habitat areas, airshed management areas, designated research areas, and rural/urban/wildland interface zones.

The fire prevention and education program is responsible for wildland fire prevention, prescribed fire education, fire trespass and investigations, and compiling fire statistics. The function of the program is to provide and maintain a viable and effective fire prevention and education program to educate the public concerning fire prevention concerns, fire management activities, and fire statistics for public education. Special emphasis is given to use of fireworks, abandoned campfires, railroad fires, children playing with fire, and prescribed fire and fire occurrence data. The fire trespass and investigations team of the fire prevention program is responsible for investigating human-caused fire to determine the origin, ignition source, and the identity of the responsible persons. After the cause is determined, proper documentation and billing will occur.

There are two major uses of prescribed fire to achieve specific fire and resource goals in southern Nevada. Wildland fire hazard reduction involves decreasing a quantity of accumulated fuel that could through natural means become a devastating event. Prescribed burns also facilitate vegetative manipulation to benefit habitat.

The range of wildfires does not follow jurisdictional boundaries. The use of cooperative agreements promotes the common goals for the agency to manage incidents in a cost-effective manner for the protection of life, property, and natural resources. It is in the interests of city, county, state, tribal, and Federal agencies to work toward a common goal concerning an incident.

There are eight identified resource concerns described below.

1. *Wilderness Study Areas*
   Fire suppression efforts in Wilderness Study Areas strive to maintain the qualities of the existing environment and must be conducted to comply with the non-impairment criteria in the Interim Management Policy. This includes implementation of minimum handline construction, engine crew hose lay deployment, limited or no off-road vehicle driving, use of existing open areas for heliports and drop zones, an emphasis on use of smokejumpers or helitack crews and use of natural barriers, and a prohibition on bulldozer lines. In some cases, fire line rehabilitation may be necessary following the conclusion of an incident.

2. *Designated Natural Areas*
   Values that constitute a Natural Area, including unique visual resources, vegetative community uniqueness, and specific biological qualities, are

described in those documents that prescribed the designation. Fire suppression strategies are set in those documents. In most situations, a resource advisor is required during implementation of fire suppression field strategies.

3. *Cultural Resources and Historical Properties*
In areas where important cultural resources, including both prehistoric and historic features were identified, a qualified archaeologist is required to assist the incident commander on possible fire suppression equipment restrictions. Historic structures, such as mining fixtures and ranching line cabins, are fragile and should receive maximum protection.

4. *Desert Tortoise Habitat Areas*
Fire suppression tactics focus on protection of tortoise habitat, while minimizing impacts to the species. At present, the strategy is to conduct immediate suppression efforts.

5. *Riparian Areas*
The strategy in riparian areas is to protect habitat and species. Because protection of species is important, the use of ground and/or aerial retardants and foams are restricted.

Table 3-29. Summary of 10 year fire history.

Year	Number	BLM Acres	Other Acres
1978	75	2481	6
1979	83	2221	40
1980	136	16,070	2563
1981	146	7651	197
1982	175	14,503	1
1983	117	4074	2204
1984	119	377	75
1985	138	668	256
1986	134	211	11
1987	159	7172	884
1988	133	22,784	9350
Totals	**1,415**	**78,212**	**15,587**

(Source: BLM, Las Vegas District Office files, 1991)

6. *Mining Districts*
The nature of mining often involves use of toxic and hazardous chemicals. Special training with fire department and environmental protection agencies is necessary for personnel involved in directing suppression activities. The tactics should be a result of consideration of a "back-off and protect" policy.

7. *Air Shed Management*
Fire suppression strategies should emphasize immediate limitation of conflagrations in the Las Vegas Valley "air shed" due to the negative impact on air quality in the urban area.

8. *Special Vegetative Communities*
To protect the range of special vegetative communities, such as desert biomes with mesquite and certain cacti, fire suppression actions should be immediate in these designated areas.

The use of fire suppression equipment and techniques to the maximum design capabilities will be modified as necessary to assure impacts from suppression activities are not greater than effects from the fire. In areas or locations where special resource concerns have been identified, a resource advisor will be requested to assist the incident commander.

Socioeconomic Values

Area and Population

Las Vegas Valley, a highly developed urban area where the majority of the state's population (66 percent in 1996) resides, is the hub of Clark County and southern Nevada. According to the Nevada State Demographers Office (1997), Clark County's population was estimated at more than one million in July 1996; it is expected to more than double by the year 2010 and then to exceed 2.5 million by 2017. In recent years, estimates are that as many as 6,000 people move into the Las Vegas Valley each month, some as retirees, others for employment opportunities (Lee 1995). This in-migration pushed Clark County's population to over one million in mid-1995, and the phenomenal growth has continued. According to the Census Bureau's data for 1990 to 1996, the fastest growing U.S. city with a population over 100,000 is Henderson, and the sixth fastest growing city is Las Vegas. The

Nevada Department of Employment, Training and Rehabilitation reported, in October 1997, that the city of North Las Vegas is growing even faster than Las Vegas, but its population was not above 100,000 and was therefore not reported by the Census Bureau. One of the county's fast growing rural communities is the city of Mesquite, which has a population of 7,460 but is expected to double by year 2010. Clark County will continue to be a majority of the Nevada population over the next 20 years, assuming that current economic growth and in-migration trends continue (UNLV 1994),

Situated within Clark County are two Indian reservations (Moapa Paiute and Las Vegas). The Moapa Paiute Reservation comprises 71,961 acres off Interstate Highway 15, about 45 miles northeast of Las Vegas. Its resident population is an estimated 330 persons. The Las Vegas Tribe has 3,856 acres, incorporating two land bases, one within the Las Vegas City limits and the other about 15 miles northwest of Las Vegas, off Interstate Highway 95. The resident population of the Las Vegas Tribe is 114. The annual growth rate of both tribes is three percent (BIA 1993).

The population density in Clark County is estimated at 141 persons per square mile. The majority of that county's population resides within Las Vegas Valley. Most of the county is sparsely populated and similar in character to the rural southern portion.

Nye County, the largest in the State, is rural and sparsely populated. With an estimated population of 25,240 in 1996 (Nevada State Demographer's Office) and a total area of 18,147.2 square miles, population density for Nye County is about 1.4 persons per square mile. Federal ownership of land within Nye County totals 8,560,733 acres, or nearly 74 percent of the 11,568,558-acre land base. An estimated 700,000 acres of this public land is managed by the Las Vegas BLM Field Office.

At the end of 1996, approximately 17,000 persons lived in the southern portion of Nye County in the Las Vegas BLM District. An estimated 13,761 persons lived in Pahrump Township, a primarily residential rural community. Pahrump is the fastest growing town in Nye County and its population is projected to reach 17,091 in the year 2001. Its present annual growth is about 6 percent.

Income and Employment

Tables 3-30 and 3-31 show earnings and employment, by major industries, in 1995 for both counties. The service industries are the single most important employers and income producers for the two counties, with Federal and State Government providing the second largest source of income for Clark County, and the third most important source for Nye County. The high incidence of mining in Nye County makes mineral production that county's second most important source of income, and its third most important employer.

The predominance of service industries is explained primarily by gaming employment in Clark County. In Nye County, it is attributed to civilian employment of private firms providing contractual services to the U.S. military facilities.

Approximately 28.3 million tourists and conventioneers from all over the world came to the Las Vegas Valley in 1994, and the numbers continue to increase. Visitors are attracted by the gaming and resort industry, which has made Las Vegas one of the nation's most impressive economic growth phenomenons. In 1994, visitor expenditures provided $19.2 billion to the southern Nevada economy. The gaming and resort industry of southern Nevada, as well as the favorable tax climate, induced growth in the services, manufacturing, construction, and retail industries. In all, these industries created over 39,000 new jobs in 1994 (Lee 1995). The gaming and resort industry is undoubtedly the driving force for community and economic development in southern Nevada (Acruso 1995).

The Nye County economy is based on Federal facility employment, mining, recreation, tourist/highway travelers, and retiree income (Nye County 1993). The service industry is the number one employer and income producer in both Pahrump and Amargosa Valley. In Pahrump, the service industry is followed by the retail trade and manufacturing industries in producing income and employment. Due to its reputation as a retirement center and its close proximity to Las Vegas, Pahrump is expected to continue attracting new residents. In Amargosa Valley, the service industry is followed by mining, retail trade, and agriculture in producing income and employment (Nye County OEDP 1993). As the community nearest to the proposed Department of Energy Yucca Mountain

Repository, Amargosa Valley would receive population growth from construction and operation if that facility is authorized.

Unemployment rates, by county for December 1997 were 3.9 percent for Clark, and 3.7 percent for Nye. These rates compare very favorably with the previous year's unemployment rates of 5.1 and 4.5 percent, respectively. Both counties reported an expanding labor force and a decline in the numbers of unemployed. The Nevada Department of Employment, Training, and Rehabilitation reports that Clark County, with about 66 percent of the state's total employment, created over 80 percent of the net new jobs in the last year.

Annual per capita personal income figures for 1995 show Clark ($23,812) and Nye ($18,462) counties are below the average of $24,361 for the state's 17 counties. Clark and Nye Counties ranked 4th and 15th, respectively.

Social Setting, Attitudes, and Values

The State of Nevada is characterized as an individualistic state that affords and favors income-earning opportunities to miners, farmers, ranchers, and merchants; and more recently to those employed in the gaming entertainment, recreation, and construction industries. This assessment holds true for southern Nevada. These activities are seen as attracting individuals who wish to pursue their economic objectives relatively free from government interference (Sodin 1994). However, "water allocations,... and a significant defense establishment all suggest that the role of the government bears heavily on Nevada" (Sodin 1994).

A 1995 social research survey conducted by the University of Nevada Las Vegas revealed social attitudes and values of the southern Nevada urban and rural populations. Rural residents are less tolerant of outside influence in their lives and value personal independence, responsibility, and self-reliance. These characteristics are typical of ranchers and miners who cherish their traditional and historical lifestyles. Economic development, industrial growth, and community expansion are generally favored by both populations. However, the Las Vegas urban population recorded its need for environmental protection actions in relation to water demand, air quality, and traffic congestion. Urbanites related a higher concern than rural counterparts about wildlife and ecosystem values when recording their risk assessment for the proposed Department of Energy nuclear waste storage facility at Yucca Mountain. Dennis Sodin, a University of Nevada Las Vegas Social Science Professor, explained that rural closeness to the natural system may account for this value disparity in contrast to urbanites who yearn for the rural experience and day-to-day closeness with a more healthy ecosystem having a higher quality of life. The rural population, including Native American Reservation communities, is more concerned about urban water use, outside government control of their destinies, and intrusions into their territory. In general, Clark and Nye county populations favor growth, contingent on consideration for planned growth to support their desire for development of new and diversified employment and income opportunities. Both populations are concerned about the economics of developing their physical infrastructures to support their future community and economic growth needs.

The Las Vegas and Moapa Paiute Indian governments and tribal members have special recognition from the Federal government concerning their land, cultural, and economic resources. Another tribe, The Mojave (situated on the Colorado River in the vicinity of Northern Arizona, Southern Nevada, and California borders) lays claim to the Spirit Mountain Area. This area, known as the Newberry Mountain Range, is approximately 15 miles south of Searchlight, Nevada. The tribe's claim is based on their traditional and historic cultural relationship with The Mountain.

Secretarial Order 3175 detailed the Department of the Interior's responsibility to maintain a government-to-government relationship to fulfill its legal obligations to identify, protect, and conserve the land, cultural, and economic resources of Federally recognized Indian tribes and tribal members. Consideration must be given whenever land use plans, activities or actions affect tribal trust resources, trust assets, or tribal health and safety. In addition, Executive Order 12898 underscores the BLM's responsibility to consider whether its program policies and activities have a disproportionally high and adverse effect on the health or environment of minority and low-income populations (Rivers-Council 1995).

Clark County Desert Conservation Plan

In July 1995, Clark County entered into a long-term agreement with the U.S. Fish and Wildlife Service and other Federal agencies (including BLM), as well as State and municipal agencies, for a Desert Tortoise Habitat Conservation Plan. This plan is officially known as the *Clark County Desert Conservation Plan*. The plan's purpose is to establish rules, policies, and procedures that permit continued development in Clark County, while providing extensive measures to minimize and mitigate impacts that might result from incidental taking of desert tortoise.

The Habitat Conservation Plan imposes a $550 per acre mitigation fee on all land disturbed within Clark County below 5,000 feet in elevation, which is subject to permitting requirements of Clark County and the cooperating municipalities. These fees provide a fund for mitigation of impacts on desert tortoise habitat. The Habitat Conservation Plan further provides for Clark County to negotiate with individuals for purchase and exchange of grazing privileges to offset developed land and to achieve conservation objectives.

Affected Sectors

Livestock Grazing

Livestock-oriented agriculture and mining are the major basic industries to be affected by management proposals. Future livestock grazing and mining activities will be affected by decisions providing constraints and prescriptions to protect wildlife, principally in desert tortoise habitats identified in the BLM's proposed Areas of Critical Environmental Concern, which closely coincide with the U.S. Fish and Wildlife Service's designated critical habitat for desert tortoise. Any grazing or mining activities proposed within desert tortoise habitat areas will require Section 7 consultation.

Land disposal proposals and rights-of-way corridors, which may also be constrained by the proposed Areas of Critical Environmental Concern, will be subject to Section 7 consultation. There is need to mediate the conflict between the demand for inexpensive and accessible sources of sand and gravel for the construction industry, and the encroachment on those sources by the rapidly expanding development of housing and light industry within the Las Vegas Valley.

Agriculture

Agricultural production in the planning area consists of cattle, sheep, alfalfa, hay, and cotton. Livestock predominates. Cash receipts from marketings in 1995 totaled $20.1 million in Clark County, including $18.1 million from livestock and livestock products and the remainder from crops. Total farm labor and proprietors income for Clark County is estimated at $3.2 million. Nye County cash receipts from agriculture totaled $13.2 million in 1995, with the majority ($9.1 million) from livestock and livestock products and the remainder from crops.

Regionally, however, agricultural production in Clark and Nye counties is not considered significant. Agriculture accounts for less than one-tenth of one percent of total income and employment in Clark County, and 0.9 percent of income and 1.9 percent of employment in Nye County. Within the planning area, agriculture contributes little indirect income to either Clark or Nye counties because most, if not all, farm and ranch inputs are purchased outside the counties, in St. George, Utah, or Bishop, California.

Though of little or no economic significance, the viability and success of the livestock grazing industry remains linked to public lands because livestock operators continue to hold a strong commitment to their traditions and lifestyle. In 1990, livestock used an average of 22,600 animal unit months in the planning area. In the last five years, however, the average dropped by more than half to 10,037 animal unit months with only 13 permittees remaining in active grazing use on public lands. This decrease is attributed to poor forage production on ephemeral range, listing of the Desert Tortoise, and transactions associated with the Clark County Habitat Conservation Plan. Although typical ranch budgets are difficult to determine for various reasons (including the area's diversity, differences in individual operations, forage seasons, and high dependence on ephemeral range), the net ranch income is estimated at $4.77 per animal unit month.

Historically, the economic benefits that area ranchers received from using public range exceeded assessed fees. This market imbalance or "consumer surplus" inferred that ranchers were willing to pay

extra for the opportunity to use public lands, thereby causing grazing permits to acquire a market value (Vale 1979, Neilson and Workman 1971). The permits can either be bought or sold in the market place, or used as collateral for loans (Corbett 1978). Although not officially recognized as real property, BLM permits have nonetheless become an integral element in the capital and credit structure of area ranchers. Currently, the market value of Federal animal unit months ranges from $25 to $60 per animal unit month. Recent appraisals by Pacific Agribusiness Service for the Clark County Habitat Conservation Plan estimated the values for several of these operations at about $45 per animal unit month. Assuming this value, BLM grazing licenses (which have averaged 10,037 animal unit months in the affected area) contribute close to half a million dollars ($451,665) to the wealth of area ranchers.

Mining

Mining is an important industry in the Nye County economy, providing the county's third largest source of employment and its second most important source of income. In 1995, mining in Nye County provided 1,376 jobs (almost 13 percent of the county's total), which generated total earnings of $64 million (almost 18 percent of all earnings in the county).

In Clark County, mining provided 1,189 jobs (0.2 percent of county employment) and produced $25.2 million in earnings (0.2 percent of total county income).

The BLM geologists estimate that 95 percent of the mining activity from BLM-administered lands in the two counties occurs in that portion on Nye County outside of the Las Vegas District and that mining production and income comes primarily from patented mining claims. There has been very low production from BLM-administered lands in Clark County in the last 30 years, except for sand, gravel, and silt. Public lands in the resource area continue to provide important and economic material sources for sand, gravel, and silt, in support of the construction industry. However, due to the very growth and development they have supported, the sand and gravel operations are conflicting both economically and environmentally with air quality and aesthetics.

The encroachment of new construction (including residential developments) on material site locations necessitates locating alternative and economic sources for sand, gravel, and silt. An important cost consideration in doing so is haul costs. There will be a continuing need by the construction industry for inexpensive and accessible sources of sand and gravel close to housing and business facility development opportunities.

Lands

Potential changes in the amount of public compared to private lands could affect both the tax base and BLM payments to the counties in lieu of property taxes.

Release of BLM-administered land for disposal by sale, exchange, or lease, and any resulting development will put further demands on existing public infrastructure. Such disposals will have a cumulative impact on rural ecosystems, water availability, and air quality in relation to housing, community, and industrial development opportunities. Land use planning offices of Clark and Nye counties, including unincorporated cities and utility companies, will be tasked as always to provide appropriate infrastructure.

Rights-of-Way Corridors

Designation of additional corridors will enable more efficient planning of future energy, communication, and transportation facilities. A lack of designated corridors sustains high planning costs to utility companies and results in longer processing time for right-of-way applications. Such additional costs translate into higher costs to the consumer.

Recreation

Expenditures for recreation in the planning area contribute to the regional economy through the purchase of lodging, services, equipment, fuel, and food. Public land resources associated with recreation and affected by this plan include wildlife, wild horses and burros, wilderness, lands, and riparian areas.

Formal off-highway vehicle events on public lands provide substantial economic benefits to the local economy. These activities include the Nissan 400, Nevada 500, and Gold Coast 300, among others. Additional events, such as motorcycle racing and

Radio Controlled Aircraft activities, generate further expenditures and income. The recreation staff of BLM's Las Vegas Field Office, in consultation with the Off-Road Vehicle Association and other recreational organizations, estimates that the associated income produced by these various recreation events is between $76.6 and $114.9 million per year.

Section 7 Consultation Costs

Section 7 of the Endangered Species Act of 1973 requires Federal agencies to consult with the U.S. Fish and Wildlife Service on actions that may jeopardize a threatened or endangered species, or destroy or adversely modify critical habitat.

Section 7 directs agencies to submit to the U.S. Fish and Wildlife Service a complete description of any proposed action and their anticipated effects (biological assessment). The U.S. Fish and Wildlife Service then has up to 135 days (with an additional 60-day extension, when necessary) to review the proposal and prepare a biological opinion, which may enable the project to go forward and, in some cases, provide for incidental take of the subject species, while providing certain conditions of operation, or modification of plans, or means to mitigate adverse effects.

Private individuals, companies, or corporations are frequently the proponents of projects or proposals to utilize the public lands for such uses as minerals developments, land exchanges or transfers, and utility corridors. The Federal agency is responsible for initiating the proposed action to prepare the description of the action and the anticipated effects (the biological assessment). However, as is the case for the Bureau of Land Management, the Federal agency oftentimes lacks sufficient staff or funding to process a private party request in a sufficiently timely manner to meet needs of the project proponent. In such cases, the project proponent may prepare the biological assessment under BLM's direction to facilitate initiation of the required consultation and expedite scheduling.

These documents may be quite simple or very complex, depending upon the nature and extent of the proposed public land use and the species involved. Private individuals sometimes hire a consultant or consult an attorney to guide them through the process. Large companies or corporations often employ an Environmental Coordinator or a Project Manager on a permanent full-time basis for just these types of activities. If the proposed project is quite extensive, a third party Environmental Consulting firm may be employed to undertake the necessary studies and documentation.

The costs of Section 7 consultation may be quite variable due to the various cost factors, including the nature of the project, biological requirements of the species, extent of analytical detail required, and time and expertise employed in preparing the analysis and documentation. Additional costs could be incurred for any additional mitigation measures required to ameliorate potential effects on the species or for any delays imposed on initiating project development.

At the present time, Section 7 consultation is required throughout the area covered by this Plan. The establishment of a framework for land-use proposals and management decisions, which is the purpose of the Plan, will provide sufficient guidelines to effectively focus potential land-use proposals and ameliorate or reduce Section 7 consultation and mitigation costs.

Environmental Justice

Executive Order 122898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* requires that Federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects that impact low-income and minority populations as a result of Federal programs, policies, or activities. Demographic analysis is the first step in this determination. Such analysis includes defining the region of influence, census block groups, low-income populations, minority communities, and the thresholds for calculating a low-income or minority community census block group (USDOE 1996: 4-0223). Minority communities are identified by the four racial classifications recognized by the U.S. Bureau of the Census (White; Black; American Indian, Eskimo or Aleut; and Asian or Pacific Islander). Hispanic is considered to be an origin, rather than a racial classification by the U.S. Bureau of the Census.

The Plan addresses management action for public lands in Clark and Nye counties, the two counties comprising the region of influence for this Plan and Environmental Impact Statement. Census block

Table 3-30. Clark and Nye Counties, 1995 Earnings by Major Industries.

EARNINGS BY MAJOR INDUSTRY ($1,000)				
INDUSTRY	CLARK CO.	PERCENT	NYE COUNTY	PERCENT
Agriculture	3,254	0.0	3,350	0.9
Agricultural Services	107,351	0.6	447	0.1
Mining	25,214	0.2	64,036	17.6
Construction	1,885,528	10.4	11,327	3.1
Manufacturing	543,511	3.3	3,128	0.9
Transportation & Public Utilities	1,047,864	5.8	10,463	2.9
Wholesale Trade	687,547	3.8	2,368	0.6
Retail Trade	1,758,058	9.7	18,539	5.1
Finance, Insurance & Real Estate	1,120,117	6.2	6,271	1.7
Services	8,688,453	48.0	197,492	54.3
Government	2,176,439	12.0	46,503	12.8
TOTAL	18,093,336	100.0	363,924	100.0

Earnings include wages and salaries, other labor income, and proprietor income. Earnings represent the principle component of total income which is further comprised of dividends, interest, rent and transfer payments, less personal contributions for social insurance.

(Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, August 1997).

groups are defined as clusters of blocks within the same census tract. The census block groups do not cross county or census tract boundaries and generally are comprised of between 250 and 550 housing units (U.S. Bureau of the Census 1993; USDOE 1996: 4-223). For analytic purposes, low-income populations are defined as individuals living within a census block group whose income is below the poverty level. Households are classified as being below the poverty level if the total family income or unrelated individual income is less than the poverty threshold specified for the applicable family size (Ibid). As an example, the weighted average threshold for a 4-person family was $12,674 for the 1990 census (U.S. Bureau of the Census 1994). Percentages of low-income and minority communities can be calculated within each census block group, using thresholds developed to avoid biasing the designation of poverty areas.

No low-income or minority populations have been identified to experience disproportionately high and adverse human health or environmental effects as a result of this Plan.

Table 3-31. Clark and Nye Counties, 1995 Employment by Major Industries.

EMPLOYMENT BY MAJOR INDUSTRY

INDUSTRY	CLARK CO.	PERCENT	NYE COUNTY	PERCENT
Agriculture	302	0.0	209	1.9
Agricultural Services	5,996	1.0	90	0.8
Mining	1,189	0.2	1,376	12.7
Construction	52,437	8.6	493	4.6
Manufacturing	17,832	2.9	218	2.0
Transportation & Public Utilities	28,614	4.7	269	2.5
Wholesale Trade	18,743	3.1	91	0.9
Retail Trade	96,320	15.8	1,086	10.0
Finance, Insurance & Real Estate	43,200	7.1	435	4.0
Services	282,746	46.4	5,102	47.1
Government	62,305	10.2	1,456	13.5
TOTAL	609,684	100.0	10,825	100.0

(Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, August 1997).

Chapter 4 - Environmental Consequences

Introduction

This chapter is organized into four sections. The first part assesses the anticipated physical, biological, social, and economic consequences of implementing the Proposed Resource Management Plan/Final Environmental Impact Statement, hereafter known as The Plan, as described in Chapter 2. The second part analyzes the cumulative effects from The Plan implementation on both BLM, other public, and private lands. Certain impacts are considered unavoidable and are discussed by resource in the third part. The final part addresses the irreversible and irretrievable commitment of specific resources, and short-term uses and long-term productivity. The guidelines and assumptions for analysis are discussed below.

Analysis Guidelines

The baseline for comparing impacts is the No Action Alternative, which represents a continuation of the existing management situation. Impacts expected to occur by 2018 that are identified for The Plan are compared to this baseline. The analysis of environmental consequences includes identification and discussion of long-term, short-term, direct, indirect, and cumulative impacts. Unavoidable, irreversible, and irretrievable impacts, as well as the relationship between short-term uses and long-term productivity, are identified at the end of this chapter.

Assumptions for Analysis

An interdisciplinary approach was used to analyze the environmental consequences. The following general assumptions were applied:

- Funding and staffing will be adequate to fully implement all management actions associated with each alternative.
- Any Resource Management Plan recommendations requiring authorization beyond the level of the Division Chief , District Manager, or State Director will be accepted and implemented. For example, Resource Management Plan recommendations for establishing new withdrawals in excess of 5,000 acres will be favorably acted upon by the Secretary of the Interior and Congressional concurrence will be obtained.
- The effective life of The Plan is anticipated to be 20 years.
- Short-term impacts are those that would occur within five years of implementation of any given management action. Long-term impacts are those that would occur between 5 and 20 years or longer after implementation of an action.
- Impacts are considered to be direct, unless otherwise indicated.
- In some cases, minor impacts are presented to better illustrate the scope and effect of a management action.
- Most public lands identified as available for disposal would not go into private ownership. Those lands encumbered by other Federal actions, mining claims, or economic constraints could remain in Federal ownership.
- Any Resource Management Plan decisions that would affect a Wilderness Study Area and result in non-compliance with the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* would not be implemented unless or until Congress releases any Wilderness Study Areas from further consideration for designation as wilderness.
- Site-specific reviews would be conducted for: specific livestock range improvement projects; wild horse and burro habitat enhancement projects; wildlife habitat enhancement projects; recreation facility construction projects; off-road vehicle events not in conformance with stipulations and limitations included herein and in Appendix J; issuance of rights-of-way and other land use authorizations and leases; disposal of specific public lands; plans of operation for 43 CFR 3802 and 3809 actions; applications for permit to drill (APD); and mine plans for sand and gravel extraction. These reviews will generally result in preparation of administrative determinations,

categorical exclusions, environmental assessments (EAs), or environmental impact statements (EISs).

- Acreage figures and other numbers used in this analysis are approximate projections for comparison and analytic purposes only. Readers should not infer that they reflect exact measurements or precise calculations.

- The discussion of impacts is based on the best available data. Knowledge of the planning area and professional judgement, based on observation and analysis of conditions and responses in similar areas, were used to infer environmental impacts where data is limited.

- The definition of impacts to cultural resources has a conceptual range from maximum to minimum disturbance. The maximum concept states that the qualities that give a site its eligibility potential must be destroyed to constitute an impact. Even in such a case, adverse impacts can be mitigated through consultation under Section 106. For example, casual collection of a few artifacts on the surface within an aboriginally used shelter that possesses a meter of stratigraphic deposition would not affect the eligibility potential for yielding important data that can add to the knowledge of regional prehistory. If the shelter would be destroyed through permitting a Federal action, then a data recovery plan would mitigate those adverse affects.

- The minimal point of view states that any change to a cultural resource, no matter how seemingly small, as a consequence of human actions constitutes an affect. For instance, when an archeological property is discovered by people, a cycle of impacts is initiated. These impacts may simply consist of disturbing spiritual or cultural values considered by Native Americans or other interested parties as belonging to the objects, features, or the surrounding area. The impact may also include removing artifacts and in so doing dismembering the cultural property. Conducting a data recovery of the artifacts, charcoal samples, and biological materials at the shelter site proposed for destruction would not mitigate the adverse affects, but merely attempt to reduce the degree of impact. Section 106 consultation provides professional guidance in salvaging a sample of physical items, but does not erase the fact that the site has been destroyed.

The assessment of impacts for cultural resources in this plan assumes a minimal concept of disturbance.

A cycle of impacts begins after a site is changed by removal or disturbance as a consequence of the evaluation or disposal phase involved in processing a Federal action. The only situation where impacts are considered positive are those that provide direct benefits through preservation and stabilization. All other changes are considered to be negative effects or impacts. Significant impacts are those where an action or a group of similar actions resulting from an environmental policy, such as processing and approving all Plans of Operations within Las Vegas BLM District for the life of the plan, affecting a relatively large number of eligible cultural resource properties. This assessment was determined through the professional judgement of the cultural resource manager.

Assessment of the Physical, Biological, Social and Economic Consequences

The anticipated physical, biological, social, and economic consequences of implementing The Plan are described for individual resources. The discussion of the environmental consequences is in proportion to the effect of the anticipated impacts. When a determination indicated that an in-depth analysis of a resource or resource use was unnecessary, that resource was not addressed. For example, no impacts in the Forestry program were determined to be significant. Mitigation measures designed to avoid or reduce the degree of anticipated impacts are incorporated, where appropriate, into management directions in the proposed action. A good example is, keep permitted events 0.25 mile away from artificial and natural water sources.

Air Resource Management

The air resource would be impacted by improving watershed conditions. The improvement of approximately 96,994 acres of soil with a critical erosion condition and 37,670 acres with a moderate erosion condition and high erosion susceptibility would reduce the ability of wind to move soil and produce airborne particulates.

From Vegetation Management
Actions to maintain or improve the condition of vegetation on 3,331,895 acres to a Desired Plant Community or to Potential Natural Community would improve protective ground cover and soil holding capability. Soil erosion resulting in windblown particulates would be reduced.

From Lands Management
Air resources within the Las Vegas Valley Non-Attainment Area have been degraded by pollutant levels, primarily particulates (PM_{10}) and carbon monoxide (CO), which are in excess of National Ambient Air Quality Standards (NAAQS). Air quality in the remainder of the planning area is acceptable, meaning that pollutant levels are less than or equal to established standards on a continuous basis.

Within the Las Vegas Valley, approximately 25,540 acres would be disposed over the next 20 years to provide for orderly expansion, development, and public services. Land disposals would indirectly impact the air resource by providing land that may be developed resulting from an increased growth rate within the valley. Pollutant sources and emissions are expected to increase along with the increased rate of population growth. An estimated increase of 243 tons per year in airborne PM_{10} (particles less than 10 microns in size) particulate emissions would result from subsequent development of disposed lands. Because it is unlikely that all disposed lands will be developed, the actual increase in PM_{10} would be somewhat less than that indicated. The production figure is based on an annual disposal rate of 1,277 acres over the life of the Resource Management Plan (20 years) and an average PM_{10} production figure of 0.19 tons per acre per year (calculated from current acres of development and PM_{10} emissions in the valley). After construction activities on a given site are completed, PM_{10} resulting from these activities will generally diminish. PM_{10} emissions resulting from sources other than construction activities would continue to increase proportionately with continued land development.

Carbon monoxide levels would be expected to rise, along with increases in the population and the number of vehicles (the two primary sources of carbon monoxide in the valley). Based on the annual disposal acreage and an average carbon monoxide production of 1.37 tons per acre per year (calculated the same as PM_{10}) from all sources, the expected increase of carbon monoxide would be 1,750 tons per year.

Increases would also be expected in volatile organic compounds (VOC), oxides of nitrogen (NO_X) and sulfur dioxide (SO_2). Based on an average production of 0.29 tons/acre/year of VOC, 0.29 tons/acre/year of NO_X and 0.008 tons/acre/year of SO_2, the estimated increase would be 370, 370, and 10.2 tons/year, respectively. The Las Vegas BLM Field Office Hazardous Materials Incident Contingency Plan will be followed in the event of a hazardous materials incident where a toxic air plume is emitted. This includes appropriate coordination with the Local Emergency Planning Committee (LEPC).

