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In cooperation with the
Natural Resources and
Environmental Affairs
Directorate, Marine Corps
Air Ground Combat Center,
TwentyNine Palms and the
Mojave Desert Resource
Conservation District

Rangeland Ecological Site Descriptions of Marine Corps Air Ground Combat Center, TwentyNine Palms, California



The following information is an excerpt from the Soil Survey of the Marine Corps Air Ground Combat Center, Twentynine Palms.

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Introduction

Landscapes of native vegetation are divided into ecological sites for the purposes of inventory, evaluation, and management. An ecological site, as defined for rangeland, is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

An ecological site is the product of all the environmental factors responsible for its development including parent material, landscape, climate, soils, biota, hydrology, fire and time in place. The ecological site description contains information on each of the environmental factors. Included are brief descriptions of: a) physiographic and climatic features; b) major identifiable plant community types that may occupy the site, including the historic climax plant community; c) total annual production; d) ecological dynamics of the plant communities; e) soils and their main properties; f) and site interpretations and general management considerations for wildlife, livestock, threatened and endangered species, hydrology, recreation, fire, aesthetics and restoration/revegetation.

The historic climax plant community for a site is the plant community that existed prior to European immigration and settlement. It is the plant community that had developed on the site as a result of all site forming factors. This community was best adapted to the unique combination of environmental factors associated with the site. Natural disturbances, such as drought, fire, grazing by native fauna and insects, were inherent in the development and maintenance of these native plant communities. These natural disturbances are reflected in the site descriptions. Plant communities that are subjected to abnormal disturbances and physical site deterioration or that are protected from natural influences for long periods seldom typify the historic climax vegetation and may exist in a steady state that is different from the historic climax plant community.

The historic climax plant community is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities can be recognized by characteristic patterns of species composition, association, and community structure. Generally one species or a group of species dominates a site. Because of their stability in the climax plant community, they can be used to distinguish sites and

to differentiate one site from another. Species of minor occurrence can be used to distinguish sites when the dominant species are in equal proportion.

At times, less frequently occurring plants may increase on a site, or plants not formerly found in the climax community may invade the site. The presence or abundance of these plants may fluctuate greatly because of differences in microenvironment, weather conditions or human actions. Using these species for site identification can be misleading; thus they should not be used to differentiate sites.

The following ecological site inventory methods are used in determining the characteristic plant communities of an ecological site:

1. Identification and evaluation of reference and/or relict sites with similar plant communities and associated soils.
2. Interpolation and extrapolation of plant, soil, and climatic data from existing historic reference areas along a continuum to other points on that continuum for which no suitable reference community is available.
3. Evaluation and comparison of the same ecological site occurring in different areas, but that have experienced different levels of disturbance and management. Further comparison is made with areas that are not disturbed.
4. Evaluating and interpretation of research data dealing with the ecology, management, and soils of plant communities.
5. Review of historical accounts, survey and military records, and botanical literature of the area.

The initial description of the historic climax plant community should be considered as an approximation subject to modification as additional knowledge is gained.

Climax plant communities change along environmental gradients. When changes in soils, aspect, topography, or moisture conditions are abrupt, plant community boundaries are distinct. Boundaries are broader and less distinct where plant communities change gradually along wide environmental gradients of relatively uniform soils and topography. Thus, the need for site differentiation may not be readily apparent until the cumulative impact of soil, topography, hydrology, or climate is examined over a broad area. Frequently, such differences are reflected first in production and second in the kinds and proportion of plant species making up the core of the plant community. Of necessity, boundaries between ecological sites along a continuum of closely related soils and a gradually changing climate are somewhat arbitrary.

The following criteria are used to differentiate one ecological site from another:

1. Significant differences in the species or species groups that are in the characteristic plant community.
2. Significant differences in the relative proportion of species or species groups in the characteristic plant community.
3. Significant differences in the total annual production of the characteristic plant community.
4. Soil factors that determine the plant production and composition, the hydrology of the site, and the functioning of the ecological processes of the water cycle, mineral cycles, and energy flow.

Differences in kind, proportion, and production of plants are the result of differences in soil, topography, climate and other environmental factors. Slight variations in these factors are not criteria for site differentiation. Individual environmental factors are frequently associated with significant differences in native plant communities. The differences in the environmental factors must be great enough to affect the kinds, and amounts and proportions of the plant community to be differentiated into a distinct site.

Ecological site inventories were conducted and site descriptions were developed in cooperation with the Fort Irwin National Training Center Soil Survey.

Alluvial Plain

Plant Symbol: ATPO/ACHY
 Site Number: 030XY047NV

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on alluvial flats and lake plains. Elevations are 1745 to 2735 feet. Slopes range from 0 to 4 percent but slopes of 0 to 2 percent is most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occur from July to September as a result of summer convection storms. Mean annual air temperature is 61 to 73 degrees F.

b. The average frost-free period is 240 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Desert Saltbush Scrub or Allscale Series. This community is dominated by allscale saltbush. Potential vegetative composition is about 15 percent grasses, 5 percent forbs, and 80 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATPO	Allscale saltbush	60-70
SSSS	Other shrubs	5-15**
LATR2	Creosotebush	
AMDU2	White bursage	
ATCA2	Fourwing saltbush	
EPNE	Nevada ephedra	
LEFR2	Desert alyssum	
PSEM	Emory dalea	
SUMO	Mojave seablite	
ATHY	Desert holly	

** Allow no more than 5 percent of each species of this group, and no more than 15 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
ACHY	Indian ricegrass	5-15
PPGG	Other perennial grasses	2-10**
DISP	Inland saltgrass	
PLRI3	Big galleta	
AAGG	Other annual grasses	T-3
BOBA2	Sixweeks grama	

** Allow no more than 4 percent of each species of this group, and no more than 10 percent in aggregate

Forbs (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	T-5**
SPAM2	Desert globemallow	
AAFF	Other annual forbs	T-10
CRYPT	Cryptantha	
GECA2	Desert sunflower	
PLOV	Desert Indianwheat	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	400
Unfavorable Years	250

e. Ecological dynamics: As ecological condition deteriorates perennial grasses decrease. Allscale saltbush may initially increase but with continued site degradation allscale will also decrease. Non-native grasses and forbs such as schismus, red-stem filaree and Russian thistle will invade this site. White burrobush is a pioneer species on this site.

f. Major plant community types:

Desert Saltbush Scrub or Allscale Series --This is a xerophytic phase of saltbush scrub with limited salt tolerance. This community usually consists of low, grayish, microphyllus shrubs, 0.3 to 1 meter tall, with some succulent species. Shrubs are widely spaced with total cover typically low. Stands are dominated by allscale. Annuals are seasonally present. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3007

Growth Curve Name--Allscale saltbush

Description: Growth begins in early spring; flowering and seed set occur by October.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	15	30	20	10	5	5	5	0	0	0

Growth Curve Number--CA3022

Growth Curve Name--Indian ricegrass

Description: Growth starts in early spring with most growth occurring from April to May. Flowering and seed set occur by June. Dormancy occurs during the hot summer months.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	30	35	5	0	0	5	5	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 (030XY046NV) Outwash Plain
 (030XY127CA) Sodic Dune 3-5" P.Z.
 (030XY133CA) Sodic Sand 3-5" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 (030XY046NV) Outwash Plain [AMDU2, LATR2 important shrubs]
 (030XY133CA) Sodic Sand 3-5" P.Z. [ATCA2, LATR2 dominant shrubs]
- c. This ecological site description is based on the following documentation:
 Sampling technique
 3 NV-ECS-1
 1 SCS-Range 417
 Other

5. Soils

- a. The soils that characterize this site are very deep and somewhat excessively drained. They are formed in mixed alluvium. Surface textures and subsurface textures are sands and sandy loams. The soils are slightly to moderately alkaline. Available water capacity is low and permeability is rapid. Wind erosion hazard is severe. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches.

Representative Soil Map Units

- 180 Cajon minor component in Hypoint, saline-Cajon dry association, 0-4 percent slopes
- 210 Typic Torriorthents minor component in Kentonmill-Lava flow complex, 0-2 percent slopes

903 Typic Torriorthents minor component in Playa-Typic Torriorthents association, 0-4 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as Merriam's kangaroo rats, desert kangaroo rats, little pocket mice, black-tailed jackrabbits and coyotes. Allscale saltbush provides valuable cover and forage.
- b. Reptiles occurring on this site include zebra-tailed lizards, western whiptails, desert iguana and side-blotched lizards. Sidewinders also occur. Habitat for desert tortoise is limited due to the occurrence of ponding and flooding.
- c. Birds occurring on this site include common ravens, horned larks, LeConte thrashers, and several species of sparrows including black-throated, sage and Brewer's sparrows.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations:
 Allscale is a highly palatable plant for domestic livestock and provides valuable forage during the winter and early spring months. Overgrazing can eliminate this species from the site. In favorable years, annual forbs and grasses may provide limited spring grazing.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	400	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and the soil crust and structure can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing, barren areas and the introduction of non-native plant species. Vehicles should be limited to existing roads and trails. The soils are dusty when subjected to vehicular traffic and treatment may be desirable in areas of heavy traffic. The frequency of flash flooding may also increase with an increase in surface runoff and loss of vegetative cover.

3. Ecosystem Management

a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Vehicle activity off of designated tank trails and roads may result in loss of vegetative cover, increased erosion and destruction of small mammal burrows. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water developments would increase the species diversity of this site.

b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts.

Allscale saltbush is valuable for erosion control and cover restoration. Direct seeding should be done during the fall and winter months when low soil temperatures and high soil moisture are favorable for germination.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

a. Runoff is very low to low. Hydrologic group A--soils having high infiltration rates even when thoroughly wetted and consisting of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Cajon	A	49	55	63
Typic Torriorthents	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

a. Russian thistle, *Salsola tragus*, occurs in heavily disturbed areas. Schismus, *Schismus barbatus*, occurs throughout the site. Saltcedar, *Tamarix ramosissima*, occurs in washes and bomb craters that intermittently hold water.

6. Recreation and Aesthetics

a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Eremophila alpestris--Horned lark
 Federal and State species of concern
Toxostoma lecontei--LeConte's thrasher
 State species of concern

8. Fire

a. The foliage of the saltbushes appears to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill aboveground portions of the saltbushes. Indian ricegrass sustains slight damage by fire and can reestablish via seed dispersed from adjacent unburned areas.

9. Typical Site Location

NW 1/4, Sec. 35, T7N, R6E
 Approximately 10 miles southwest of Ludlow, CA
 Lavic Lake Quadrangle
 UTM 11S 0561500e 3835300n; (Datum=NAS-C)
 San Bernardino Co., CA

Cobbly Wash

Plant Symbol: HYEM-ACGR/PLRI3

Site Number: 030XB128CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs along drainageways of inset fans. Elevation is 1100 to 2400 feet. Slopes range from 2 to 8 percent.

2. Climatic Features

a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 61 to 73 degrees F.

b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Wash Scrub. Desert lavender, catclaw acacia, creosotebush and big galleta dominate this community. Potential vegetative composition is about 15 percent grasses, 10 percent forbs, and 75 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (75 percent):

Symbol	Common Name	% Composition (air-dry weight)
HYEM	Desert lavender	30-50
ACGR	Catclaw acacia	2-10
LATR2	Creosotebush	2-10
HYSA	White burrobush	2-5
BEJU	Sweetbush	2-5
SSSS	Other shrubs	10-15**
ENFA	White brittlebush	
POGR	Odora	
SAME	Bladdersage	
KRGR	White ratany	
AMDU2	White bursage	
BABR	Shortleaf baccharis	
SEAR8	Desertsenna	
PSSP3	Smoketree	

ENFR Bush encelia

** Allow no more than 5 percent of each species of this group, and no more than 20 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	5-10
PPGG	Other perennial grasses	2-5**
ACSP12	Desert needlegrass	
AAGG	Other annual grasses	T-5
ARAD	Sixweeks threeawn	
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
ERIN4	Desert trumpet	
MIBI8	Wishbone herb	
ASSU	Rush milkweed	
EUPO3	Sandmat	
SPAM2	Desert globemallow	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
CRYPT	Cryptantha	
PHACE	Phacelia	
MOCO	Ghost flower	

** Allow no more than 3 percent of each species of this group, and no more than 8 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	350
Unfavorable Years	200

e. Ecological dynamics: As ecological condition deteriorates, creosotebush, white burrobush and white bursage will initially increase. Perennial forbs and grasses will decrease. Continued surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such

as desert lavender, creosotebush and catclaw acacia. Species likely to invade this site include saltcedar and non-native annual grasses and forbs such as schismus, red brome, red-stem filaree and Russian thistle.

f. Major plant community types:

Mojave Wash Scrub--The historic site potential is a diverse community with an open canopy of shrubs and scattered trees. Perennial grasses and forbs are common. Annuals are seasonally present and are abundant in years of above average precipitation. This site is inherently unstable due to the frequency of flooding.

g. Plant Growth Curve

Growth Curve Number--CA3023

Growth Curve Name--Desert lavender

Description: If moisture and temperature conditions are favorable growth may occur throughout the year.