Although an increase in visibility impairing pollutants would be expected, the actual impact on visibility is not known. Currently, there is no definitive information indicating that pollutants generated in the Las Vegas Valley are impacting downwind Class I receptors such as the Grand Canyon. A description of Federal Class I areas can be found in Chapter 3 under Air Resource Management.

From Recreation Management
Air resource management would be enhanced by limiting future off-road vehicle activity to existing roads and trails within 99.9% of the planning area. Under this plan, future competitive off-road activities are restricted to existing courses so the acres of disturbance is not expected to increase beyond the existing 3,325 acres of disturbance inventoried (courses, pit/staging areas, roads/trails and washes). Competitive off-road vehicle activity has the potential to produce airborne particulate matter (PM_{10}), especially if events are conducted in areas where soils are susceptible to erosion. It is unknown how much of the existing 3,325 acres of disturbance is actually located within areas containing susceptible soils.

Continued surface disturbance would leave soils vulnerable to wind erosion, resulting in wind-blown dust production in these areas. With the exception of the Nellis Sand dunes Open Use Area, competitive off-road events would no longer be allowed within the Las Vegas Valley Non-Attainment Area, where windblown dust is a concern and levels of PM_{10} already exceed National Ambient Air Quality Standards (NAAQS).

Under this plan, the only events allowed within the Las Vegas Valley are those that occur at Nellis Dunes located at the northeast, downwind, boundary of the

Non-Attainment Area. Dust generated from off-road vehicle activities at this location is not expected to impact the valley. Events held upwind of the valley would potentially contribute to short-term degradation of Las Vegas Valley's air quality if the wind blew dust into the valley. Compliance with local regulatory agencies permitting requirements would help minimize impacts to the air resource and ensure conformity with the State Implementation for PM_{10} and CO.

From Wilderness Management
Wilderness designation would eliminate the potential for surface disturbance on lands susceptible to erosion. If the acreage recommended for wilderness designation is approved by Congress, 7,424 acres in critical erosion condition would be protected under the restrictions of a Wilderness Area. The remaining Wilderness Study Areas acres with a critical erosion condition (24,754 acres) and all of the areas containing soil highly susceptible to erosion would be protected from Off-Road vehicle impact due to the limits on vehicles use to existing/designated roads. Since no roads exist in Wilderness Study Areas currently, no new Off-Road vehicle use would be possible.

From Minerals Management
Mineral exploration has the potential to produce short-term impacts to the air resource through temporary generation of airborne particulates (PM_{10}). Impacts resulting from PM_{10} generated from mineral development (approximately 1,461 acres currently disturbed) would be generally long-term in nature lasting through the life of the various mineral operations. This is particularly true within areas with highly (17,499 acres) and moderately (126,040 acres) susceptible soils, and the Las Vegas Valley Non-Attainment Area.

Within the Las Vegas Valley, the primary mineral activity is sand and gravel operations. Based on information provided by the Clark County Health District, sand and gravel operations are responsible for the production of approximately 743 tons of PM_{10} annually. During the life of the Resource Management Plan, it is estimated that there would be no appreciable change from what currently exists in the acreage that would be in sand and gravel production at any given time. Under this plan, the only area having sand and gravel operations would be the Salt Lake Community Pit located in the northeast and downwind portion of the Non-Attainment Area. This limitation should aid in reducing the impact of PM_{10} emissions on the Non-Attainment Area from this source category.

From Fire Management
Wildfire suppression efforts would result in reduced particulate (PM_{10}) production and visibility impairment from smoke and windblown dust. This is especially of benefit within and upwind from the Las Vegas Valley Non-attainment Area, which currently has PM_{10} levels in excess of National Ambient Air Quality Standards. Wildfire suppression efforts would potentially result in a short-term increase in windblown dust due to surface disturbance by fire fighting equipment and operations. However, successful suppression efforts would minimize the number of acres impacted as a result of vegetative cover loss.

Following fire suppression, the successful implementation of the Las Vegas District Normal Fire Rehabilitation Plan would minimize the period during which soils would be vulnerable to increased wind erosion and windblown dust due to reduced vegetative cover. See the Soil Resource Management (from Fire Management) section of this Chapter for a description of the Normal Fire Rehabilitation Plan.

Use of prescribed burns as a vegetative manipulation tool could result in an increase in airborne particulate matter (smoke and dust). As with wildfires, given proper meteorological conditions, prescribed burns could impact the Las Vegas Valley Non-Attainment Area if they occur within or upwind of the valley. Although particulate emissions would be expected to increase and visibility decrease, this impact would be short-term in duration. Currently, there is no data available indicating PM_{10} contributions from fires occurring on vacant land. Proper timing (best meteorological conditions) and compliance with local regulatory agencies permitting requirements would help to minimize impacts to the air resource resulting from prescribed burns.

From Hazardous Materials
The air resource would be impacted from an incident where a toxic air plume is emitted. In the event a toxic air plume does pollute the air resource, proposed actions taken would minimize the impact and ensure that air quality is maintained or restored to protective levels as prescribed under regulatory requirements.

Soils Resource Management

From Riparian Management
A reduction in soil loss would be expected with the improvement of spring-associated riparian areas and those associated with perennial streams to proper functioning condition (PFC). The reduction would result from better vegetative cover on riparian meadows and on streambanks.

From Vegetation Management
Actions to maintain or improve the condition of vegetation on 3,331,895 acres to a Desired Plant Community or to Potential Natural Community would improve protective ground cover and soil holding capability. Soil erosion and loss would be minimized through the dissipation of energy associated with stormwater runoff.

From Areas of Critical Environmental Concern
The proposed plan designates 23 Areas of Critical Environmental Concern (approximately 1,005,031 acres) in which livestock grazing, wild horse and burro use, and competitive off-road vehicle use would not be allowed and mineral activities would be intensively managed. These restrictions would improve protective ground cover and soil holding capability. Soil erosion and loss would be minimized through the dissipation of energy associated with stormwater runoff. See the specific discussions above for estimated soil losses attributable to livestock grazing, wild horse and burro use, off-road vehicle use, and mineral activities.

From Fish and Wildlife Habitat Management
Designation of 743,209 acres as Areas of Critical Environmental Concern for recovery of the desert tortoise would place restrictions on livestock grazing, wild horse and burro use, off-road vehicle use, and mineral activities. Within the boundaries of the Areas of Critical Environmental Concern, 27,735 acres of soil that are highly susceptible and 420,195 acres of soil that are moderately susceptible to erosion would be protected from the previously referenced soil-disturbing activities and resultant potential soil loss. See the specific discussions below for estimated soil losses attributable to livestock grazing, wild horse and burro use, off-road vehicle use, and mineral activities.

From Livestock Grazing Management
Livestock grazing impacts the soil resource primarily through reduction of vegetative and litter cover that protects the soil from erosional processes and, to some degree, soil compaction that channels and concentrates storm water runoff. There are 22,728 acres of soil highly susceptible and 288,229 acres of soil moderately susceptible to erosion within those allotments remaining open to livestock grazing (Table 3-4). Of this, there are only 7,268 acres of soil highly susceptible and 61,969 acres of soil moderately susceptible to erosion within the areas actually utilized by livestock. Although within the estimated boundary of cattle utilization, all this acreage is not actually visited by livestock and is therefore not directly impacted through their activity. The actual extent of disturbance is not known at this time; therefore, the soil loss figures presented below should be considered as a worst case. Although based on a worst case, soil losses are minimal when compared to that occurring naturally.

Under this plan, 11 of the 53 allotments within the planning area would be open to all livestock grazing. Soil resources in allotments closed to grazing would improve through preservation of vegetative cover and resultant decrease in erosion and soil loss. Table 4-1 lists the active allotments remaining open with estimated potential soil loss (tons/year), both natural and that expected as a result of continued livestock grazing. Table 3-6 presents soil loss estimates from all allotments within the planning area. An explanation of soil loss calculations can be found in Chapter 3.

The estimated potential soil loss of 224 tons per year (4480 tons over 20 years) from those allotments remaining open is less than any other alternative. The savings results in 966 tons per year (19,320 tons over 20 years), which is less soil loss than if all 53 allotments remained open.

From Wild Horse and Burro Management
Wild horse and burro grazing, as with livestock grazing, impacts the soil resource primarily through the reduction of vegetative and litter cover that protects the soil from erosional processes and, to some degree, soil compaction that channels and concentrates storm water runoff. There are 138,646 acres of soil moderately susceptible to erosion (Table 3-4) within the existing Herd Management Areas. Of this, there are approximately 26,774 acres of soil moderately susceptible to erosion within the areas actually utilized by wild horses and burros. Although within the estimated boundary of utilization, all of this soil is not actually visited by horses and burros and is therefore not directly impacted through disturbance from their presence. The actual extent of disturbance is not known at this time; therefore, the soil loss

Table 4-1. Soil Losses Within Grazing Allotments.

Allotment	Natural Soil Loss	Soil Loss Due to Grazing
Arrow Canyon	194	0
Flat Top Mesa	705	0
Hidden Valley	9,798	20
Jean Lake	40,362	89
Lower Mormon Mesa	4,829	0
Mesa Cliff	1,879	6
Mount Stirling	6,129	0
Muddy River	506	0
Ronch Lake	1,882	0
Wheeler Wash	78,746	102
White Basin	3,238	7
Total	**148,268**	**224**

figures presented below should be considered as a worst case. Although based on a worst case, the soil losses are minimal when compared to that which occurs naturally.

Under this plan, three of the six Herd Management Areas within the planning area would have an Appropriate Management Level of 0 established. Soil resources within the Herd Management Areas managed at 0 Appropriate Management Level would improve through the preservation of vegetative cover and resultant decrease in erosion and soil loss. Table 4-2 lists the remaining active Herd Management Areas, including the natural and estimated potential soil losses (tons/year) occurring at present from horses and burro. Also included is the expected soil loss that will occur at the Appropriate Management Level. Table 3-6 presents soil loss estimates from all the Herd Management Areas within the planning area. An explanation of soil loss calculations can be found in Chapter 3.

The expected estimated soil loss of 0 ton per year attributable to horses and burro use at the Appropriate Management Level under this plan would result in a reduction of 113 tons per year (2,260 tons over 20 years) if animal numbers remained at current levels.

From Recreation Management
Since competitive off-road vehicle activity would only occur in previously disturbed areas, the soil resource is expected to benefit through the preservation of areas presently undisturbed. Soil losses resulting from continued use of previously disturbed areas are expected to be approximately 2,650 tons per year, for a total soil loss over the life of the Resource Management Plan (20 years) of 53,000 tons.

Actual impact to the soil resource from casual off-road vehicle use is not known. However, when considering the increasing population in southern Nevada, that activity would proportionately increase. Under this plan, limiting off-road vehicle activity to existing roads and trails would benefit the soil resource through the prevention of new disturbance and potential soil loss.

Soil surface disturbance due to off-road vehicle activity, on existing roads/trails and off-road, would leave soils vulnerable to both water and wind erosion. Off-road vehicle use, both competitive and casual, has potential to impact the soil resource, particularly if the activity occurs within areas with highly susceptible soils. It is unknown at this time how much of the existing 3,325 acres of disturbance is actually located within areas containing susceptible soils. The actual extent of disturbance, however, will be limited because use will be restricted to existing courses, pit/staging areas, roads/trails and washes (approximately 3,325 acres).

From Wilderness Management
Wilderness designation would eliminate the potential for surface disturbance on lands susceptible to erosion. If the acreage recommended for wilderness designation is approved by Congress, 7,424 acres in critical erosion condition would be protected under the restrictions of a Wilderness Area. The remaining Wilderness Study Area acres with a critical erosion condition (24,754 acres) and all of the areas containing soil highly susceptible to erosion would be protected from off-road vehicle impact due to the limits on vehicles use to existing/designated roads. Since no roads exist in Wilderness Study Areas currently, no new off-road vehicle use would be possible.

From Minerals Management
Impacts to the soil resource from mineral exploration and development are both short term and long term in nature. With proper mitigation and reclamation, mineral exploration activities would not impact the soils in the short term. Mineral development would be a long-term impact to soils if mitigation measures and reclamation are unsuccessful. The arid vegetation communities are not readily amenable to standard

Table 4-2. Soil Losses Within Herd Management Areas.

Herd Management Area	Natural Soil Loss	Soil Loss Due to WH&B (at AML)
Gold Butte	87,588	113(0)
Johnnie	27,436	0(0)
Muddy Mountains	14,207	0(0)
Total	**129,231**	**113(0)**

rehabilitation efforts as a result of the low precipitation in the planning area. Even after abandonment of mineral developments, accelerated soil erosion may continue.

Fluid mineral activities could create impacts, primarily associated with road travel and drill pad construction. Because little activity of this type occurs within the Las Vegas BLM District, no increases are anticipated. Locatable minerals, mineral material sales, and non-energy leasable activities could result in soil erosion impacts. Soil disturbance could result from both mineral exploration and development activities, including access and haul road construction, stockpiling of topsoil, and pit construction. Areas with soils susceptible to erosion would be particularly vulnerable. Under this plan, 41,649 acres of soil highly susceptible and 511,796 acres of soil moderately susceptible to erosion would be open to mineral activity. Currently, there are approximately 1,461 acres of disturbance associated with mineral activities. This is not expected to increase and may actually decrease somewhat. Considering the disturbed acreage, the estimated soil loss expected would be 1,164 tons per year, for a total of 23,280 tons over the life of the Resource Management Plan (20 years).

From Hazardous Materials Management
The soil resource would be impacted through hazardous materials entering the environment and potentially contaminating soils, thereby reducing soil productivity. In the event these materials do contaminate the soil resource, the soil would likely be removed for treatment and/or disposal. This would result in a loss of productivity of the impacted soil, but would protect nearby soils from damage.

From Fire Management
Wildfire suppression efforts would potentially result in a short-term increase in erosion and soil loss due to surface disturbance by fire fighting equipment and operations. However, successful suppression efforts would minimize the number of acres impacted as a result of vegetative cover loss. Following fire suppression, the successful implementation of the Las Vegas BLM District Normal Fire Rehabilitation Plan would minimize the period during that soils would be exposed to increased wind and water erosion. The period would be reduced by re-establishing a vegetative cover and implementing other erosion prevention measures immediately following a fire.

The purpose of the Normal Fire Rehabilitation Plan is to expedite the emergency fire rehabilitation process for the completion of emergency land treatments, on public land, that are consistent with the urgent nature of fire rehabilitation. The objective of emergency fire rehabilitation is to implement a combination of planned actions in a time frame necessary to reduce watershed degradation as a result of wildfires. The outcome of these actions will be to minimize:

- Damage to property, on and off site, from increased runoff and sediment yields.
- Loss of water control and deterioration of water quality.
- Loss of watershed cover (vegetation).
- Loss of soil and on-site productivity.
- Invasion of burned areas by highly flammable plants and noxious weeds.
- Loss of wildlife habitat.

The use of prescribed burns as a vegetative manipulation tool could result in a short-term increase in wind and water erosion. In the long-term, the improved vegetative cover gained would be expected to reduce the potential for erosion.

Water Resources

From Soil Resource Management
Erosion, soil loss ,and resultant sediment production would be expected to decrease as a result of a decrease in surface-disturbing activities. There would be soil losses as a result of actions imposed under this plan to livestock grazing, wild horse and burro use, off-road vehicle use, and mineral exploration and development . These activities are expected to result in approximately 80,760 tons of soil loss over the 20-year life of the Resource Management Plan. This is 21,580 tons less than that

estimated under current management (102,340 tons). Regardless of what actions occur on lands other than public, actions taken under this plan would result in a net improvement to the soil resource and resultant water quality.

From Riparian Management
Riparian areas would be managed to improve where practical or to maintain these areas in proper functioning condition (PFC). Proper functioning riparian areas would result in improved water quality. Improvement would result through streambank stabilization, sediment reduction, decreased water temperatures, moderation of peak flows, and the stabilization of base flows. Also, water quality is expected to improve as a result of protecting the 29 springs in the 11 allotments remaining open to livestock grazing and the 3 Herd Management Areas containing horses and burro. Prohibiting competitive off-road vehicle activity within 0.25 mile of a water source would protect water resources from potential direct impacts (such as sedimentation).

From Vegetation Management
Actions to maintain or improve the condition of vegetation on 3,331,895 acres to a Desired Plant Community or to Potential Natural Community would improve protective ground cover and soil holding capability. Vegetation is a key component of a healthy watershed and as a result of improved dissipation of energy associated with stormwater runoff, erosion, and soil loss would be minimized improving water quality.,An improvement in water quantity would be expected through better floodwater retention and groundwater recharge.

From Areas of Critical Environmental Concern
The proposed plan designates 1,005,031 acres of Areas of Critical Environmental Concern. On these areas livestock grazing, wild horse and burro use (except for Gold Butte Part B, 119,097 acres), and competitive off-road vehicle use would not be allowed and mineral activities would be intensively managed. These restrictions are expected to reduce contaminants (such as sediments and coliform) entering the 106 springs and 1.7 miles of perennial streams within their boundaries.

The elimination of livestock, wild horse and burro grazing would improve vegetative condition and consequently result in better protective ground cover and soil-holding capability. Erosion and soil loss would be reduced and water quality improved as a result of better dissipation of energy that is associated with stormwater runoff. Improved water quantity would be expected through better floodwater retention and groundwater recharge.

From Fish and Wildlife Habitat Management
Designation of 743,209 acres as Areas of Critical Environmental Concern for recovery of the desert tortoise would place restrictions on livestock grazing, wild horse and burro use, off-road vehicle use, and mineral activities. Within the boundaries of the Areas of Critical Environmental Concern there are 82 springs and 1.7 miles of perennial streams that would realize an improved degree of protection. In addition, there are 27,735 acres of soil highly susceptible and 420,195 acres of soil moderately susceptible to erosion that would be protected from the previously referenced soil- disturbing activities and resultant potential soil loss and sedimentation. Direct contamination of water sources from cattle, horses and burros would also be expected to diminish. See the specific discussions below for estimated soil losses attributable to livestock grazing, wild horse and burro use, off-road vehicle use, and mineral activities.

Actions to maintain or improve the condition of vegetation on 869,800 acres of bighorn sheep habitat to full ecological potential or the Desired Plant Community would help improve protective ground cover and soil-holding capability. Vegetation is a key component of a healthy watershed and as a result of improved dissipation of energy associated with stormwater runoff, erosion and soil loss would be minimized and water quality improved. An increase in water quantity would be expected through better floodwater retention and groundwater recharge.

The maintenance or improvement of 5 acres of spring-associated riparian area at Ash Meadows and the improvement of 200 acres of aquatic and riparian habitat on the Virgin River would result in improved water quality. The Improvement would be associated with streambank stabilization, sediment reduction, decreased water temperatures, moderation of peak flows, and the stabilization of base flows.

From Livestock Grazing Management
An impact on surface water would be expected, resulting in potential changes in water quality, quantity, and timing. Livestock grazing is considered to be a major contributor of coliform bacteria contamination occurring in most surface water sources of the planning area. Approximately 94 percent of spring sources are currently contaminated. Under this plan, water quality improvement on 117 spring

sources would be expected as a result of reduced grazing activity. There would continue to be contamination on those springs (19) within the open allotments but this would be short term, occurring for a period until the completion of protective measures. Through the closure of the Virgin River and Meadow Valley Wash to cattle grazing, coliform contamination from this source would be eliminated. Some contamination would occur on the Muddy River, where grazing would continue to be authorized, until appropriate protective measures are taken (such as fencing).

The water resource is also impacted through soil compaction and the reduction of vegetative and litter cover that reduces infiltration and increases storm water runoff and sedimentation. Livestock grazing would be associated with an estimated potential soil loss of 224 tons per year, or a total of 4,480 tons over the life of the plan (20 years), in the allotments remaining open to grazing. Some of the displaced soil is expected to be in the form of sediments that would enter stream channels. However, due to the variability in the physical features and hydrologic characteristics of each watershed, actual amounts are not known at this time.

From Wild Horse and Burro Management
Impacts to the water resource from wild horse and burros would be similar to those resulting from livestock grazing. As with livestock, horses and burros are considered to be a major contributor of coliform bacteria contamination occurring in most surface water sources of the planning area. Under this plan, water quality improvement on 34 spring sources would be expected as a result of the removal of horses and burros from 3 of the 6 Herd Management Areas. There would continue to be contamination on those springs (28) within the Herd Management Areas containing animals, but this would be short term, occurring for a period until completion of protective measures. Within the Las Vegas BLM District, horses and/or burros do not frequent the area of the Virgin River, Meadow Valley Wash or the Muddy River; therefore, impacts to those systems are not expected.

The water resource is also impacted through soil compaction and the reduction of vegetative and litter cover that reduces infiltration and increases storm water runoff and sedimentation. Water resources within the Herd Management Areas managed at a 0 Appropriate Management Level would improve through the preservation of vegetative cover and resultant decrease in erosion, soil loss, and sediment production.

There are presently 113 tons/year of soil loss occurring in the Herd Management Areas remaining active in this plan (See Table 4-2). When these Herd Management Areas reach the Appropriate Management Level, the soil loss and sediment production would be 0.

From Lands Management
Within the Las Vegas Valley, approximately 25,540 acres would be disposed to provide for orderly expansion, development, and public services. Growth and development have already resulted in a groundwater overdraft situation and the rapid depletion of Nevada's allocation of Colorado River water. Land disposals would indirectly impact the water resource by providing land that may be developed resulting in an increased growth rate and demand on an already taxed water supply. Additional water requirements could lead to further over-drafting of available ground water and resultant water quality deterioration.

An increase in annual water usage of 3,193 acre-feet per year is estimated to result from subsequent development of disposed lands. All of the disposed of lands will probably not be developed;, therefore, the actual increase in water use would be somewhat less than that indicated. The water use figure is based on an annual disposal rate of 1,277 acres over the life of the Resource Management Plan (20 years) and an average water use figure of 2.5 acre-feet per acre per year (calculated from current acres of development and water use in the Valley).

Increased growth and development in the valley would result in more acres of impermeable surface, creating additional storm water runoff, accelerated erosion, and greater peak flow rates. Increased sedimentation and erosion could be expected within the Las Vegas Wash, where much of the riparian/wetland area has already been impacted by floodwater runoff. Other communities within the planning area could also experience increased amounts of runoff, soil erosion and consumptive demand, but to a lesser extent than in the Las Vegas Valley.

Subsidence resulting from continued overdrafting of groundwater within the Las Vegas Valley has continued to be a problem since 1940. If groundwater is relied upon to meet additional water needs in response to further development of disposed of lands,

subsidence would be expected to occur to some degree depending on the remedial efforts taken. The groundwater recharge system currently in place by local purveyors may offset any potential subsidence impacts.

From Rights-of-Way Management
The potential for impacts to the water resource would be present throughout the planning area, depending on the location and purpose of a right-of-way. This would be particularly true if the associated disturbance occurred within areas containing soil with high erosion susceptibility (90,550 acres). Impacts would result from soil disturbance and the resulting vegetative removal. As a result of this disturbance, the soils would be left in a vulnerable state (bare soil) with an increased potential for erosion. Depending on the location of a water source in relation to a right-of-way, it could be impacted through reduced water quality/quantity. The impact would be short term, lasting until rehabilitation efforts (including the re-establishment of vegetative cover and its soil holding capability) stabilize the soil. The low precipitation and resultant arid vegetation communities of the planning area are not readily amenable to standard rehabilitation efforts, so the time period necessary to adequately rehabilitate an area may be longer than under non-arid conditions.

Few established right-of-way corridors are currently designated within the Las Vegas BLM District. Under this plan, 538 miles (157,761 acres) of utility/transportation corridors would be designated within the planning area. The potential impacts to those water sources outside the corridors, from transmission facilities, would be reduced. As identified in Table 3-4, these corridors would contain 1,793 acres of soil highly susceptible and 40,505 acres of soil moderately susceptible to erosion. There are 3 springs and 0.01 miles of perennial streams within the boundaries of the corridors, however minimal impact would be expected as a result of avoidance and implementation of mitigation on a site specific basis.

From Recreation Management
Since competitive off-road vehicle activity would only occur in previously disturbed areas, it is expected the soil, water and air resource would benefit through the preservation of areas presently undisturbed. The potential for direct impact to four springs (approximately 2 acres) would be reduced through the exclusion of competitive off-road vehicle activity within 0.25 mile of a natural water source. These are the only riparian areas located within the area open to competitive off-road vehicle activity.

The water resource would be impacted as a result of soil surface disturbance due to competitive and casual off-road vehicle activity, both on existing roads/trails and off-road. This disturbance would leave soils vulnerable to erosion and soil loss; sedimentation to water sources such as springs and perennial streams may occur. This is particularly true if off-road vehicle activity occurs in areas with soil susceptible to erosion. It is not known at this time how much of the existing 3,325 acres of disturbance is actually located within areas containing susceptible soils. The actual extent of disturbance, however, will be limited because use will be restricted to existing courses, pit/staging areas, roads/trails and washes (approximately 3,325 acres).

From Wild and Scenic Rivers Management
The Virgin River would have added protection through interim management that considers the potential effect of proposed actions on the river's classification as a Recreation River. If the river is so classified, actions that would threaten its eligibility would be prohibited, including impacts to its flow and water quality.

From Wilderness Management
If the acreage recommended for wilderness designation is approved by Congress, 7,424 acres in critical erosion condition would be protected under the restrictions of a Wilderness Area. The remaining Wilderness Study Area acres with a critical erosion condition (24,754 acres) and all of the areas containing soil highly susceptible to erosion would be protected from off-road vehicle impact due to the limits on vehicles use to existing/designated roads. Since no roads exist in Wilderness Study Areas currently, no new off-road vehicle use would be possible.

From Minerals Management
Impacts to the water resource from mineral exploration and development are both temporary and potentially long term. With proper mitigation and reclamation, mineral exploration activities would not degrade water sources in the long term. Mineral development, however, could potentially be longer-term. The low precipitation and resultant arid vegetation communities of the planning area are not readily amenable to standard rehabilitation efforts, and the establishment of a soil holding vegetative cover is slow. Even after abandonment of mineral

developments, potential soil erosion and sedimentation to springs and streams may occur, depending on their location in relation to the activity.

Fluid mineral activities could create impacts, primarily associated with road travel and drill pad construction. Little activity of this type occurs within the Las Vegas BLM District, and no increases are anticipated.

Locatable mineral, mineral material sales, and non-energy leasable activities could present potential water resource impacts, depending on their proximity to springs and streams. Soil disturbance and potential sedimentation could result from both mineral exploration and development activities, including access and haul road construction, stockpiling of topsoil, and pit construction. Water resources in areas with soils susceptible to erosion would be particularly vulnerable.

Under this plan, 41,649 acres of soil highly susceptible to erosion and 511,796 acres of soil moderately susceptible to erosion would be open to mineral activity. Within the area open to mineral activity, 90 springs and approximately 12.05 miles of perennial streams would be potentially impacted. Closure to all mineral activity, except fluid minerals, within 0.25 mile of natural springs and associated riparian areas would help to mitigate potential impacts. Currently, there are approximately 1,461 acres of disturbance associated with mineral activities; this acreage is not expected to increase and may actually decrease somewhat. Stipulations incorporated into mining plans of operation, project design, reclamation, and compliance checks would eliminate or minimize potential impacts to the water resource.

From Hazardous Materials Management
The water resource would be impacted through hazardous materials entering the environment and potentially contaminating water, thereby reducing the water quality of surface and/or groundwater resources. In the event these materials enter a water resource, water quality will be maintained or restored to levels as prescribed by the appropriate regulatory agency.

From Fire Management
Wildfire suppression efforts would potentially result in a short-term increase in erosion/soil loss that may enter water resources (depending on location), due to surface disturbance by fire fighting equipment and operations. However, successful suppression efforts would minimize the number of acres impacted as a result of vegetative cover loss. Following fire suppression, the successful implementation of the Las Vegas District Normal Fire Rehabilitation Plan would minimize the period during which soils would be vulnerable to increased erosion. The period would be reduced by re-establishing a vegetative cover and implementing other erosion prevention measures immediately following a fire. See the Soil Resource Management (from Fire Management) section of this Chapter for a description of the Normal Fire Rehabilitation Plan.

Use of prescribed burns as a vegetative manipulation tool could result in an increase in erosion and resultant sedimentation and salt loading to water resources, depending on their location in relation to the burn area. The potential for increased erosion would would be short-term. In the long-term, improved vegetative cover would be expected to reduce the potential for erosion and impact to water resources.

Riparian Management

From Soil Resource Management
The riparian resource would be impacted through improvement of watershed conditions. The improvement of approximately 96,994 acres of soil with a critical erosion condition and 37,670 acres with a moderate erosion condition and high erosion susceptibility would help to reduce impacts from erosion and sedimentation as stormwater runoff is modified. An increase in water quantity would be expected through better floodwater retention and groundwater recharge.

From Water Resource Management
Actions taken through this program would impact the riparian areas through maintenance and/or improvement of water quality and quantity. Reductions in erosion and sedimentation would also be expected to aid in maintenance and/or improvement of riparian areas as stormwater runoff is modified.

From Riparian Management
Riparian areas would be managed to maintain, restore or improve these areas to a healthy and productive ecological condition. Under this plan, measures would be taken to ensure that all 149 spring-associated riparian areas where practical and those riparian areas associated with perennial streams would

be in proper functioning condition (PFC). The implementation of measures to protect the 29 spring associated riparian areas (15 acres), that would continue to be impacted by grazing animals (livestock, wild horses and burros) would allow recovery of these areas to good condition.

Five of these riparian areas have already been protected through the use of fencing. Riparian resources are expected to be protected from impacts associated with competitive off-road vehicle activity (such as sedimentation) by prohibiting such activity within 0.25 mile of water sources and their associated riparian areas.

From Areas of Critical Environmental Concern
The proposed plan recommends designation of 1,005,031 acres of Areas of Critical Environmental Concern. Precluding livestock grazing, wild horse and burro use (except for Gold Butte Pat B, 119,097, includes Gold Butte Townsite acres), and competitive off-road vehicle use and having mineral activities intensively managed would reduce impacts in these areas. There would be expected reduction in contaminants (such as sediments and coliform) entering the aquatic/riparian areas associated with 106 springs and 1.7 miles of perennial streams within their boundaries. Elimination of livestock, wild horse, and burro grazing would contribute to an improvement in vegetative condition of the riparian area, as well as the uplands. This would be expected to result in better protective ground cover and soil-holding capability. Erosion and soil loss would be reduced and water quality improved as a result of better dissipation of energy associated with storm water runoff. An improvement in water quantity would be expected through better floodwater retention and groundwater recharge.

From Fish and Wildlife Habitat Management
Designation of 743,209 acres as Areas of Critical Environmental Concern for recovery of the Desert Tortoise would place restrictions on livestock grazing, wild horse and burro use, and mineral activities that could potentially impact riparian areas. Within the boundaries of the Areas of Critical Environmental Concern, there are 82 spring associated riparian areas (approximately 41 acres) and 1.7 miles of stream associated riparian areas (approximately 20 acres). In addition, there are 27,735 acres of soil highly susceptible and 420,195 acres of soil moderately susceptible to erosion that would be protected from soil-disturbing activities and resultant potential soil loss and sedimentation to riparian areas.

Actions to maintain or improve the condition of vegetation on 869,800 acres of bighorn sheep habitat to full ecological potential or the Desired Plant Community would help improve protective ground cover and soil-holding capability. Vegetation is a key component of a healthy watershed. As a result of improved dissipation of energy associated with stormwater runoff, there would be reduced erosion, soil loss and sedimentation impacting riparian areas. An increase in water quantity at riparian areas would be expected through better floodwater retention and groundwater recharge.