Flowering may occur at any time during the year, with peak flowering occurring from October through May. Seeds are typically collected during the spring.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	5	15	20	20	5	0	0	10	10	5	5

Growth Curve Number--AZ3091

Growth Curve Name--Catclaw acacia

Description: Greens up in spring; flowers in May and June and pods mature between July and September.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	10	15	30	15	10	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occurs by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB092NV) Desert Patina

(030XB019NV) Limy 3-5" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB028NV) Valley Wash [HYSA dominant shrub,

HYEM minor shrub]

(030XB136CA) Dry Wash [HYSA-LATR2 dominant shrubs; less productive site]

c. This ecological site description is based on the following documentation:

Sampling technique

2 NV-ECS-1

 SCS-Range 417

2 Other

5. Soils

a. The soils that characterize this site are very deep and excessively drained. They are formed in stratified alluvium from mixed sources. Surface and subsurface textures are loamy coarse sands, extremely gravelly sands and very cobbly sands. Available water capacity is very low and permeability is very rapid. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches. This site is subject to frequent flooding.

Representative Soil Map Units

- 274 Arizo minor component, Arizo extremely gravelly loamy coarse sand, dry, 2-8 percent slopes
- 276 Arizo minor component, Arizo dry-Twobitter association, 2-8 percent slopes
- 313 Carrizo minor component, Carrizo complex, 2-8 percent slopes
- 314 Carrizo minor component, Carrizo complex, 2-8 percent slopes, rubbly
- 315 Carrizo minor component, Carrizo-Clegorpass association, 2-8 percent slopes

6. Wildlife Communities

a. Mammals common to this site includes long-tailed pocketmice, canyon mice, white-tailed antelope squirrels, coyotes and black-tailed jackrabbits. Catclaw acacia seeds and pods are valuable forage for ground squirrels.

b. Common lizards include the side-blotched lizard, western whiptail and zebra-tailed lizard. Desert tortoises frequently den in the banks and berms of washes and feed on vegetation occurring in the wash.

c. Birds common to this site include Costa's hummingbirds, black-throated sparrows, black-tailed gnatcatchers, verdins and mourning doves. Catclaw acacia provides food and cover for several species of birds. Desert lavender provides nesting sites.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited value for livestock grazing due to low productivity. Desert lavender provides limited forage for livestock. Catclaw acacia is poor forage for livestock. It may be browsed in early spring when twigs are green but is otherwise seldom eaten. Creosotebush is unpalatable. During favorable years, annual grasses and forbs provide additional forage.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	350	

2. General Management Considerations

- a. Military Operations--Vehicle use in washes can destroy the vegetation and channel morphology. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover. Channel width and depth will also increase. Gully stabilization methods include straw bale checkdams, rock riprap and sand bags. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity in washes may destroy desert tortoise and small mammal habitat. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Desert lavender has been successfully transplanted using cuttings. Catclaw acacia has shown varying success when transplanted onto disturbed sites. Seedlings should be grown in tall containers to allow for the development of a deep root system. White burrobush is a short-lived species, although the seeds have high viability and germination rates compared to other desert shrubs. Creosotebush, is a long-lived species, which once established may

improve the site for annuals that grow under its canopy by trapping fine soil, organic matter and seeds. Creosotebush can be used for long-term stabilization and for improvement of desert tortoise habitat.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low and low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Carrizo	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*

6. Recreation and Aesthetics

- a. This site is valued for open space and those interested in desert ecology. Desert tortoise, flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California

Endangered Species Handbook).
Gopherus agassizii--Desert Tortoise
Federal and State threatened

8. Fire

- a. This site is usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Desert lavender and catclaw acacia are able to resprout from the root crown following top-kill by fire. White burrobush establishes quickly after fire via off-site

seeds and sprouting. Creosotebush possesses limited sprouting ability, thus, can be killed by fire.

9. Typical Site Location

SW1/4 Sec. 31, T3N R10E
Approximately 6 miles northeast of Marine Corps Air
Ground Combat Center headquarters
Lead Mountain SE Quadrangle
UTM 11S 0593800e 3795500n (Datum=NAS-C)
San Bernardino Co., CA

Desert Patina

Plant Symbol: LATR2

Site Number: 030XB092NV

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on summits of fan remnants. Elevation is 720 to 3500 feet. Slopes range from 0 to 8 percent, but slopes from 2 to 4 percent are most typical.

2. Climatic Features

- a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 61 to 73 degrees F.
- b. The average frost-free period is 240 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Mojave Creosotebush Scrub or Creosotebush Series. This community is dominated by creosotebush. Potential vegetative composition is about 5 percent grasses, 5 percent forbs, and 90 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (90 percent):

Symbol	Common Name	% Composition (air-dry weight)
LATR2	Creosotebush	90-95
SSSS	Other shrubs	T-5**
AMDU2	White bursage	
KRER	Range ratany	
KRGR	White ratany	
OPUNT	Cactus	
SEAR8	Desertsenna	
ENFR	Bush encelia	
ATHY	Desert holly	
YUSC2	Mojave yucca	

** Allow no more than 5 percent in aggregate

Grasses and Grass-like Plants (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPG	Other perennial grasses	T-5**
ERPU8	Fluffgrass	
AAGG	Other annual grasses	T-5

** Allow no more than 3 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	T-3**
ERIN4	Desert trumpet	
MIBI8	Wishbone herb	
STEPH	Wirelettuce	
AAFF	Other annual forbs	T-5
CHRI	Turkshead	
PLOV	Desert Indianwheat	
PSRA	Turtleback	

** Allow no more than 3 percent in aggregate

- c. Approximate ground cover (basal and crown) is 1 to 3 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	150
Normal Years	75
Unfavorable Years	25

- e. Ecological dynamics: This is a very stable plant community so long as the desert pavement is undisturbed. This site is characterized by low productivity with little plant diversity. Annual forbs account for most of the variability in production levels. Disturbance would cause an increase in desert trumpet and wirelettuce and an introduction of non-native species such as red brome, schismus, and red-stem filaree. White burrobrush is the primary perennial pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or Creosotebush Series--The historic site potential is characterized by widely spaced shrubs up to 2 meters tall. Creosotebush dominates this series. White bursage may be present but is not an important shrub. Perennial grasses are sparse.

Annual forbs and grasses are seasonally present. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB005NV) Limy 5-7" P.Z.

(030XB145CA) Valley Wash

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB019NV) Limy 3-5" P.Z. [More productive site]

(030XB005NV) Limy 5-7" P.Z. [More productive site;AMDU2-LATR2 codominant]

(030XB017NV) Limy Hill 3-5" P.Z. [Less productive site; occurs on mountain sideslopes]

c. This ecological site description is based on the following documentation:

Sampling technique

 11 NVECS-1

 SCS-Range 417

 Other

5. Soils

a. The soils that characterize this site are very deep and well drained. They are formed in mixed alluvium. Surface textures are extremely gravelly loams. Subsoil textures are very gravelly loams, very gravelly coarse sands and very gravelly sandy loams. Available water capacity is very low to low and permeability is moderate. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 60 inches or more.

Representative Soil Map Units

261	<u>Twobitter</u> -Cajon-Arizo complex, 2-8 percent slopes
276	Arizo, dry- <u>Twobitter</u> association, 2-8 percent slopes
293	Arizo- <u>Twobitter</u> association, 2-4 percent slopes
315	Carrizo- <u>Clegorpass</u> association, 2-8 percent slopes

6. Wildlife Communities

a. This site provides habitat for mammals such as long-tailed pocket mice, canyon mice, black-tailed jackrabbits and coyotes.

b. Lizards common to this site include western whiptail and side-blotched lizard. Desert tortoise may dig depressions in the desert pavement to collect rainwater.

c. Birds common to this site include common ravens, horned larks, rock wrens and black throated sparrows.

B. Ecological Site Interpretations

1. Livestock Grazing

a. Season of Use--Other Mgt. Considerations--This site has limited use for livestock grazing due to low productivity. The primary source of forage is limited to annual grasses and forbs and low amounts of white bursage. Creosotebush is unpalatable to livestock. Domestic sheep use this shrub for shade.

b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

Pounds/acre

air dry AUM/AC AC/AUM

Normal Years 75

2. General Management Considerations

a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and desert pavement can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing, barren areas and the introduction of non-native plants.

3. Ecosystem Management

a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails can result in destruction of tortoise habitat. Water developments would increase the species diversity of this site.

b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Creosotebush transplants, grown in tall pots, are essential on soils that have a

thick argillic horizon. The tall pots will allow the roots to develop below the argillic horizon. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is low to medium. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Clegorpass	B	68	72	77
Twobitter	B	68	72	77

5. Poisonous Plants and/or Non-native Plants

- a. Non-native plants occurring on this site include red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus barbatus*.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Gopherus agassizii*--Desert Tortoise
Federal and State threatened
 - Eremophila alpestris*--Horned Lark
Federal and State species of concern

8. Fire

- a. This site is usually unaffected by fire because of low fuel loads. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

NW1/4 Sec. 19 T4N, R11E
 Approximately 13 miles southwest of Amboy, CA
 Lead Mountain NE Quadrangle
 UTM 11S, 0603341e 3809876n (Datum=NAS-C)
 San Bernardino Co., CA

Dry Wash

Plant Symbol: **HYSA-LATR2**

Site Number: **030XB136CA**

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on inset fans along drainageways of ephemeral streams. Elevation is 1800 to 2835 feet. Slopes gradients of 2 to 8 percent are most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 70 degrees F.

b. The average frost-free period is 240 to 300 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Wash Scrub. This community is dominated by white burrobush and creosotebush. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
HYSA	White burrobush	20-30
LATR2	Creosotebush	5-15
SEAR8	Desertsenna	5-15
EPCA2	California ephedra	5-15
SSSS	Other shrubs	10-20**
ATPO	Allscale saltbush	
ENFR	Bush encelia	
ISAR	Bladderpod	
AMDU2	White bursage	
CHPA12	Desert rabbitbrush	
BEJU	Sweetbush	
SAME	Bladdersage	

PETH4	Thurber sandpaper plant
KRGR	White ratany
ACGR	Catclaw acacia
PSSP3	Smoketree

** Allow no more than 5 percent of each species of this group, and no more than 20 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	1-5
PPGG	Other perennial grasses	2-5**
ACSP12	Desert needlegrass	
ACHY	Indian ricegrass	
ERPU8	Fluffgrass	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	5-10**
NIOC	Hole-in-the sand plant	
DAWR	Sacred datura	
SPAM2	Desert globemallow	
ASER	Desert milkweed	
AAFF	Other annual forbs	T-10
MAGL3	Desert dandelion	
NADE2	Leafy nama	
PLOV	Desert Indianwheat	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	350
Normal Years	150
Unfavorable Years	75

e. Ecological dynamics: As ecological condition deteriorates, white burrobush and bush encelia will initially increase, perennial grasses and forbs will decrease. Continued surface disturbance may

reduce the cover of the short-lived perennials as well as the long-lived perennials such as creosotebush. Species likely to invade this site are saltcedar and non-native annual grasses and forbs such as schismus, red brome, red-stem filaree and Russian thistle.

f. Major plant community types:

Mojave Wash Scrub --The historic site potential is a diverse community with an open canopy of shrubs less than 2 meters tall. This site lacks a tree component. Perennial grasses and forbs are sparse and annuals are seasonally present. This site is inherently unstable due to the occurrence and frequency of flooding.

g. Plant Growth Curves

Growth Curve Number--CA3011

Growth Curve Name--White burrobush

Description: Growth starts in early spring; flowering and seed set occur by June. Plants go dormant as a result of drought stress. New twig and leaf growth is initiated after summer and winter rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	30	20	10	0	5	5	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--CA3017

Growth Curve Name--Desertsenna

Description: Growth starts in spring, flowering occurs from April to May and occasionally after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	20	40	15	5	5	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

- (030XB005NV) Limy 5-7" P.Z.
- (030XB019NV) Limy 3-5" P.Z.
- (030XB001NV) Limy Hill 5-7" P.Z.

- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 - (030XB050NV) Dry Wash [ATPO important shrub]
 - (030XB148CA) Gravelly Wash [More productive site; has CHLI2]
 - (030XB145CA) Valley Wash [More productive site; has ACGR]
 - (030XB128CA) Cobble Wash [HYEM-ACGR dominant shrubs]

c. This ecological site description is based on the following documentation:

- Sampling technique
- _6_ NV-ECS-1
- _2_ SCS-Range 417
- _1_ Other

5. Soils

a. The soils that characterize this site are very deep and excessively drained. They are formed in mixed alluvium. Surface textures are very gravelly and extremely gravelly loamy sands. Subsurface textures are extremely gravelly coarse sands, very gravelly loamy coarse sands and sands. Available water capacity is very low to low and the permeability is rapid to very rapid. Wind erosion hazard is negligible to due surface rock fragments. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches. This site is subject to frequent flooding.

Representative Soil Map Units

- 100 Hypoint minor component, Cajon-Pipeflat association, 2-8 percent slopes
- 103 Arizo minor component, Cajon-Calcio-Edalph complex, 2-4 percent slopes
- 105 Arizo minor component, Cajon-Arizo-Bluepoint complex, 2-8 percent slopes
- 298 Arizo complex, 2-4 percent slopes, frequently flooded

6. Wildlife Communities

- a. Mammals occurring on this site include coyotes, black-tailed jackrabbits, Merriam's kangaroo rats, cactus and canyon mice, and long-tailed pocket mice.
- b. Common lizards include the side-blotched lizard, desert horned lizard, western whiptail and zebra-tailed lizard. Desert tortoise frequently den in the banks and berms of washes and feed on vegetation occurring in the wash.
- c. Birds commonly occurring on this site include horned larks, mourning doves, Costa's hummingbirds, common ravens, black-tailed gnatcatchers, rock wrens, loggerhead shrikes and black-throated sparrows.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited use for livestock grazing due to low productivity. White burrobush seeds are grazed by domestic sheep. Creosotebush is unpalatable to livestock. Annual forbs and grasses provide abundant forage during favorable years.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	150	

2. General Management Considerations

- a. Military Operations--Vehicle use in washes may alter the vegetation and channel morphology. This may result in increased peak flows, accelerated erosion, soil blowing and barren areas. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover. Channel width and depth will also increase. Gully stabilization methods include straw bale checkdams, rock riprap and sand bags. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Dry washes are known to be zones of high animal activity in the desert. An abundance of insects attracts both birds and mammals to the wash. The occurrence of taller, statured shrubs also provide wildlife cover, thus the washes serve as wildlife corridors. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Restore channel morphology where impacted. Water developments would also increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White burrobush is a short-lived species, although the seeds have high viability and germination rates compared to other desert shrubs. Creosotebush, is a long-lived species, which once established may improve the site for annuals that grow under its canopy by

trapping fine soil, organic matter and seeds. Creosotebush can be used for long-term stabilization and for improvement of desert tortoise habitat.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low and low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Carrizo	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*.

6. Recreation and Aesthetics

- a. This site is valued for open space and those interested in desert ecology. Desert tortoise, flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).

Gopherus agassizii--Desert Tortoise
Federal and State threatened
Eremophila alpestris--Horned Lark
Federal and State species of concern
Muilla coronata--Crowned muilla
Species of limited distribution

8. Fire

- a. This site is usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. White

burrobush establishes quickly after fire via off-site seeds and sprouting. Creosotebush possesses limited sprouting ability, thus, can be killed by fire.

9. Typical Site Location

SE1/4 Sec. 31, T3N R8E
Approximately seven miles northwest of MCAGCC
mainside
Deadman Lake SW Quadrangle
UTM 11S 0575300e 3795900n (Datum=NAS-C)
San Bernardino Co., CA

Dune 3-5" P.Z.

Plant Symbol: PRGLT-ATCA2/ACHY

Site Number: 030XY154CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on stabilized sand dunes. Elevation is 1750 to 2300 feet. Slopes range from 4 to 30 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 70 degrees F.
- b. The average frost-free period is 240 to 300 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Stabilized and Partially Stabilized Desert Dunes or Mesquite Series. Western honey mesquite and four-wing saltbush dominate this community. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
PRGLT	Western honey mesquite	40-60
ATCA2	Fourwing saltbush	5-15
ATPO	Allscale saltbush	5-15
LATR2	Creosotebush	T-5
SSSS	Other shrubs	5-15**
SUMO	Mojave seablite	
OPUNT	Cactus	
AMDU2	White bursage	

** Allow no more than 5 percent of each species of this group and no more than 15 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
ACHY	Indian ricegrass	2-15
PPGG	Other perennial grasses	2-8**
DISP	Inland saltgrass	
PLRI3	Big galleta	
SPCR	Sand dropseed	
AAGG	Other annual grasses	2-8
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group and no more than 8 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
CRCA5	California croton	
AAFF	Other annual forbs	2-10
CRYPT	Cryptantha	
OEDE2	Triangle eveningprimrose	
AMTE3	Bristly fiddleneck	
BAPL	Wooly marigold	
LOMA	Desert calico	

** Allow no more than 2 percent of each species of this group and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 15 to 30 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Favorable Years	900	
Normal Years	600	
Unfavorable Years	400	

- e. Ecological dynamics: As ecological condition deteriorates western honey mesquite and creosotebush will initially increase. The perennial grasses and forbs will decrease. Continued surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials. Die-off of western honey mesquite may also occur with watertable drawdown or other changes in groundwater hydrology. Non-native annual forbs and grasses such as Russian thistle and schismus will invade this site.
- f. Major plant community types:
Stabilized and Partially Stabilized Desert Dunes or

Mesquite Series--The historic site potential is characterized by wind blown sand accumulations which are stabilized or partially stabilized by shrubs, scattered low annuals and perennial grasses. The total cover increases as the dunes are progressively stabilized. This site is typically a fairly dense stand of shrubs dominated by *Prosopis glandulosa var. torreyana* and *Atriplex canescens*. Perennial grasses are sparse. Annuals are seasonally present. Dunes will retain water just below the surface allowing the perennial vegetation to survive long drought periods. Western honey mesquite is a phreatophyte, with a well-developed taproot to access the groundwater table, allowing this species to maintain leaves during the driest and hottest months of the year.

g. Plant Growth Curve

Growth Curve Number--CA3016

Growth Curve Name--Western honey mesquite

Description: Growth begins in early spring; leaves grow in two time periods, January to April and July to September. Flowers develop from February to May. Pods begin maturing in April to May and may continue until August.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	15	20	15	10	5	10	10	5	5	0	0

Growth Curve Number--CA3008

Growth Curve Name--Fourwing Saltbush

Description: Growth begins in spring to early summer, flowering occurs in May through September, fruit ripens from October to December, with seed dispersal from October through April. Seed may remain on the plants for one to two years.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	35	15	10	5	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

- (030XY127CA) Sodic Dune 3-5" P.Z.
- (030XY133CA) Sodic Sand 3-5" P.Z.
- (030XB150CA) Sandhill 3-5" P.Z.
- (030XY129CA) Gypsic Flat 3-5" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

- (030XY133CA) Sodic Sand 3-5" P.Z. [PRGLT absent; less productive site]
- (030XY127CA) Sodic Dune 3-5" P.Z. [PRGLT absent; less productive site]

c. This ecological site description is based on the

following documentation:

- Sampling technique
- 2 NV-ECS-1
- ___ SCS-Range 417
- ___ Other

5. Soils

a. The soils that characterize this site are very deep and somewhat excessively drained. They are formed in sandy eolian material blown from recent alluvium. Surface and subsurface textures are loamy sands, fine sands and loamy fine sands. Available water capacity is low and permeability is rapid. Wind erosion hazard is severe to very severe. Effective rooting depth is greater than 60 inches. Water tables are greater than 60 inches.

Representative Soil Map Units

- 151 Rositas inclusion in Rositas sand, 4-30 percent slopes
- 160 Bluepoint association, 4-30 percent slopes

6. Wildlife Communities

a. This site provides habitat for small mammals such as southern grasshopper mice, and Merriam's and desert kangaroo rats. Coyotes and black-tailed jackrabbits may also occur. Fourwing saltbush is a preferred browse for rabbits and small mammals. Rabbits and small mammals readily eat the seeds of fourwing saltbush and western honey mesquite. Western honey mesquite also provides valuable shade and cover for mammals.

b. Reptiles common to this site include Mojave fringe-toed lizards, western whiptails, side-blotched lizards and sidewinders. The sandy textures of the soil are a restrictive feature for burrowing reptiles, such as the desert tortoise.

c. Birds common to this site include common ravens, loggerhead shrikes, mourning doves, Wilson's and orange-crowned warblers, horned larks, blue-gray gnatcatchers, verdins and several species of sparrows. Upland game birds and small nongame birds readily eat seeds of fourwing saltbush and honey mesquite. Western honey mesquite provides valuable nesting habitat for several species of birds.

B. Ecological Site Interpretations

1. Livestock Grazing

a. Season of Use--Other Mgt. Considerations: Fourwing saltbush is considered valuable browse for domestic livestock and can withstand heavy grazing. Fourwing saltbush is rated fair to good

forage value for domestic sheep and goats, and at least fair forage value for cattle. Western honey mesquite provides forage chiefly in its seedpods, which are high in sugar, protein and minerals. They are relished by cattle, sheep, goats, swine and horses. The twigs become green in the spring before the leaves appear and are readily grazed by livestock for a short period. The leaves are eaten only slightly when they first appear, except on overgrazed range or during prolonged drought.

- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	600	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation can result in accelerated erosion, severe soil blowing and barren areas.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails can destroy small mammal burrows.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Western honey mesquite is a valuable soil binder, growing in clumps; it catches and holds sand. Nursery-grown seedlings have been successfully established with adequate irrigation. Fourwing saltbush has been widely used for rehabilitating sites in southern and northern desert shrublands. Seed may be broadcast or drill-seeded, but broadcasting often produces better results. Seeding success is generally sporadic. Seedlings, which tend to be more drought tolerant and less susceptible to predation, may be transplanted. Creosotebush may also be used to rehabilitate disturbed sites. Once established, creosotebush may improve sites for annual forbs and grasses.

Planting in late fall or early spring allows for

acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season.

Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents and blowing sand is also recommended.

4. Watershed

- a. Runoff is very low and low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor -less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Bluepoint	A	49	55	63
Rositas	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. Russian thistle, *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include schismus, *Schismus barbatus*, and red-stem filaree, *Erodium cicutarium*.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Songbirds and flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Eremophila alpestris*--Horned lark
Federal and state species of concern
 - Lanius ludovicianus*--Loggerhead shrike
Federal and state species of concern
 - Wislizenia refracta ssp. refracta*--Jackass-clover

Species rare in California, common elsewhere

8. Fire

- a. The response of western honey mesquite following fire varies with fire intensity. Plants are either top-killed or killed. Plants will resprout following low intensity fires. Fourwing saltbush is reportedly tolerant of fire. It is characterized by a low volatilization rate, which renders the plant somewhat fire-resistant. If burned, fourwing saltbush can resprout from the root crown or underground portions of the stem. This species can also reestablish some sites through an abundance

of wind-dispersed seed from adjacent unburned sites. Creosotebush is very flammable and is poorly adapted to fire, due to its limited sprouting ability. Factors such as season of burning, fuel quantity, fire intensity and age of existing shrubs will affect the ability of creosotebush to resprouting.

9. Typical Site Location

SW1/4 Sec. 21, T3N R8E
West of Deadman Lake
Deadman Lake SW Quadrangle
UTM 11S 0578000 e 3798700n (Datum=NAS-C)
San Bernardino Co., CA

Granitic Drain 5-7" P.Z.