An improvement toward PFC would be expected in relation to maintenance or improvement of 10 springs and 5 acres of associated riparian area at Ash Meadows and 200 acres of riparian habitat on the Virgin River.

From Livestock Grazing Management
Under this plan, improvement of the riparian areas associated with 117 springs (59 acres) would be expected as a result of eliminating grazing activity. There would continue to be an impact on 19 springs (10 acres) within the allotments that remain open to grazing, but this would be short term, occurring for a period until the completion of protective measures. Livestock grazing within riparian areas prevents regeneration of desirable vegetative types, compacts soil, increases surface salinity; can overgraze plant growth; and also lower the water table by increasing soil erosion. Through the closure of the Virgin River and Meadow Valley Wash to cattle grazing, impacts resulting from livestock would cease and result in recovery in riparian health. Impacts to the riparian area associated with the Muddy River would continue where grazing is authorized, until appropriate protective measures are taken. This impact, as with the springs located within open allotments, would be short term.

From Wild Horse and Burro Management
In the short term, horse and burro use on 28 of the 33 spring associated riparian areas (14 acres) in the Gold Butte, Johnnie, and Muddy Mountains Herd Management Areas would continue to impact these areas. Five of the riparian areas (0.61 acres) have already been protected through the use of fencing. Wild horses and burros would continue to impact the unprotected riparian areas by concentrating around springs until protective measures are put in place as planned. As with livestock, wild horse and burro grazing within riparian areas prevents regeneration of desirable vegetative types, compacts soil, increases

surface salinity, overgrazes plant growth, and can lower the water table by increasing soil erosion.

Removal of all horses and burros from the Eldorado Herd Management Area, and managing the Ash Meadows and Amargosa Herd Management Areas at a zero Appropriate Management Level, would eliminate grazing impacts on 34 spring associated riparian areas (17 acres). Establishment of Appropriate Management Levels for the remainder of the herd management areas would be based on riparian enhancement and requirements to sustain a healthy, properly functioning condition (such as have amount of water necessary to maintain the riparian area). Riparian conditions would improve in the long term, through adjustments in animal numbers to the appropriate levels to maintain the thriving natural ecological balance.

From Lands Management
Land disposals resulting in increased growth and development within the valley would contribute to more acres of impermeable surface, creating additional storm water runoff, accelerated erosion, and greater peak flow rates. Increased sedimentation and erosion could be expected within the Las Vegas Wash, which is where much of the riparian/wetland area has already been impacted by floodwater runoff. Other communities within the planning area could also experience increased amounts of runoff and soil erosion that may impact riparian areas, but to a lesser extent than in the Las Vegas Valley.

From Rights-of-Way Management
The potential for impacts to the riparian resource would be present throughout the planning area, depending on the location and purpose of a right-of-way. Further, depending on its proximity to a right-of-way, a riparian area could be impacted through reduced water quality/quantity resulting from soil disturbance. The impact would be short term, lasting until rehabilitation efforts (including the re-establishment of vegetative cover and its soil holding capability) stabilize the soil. The low precipitation and resultant arid vegetation communities of the planning area are not readily amenable to standard rehabilitation efforts, so the time period necessary to adequately rehabilitate an area may be longer than under non-arid conditions.

Few established right-of-way corridors are currently designated within the Las Vegas BLM District. Under this plan, 538 miles (157,761 acres) of utility/transportation corridors would be designated within the planning area. Placement of transmission facilities within these corridors would eliminate potential impacts to those riparian areas outside the corridors. Although there are 3 spring-associated and 0.01 miles of stream-associated riparian areas (approximately 1.6 acres) within the boundaries of the corridors, minimal impact would be expected as a result of avoidance and implementation of mitigation on a site-specific basis.

From Acquisitions Management
Along the Virgin River there is interspersed private riparian area below the Riverside Bridge. Acquisition of this privately owned riparian area would facilitate its improvement to proper functioning condition by eliminating potential impacts from non-public holdings and by allowing a holistic approach to riparian improvements.

From Recreation Management
Since competitive off-road vehicle activity would only occur in previously disturbed areas, it is expected that soil and consequently the riparian resource would benefit through the preservation of areas presently undisturbed. The potential for direct impact to 4 springs (approximately 2 acres) and their associated riparian areas would be reduced through the exclusion of competitive off-road vehicle activity within 0.25 mile of a riparian area. These are the only riparian areas located within the area open to competitive off-road vehicle activity.

The actual impact to the riparian resource from casual off-road vehicle use is not known, but considering the increasing population in southern Nevada that activity is expected to proportionately increase. Under this plan, limiting off-road vehicle activity to existing roads and trails would improve the riparian resource through the prevention of new soil disturbance and sediment production.

From Wild and Scenic Rivers Management
The riparian area associated with the Virgin River would see added protection through interim management that considers the potential effect of proposed actions on the river's classification as a Recreation River. If the river is so classified, actions that would threaten its eligibility would be prohibited, including impacts to the riparian area.

From Wilderness Management
If the acreage recommended for wilderness designation is approved by Congress, 7,424 acres in critical erosion condition would be protected under the

restrictions of a Wilderness Area. The remaining Wilderness Study Area acres with a critical erosion condition (24,754 acres) and all of the areas containing soil highly susceptible to erosion would be protected from off-road vehicle impact due to the limits on vehicles use to existing/designated roads. Since no roads exist in Wilderness Study Areas currently, no new off-road vehicle use would be possible.

From Minerals Management
Impacts to the riparian resource from mineral exploration and development, although both temporary and potentially long term, would be minimal because riparian areas would be withdrawn from locatable minerals. In areas where existing mining claims are located, proper mitigation and reclamation would reduce impacts significantly. Because the low precipitation and resultant arid climate are not readily responsive to standard rehabilitation efforts, there is slow establishment of a soil-holding vegetative cover. Even after abandonment of mineral developments, potential soil erosion and sedimentation to the riparian areas associated with springs and streams may occur, depending on location of the waters in relation to the activity.

Impacts from fluid minerals activities would be minimal. This plan would provide for No Surface Occupancy stipulations for any leases requested in riparian areas described in Table 2-12. Mineral material sales and non-energy leasable activities could potentially impact riparian resources, depending on their proximity to springs and streams. Soil disturbance and potential sedimentation could result from both mineral exploration and development activities, including access and haul road construction, stockpiling of topsoil, and pit construction. Riparian resources in areas with soils susceptible to erosion would be particularly vulnerable. Under this plan, 41,649 acres of soil highly susceptible and 126,040 acres of soil moderately susceptible to erosion would be open to mineral activity. Within the area open to mineral activity, approximately 45 acres (90 springs) of spring associated and 292 acres (12.05 miles) of stream associated riparian area could be potentially impacted. Closure to all minerals activity, except fluid minerals, within 0.25 mile of natural springs and associated riparian areas would help to mitigate potential impacts. Currently, there are approximately 1,461 acres of disturbance associated with mineral activities. This is not expected to increase and may actually decrease somewhat. Stipulations incorporated into mining plans of operation, project design, reclamation, and compliance checks would eliminate or minimize potential impacts to the riparian resource.

From Hazardous Materials Management
The riparian resource could be impacted through hazardous materials entering the environment and potentially contaminating riparian areas thereby reducing water quality , vegetative cover and diversity of riparian areas. In the event that these materials do enter a riparian area, proposed actions taken would minimize the impact and ensure that its functioning condition is maintained or restored.

From Fire Management
Wildfire suppression efforts would potentially result in a short-term increase in erosion/soil loss that may enter aquatic/riparian areas (depending on location), due to surface disturbance by fire fighting equipment and operations. However, successful suppression efforts would minimize the number of acres impacted as a result of vegetative cover loss both within and outside riparian areas. Following fire suppression, the successful implementation of the Las Vegas District Normal Fire Rehabilitation Plan would minimize the period during which soils would be vulnerable to increased erosion. The period would be reduced by reestablishing a vegetative cover and implementing other erosion prevention measures immediately following a fire. See the Soil Resource Management (from Fire Management) section of this Chapter for a description of the Normal Fire Rehabilitation Plan.

Use of prescribed burns as a vegetative manipulation tool could result in an increase in sedimentation to riparian areas, depending on their proximity to the burn area. Although the potential for increased impact to riparian areas would be expected, it would be short-term. In the long-term, improved vegetative cover would be expected to reduce the potential for erosion and impact to riparian resources.

Vegetation Management

From Vegetation Management
Managing for the Desired Plant Community or the Potential Natural Community would substantially enhance vegetation communities by replacing invading species, including noxious an invasive weeds with natural species. Efforts to rehabilitate disturbed sites, when possible, would be undertaken in accordance with the fire rehabilitation plan and project-specific mitigation measures. Native species would be the preferred plant in rehabilitation efforts to manage

toward the Potential Natural Community and to provide optimum native species diversity.

Vegetation would progress very slowly toward the Desired Plant Community or the Potential Natural Community regardless of BLM actions. An upward trend, representing a progression from one condition class to a higher class (such as from mid-seral stage to late-seral stage), would be accomplished in much of the planning unit during the life of the plan. Threatened, endangered and candidate plant species would be protected by prohibiting construction, mining, and cross-country off-road vehicle uses. Protection would also occur through avoidance and mitigation through the National Environmental Policy Act process. This would also reduce the potential for listing of other species as threatened and endangered.

From Livestock Grazing Management
Vegetation resources on approximately 611,000 acres of public lands would be impacted by livestock grazing. Approximately 689,784 acres currently closed to livestock grazing would remain closed and an additional 2,031,111 acres of public lands would be closed.

The number of animal unit months licensed has declined from approximately 30,000 in 1988 to 7,730 in 1994. Livestock numbers and animal unit months used are expected to decrease for the next few years, due to general economics and management to protect threatened and endangered species. An estimated future use level of approximately 4,000 Animal Unit Months is projected, based on allotments closures.

A total of 11 allotments would be managed under grazing systems in the long term. Above-ground biomass would increase and plant reproductive capability maintained or improved. The vigor of mature plants would be maintained or improved. Increased numbers of immature plants would successfully become established, making more plant material available for litter. If grazing exceeds established use levels, livestock would be removed, thus eliminating the potential to decrease vegetative cover. In the long term, species diversity should increase and ecological condition approach or reach a Potential Natural Community.

No grazing would increase above-ground biomass with plant reproductive capability maintained or enhanced. The vigor of mature plants would be maintained or improved. Abundant immature plants would successfully become established, increasing litter potential for soil stabilization.

Specific impacts related to unmanaged grazing would include repeated removal of above ground biomass, resulting in decreased production. Mature plants would experience reduced reproductive capability and vigor, while immature individuals would have difficulty in becoming established. Physical damage to both forage and non-forage species could result from trampling. Impacts during the dormant period would further reduce vegetative cover and the amount of plant material available for litter.

Grazing use would be keyed to specific utilization levels, depending on season of use, thus reducing the damaging impacts of cropping associated with year-long livestock grazing. An increase in canopy cover and plant vigor is expected. If grazing use exceeds established levels, livestock would be removed from an allotment. In the long term, under properly managed rangelands, species diversity and ecological condition should be maintained or improved.

From Wild Horse and Burro Management
Wild horse and burro impacts to vegetative resources would be eliminated on the Ash Meadows, Eldorado, and Amargosa Herd Management Areas. Wild horse and burro impacts to vegetation would continue to occur on three Herd Management Areas. Managing population levels at a thriving natural ecological balance would minimize or eliminate damage to the vegetation resources. Increased monitoring of utilization levels within the grazed Herd Management Areas would clearly indicate when animals should be removed to protect the vegetative resource. This level of monitoring would be proposed in any new Herd Management Area Plan developed for proper herd management. (See also impacts described under Riparian Management.)

From Lands Management
The vast majority of the Blue Diamond Cholla habitat would be protected under BLM management. No special management actions or use restrictions would be needed to ensure the long-term viability of the species. Listing as a threatened or endangered species would be avoided.

From Mineral Management
Removal of vegetative cover can lead to increased soil erosion by wind and water, as well as a loss of forage and habitat for livestock, wildlife and wild horses and burros. Soil compaction, mixing of soil horizons, the

presence of hazardous materials and high concentrations of minerals in areas of exploration and development would further hamper revegetation efforts. A visual impact would also occur because even with reclamation efforts the plant community would be different than the surrounding areas. Based on the recommended closures, approximately 33 percent of the district would be protected from surface disturbance caused by mining activity. This would enhance the habitats for the species dependant plants being protected.

Visual Resource Management

From Visual Resource Management
Adopted Visual Resource Management classes would provide standards and guide the development of mitigation measures to protect or enhance visual resources. Mitigation measures designed to reduce or eliminate impacts to visual resources would be developed and implemented on all actions. These could include changing the color of structures to blend with the natural color of the landscape, hiding structures or roads behind ridge lines, and by restricting motorized vehicle recreation and activity to either existing or designated roads and trails. Immediately adjacent to Las Vegas the rural open visual character of the landscape would be eliminated.

From Lands Management
Urbanization of southern Nevada will cause a loss of the natural landscape in Las Vegas Valley, as well as the Mesquite, Pahrump, and Laughlin areas. Loss of visual quality to form, line, color, and texture of the existing landscape would be caused by new roads, housing developments, commercial development, recreation facilities, and schools.

From Rights-of-Way Management
Designated corridors would help protect visual qualities by concentrating impacts within specified geographic zones. Although the process of designating corridors creates no visual impacts, the following analysis is intended to evaluate the potential impacts of construction of electrical transmission lines through those proposed corridors.

Construction of approximately four powerlines in the Coyote Springs Valley could degrade the visual resources along U.S. Highway 93 from State Road 165 south, where only one short line currently exists. Due to technical considerations and the presence of critical desert tortoise habitat, one line would likely be placed close to the road, 600 feet east of the highway centerline. All lines would be suspended from towers averaging 120 to 130 feet in height. At the south end of the valley, three lines would cross over the existing line and swing east over the Arrow Canyon Range, while the existing line would continue south along the highway. The visual impacts would be apparent for several miles in each direction along the highway due to the tower height and the locations on the ridges of the Arrow Canyon Range. Corridor crossings of major highways, such as Interstate 15 (I-15) and State Roads 93 and 95, would be confined to previously impacted areas and should not substantially degrade the visual resources in these locations.

Map 2-4 shows corridor alternatives for construction of electrical transmission lines through the Rainbow Gardens and River Mountains Areas of Critical Environmental Concern (and the Henderson Area). The planning objective was to provide a feasible corridor for the construction of up to six additional 500-kV powerlines, which were previously authorized or pending approval.

Corridor A avoids the central portion of Rainbow Gardens Area of Critical Environmental Concern and follows a route that would restrict placement of the lines between two prominent ridges, obscuring visibility from most of residential Las Vegas. However, the designation would route lines into a two-mile area that is presently undisturbed prior to an intersection with existing roads near the former Sunrise Mountain Landfill. Any above-ground transmission line would also substantially alter the unobstructed view of the Las Vegas Wash park area, currently under development.

Corridor B would route additional lines through the center of the Rainbow Gardens area and over the Red Needle feature in this area. Lines would be placed in an area currently containing two major transmission lines. Although other lines currently exist in this corridor, the addition of up to four additional lines would create an additional impact in this area by visually dominating the landscape. The rugged nature of the terrain would impose engineering constraints and potentially create more surface disturbance.

Corridors A and B would require that the Intermountain Power Project (IPP) and McCullough lines are crossed south of Las Vegas Wash. The new corridor lines could not be constructed on the west side of the present lines due to urban development in the Henderson areas, starting at a new subdivision,

Calico Ridge, approximately one-half mile south of the Wash near Lake Mead Drive. Other housing areas are located immediately adjacent to the present lines south of Lake Mead Drive. The crossing would require construction of larger and taller towers in comparison to those existing facilities, creating a more obvious visual intrusion. Five or six additional towers on each side of the existing six towers could be placed within a distance of approximately 2,500 feet.

South of this crossing, new lines could follow the 1,400-feet corridor, parallel to the IPP and McCullough lines or the 2,000-feet corridor through the River Mountains. In either case, between four and eight parallel lines would be located in the immediate vicinity of Calico Ridge, the entrance road to Lake Las Vegas, and Lake Mead Drive. This would comprise a considerable, unavoidable visual intrusion. Visual impacts on the Lake Las Vegas entrance would be reduced to some extent by the presence of the ridge between the corridor and the entrance road. However, visual impacts for travelers on Lake Mead Drive and to Calico Ridge subdivision would continue to be major for over a mile south, where the corridor passes over the ridge.

The corridors would have a moderate visual impact on private property and the urban areas of Henderson south of Lake Mead Drive for approximately two miles. The intensity of the impacts would be assessed as low to moderate for an additional two miles, at which point all construction would be restricted to the sides and tops of ridges. Multiple lines would be *skylined* in this area. In the vicinity of U.S. Highway 95 south of Henderson, impacts would be high where the lines would cross the highway.

From Minerals Management
Visual resources within the Arrow Canyon, Muddy Mountains, and Resting Springs Ranges (all within Class II Visual Resource Management areas) would be impacted over the long term by projected mineral development. Due to the low unit values of mineral resources in these areas, the large scale, open pit type operations necessary to operate profitably would require strategic location and extensive mitigative measures to maintain the impacts within the standard of Class II Visual Resource Management.

A major ridge of the Arrow Canyon Range within Visual Resource Management Class III could be mined for limestone. The large mine required for an economic operation would be visible to travelers along U.S. Highway 93 for several miles, creating a permanent, negative impact on visual resources.

Areas of Critical Environmental Concern

The discussion below summarized anticipated impacts from designation of Areas of Critical Environmental Concern. The impacts to a specific program or resource are analyzed in additional detail in the appropriate program or resource discussion.

From Areas of Critical Environmental Concern
Areas of Critical Environmental Concern, encompassing approximately 1,005,031 acres, would be designated, providing special management attention to protect critical environmental values. In addition to the special management attention identified in the individual Area of Critical Environmental Concern discussions in Chapter 2 and the impacts discussed below, one regulatory impact would occur upon designation. The *Code of Federal Regulations* at Title 43, Sub-Part 3809 (43 CFR 3809) requires that a plan of operations be submitted for approval by BLM, prior to commencing *any* surface-disturbing activities conducted pursuant to the 3809 regulations (locatable mineral activities) within a designated Area of Critical Environmental Concern. This requirement affords BLM the opportunity to prepare an Environmental Assessment to identify alternatives and mitigating measures. Where appropriate, a Section 7 consultation for endangered and threatened species and/or a Section 106 consultation for cultural resources must also be conducted, thus reducing or eliminating impacts to these sensitive resources.

Approximately 743,209 acres in four areas would be designated as Areas of Critical Environmental Concern to provide for the recovery of the desert tortoise. Impacts, including habitat loss and direct mortality to tortoises and other wildlife species, would be reduced through operation of the 3809 regulations on valid existing rights, by limiting casual off-road vehicle use to designated roads and trails, by prohibiting all speed off-road vehicle events and Section 7 consultations.

Approximately 261,822 acres in other areas would be designated as Areas of Critical Environmental Concern to protect other critical resource values, including threatened and endangered species, botanical resources, wildlife habitat, cultural and paleontological resources, geological resources, scenic quality and visual resources, and designated natural areas. Impacts such as habitat loss, direct mortality to

wildlife species, and degradation of scenic quality would be reduced through the following management actions: operation of the 3809 regulations on valid existing rights, limiting casual off-road vehicle use to existing roads and trails, prohibiting speed off-road vehicle events and closure to mineral material disposal, locatable mineral entry and leasable minerals.

From Rights-of-Way Management
See Fish and Wildlife Habitat Management, From Rights-of-Way Management, for a discussion of impacts to desert tortoise.

From Minerals Management
Table 2-12 shows the Areas of Critical Environmental Concern that would be closed to locatable, leasable, and salable mineral entry; closed to solid leasing; and subject to fluid mineral no surface occupancy. However, mineral development may still occur on valid existing rights. Mineral exploration and development in desert tortoise Areas of Critical Environmental Concern would impact desert tortoise. Habitat would be degraded or destroyed. Individual tortoises would either be killed or displaced from their home ranges. Increased roads and traffic in the Area of Critical Environmental Concern would increase the potential for road kills of desert tortoise. (See the section on Cultural Resource Management, From Minerals Management, for a discussion of impacts to cultural resources.)

Fish and Wildlife Habitat Management

From Soil, and Water Management
Improved watershed conditions would increase forage and cover for wildlife. Erosion control, particularly in riparian areas, would encourage vegetative production and improve water quality. These areas would have enhanced value as wildlife habitat. Management actions would help ensure that sufficient water is available to maintain riparian and aquatic habitats. Habitat for threatened and endangered species in the Virgin River would be maintained or improved.

From Riparian Management
Riparian enhancement actions would provide healthy riparian systems, providing habitat for a variety of wildlife species. A greater diversity and density of wildlife species would find habitat in these improved riparian areas. The density and distribution of wildlife species that depend upon riparian habitat could change over the long term. Riparian condition would affect water temperature, silt load, instream flow, spring flow, water quality and salinity of aquatic habitat. Habitat for threatened and endangered fish species in the Virgin River could improve. Special status plants that occur in riparian habitats would be protected.

From Vegetation Management
Managing for Desired Plant Community or Potential Natural Community would ensure availability of a variety of habitats for wildlife and special status species. Greater plant species diversity would provide a variety of forage, increasing the potential for improved tortoise nutrition and decreasing the incidence of malnutrition. More vigorous tortoise populations would result in increased survival and recruitment rates. Managing for a Potential Natural Community would create increased cover, affording hatchling and juvenile tortoises greater protection from predation, and improving recruitment. If individual tortoises are healthier, their resistance to Upper Respiratory Tract Disease (URTD) would be expected to increase.

From Areas of Critical Environmental Concern
Designation of approximately 1,005,031 acres as Areas of Critical Environmental Concern would result in additional protection for wildlife and plant habitat. These areas would be managed to preserve the values of the area and other activities would be limited. Most wildlife species would incur advantages from reduced loss, degradation, and fragmentation of habitat. Habitat of some candidate species would be protected, reducing the likelihood of future listing of the species as threatened or endangered.

Essential habitat in Ash Meadows Area of Critical Environmental Concern would be managed for recovery of the Ash Meadows ecosystem and endemic species. Beetle habitat on Big Dune and bighorn sheep habitat in the River Mountains would receive additional protection. Mesquite would be managed to provide ample cover and forage for wildlife. Desert tortoise habitat totaling 743,209 acres would be managed primarily for the recovery of the species, resulting in impacts to the desert tortoise. Ecological condition in the desert tortoise Areas of Critical Environmental Concern would be improved to allow the recovery of the species; impacts to tortoise would be mitigated.

Conflicting land uses would be limited, reducing both direct and indirect impacts on the tortoise. Protective

measures implemented in the desert tortoise Areas of Critical Environmental Concern, such as elimination of future mineral exploration, development and mining and grazing by livestock and wild horses and burros, would allow for improvement of tortoise habitat and upward population trends in tortoise populations. Las Vegas bear poppy habitat in Rainbow Gardens and Gold Butte would be afforded a higher level of protection.

Designation of desert tortoise Areas of Critical Environmental Concern would aid in recovery and eventual delisting of the desert tortoise. In combination with land managed by other Federal agencies and other BLM districts, sufficient habitat would be protected to support viable populations of desert tortoise and to meet the criteria of the *Tortoise Recovery Plan.*

From Fish and Wildlife Habitat Management
Management actions for desert tortoise ensure adequate habitat is available to support viable populations. Impacts to tortoise from other uses would be reduced. Other resident wildlife would thrive from improved habitat conditions.

Existing populations of game species would be maintained or increased through protection and improvement of habitat. Habitat for special status species would be protected, thereby reducing the potential that these species would be listed as threatened or endangered and aiding in the recovery of listed species. BLM inholdings in Ash Meadows National Wildlife Area/Refuge (NWR) would be made available for withdrawal by the U.S. Fish and Wildlife Service (USFWS) for inclusion in the Refuge, facilitating refuge management and indirectly improving the habitat of some species.

Habitats for non-game species, such as neotropical birds, would be inventoried and managed to maintain or improve habitat conditions for species of concern.

Important habitats for special status plant species would be protected, allowing for the maintenance of existing populations of plant species of concern. Additional management attention would be directed toward these species through development and implementation of conservation agreements.

From Forestry Management
Impacts to non-game bird special status species from firewood harvest would be minimal. Firewood harvest would not be authorized, unless beneficial to wildlife species dependent on mesquite habitats.

From Livestock Grazing Management
Elimination of livestock grazing on all but 11 allotments would enhance wildlife habitat and reduce competition for forage and water. Closure of Areas of Critical Environmental Concern to livestock grazing would have a long-term, substantial stabilization and improvement of desert tortoise habitat and populations trends. A diverse nutritious forage base would be provided for desert tortoise, lowering the incidence of malnutrition and osteoporosis. Improved vigor of tortoise populations would reduce the susceptibility of individuals to Upper Respiratory Tract Disease. Reduced utilization levels would improve cover for hatchling and juvenile tortoises, susceptible to predation. This would lessen competition for forage and the likelihood of trampling of tortoises and burrows. Over the long term, increased recruitment rates would aid in the recovery of the tortoise.

Continuing grazing on open allotments at Prescription 2 levels outside of Areas of Critical Environmental Concern would enhance the condition of the existing vegetative communities. Restricting the utilization of key forage species would sustain current habitat quality, with possible improvement. Tortoise populations would be maintained at current levels. Trampling of tortoise and competition for forage would continue in those areas open to grazing.

Management for the Potential Natural Community or the Desired Plant Community would provide good habitat conditions for many wildlife species. Competition between wildlife and livestock for water, forage and space would continue in those areas open to livestock grazing. Special status plants would benefit from a reduction in grazing pressure and soil disturbance in those areas closed to livestock grazing. In those areas remaining open to grazing, plants would continue to be impacted by trampling and herbivory.

Grazing closure in the Virgin River Bottom Allotment and riparian areas in Meadow Valley Wash and the Virgin River would protect threatened and endangered fish, waterfowl, and non-game species. Erosion would be reduced as a result of decreased utilization of forage within the riparian area and trampling of the stream banks; water quality would also improve. No domestic sheep grazing would be authorized, greatly reducing the potential for disease transmission to bighorn sheep.

From Wild Horse and Burro Management
Over the long-term, competition for forage would be non-existent by managing the Ash Meadows, Amargosa, and Eldorado Herd Management Areas for 0 horses and burros. This would directly protect and enhance wildlife and their habitat. Areas with past overgrazing would be allowed to recover. Increased forage and cover would be available for wildlife with competition for water and forage between wildlife and wild burros removed.

Multiple-use decisions would be used to adjust any Appropriate Management Level established in The Plan based on new monitoring data. Riparian areas may require protective fencing, making the water less accessible to wildlife. In the Gold Butte, Muddy Mountain, Red Rocks, Johnnie and Wheeler Pass herd management areas, impacts to wildlife and plants would continue at a lower level than that which occurred under the no action alternative. Some level of competition for forage and water would continue between wild horses and burros and wildlife. Plants would be subject to some level of trampling and herbivory.

From Lands Management
Discretionary Disposal Areas. Approximately 1,022,314 acres within the planning unit would be available for disposal through sale, exchange, color-of-title, or Recreation and Public Purposes patent. These lands would be evaluated for the presence of special status species before being approved for disposal. Public land outside of established disposal areas would only be considered for disposal if specific criteria are met. Areas of critical environmental concern would not be available for disposal under any circumstances, protecting habitat for desert tortoise and other wildlife.

Most of the habitat within established disposal areas is marginal wildlife habitat due to the proximity of urban areas. Continued expansion of the developed areas would create new marginal areas for wildlife. Direct impacts to wildlife would include incidental take and loss of habitat. Indirect impacts would comprise the increased possibility of take due to casual recreational use, harassment by domestic dogs and cats, and degradation and fragmentation of habitat. Due to urban development, movement of bighorn sheep between the McCullough and River Mountains may no longer be possible.

Disposal of lands outside of established disposal areas would require close coordination with Nevada Division of Wildlife, Nevada Division of Forestry, and the U.S. Fish and Wildlife Service, providing for the identification of potential impacts to wildlife and special status species. If the disposal would result in significant impacts to wildlife or special status species, the lands would likely be retained.

Large blocks of habitat sufficient to support viable populations of wildlife would be maintained outside of established disposal areas. Springs and associated riparian habitats would be preserved for wildlife use. Private and leased lands in Coyote Springs Valley, if returned to Federal jurisdiction, would improve the integrity of Coyote Springs Area of Critical Environmental Concern and increase the potential for recovery and delisting of the desert tortoise.

From Rights-of-Way Management
All Areas of Critical Environmental Concern would be designated as rights-of-way avoidance areas. Over the long term, wildlife and special species habitat within these areas would be subject to less disturbance. For the most part, these areas would be excluded from mineral material rights-of-way. However, areas within 0.50 mile of Federal aid highways would be open to mineral material rights-of-way issued to governmental entities.

Development of material site rights-of-way would have impacts on resident wildlife and special status species, including loss of habitat and mortality of individuals. Residual impacts to wildlife would be mitigated to the extent possible.

Designation of utility corridors would facilitate the mitigation of impacts from proposed utilities and prevent proliferation of rights-of-way throughout the planning area. Concentrating powerlines in narrow corridors would restrict and localize raven and raptor perching sites.

In spite of the designation of corridors, overhead powerlines would impact desert tortoise by providing additional perching sites for ravens and raptors, causing loss and degradation of habitat, and resulting in direct mortality of animals during construction. Access roads for utility rights-of-way could also result in increased access into wildlife habitat. Increased access would create a greater potential for incidental *take* of desert tortoise, harassment of wildlife, road kills, and degradation of habitat. Impacts to wildlife from material sites, including loss and fragmentation of habitat and direct mortality, would be reduced under this alternative.

From Acquisitions Management
The BLM would attempt to acquire key, undeveloped private lands within Areas of Critical Environmental Concern. Wildlife habitats would be consolidated, facilitating management of large blocks of public lands. Lands not specifically identified for acquisition could be acquired for the protection of threatened, endangered and special status species of plants and animals. There would be a positive impact on management for special status species, particularly plants which occur in small, isolated populations, often outside of areas of critical environmental concern and sometimes on private lands within disposal areas.

From Recreation Management

Special Recreation Management Areas. Designation of approximately 40,200 acres in the Rainbow Gardens area as a special recreation management area could have negative impacts on special status plants occurring in the area.

Off-road Vehicle Racing. Acreage open to high-speed, competitive off-road vehicle events would decrease in comparison to the No Action Alternative. This would reduce direct impacts associated with high-speed, competitive events including soil compaction and erosion, widening of existing roads and trails, creation of new roads and trails, and increased potential for direct mortality and harassment of wildlife. Off-road activity by spectators can cause damage to vegetation and soils, and direct mortality and harassment of wildlife would be decreased by strict regulation of spectators and spectator viewing areas. Big Dune beetle habitat area would be closed to all competitive events, reducing the potential to impact candidate species. These impacts would continue in those areas open to racing. All areas of critical environmental concern would be closed to off-road vehicle speed events, resulting in additional protection for wildlife and plant habitat.

Off-Road Vehicle Designations. There would be reduced impacts associated with off-road activities, such as habitat degradation, proliferation of roads, harassment of wildlife, vandalism, and road kills. The acreage designated as *open* would decrease substantially; a portion of Big Dune, the Nellis Dunes, and non-vegetated portions of dry lakes would be the only areas that would remain *open*. All desert tortoise Areas of Critical Environmental Concern would be designated as "limited to designated roads and trails", further reducing impacts to wildlife. Some roads would be physically closed and rehabilitated. Approximately 200 acres at Big Dune would be closed to all Off-road vehicle use. Off-road vehicle use in Wilderness Study Areas not designated by Congress would be limited to existing roads and trails, providing long-term protection of bighorn sheep habitat.

Rainbow Gardens Area of critical environmental concern would be designated as "limited to designated roads and trails" providing additional protection for habitat of special status plant species occurring in the area. The remainder of the planning area would be "limited to existing roads and trails" reducing impacts to vegetation, soils and wildlife.

Due to continued rapid population growth in Clark County, there will be a continually increasing demand for casual recreational opportunities on Public . Management actions proposed in The Plan will reduce impacts to wildlife and plants from casual recreational use of public lands.

From Wilderness Management
In the short term, implementation of the Interim Management Policy would assist in the protection of wildlife and special status species habitat. Long term, the designation of Wilderness Areas would enhance such habitats=. Although some wildlife management activities may be precluded in Wilderness Areas, long-term habitat protection from off-road vehicle use, mineral exploration and development, and associated indirect impacts would outweigh impacts to wildlife from constraints on wildlife management.

From Minerals Management
Outside of areas of critical environmental concern, mining and other mineral developments would contribute to impacts on wildlife and plant habitat and populations. Impacts from mineral exploration and development would include direct mortality during mining activities. The loss and degradation of habitat, harassment, and an increased probability of incidental *take* would constitute indirect impacts. These would occur during exploration and development activities which could also create new roads, further fragmenting wildlife habitat and increasing access. Some effects would be substantially mitigated through standard stipulations and mitigation measures developed through Section 7 of the Endangered Species Act and other relevant legislation and policy.

Within areas of critical environmental concern, potential impacts from mining would be reduced

compared to the No Action Alternative. These areas would be closed to solid leasables, subject to no surface occupancy, or timing and surface use constraints for fluid mineral development, segregated and withdrawn from the operation of the mining laws and closed to most salable mineral development.

Fluid Minerals. Approximately 55 percent of the planning area would be open to fluid mineral development. Another 25 percent would be available for leasing only, with No Surface Occupancy stipulations. An additional 3 percent of the planning area would be available for leasing subject to timing and surface use restrictions. The opportunity for exploration and development of fluid minerals would be reduced, thereby reducing impacts to wildlife. Seismic line projects utilizing cross-country travel would require rehabilitation and temporary closure to reduce subsequent use by off-road vehicles. There would be a potential for crushing of small wildlife during seismic operations. Mitigation measures, including the use of low pressure tire vehicles and seasonal restrictions on seismic activities, could lessen, but not eliminate, these impacts.

Outside of areas of critical environmental concern, impacts to wildlife and special status species could result from fluid mineral exploration and development. Development of a large oil and gas field would impact wildlife through the loss and fragmentation of habitat, mortality of individual animals, and increased access. Mitigation of impacts, to the extent possible, would be developed through Section 7 consultation.

Locatable Minerals. Under the management direction in this plan, approximately 1,005,031 acres of Areas of Critical Environmental Concern and 189,279 acres of lands identified for disposals and BLM administrative sites would be segregated and withdrawn from future locatable mineral entry during plan implementation. These areas would be closed to locatable, salable and leasable mineral entry, which would protect wildlife and their habitats from loss, degradation and fragmentation. In areas open to mineral entry or with valid existing rights, indirect impacts from mineral exploration and development would include habitat degradation, fragmentation and loss. Direct impacts would include harassment, injury, and mortality of individual animals. Impacts would be mitigated to the extent possible during development of mining plans of operation.

Loss of habitat for the Las Vegas Bear Poppy may occur from mining of gypsum in the Muddy Mountains and the development of valid existing claims in the Rainbow Gardens Area of Critical Environmental Concern. This species is listed as critically endangered by the State of Nevada and is restricted to gypsiferous soils. Much of its habitat in the Las Vegas Valley has already been lost to urban development. Proposed mineral withdrawals would protect an estimated 80 percent of the Las Vegas bear poppy habitat on public lands within the planning area.

Salable Minerals. Disposal of salable minerals would not be allowed within 36 percent of the total planning area. These areas would be managed as sensitive riparian areas, B LM administrative sites, and Areas of Critical Environmental Concern, with allowance for 0.50 mile corridor on either side of Federal-aid highways and county roads described in minerals management direction MN-1-k and MN-1-n. This would reduce loss, degradation, and fragmentation of wildlife and their habitats in the planning area. In areas open to salable mineral disposal, indirect impacts from mineral material exploration and development would include habitat degradation, fragmentation, and loss. Direct impacts would include harassment, injury, and mortality of individual animals. Impacts would be mitigated to the extent possible during development of mineral extraction plans and disposal contract stipulations.

Salable mineral development would be allowed within areas of critical environmental concern. However, authorizations for mineral removal would be allowed only within 0.50 mile of Federal aid highways, state highways, and county roads and issued only to governmental entities. This would provide additional protection to wildlife and special status species habitat in areas more than 0.50 mile from roads.

Within the 0.50 mile area and outside of areas of critical environmental concern, impacts to wildlife and special status species would continue. Indirect impacts from mineral exploration and development would include habitat degradation, fragmentation and loss. Direct impacts would include harassment, injury, and mortality of individual animals or loss of individual plants. Impacts would be mitigated to the extent possible. Given the continued rapid growth in southern Nevada, the demand for sand and gravel will continue to be high. Management actions in The Plan will reduce impacts to wildlife and special status

species by focusing mineral extraction actives within the less sensitive areas.

From Hazardous Materials Management
Hazardous materials contamination of the soil, water, or air may result in degradation of fish and wildlife habitat. Appropriate hazardous material planning and response will minimize these impacts.

Livestock Grazing Management

From Riparian Management
Livestock operators who are unwilling to manage use in riparian areas could sustain economic hardships due to removal of cattle when use levels are exceeded. Riparian areas in the Las Vegas BLM District are few in number and tend to be heavily grazed at various times during the year. Unprotected riparian areas where livestock continue to graze would constitute a limiting management factor. Utilization levels for riparian species would be used to determine when livestock would be either removed from the allotment or relocated within the allotment.

From Vegetation Management
Protection of candidate plants in the Las Vegas BLM District would require management actions that assure the species do not require listing as threatened or endangered. Such actions could impact livestock management on allotments where candidate species occur, potentially changing grazing strategies or causing the removal of livestock. Utilization levels identified for key forage species could result in reduced herd size, which could affect the economic viability of most permittees' operations.

From Fish and Wildlife Habitat Management
The management goals identified in the *Tortoise Recovery Plan* would have far-reaching impacts to the livestock industry. Only 11 allotments within the Las Vegas BLM District would be available for domestic livestock grazing. Grazing use would be authorized in accordance with the *Tortoise Recovery Plan* objectives. This would reduce the number of animal unit months available from approximately 10,037 to 2,440. (Refer to the Socioeconomic section for a detailed analysis of livestock grazing economics.)

Thirty-nine allotments would be closed to all domestic livestock grazing. This figure includes closures carried forward as valid existing management, one allotment for lack of base property, two allotments closed due to conflicts with riparian management, and the Meadow Valley Wash and Virgin River floodplain and riparian zones.

This action would close five currently active allotments to livestock grazing and put up to nine operators out of business. Since the Lower Mormon Mesa Allotment was not included as critical desert tortoise habitat, it would not be closed to livestock grazing from March 1 to June 14. However, the utilization restrictions of would apply. Use during the spring would maintain the permittee's current operation.

From Wild Horse and Burro Management
Wild horses and burros in two different Herd Management Areas (Muddy Mountains and Johnnie) would continue to directly compete with livestock for forage, water, and space on three grazing allotments (Mount Stirling, Wheeler Wash, and White Basin.) If wild horse and burro numbers are maintained in a thriving natural ecological balance, the impact to livestock grazing would be the loss of forage to wild horses and burros that would otherwise be available for livestock. Numbers could also be restricted based on available water capacity at spring sources or reduced during drought conditions to meet riparian objectives.

Wild Horse and Burro Management

From Air, Soils, and Water Management
In the short term, management actions to protect or improve soil and water resources may impact wild horse and burro management by requiring a reduction in wild horse or burro numbers. This would allow for recovery of vegetation and stabilization of soil, especially in riparian areas. Over the long term, these actions would reduce indirect impacts on wild horses and burros by improving the overall forage condition and water quality and quantity within Herd Management Areas. This would lead to healthier animals and habitat in the long term.

From Fish and Wildlife Habitat Management
Management of threatened and endangered species could have major impacts on wild horse and burro management. In extreme cases such as Ash Meadows, wild horse and burros would continue to be excluded from areas where they were present in 1971 in an effort to protect and ensure recovery of threatened and endangered plant species unique to the Ash Meadows ecosystem.

Designation of desert tortoise Areas of Critical Environmental Concern would require removal of all wild horses and burros from the Eldorado Herd Management Area. This would increase to three the number of Herd Management Areas with a 0 Appropriate Management Level. The remaining three Herd Management Areas would require that an Appropriate Management Level be set, as shown in Table 2-9. Managing for the appropriate management level would enhance animal and vegetative health in the long term.

From Lands Management - Pre-FLPMA Rights-of-Way
Some rights-of-way issued prior to the Federal Land Policy Management Act did not define specific requirements to provide for wild horse and burro movement across fenced highways. Any fence constructed along a highway without an underpass to allow passage for wild horses and burros would substantially restrict animal movement. Wild horses and burros could become confused and disoriented, causing some to run into the fences, sustaining injuries, and damaging the fence. Fencing highways would hinder current animal trailing patterns and possibly eliminate access to needed water sources. Animals could also be concentrated in smaller areas, thus adding additional stress to the habitat. Any fencing of highways without underpasses could require development of additional water to ensure animals do not die of thirst.

Cultural Resource Management

The definition of impacts to cultural resources has a conceptual range from maximum to minimum disturbance. The *maximum disturbance* orientation defines impacts to cultural resources as limited to the destruction of those qualities that would qualify the resources as eligible for nomination to the *National Register of Historic Places* (NRHP). In such cases, adverse impacts can be mitigated through consultation under Section 106 of the *National Historic Preservation Act*. For example, casual collection of a few artifacts on the surface within an aboriginally used shelter that possesses a meter of stratigraphic deposition would not affect the eligibility potential for yielding important data that can add to the knowledge of regional prehistory (36 CFR 60.4). If the shelter was destroyed through permitting a Federal action, then a data recovery plan could presumably mitigate those impacts or effects.

The *minimal disturbance* reference point states that any change to a cultural resource as a consequence of human actions, no matter how seemingly small, constitutes an effect. For instance, when an archeological property is discovered by people, a cycle of impacts is initiated. These impacts may simply consist of disturbing spiritual or intangible cultural values considered by Native Americans or other interested parties as belonging to the objects, features, or the surrounding area. Removal of any artifacts could be considered as dismembering the cultural property. Conducting a data recovery of the artifacts, charcoal samples, and biological materials at the shelter site proposed for destruction would not mitigate the adverse effects, rather, attempt to reduce the degree of impact. Section 106 consultation provides professional guidance to salvage a sample of physical objects and impressions, but does not erase the fact that the site was destroyed.

The assessment of impacts for cultural resources in this plan assumes a *minimal disturbance* reference. This assessment was determined through the professional judgement of the cultural resource manager. A cycle of impacts begins when a site is changed by removal or disturbance as a consequence of the evaluation or disposal phase involved in processing a Federal action. The only situations where impacts would be considered as improvements are those that provide direct protection through preservation and stabilization. All other changes are considered to be damaging to cultural resources. Substantial impacts are those where an action or a group of similar actions affect a relatively large number of eligible cultural resource properties. Examples of these kinds of whole scale environmentally reviewed actions include the processing and approval of mining plans of operations under the framework of this plan.

From Fish and Wildlife Management
Designation of 1,005,031 acres as Areas of Critical Environmental Concern would aid in the preservation of 2,100 eligible sites by restricting and inhibiting potentially threatening actions.

From Forestry Management
The development of a woodland management plan in the Pahrump Valley has the potential to affect 200 sites. This would constitute a significant impact on cultural resources.

From Livestock Grazing Management
Continuation of livestock grazing on approximately 610,893 acres of public lands and construction of rangeland improvements would have the potential to affect 1,255 eligible sites. Effects could include trampling of sites by cattle, surface disturbance from vehicles used by permittees, and destruction of sites during range improvement construction. In particular, the integrity of archaeological districts in the Muddy Mountains and McCullough Mountains could be sacrificed.

From Lands Management
The availability for disposal of approximately 1,022,314 acres of public land through sales, leases, and rights-of-way has the potential to affect 2,100 eligible sites. The withdrawal of 114,000 acres from leases, permits, and disposal would aid in preservation of approximately 245 archaeological properties. The potential for substantial impacts to cultural resources would be present under this alternative.

From Rights-of-way Management
Designation of 157,761 acres of corridors for transmission systems and facilities in Clark and Nye Counties has the potential to affect 200 eligible sites. Although utility corridor designation would protect a large number of eligible properties from impacts, potential effects to 200 sites would constitute a significant impact to cultural resources.

From Recreation Management
Approximately 20 eligible sites could be affected by designation of 9,180 acres as open for off-road vehicle use areas. Zones that would be open are evaluated as having medium to low sensitivity for cultural resources, based on limited survey.

From Wilderness Management
Management of Wilderness Study Areas would reduce the impacts to cultural resources by prohibiting new access roads and limiting lands, minerals and recreation uses.

From Minerals Management
Encouragement of fluid, locatable, saleable, and non-energy leasable mineral development within approximately 80 percent of the planning area has the potential to affect 7,500 eligible sites. Effects could include total disturbance of properties during seismic testing, open pit mining, opening of previously inaccessible areas, and the direct and purposeful mining of historic and prehistoric sites under the concept of exploration. The minerals program has the potential for significant impacts to cultural resources.

Approximately 960,000 acres of Areas of Critical Environmental Concern require minerals actions to achieve compliance with the *National Historic Preservation Act*. While these restrictions limit untreated destruction of cultural values, the consumptive nature of mining operations would require scientific removal of archaeological data, thus causing irrevocable and irretrievable impacts to eligible cultural resources.

Lands Management

From Areas of Critical Environmental Concern
Under The Plan, 9,423 acres of BLM inholdings within the Ash Meadows National Wildlife Refuge boundary could be taken out of multiple-use management and transferred to the US Fish and Wildlife Service.

Indirect impacts include no land disposals allowed, avoidance of sensitive and threatened and endangered species habitat, as well as exclusion of rights-of-way in some limited areas. This would lead to potential increases in the cost of project completion, as well as closing these areas to most forms of development.

From Sensitive Species
Impacts could include relocation of a lands project or depending on the sensitivity of the species, avoidance of the species or even denial of lands action. Additional coordination with the Nevada Division of Wildlife would be required for species identified as endangered by State law. All these impacts would cause delays in application processing, potentially resulting in project timeline overruns, development of species specific mitigation measures, and increased expense for the applicant.

From Lands Management

Lease Areas. Airport leases would be authorized on an as-needed basis, providing communities with airport facilities which they could not otherwise afford to purchase. These lands would not be available for residential developments. However, commercial industries could potentially be developed within the lease areas.

Recreation and Public Purpose leases would be authorized within disposal areas to enhance communities by providing lands at less than fair

market value. Leases may be authorized for schools, libraries, community centers, parks, public golf courses, fire stations, churches, community buildings, law enforcement facilities, correctional institutions and water and sewage treatment facilities.

Withdrawals. Approximately 18,250 acres of public land within the planning area would continue to be encumbered by Federal Energy Regulatory Commission withdrawals. The filing of an application for a preliminary permit with the Federal Energy Regulatory Commission automatically segregates the lands from the public land laws, pending the authorization of a licensed hydropower project. These lands can not be used for any other purpose.

From Rights-of-Way Management
Under The Plan, approximately 157,761 acres of public lands would be designated for utility corridors. Designation of corridors would lessen the encumbrances incurred on public lands by randomly placed, single-use lines. The potential exists for a loss of approximately 2,309 acres of public land identified for discretionary disposal. These corridors would be limited to very specific types of rights-of-way, with no other uses considered. Hazardous materials contamination of the soil, water, or air may result in degradation of fish and wildlife habitat. Appropriate Hazardous material planning and response will minimize these impacts.

From Acquisition
Acquisition of riparian areas and desert tortoise habitat, as well as sensitive species habitat, will enhance the BLMs efforts to ensure protection of these ecosystems.

Any acquisition of riparian habitat that is infested with Tamarisk would be identified for restoration through removal of Tamarisk. The potential for private individuals to control Tamarisk-infested lands is limited. Therefore, a seed source would continue to exist, which would lead to continued or additional infestations of Tamarisk on adjacent public lands.

Acquisition of sensitive species habitat would indirectly assist in ensuring all possible actions could be taken to avoid listing of additional species as threatened or endangered.

From Minerals Management
Mineral entry and development encumbers the land and lowers the appraisal values. High potential mineral value could also preclude disposal of the lands. Other important influences on the lands disposal program include so-called "nuisance" claims, filed on lands known for their high sale value. In cases where the mining claimant refuses to relinquish the claims, the individual or agency applying for the land disposal could be forced to buy out the claimant. Processing of validity tests, a mechanism for ridding sale parcels of "nuisance" claims, would be expensive and time-consuming.

Rights-of-Way Management

From Visual Resource Management
There would be minimal impacts to the right-of-way program. In Visual Resource Management Class II areas (approximately 968,890 acres) and Class III areas (approximately 1,727,870 acres), rights-of-way would be relocated as necessary, buried, or painted a color compatible with their surroundings to ensure scenic integrity.

From Areas of Critical Environmental Concern
Within Areas of Critical Environmental Concern, rights-of-way for new roads would be in response to specific authorized actions only or to ensure access to private property. Reclamation of temporary roads authorized through the right-of-way process would be required. (Right-of-way exclusion and avoidance areas are discussed under Rights-of-Way section above).

From Fish and Wildlife Habitat Management
Relocation of proposed project sites or Section 7 consultation would occur, as required, to reduce impacts to threatened and endangered species and their habitat. To prevent undue and unnecessary degradation of bighorn sheep lambing habitat, no new road construction will be authorized through the right-of-way program in those areas.

From Rights-of-Way Management
Under The Plan, approximately 538 miles of utility corridors would be designated, totaling 157,761 acres of public lands. Corridors would range from 1,000 to 3,000 feet in width. Minimizing the proliferation of randomly placed, single-use utility lines would better protect the scenic values and integrity of the surrounding areas. Although utility rights-of-way would not be limited to designated corridors, all efforts would be focused on utilizing corridors whenever possible and to their maximum capacity. Prospective right-of-way holders would

conserve costs through the use of existing data for environmental compliance analysis. In some instances, location and size of designated corridors could cause minimal impacts to other land uses or projects in the area not compatible with corridor use.

Authorization of future communication site rights-of-way would be limited to existing established sites, within existing rights-of-way, related buildings, and communication facilities until a site management plan has been approved for that site. This would help eliminate the proliferation of scattered single-user sites and lessen further administrative impacts to established communication sites.

Within the Las Vegas BLM District, there are 178 material site rights-of-way, totaling approximately 15,842 acres. No new material site rights-of-way would be authorized until the following are completed:

- Incorporate the terms and conditions for material site rights-of-way contained in Appendix M in all new material site rights-of-way
- Coordinate with the Nevada Department of Transportation and evaluate the need for existing sites.
- Encourage the Nevada Department of Transportation to relinquish sites no longer needed.
- Receive justification by the Nevada Department of Transportation for continued use of existing sites or need for additional sites.

Unnecessary, randomly-placed, and unmanaged material site rights-of-way that encumber public lands otherwise valuable for disposal or lease would not continue to proliferate.

Designation of rights-of-way exclusion areas would constitute a loss of 5,640 acres of public land available for linear rights-of-way and a loss of 1,005,031 acres of public land available for site type rights-of-way (excluding existing established communication sites).

Designation of rights-of-way avoidance areas would constitute a potential loss of 1,011,069 acres of public land available for all types of rights-of-way.

From Wilderness Management
No rights-of-way could be authorized within the Sunrise Instant Study Area, unless it is released from further wilderness consideration. Due to the fact this is the only area where large powerlines (500-kV and higher) can pass into the Las Vegas Valley, long delays in application approval would be expected if Congress does not release the area from Wilderness consideration.

Acquisitions Management

Consideration would be given to acquiring undeveloped private lands within all designated Areas of Critical Environmental Concern, sensitive species habitat, and the Aerojet Lands. These lands would be included within applicable designated Areas of Critical Environmental Concern to enhance the integrity of each Area of Critical Environmental Concern, as well as provide additional management opportunities to protect the values within each area.

Recreation Management

From Air, Soil, and Water Management
Construction of reservoirs, spring developments, and bighorn and upland game guzzlers would affect opportunities for semi-primitive nonmotorized recreation opportunities, depending on locations, by limiting or closing access to protect the soil and water resources. These same developments could increase opportunities for hunting, wildlife viewing and photography upon habitat improvement. Increased development of water sources could increase visitor days for hunting by 10 percent or up to 36,000 visitor days per year. Off-road vehicle events would be eliminated from traditional courses within the non-attainment area, with the exception of Nellis Dunes.

From Areas of Critical Environmental Concern
Management of these areas would eliminate off-road vehicle speed competitive events on 1,005,031 acres. The following historically held events would be directly affected: five motorcycle events in the Piute Valley, and a motorcycle event in the Mormon Mesa/Moapa area. Approximately 750 participants (racers, pit crew members, and families), and 1,000 non race-related spectators per year would be impacted. Users would be displaced to other areas, including the Nelson Hills, the Mount Stirling area, Jean Lake/Roach Lake Special Recreation Management Area, Dry Lake Valley, and Nellis Dunes Special Recreation Management Area. This displacement could increase use in the Nelson Hills by 25 percent; the Jean Lake/Roach Lake Special Recreation Management Area and the Dry Lake Valley area by 25 percent, and in the Pahrump and

Nellis Dunes Special Recreation Management Area by 15 percent.

Casual off-road vehicle use would be limited to designated roads and trails on 743,209 acres of tortoise Areas of Critical Environmental Concern. An additional 3,360 acres would be closed to all motorized uses in Hidden Valley Area of Critical Environmental Concern. This is not a change from the no action, because Hidden Valley is currently closed.

Management stipulations developed for non-speed organized rides and events passing through areas of critical environmental concern will allow a greater opportunity for recreation. The current situation where each proposed use must be individually analyzed by BLM and the U.S. Fish and Wildlife Service will end. Ride organizers and the public will have more assurance of what BLM will allow and permit. Grandfathered provisions for the larger historically run events will provide a continuity of use. The impact of area of critical environmental concern designation "landlocking" Mesquite will be partially relieved.

The temporary reduction in the number of non-speed events and entrants allowed in tortoise Areas of Critical Environmental Concern during the tortoise active season for an initial three year monitoring program should not adversely impact non-speed activities. While non-speed events are seen as growing in number and demand in the future, the current use does not exceed the temporary limits. However, should the temporary limits be made permanent as a result of monitoring, there would be an adverse impact on the future growth of non-speed events. The one-for-two provision, allowing events historically held during the active season with entrants in excess of 100 (the temporary limit is 75), such as the Silver State 300, which otherwise would not be allowed, provides a great degree of flexibility without increasing the level of use in areas of critical environmental concern. Under this provision, an event with entrants in excess of the allowed limit can be authorized if it is counted as two events of the allowable total. Therefore, overall use levels are not increased.

From Fish and Wildlife Habitat Management
Opportunities for competitive speed based off-road vehicle events would be lost on approximately 743,209 acres of public lands within the planning area due to restrictions imposed in Areas of Critical Environmental Concern managed for the recovery of the desert tortoise. This loss of opportunity would displace users to other areas such as the Jean/Roach Special Recreation Management Area, Pahrump Valley, Laughlin, and the Nellis Dunes Special Recreation Management Area. Use would be anticipated to increase by 15 percent or more in the Nellis Dunes, at least 25 percent in the Jean/Roach Special Recreation Management Area, at least 15 percent in the Pahrump Valley and Laughlin areas. Based on current volume, 5 to 10 percent of special recreation permit applications would either be denied or canceled due to time and resource constraints associated with protection of sensitive species habitat. Some of this impact has already occurred due to restrictions implemented as part of the tortoise recovery plan.

Off-road vehicle touring and free-play, hunting, camping, picnicking, and other recreational competitive and commercial activities could be restricted, eliminated, or displaced to other areas due to limitations and closures designed to protect desert tortoise habitat. Road designations in desert tortoise Areas of Critical Environmental Concern could directly affect 10 percent of all visitor use in the planning area (or approximately 173,772 visitor days).

Closure of approximately 200 acres within the Big Dune Area of Critical Environmental Concern to off-road vehicle activity for protection of crucial beetle habitat would eliminate this area from any future off-road vehicle use. It may also displace current users to other locations such as the Dumont Dunes in California.

From Lands Management
Disposal of land within the Las Vegas Valley will further displace public land users who feel they are being pushed farther and farther away from Las Vegas. While this is definitely occurring, the development of large blocks of private lands used interchangeably with BLM lands by the public is addiing to this problem.

From Rights-of-Way Management
If designated rights-of-way corridors are developed, semi-primitive nonmotorized and semi-primitive motorized recreation opportunities could be limited throughout the planning area by potential restrictions of exclusive use rights-of-way. While increased access could increase opportunities for hunting, camping, and off-road vehicle touring, racing, and free-play, there could be a loss of more primitive recreational settings. It would be more difficult to avoid the sights and sounds of human activities.

Avoidance of rights-of ways on 3,200 acres would ensure protection of significant cave and karst resources.

From Recreation Management
Areas designated as Special Recreation Management Areas would be managed to ensure that recreation opportunities are maintained in the long-term and to resolve conflicts between users and with other resource values. The area designated as an Extensive Recreation Management Area would be managed to ensure that dispersed recreation opportunities are maintained in the long term.

Designation of Special Recreation Management Areas would focus BLM efforts on opportunities available in these areas. The explosive growth in southern Nevada could increase recreation use by approximately 40 percent or 579,240 visitor days per year (total visitor days could exceed 3,475,456 visitor days annually) within the next decade.
Adoption of the Recreation Opportunity Spectrum inventory as a long-term condition to be retained would help maintain the settings in which recreational activities take place. A wide range of recreational opportunities would be possible. Recreational visitors could expect to find areas to experience primitive opportunities away from human impacts, as well as areas with improvements and actions taken to facilitate other opportunities.

Less than one percent of the planning area would be designated open for unrestricted off-road vehicle use (47 percent presently open) and less than 1 percent or 3,560 acres (no measurable change) would be closed to all motorized use. The impact of limited use designations would be; 69 percent (51 percent presently) or 2,460,100 acres would be limited to existing roads, trails, and dry washes while 30 percent (2 percent presently) or 1,079,930 acres would be limited to designated roads and trails. Overall impact to users would be minimal from these designations, since very little of the planning area is used for cross-country (off existing roads, trails, and dry washes) travel due either to rough terrain or restrictions in place to protect desert tortoise habitat.

The availability of public lands for competitive off-road vehicle events would be significantly reduced. Much of this reduced availability has already taken place as part of implementing the desert tortoise recovery plan and is merely being formalized in this Resource Management Plan. Off-road vehicle events could be allowed in Nellis Dunes, Jean/Roach Dry Lakes, Crater Flats area, Pahrump Valley to Beatty area, Laughlin area, Muddy Mountains area, Wheeler Wash area, Last Chance Range, Amargosa Valley, Nelson Hills area, and Eldorado Valley (outside of the Areas of Critical Environmental Concern).

The population growth of southern Nevada would continue to increase the demand for recreational opportunities in the planning area. This demand would primarily affect lands surrounding population centers such as Las Vegas, Laughlin, Mesquite, Boulder City, and Pahrump. Outlying areas would also receive greater demand from people seeking solitude from urbanization. Visitation is anticipated to increase by 20 percent or 289,620 visits within the next decade (total visitor days per year would equal approximately 3,185,820). This increase is projected to occur whether BLM provides additional opportunities or not.

Recreational shooters, equestrian riders, hikers, bicyclists, off-road vehicle recreationists, and other passive recreation users of public land would be directed to areas appropriate for their particular use, or where uses would be compatible. The Sunrise Mountain area would be managed for more compatible recreation opportunities, helping to eliminate the impacts associated with recreational shooters and illegal dumping.

Recreation Activity Management Plans developed for Special Recreation Management Areas would improve recreation management in areas of heavy, and potentially conflicting, recreational uses. Heavy uses in sensitive locations (tortoise habitat and archaeological sites) and overcrowding would be avoided through advanced planning.

The resource integrity and quality of area caves could be enhanced through active management, educational information dissemination to the public, and the creation of a greater sensitivity for cave and karst resources. This should lead to decreased vandalism and decreased long-term degradation.

From Minerals Management
Under this alternative, approximately 20 percent (55,314 acres) of all lands that afford opportunities for semi-primitive recreation would be open to mineral exploration and development. Opportunities for semi-primitive recreation, including hiking and horseback riding, would be eliminated as new roads are constructed and increased traffic compromises the primitive character of the landscape. Significant caves

would continue to be protected by stipulations and through withdrawals from locatable mineral entry.

All 10,000 acres of the Nellis Dunes Special Recreation Management Area would be closed to all forms of mineral surface disturbance from prospecting, exploration and mineral development.

Within the Keyhole Canyon area, 361 acres would be closed to all forms of surface disturbance from mineral development to protect important cultural, recreation, and aesthetic values.

Wild and Scenic Rivers Management

Motorized vehicle restrictions, mineral withdrawals, no land disposals, and rights-of-way avoidance along the Virgin River as part of implementing the Area of Critical Environmental Concern designation would protect the scenic, riparian, wildlife, and natural values along the river throughout the life of the Plan. If the river is not designated as a Recreational (Wild and Scenic) River, its scenic, riparian, wildlife, and natural values would remain protected through the same above-mentioned actions.

Wilderness Management

From Minerals Management
Mineral activities in Wilderness Study Areas would continue to be managed under the Interim Management Policy guidance until Congressional designation or release. In those Wilderness Study Areas that are not designated as wilderness (based on Congress' acceptance of the BLM's recommendations), minerals extraction would be limited by the mineral values present and the economics of development. Locatable mineral development, oil and gas exploration and development, and mineral material sales could impact up to 2,000 acres; viable operations would likely be large scale or open pit mines. Locatable non-metallic minerals would potentially be developed in the Resting Springs, Muddy Mountains, Arrow Canyon, and South McCullough Wilderness Study Areas.

Following release from wilderness study, mineral material sales could occur in the Nellis 1, 2, and 3 Wilderness Study Areas. Leasing and exploration activities would be anticipated for oil and gas with the potential for discovery and development in the Muddy Mountains, Arrow Canyon, and Mount Stirling Wilderness Study Areas. An additional 602 acres of long-term impacts on resources from oil and gas exploration could be anticipated. Initial geothermal investigations could be made in the Resting Springs and Muddy Mountains Wilderness Study Areas. If minerals developments are located on the peripheries of the Wilderness Study Areas, the effects on primitive and semi-primitive values would be minimal. In the event that mines and facilities were to be developed in the interior portions of Wilderness Study Areas, the impacts would be detrimental to the areas primitive and semi-primitive values.

Projected potential maximum disturbance in areas released from wilderness consideration would be 2,000 acres, based on oil and gas exploration and production (500 acres), the development of one large clay mine (500 acres), a large silica mine (500 acres), a limestone quarry (200 acres), a gypsum mine (200 acres), and 20 exploration efforts or small mines producing uncommon varieties of stone, sand, or clay (100 acres). Mitigation stipulations would lessen the impacts to primitive and semi-primitive values, but could not eliminate all damage in localized areas.

Minerals Management

From Riparian Management
The proposed withdrawal and no surface occupancy direction for approximately 9,010 acres of Riparian Management Areas (areas within 0.25 mile of springs and their associated riparian zones) would limit availability of public lands for mining claim location, mineral leasing and mineral material disposal. The withdrawal would close approximately 9,010 acres to mining claim location, mineral material disposal and solid mineral leasing. It would allow fluid mineral leasing with the stipulation that no surface occupancy occur within the Riparian Management Areas.

From Areas of Critical Environmental Concern
The proposed withdrawal of 1,005,031 acres as Areas of Critical Environmental Concern would close these areas to mineral entry. This closure would limit the availability of public lands for mining claim location, mineral leasing, and mineral material disposal.