Plant Symbol: PSSP3-ACGR

Site Number: 030XB103NV

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on drainageways of inset fans and axial-stream terraces. Elevation is 960 to 2800 feet. Slopes range from 2 to 8 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 73 degrees F.
- b. The average frost-free period is 240 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Mojave Wash Scrub. Smoketree and catclaw dominate this community. Potential vegetative composition is about 5 percent grasses, 15 percent forbs, and 80 percent shrubs and trees.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
PSSP3	Smoketree	50-70
ACGR	Catclaw acacia	5-10
HYSA	White burrobush	2-8
BEJU	Sweetbush	2-5
SSSS	Other shrubs	5-25**
ENFR	Bush encelia	
LATR2	Creosotebush	
AMDU2	White bursage	
KRGR	White ratany	
ENFA	White brittlebush	
PETH4	Thurber sandpaper plant	
HYEM	Desert lavender	
PSARS	Mojave indigo bush	
EPCA2	California ephedra	

BRIN	Wooly brickellbush
SEAR8	Desertsenna
CHLI2	Desert willow
ISAR	Coastal bladderpod
PHCA8	Mesquite mistletoe
LYAN	Anderson wolfberry

** Allow no more than 5 percent of each species of this group and no more than 25 percent in aggregate

Grasses and Grass-like Plants (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-8**
PLRI3	Big galleta	
ERPU8	Fluffgrass	
ACSP12	Desert needlegrass	
AAGG	Other annual grasses	1-5
ARIST	Threeawn	
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group and no more than 8 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
SPAM2	Desert globemallow	
ERIN4	Desert trumpet	
EUP03	Sandmat	
ASSU	Rush milkweed	
AAFF	Other annual forbs	T-10
SAC06	Chia	
ESGL	Desert goldpoppy	
ATPL	Parachute plant	
AMTE3	Fiddleneck	
CRYPT	Cryptantha	
GILIA	Gilia	
MIBI6	Bigelow monkeyflower	

** Allow no more than 2 percent of each species of this group and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 5 to 15 percent.

- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	350
Unfavorable Years	200

e. Ecological dynamics: Surface disturbance may reduce plant cover, density and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use and an assortment of environmental factors (topography, soil type). Short-lived perennials such as white burrobush and bush encelia may initially increase. Continued surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such as smoketree and catclaw acacia. Species likely to invade this site are saltcedar and non-native annual grasses and forbs such as schismus, red brome, red-stem filaree and Russian thistle.

f. Major plant community types:
 Mojave Desert Wash Scrub--The historic site potential is characterized by a shrubby, diverse, open community dominated by *Psoralea argophylla* and *Acacia greggii*. Perennial grasses and forbs are sparse. Annuals are seasonally present and are abundant in years of above average precipitation. This site is inherently unstable due to the occurrence and frequency of flooding.

g. Plant Growth Curve
 Growth Curve Number--CA3020
 Growth Curve Name--Smoketree
 Description: Leafless for most of the year, although leaves will emerge with rains. Flowering may occur from February through November, with peak flowering from May through July. Pods mature between July and September.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	25	25	15	5	5	5	0	0

Growth Curve Number--AZ3091
 Growth Curve Name--Catclaw acacia
 Description: Greens up in spring; flowers in May and June; pods mature between July and September.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	10	15	30	15	10	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 (030XB145CA) Valley Wash
 (030XB005CA) Limy 5-7" P.Z.
 (030XB137CA) Granitic Loam 3-5" P.Z.
 (030XB019NV) Limy 3-5" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 (030XB145CA) Valley Wash [PSSP3 minor

- component]
 (030XB136CA) Dry Wash [PSSP3 and ACGR absent]
 (030XB131CA) Moist Granitic Drain [CHLI2 co-dominant; more productive site]

- c. This ecological site description is based on the following documentation:
 Sampling technique
 1 NV-ECS-1
 1 SCS-Range 417
 4 Other

5. Soils

- a. The soils that characterize this site are very deep and excessively drained. They are formed in mixed alluvium. Surface textures are gravelly coarse sands and extremely gravelly sands. Subsurface horizons are stratified lenses of extremely gravelly, very gravelly and/or gravelly coarse sands. Available water capacity is very low and permeability is very rapid. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches. This site is subject to frequent flooding.

Representative Soil Map Units	
294	Arizo complex, 2-4 percent slopes
298	Arizo complex, 2-4 percent slopes, frequently flooded
316	Carrizo, Carrizo warm association, 2-4 percent slopes, frequently flooded

6. Wildlife Communities

- a. This site provides habitat for small mammals such as white-tailed antelope squirrels, long-tailed pocket mice, canyon mice, cactus mice, and Merriam's kangaroo rats. Black-tailed jackrabbits and coyotes may also occur.
- b. Reptiles common to this site include lizards such as the zebra-tailed, desert horned, desert spiny, long-tailed brush, side-blotched, and western whiptail. Speckled rattlesnakes and coachwhips may also occur. Desert tortoises frequently den in the banks and berms of washes and feed on vegetation occurring in the wash.
- c. Birds occurring on this site include mourning doves, Costa's hummingbirds, horned larks, common raven, verdins, blue-gray and black-tailed gnatcatchers, phainopeplas, house finches and several species of sparrows. Long-eared and great horned owls have been observed in canyons where this site occurs. Smoketree provides nesting sites

for verdins and gnatcatchers. Catclaw acacia's spiny branches provide cover for numerous songbirds, and nesting habitat for verdins.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited value for livestock grazing due to low productivity. Smoketree and catclaw acacia are considered poor forage for livestock. Catclaw acacia may be browsed in the early spring when twigs are green but is otherwise seldom eaten. Annual forbs and grasses provide abundant forage especially during favorable years.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

Estimated Total Annual Production	Air-Dry Weight
Normal Years	lbs./acre
	350

2. General Management Considerations

- a. Military Operations--Vehicle use in washes may alter the vegetation and channel morphology. This may result in increased peak flows, accelerated erosion, soil blowing and barren areas. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover. Channel width and depth will increase. Gully stabilization methods include straw bale checkdams, rock riprap and sand bags. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Dry washes are known to be zones of high animal activity in the desert. An abundance of insects attracts both birds and mammals to the wash. The occurrence of taller statured shrubs also provide wildlife cover, thus the washes serve as wildlife corridors. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Restore channel morphology where impacted. Water developments would also increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species

indigenous to this site are recommended for any revegetation efforts.

Catclaw acacia has shown varying success when transplanted onto disturbed sites. Seedlings should be grown in tall containers to allow for the development of a deep root system. Smoketree develops an extensive root system and is a rapid grower under favorable conditions. It can be an effective soil stabilizer, especially in sandy soils. White burrobush is a short-lived species, although the seeds have high viability and germination rates compared to other desert shrubs. Creosotebush, is a long-lived species, which once established may improve the site for annuals that grow under its canopy by trapping fine soil, organic matter and seeds.

Creosotebush can be used for long-term stabilization and for improvement of desert tortoise habitat.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions.

Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Summer annuals and non-native plants should be removed from around the transplanted shrubs to reduce competition for water. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low and low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor -less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Carrizo	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. Non-native plants occurring on this site include red-stem filaree, *Erodium cicutarium*; red brome, *Bromus rubens*; Russian thistle, *Salsola tragus*; and schismus, *Schismus barbatus*.

6. Recreation and Aesthetics

- a. This site is valued for open space and those interested in desert ecology. Smoketree and wildflowers provide spectacular floral displays especially in years with above average precipitation.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Gopherus agassizii--Desert tortoise
Federal and State threatened

Eremophila alpestris--Horned lark
Federal and State species of concern
Cynanchum utahense--Utah vine milkweed
Species of limited distribution

8. Fire

- a. This site is usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Catclaw acacia is able to resprout from the root crown following top-kill by fire. Smoketree is top-killed by fire and surviving roots may resprout. White burrobush establishes quickly after fire via off-site seeds and sprouting. Creosotebush possesses limited sprouting ability, thus, can be killed by fire.

9. Typical Site Location

NW1/4 Sec. 29, T6N R7E
Approximately 12 miles southwest of Ludlow, CA
UTM 11s 0566800e 3827000n (Datum=NAS-C)
San Bernardino Co., CA

Granitic Loam 3-5" P.Z.

Plant Symbol: AMDU2/PLRI3

Site Number: 030XB137CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on sand sheets and fan aprons over fan remnants. This site benefits from additional run-in moisture from adjacent upslope areas. Elevation is 1800 to 3135 feet. Slopes range from 0 to 15 percent, but slope gradients of 2 to 8 percent are most typical.

2. Climatic Features

- a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 100 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 70 degrees F.
- b. The average frost-free period is 240 to 300 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Mojave Creosotebush Scrub or White Bursage Series. This community is dominated by white bursage and big galleta. Potential vegetative composition is about 35 percent grasses, 10 percent forbs, and 55 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (55 percent):

Symbol	Common Name	% Composition (air-dry weight)
AMDU2	White bursage	30-45
LATR2	Creosotebush	10-20
KRAME	Ratany	2-5
KRER	Range ratany	
KRGR	White ratany	
SSSS	Other shrubs	5-15**
EPCA2	California ephedra	
LYCIU	Boxthorn	
ENFR	Bush encelia	
ACSP	Rayless goldenhead	
PETH4	Thurber sandpaper plant	

OPUNT	Cactus
ENFA	White brittlebush
SEAR8	Desertsenna
YUBR	Joshua tree

** Allow no more than 5 percent of each species of this group, and no more than 15 percent in aggregate

Grasses and Grass-like Plants (35 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	20-40
ACHY	Indian ricegrass	2-10
PPGG	Other perennial grasses	2-5**
AAGG	Other annual grasses	2-5
BOBA2	Sixweeks grama	

** Allow no more than 3 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
MIBI8	Wishbone herb	
CRCA5	California croton	
STPA4	Wirelettuce	
AAFF	Other annual forbs	T-10
OEDE2	Triangle eveningprimrose	
OECL	Browneyed eveningprimrose	
BAPL	Wooly marigold	
NADE2	Leafy nama	

** Allow no more than 2 percent of each species of this group, and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 5 to 15 percent.

- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	600
Normal Years	450
Unfavorable Years	300

- e. Ecological dynamics: Surface disturbance may reduce plant cover, density, and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use, and an assortment of environmental factors (topography, rainfall, and soil type). As ecological condition deteriorates, big galleta and other perennial grasses decrease.

Short-lived perennials such as bush encelia, rayless goldenhead, California croton and wirelettuce will initially increase. Continued surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such as creosotebush, ratany and California ephedra. White bursage, a long-lived opportunistic species may initially increase. With a loss of perennial cover, non-native annual grasses and forbs such as red brome, schismus, red-stem filaree and Russian thistle will readily invade this site. White burrobush and wirelettuce are the primary perennial pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or White Bursage Series-
-The historic site potential has an open two-tiered canopy less than 2 meters tall with few creosote bushes in the upper tier over the lower one of white bursage and big galleta. Annuals are seasonally present. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3024

Growth Curve Name--Big galleta

Description: Some green up in spring; dormant May and June; most growth occurs after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

- (030XB005NV) Limy 5-7" P.Z.
- (030XB136CA) Dry Wash
- (030XB148CA) Sandy Plain 3-5" P.Z.
- (030XB150CA) Sandhill 3-5" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

- (030XB134CA) Cobbly Claypan 5-7" P.Z. [More productive site]
- (030XB150CA) Sandhill 3-5" P.Z. [AMDU2 minor shrub; more productive site]

(030XB148CA) Sandy Plain 3-5" P.Z. [AMDU2 minor shrub; more productive site]

(030XB018NV) Granitic Loam 3-5" P.Z. [ENFA important shrub]

c. This ecological site description is based on the following documentation:

Sampling technique

 2 NV-ECS-1

 9 SCS-Range 417

 10 Other

5. Soils

a. The soils that characterize this site are very deep and well drained to somewhat excessively drained. They are formed in sandy and granitic alluvium. Surface textures are sands, coarse sands and loamy sands. Subsurface textures are sands, coarse sands, loamy sands and loamy coarse sands. Available water capacity is low and the permeability is rapid. Wind erosion hazard is very severe. Effective rooting depth is 60 inches or more.

Representative Soil Map Units

- 100 Cajon-Pipeflat association, 2-8 percent slopes
- 103 Cajon-Calcio-Edalph complex, 2-4 percent slopes
- 107 Cajon complex, 2-4 percent slopes
- 108 Cajon loamy sand, 2-8 percent slopes
- 205 Bluepoint-Pipeflat-Cajon association, 0-4 percent slopes
- 261 Twobitter-Cajon-Arizo complex, 2-8 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as little pocket mice and Merriam's and desert kangaroo rats, black-tailed jackrabbits and coyotes.
- b. Reptiles occurring on this site include zebra-tailed, side-blotched, long-tailed brush, desert night and desert spiny lizards; western whiptails and desert tortoise. The sandy subsurface textures of Cajon soils may be a restrictive feature to burrowing reptiles.
- c. Birds occurring on this site include horned larks, common ravens, cactus wrens, and black-throated and sage sparrows.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: Big galleta is highly palatable to cattle and horses. White bursage is fair browse for cattle and horses,

and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. During favorable years, annual forbs and grasses provide additional forage.

- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre air dry	AUM/AC	AC/AUM
Normal Years	450		

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and soil structure can result in accelerated erosion, soil blowing, and barren areas.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails may result in destruction of desert tortoise and small mammal burrows. Removal of weedy species with an appropriate monitoring program is recommended. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White bursage is valuable for erosion control and cover restoration. Big galleta has moderate potential for erosion control and long-term revegetation and low potential for short-term revegetation projects. Big galleta is somewhat effective at holding blowing sand because of its isolated, clumped growth form.
Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Cajon	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Desert tortoise, flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Gopherus agassizii--Desert Tortoise
Federal and State threatened
Uma scoparia--Mojave fringe-toed lizard
Species of special concern (State level)
Eremophila alpestris--Horned lark
Federal and State species of concern
Cynanchum utahense--Utah vine milkweed
Species of limited distribution

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. If non-native annual forbs and grasses are present, the intensity and frequency of fires will increase significantly. When fires do occur, the effect on the ecosystem may be extreme due to

the harsh environment and the slow rate of recovery. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed. Fire damage to big galleta varies, depending on whether plants are dormant when burned. If plants are dry, damage may be severe because the live center may be burned out. Big galleta may resprout from rhizomes.

9. Typical Site Location

NE1/4 Sec 3, T2N, R7E
Approximately seven miles west of Deadman Lake
Deadman Lake SW Quadrangle
UTM 11S 0570640e 3794230n (Datum=NAS-C)
San Bernardino Co., CA

Gravelly Ridge 5-7" P.Z.

Plant Symbol: ENFA-AMDU2

Site Number: 030XB099NV

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on convex sideslopes of mountains. Elevation is 1040 to 2620 feet. Slopes range from 8 to 30 percent.

2. Climatic Features

a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 70 to 78 degrees F.

b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Creosotebush Scrub or White Brittlebush Series. White brittlebush and white bursage dominate this community. Potential vegetative composition is about 10 percent grasses, 15 percent forbs, and 75 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (75 percent):

Symbol	Common Name	% Composition (air-dry weight)
AMDU2	White bursage	30-40
ENFA	White brittlebush	25-35
LATR2	Creosotebush	5-10
KRAME	Ratany	2-5
KRER	Range ratany	
KRGR	White ratany	
SSSS	Other shrubs	5-15**
OPUNT	Cactus	
BEJU	Sweetbush	
ECPO2	Hedgehog barrel cactus	
MATE4	Common fishhook cactus	

** Allow no more than 3 percent of each species of this group and no more than 15 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-5**
PLRI3	Big galleta	
ERPU8	Fluffgrass	
AAGG	Other annual grasses	T-10
ARAD	Sixweeks threeawn	
VUOC	Sixweeks fescue	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-5**
ASTRA	Milkvetch	
ERIN4	Desert trumpet	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
AMTE3	Bristly fiddleneck	
OENTH	Eveningprimrose	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 10 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	300
Normal Years	225
Unfavorable Years	150

e. Ecological dynamics: The rocky habitat protects this site from extensive ecological site degradation by livestock grazing or off-road vehicle use. White brittlebush is an early colonizer of disturbed sites, often replacing long-lived perennials in postfire communities. White burrobush is also a pioneer species on this site. Non-native annual grasses and forbs such as schismus and red-stem filaree are invaders on this site.

f. Major plant community types:

Mojave Creosotebush Scrub or Brittlebush Series--
 The historic site potential is characterized by widely spaced shrubs less than a meter tall occurring on hot, dry, rocky slopes. White brittlebush and white bursage are codominant on this site. Perennial grasses and forbs are sparse. White brittlebush is allelopathic and produces a toxic, water-soluble substance that inhibits the growth of several winter annuals. A sparse cryptogamic crust is present in undisturbed areas. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3004
 Growth Curve Name--White bursage
 Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3012
 Growth Curve Name--White brittlebush
 Description: Growth starts in early spring; flowering and set seed by July. Dormancy occurs during the hot summer months. Late summer and fall rains will break dormancy.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3015
 Growth Curve Name--Creosotebush
 Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. Late summer and fall rains will break dormancy.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
- (030XB092NV) Desert Patina
 - (030XB077NV) Steep South Slope
 - (030XB145CA) Valley Wash
 - (030XB001NV) Limy Hill 5-7" P.Z.
 - (030XB005NV) Limy 5-7" P.Z.

- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 (030XB077NV) Steep South Slope [AMDU2 minor shrub; more productive site]
 (030XB001NV) Limy Hill 5-7" [ENFA minor shrub]
- c. This ecological site description is based on the following documentation:
 Sampling technique
 ___ NV-ECS-1
 ___ SCS-Range 417
 1 Other

5. Soils

- a. The soils that characterize this site are shallow and very shallow and are somewhat excessively drained. They are formed in stratified alluvium from volcanic sources. Surface textures are very gravelly loamy coarse sands. Subsurface textures are very gravelly coarse sandy loams. Available water capacity is very low and permeability is rapid. Wind erosion hazard is slight. Effective rooting depth is 0 to 7 inches on Sunrock soils.

Representative Soil Map Units

141 Sunrock minor component, Sunrock-Haleburu-Lava Flows association, 15-75 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as canyon mice, long-tailed pocket mice and white-tailed antelope squirrels. This site also provides habitat for desert bighorn sheep.
- b. This site provides habitat for lizards such as western whiptails, side-blotched lizards, desert-collared lizards and chuckwallas. The depth to bedrock is a restrictive feature for burrowing reptiles such as the desert tortoise.
- c. Birds common to this site include common ravens, rock wrens, black-throated sparrows, and Say's phoebe.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: The limiting factors for livestock grazing are the steep, rocky slopes and low forage productivity. White brittlebush and creosotebush have no forage value for domestic livestock. White bursage is fair browse for cattle and horses, and fair to good browse for sheep.
- b. General guide to initial stocking rate. Before

making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM_
Normal Years	225	

2. General Management Considerations

- a. Military Operations--The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Water is the main limitation on this site. Water developments would greatly increase the diversity of species and would aide in the distribution and population size of the desert bighorn sheep.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White brittlebush is valuable for rehabilitating low maintenance landscapes, critical stabilization areas and other disturbed areas. It is easily transplanted and can be established by direct seeding during the fall or early spring months. White bursage and creosotebush are also valuable for erosion control and cover restoration.

4. Watershed

- a. Runoff is medium. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Sunrock	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

- a. Non-native species occurring on this site include red-stem filaree, *Erodium cicutarium*; red brome, *Bromus rubens*; and schismus, *Schismus spp.*

6. Recreation and Aesthetics

- a. This site has value for open space and those interested in desert ecology. Flowering shrubs and wildflowers are aesthetically pleasing in the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Sauromalus obesus--Common chuckwalla Federal Species of Concern
Ovis canadensis nelsoni--Nelson's bighorn sheep Species of special concern

8. Fire

- a. White brittlebush is often top-killed or completely killed by fire. The wind-dispersed seeds readily invade post-fire environments and often become well established. The likelihood of white brittlebush recovery from fire by sprouting is greater on cool, less xeric sites where fires are often less severe. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

NE1/4 Sec. 22 T5N R10E
 Approximately 11 miles southwest of Amboy, CA
 Bagdad SW Quadrangle
 UTM 11S 0598902e 3818795n (Datum=NAS-C)
 San Bernardino Co., CA

Gypsic Flat 3-5" P.Z.

Plant Symbol: SUMO-ATPO
 Site Number: 030XY129CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on alluvial flats. Elevation is 590 to 655 feet. Slopes range from 0 to 4 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 5 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 69 to 75 degrees F.
- b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Desert Sink Scrub or Bush Seepweed Series. This community is dominated by Mojave seablite and allscale saltbush. Potential vegetative composition is about 5 percent grasses, 5 percent forbs, and 90 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (90 percent):

Symbol	Common Name	% Composition (air-dry weight)
SUMO	Mojave seablite	50-65
ATPO	Allscale saltbush	10-25
ATCA2	Fourwing saltbush	5-15
SSSS	Other shrubs	T-5**
AMDU2	White bursage	
LATR2	Creosotebush	

** Allow no more than 5 percent in aggregate

Grasses and Grass-like Plants (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	T-5**
DISP	Inland saltgrass	

AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-5**
EUPO2	Sandmat	
AAFF	Other annual forbs	T-5
CHRI	Turkshead	
PLOV	Desert Indianwheat	
GECA2	Desert sunflower	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

- c. Approximate ground cover (basal and crown) is 2 to 10 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

	Estimated Total Annual Production Air-Dry Weight lbs./acre
Favorable Years	250
Normal Years	150
Unfavorable Years	75

- e. Ecological dynamics: This site is characterized by low productivity with little plant diversity. Disturbance would allow for the introduction of non-native annuals such as schismus and red-stem filaree. White burrobrush is the primary perennial pioneer species.

- f. Major plant community types:
 Desert Sink Scrub or Bush Seepweed Series: This site occurs adjacent to dry lake beds and is characterized by a low, open shrublands dominated by alkali-tolerant chenopods, especially *Suaeda moquinii*. Perennial grasses and forbs are sparse. Annuals are sparse and seasonally present. This site is stable in this condition.

- g. Plant Growth Curve
 Growth Curve Number--CA3010
 Growth Curve Name--Mojave Seablite
 Description: Growth begins in early spring; flowering occurs from July to September.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	30	15	10	5	0	0	0

Growth Curve Number--CA3007
 Growth Curve Name--Allscale Saltbush
 Description: Growth begins in early spring; flowers and sets seed by October.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	15	30	20	10	5	5	5	0	0	0

Growth Curve Number--CA3008
 Growth Curve Name--Fourwing Saltbush
 Description: Growth begins in spring to early summer, flowering occurs in May through September, fruit ripens from October to December, with seed dispersal from October through April. Seed may remain on the plants for one to two years.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	35	15	10	5	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 (030XY132CA) Saline Flat 3-5" P.Z.
 (030XY046NV) Outwash Plain
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 (030XY047NV) Alluvial Plain [SUMO minor shrub; more productive site]
 (030XY127CA) Sodic Dune 3-5" P.Z. [ATCA2 dominant shrub; more productive site]
- c. This ecological site description is based on the following documentation:
 Sampling technique
 2 NV-ECS-1
 ___ SCS-Range 417
 3 Other

5. Soils

a. The soils that characterize this site are very deep and well drained. They are formed in lake sediments. Surface textures are fine sandy loams, very fine sandy loams and loamy coarse sands. Subsurface textures are very fine sandy loams, gravelly fine sandy loams and loams. These soils are moderately to strongly alkaline and have a gypsic horizon from 4 to 12 inches. Available water capacity is very low and permeability is moderate. Wind erosion hazard is moderate. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches. This site is subject to ponding.

Representative Soil Map Units

253 Amboy Crater-Gypboy association, 0-15 percent slopes

6. Wildlife Communities

- a. This site has low species diversity. Small mammals that may occur include round-tailed ground squirrels and Merriam's kangaroo rats. Coyotes and black-tailed jackrabbits may also occur.
- b. Lizards common to this site include western whiptails and zebra-tailed lizards.
- c. Birds occurring on this site include horned larks, black-throated sparrows, loggerhead shrikes and common ravens.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited use for livestock grazing due to very low productivity and lack of stock water. Mojave seablite is considered poor forage for livestock. Allscale and fourwing saltbush are considered valuable browse. Fourwing saltbush has fair to good forage value for domestic sheep and goats, and at least fair forage value for cattle. Fourwing saltbush can withstand heavy grazing, however, overgrazing can eliminate allscale saltbush from this site.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	100	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing, barren areas and the introduction of non-native plants.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails

no longer being used and revegetate using native species indigenous to this site. Removal of weedy species and an appropriate monitoring program are also recommended.

- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Fourwing saltbush and allscale have been widely used for rehabilitating sites in southern and northern desert shrublands. Seed may be broadcast or drill-seeded, but broadcasting often produces better results. Direct seeding should be done during the fall and winter months when low soil temperatures and high soil moisture are favorable for germination. Seeding success is generally sporadic.

Transplanting seedlings is more effective than direct seeding. Seedlings tend to be more drought tolerant and less susceptible to predation. The soil profile should be irrigated prior to transplanting and supplemental irrigation is recommended for the first growing season. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low. Hydrologic soil group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Prehoda	B	68	72	77

5. Poisonous Plants and/or Non-native Plants

- a. Schismus, *Schismus spp.* occurs in disturbed areas. Saltcedar, *Tamarix ramosissima*, occurs in washes and bomb craters that intermittently hold water.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Eremophila alpestris--Horned lark
 - Federal and state species of concern
 - Lanius ludovicianus--Loggerhead shrike
 - Federal and state species of concern

8. Fire

- a. This community is usually unaffected by fire because of low fuel loads. The foliage of the chenopods appears to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill the aboveground portions. If burned, saltbushes can resprout from the root crown or underground portions of the stem. These species can also reestablish sites through an abundance of wind-dispersed seed from adjacent unburned sites.