From Fish and Wildlife Habitat Management
Withdrawal of 827,603 acres primarily for desert tortoise and special status species habitat protection would close approximately 25 percent of the district. Special management requirements resulting from desert tortoise Area of Critical Environmental Concern

designations would increase the costs of mineral operations and reclamation of disturbed areas, possibly delaying operations. Required mitigation fees could make low-unit value minerals or small-volume, high-value minerals economically questionable and have the potential for loss of income to operators.

From Cultural Resource Management
Mining operations must comply with Section 106 of the *National Historic Preservation Act* (NHPA). Cultural resources within all the designated areas of critical environmental concern would be protected by the withdrawal of eligible archaeological sites and areas from mineral law uses, and through the requirement of specific evaluation and treatment prior to surface disturbing actions.

Designations of Areas of Critical Environmental Concern or areas "closed" to off-road vehicles require implementation for inventory and mitigation procedures for all mineral exploration actions. The designation of Traditional Lifeways Areas requires consultation with Native American tribes for all actions in those areas on the effects of all mining activities. Under Section 106 of the National Historic Preservation Act, cultural resources must be identified through adequate inventory actions, evaluation of archaeological and cultural sites, determination of effect on the properties, and attempts to mitigate adverse effects. The procedures could range from simple inventory efforts to complex evaluation and mitigation activities that could indefinitely delay the proposed mineral exploration and recovery actions. Such procedures could determine that the project be considered economically unfeasible.

On remaining lands within the district, including the 420,970 acres of Wilderness Study Areas not designated as Wilderness by Congress, BLM would be allowed 15 days for inventory and evaluation of eligible sites that could be affected by the activities. The claimant would be notified of eligible sites and the procedures for protection and mitigation. In special cases, the process to conduct avoidance or mitigative activities could necessitate delays in mining operations.

From Lands Management
If the salable mineral estate is sold along with the surface estate, disposal of 175,314 acres within the district would decrease the availability of silt to the landscape industry, as well as sand and gravel to the building industry. Construction of housing and other structures on these lands would increase the demand for silt, sand, and gravel, which would already be in short supply within the Las Vegas Valley.

Existing classifications, withdrawals, and segregation (CW&S), which total approximately 166 and affect approximately 434,055 acres, limit the availability of public lands for mining claim location, mineral leasing, and mineral material disposals.

From Rights-of-way Management
Lands affected by material site rights-of-way are effectively withdrawn from entry and location under the mining law. Approximately 181 material site rights-of-way exist accounting for 15,842 acres.

From Recreation Management
Designation of two areas comprising approximately 3,560 acres as closed to off-highway vehicle use would require that a plan of operation be approved prior to commencing any mining operation, except casual use in those areas. Closure of Nellis Dunes, approximately 10,000 acres, to mining would close that area to solids, mining claim location, and mineral material disposals. It would allow fluid mineral leasing with the stipulation that no surface occupancy occur.

From Wild and Scenic Rivers Management
Designation of the Virgin River for addition to, or as an actual component of, the national wild and scenic rivers system would require approval of a plan of operation prior to commencing any mining operation except casual use in that area. However, under management direction for riparian areas, the Virgin River Area of Critical Environmental Concern would be withdrawn.

From Wilderness Management
Pending a decision by Congress as to the suitability of Wilderness Study Areas as Wilderness, no unnecessary or undue degradation of these lands will be permitted. The wilderness study areas comprise approximately 420,970 acres.

From Minerals Materials Management
Mineral material disposals can not be made from those public lands containing mining claims that have not been cancelled. This limits the availability of public lands for issuance of material sales contracts and free use permits.

Fire Management

From Air, Soil and Water Management
Fire suppression activities within the Las Vegas Valley Non-Attainment Area would continue to be managed to keep fire size to a maximum of 10 acres 90 percent of the time. This guidance would minimize impacts to air quality, from primarily particulates and haze. Use of fire suppression foams, penetrants, and retardants would continue to be prohibited in the immediate area surrounding water sources. To reduce other impacts to soil and water resources from fire suppression activities, mitigation measures would be developed on a case-by-case basis, utilizing Resource Advisors in coordination with fire management specialists. Such mitigation could include requiring that a fire line in a critical erosion area be constructed using only hand tools.

From Wilderness Management
Fire suppression activities in wilderness study areas would continue to be managed to keep fire size to a maximum of 100 acres 90 percent of time to minimize detrimental impacts to resources. All fire suppression activities must be conducted so as to comply with the non-impairment criteria in the *Interim Management Policy*.

Prescribed burning for resource enhancement purposes would be allowed only on 56,721 acres in the Virgin Mountain Instant Study Area, the North and South McCullough Mountains Wilderness Study Areas (see Map 2-11). A programmatic fire burn plan and an Environmental Assessment would be prepared for each resource enhancement area prior to the authorization of any prescribed burn. Subsequent prescribed burns would be authorized without further environmental documentation, provided that the terms and conditions of the programmatic burn plan and an Environmental Assessment are met and the authorized officer or manager concurs.

Prescribed burning for fuel reduction purposes would be allowed only on 44,343 acres in the Virgin Mountain Instant Study Area and the North and South McCullough Mountains Wilderness Study Areas (see Map 2-11). A programmatic fire burn plan and an environmental assessment would be prepared for each fuel hazard reduction area prior to the authorization of any prescribed burn. Subsequent prescribed burns would be authorized without further environmental documentation, provided that the terms and conditions of the programmatic burn plan and an environmental assessment are met and the authorized officer or manager concurs.

From Fire Management
Prescribed burning for resource enhancement purposes would only be allowed on 163,482 acres in the Ash Meadows/Amargosa Flat area, the Gold Butte grazing allotment, the Virgin River floodplains, and South McCullough Mountains (see Map 2-11). A programmatic fire burn plan and an environmental assessment would be prepared for each resource enhancement area prior to the authorization of any prescribed burning.

Subsequent prescribed burns would be authorized without further environmental documentation, provided that terms and conditions of the programmatic burn plan and the environmental assessment are met and the authorized officer manager concurs.

Prescribed burning for fire fuels hazard reduction purposes would be allowed only on 95,516 acres in the Spring Mountains, South McCullough Mountains, and Virgin Mountains (see Map 2-11). A programmatic fire burn plan and an environmental assessment would be prepared for each fuel hazard reduction area prior to the authorization of any prescribed burn. Subsequent prescribed burns would be authorized without further environmental documentation, provided that the terms and conditions of the programmatic burn plan and the Environmental Assessment are met and the authorized officer concurs.

From Hazardous Materials Management
Prescribed burns will not be conducted near sites where hazardous materials are known to exist, including millsites and dump areas.

Socioeconomic Values

From Livestock Grazing Management
The economic impact of livestock grazing closure in critical desert tortoise habitat would include the loss of all gross income ($229,482) to the regional economy. Gross income was estimated based on marketing of yearling calves at an average market weight of 500 pounds, with an average value per pound of $.90. Average calf crops of 80 percent were used and a ratio of one bull for 20 cows. Loss to 11 operators, based on a 4 percent net profit on gross income, would be estimated at $9,179. Specific information on profit or loss to operators as a result of livestock grazing closures is unknown. Individual operators may have higher or lower net profits, depending on a number of variables which range from

weather and range conditions to herd management strategies.

Thirteen operators are currently grazing 879 cattle and 16 horses on approximately 605,000 acres, with 7,424 Animal Unit Months. The current gross economic livestock production of Federal lands in the planning unit is estimated to be $342,871. Closure of grazing on critical habitat would reduce the number of active operators to five, grazing 295 cattle and 8 horses (2,601 Animal Unit Months) on approximately 329,000 acres.

If six currently inactive allotments were reactivated, 660 cattle and 11 horses (6,740 Animal Unit Months) could graze on approximately 608,453 acres. The projected gross would be $293,827, with a total net income to operators of $11,750. This would be reduced to $113,389, upon closure of five additional active allotments.

Cumulative Impacts

Cumulative impacts are those impacts that result from the incremental impact of an action, decision, or project in combination with other past, present, and reasonable foreseeable future actions, regardless of the agency (Federal or non-federal) or person undertaking such other actions. Cumulative impacts can result from individually minor but collectively significant actions over a period of time, from similar projects or actions, and from projects or actions which have similar impacts (40 CFR Part 1508.7).

Parameters

The parameters for cumulative impact analysis are used in concert with the assumptions for analysis identified in Chapter 4. These focus and direct the analysis effort to ensure that adequate information will be gathered and analyzed to make a reasoned decision.

The cumulative impact analysis is limited to the anticipated effective life of The Plan, which is 20 years.

Air, water, desert tortoise habitat, cultural resources, lands, and recreation are the only resources discussed in the cumulative impact analysis. These resources are affected by both private and BLM actions and are subject to cumulative impacts. The Plan analysis of impacts was limited to BLM actions.

Cumulative impacts to air resources are analyzed only within the Las Vegas Valley Air Quality Non-attainment Area.

A comprehensive cumulative impacts analysis on the desert tortoise for the Northeastern Mojave Recovery Unit was completed for the Ely District Caliente Management Framework Plan in cooperation with Nevada, Arizona and Utah BLM offices. The Las Vegas District used this analysis, with minor adjustments, to complete the cumulative impact analysis on the desert tortoise in the Northeastern Mojave Recovery Unit (Appendix I).

Portions of two additional recovery units are located within the administrative boundary of the Las Vegas District. These are the Eastern Mojave and Northern Colorado Recovery Units. Approximately seventeen and one percent are located within the Las Vegas District, respectively. The vast majority of the recovery units are within California.

Management objectives and direction for those portions of the Eastern Mojave and Northern Colorado Recovery Units located within the Las Vegas BLM District are consistent with those management objectives and direction identified for the Northeastern Mojave Recovery Unit. There is a clear link to the cumulative impact analysis for the Northeastern Mojave Recovery Unit, based on consistency in management objectives and direction, the Critical Desert Tortoise Habitat designations, proposal for Desert Tortoise Areas of Critical Environmental Concern, and the Clark County's Habitat Conservation Plan recommendations.

Because of this consistency in management direction between recovery units, and the relatively small area of these other recovery units within the Las Vegas BLM District, detailed analysis of cumulative effects within the Eastern Mojave and Northern Colorado Recovery Units will not be completed as part of this Proposed Resource Management Plan. Cumulative effects on the Eastern Mojave and Northern Colorado Recovery Units will be analyzed during development of Recovery Plan implementation strategies for those Recovery Units.

Increases in population generally lead to increased impacts on public land from both authorized uses (such as rights-of way) and unauthorized uses (such as illegal dumping). Both authorized and unauthorized uses increase the possibility of a release of hazardous materials. Additionally, urban encroachment near

waste site (including hazardous and non-hazardous) increase health risks to the public.

Past, Present, and Reasonably Foreseeable Future Actions

Past and Present Actions

Past and present actions in the planning area can be divided into two categories: BLM actions and all other types (including other Federal, state, local government, and private actions).

BLM Actions. Past and present BLM actions and BLM-authorized actions are partially identified and described in Chapter 3, *Affected Environment*, and the No Action Alternative of the Draft Resource Management Plan/Environmental Impact Statement. Where necessary to support a Reasonable Foreseeable Development Scenario, additional information is provided.

Other Actions. Other past and present actions in the planning area would be difficult, if not impossible, to accurately describe in this document. All private actions that would likely contribute to the cumulative impacts are assumed to have required some type of governmental approval and would, therefore, appear within the records of the various Federal, state, and local government offices.

Actions by local governments are directly tied to either the above-mentioned private actions or to BLM actions. Clark County, Nye County, and the incorporated cities of Las Vegas, North Las Vegas, Henderson, Boulder City, and Mesquite have different real property bases. In terms of their cumulative impacts, the local governments serve as permitting agencies for private businesses or individual citizens. Local governments acquire the use of public lands at nominal costs under the auspices of the Recreation and Public Purpose Act, in order to provide facilities and services such as schools, parks, and fire stations. The impacts of these acquisitions are considered in the discussion of past and present BLM actions.

The following assumptions were used in the cumulative analysis:

- Regardless of ownership, the amount of private lands developed in the planning area resulted in removal of these lands from other uses such as wildlife habitat, recreation areas, livestock grazing, and in many cases, mineral exploration and development. Within the planning area as a whole, this acreage (approximately 252,000 acres) is not substantial. In the Las Vegas Valley, however, impacts from private land development directly result in a loss of habitat (approximately 90,000 acres). The 90,000 developed acres represent approximately 38 percent of the private lands in the Las Vegas Valley.

- The State of Nevada functions primarily in the same role as local governments and owns a limited amount of real property in the planning area. Spring Mountain State Park, Valley of Fire State Park, and Floyd Lamb State Park (a total of approximately 42,046 acres or one percent of the planning area) constitute the real property of the State of Nevada in the planning area.

Reasonably Foreseeable Future Actions

BLM Actions. The preceding discussion of the alternatives identified several different areas to be managed for certain uses; acreage figures identified for these areas are utilized in this analysis to assess cumulative impacts. Reasonably foreseeable future actions related to specific on-the-ground activities are identified. In some cases, a full development scenario is presented. Those reasonably foreseeable future actions anticipated to result from BLM-initiated and authorized actions are described below by resource or program.

Air, Soil, and Water Resource Management

No reasonably foreseeable future actions are expected to occur in the planning area as a result of BLM management of air and soil resources. Management will continue to emphasize land use restrictions and project or site-specific constraints and mitigation. Reasonably foreseeable future actions, together with past and present actions, are not expected to result in unacceptable air quality in any areas outside of the existing Non-Attainment Area.

The water quality of 29 springs is projected to improve over the life of the Plan through the implementation of protective measures.

Riparian Management

Riparian areas associated with 29 springs, approximately 15 acres, are projected to improve over

the life of the Plan through implementation of protective measures. Approximately 4 miles of fence will be constructed around springs. Approximately 3,000 acres of *Tamarix* (salt cedar) will be removed along the Muddy and Virgin Rivers as a result of coordination efforts with various agencies in conjunction with the Moapa Town Board. Small infestations will also be removed as part of the project's total removal.

Vegetation Management

Rehabilitation of approximately 700 acres of disturbed areas will occur over the life of the Plan to aid in recovery of threatened and endangered species and improve their habitat. Management of this resource will continue to emphasize land use restrictions, as well as project or site-specific constraints and mitigation.

Visual Resource Management

Approved Visual Resource Management classifications would be used to establish management standards for the design and development of future projects, and the rehabilitation of existing projects in the planning area. The visual qualities common to large undeveloped open spaces would largely be retained.

Fish and Wildlife Habitat Management

Specific projects identified during the development of The Plan to improve management of fish and wildlife habitat in the planning area are shown in Table 4-3.

Forestry Management

Based on recent scientific data, Mesquite woodlands are extremely important for survival of numerous special status species. It is anticipated that limited amounts of firewood would be available for cutting, and only to ensure the health of the woodland. No wood could be sold until a woodlands management plan is completed with required environmental documentation.

Table 4-3. Proposed fish and wildlife habitat improvements.

Type of Improvement	Number of Units	Estimated Miles	Estimated Acres
Big game water developments	10-15	--	2-5
Spring developments	25-30	--	6 - 22
Riparian/aquatic habitat improvements	5-10	--	300
Tortoise proof fencing	--	200-300	--
Standard Fencing	--	10-20	--
Total	**40-55**	**210-320**	**308-327**

Livestock Grazing Management

Allotment evaluations were used to identify range improvement projects anticipated to be constructed during the 20-year span of The Plan (see Table 4-4). Livestock grazing would continue to be authorized on 11 allotments.

Table 4-4. Proposed range improvements.

Type of Improvement	Number of Units	Estimated Miles	Estimated Acres
Fences	--	0-56	0-42
Cattleguards	0-5	--	--
Corral	3	--	0-2
Pipeline	--	4-10	24-104
Water Hauls	2-5	--	.5-3
Troughs	6-18	--	--
Reservoirs	--	--	--
Wells	4-8	--	4-8
Springs (Rework)	8-30	--	4-15
Totals	**23-69**	**4-66**	**32.5-174**

Wild Horse and Burro Management

Three Herd Management Areas would have 0 populations, and three would be managed at the Appropriate Management Level. All Herd Management Areas would initially be managed at the established Appropriate Management Level identified in Chapter 2. The continued listing of additional animals as threatened or endangered species could eliminate the majority of wild equids on public lands. This worsens a conflict between Federally protected species, which may require court action for resolution. Specific projects needed for management of wild horses and burros will be identified in the Herd Management Area Plans.

Cultural Resource Management

No reasonably foreseeable future actions are expected to occur in the planning area as a result of BLM management of cultural resources. Management of this resource would continue to emphasize land use restrictions and project or site-specific constraints and efforts to mitigate adverse effects.

Lands Management

The following statistics are based on known data and reports using September 1983 through August 1995 as base dates.

Sales

Three types of land sales are discussed. They are *Santini-Burton Act, FLPMA* Section 203, and *Recreation and Public Purposes Act* sales.

Santini-Burton Act Sales

Sales would continue until designated lands have been disposed as prescribed by Public Law 96-586. Sales would be completed in accordance with Section 203 of FLPMA, at fair market value, and would occur only within the Las Vegas area. Based on historical use, sales would range from 1 to 50 acres. Since approval of the Clark County Management Framework Plan in September of 1983, a total of 2,700 acres were patented under the *Santini-Burton Act,* which is an average of 225 acres per year.

Initial *Santini-Burton Act* sales were conducted at oral auctions, but were not met receptively. Later sales were curtailed due to the National Wildlife Federation Lawsuit, which has since been resolved in favor of the BLM.

In 1982, closed bid procedures were adopted for *Santini-Burton Act* sales. Sales conducted through these procedures were more successful. If the program could be actively pursued in future years at a maximum of 700 acres per year, the remaining 6,600 acres identified for disposal under P.L. 96-586 would be sold by the year 2002. Under the 1992 Interim Cooperative Management Agreement between BLM and Clark County, it is unlikely this would happen unless the *Santini-Burton Act* area is expanded outside the McCarran Airport aircraft noise zone.

FLPMA Section 203 Sales

Disposal of public lands would continue within the areas identified in The Plan, depending on public interest and community need. Sales would occur under Section 203 authority at fair market value and would occur throughout the planning area. Based on historical use, sales would range from 1 to 25 acres, 40 to 160 acres for medium parcels, and 300 to 5,000 acres for larger parcels. Smaller parcels usually receive higher value per unit appraisals and generate more revenue to the Federal government. A total of 1,754 acres were patented under Section 203 in the past 12 years, which equates to an average of 96 acres per year.

These projections, based on previous yearly sales and the priority given to *Santini-Burton*sales, are shown in Table 4-5. With the possible decrease in *Santini-Burton* sales, there may be an increase in FLPMA Section 203 sales. The potential also exists for sale of public lands rather than exchange to generate monies to purchase environmentally sensitive lands for special management purposes. The Plan identifies a number of public lands for sale that have never been offered on the open market. This could stimulate private sale requests and speculation by commercial interests within the next 20-year period.

Recreation and Public Purposes Act Leases

Disposal of public lands would continue within the areas identified as available for *Recreation and Public Purpose* actions in The Plan. Disposals would be at

less than fair market value to accommodate state and local government entities and nonprofit organizations seeking community facilities that could not otherwise be afforded. Based on historical use, sales would range from 5 to 15 acres for smaller parcels, 20 to 80 acres for medium parcels, and 100 to 300 acres for larger parcels. A total of 3,597 acres were patented under Recreation and Public Purpose in the past 12 years, which is an average of 300 acres per year. Table 4-5 lists projections for the next 20-year period (based on Recreation and Public Purpose patents issued in previous years), such leases that could reach completion of development, and the potential for additional public facilities needed due to steady growth.

Leases

Three types of land leases are discussed below:
- *FLPMA* Section 302
- *Recreation and Public Purposes Act*
- Airport leases

FLPMA Section 302 Leases. Under The Plan, Section 302 leases or permits would continue to be authorized on public lands throughout the Las Vegas BLM District. All public lands within the Las Vegas BLM District, other than Areas of Critical Environmental Concern, would be available at fair market value to meet the needs of growing communities, industry, and free enterprise. Section 302 authorizations may also be used to resolve suspected trespass. Based on historical use, leases/permits would range from 1 to 50 acres, however one 2,720-acre lease was authorized within the District in 1995. This lease was for a law enforcement training facility and shooting range.

Based on previous annual numbers (excluding 1995) and the policy of the BLM to dispose of lands through sale or exchange rather than encumber them with temporary or long-term leases, approximately six Section 302 leases for an approximate 50 acres would be authorized for the next 20-year period. If the District takes a pro-active stand on trespass activity, lease at fair market may be a viable resolution.

Recreation and Public Purposes Act Sales.
Lease of public lands would continue within the planning area on the lands identified as available for recreation and public purposes in The Plan. Leases would be at less than fair market value to accommodate state and local government entities and nonprofit organizations seeking community facilities, that could not otherwise be afforded. Based on historical use, leases would range from 5 to 15 acres for small sites, 20 to 80 acres for medium sites, and 100 to 300 acres for larger sites (see list on Table 4-5).

Airport Leases

With the exception of Areas of Critical Environmental Concern, all public lands within the planning area are available for airport leasing under the *Airport Lease Act* of May 24, 1928, as amended. These lands could be leased at less than fair market value to meet the need for public airport facilities for small but growing communities otherwise unable to afford such lands for these facilities. A total of 1,370 acres were leased for airport purposes during the last 12-year period. The leases ranged from 60 to 860 acres.

Based on previous years and the current interest in certain areas for public airport purposes by Nye and Clark counties, approximately 6 airport leases totaling 2,000 acres will be authorized over the next 20-year period.

Agricultural Entry

Three types of agricultural entry actions are discussed below:
- *Indian Allotments*
- *Desert Land Entries*
- *Carey Act* grants.

Indian Allotments.

There would be no *Indian Allotments* authorized under The Plan. Under the No Action Alternative, one *Indian Allotment* consisting of 160 acres was authorized in 1984.

Desert Land Entry

There would be no *Desert Land Entries* authorized under The Plan. An estimated six leases for an approximate total of 2,000 acres are expected to be authorized over the next 20-year period.

Under the No Action Alternative, two *Desert Land Entries* were authorized in 1990 consisting of 498 acres.

Table 4-5. Projections of sales, leases, conveyances, exchanges, withdrawals, and rights-of-way in the planning area for the next 20 years.

LANDS MANAGEMENT

Sales ***FLPMA Section 203***

Size of Sale	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	14	1 to 25	14 to 350
Medium	5	40 to 160	200 to 800
Large	1	300 to 5,000	300 to 5,000
Total	**20**	**----**	**514 to 6,150**

Recreation and Public Purposes Act

Size of Sale	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	35	5 to 15	175 to 525
Medium	25	20 to 80	500 to 2,000
Large	5	100 to 300	500 to 1,500
Total	**40**		**1,175 to 4,025**

Leases FLPMA Section 302

Size of Lease	Number in 20 Years	Range of Acreage For Individual Actions	Total Acreage
Varied in size	6	1 to 50	50

R&PP Act

Size of Lease	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	40	5 to 15	200 to 600
Medium	100	20 to 80	2,000 to 8,000
Large	40	100 to 300	4,000 to 12,000
Total	**180**		**6,200 to 20,600**

Airport Act of May 24, 1928, as amended

Size of Lease	Number in 20 Years	Range of Acreage For Individual Actions	Total Acreage
Varied in size	6	60 to 1,000	2,000

Conveyances
FLPMA Section 209

Size of Conveyance	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	40	1.5 to 5	60 to 200
Medium	25	10 to 40	250 to 1,000
Large	5	50 to 200	250 to 1,000
Total	**70**		**560 to 2,200**

Table 4-5. Projections of sales, leases, conveyances, exchanges, withdrawals, and rights-of-way in the planning area for the next 20 years (continued).

LANDS MANAGEMENT (continued)

Exchanges

Size of Exchange	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	10	50 to 300	500 to 3,000
Medium	6	500 to 1,000	3,000 to 6,000
Large	4	2,000 to 10,000	8,000 to 40,000
Total	**20**		**11,500 to 49,000**

Withdrawals

Size of Withdrawal	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	13	10 to 1,000	130 to 13,000
Medium	11	2,000 to 5,000	22,000 to 55,000
Large	8	6,000 to 20,000	48,000 to 160,000
Very Large	11	> 20,000	220,000
Total	**43**		**290,130 to 448,000**

RIGHTS-OF-WAY MANAGEMENT

Linear

Size of Rights-of-way	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	660	0.5 to 1	330 to 660
Medium	240	5 to 20	1,200 to 4,800
Large*	40	100 to 500	4,000 to 20,000
Total	**940**		**5,530 to 25,460**

* [it is expected that large energy and nonenergy (if compatible) ROWs would be placed within designated corridors.]

Areal

Size of Rights-of-way	Number in 20 Years	Range of Acreage For Individual Actions	Range of Acreage Multiplied by Number of Actions
Small	300	1 to 5	300 to 1,500
Medium	100	10 to 50	1,000 to 5,000
Large	40	100 to 500	4,000 to 20,000
Total	**440**		**5,300 to 26,500**

Carey Act

There would be no *Carey Act* Grants authorized under The Plan. Under the No Action Alternative, there were no *Carey Act* Grants authorized within the Las Vegas BLM District.

Conveyances

Prior to enactment of FLPMA in 1976, no provisions existed for obtaining the subsurface estate with no known value with the sale of the surface estate. Although FLPMA provided for sale of the subsurface estate, until 4 or 5 years after its enactment there was no program in place to aggressively pursue simultaneous sale of both the surface and subsurface estates. In the past 9 or 10 years, the sale of subsurface estate of no known value with the surface estate was a condition of the sale. This action established an awareness by the public of the probable availability of the subsurface; more people are submitting applications for conveyance of the mineral estate on public sale parcels purchased after 1976. It is probable that this trend would continue into the future, but at a declining rate since both estates are being conveyed simultaneously, when appropriate, with BLM motion sales.

Issuance of Section 209 conveyances would be for the mineral estate of no known value under the following conditions: 1) if Federal ownership precludes appropriate non-mineral development, and 2) such development is a more beneficial use of the land than the mineral development. Based on historical use, conveyances would range from 1.5 to 5 acres for small parcels, 10 to 40 acres for medium parcels, and 50 to 200 acres for large parcels. A total of 214 acres were patented under FLPMA Section 209 conveyances in the past 12 years. Based on previous years and the fact that both surface and subsurface estates are now disposed simultaneously, a gradual decline in this type of conveyance could be expected. Projections for the next 20-year period are listed in Table 4-5.

Exchanges

Disposal of lands under the exchange authorities would continue as long as the BLM encourages local government and private individuals to purchase environmentally sensitive lands, or lands rich in valuable resources that would enhance Federal land management. These lands could then be exchanged for public lands within the disposal areas identified in The Plan. All exchanges may not occur in the areas identified, because interested parties outside the state may seek legislative exchange as was done in the *Nevada-Florida Land Exchange Authorization Act* of 1988 (Aerojet). Historically, exchanges ranged from 50 to 300 acres for small parcels, 500 to 1,000 acres, and 2,000 to 10,000 acres for large parcels. Within the past 12 years, however, there was a total of 17,768 acres of public land disposed under exchange.

Based on previous years and the actual acreage that BLM would prefer to acquire and could realistically manage, it is unlikely that a large increase in exchanges would be completed. There should be an equivalent gain in acreage that is environmentally sensitive or rich in valuable resources that would enhance Federal land management. Projections for the next 20-year period are shown in Table 4-5.

Withdrawals

The Plan identifies withdrawals to be completed on public lands identified in each of the alternatives. Although other Federal agencies have not identified lands for withdrawal in this Resource Management Plan, based on historical use, it is possible that they may request lands to be withdrawn for specific projects at a later date. Also, based on historical use, withdrawals would range from 10 to 1,000 acres for small parcels, 2,000 to 5,000 acres for medium parcels, and 6,000 to 20,000 for large parcels. A total of 341,373 acres were withdrawn for the use of other Federal agencies. Benefitting agencies were the U.S. Forest Service, Bureau of Reclamation, Bureau of Indian Affairs, Federal Aviation Administration, and Federal Energy Regulatory Commission.

Other Bureau of Reclamation lands currently under withdrawal are in the process of being relinquished back to the BLM. Given the protection allowed by designating specific Areas of Critical Environmental Concern, the potential exists for a decrease in the number of withdrawals requested for the protection of valuable natural resources. Projections for the next 20-year period are listed in Table 4-5.

Rights-of-Way Management

All requests for rights-of-way on or across public lands are not strictly linear or areal. Some rights-of-way are a combination of both types. Examples

include floodwater detention basins and related flood control channels; electric power generation stations and related transmission lines; water wells and related water distribution lines; and communication sites and related access roads. Usually the primary use is the determining factor in whether a right-of-way is categorized as linear or areal. Most rights-of-way would occur within the Las Vegas Valley (80 percent). The others would be in Laughlin (4 percent), Pahrump (7 percent), Mesquite (3 percent), Moapa (3 percent) and Searchlight (3 percent).

Linear Rights-of-Way

Requests for linear rights-of-way across public lands within the planning area would continue in conjunction with private lands development. Rights-of-way would include access roads and highways, water and power utility lines, sewage lines and flood control channels. Based on historical use, future rights-of-way would range from 0.5 to 1 acre for small projects, 5 to 20 acres for medium projects, and 100 to 500 acres for large projects. Within the past 12 years, there were 817 linear rights-of-way authorized for a total of 2,979 acres. Projections for the next 20-year period are shown in Table 4-5.

Areal Rights-of-Way

Requests for areal (non-linear) rights-of-way on public lands within the planning area would continue with population growth and the need for co-facilities for linear rights-of-way. Rights-of-way would include communication sites, flood control basins, water and power utility substations, well sites, and sewage ponds. Based on historical use, future rights-of-way would range from 1 to 5 acres for small projects (such as communication sites), 10 to 50 acres for medium projects, and 100 to 500 acres for large projects. Within the past 12 years, 229 areal rights-of-way were authorized for a total of 96,050 acres. Projections for the next 20-year period are listed in Table 4-5.

Recreation Management

It is anticipated that 680 to 820 competitive off-road vehicle events will be authorized on 1,200 to 1,520 miles of existing courses during the life of the Resource Management Plan. An additional 300 competitive events will be authorized on 10,000 acres within the Nellis Dunes Special Recreation Management Area; the entire area is anticipated to be impacted during the life of the Resource Management Plan.

Wild and Scenic Rivers Management

The Virgin River would be evaluated for eligibility as a Recreational River. Future management of the river will depend on the outcome of that inventory and evaluation.

Wilderness Management

Congress is anticipated to designate some wilderness within the planning area. Wilderness Management Plans will be developed and implemented for those areas designated. Wilderness Study Areas not designated by Congress will be released from management under the Interim Management Policy and be managed according to management direction provided in the approved Resource Management Plan.

Minerals Management

Reasonably foreseeable future actions resulting from BLM management of minerals are described below. Several scenarios were designed to discuss the complexities for potential Federally-owned minerals on public lands. These minerals are categorized as locatable, leasable, or salable, depending on the kind of mineral.

Leasable Minerals

(Disposal is discretionary) - Leasable minerals include:

- All minerals on acquired lands, except saleable minerals.
- All minerals on the Outer Continental Shelf.
- Geothermal resources and associated by-products. Coal, phosphate, oil, and gas.
- Chlorides, sulfates, carbonates, borates, silicates, and nitrates of sodium and potassium.
- Sulphur in the states of Louisiana and New Mexico. Oil shale, native asphalt, solid and semisolid bitumen, and bituminous rock, including oil-

impregnated rock or sands from which oil is recoverable only by special treatment after the deposit is mined or quarried.

Locatable Minerals

(Disposal is nondiscretionary) - Locatable minerals include:

- Uncommon varieties of sand, gravel, stone, pumice, pumicite, cinders, and exceptional clay.
- All "valuable mineral deposits" that are locatable under the *Mining Law* of 1872, except those specifically excluded below.

Salable Minerals

(Disposal is discretionary) - Salable minerals include:

- Petrified wood and common varieties of sand, gravel, stone, pumice, pumicite, cinders, and clay.

- All minerals not defined as locatable or leasable.

Leasable Minerals

The legal and regulatory framework for issuance and management of mineral leases is provided in the following:

- *Mineral Leasing Act* of February 25, 1920, as amended (41 Stat. 437; 30 U.S.C. 181 et seq.).
- *Acquired Lands Act* of August 7, 1947 (61 Stat. 913; 30 U.S.C. 351-359).
- *Geothermal Steam Act* of December 24, 1970 (84 Stat. 1566; 30 U.S.C. 1001-1025).
- 43 CFR, 3100 through 3599.

These regulations apply where public interest exists for development of oil, gas, geothermal, coal, and non-energy leasable mineral resources.

Stipulations are attached to leases and permits to assure protection of nonmineral resources that are susceptible to impacts resulting from the exploration and development of leasable mineral resources.

Fluid Leasable Minerals

To formulate scenarios, generic "Oil Fields" will be developed to understand the potential impacts to Federal lands. The model will provide a range of projected disturbances and an array of probable land uses. In reality, disturbances would vary from oil field to oil field.

Background Description. The entire planning unit is located within or adjacent to the geologic overthrust belt. This belt extends through the mountain areas of the North American continent from Alaska to Central America. The belt passes through Wyoming, Utah, and Nevada and has been the subject of major exploration efforts leading to oil and/or gas production in Wyoming, and Utah. Although located within the overthrust belt, oil production in Nevada is technically considered to be producing from a non-typical (that is, non-overthrust) geologic structure.

In southern Nevada, the geology of the belt is extremely complex having been folded, fractured, faulted, thrust, and overthrust many times through geologic history. Sedimentary rocks that comprise the overthrust belt are also overlain and interbedded with igneous rock. Sediments up to 30,000 feet thick make this the largest frontier exploration area in the contiguous 48 States.

Considerable difference of professional opinion exists as to petroleum potential. The U.S. Geological Survey Circular 902-H, *Petroleum Potential Wilderness Lands in Nevada*, concluded that potential for oil is low in the planning unit. U.S, Geological Survey Open File Report 88-450 also discusses the relatively low geologic petroleum potential of southern Nevada.

Proponents of further exploration in the belt cite as evidence the discovery of oil in Railroad Valley in Nye County, Nevada. Apache Corporation's Grant Canyon No. 3 well was the most prolific onshore, free flowing vertical well in the contiguous United States with a production rate as high as 4,100 barrels of 26° gravity oil per day (BOPD) from the Devonian Guilmette Formation. The well initially flowed at 2,272 BOPD. Completed in August 1984, it began producing water in May 1991, but was shut down in

October of the same year. Nevada oil production decreased 50 percent in 1993, as compared to 1992, due to other high volume producers in the Grant Canyon field.

Exploration Phase. The first exploration well drilled in Clark County was completed in 1929 near Arden, 15 miles southwest of Las Vegas. An area near Mesquite in the northeastern part of the county was believed to be a prospective oil area, but no wells are known to have been drilled in Nevada as a result of that promotion.

Some sporadic drilling occurred in the 1940s, but the more serious efforts began in 1950 when exploration throughout Nevada increased significantly. Although numerous wells have reported oil shows, the lack of a discovery and the general decrease in Nevada drilling in the late 1960s and early 1970s resulted in few wells being drilled in Clark County until the early 1980s. Some of these recent wells were drilled to test the possibility of "overthrust belt" oil fields like those in western Wyoming and northeastern Utah. The two most recent wells were drilled in 1992 in Nye county. Both of these wells were dry and were abandoned.

The deepest well drilled in Nevada, to date, is in Clark County on Mormon Mesa. In 1980, Mobil Oil Corporation drilled the Virgin River U.S.A. No. 1-A to a depth of 19,562 feet. It was an unsuccessful overthrust test. As of March 1, 1996, there were 41 oil and gas leases involving 54,738.54 acres in the planning area. No new leases are being issued pending finalization of the Resource Management Plan.

Geophysical Data Acquisition: Acquisition of geophysical data, emphasizing procurement of seismic data, will continue in the future. Lines will be run to obtain additional data in the vicinity of previous wells and in outlying areas. Estimates are that approximately 10 miles of seismic lines will be run each year. The best available technique will be used when completing these surveys and could be either energy or non-energy type studies. Energy type studies include vibration, above ground shot, shallow hole shot, and deep hole shot methods. Non-energy type studies could include magnetic declination surveys and the use of remote sensing techniques. Vibration and non-energy type studies generally cause negligible surface disturbance, and the use of explosives will cause some surface disturbance.

Seismic studies conducted by the petroleum industry usually consist of sending and receiving sound signals through the earth. Subsurface rock layers transmit variable velocities to the surface which are portrayed on graphs and then interpreted by geophysicists. The signals are generated by surface (shallow hole) dynamite blasts, deep hole (150+ feet) dynamite blasts, or vibroseis machines. The vibroseis process involves dropping a heavy weight on the surface of the earth and recording the shock waves. It requires surface access by heavy duty vehicles. A more detailed description of all phases of oil and gas exploration and development is provided in the mineral potential report.

Seismic evaluation in the valleys in southern Nevada is difficult due to up to 10,000 feet of alluvial fill and the great depth of sediments to penetrate. The alluvial material absorbs, deflects, and distorts signals passing through the material. New technology is available that helps clarify and interpret the distorted signal. Probable exploration would consist of 150 feet deep dynamite shots on the mountains and across the valleys. Depending on the structures being studied, the seismic line could be as short as several miles or as long as 40 to 60 miles. Seismic testing in Wilderness Study Areas on mountainous terrain would consist of helicopter operations to drill the blast holes. Blast holes in the valleys would be placed by low ground pressure all-terrain vehicles or would use existing roads and trails. Helicopter operations over the entire seismic line may also be used.

If a stratigraphic test well is drilled, it would be strategically placed to tie seismic information together with the drill data. If results of the seismic information, geophysical evaluations, and stratigraphic test well so indicate, an exploration well would be drilled. Based on oil and gas field location in the Wyoming and Utah portions of the overthrust belt, exploration wells are likely to be in the mountainous

areas of Wilderness Study Areas. Such location will require full service roads through mountain terrain, unless located at the end of the present cherry stem road or trails that penetrate some of the Wilderness Study Areas.

Projecting for the 20-year life of the Resource Management Plan, a gradual increase in exploration is projected. This level of activity will depend on the success of exploration to the north where discovery has already been made. The high risk factor associated with the complex and deep structures, multi-million dollar wells, and the low current and projected value of oil are all factors influencing a relatively low exploration program.

Within the Wilderness Study Areas, it is expected that two deep exploration wells will be drilled. The Muddy Mountains, Arrow Canyon, and Mount Stirling Wilderness Study Areas, in that order, are expected to undergo additional seismic testing. Only one major new access road is expected to be built to drill one exploratory well or stratigraphic test well. The other exploratory drill site is expected to be on or near current access roads or trails.

Oil and Gas Development, In terms of an economic development field size, oil and gas development has not been formally established in the planning area. Hypothetically, a shallow 100 barrel per day well with a 100,000 recoverable barrel field could return drilling and investment costs in a few years. Nevertheless, a large field at over 10,000 feet depth would require many millions of barrels to be economically feasible.

Development of wells would follow existing BLM and state regulations and bonding. Production facilities (well heads) would be low profile, utilizing natural colors and occupying less than 100 square feet. Gathering lines would extend from the individual wells to a common collection point, consisting of storage tanks and loading facilities for truck transport. These lines would be either buried or be on the surface. If the field is large enough, a pipeline would be built to the nearest rail line or refinery.

A large field in southern Nevada is expected to consist of 18 to 20 wells and could extend 6 to 10 miles long and 3 miles wide. The project life of the field is 35 years, at which time all facilities would be removed and the sites rehabilitated.

Based on past drill history, most of the drilling will occur outside of Wilderness Study Areas. It is estimated that two wells will be drilled in the geographic areas currently known as Wilderness Study Areas. Historically, oil discoveries in Nevada have been exclusively in the high potential valley bottoms, none of which are known in the planning area. However, new theories have outlined a possible overthrust "play" in some of the lower potential mountainous regions. No more than three drilling or workover rigs will be in operation in a field at the same time. Limited reclamation work would occur until the producing field is abandoned. Producing fields would not be abandoned during the land use planning period. Disturbed land within any producing field that is closed or abandoned would be reclaimed.

Considerable design flexibility can be incorporated into the field development to mitigate environmental impacts. For instance, while Nevada state law specifies one development per square mile, it may make sense to drill multiple wells from one site, which is what is done in the Prudhoe and Kaparuk fields in Alaska. These wells use slant drilling techniques with several wells per pad. Federal well spacing requirements are one well per 40 acres for wells 5,000 feet or less in depth, and one well per 160 acres for wells greater than 5,000 feet in depth. Normally, drilling depths are greater than 5,000 feet; therefore, most of the well spacing can be expected to be 160 acres. The average size for a producing oil and gas field in Nevada is 640 acres.

Beginning geophysical surveys may cross the entire District in a very broad brush fashion. These surveys will attempt to piece together the overall regional geology. After geologic structures of interest are located, surveys of specific areas will be intense and may be repeated frequently. An estimated 50 to 150 miles of line will be surveyed per year. Each year, geophysical exploration would disturb up to 200 acres. There will be 100 percent reclamation completed on these lines by the year's end. This reclamation will be entirely from efforts taken by the geophysical companies.

The risk factors involved would usually limit drilling to depths of 6,000 feet, although some operators would speculate that larger reservoirs would be encountered at greater depths (10,000 to 15,000 feet). Production rates of each field would range from negligible amounts (10 barrels of oil per day [BOPD]) to extremely prolific (6,300 BOPD). The production life of a field would last from 18 months to 35 years. The complexity of the geology, depth, high cost of drilling to 20,000 feet, restoration and development costs in rugged terrain, and continued low price for oil are not very conducive to active deep depth drilling unless detailed geological information is available in advance.

Future Exploration Activity. Exploration for oil and gas will presumably continue in the future. This exploration will include seismic surveys and wildcat drilling. It is anticipated that 40 wildcat wells will be drilled in the next 20 years. It is also anticipated that these wells will not lead to the discovery of any oil fields. This is contrary to the current industry standard that for every 20 wildcat wells drilled, one will have a discovery. To date, 67 wildcat wells have been drilled in the planning area without any discovery.

The projected quantity and amount of surface disturbance for the projected exploration well activity is listed in Table 4-6. The total acreage disturbed would be 416.38 acres. This is equal to 0.012 percent (416.38 acres ÷ 3,331,895 acres) of the BLM-managed surface within the planning area. Although reclamation requirements apply to all acreage, this is not reflected in the estimates above. All disturbed areas are expected to be eventually reclaimed.

Future Production Activity. Projections are minimal. It is anticipated that a few oil fields could be developed within the planning area during the 20-year anticipated life of this plan. However, if an oil field was discovered, 4 to 20 wells would be drilled in each of two oil fields (one minor and one major). Each field would contain 3 producing wells, up to 2 injection wells, and 2 to 17 plugged and abandoned wells. Because tank batteries would be placed on existing drill pads, additional surface disturbance would not be required.

Each field would be located 1 to 6 miles from a major existing road and require a 50-foot wide access road surfaced with 3 feet of gravel. Additionally, 4 to 5 miles of 30-foot wide service road with a 2-foot gravel surface would be required. Drill pads would not exceed 2 acres and would be surfaced with 2.5 feet of gravel. Between 1 and 6 miles of pipeline would be laid on a 15-foot wide disturbed area. Gravel would be obtained locally from pits not exceeding 10 feet in depth. An oil refinery disturbing 20 acres would be constructed in conjunction with the major oil field. A 30-mile long pipeline disturbing 55 acres of surface would be built from the new oil fields to the proposed refinery. The projected disturbance is listed in Table 4-7.

Two oil fields could possibly be discovered within the planning area during the 20-year anticipated life of this Plan, contingent on the release of lands being considered for Wilderness designation. These kinds of fields are projected as one small (four wells) within the Arrow Canyon Wilderness Study Area, and one larger field (20 wells) within both the Muddy Mountains Wilderness Study Area.

Drilling trends could fluctuate greatly, from an absence of drilling for up to five consecutive years, to half of the wells being drilled in a ten-year period. Each new discovery would foster an increase in drilling activity that could last for two to three years. The amount of acreage disturbed would range from a low of 41 acres, to a high of 253 acres. Although reclamation requirements apply to all acres, the disturbed acreage estimates do not reflect these activities.

Solid Leasable Minerals.

The exploration and mining scenarios for locatable minerals are used to explore the potential impacts from this resource.

Future Exploration Activity. During the proposed 20-year life of this plan, one prospecting permit would be

received for the White Basin area.. The prospecting permit would equate to a Scenario "C" and would be a two-year project to drill and evaluate the area's mineral potential. This permit is projected to possibly result in lease issuance and development for sodium. The amount of disturbance expected is listed in Table 4-7.

Future Mining Activity. Expectations for solid leasables is similar to the exploration discussion. One mine (located in White Basin) would be developed under Scenario "F." Acreage disturbed would range from a low of 335 acres to a high of 3,020 acres. This is equal to between 0.010 percent (335 acres ÷ 3,331,895 acres) and 0.09 percent (3,020 acres ÷ 3,331,895 acres) of the BLM-managed surface within the Las Vegas BLM District. Although reclamation requirements apply to all acres, reclamation activities are not included in the estimates. All disturbed areas are expected to be eventually reclaimed. Projected disturbance for the exploration and mining development is shown in Table 4-7.

Locatable Minerals

Exploration for and development of locatable mineral resources is provided by the *General Mining Law of May 10, 1872, as amended (17 Stat. 91; 30 U.S.C. 21 et seq.).* 43 CFR 3802 and 3809 provide protection to nonmineral resources, provide reclamation of disturbed areas, and provide for mineral exploration and development, while assuring that activities are conducted in a manner that prevents unnecessary or undue degradation.

Scenario Models. Several generic *mining notice* and *plan of operations* scenarios were created as models to show the complexity and variety of potential impacts to Federal lands. The models illustrate a range of projected disturbances within an array of probable land uses. In reality, disturbances would presumably vary among deposits.

(A) Exploration: mining notice Scenario: In this scenario, there could be county bladed roads, drill pads, trenches, or cut and fill roads. Average disturbance would be 3 acres per year per notice. An average drill program would range from 1 to 15 holes per year. A typical pad would be 20 feet wide by 40 feet long. Holes would often be drilled in roads with the road serving as the drill pad. Cumulative unreclaimed disturbance would not be allowed to exceed 5 acres in any individual project area.

Table 4-6. Projected quantity of material and surface disturbance needed for future fluid mineral exploration wells.

Feature	Square Feet (Each)	Cubic Feet (Each)	Number of Wells	Total Square Feet	Total Cubic Feet	Total Acres
Pad[1]	160,000	400,000	40	6,400,000	16,000,000	146.92
Road[2]	211,200	422,400	40	8,448,000	16,896,000	193.94
Total	**371,200**	**822,400**	**40**	**14,848,000**	**32,896,000**	**340.86**
Pit for extraction of material[3]: 32,896,000 cubic feet ÷ 10 feet maximum depth =					3,289,600	75.52
Total surface disturbance in acreage						**416.38**

Key:
1 Drill pads are 160,000 ft² (400 feet x 400 feet, constructed on a gravel base 2½ feet deep utilizing 400,000 ft³ (160,000 ft² x 2½ feet) of gravel.
2 Two miles of access roads, each 20 feet wide, are required for each well. Road disturbance is projected to be 211,200 ft² (10,560 feet x 20 feet). They would be constructed on a two-feet deep base utilizing 422,400 ft³ (211,200 ft² x 2 feet) of gravel.
3 All gravel would be obtained locally. Gravel pits would be a maximum of 10 feet deep.

Table 4-7. Projected disturbance following exploration and discovery of leasable minerals actions.

Discovery of an Oil Field:		
Disturbance		**Total Acres**
Well pads		8 - 40
Service roads		15 - 18
Access roads		6 - 30
Pipelines		2 - 66
Refinery		0 - 20
Gravel pits		10 - 79
Total		**41 - 253**
Exploration and Development of a Mine		
Scenario	**Number**	**Total Acres**
C	1	5 - 10
F	1	330 - 3,010
Total	**2**	**335 - 3,020**

(B) Mining Operation: mining notice. In this operation, the miner could pursue a placer deposit or a lode deposit. A front end loader and a bulldozer could be utilized. Typically, the miner would be following high grade mineralization that requires minimal processing facilities. Average disturbance would range from two to four acres per year. Cumulative unreclaimed disturbance would not be allowed to exceed 5 acres in any individual project area.

(C) Exploration: plan of operations. In this operation, the mining operator would disturb 5 to 10 acres of land per year. These projects would not normally last more than two to five years. Roads, trenches, and drill pads would be the predominant surface disturbances. An average drill program would range from 15 to 30 holes per year. Up to 200 holes could be drilled in the project area. Closer spacing of holes and more intense programs would normally be associated with the defining of a mineral resource. It is possible that some of these programs would start under a mining notice and then change to a plan of operations when they exceed the surface disturbance threshold of 5 acres.

(D) Small Enterprise: Plan of Operations. In this operation, a small scale operator would pursue a working mine. The small scale operator could be mining a high grade deposit, old tailings, or a deposit which is too small for the larger operators. This operation could be the mining of building stone, industrial minerals, precious metals, or gems. The operators would attempt to operate within favorable economic windows with little capital investment and low operating costs. This operation could employ 1 to 5 people. The disturbance is listed in Table 4-8.

(E) Small-to-Moderate Mine: plan of operations. This operation could be mining industrial minerals, base metals, precious metals, or gems. It could be an open pit gold heap leach operation utilizing a leachate such as cyanide. This mine would have an open pit to pursue the desired commodity. A processing or mill facility would be required. A heap leach pad would only be used for the gold operation. Typically, gold deposits would be low grade with a cut-off grade of 0.025 ounces of gold per ton. This operation could have grades of 0.05 to 0.1 ounces of gold per ton, but the high grade ore would be the exception. In-place gold reserves would be in the neighborhood of 50,000 to 100,000 total ounces of gold. Normally, this operation would employ 15 to 40 people and have a mine life of 3 to 6 years. The disturbance is listed in Table 4-8.

(F) Large Mine: plan of operations. This operation could be mining industrial minerals, base metals, precious metals, or gems. This mine would have one or more open pits to pursue the desired commodity. A processing or mill facility would be required. A heap leach pad would only be used for gold operations. The size of the open pit, type of processing facility, and method of tailings disposal would depend on the commodity being mined. A molybdenum/copper circuit would require larger tailings disposal areas than a gold circuit. Normally, this operation would employ 300 to 600 people and have a mine life of at least seven years. Numbers of employees would likely increase during construction phases of the operation. Water wells, power lines, parking facilities, and other ancillary facilities would be required in advance of production. Disturbance would be greatly influenced by terrain and the engineering ability to use the existing topographic features. The projected disturbance is shown in Table 4-8.

(G) Brine Mine: plan of operations. This operation would pump one or a combination of the following brines: lithium, sodium, potassium, boron, magnesium, or any metal bearing brine from the

Table 4-8. Projected disturbance from implementation of locatable minerals plans of operations.

Small Mine:	
Disturbance	**Total Acres**
Roads	2 - 5
Processing facilities	1 - 2
Heap leach sites	0 - 10
Administrative sites	½ - 1
Pit or scrape	¼ - 10
Ore stockpiles	½ - 4
Overburden storage	½ - 5
Total	**5 - 37**

Small-to-Moderate Mine	
Disturbance	**Total Acres**
Roads	6 - 10
Open pit	10 - 20
Ore stockpile	5 - 30
Leach pads and ponds	20 - 30
Plant facilities	0 - 5
Power lines	0 - 5
Water wells	1 - 5
Overburden/waste	40 - 65
Total	**82 -170**

Underground Mine:	
Disturbance	**Total Acres**
Roads	5 - 50
Processing facilities	5 - 15
Headframe or portal	5 - 10
Ventilation	5 - 10
Tailings disposal	25 - 50
Total	**45 - 135**

Large Mine	
Disturbance	**Total Acres**
Open pits	100 - 500
Leach pads and ponds	100 - 500
Mill buildings	15 - 160
Overburden storage	100 - 400
Tailings ponds	0 - 1,700
Haul roads	30 - 50
Ore stockpiles	30 - 50
Administration, engineering, shop maintenance buildings	50 - 100
Access roads	5 - 50
Total	**430 - 3,510**

Brine Mine:	
Disturbance	**Total Acres**
Processing facilities	10 - 25
Pipelines and roads	50 - 150
Power lines	5 - 20
Evaporation ponds	1,500 - 5,000
Well sites	5 - 20
Salt storage	50 - 150
Overburden storage	50 - 50
Administrative sites	5 - 25
Total	**1,675 - 5,440**

aquifer. A series of evaporation ponds would be constructed. The solution would be allowed to concentrate in the ponds. The solution would concentrate as the water evaporates. The concentrated solution would be run through a mill to remove the desired product. Salt would ultimately be the product left in the pond. The salt or metal or both would be sold as the desired product. The projected disturbance is shown on Table 4-8.

(H) Expansion: Plan of Operations. This operation would not be a wholly new mining venture, but would occur adjacent to an existing operation. It would be an expansion of an existing mine to take advantage of a new ore deposit, new technology, changing economics, or changing company philosophy. A mine could have more than one expansion during its life. This acreage could be used for a new open pit, pit expansion, leach pad, facilities, tailings expansion, waste rock expansions, and others. This model would be projected to disturb an additional 120 to 360 acres, beyond the estimates shown on Table 4-8.

(I) Underground Mine: Plan of Operations. In this operation, the operator could be mining base metals, precious metals, or gems. This operation would require a higher grade of ore than is needed for an open pit mine. Although an underground mine would require less surface acres than an open pit mine, the costs to remove a ton of material would be much higher. Indirect impacts of subsidence and acid water drainage can result from this operation. The mine and processing facilities would often be separated to take advantage of terrain. Typically, an underground mine would be very capital intensive and require extensive development work in advance of production. Normally, this operation would employ 50 to 175 people and have a mine life of 8 to 15 years. The projected disturbance is shown on Table 4-8.

Future Exploration Activity. Exploration would continue within those parts of the planning area that remain available for locatable mineral activity. Drilling programs would attempt to accomplish: 1) the complete assessment work to hold the mining claims pursuant to the *General Mining Law of 1872, as amended*, and/or 2) evaluate a mineralized area as a potential mine.

Exploration activity would vary in a pattern that follows commodity prices. When commodity prices are up, activity would be up. Work conducted during this foreseeable future would occur across the parts of planning area available for locatable mineral activity in mineral potential zones rated as low, moderate, and high. Programs would be concentrated within mining districts, surrounding existing mines, and around new discoveries.

It would be projected that 46 new Scenario "A" operations would take place each year, along with 10 amendments to existing mining notices. It would be projected that 5 new Scenario "C" operations would take place each year, along with 2 amendments to existing plans of operations. During a year, exploration pursuant to a mining notice would disturb 168 acres [(46 + 10) (3 acres)], and that exploration pursuant to plans of operations would disturb between 35 and 70 acres [(5 + 2) (5 acres to 10 acres)]. This exploration would be outside of existing mine project areas. This would total between 203 and 238 acres of new disturbance each year.

Operations pursuant to a Scenario "B" mining notice would stay constant. Currently, there are 20 such operations within the Las Vegas BLM District. These operations would relocate during the life of a plan of operations, but the acreage would remain constant. This would total between 40 and 80 acres [(20) (2 acres to 4 acres)] of existing disturbance each year. Generally, these operators would be working in historic mining districts.

Future Mining Activity.

Projections. The following discussion includes projections for selected operations in the planning area. Scenarios "D" through "I" are used in the foreseeable development scenario. Scenarios "D" through "G", and Scenario "I" focus on new mines or actions, not existing operations. Only Scenario "H" would apply to existing mines. These actions would be mainly projected in moderate or high potential zones, although many factors could lead to development in low potential areas. Based upon the proposed 20-year life of the Resource Management Plan, the total projections are listed in Table 4-9.

Acreage disturbed would range from a low of 15,490 acres to a high of 33,970 acres. This equals between 0.465 percent (15,490 acres ÷ 3,331,895 acres) and 1 percent (33,970 acres ÷ 3,331,895 acres) of the BLM-managed surface within the Las Vegas BLM District. It is important to note that reclamation requirements apply to all of these acres. These estimates do not account for reclamation. It is expected that all disturbed areas will be eventually reclaimed.

Table 4-9. Projected and current disturbances for future locatable actions.

Future Mining Projections Under Scenarios A through I

Scenario	Number	Total Acreage
A	(46 + 10) x 20 = 1,120	(1,120)(3) = 3,360 to 3,360
B	20 x 20 = 400	(400)(2 to 4) = 800 to 1,600
C	7 x 20 = 140	(140)(5 to 10) = 700 to 1,400
D	2 x 20 = 40	(40)(5 to 37) = 200 to 1,480
E	1 x 20 = 20	(20)(82 to 170) = 1,640 to 3,400
F	0.1 x 20 = 2	(2)(430 to 3,510) = 860 to 7,020
G	0 x 20 = 0	(0)(1,675 to 5,440) = 0 to 0
H	1 x 20 = 20	(20)(120 to 360) = 2,400 to 7,200
I	0.1 x 20 = 2	(2)(45 to 135) = 90 to 270
Total	**159.2 x 20 = 3,184**	**10,050 to 25,730**

Current Disturbances: Number of cases by case type from 1981 through 1995

Type	Active	Inactive	Closed	Total
Non-Wilderness Plans	29	8	75	112
Wilderness Plans	1	7	20	28
Notices	205	5	446	716
Total	**295**	**20**	**541**	**856**

Current Disturbances: Percentages of disturbances with reclamation from 1981 through 1995

Type	Reclaimed Acreage	divided by	Disturbed Acreage	Percentage of Disturbed Acreage Reclaimed
Notices	1,338 acres	÷	2,148 acres	= 62.29 percent
Plans	3,515 acres	÷	5,180 acres	= 67.86 percent
Total	**4,853 acres**	÷	**7,328 acres**	**= 66.23 percent**

Projected and Current Surface Disturbances

Type Scenario	Current Disturbed Acreage	plus	Projected Disturbed Acreage	Total Disturbed Acreage
Minimum	10,050 acres	+	2,475 acres	= 12,525 acres
Maximum	25,730 acres	+	2,475 acres	= 28,205 acres

Type Scenario	Total Disturbed Acreage	divided by	Planning Area Total Acreage	Total Percentage of Disturbed Acreage
Minimum	12,525 acres	÷	3,331,895 acres	= 0.376 percent
Maximum	28,205 acres	÷	3,331,895 acres	= 0.847 percent

Summary of Past and Projected Disturbances

Category of Disturbance	Acres	Percent of Planning Area
Notices and plans proposed from FY1981 through FY1995	7,328	0.220
Notices and plans still requiring reclamation	2,475	0.074
Foreseeable future low	10,050	0.302
Foreseeable future high	25,730	0.772
Total unreclaimed and foreseeable future low	12,525	0.376
Total unreclaimed and foreseeable future high	28,205	0.847

Current Disturbance. The amount of acres disturbed, identified by case file type, from fiscal year 1981 through fiscal year 1995 is summarized in Table 4-9. From 1981 through 1995, the disturbance proposed under mining notices was 2,148 acres (716 x 3 acres), and the disturbance proposed under plans of operation was 5,180 acres (140 x 37 acres), for a total disturbance of 7,328 acres. Not all acreage was disturbed. To close a mining notice case file, all disturbed areas must be reclaimed to the standard described in 43 CFR 3809.1-3(d). To close a plan of operations case file, all disturbed areas must be reclaimed to the standard described in the approved plan.

Reclaimed mining notices equal 1,338 acres (446 x 3 acres). Reclaimed plans of operation equal 3,515 acres (95 x 37 acres). Total reclamation of both notices and plans equals 4,853 acres. Percentages of the disturbances caused by mining operations that have been reclaimed are also shown in Table 4-9.

Unreclaimed mining notices equal 810 acres (270 x 3 acres), and unreclaimed plans of operation equal 1,665 acres (45 x 37 acres), for a total of 2,475 acres.

Combined Disturbance. The total of the current, existing disturbance added to the projected disturbance results in the total surface disturbance in the planning area. This total and the percentages of the BLM-managed surface disturbed by mining operations in the minimum and maximum development scenarios are listed in Table 4-9. No reclamation has been applied to the new disturbance. The BLM policy encourages concurrent reclamation on all projects. All operations in excess of five acres require proper bonding. A complete tabulation of disturbances from 1981 through 1995 and projections for 20 years into the foreseeable future is also listed in Table 4-9.

Saleable Materials

Modifications of the exploration and mining scenarios for locatable minerals are used to identify potential impacts from this resource. These scenarios include all reasonably foreseeable sand and gravel development activities whether these materials are presently being mined as a salable mineral, locatable mineral, leasable mineral, or material site rights-of-way. Mineral extraction for major industrial, military, recreation, and wildlife management areas would occur adjacent to and along access roads to these areas.

Mineral materials extraction would occur as close to the project as possible. Urban areas that would require materials include the cities of Boulder City, Henderson, Las Vegas, Mesquite, North Las Vegas and Pahrump, the towns of Amargosa Valley, Arden, Blue Diamond, Bunkerville, Cal-Nev-Ari, East Las Vegas, Glendale, Goodsprings, Green Valley, Indian Springs, Jean, Lathrop Wells, Laughlin, Logandale, Moapa, Nelson, Overton, Paradise, Sandy Valley, Searchlight, Sloan, Spring Valley, Sunrise Manor, and Winchester, as well as the Apex industrial site, Nellis Air Force Base, and Yucca Mountain nuclear repository site.

Numerous major paved road systems are in the planning area (see list in Table 4-10). Additional smaller, paved spurs also provide access. These paved highways, as well as the extensive road network within the Las Vegas Valley, would require maintenance, rebuilding, and continued sources of materials. Landscape rock would be mined from the Arden and Flagstone quarries.

Scenario Models. Five scenarios are discussed for operation of the salable minerals program.

(V) Sampling and testing activities. In this operation, exploration activities would disturb 3 to 5 acres of land per year, and would typically last less than one year. The predominant type of surface disturbance would consist of road cuts, trenches, and drill holes. An average drill program would range from 15 to 30 holes per year. Up to 200 holes could be drilled in the project area. Closer spacing of holes and more intense programs would normally be associated with the defining of a sand and gravel deposit. These activities would normally cover a larger area than a material site right-of-way or free use permit. All sampling and testing would be authorized under 43 CFR 3602. Ultimately, Federally-aided highway projects would be granted material site rights-of-way under 43 CFR 2800, and all other projects would be issued materials sales contracts or free use permits under 43 CFR 3610 or 3620, respectively.

(W) Community pit operations. In this scenario, up to four operators would extract within a designated community pit, with the sand and gravel deposit utilizing a front end loader and bulldozer. Operators would typically extract material that requires minimal processing facilities. Average disturbance would range from 2 to 4 acres per year.

(X) Small size pit operations. In this operation, a small-scale operator would pursue a working open pit mine consisting of either a high-quality deposit or one considered too small for the larger operators. The operation would likely extract sand and gravel, building stone, or other common variety minerals. The operation would be restricted by minimal capital investment, with a need to attain a low level of operating costs, resulting in a personnel limitation of one to five employees. The projected disturbance is listed in Table 4-11.

(Y) Moderate size pit operations. This operation would involve mining, by open-pit method, for sand and gravel, building stone, or other common variety minerals. The mine would require a processing facility, employ 15 to 40 workers, and have a mine life from three to six years. Projected disturbance is listed in Table 4-11.