9. Typical Site Location

NW 1/4, Sec. 25 T5N R10E
 Approximately 8 miles west and 5 miles south of Amboy, CA
 Lead Mountain Quadrangle
 UTM 11S 0601762e 3817324n; (Datum=NAS-C)
 San Bernardino Co., CA

Lava Flow 3-5" P.Z.

Plant Symbol: ATHY-AMDU2

Site Number: 030XB130CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on summits of lava flows. Elevation is 1870 to 1935 feet. Slopes range from 0 to 2 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 69 to 74 degrees F.
- b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Desert Saltbush Scrub or Desert holly Series. This community is dominated by desert holly and white bursage. Potential vegetative composition is about 5 percent grasses, 10 percent forbs, and 85 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (85 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATHY	Desert holly	50-65
AMDU2	White bursage	5-15
LYAN	Anderson wolfberry	2-10
ATPO	Allscale saltbush	2-5
SSSS	Other shrubs	5-10**
LATR2	Creosotebush	
ACGR	Catclaw acacia	
OPRA	Branched pencil cholla	
KRGR	White ratany	
XYTOT	Mojave aster	
PTGLT	Western honey mesquite	
ECPO2	Hedgehog barrel cactus	
OPBA2	Beavertail pricklypear	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

Grasses and Grass-like Plants (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-5**
ERPU8	Fluffgrass	
PLRI3	Big galleta	
ARIST	Threeawn	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
ERIN4	Desert trumpet	
SPAM2	Desert globemallow	
STEPH	Wirelettuce	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
CHRI	Turkshead	
CRYPT	Cryptantha	
CHBR	Spineflower	

** Allow no more than 2 percent of each species of this group, and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 5 to 10 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	300
Normal Years	200
Unfavorable Years	100

- e. Ecological dynamics: This is a very stable plant community so long as the surface rock fragments are undisturbed. Disturbance would cause an increase in desert trumpet and wirelettuce and an introduction of non-native species such as red brome, schismus, and red-stem filaree. White burrobush is the primary perennial pioneer species.
- f. Major plant community types:

Desert Saltbush Scrub or Desert holly Series--The historic plant community is an open canopy of shrubs less than 1 meter tall. Stands typically are strongly dominated by a single *Atriplex* species. Perennial grasses are sparse and annuals are seasonally present. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3005

Growth Curve Name--Desert holly

Description: Growth starts in early winter, flowering usually occurs in the winter and seed set occurs by May.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10	25	30	20	10	0	0	0	0	0	0	5

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occurs by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 - (030XB017NV) Limy Hill 3-5" P.Z.
 - (030XY047NV) Alluvial Plain
 - (030XB137CA) Granitic Loam 3-5" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 - (030XB126CA) Saline Slope 3-5" P.Z. [LYAN, ATPO minor shrubs; less productive site]
 - (030XB152CA) Saline Hill 3-5" P.Z. [AMDU2, LYAN minor shrubs]
- c. This ecological site description is based on the following documentation:
 - Sampling technique
 - _4_ NV-ECS-1
 - ___ SCS-Range 417
 - _2_ Other

5. Soils

- a. The soils that characterize this site are well drained and very shallow and shallow to bedrock. They are formed in residuum and colluvium from basalt and eolian material. Surface textures are extremely

gravelly fine sandy loams. Subsurface textures are loams. Available water capacity is very low and permeability is moderate. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 0 to 7 inches.

Representative Soil Map Units

210 Kentonmill-Lava flows complex, 0-2 percent slopes

6. Wildlife Communities

- a. Mammals occurring on this site include white-tailed antelope squirrels, long-tailed pocket mice, canyon mice, woodrats and black-tailed jackrabbits. Coyotes may also occur.
- b. Reptiles occurring on this site include side-blotched lizards, western whiptails and common chuckwalla. Snakes include speckled rattlesnakes and coachwhips. The shallow depth of the soil is a restrictive feature to burrowing reptiles such as desert tortoise.
- c. Birds common to this site include mourning dove, Say's phoebe, horned larks, black-throated sparrows, rock wrens, loggerhead shrikes and common ravens.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited use for livestock grazing due to the abundance of rock outcrop and low forage production. The primary source of forage is limited to annual grasses and forbs and low amounts of white bursage and allscale saltbush.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	200	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect if from excessive disturbance and maintain existing plant cover. Land clearing and other disturbances that destroy the vegetation, surface rock fragments and soil structure can result in soil blowing and the introduction of non-native plants.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to minimize disturbance and maintain existing vegetation and surface rock fragments.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Desert holly and white bursage are effective for erosion control and slope stabilization. Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is negligible. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Kentonmill	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

- a. Non-native plants occurring on this site include schismus, *Schismus barbatus* and red-stem filaree, *Erodium cicutarium*.

6. Recreation and Aesthetics

- a. This site is valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs provide aesthetic value during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Sauromalus obesus*--Common chuckwalla
Federal Species of Concern
 - Eremophila alpestris*--Horned lark
Federal and state species of concern
 - Lanius ludovicianus*--Loggerhead shrike
Federal and state species of concern

8. Fire

- a. The foliage of the saltbushes appears to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill the aboveground portions of the saltbushes. White bursage possesses limited sprouting ability and can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

NE 1/4 Sec. 22, T7N R6E
 Approximately 10 miles southwest of Ludlow, CA
 UTM 11S 0561386e 3838429n; (Datum=NAS-C)
 San Bernardino Co., CA

Limy 3-5" P.Z.

Plant Symbol: LATR2-AMDU2/PLRI3

Site Number: 030XB019NV

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on alluvial fans, fan aprons and summits of fan remnants. Elevation is 620 to 3845 feet. Slopes range from 0 to 15 percent, but slopes of 2 to 8 percent are most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 7 inches with most falling as rain from November to March. Approximately 30 to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 73 degrees F.

b. The average frost-free period is 200 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Creosotebush Scrub or Creosotebush Series. This community is dominated by creosotebush. Potential vegetative composition is about 5 percent grasses, 5 percent forbs, and 90 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (90 percent):

Symbol	Common Name	% Composition (air-dry weight)
LATR2	Creosotebush	65-80
AMDU2	White bursage	5-25
KRAME	Ratany	T-5
KRER	Range ratany	
KRGR	White ratany	
SSSS	Other shrubs	2-10**
EPNE	Nevada ephedra	
ENCEL	Encelia	
BEJU	Sweetbush	
OPRA	Branched pencil cholla	
OPEC	Staghorn cholla	
YUSC2	Mojave yucca	
SEAR8	Desertsenna	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

Grasses and Grass-like Plants (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	T-5**
PLRI3	Big galleta	
ACHY	Indian ricegrass	
ERPU8	Fluffgrass	
ACSP12	Desert needlegrass	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	T-5**
SPAM2	Desert globemallow	
ERIN4	Desert trumpet	
AAFF	Other annual forbs	T-5
PLOV	Desert Indianwheat	
CHFR	Pincushion flower	
CHRI	Turkshead	
GECA2	Desert sunflower	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	225
Normal Years	150
Unfavorable Years	100

e. Ecological dynamics: Defoliation and death of branches of creosotebush may occur as a result of long periods of intense moisture stress. Surface disturbance may reduce plant cover, density, and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use, and an assortment of environmental factors (topography, rainfall, and soil type). Destructive impacts such as land clearing may reduce the cover of long-lived perennial shrubs

such as creosotebush, ratany and Nevada ephedra. White bursage a long-lived opportunistic species may initially increase. With a loss of perennial cover, non-native annual grasses and forbs such as red brome, schismus and red-stem filaree will readily invade this site. White burrobush is a perennial pioneer species, which may increase on this site.

f. Major plant community types:

Mojave Creosotebush Scrub or Creosotebush Series--The historic site potential is characterized by widely spaced shrubs up to 2 meters tall. Creosotebush dominates this series. White bursage may be present but is not an important shrub. Perennial grasses are sparse. Annual forbs and grasses are seasonally present. This site is stable in this condition.

Mojave Creosote Bush Scrub/Introduced Annuals-- This plant community occurs across the west end of the MLRA. Introduced annuals such as red brome, schismus and filaree have invaded the historic climax plant community and have become a dominant component of the herbaceous cover. This change from native to non-natives may be due to a combination of factors. Contributing factors include: (1) invasion of alien species, (2) changes in the kinds of animals and their grazing patterns, (3) drought and (4) change in fire history. This site is stable in this condition unless basal cover falls below 5 percent, on slopes greater than 5 percent.

g. Plant Growth Curves

Growth Curve Number--CA3015
 Growth Curve Name--Creosotebush
 Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.
 Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 (030XB005NV) Limy 5-7" P.Z.
 (030XB136CA) Dry Wash
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 (030XB005NV) Limy 5-7" P.Z. [More productive site; AMDU2-LATR2 codominant]
 (030XB092NV) Desert Patina [Less productive site; desert pavement present]

c. This ecological site description is based on the following documentation:

- Sampling technique
- _8_ NV-ECS-1
- _2_ SCS-Range 417
- _6_ Other

5. Soils

a. The soils that characterize this site are very deep and excessively drained to somewhat excessively drained. They are formed in mixed alluvium. Surface textures are extremely gravelly loamy sands, very cobbly sandy loams, sandy loams and gravelly sandy loams. Subsoil textures are sandy loams, coarse sandy loams, gravelly loamy coarse sands, gravelly coarse sands and extremely gravelly sands. Available water capacity is very low to low and permeability is moderate to very rapid. Wind erosion hazard is negligible to moderate, depending on the amount of surface rock fragments and/or surface texture. Effective rooting depth is 60 inches or more.

Representative Soil Map Units	
200	Narea-Macagce-Edaliph complex, 2-8 percent slopes
231	Calcio-Edaliph-Calcio complex, 0-8 percent slopes
274	Arizo extremely gravelly loamy coarse sand, dry, 2-8 percent slopes
276	Arizo dry-Twobitter association, 2-8 percent slopes
278	Arizo extremely gravelly loam, 8-15 percent slopes
290	Arizo-Tonopah association, 2-8 percent slopes
300	Narea-Edaliph-Macagce complex, 0-30 percent slopes
313	Carrizo complex, 2-8 percent slopes
314	Carrizo complex, 2-8 percent slopes, rubbly
401	Haleburu-Arizo association, 2-15 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as long-tailed pocket mice, canyon mice, black-tailed jackrabbits, badgers and coyotes. Desert woodrats build nests in the basalt boulders. Many small mammals browse creosotebush or consume its seeds. Black-tailed jackrabbits and coyotes are also common.
- b. Reptiles occurring on this site include lizards, such as western whiptails, desert horned, desert spiny and side-blotched lizards.
- c. Birds occurring on this site include Brewer's and black-throated sparrows, mourning doves, common ravens, greater roadrunners, Say's phoebes, house finches and horned larks.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: The primary source of forage is limited to annual grasses and forbs and low amounts of white bursage. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. Creosotebush is unpalatable to livestock. Domestic sheep use this shrub for shade.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	150	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and soil crust and structure can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing, barren areas and the introduction of non-native plant species. Gully stabilization methods include straw bale checkdams, rock riprap, and sand bags.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to maintain existing vegetative cover and protect it from excessive disturbance. Vehicle activity off of designated tank trails and roads can result in destruction of desert tortoise and small mammal burrows. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White bursage and creosotebush are valuable for erosion control and cover restoration. Nevada ephedra forms dense, spreading colonies, which make it valuable for soil stabilization.
Transplants are more effective than direct seeding, although Nevada ephedra seedlings are very tolerant of drought and generally establish well following fall or winter seeding.
Planting transplants in late fall or early spring allows for acclimation to summer conditions.

Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Summer annuals and non-native species should be removed from around the transplanted shrubs to reduce competition for water. Protection from rodents is also recommended.

Shallow ripping of heavily compacted soils may facilitate water infiltration, seed germination and rapid root growth. This may also improve overall plant survival and growth.

4. Watershed

- a. Runoff is very low to low. Hydrologic group A--soils having high infiltration rates when thoroughly wetted and consisting chiefly have deep, well drained to excessively drained sands or gravel. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Calcio	B	68	72	77
Carrizo	A	49	55	63
Macagce	B	68	72	77
Tonopah	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. Non-native plants occurring on this site include red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.* Russian thistle, *Salsola tragus*, occurs in heavily disturbed areas.

6. Recreation and Aesthetics

- a. This site is valued for open space. Flowering wildflowers and shrubs provide aesthetic value during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California

Endangered Species Handbook).

Gopherus agassizii--Desert Tortoise

Federal and State threatened

Eremophila alpestris--Horned Lark

Federal and State species of concern

Escobaria vivipara var. *alversonii*--Foxtail cactus

Federal candidate

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuel by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the

ecosystem may be extreme due to the harsh environment and the slow rate of recovery.

Creosotebush is very flammable and is poorly adapted to fire due to its limited sprouting ability.

Season of burning, fuel quantity, fire intensity and age of existing creosotebush all affect its resprouting ability.

9. Typical Site Location

NW1/4, Sec. 12, T2N R7E

Approximately nine miles northwest of Twentynine Palms, CA

Deadman Lake SW Quadrangle

UTM 11S 0572950e 3793080n (Datum=NAS-C)

San Bernardino Co., CA

Limy 5-7" P.Z.

Plant Symbol: AMDU2-LATR2/PLRI3

Site Number: 030XB005NV

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on alluvial fans, specifically fan terraces, fan aprons, and fan remnants. Elevation is 600 to 3930 feet. Slopes range from 2 to 15 percent, but slope gradients of 2 to 8 percent are most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 7 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 73 degrees F.

b. The average frost-free period is 200 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Creosotebush Scrub or Creosotebush-White Bursage Series. This community is dominated by white bursage and creosotebush. Potential vegetative composition is about 15 percent grasses, 10 percent forbs, and 75 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (75 percent):

Symbol	Common Name	% Composition (air-dry weight)
AMDU2	White bursage	25-50
LATR2	Creosotebush	10-25
KRAME	Ratany	2-5
KRGR	White ratany	
KRER	Range ratany	
EPNE	Nevada ephedra	T-5
SSSS	Other shrubs	5-15**
LYAN	Anderson wolfberry	
OPUNT	Cactus	
PSARS	Mojave indigo bush	

EPCA2	California ephedra
SEAR8	Desertsenna
ENFR	Bush encelia
YUSC2	Mojave yucca
ENFA	White brittlebush

** Allow no more than 3 percent of each species of this group, and no more than 15 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	T-8
PPGG	Other perennial grasses	T-8**
ACSP12	Desert needlegrass	
ACHY	Indian ricegrass	
ERPU8	Fluffgrass	
AAGG	Other annual grasses	T-10
VUOC	Sixweeks fescue	
BOBA2	Sixweeks grama	

** Allow no more than 3 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
ERIN4	Desert trumpet	
MIBI8	Wishbone herb	
SPAM2	Desert globemallow	
STEPH	Wirelettuce	
AAFF	Other annual forbs	T-20
CRYPT	Cryptantha	
AMTE3	Bristly fiddleneck	
MAGL3	Desert dandelion	
CHFR	Fremont pincushion	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

c. Approximate ground cover (basal and crown) is 10 to 20 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	300
Unfavorable Years	200

e. Ecological dynamics: Defoliation and death of branches of creosotebush may occur as a result of

long periods of intense moisture stress. Surface disturbance may reduce plant cover, density, and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use and an assortment of environmental factors (topography, rainfall, and soil type). With surface disturbance, short-lived perennials such as encelia, rayless goldenhead, desert trumpet and wirelettuce may initially increase. Continued disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such as creosotebush, range ratany and Nevada ephedra. White bursage, a long-lived opportunistic species may initially increase. With long-term disturbance it too will decrease. With a loss of perennial cover, non-native annual grasses and forbs such as red brome, schismus, red-stem filaree and Russian thistle will readily invade this site. White burrobush and wirelettuce are the primary perennial pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or Creosotebush-White Bursage Series--The historic site potential is characterized by widely spaced shrubs, 0.5 to 2 meters tall. Creosotebush and white bursage form the most characteristic association.

Perennial grasses and forbs are common. The composition and abundance of annual vegetation differs from year to year, depending on the time and amount of precipitation. This site is stable in this condition.

Mojave Creosote Bush Scrub/Introduced Annuals--This plant community occurs across the west end of the MLRA. Introduced annuals such as red brome, schismus and filaree have invaded the historic climax plant community and have become a dominant component of the herbaceous cover. This change from native to non-natives may be due to a combination of factors. Contributing factors include: (1) invasion of alien species, (2) changes in the kinds of animals and their grazing patterns, (3) drought and (4) change in fire history. This site is stable in this condition unless basal cover falls below 5 percent, on slopes greater than 5 percent.

g. Plant Growth Curves

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--AZ3075

Growth Curve Name--White ratany

Description: Growth starts in spring; flowering and seed set occur by June. Dormancy does not occur during the hot, dry summer months. Summer rains will initiate new growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	20	35	5	15	15	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 - (030XB137CA) Granitic Loam 3-5" P.Z.
 - (030XB019NV) Limy 3-5" P.Z.
 - (030XB136CA) Dry Wash
 - (030XB001NV) Limy Hill 5-7" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 - (030XB019NV) Limy 3-5" P.Z. [Less productive site; LATR2 dominant shrub]
 - (030XB001NV) Limy Hill 5-7" P.Z. [Less productive site; steeper slopes]
- c. This ecological site description is based on the following documentation:
 - Sampling technique
 - _12 NV-ECS-1
 - _7_ SCS-Range 417
 - _17 Other

5. Soils

- a. The soils that characterize this site are moderately deep to very deep. They are well drained to somewhat excessively drained. They are formed in mixed alluvium. Surface textures are extremely gravelly loamy sands and sands, loamy coarse sands, gravelly loamy coarse sands and gravelly sandy loams.

Subsurface textures are sandy loams, loamy coarse sands, sandy clay loams and gravelly sandy clay loams. Available water capacity is very low to moderate and permeability is moderately slow to very rapid. Wind erosion hazard is negligible to very severe, depending on the amount of surface rock fragments and/or surface texture. Effective rooting depth is 60 inches or more. Desfirex has a weakly cemented duripan from 20 to 30 inches.

Representative Soil Map Units	
200	<u>Narea-Macagce-Edalph</u> complex, 0-8 percent slopes
270	Arizo extremely gravelly loamy sand, 2-8 percent slopes
293	<u>Arizo-Twobitter</u> association, 2-4 percent slopes
297	Arizo-Hypoint-Olympus complex, 2-8 percent slopes
313	Carrizo complex, 2-8 percent slopes
361	Cajon coarse sand, 0-4 percent slopes
372	Calcio-Edalph-Desfirex complex, 2-4 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as white-tailed antelope ground squirrels, desert kangaroo rats, long-tailed pocket mice and canyon mice. Many of the small mammals browse creosotebush or consume its seeds or use it for cover or den building. Black-tailed jackrabbits and coyotes are common.
- b. Reptiles occurring on this site include lizards, such as the western whiptails, zebra-tailed lizards, desert horned lizards, desert spiny lizards, side-blotched lizards and desert tortoise. Desert tortoise dig their burrows under creosotebush where its roots stabilize the soil.
- c. Birds occurring on this site include sage and black-throated sparrows, mourning doves, Costa's hummingbirds, loggerhead shrikes, horned larks and common ravens.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. Creosotebush is unpalatable to livestock. Domestic sheep use creosotebush primarily for shade. Range ratany is rated fair to good for cattle and sheep. During favorable years, annual forbs and grasses provide additional forage on this site.
- b. General guide to initial stocking rate. Before

making specific recommendations, an on-site evaluation must be made.

	Pounds/acre		
	air dry	AUM/AC	AC/AUM
Normal Years		300	

2. General Management Considerations

- a. Military Operations--Land clearing or other disturbances that destroy the vegetation and soil crust and structure can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing and barren areas.
The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover. Gully stabilization methods include straw bale checkdams, rock riprap and sand bags.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails can result in destruction of desert tortoise and small mammal burrows. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White bursage is valuable for erosion control and cover restoration. Creosotebush may also be used to rehabilitate disturbed sites. Once established, creosotebush may improve sites for annual forbs and grasses. Nevada ephedra forms dense, spreading colonies, which make it valuable for soil stabilization.
Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Summer annuals and non-native species should be removed from around the transplanted shrubs to reduce competition for water. Protection from rodents is also recommended.
Shallow ripping of heavily compacted soils may

facilitate water infiltration, seed germination and rapid root growth. This may also improve overall plant survival and growth.

4. Watershed

- a. Runoff is very low to low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic group C--soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Cajon	A	49	55	63
Calcio	B	68	72	77
Carrizo	A	49	55	63
Desfirex	C	79	81	85
Edalph	B	68	72	77
Gravesumit	B	68	72	77
Hypoint	A	49	55	63
Olympus	B	68	72	77
Narea	B	68	72	77

5. Poisonous Plants and/or Non-native Plants

- a. *Cuscuta* sp.--Dodder: The presence of dodder is related to the soil-moisture conditions, therefore, its impact varies from year to year. Dodder has the ability to kill the host plant and consequently influence the ecology of an area. Russian thistle, *Salsola tragus*, occurs in heavily disturbed areas. Other non-native species occurring on this site include red-stem filaree, *Erodium cicutarium*; and

schismus, *Schismus* spp.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
- Gopherus agassizii*--Desert Tortoise
Federal and State threatened
 - Eremophila alpestris*--Horned Lark
Federal and State species of concern
 - Lanius ludovicianus*--Loggerhead shrike
Federal and State species of concern
 - Castela emoryi*--Crucifixion thorn
Considered rare in California, common elsewhere
 - Escobaria vivipara* var. *alversonii*--Foxtail cactus
Federal candidate

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed. Range ratany resorts from the rootcrown following top-kill by fire.

9. Typical Site Location

NW1/4 Sec. 34, T3N R11E
Approximately 2 miles northwest of Cleghorn Lakes
Cleghorn Lakes Quadrangle
UTM 11S 0608570 3796981n (Datum=NAS-C)
San Bernardino Co., CA

Limy Hill 3-5" P.Z.

Plant Symbol: LATR2

Site Number: 030XB017NV

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on steep sideslopes of mountains on all exposures. Elevation is 610 to 4690 feet. Slopes range from 4 to 75 percent, but slopes of 8 to 30 percent are most typical.

2. Climatic Features

- a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 7 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 78 degrees F.
- b. The average frost-free period is 200 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Mojave Creosotebush Scrub or Creosotebush Series. This community is dominated by creosotebush. Potential vegetative composition is about 10 percent grasses, 5 percent forbs, and 85 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (85 percent):

Symbol	Common Name	% Composition (air-dry weight)
LATR2	Creosotebush	75-90
AMDU2	White bursage	5-15
SSSS	Other shrubs	5-10**
EPNE	Nevada ephedra	
THMO	Turpentinebroom	
KRGR	White ratany	
KRER	Range ratany	
ACGR	Catclaw acacia	
LYAN	Anderson wolfberry	
XYTOT	Mojave aster	
ECPO2	Hedgehog barrel cactus	
OPBA2	Beavertail pricklypear	

OPRA	Branched pencil cholla
MATE4	Common fishhook cactus
PSP0	Nevada dalea
BEJU	Sweetbush
ENCEL	Encelia
PESC4	Schotts pygmycedar

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-10**
ACSP12	Desert needlegrass	
ERPU8	Fluffgrass	
PLRI3	Big galleta	
AAGG	Other annual grasses	T-5

** Allow no more than 2 percent of each species of this group, and no more than 10 percent in aggregate

Forbs (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
ERIN4	Desert trumpet	
SPAM2	Desert globemallow	
STEPH	Wirelettuce	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
MAGL3	Desert dandelion	
CHFR	Fremont pincushion	

** Allow no more than 2 percent of each species of this group, and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 5 to 10 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	125
Normal Years	75
Unfavorable Years	25

- e. Ecological dynamics: As ecological condition deteriorates, creosotebush and the opportunistic white bursage would increase. Disturbance to this site may result in the introduction of non-native forbs and grasses such as red brome, schismus

and red-stem filaree. White burrobrush and wirelettuce are also pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or Creosotebush Series--The historic site potential is characterized by widely spaced shrubs up to 2 meters tall. Creosotebush dominates this series. White bursage may be present but is not an important shrub. Perennial grasses are sparse. Annual forbs and grasses are seasonally present. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3015
 Growth Curve Name--Creosotebush
 Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth. Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 (030XB001NV) Limy Hill 5-7" P.Z.
 (030XB077NV) Steep South Slope
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 (030XB139CA) Limy Hill 3-5" P.Z. [POSE present]
 (030XB001NV) Limy Hill 5-7" P.Z. [AMDU2 dominant; more productive site]
 (030XB019NV) Limy 3-5" P.Z. [AMDU2 important shrub; more productive site]
- c. This ecological site description is based on the following documentation:
 Sampling technique
 _11 NV-ECS-1
 ___ SCS-Range 417
 _15 Other

5. Soils

a. The soils that characterize this site are very shallow, shallow and very deep. They are well drained to somewhat excessively drained. They are formed in mixed alluvium from granitic and volcanic sources. Surface textures are extremely gravelly sandy loams, extremely gravelly fine sandy loams and extremely stony sandy loams. Subsoil textures are loams, extremely gravelly and very gravelly sandy loams and extremely gravelly loamy sands. Available water capacity is predominantly very low

and permeability is moderate to rapid. Wind erosion hazard is negligible to moderate, depending on the amount of surface rock fragments and/or surface texture. Effective rooting depth of the shallow soils is 0 to 10 inches to bedrock. Effective rooting depth of the very deep soils is 60 inches or more.