(Z) Large size pit operations. This operation would utilize one or more open pits to extract sand and gravel, building stone, and other common variety minerals. A processing or hot plant facility would be required. The size of the open pit, type of processing facility, and method of overburden disposal would be dependent upon the commodity being mined. The operation would normally employ 50 to 300 people and have a mine life of 7 years or more; additional employees would be needed during construction phases. Water wells, power lines, parking areas, and other ancillary facilities would be required in advance of production. Disturbance would largely depend on the nature of the terrain and the available engineering technology. Projected disturbance is listed in Table 4-11.

Future Exploration Activity. During the approximate 20- year life of this plan, there will be an estimated 70 requests for letters of authorization to conduct sampling and testing activities for sand and gravel. Of these, 85 percent will be by the Nevada Department of Transportation and 15 percent by private contractors. Further, 32 of these authorization requests are projected to result in approval to mine sand and gravel, and there would be 25 for material site rights-of-way, 5 for free use permits, and 2 for contracts for material sales to private contractors. Also, all 22 sand and gravel pits are expected to be developed.

The sampling and testing activities would equate to a Scenario "V" and would be received for the portions of the planning area described in MN-1-k. It would be a one-year project to drill and evaluate the potential for these mineral materials. Three new Scenario "V" operations are expected to occur each year. Exploration activities pursuant to letters of authorization to conduct sampling and testing would

Table 4-10. Major paved road systems in the planning area.

Road Designation	Locations Connected
I-15	Stateline - Las Vegas -Mesquite
US 93	Arrow Canyon - Las Vegas - Hoover Dam
US 95	Beatty - Las Vegas - I-40
SR 144	Mesquite (old highway)
SR 146	I-15 at Sloan - Henderson
SR 147	Henderson - Lake Mead NRA
SR 156	Lee Canyon Road
SR 157	Kyle Canyon Road
SR 158	Deer Creek to SR 157
SR 159	Las Vegas - Blue Diamond - SR 160
SR 160	I-15 at Arden - Pahrump - US 95
SR 161	Jean - Goodsprings - Sandy Valley
SR 163	US 95 - Laughlin
SR 164	I-15 at Mountain Pass - Searchlight - Cottonwood Cove
SR 165	US 95 - Nelson
SR 168	Arrow Canyon - Moapa - I-15 at Glendale
SR 169	I-15 at Glendale - Logandale - Overton
SR 170	I-15 - Bunkerville - I-15
SR 372	Pahrump - California and Nevada border
SR 373	Lathrop Wells - California and Nevada border
SR 374	Beatty to California and Nevada border
SR 604	Las Vegas Boulevard (old highway)

Key:
SR State Route (Nevada)
US United States highway (Federal)
I- Interstate highway (Federal)

disturb between 9 and 15 acres [(3 authorizations) (3 acres to 5 acres)] of new disturbance each year. This exploration would be outside of existing sand and gravel mining areas.

Future Mining Activity. Community pit operations would equate to a Scenario "W." Currently, there are 28 active Scenario "W" operations in the planning area. An average of 30 operations per year are expected over the life of the plan, involving about 30 operators and between 0.25 to 2 acres of new disturbance each year. These operations would relocate during the life of the plan as operators move and community pits are opened and closed. These operators vary in size from small, to medium to large.

Small operations would equate to a Scenario "X". Currently, there are five Scenario "X" operations within the Las Vegas BLM District. An average of 10 new disturbances is expected over the life of the plan, totaling between 60 and 120 acres, and involving 30 operators at 2 acres to 4 acres each. These operations would relocate during the life of the plan as operators move.

Moderate operations would equate to a Scenario "Y." Currently, there are 15 Scenario "Y" operations within the Las Vegas BLM District. An average of five per year is expected over the life of the plan. The total would be between 20 and 80 acres of new disturbance, involving 5 operators at 4 to 16 acres each.. These operations would relocate during the life of the plan as operators move.

Large operations would equate to a Scenario "Z." Currently, there are 4 Scenario "Z" operations in the Las Vegas BLM District. An average of five per year is expected over the life of the plan. This would total between 48 and 192 acres, involving 3 operators and 16 to 64 acres of new disturbance each year. These operations would relocate during the life of the plan as operators move.

Projections follow for operations in the planning area. Scenarios "V" through "Z" are being used in the foreseeable development scenario. These actions would mainly occur in areas of moderate or high sand and gravel potential, although many factors could lead to development in low potential areas. Based on the approximate 20-year life of the Resource Management Plan, total projections are listed in Table 4-11.

The amount of disturbed acreage would range from a low of 3,010 acres to a high of 9,640 acres. Although reclamation requirements apply to all acres, the projections and estimates do not reflect this data. The percentages of BLM-managed surface within the planning area disturbed by mining operations in the minimum and maximum development scenarios are also listed in Table 4-11. This includes 40 designated pits (10 that average 3,150 acres), each with 3 percent or 95 acres disturbed or active at any given time. A total of 3,800 acres of active community pit disturbance is expected each year.

Assessment of Cumulative Impacts from the Past, Present, and Reasonably Foreseeable Future Actions

The following section analyzes the cumulative effects expected from implementation of The Plan. The assessment attempts to address effects on each resource for all lands regardless of ownership.

Air Resource Management

The discussion of cumulative impacts to air resources will be restricted to the Las Vegas air quality Non-Attainment Area (see Map 3-4a). Air resources within the Non-Attainment Area have been degraded by pollutant levels, primarily particulates (PM_{10}) and carbon monoxide, in excess of ambient air quality standards established by the Environmental Protection Agency, State of Nevada, and Clark County Health District. Air quality in the remainder of the planning area is acceptable, meaning that pollutant levels are less than or equal to established standards on a continuous basis. Reasonably foreseeable future actions, together with past and present actions, are not expected to result in unacceptable air quality in any areas outside of the existing Non-Attainment Area.

The primary contributor to the cumulative impact to the air resource within the Las Vegas Valley is public land disposals. Land disposals would indirectly impact the air resource by providing land that may be developed, resulting in an increased growth rate within the valley. Pollutant sources and discharge would be expected to increase along with an increased growth rate. Under this plan, approximately 52,000 acres of public lands within the Las Vegas Valley Non-Attainment Area are designated as being available for disposal.

The fact that public lands have been identified for disposal does not guarantee their eventual disposal

Table 4-11. Projected disturbance from implementation of saleable minerals operations.

Small-sized Pit Disturbance (X)	**Total Acres**
Roads	¼ - ½
Processing facilities	¼ - ½
Pit or scrape	1 - 2
Material stockpiles	¼ - ½
Overburden storage	¼ - ½
Total	**2 - 4**

Large-sized Pit Disturbance (Z)	**Total Acres**
Roads	1 - 4
Processing facilities	1 - 4
Pit or scrape	10 - 40
Ore stockpiles	2 - 8
Overburden storage	2 - 8
Total	**16 - 64**

Moderate-sized Pit Disturbance (Y)	**Total Acres**
Roads	½ - 1
Processing facilities	½ - 1
Pit or scrape	2 - 10
Ore stockpiles	½ - 2
Overburden storage	½ - 2
Total	**4 - 16**

Future Mining Projections Under Scenarios V through Z

Scenario	**Number**	**Total Acreage**
V	3.5 x 20 = 70	(70)(3 to 5) = 210 to 350
W-small	24 x 20 = 480	(480)(2 to 4) = 960 to 1,920
W-med	2 x 20 = 40	(40)(4 to 6) = 160 to 640
W-large	2 x 20 = 40	(40)(16 to 64) = 640 to 2,560
X	10 x 20 = 200	(200)(2 to 4) = 400 to 800
Y	15 x 20 = 300	(300)(4 to 16) = 1,200 to 4,800
Z	3 x 20 = 60	(60)(16 to 64) = 960 to 3,840
Total	**71 x 20 = 1,420**	**4,530 to 14,920**

Projected Surface Disturbances

Type Scenario	**Projected Disturbed Acreage**	**divided by**	**Planning Area Total Acreage**	**Total Percentage of Disturbed Acreage**
Minimum	4,530 acres	÷	3,331,895 acres	= 0.136 percent
Maximum	14,920 acres	÷	3,331,895 acres	= 0.449 percent

and development, and this fact must be taken into consideration in development of reasonably foreseeable future actions and assessment of impacts. Among the many factors affecting disposal of public land are budget and workforce considerations, public demand, economic conditions, changing resource values (such as the listing of the desert tortoise), and coordination with local governments.

Approximately 15,325 acres of public lands have been disposed in the Las Vegas Valley over the last 12 years, which averages 1,277 acres per year. Assuming that land disposals will continue at a similar rate as in the past, approximately 25,540 acres of public lands are expected to be disposed during the life of the Resource Management Plan (20 years).

For the purposes of this analysis, it is assumed that approximately 54,000 acres of private lands within the Las Vegas Valley will be developed during the life of the Resource Management Plan (based on a past annual total land development estimate of approximately 4,000 acres provided by local entities, less the average annual disposal figure of about 1,300 acres). This projection, along with the anticipated public land disposals (assuming development of all acres), would result in a total of approximately 80,000 acres of new development during the life of this plan; this represents a 60 percent increase of the total developed land base (currently approximately 132,000 acres) in the Valley .

Estimates for PM_{10} and carbon monoxide emissions due to land disposals are based on data obtained from the Clark County Health District and Clark County Comprehensive Planning. Cumulative impacts from both private and public land development activities during the life of this plan would result in an annual PM_{10} increase of about 760 tons, a total of approximately 15,000 tons (based on 0.19 tons/acre/year) at the end of the 20-year life of the planning period. These figures represent a worst-case scenario in that it is assumed that all of the public land acres disposed will be developed. In practice, all the acres probably will not be developed, and the actual emissions figures resulting from development will be somewhat less than those presented.

Cumulative impacts on carbon monoxide emissions from both private and public land development activities during the life of this plan would result in an annual increase of 5,459 tons, a total of 109,180 tons (based on 1.37 tons/acre/year) at the end of the 20-year life of the planning period. This anticipated increase is due primarily to growth induced increases in motor vehicles and their resultant emissions. These estimates represent a worst-case scenario by not factoring in technological advances that will undoubtedly be made in reducing carbon monoxide emissions from internal combustion engines. It also does not consider additional legal or regulatory measures that may be taken by Federal, state, or local governments to reduce carbon monoxide emissions.

Soil Resource

Erosion and soil loss are expected to decrease as a result of a decrease in surface-disturbing activities. A total of approximately 81,000 tons of soil loss can be expected over the 20-year life of the Resource Management Plan. Actions under The Plan contributing to these losses include livestock grazing; wild horse and burros grazing; off-road-vehicle use; and mineral exploration and development. The soil loss is approximately 21,000 tons less than estimated under current management (about 102,000 tons). Regardless of what actions occur on lands other than public, actions taken under this plan would result in a net improvement to the soil resource.

Water Resource Management

The discussion of the cumulative impacts to the water resource will be restricted to the Las Vegas Valley where rapid growth and development has resulted in a groundwater overdraft situation. In this area, Nevada's Colorado River water allocation is also being rapidly depleted.

The primary contributor to the cumulative impact to the water resource in the Las Vegas Valley is public land disposals. Land disposals would indirectly impact the water resource by providing land that may be developed, resulting in an increased growth rate within the valley. Water demand would be expected to increase along with an increased growth rate.

Under this plan, approximately 52,000 acres of public lands within the Las Vegas Valley are designated as being available for disposal. The fact that public lands have been identified for disposal does not guarantee their eventual disposal and development, and this fact must be taken into consideration in the development of reasonably foreseeable future actions and assessment of impacts. Among the many factors

affecting disposal of public land are budget and workforce considerations, public demand, economic conditions, changing resource values (such as the listing of the desert tortoise), and coordination with local governments.

Approximately 15,000 acres of public lands have been disposed in the Las Vegas Valley over the last 12 years (an average of approximately 1,300 acres per year). Assuming that land disposals will continue at a similar rate as in the past, it is anticipated that approximately 26,000 acres of public lands will actually be disposed of during the life of the Resource Management Plan (20 years).

Records indicate that approximately 67,000 acre feet of groundwater was extracted from the principal aquifer of the Las Vegas Valley, far exceeding the estimated recharge of 30,000 acre-feet (Table 3-9). In addition to groundwater withdrawals, the Valley used approximately 293,000 acre feet of Nevada's allocation of Colorado River water. Current projections indicate that consumptive use within the Valley may reach its maximum allocation of the Colorado River water much sooner than anticipated.

For the purposes of this analysis, it is assumed that approximately 54,000 acres of private lands within the Las Vegas Valley will be developed during the life of the Resource Management Plan. This estimate is based on a past annual total land development of approximately 4,000 acres provided by local entities, less the average annual disposal figure of approximately 1,300 acres. This amount, along with the anticipated public land disposals (assuming development of all acres), would result in a total of approximately 80,000 acres of new development during the life of this plan. This total represents an increase of 60 percent of the total developed land base (currently approximately 132,000 acres) in the Valley. These actions would have indirect impacts on the water resource by encouraging growth within the Valley and increasing demand on an already taxed water supply.

To date, approximately 132,000 acres of land have been developed in the Las Vegas Valley. Assuming that nearly all present water usage (approximately 336,000 acre-feet) from both groundwater sources and the Colorado River is consumed by these land holdings, the per acre annual water usage in the Valley is approximately 2.5-acre feet. The estimated increase in annual water usage from new development would be approximately 10,000 acre-feet. However, because all disposed lands would probably not be developed, the actual increase in water use would be somewhat less than indicated.

Over the 20-year life of the Resource Management Plan, the anticipated consumption of additional water would be approximately 200,000 acre-feet. Adverse implications of the increased water consumption could be moderated by actions taken by the entities within the Valley charged with management of the water situation. The Las Vegas Valley Water District has initiated an exploration and development program designed to increase current water supplies over the next 15 to 20 years. Mandatory conservation measures may be introduced to better utilize currently available water supplies.

Riparian Resource

Current and proposed actions would act synergistically. These actions include intensive riparian management and/or protection; closure of 43 of the 54 grazing allotments; removal of all wild horses and burros from three Herd Management Areas and reduction to the Appropriate Management Level within three Herd Management Areas; and a forage utilization limit for riparian vegetation. These various actions would help to stabilize and improve the proper functioning condition of the 149 spring associated riparian areas (75 acres) and those associated with the Muddy River, Virgin River and the Meadow Valley Wash (292 acres).

Public land disposals and eventual development of these lands, along with land development other than that associated with public land disposals, would continue to increase the impermeable surface acreage within the Las Vegas Valley. There would be increased runoff and sediments from these areas along with continued erosion within the Las Vegas Wash. These impacts, however, would be expected to be moderated through the efforts of the Clark County Regional Flood Control District. Impacts to the Virgin River riparian area (but to a lesser degree than those within the Las Vegas Valley) would be expected as a result of public land disposals in and around the City of Mesquite.

Vegetation Management

Vegetation on approximately 29,000 acres would either be lost or changed due to surface disturbance activities over the life of this plan. It is reasonable to expect limited success in reclamation efforts based on past results from many projects. Use of native local cacti species, which transplant well, could be used to improve the success ratio of reclamation efforts.

Weedy species (such as red brome, Mediterranean grass and Russian thistle) tend to invade disturbed sites under most conditions and can become dominant in some situations. Evidence of this occurs throughout the Las Vegas District. It is reasonable to expect white bursage to become established on disturbed sites naturally, provided a seed source is present. This plant is important for soil stabilization.

Plant vigor and species diversity would be expected to improve over the life of this plan due to closure of areas to livestock grazing and new mineral entities. Areas remaining open to livestock grazing would also improve based on intensive management and completion of allotment management plans. Managing grazing at proper use levels and alternating use through deferment grazing systems is expected to improve vegetative conditions over the long term.

Desert Tortoise Habitat Management

Cumulative impacts to desert tortoise habitat are expected to occur over the entire planning area, in varying intensity from location to location. Within the Las Vegas Valley, cumulative impacts to desert tortoise will be significant; This assessment is tempered by the fact that it is unlikely for a long-term viable breeding population to be sustained in the Valley, given current development and the projected growth of Las Vegas over the life of The Plan. Assuming that the identified reasonable foreseeable future actions occur, approximately 107,000 acres of low density tortoise habitat will be lost over the life of The Plan. The majority of this habitat would be located in the Las Vegas Valley. A loss of this magnitude would normally be considered significant, but due to the lack of large *islands* of habitat in the Las Vegas Valley that are capable of sustaining minimum viable populations levels, this loss of habitat is not expected to jeopardize the continued existence of the desert tortoise in Nevada.

A total of approximately 743,000 acres would be designated as Areas of Critical Environmental Concern to be managed primarily for the recovery of desert tortoise. Section 7 consultation would be required on all Federal actions that may affect a threatened or endangered species.

Designation of critical habitat for desert tortoise or other species changes the threshold for jeopardy. Therefore, Federal actions proposed within Areas of Critical Environmental Concern or critical tortoise habitat are more likely to result in a jeopardy opinion. Mitigation measures are expected to be less stringent on projects located outside of Areas of Critical Environmental Concern and critical habitat. Proposed changes in livestock grazing, mineral development, off-road-vehicle designations, and off-road-vehicle racing would reduce, but not eliminate, impacts to desert tortoise. The areas considered most important for tortoise recovery would be protected by Area of Critical Environmental Concern designation.

Recreation Management

Cumulative impacts to recreation will occur throughout the planning area as a result of the management of critical tortoise habitat and the transfer of public lands. The critical habitat designation and management restrictions imposed under the *Tortoise Recovery Plan* restricts casual use and organized off-road-vehicle activity. These limits and the loss of opportunities will cause a long-term shift of off-road-vehicle use to other areas and reduce options for current and future users.

The transfer of public lands under the *Eldorado Lands Act* removed one of the most heavily used recreation areas in the Las Vegas area from public domain. Depending on future management of those lands, there could be losses in the major off-road-vehicle events, numerous other organized permitted activities, and many casual use recreation opportunities. The population growth to nearly 1.5 million people during the life of this plan would create millions of additional visitor days' use on the public lands. This additional use could result in increased user conflicts, overcrowding, and possible resource degradation at other areas in the Las Vegas BLM District that currently do not receive intensive recreational use.

Unavoidable Impacts

Certain impacts or effects to resources that are considered to be unavoidable after general attempts at mitigation for designated actions are discussed below by resource.

Air Quality

Dust from various activities such as gravel pits, off-road-vehicle races, and construction activities will continue. Increased vehicle emissions are expected due to continued population increases, based on development in the planning area. Strict enforcement of State air quality standards may limit, but not eliminate, increases in pollutants from energy and industrial sources.

Soil

Areas open to off-road-vehicle use, new roads, flood control structures, sand and gravel pits, and industrial sites would result in soil compaction, loss and disturbance as described in this chapter.

Water

Springs and wells would not be used to water cattle or other domestic animals on allotments closed to livestock grazing. Overdrafting of ground water in the Las Vegas Valley would be expected to continue, unless additional injection wells are drilled to recharge the aquifer. Short-term impacts to water quality by grazing animals would continue until spring sources are protected by the appropriate means.

Vegetation

There would be loss of vegetation due to land disposal and subsequent development, gravel pit expansion, and other ground disturbing activities. There would be continued spread of introduced species from disturbance activities. Native plants would be lost due to any ground-disturbing activity.

Visual Quality

Construction of powerlines, whether in corridors or not, would reduce visual qualities and leave lasting changes of the landscapes line and form.

Wildlife

Some desert tortoise and other wildlife would be taken due to both permitted activities and casual use throughout the Las Vegas BLM District. Wildlife habitat would be lost or degraded whenever the surface vegetation is removed.

Grazing

Most livestock permittees would be out of business following closure of allotments to grazing. Land disposal for community growth would lead to limited grazing allotment closures.

Wild Horse and Burro

The Appropriate Management Level of any Herd Management Area would be zero in desert tortoise Areas of Critical Environmental Concern. Animals would be removed from other areas where populations exceed the Appropriate Management Level.

Cultural Resources

Inadvertent effects to cultural properties would occur in three types of situations. Casual recreational activities from uses such as driving off-road-vehicles, riding domesticated horses, riding all-terrain bicycles, and rock collectors could cause disturbances to archaeological features in high use areas. The second situation involves effects to sites from wildlife, which would animals grazing around waterholes and animals burrowing in locales where stratified deposits remain. The third situation would involve natural weathering processes that could move artifacts and disturb intact features through wind erosion, flooding, and ground-shifting.

Lands

Desert Land Entries, Indian Allotments and Carey Acts would be denied due to lack of water or suitable soils.

Recreation

Decreased opportunities for unrestricted off-road-vehicle use. Restrictions based on desert tortoise management are unavoidable. Closure of the (air quality) Non-attainment area to competitive off-road-vehicle events (except for Nellis Dunes) would cause a loss of traditional use areas and courses associated with Las Vegas Valley.

Mining

Some areas would be closed to mineral entry.

Socioeconomics

Property values could be lowered in areas where powerline corridors are designated.

Some grazing permittees would need to accept the loss of a life-style and find another means to support a family. Impacts on the agriculture community would result from closure of allotments to grazing because fewer animals would go to market at sale yards.

Irreversible And Irretrievable Commitment of Resources

Irreversible commitments are those that cannot be reversed except perhaps in the extreme long term (100 years or more).

Irretrievable commitment of a resource is the loss of an opportunity for production or use of a renewable resource for a period of time.

Irreversible Commitments

- Disposal of public lands to nonpublic uses.
- Loss of wilderness values in a Wilderness Study Area.

Irretrievable Commitments

- Loss of a ranching operation as a result of Resource Management Plan implementation.
- Closure of allotments to grazing.
- Construction or disposal that results in loss of cultural resources.
- Setting an Appropriate Management Level of zero for an Herd Management Area.
- Loss of access to mineral potential as a result of implementing the Plan.
- Loss of soil through wind and water erosion.
- A loss of visual resources as a result of construction of roads, buildings, and powerlines (some of which is immediate and long term, as for powerlines).
- Water and air quality degradation and soil loss due to mining, off-road-vehicles, grazing and powerline construction.
- Loss of woodland sites for firewood potential.

Irreversible and Irretrievable Commitments

- Extraction of materials, as a result of mine development and sand and gravel pit expansion
- Loss or destruction of wildlife and its habitat through construction and other permitted activities.

Relationship Between Short-Term Uses of the Human Environment and Maintenance and Enhancement of Long-Term Productivity

Short-term uses are generally those that determine the present quality of life for the public. Long-term productivity refers to the capacity of the land to support sound ecosystems that produce resources such as forage, wildlife, and water.

- The disposal of lands from Federal ownership, which is a short-term use, would preclude long-term use of those lands. This would provide for long-term, sustained community growth and agricultural development.

- Actions that improve vegetation conditions would result in an increase in long-term productivity of the resource.

- Locatable minerals development would be constrained by withdrawals and closure to mineral entries, resulting in long-term economic and production loss or delay in mineral activities on affected lands.

- Changes in livestock grazing practices, including no grazing, would result in long-term improvement in riparian, hydrologic and vegetation conditions. The same kinds of restrictions would also result in the suspension of permittees' operations in the short-term and lead to long-term reduced levels of grazing on public lands.

Chapter 5 - Consultation and Coordination

Introduction

This chapter summarizes the preparation, public participation, consultation, and coordination activities conducted for the *Proposed Las Vegas Resource Management Plan/Final Environmental Impact Statement*, referenced frequently as The Plan. During preparation of this document, numerous formal and informal efforts were made to involve the public, various special interest groups and organizations, other Federal agencies, and state and local governments in the planning process, per 40 CFR 1502.25 and 43 CFR 1610.3.

An ongoing extensive data collection effort preceded the writing of The Plan. This process included data assembly, public participation, interagency coordination and consultation, and preparation of the Analysis of the Management Situation. It also included consultation and coordination requests to the U.S. Fish and Wildlife Service for technical assistance for managing candidate species in the planning area, individual scoping meetings for local governments, and meetings with individual members of the general public and representatives of special interest groups and various organizations. Documentation of these consultation and coordination efforts and a complete mailing list of those contacted during the scoping process are on file in the Las Vegas BLM Field Office.

Public Scoping/Participation

The public participation process began in March 1990 with publication of a Notice of Intent to prepare the Stateline Resource Management Plan/Environmental Impact Statement in the *Federal Register* (Volume 55, No. 60, Wednesday, March 28, 1990, page 11445).

On March 29, 1990, approximately 1,400 initial scoping reports were distributed to a mailing list that included interested and affected individuals, State and Federal agencies, local governments, organizations, and private industry. Over 1,000 additional scoping reports were requested and distributed throughout the scoping period. In addition, copies of the scoping report were available at all public meetings.

The scoping report summarized tentative planning issues, preliminary criteria and alternatives, and resource concerns identified by BLM managers and resource specialists. The scoping report also described procedures for nominating Areas of Critical Environmental Concern. The public was specifically asked to:

- Evaluate the scoping report
- Identify additional issues, criteria, or concerns for analysis in the Draft Resource Management Plan/Environmental Impact Statement, hereafter known as, The Draft Plan.
- Nominate Areas of Critical Environmental Concern.

Locations, dates, and times of the nine public scoping meetings were also included in the scoping report.

Copies of the scoping report and a news release announcing the scoping meetings were sent to 218 individuals, organizations, newspapers, and radio and television stations throughout Nevada and some locations in California.

The public scoping meetings were held to solicit comments on the tentative issues, the preliminary planning criteria, and alternatives. Nominations for Areas of Critical Environmental Concern were accepted during the scoping meetings.

There were nine scoping meetings held throughout the District to help identify issues for consideration or analysis in the Resource Management Plan. A total of 198 interested public attended these meetings and voiced their concerns about management of public lands. The scoping period for the Stateline Resource Management Plan/Environmental Impact Statement generated 212 comment forms and

letters.

A Notice of Availability for The Draft Plan was published in the *Federal Register* (Vol. 57, No. 113, Thursday, June 11, 1992).

A Notice of Intent to supplement The Draft Plan was published in *the Federal Regi*ster (Vol. 58, No. 126, Friday, July 2, 1993).

A Notice of Availability for The Supplement was published in the *Federal Register* (Vol. 59, No. 104, Wednesday, June 1, 1994).

Consultation

Section 7 of the *Endangered Species Act* mandates consultation between the BLM and the U.S. Fish and Wildlife Service prior to authorization or implementation of any project that may affect any Federally threatened or endangered plant or animal species or their habitat. Technical assistance on candidate species was requested during the scoping period, and informal consultation on listed species is ongoing throughout the planning process. The Draft Plan and The Supplement were submitted to the U.S. Fish and Wildlife Service for informal consultation for all listed species. The Plan was submitted for formal consultation in December 1997.

Concurrent with development of The Plan, several other major planning efforts were in progress regarding the desert tortoise. Among them were Clark County's short and long-term Habitat Conservation Plans and the U.S. Fish and Wildlife Service *Tortoise Recovery Plan.* The Plan was written to be consistent with both of these documents, which have since been completed .

The Nevada Division of Wildlife was contacted concerning state-listed threatened and endangered wildlife and plant species. This plan is consistent with legislation protecting state-listed species. Coordination and consultation with the State of Nevada will be continued throughout the planning process and during implementation.

The BLM cultural resource management program operates in accordance with 36 CFR, Part 60, which outlines specific procedures for consultation between BLM and the State Historic Preservation Office. A National Programmatic Agreement among the State Historic Preservation Office, the Advisory Council on Historic Preservation, and the BLM became effective in 1997. When implemented in Nevada, this agreement will coordinate provisions of 36 CFR 60 with existing BLM procedures, emphasizing Section 106 consultation. The agreement will also incorporate statewide protocol between BLM and the State Historic Preservation Office, establish reporting standards, and define undertakings and activities that require consultation.

Coordination

Coordination, as defined in this section, refers to efforts to achieve compatibility with other Federal, state, and local land use plans. Public scoping represents initial efforts to coordinate with other entities. All agencies listed at the end of this chapter received at least one copy of the scoping report. Most of the public scoping meetings were attended by representatives from local, state, or Federal entities.

With the City of Las Vegas Planning Department acting as coordinator, public agency scoping meetings were scheduled early in the planning process. Invitations were extended to Clark County and all incorporated cities within the county. The first meeting was held May 8, 1990, and was attended by representatives from the planning departments of BLM, Clark County, and the cities of Henderson, Las Vegas, and Boulder City. A follow-up meeting held May 30, 1990 was attended by all parties from the first meeting, as well as representatives from the Regional Transportation Commission and Clark County Regional Flood Control District. A third meeting was held on July 12, 1990, between BLM and Clark County.

Tonopah was the site of a June 5, 1990. meeting between BLM and representatives from Nye County Planning.

Written comments were received from various departments of the State of Nevada (including the State Clearinghouse), Inyo County, California, various town boards, town advisory boards, and Citizen's Advisory Committees.

Other Federal agencies providing written comments included National Park Service (Western Region, Death Valley National Monument, and Lake Mead National Recreation Area), U.S. Fish and Wildlife Service (Reno Field Station and Desert National Wildlife Refuge Complex), U.S. Forest Service (Mt. Charleston Ranger District), Environmental Protection Agency (Region IX), U.S. Bureau of Mines (Western Field Operations Center), and U.S. Air Force (Nellis Air Force Base).

Public Review of the Draft, Supplement and Proposed Plan

The Draft Plan and The Supplement were published and made available for a 90-day public comment period on June 11, 1992 and June 1, 1994 respectively. Additional copies of The Draft and Supplement documents were distributed to numerous agencies and organizations, as well as many individuals. The Plan was mailed to everyone on the mailing list, which is included for review at the end of this chapter. The complete mailing list is located at the Las Vegas BLM Field Office at 4765 Vegas Drive, Las Vegas, Nevada, 89108.

A total of eight hearings were held throughout the district, seven for The Draft Plan and one for The Supplement. A combined total of 152 speakers gave testimony for The Draft Plan and Supplement, 124 and 28 respectively.

Written and Testimony Comments

A total of 406 comment letters were received on The Draft Plan and Supplement, 340 and 66 respectively. Written comments and questions were divided into 50 general categories to accommodate review and answering by staff specialists.

Public comments and questions received during the scoping and planning process, including the various meetings and hearings, as well as the BLM's responses, are presented in Appendix O. The presentation of comments and questions is arranged by resource programs in the same order as the resources are addressed in the Plan. Only those letters that addressed issues presented in the Draft Plan and Supplement are addressed in the appendix. All letters received are on file and available for review at the Las Vegas BLM Field Office, along with agency responses to individual comments and questions.

Corrections in The Plan

The following errors or inconsistencies in The Draft Plan and The Supplement were noted in public comments and corrected in The Plan.

Air, Soils and Water Management

On page 4-31 of The Draft Plan, the sentence "With proper mitigation and reclamation, mineral activities would adversely impact the soils in the short term," was changed to "With proper mitigation and reclamation, mineral exploration should not adversely impact the soils in the short-term.

On page 2-38 of the Draft Plan, a reference was made to Appendix A, but should have been Appendixes B and C. Appendixes A-D are included in Appendix M in The Plan. In Chapters 3 and 4, the most current data was used for The Plan to state the Federal Ambient Air Quality Standard is PM10 (particles less than 10 microns).

Page 2-2 of The Supplement states, "Obtain water rights to springs associated with the grazing privilege for those allotments that are retired from livestock grazing. Maintain those waters for wildlife, wild horses and burros, and riparian habitat values." This statement was changed to, "Determine the amount of water needed to meet management objectives. File for appropriative water rights on public and acquired lands, in accordance with the State of Nevada

water laws, for those water sources that are not Federally reserved."

Page 2-6 of The Supplement states, "Obtain water rights to base waters on grazing allotments which are closed and manage these for wildlife and riparian values." This measure was deleted for The Plan.

Forestry

Page 2-13 of The Supplement refers to wood cutting areas, but only one area is proposed. This error was corrected in The Plan to read that only one area is available for wood cutting.

Livestock Grazing Management

In The Draft Plan, there are inconsistencies in the numbers of active allotments. The inconsistencies were corrected. Maps 2-11 and 2-27 are difficult to compare and the map legends are not accurate. The map legends were corrected and the maps clarified.

Potential Natural Community and Desired Plant Community were not defined in The Draft Plan, but are defined in the Glossary of The Plan.

Pages 4-96 and 4-145 of the Draft Plan are inconsistent with management of livestock. The error on page 4-96 was corrected to match information presented on page 4-145.

Wild Horse and Burro

The Draft Plan should have included a better discussion of constraints on wild horse and burros. A more complex discussion was added for The Plan.

In The Draft Plan, the Valley of Fire State Park lands were included in the Las Vegas BLM District lands. This error was corrected in The Plan.

Page 2-21 of the Draft Plan should be revised to state, "...coordinate herd management with the U.S. Forest Service where Herd Management Areas extend across administrative boundaries, and with the National Park Service in areas where burros inhabit use areas crossing administrative boundaries." This revision was added to The Plan.

In The Draft Plan, the animal numbers do not represent recently recorded data. The new data is reflected in The Plan.

In The Supplement, Table S-1, the Wild Horse and Burro Program should be moved to Wild Horse and Burro section (Page S- 22). This was corrected for The Plan.

Fish and Wildlife

The lands in North Las Vegas called Category 2 tortoise habitat in The Draft Plan are incorrectly identified. This error was corrected in The Plan as Category 3 habitat.

In The Draft Plan, Table 3-7 (Estimated Bighorn Sheep Population Numbers), Map 3-8, and the Species lists in Appendix F and Appendix G were outdated. They were updated for The Plan, in Appendix A and B.

Lands Management

In The Draft Plan, Map 1-2 does not show the Kerr-McGee lands. The lands were identified in The Plan.

Volume II of The Draft Plan does not accurately describe the Eldorado Valley Act lands. These lands were accurately described with the final sale results in The Plan.

In The Supplement, there are inconsistencies in Chapter 4 regarding visual impacts. This was corrected in The Plan.

Minerals Management

In The Draft Plan, the Special Management acreage in the Minerals Management section was

listed as 172,281 acres, and was changed to 172,218 acres.

Maps 3-17, 3-18 and 3-19 show the mineral potential classifications for lands, such as the Lake Mead National Recreation Area-managed acreage, as surface estate managed by BLM. Those maps were revised to show lands where the surface estate is not managed by BLM.

Socioeconomics

In the Draft Plan, the socioeconomics information in most programs, especially the Minerals Management section, does not reflect accurate data and consequently was updated in The Plan.

Fire

Fire management levels are incorrectly shown on the map on U.S. Forest Service lands. The map was determined not necessary and not carried forward to The Plan.

Special Management Areas

In Appendix E of The Draft Plan, the Crescent Area of Critical Environmental Concern nomination and the Amargosa Mesquite Area of Critical Environmental Concern were missing, because the nomination forms were inadvertently omitted.. This appendix was not carried forward to The Plan.

List of Agencies, Organizations, Individuals and Other Offices

Listed below are the various individuals, agencies, groups, and offices that are on the Las Vegas BLM Field Office mailing list. They were mailed copies of planning documents and notices as part of the consultation and coordination planning process of The Plan.

Congressional Delegation

U.S. Senator Richard Bryan
U.S. Senator Harry Reid
U.S. Congressman John Ensign
U.S. Congresswoman Barbara Voucanovich (past)
U.S. Congressman Jim Gibbons

Federal Agencies

Department of Agriculture
U.S. Forest Service
Soil Conservation Service

Department of Defense
Army Corps of Engineers
Nellis Air Force Base

Department of Energy
Nevada Field Office
Nevada Operations Office

Federal Energy Regulatory Commission
Office of Environmental Compliance
Western Area Power Administration
Yucca Mountain Project Office

Department of the Interior
Bureau of Indian Affairs
Bureau of Mines
Bureau of Reclamation
Bureau of Land Management
- Alaska State Office
- Arizona State Office
- California State Office
- Colorado State Office
- Eastern States Office
- Idaho State Office
- Montana State Office
- Nevada State Office
- New Mexico State Office
- Oregon State Office
- Utah State Office
- Wyoming State Office
- Arizona Strip District
- California Desert District
- Barstow Resource Area
- Needles Resource Area
- Ridgecrest Resource Area
- Tonopah Resource Area

Battle Mountain Field Office
Caliente Resource Area
Carson City Field Office
Elko Field Office
Ely Field Office
Las Vegas Field Office
Winnemucca Field Office
Field Solicitor

Minerals Management Service
National Park Service
U.S. Fish and Wildlife Service
U.S. Geological Survey

Department of Transportation
Federal Highway Administration
Federal Aviation Administration

Environmental Protection Agency

State Agencies

Arizona
Game and Fish Department

California
Department of Fish and Game, Region 5

Nevada
Agency for Nuclear Projects
Colorado River Commission
Commission for the Preservation of Wild Horses and Burros
Conservation Commission
Land Use Planning Advisory Committee
Multiple Use Advisory Committee for Federal Lands
Army National Guard
Department of Agriculture
Department of Industrial Relations
Department of Minerals
Department of Transportation
Department of Wildlife
Division of Forestry
Division of Historic Preservation and Archaeology
Division of State Lands
Division of State Parks
Military Department
Nevada State Clearinghouse
Office of the Governor
Spring Mountain Ranch State Park
State Senators and Assemblymen (Clark and Nye counties)
University of Nevada-Reno Agriculture and Resource
Economic Division
American Institute of Mining and Metallurgical Society
American Institute of Mining Engineers-Nevada
Animal Sciences
Department of Mining Engineering
Department of Range, Wildlife, and Forestry
Desert Research Institute
Fleshman College of Agriculture
Mackay School of Mines
Plant, Soil, Water Resources
Renewable Natural Resource Center
University of Nevada-Las Vegas
Barrick Museum of Natural History Center
for Business and Economic Research
(Departments of
Anthropology, Biological Sciences, Geoscience, and
Physics)

Local Government

Citizen's Advisory Councils
Bunkerville
East Las Vegas
Goodsprings
Indian Springs
Moapa Valley
Mt. Charleston
Sandy Valley

City of Boulder City
City Council
City Manager
Community Development and Planning
Department of Public Works
Mayor
Utilities

City of Henderson
City Council
City Engineer
City Manager
Department of Parks and Recreation

Department of Planning
Department of Public Works
Mayor
Water and Sewer

City of Las Vegas
City Council
City Manager
Community Planning and Development
Department of Public Works
Mayor
Parks and Leisure Activities

City of Mesquite
City Manager

City of North Las Vegas
City Council
City Engineer
City Manager
Community Planning and Zoning
Department of Parks and Recreation
Department of Public Works
Mayor
Office of Economic Development
Utilities

Clark County
Clerk
Commissioners
Community and Economic Development
Community College
County Manager
Department of Comprehensive Planning
Department of General Services
Department of Parks and Recreation
Health District
Planning Commission
Public Works
School District
Soil Conservation District
Clark County Museum
Clark County Regional Flood Control District
Clark County Regional Transportation Commission
Clark County Wildlife Advisory Board

Inyo County, California
Planning Department

Nye County
Commissioners
Planning Department
Road Department
School District
Town Boards
Beatty
Amargosa Valley
Town Advisory Boards
Bunkerville
Moapa Valley
Laughlin
Mt. Charleston
Searchlight

Native American Councils

Intertribal Council of Nevada
Las Vegas Indian Center

Public Libraries

Amargosa Public Library
Beatty Community Library
Blue Diamond Library
Boulder City Library
Bunkerville Library
Charleston Heights Library
Clark County Community College
Learning Resource Center
Clark County Library
Colorado State University
Department of Interior Natural Resources Library
Goodsprings Library
Henderson Library
Indian Springs Library
Las Vegas Public Library
Moapa Valley Library
Mt. Charleston Public Library
North Las Vegas Library
Nye County Library
Pahrump Public Library
State of Nevada Library
Sunrise Public Library
University of Nevada-Las Vegas
University of Nevada-Reno
Virgin Valley Library
Washoe County Library

Organizations

All-Terrain Vehicle Safety Institute
American Alpine Institute
American Mustang and Burro Registry
American Rivers
Archaeo-Nevada Society
Best In The Desert Motorcycle Club
Blue Ribbon Coalition
Boulder City Chamber of Commerce
Boulder Gem Club
Bureau of Land Management Lands Foundation
Center for Urban Affairs and Policy Research
Citizen Alert
Clark County Gem Collectors
Desert Bighorn Council
Ecology Center of Southern California
Environmental Defense Fund
Fraternity of the Desert Bighorn
Friends of Nevada Wilderness
Friends of Red Rock Canyon
Friends of the Mojave Road
Friends of the River
Frontier Girl Scout Council
Groundshakers Motorcycle Club
Henderson Chamber of Commerce
High Desert Racing Assn.
Humane Society of Southern Nevada
International Society for the
Protection of Mustangs and Burros
Las Vegas Board of Realtors
Las Vegas Chamber of Commerce
Las Vegas Distance Riders Club
Las Vegas District Advisory Council
Las Vegas Gem Club
Las Vegas League of Women Voters
Legislative Counsel Bureau
Lost City Museum
Motorcycle Racing Association of Nevada
NAACP-Las Vegas Branch
Natural Resource Defense Council
National Speleological Society
National Wildlife Federation
Nevada Federation of Animal Protection
Organizations
Nevada League of Women Voters
Nevada Natural Heritage Program
North Las Vegas Chamber of Commerce
Partners for PFT
Red Rock Audubon Society
Sierra Club
Silver Dust Racing Assn.
Southern Nevada Off-Road Enthusiasts
Soroptimist International
Southern Nevada Clean Communities, Inc.
Southern Nevada Grotto
Southern Nevada Home Builders Assn.
Southern Nevada Landcruisers
Teamsters Local 631
The Nature Conservancy
The Wilderness Society
Tri County Livestock Council
U.S. Humane Society
U.S. Wild Horse and Burro Foundation
Wild Horse Organized Assistance, Inc.

Businesses

AeroTech
Aggrandize Mining Company, Inc.
AMAX Gold Inc
American Borate Company
American Sand and Gravel
Andalex Resources
Animal Protection Institute of America
Associated Press
Avery Engineering Company
Baron Mining Corporation
Bell Telephone Company of Nevada
Black Canyon Mining Company
Blystone Equipment Co.
BO-K Explorations
Bob Bottom, Inc.
Bolling Construction
Bow and Arrow Cattle Co.
Brookline Mining Company
CALNEV Pipeline Co.
Charles H. Heisen and Associates
Consolidated Minerals Mgmt. Corp.
Converse Consultants
Dames and Moore
Delorda Mining Company
Desert Echo
Dimick Drilling
Dixie Mining
Eldorado Valley Mining Corp
Energy Research Company, Inc.
Frehner Construction Company, Inc.
Galli Exploration USA
G. C. Wallace, Inc.
Gold Fields Mining Corporation

Grace Petroleum Corporation
Henderson Home News
Holchem Inc.
Hollywood Gravel Co.
Holnam, Inc.
Homestake Mining Company
H and W Minerals Company
Idaho Power
IMV
Industrial Photographics
Jacobs Engineering Group, Inc.
James Hardie Gypsum
Jetco Enterprises, Inc.
Johnstone Supply
J.R. Simplot Company
Kern River Gas Transmission Co.
Kerr-McGee Chemical Corporation
Key West Mining, Inc.
Knight and Leavitt Associates, Inc.
Krause/Thacke Mining and Minerals Co.
KVBC TV (Channel 3)
LAC Minerals (USA), Inc.
Los Aangeles Department of Water and Power
Las Vegas Paving Corporation
Las Vegas Sun
Las Vegas Valley Water District
Lewis Homes
Magnum Mining Company
MEA, Inc.
Mesquite Farmstead Water Assn.
Micron Minerals Corporation
Minerals Exploration Coalition
Mitsubishi Cement
Moapa Valley Telephone Company
Monco Petroleum
Nevada Environmental Consultants, Inc.
Nevada Cobalt Industries, Inc.
Nevada Pacific Company, Inc.
Nevada Power Company
Noble-Tech Group, Ltd.
Oglebay Norton Company
Osage Industries
Oxbow Power Corporation
PABCO Gypsum
Pathfinder Gold Mines Corp.
Planning Information Corporation
Popular Mining Magazine
Precision Asphalt and Grading
Public Land News
R.A.M.M. Corporation
R.B. Peterson Construction Company
Red Corral Mines
Resource Concepts, Inc.
Ruby Drilling Company, Inc.
Science Applications International Corporation
Santa Fe Pacific Mining Company
Sierra Pacific Power Company
Silver State Disposal Company
Silver State Materials Corp.
Simplot Silica Products
Sky's The Limit, Inc.
Skyline Construction Company, Inc.
Snowbird Resources Limited
Southern California Edison
Southern Nevada Mining Partners
Southern Nevada Paving, Inc.
Southwest Gas Corporation
S & S Geologic Consulting Services
Standard Industrial Minerals, Inc.
Stateline Resources, Inc.
St. Joe Gold Corp.
Stocks Mill and Supply Company, Inc.
Sundance Realty and Development
TAMETIC
Tele-Reservations
U.S. Borax and Chemical Corporation
U.S. Engineering and Mining Company
United States Resources, Inc.
Valley Ready Mix
Van Sickle Enterprises
Viceroy Gold Corporation
Vosburg Equipment
VTN
Washington Contractors Group
Western Range Service
Western Rock Products
Whiting Brothers, Inc.
Wil-Tel Communications
Wittwer Ranch
WMK

Individuals

Aaron L. Clark
Abe Teerlink
Al Atwell
Amy Mazza
Andrea L. Sweet
Audrey Bradbury
Barbara Rodgers
Bart and Jean Pearson

Ben Brown
Betty J. Rivers
Bill Fleshman
Bill Shapley
Billy B. Crank
Bob Moss
Bob Collette
Bob and Rita Pribila
Bret Braden
Bryce Gubler
Bruce Canfield
Byron and Ellie Green
C. A. Lewis
Carl Semon
Carl Volkmar
Carol Jacobson
Charles Carson
Charles D. Snow
Charles Luzier
Charles P. Van Epps
Charlie Lam
Cheri Madison
Chris Mitchell
Chuck Garrett
Clay Mills
Colonel Scott C. Bergren
Craig Walton
Cris Trolson
Dan Mundy
Daniel C. Thorne
Dave Naslund
David and Mary Deitrich
David Donnelly
David Hinkson
David L. Platerio
David Meshard
David Pierce
Deborah Collins
Dennis B. Whitmor
Dennis and Lola Egan
Derril Wenzel
Donald G. and Connie R. Whitney
Donna Geiser
Douglas E. Noland
D. R. Moody
Dr. Stanley E. Jones
Earl Gregory
Eddy Dean
Ed Pribyl
Edward and Adriane Wheeler
Edwin O. Larson
Emerson Leavitt
Ernest and Marge Sandquist
E. R. Riggs
Evan Blythin
Evelyn Hartin
Frank Buckley
Frank Maxwell
Franklin Rittenhouse
Fred Hansen
Gail D. Armstrong
Garry Hayes
Gary Bullard
George Austin
George D. Fehr
George H. Reed
George Moehr
Gladys Feinn
Glenn Stone
Greg Gault
Hardy H. Seglor
Harley Dickensheets
Harold C. Anderson
Harold Fischer
Harold Wittwer
Harry Pappas
Herbert M. Jones, Esq.
H. W. Gulley
Ivan G. Pivaroff
Jack Baker
Jack Woodcock
Jeff Landers
Jeff Van Ee
Jerry Riggs
Jim Sallee
Jo and Don Noble
Joe Cleary
Joe and David Jones
John A. Davenport
John Clark
John and Della Yeager
John L. Grassmeier
John Peplowski
John P. Rich
John Sherman
John Steele
John W. Arlidge
Joseph H. Robertson
Joseph Puckett
Joyce Stalians
Julene P. Haworth
Katherine Goudreau

Keith Kindred
Keith and Marilyn Nay
Ken Jensen
Kent Tim Hafen
Kirk Harrison
LaRene Younghans
Larry Isbell
Larry P. Brundy
Lee Halsey
Lee Kapaloski
Lee, Paul, and David Ziegler
Len Haeckel
Leo C. Artman
Leon Sprouse
Linda Sanders
Lionel Tyree
L. Levy
Lorin Bunker
Louis Koncher
Lt. Craig Klatt
Malcolm J. Reeves
Manning J. Post
M. R. Rambo
Marjorie Sill
Mark A. Sorensen, P.E.
Mark Royce
Mark Saylor
Marvin Veneman
Mary Hibbs
M. Dean Webb
Melburn Jensen
Michael Kirk, D.V.M.
Michele Spruell
Mike Payne
Mike Verchick
Milton Linn
Mr. Melburn Jensen
Mr. Mildred K. Kaunas
Pat Foley
Paul E. Huish
Paul Selzer
Paul and Timothy Austin
Perry Bowman
Peter Gattuso
Randal Grandstaff
Ray Ausmus
Ray Lindblom
Raymond Sunday
R. E. Bob King
Rex Goodell
R. H. Cronshey
Richard Arnold
Richard C. MacDonald
Richard J. Mitchell
Richard Peters
Richard Thurmond
R. James Steward
Robert B. Leydecker, Jr.
Robert C. Broadbent Jr.
Robert and Joan Michel
Robert Kerr
Robert Murphy and Evangeline Brown
Robert Stoldal
Robert W. Maichle
Roland Holmes
Ronald M. Newell
Ron and Ann Schreiber
Ron L., Ron W., and Leslie Hardy
Ron Rudin Realty
Rose Strickland
Russell F. Miller
Ruth Sunday
Sal Fish
Sandy McFarlane
Sanford and Marilyn Shuler
Scott Margetts
Scott Obney
Shirley and Wayne Leavitt
Spencer Apple
Stanley Pierce
Steve Hailey
Steven Reiter
Team Loomis, Off-Highway Training
The C. L. Hesters
Thomas Davis
Thomas L. Williams
Tim Boyce
Tom Mannillo
Walter Barbuck
William A. Kelley
William J. Herbert, Jr.
William R. Hodges
William and Toni Dixson
William Lescenski
William Pautle

LIST OF PREPARERS

The Las Vegas Proposed Resource Management Plan and Final Environmental Impact Statement was prepared by specialists from the Las Vegas Field Office. Planning, resource, and printing staff from the Nevada State Office provided technical reviews and support. The Ely Field Office completed the Desert Tortoise Cumulative Impact Analysis in Appendix I. Tables 5-1, 5-2, and 5-3 list the individuals and their responsibilities in the preparation of this document.

Table 5-1. List of preparers.

Name	Assignment	Education and Qualifications	Years of Experience
Roger Alexander	Team Leader	B.S.-Wildlife Science	20
Jerry Wickstrom	Team Leader (after 7/91)	B.S.-Wildlife Science	30 retired
Jeff Steinmetz	Team Leader (after 9/94)	B.S.-Range Management	20
Jeanie Cole	Wildlife Habitat Mgmt. Aquatic Habitat Mgmt. ACECs	B.S.-Wildlife Ecology	11
Tom Cook	Geology, Minerals	B.S.-Geography B.S.-Geology B.S.B.A.-Accounting M.S.-Accountancy M.B.A.- Business Administration	19
Sharon DiPinto	Lands, Rights-of-Way, Acquisitions		19
Gary McFadden	Wild Horse & Burro Mgmt.,	B.S.-Range Animal Science	23
Kathy Helm	Technical Writer/Editor		16
Rebecca Lange	Geology and Minerals	B.A. Geology	15
Joel Mur	Red Rock Canyon NCA	B.A.-Liberal Arts B.S.-Natural Resources/ Recreation Lands Mgmt.	21
Keith Myhrer	Cultural Resources, Paleontological Resources	M.A.-Anthropology	5 USAF
Paul Myers	Socio-Economics	B.S.-Economics	20
Jack Norman	Soils and Hydrology	B.S. Soil Science	16
Gary Pavusko	Fire Management	A.A.S.-Fire Science Mgmt. A.A.S.-Fire Science Tech. B.S.-Natural Resource Conservation	12 CDF
Jake Rajala	Desert Tortoise Cumulative	M.A. Anthropology M.S. Forestry & Range B.A. Anthropology	21
Donn Siebert	Air Resources, Soils, Water Resources, Riparian Mgmt.	B.S.-Watershed Mgmt. B.S.-Forest Mgmt.	19
Robert Taylor	GIS Support	B.S. Landscape Architect	22
Dave Wolf	Recreation, Wilderness, VRM, Wild & Scenic Rivers,	B.S.-Wildlife Management B.S. Recreation	23

Table 5-2. List of reviewers and technical support and guidance.

Name	Title	Office
Bob Stager	Rangeland Management Specialist	Las Vegas Field Office
Bob Taylor	Resource Advisor	Las Vegas Field Office
Sid Slone	Wildlife Biologist	Las Vegas Field Office
Stan Rolf	Archaeologist	Las Vegas Field Office
Gayle Marrs-Smith	Botanist	Las Vegas Field Office
Ken Stowers	Realty Specialist	Nevada State Office
Richard Hoops	Fluid Minerals Team Leader	Nevada State Office
Brad Hines	Range Specialist	Nevada State Office
Dave Pulliam	Wildlife Biologist	Nevada State Office
Randy McNatt	Fish/Foresrty Specialist	Nevada State Office
Margaret Wolf	Outdoor Recreation Planner	Nevada State Office
Mary Clark	Land Law Examiner	Nevada State Office
Neil Talbot	Planning/Environmental Analyst	Nevada State Office
Pat Barker	Archaeologist	Nevada State Office
Stephen Smith	Wilderness Specialist	Nevada State Office

Table 5-3. Management support and guidance.

Name	Title	Office
Robert V. Abbey	State Director	Nevada State Office
Dan Rathbun	Special Assistant to State Director	Nevada State Office
Tom Leshendok	Divisions Chief, Minerals Mgt.	Nevada State Office
Sandra Allen	Chief, Natural Resources, Lands & Planning	Nevada State Office
Jo Simpson	Chief, Office of External Affairs	Nevada State Office
Mike Lipka	State Fire Control Officer	Nevada State Office
Jessie Dingman	State Fire Management Officer	Nevada State Office
Michael Dwyer	Field Office Manager	Las Vegas Field Office
Marvin D. Morgan	ADM Renewable Resources	Las Vegas Field Office
Mark Chatteron	ADM Non-Renewable Resources	Las Vegas Field Office
Dan Krutina	Interagency Fire Mtg. Officer	Las Vegas Field Office

Chapter 6 - Plan Implementation, Maintenance, and Amendment

Introduction

The Las Vegas District Resource Management Plan is designed to provide the framework for managing public lands in the Las Vegas BLM District for a period of approximately 20 years. To accomplish this goal, the planning process must provide for changes in the terms, conditions, and decisions of the Approved Resource Management Plan, in response to unforeseen future demands or events.

Plan Implementation

Following approval of the resource management plan, the BLM will implement the management actions of this plan. The following standard operating procedures will be followed during plan implementation to mitigate the impacts of those management actions.

Standard Operating Procedures

1. Management actions will conform to all laws, Executive Orders, regulations, Memoranda of Understanding, Cooperative Management Agreements, Department of Interior manuals, BLM manuals, and BLM Instruction Memoranda.

2. All management actions will require an environmental analysis prior to implementation. The environmental assessment process will evaluate the proposed action for conformance with applicable laws and regulations. If the assessment determines there is potential for significant impacts that cannot be mitigated, the proposed action will be modified or abandoned.

Plan Maintenance

The Las Vegas District Resource Management Plan will be maintained as necessary to reflect minor changes in data. Situations requiring plan maintenance include changing acreage figures to reflect recent land disposals or acquisitions, to reflect new legislation, and to provide new language clarifying a decision, term, or condition. Maintenance of the Plan cannot expand the scope of a resource use or a restriction, nor can it change the terms, conditions, and decisions of an approved Resource Management Plan. Plan maintenance does not require formal public involvement, interagency coordination, or the preparation of an environmental assessment or environmental impact statement. Any maintenance must, however, be documented in the Plan and supporting records.

Plan Amendments

The *Federal Land Policy and Management Act* (1976) requires that all actions occurring on public land conform to an approved land use plan. The BLM regularly receives proposals, applications, and requests for uses that are not in conformance with an approved land use plan. Approval of any of these proposals would alter the scope of a resource use or use restriction; or change the terms, conditions, or decisions of the Resource Management Plan. In this situation, the Bureau has two options: (1) to deny the request or application, based on non-conformance with the approved land use plan, or (2) to initiate the plan amendment process.

The plan amendment process may also be initiated at any time by the BLM State Director, in response to new data obtained from plan monitoring and evaluation; new or revised policy; changes in the scope of a resource use or a use restriction; and any changes in the terms, conditions, or decisions of the Resource Management Plan.

The decision to initiate the plan amendment process does not guarantee that the proposed plan amendment will be approved. The proposed amendment will be analyzed in accordance with the planning regulations and receive an appropriate level of environmental analysis, public participation, and interagency coordination (including consistency determinations with other approved Federal, state, and local land use plans), prior to the Bureau's final decision.

Based on the significance of the anticipated environmental impacts from the specific proposal and the significance of the anticipated change to the Resource Management Plan, plan amendments are categorized as described below:

- *Category 1* - The proposed amendment, based on preliminary analysis, would not involve a significant change in the goals, objectives, terms, conditions, or decisions of the Resource Management Plan and would not result in a significant environmental impact. An Environmental Impact Statement would not be required, and the proposed plan amendment would be analyzed in an environmental assessment.

- *Category 2* - The proposed amendment, based on preliminary analysis, would involve a significant change in the goals, objectives, terms, conditions, or decisions of the Resource Management Plan, and would result in a significant environmental impact. An Environmental Impact Statement would, therefore, be required.

Plan Amendment Process

The plan amendment process for the Las Vegas District Resource Management Plan will be conducted on an annual basis, except in special circumstances where the State Director requires that the process begin immediately. In March of every year following approval of the Resource Management Plan, a 30-day time period will be designated for the purpose of submitting proposed amendments to the Las Vegas District Manager. Public notification of the submission period will be published in the *Federal Register*; news releases will be distributed to all major media sources in Nevada; and a notice will be sent to all individuals, organizations, agencies, and other entities who have requested to be on the Planning Mailing List.

All proposed amendments submitted during this time period will be evaluated to:

- Determine if the proposed amendment is in accordance with applicable laws and regulations and provides for the immediate and future management, use, development, and protection of the public lands within the Las Vegas BLM District. The BLM Las Vegas District Manager will base the rationale for such determination on the principles of multiple use, sustained yield, and maintenance of environmental quality, as required in the *Federal Land Policy and Management Act* of 1976.

- Determine if alternative locations within the Las Vegas District are available to meet the applicant's needs without requiring a change in the Resource Management Plan's classification or an amendment to any plan element.

The following criteria must be present before a plan amendment will be considered:

- The proposed amendment is based on new data not considered when the plan was developed.

- The information represents a change in legal or regulatory mandate.

- The supporting detail is sufficient and the problem is clearly stated to allow consideration of the request.

- The information represents a formal change in State or local government or agency plans.

If the proposed amendment cannot be considered due to legal or regulatory constraints or to improper submission, or if the situation can be resolved without a plan amendment, the amendment process will end at this point.

If a determination is made by the Las Vegas BLM District Manager to proceed with the amendment process, the proposed plan amendments will be presented to the Resource Advisory Council for discussion and recommendations. The Council will serve only in an advisory capacity and their recommendations will not be binding on the District Manager.

The recommendations of the District Manager and the Resource Advisory Council will be forwarded to the State Director, who will decide to either:

- Reject the proposed plan amendment, in which case the requestor will be notified of the decision and its rationale.

- Further consider the proposed plan amendment, in which case the Director will determine the category of the amendment with regard to the level of environmental analysis. The Bureau will then proceed with the amendment process, as indicated below.

Category 1 Amendment

- Issue Notice of Intent (NOI) to prepare a plan amendment.
- Provide a 30-day public review and comment period.
- Identify issues related to the proposed plan amendment and review existing Resource Management Plan planning criteria. Revise the planning criteria, if necessary, and provide for public comments on the revised criteria. Collect necessary data, review the existing Analysis of the Management Situation as it applies to the proposed amendment, and revise as needed. Formulate alternatives and estimate effects of implementing any of these alternatives.
- Prepare Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).
- Provide for 60-day Governor's Consistency Review.
- Issue Notice of Availability (NOA) for Proposed Plan Amendment/Environmental Assessment/Finding of No Significant Impact.
- Provide a 30-day protest period.
- Resolve any protests.
- Prepare Approved Plan Amendment/Decision Record.

Category 2 Amendment

- Issue Notice Of Intent to prepare a plan amendment/Environmental Impact Statement.
- Provide a 30-day public scoping period.
- Identify issues related to the proposed plan amendment and review existing Resource Management Plan planning criteria. Revise the criteria, if necessary, and provide for public comments on the revised criteria. Collect necessary data, review the existing Analysis of the Management Situation as it applies to the proposed amendment, and revise as necessary. Formulate alternatives and estimate the effects of implementing any of these alternatives.
- Prepare Draft Plan Amendment/Environmental Impact Statement.
- Provide for 90-day public comment and review period.
- Analyze comments and prepare Proposed Plan Amendment/Final Environmental Impact Statement.
- Issue Notice of Availability for Proposed Plan Amendment/Final Environmental Impact Statement.
- Provide 30-day protest period and 60-day Governor's Consistency Review.
- Resolve any protests.
- Prepare Approved Plan Amendment/Record of Decision.

Plan Amendment Information

All requests for amendment must be submitted to the Las Vegas BLM District Manager at the following address:

Bureau of Land Management
Attention: District Manager
4765 Vegas Drive
Las Vegas, NV 89108

Information Required from Individuals and Organizations

Requests for a plan amendment from individuals, private groups, organizations, and businesses must contain the following information:

- Reason for the request, including: (1) explanation of any adverse effects on an individual, group, organization, or business by existing requirements or management objectives in the Resource Management Plan, or (2) description of new data or circumstances attributed to the need to amend the Resource Management Plan.

- Description of the proposed plan amendment, including objectives, direction, and actions.

Information Required from Governmental Agencies

Cities

Requests for a plan amendment from an incorporated city must contain the following information:

- Approval of the request by vote of the appropriate City Council.

- Reason for request, including: (1) explanation of any adverse effects on the city by the Resource Management Plan or parts thereof, or (2) description of new data or circumstances attributed to the need to amend the Resource Management Plan.

- Description of the proposed plan amendment, including objectives, direction, and actions, as well as supportive data explaining the necessity of the proposed amendment for consistency with officially adopted city land use plans.

County

Requests for a plan amendment from Clark or Nye County must contain the following information:

- Approval of the request by vote of the appropriate County Commissioners.

- Reasons for the request, including: (1) explanation of any adverse effects by the Resource Management Plan, or parts thereof, or (2) description of new data or circumstances attributed to the need to amend the Resource Management Plan.

- Description of the proposed plan amendment, including objectives, direction, and actions, as well as supportive data explaining the necessity of the proposed amendment for consistency with officially adopted county land use plans.

State

Requests for plan amendment from the Legislative or Executive Branch of the State of Nevada must contain the following:

- Approval of the Executive Director or Secretary of the submitting agency, after demonstrating coordination with other potentially affected State agencies.

- Reasons for the request, including (1) explanation of any adverse effects on the State by the Resource Management Plan, or parts thereof; or (2) description of new data or circumstances attributed to the need to amend the Resource Management Plan.

- Description of the proposed plan amendment, including objectives, direction, and actions, as well as supportive data explaining the necessity of the proposed amendment for consistency with adopted State plans or programs.

Federal Agency

Requests for plan amendment from a department, office, or bureau of the Executive Branch of the United States Government (other than BLM) must contain the following:

- Approval by the director of the submitting department, office, or bureau.

- Reasons for the request, including: (1) explanation of any adverse effects on the agency by the Resource Management Plan, or parts thereof, or (2) description of new data or circumstances attributed to the need to amend the Resource Management Plan.

- Description of the proposed plan amendment, including objectives, direction, and actions, as well as supportive data explaining the necessity of the plan amendment for consistency with officially adopted plans or programs.

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