Representative Soil Map Units

120	Eastrange gravelly sandy loam, 8-30 percent slopes
130	Owlshhead association, 8-30 percent slopes, very stony
140	Sunrock-Lava flows complex, 4-15 percent slopes, extremely stony
223	Gayspass complex, 8-30 percent slopes
282	Mask extremely gravelly fine sandy loams, 8-30 percent slopes
406	Haleburu-Noble Pass complex, 15-50 percent slopes
423	Dalvord association, 15-50 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as antelope ground squirrels, desert woodrats, canyon mice and long-tailed pocket mice. Many small mammals browse creosotebush and consume its seeds. Desert bighorn sheep, bobcats, black-tailed jackrabbits and coyotes may also occur.
- b. Reptiles occurring on this site include lizards, such as the western whiptail, desert collared lizard, desert spiny lizard, and side-blotched lizard; chuckwalla; and snakes such as gopher, coachwhip, western patch-nosed and speckled rattlesnake. Depth to bedrock is a restrictive feature to burrowing reptiles, such as the desert tortoise.
- c. Birds occurring on this site include black-throated sparrows, rock wrens, common ravens and raptors.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited use for livestock grazing due to the steep, rocky slopes and low productivity. Creosotebush is unpalatable to livestock.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM_
Normal Years	75	

2. General Management Considerations

a. Military Operations--The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water is the main limitation on this site. Water developments would greatly increase the diversity of species and aid in the distribution and population size of the desert bighorn sheep.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Creosotebush is valuable for erosion control and cover restoration. Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

a. Runoff is low to medium. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic group C--soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Dalvord	D	84	86	88
Eastrange	A	49	55	63
Gayspass	B	68	72	77
Haleburu	D	84	86	88
Mask	B	68	72	77
Owlshead	C	79	81	85
Sunrock	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

a. Non-native species occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus* spp.

6. Recreation and Aesthetics

a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Ovis canadensis nelsoni*--Nelson's bighorn sheep
Species of special concern
 - Sauromalus obesus*--Chuckwalla
Federal Species of Concern

8. Fire

a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

NW1/4, Sec. 18, T4N R10E
 Approximately 12 miles southwest of Amboy, CA
 Lead Mountain Quadrangle
 UTM 11S 0603357e 3811171n (Datum=NAS-C)
 San Bernardino Co., CA

Limy Hill 5-7" P.Z.

Plant Symbol: AMDU2-LATR2/PLRI3

Site Number: 030XB001NV

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on sideslopes of fan remnants, low hills and mountains on all exposures. Elevation is 845 to 4700 feet. Slopes range from 8 to 75 percent, but slope gradients of 15 to 50 percent are most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 3 to 7 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 75 degrees F.

b. The average frost-free period is 200 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Creosotebush Scrub or White Bursage Series. This community is dominated by white bursage, creosotebush and desert needlegrass. Potential vegetative composition is about 15 percent grasses, 10 percent forbs, and 75 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (75 percent):

Symbol	Common Name	% Composition (air-dry weight)
AMDU2	White bursage	50-60
LATR2	Creosotebush	5-20
KRAME	Ratany	2-5
KRER	Range ratany	
KRGR	White ratany	
PSARS	Mojave indigo bush	T-5
SSSS	Other shrubs	10-15**
ENCEL	Encelia	
LYAN	Anderson wolfberry	
XYTOT	Mojave aster	

EPNE	Nevada ephedra
LEFR2	Desert alyssum
ECPO2	Hedgehog barrel cactus
ECEN	Hedgehog cactus
OPBA2	Beavertail pricklypear
MATE4	Common fishhook cactus
SEAR8	Desertsenna
VIPA	Parish's viguiera

** Allow no more than 3 percent of each species of this group, and no more than 15 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
ERPU8	Fluffgrass	2-5
PLRI3	Big galleta	T-5
PPGG	Other perennial grasses	T-5**
ACSP12	Desert needlegrass	
ARIST	Threeawn	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	
ARAD	Sixweeks threeawn	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	5-10**
ERIN4	Desert trumpet	
MIBI8	Wishbone herb	
SPAM2	Desert globemallow	
STEPH	Wirelettuce	
ASTRA	Milkvetch	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
CHFR	Fremont pincushion	
CRYPT	Cryptantha	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

c. Approximate ground cover (basal and crown) is 10 to 20 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	350
Normal Years	250
Unfavorable Years	100

e. Ecological dynamics: As ecological condition deteriorates, desert needlegrass and other perennial grasses will decline. Short-lived perennials such as encelia, desert trumpet and wirelettuce will initially increase. White bursage, a long-lived opportunistic species will also increase. Non-native annual grasses and forbs such as red brome, schismus and red-stem filaree are invaders on this site. White burrobrush is the primary perennial pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or White Bursage Series-
-The historic site potential is characterized by widely spaced shrubs, 0.5 to 2 meters tall. White bursage dominates. Perennial grasses and forbs are common. The composition and abundance of annual vegetation differs from year to year, depending on the time and amount of precipitation. Pockets of cryptogamic crust have developed between the surface rock and vegetation. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--CA3024

Growth Curve Name--Big galleta

Description: Growth starts in spring; most growth occurs in summer and seed set occurs by late summer.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 - (030XB145CA) Valley Wash
 - (030XB077NV) Steep South Slope
 - (030XB017NV) Limy Hill 3-5" P.Z.
 - (030XB005NV) Limy 5-7" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 - (030XB017NV) Limy Hill 3-5" P.Z. [Less productive site; LATR2 dominant]
 - (030XB005NV) Limy 5-7" P.Z. [More productive site; does not occur on hill landforms]
- c. This ecological site description is based on the following documentation:
 - Sampling technique
 - 25+ NV-ECS-1
 - ___ SCS-Range 417
 - _4_ Other

5. Soils

- a. The soils that characterize this site are primarily very shallow to shallow over a duripan or bedrock. The soils are well drained to somewhat excessively drained. They are formed in mixed alluvium, from granitic and volcanic sources. Surface textures are loamy coarse sands, extremely gravelly and very gravelly sandy loams and extremely gravelly fine sandy loams. Subsurface textures are loams, loamy coarse sands, extremely gravelly and very gravelly sandy loams and extremely gravelly loamy sands. Available water capacity is very low to moderate and permeability is moderately rapid to rapid. Wind erosion hazard is negligible to severe, depending on the amount of surface rock fragments. Effective rooting depth is 0 to 10 inches on shallow soils and greater than 60 inches on very deep soils. Owshead soils have a weakly cemented and fractured duripan from 11 to 29 inches.

Representative Soil Map Units

- 121 Eastrange-Gayspass-Edalph complex, 8-50 percent slopes
- 130 Owshead association, 8-30 percent slopes, very stony
- 141 Sunrock-Haleburu-Lava flows association, 15-75 percent slopes
- 190 Lavabed-Dalvord association, 8-50 percent slopes
- 416 Goldroad-Dalvord-Rock outcrop association, 15-50 percent slopes
- 423 Dalvord association, 15-50 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as antelope ground squirrels, desert woodrats, canyon mice and long-tailed pocket mice. Many small mammals browse creosotebush and consume its seeds. Desert bighorn sheep, bobcats, black-tailed jackrabbits and coyotes may also occur.
- b. This site provides habitat for lizards, such as the western whiptail, desert collared lizard and chuckwalla; and snakes such as gopher, coachwhip, western patch-nosed and speckled rattlesnake. Depth to bedrock or a duripan is a restrictive feature to burrowing reptiles, such as the desert tortoise, although tortoise have been documented on this site.
- c. Birds common on this site include black-throated sparrows, rock wrens and common ravens and raptors.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Consideration: This site has limited use for livestock grazing due to the steep rocky slopes and low productivity. White bursage is fair browse for cattle and horses, and fair to good browse for sheep. Creosotebush is unpalatable to livestock.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	250	

2. General Management Considerations

- a. Military Operations--The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Disturbance of the cryptogamic crust may result in increased soil erosion.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water is the main limitation on this site. Water developments would greatly increase the diversity of species and aid in the distribution and population size of the desert bighorn sheep.
- b. Revegetation of Disturbed Areas--Species

indigenous to this site are recommended for any revegetation efforts. White bursage and creosotebush are valuable for erosion control and cover restoration. Desert needlegrass may be used for cover restoration in areas of light disturbance, but it is susceptible to excessive trampling.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Summer annuals and non-native species should be removed from around the transplanted shrubs to reduce competition for water. Protection from rodents is also recommended.

4. Watershed

- a. Runoff ranges from low to medium. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic group C--soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Dalvord	D	84	86	88
Eastrange	A	49	55	63
Edalph	B	68	72	77
Gayspass	B	68	72	77
Haleburu	D	84	86	88
Owlshead	C	79	81	85

5. Poisonous Plants and/or Non-native Plants

- a. *Cuscuta* sp.--Dodder: The presence of dodder is related to the soil-moisture conditions, therefore, its impact varies from year to year. Dodder has the ability to kill the host plant and consequently influence the ecology of the area.

Non-native species occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus* spp.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).

Gopherus agassizii--Desert Tortoise
Federal and State threatened
Sauromalus obesus--Chuckwalla
Federal Species of Concern

Allium parishii--Parish's onion

Species of limited distribution

Escobaria vivipara var. *alversonii*--Foxtail cactus

Federal candidate

Ferocactus cylindraceus var. *cylindraceus*--

California barrel cactus

Threatened by collecting

Ovis canadensis nelsoni--Nelson's bighorn sheep

Species of special concern

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

SE1/4 Sec 11, T3N R11E

Approximately five miles north of Cleghorn Lakes

Cleghorn Lakes Quadrangle

UTM 11S 0611130e 3802574n (Datum=NAS-C)

San Bernardino Co., CA

Loamy Hill 5-7" P.Z.

Plant Symbol: ATCO-AMDU2/PLRI3

Site Number: 030XB153CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on sideslopes of mountains on all exposures. Elevations are 2935 to 4400 feet. Slopes range from 8 to 30 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 100 degrees F). The average annual precipitation ranges from 3 to 6 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 64 degrees F.
- b. The average frost-free period is 235 to 300 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Shadscale Scrub or Shadscale Series. Shadscale, white bursage and big galleta dominate this community. Potential vegetative composition is about 15 percent grasses, 10 percent forbs, and 75 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (75 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATCO	Shadscale	35-50
AMDU2	White bursage	10-20
KRGR	White ratany	2-5
EPNE	Nevada ephedra	2-5
SSSS	Other shrubs	5-15**
LATR2	Creosotebush	
LYAN	Anderson wolfberry	
XYTOT	Mojave aster	
ACGR	Catclaw acacia	
SEAR8	Desertsenna	
YUSC2	Mojave yucca	
OPBA2	Beavertail pricklypear	
THMO	Turpentinebroom	
LEFR2	Desert alyssum	

** Allow no more than 3 percent of each species of this group and no more than 15 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	5-10
ACSP12	Desert needlegrass	2-8
PPGG	Other perennial grasses	2-5**
ACHY	Indian ricegrass	
ERPU8	Fluffgrass	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	5-10**
SPAM2	Desert globemallow	
ERIN4	Desert trumpet	
MIBI8	Wishbone herb	
STEPH	Wirelettuce	
AAFF	Other annual forbs	T-10
AMTE3	Bristly fiddleneck	
CHFR	Fremont pincushion	
CRYPT	Cryptantha	
LOMA	Desert calico	
PHACE	Phacelia	

** Allow no more than 3 percent of each species of this group and no more than 10 percent in aggregate

- c. Approximate ground cover (basal and crown) is 5 to 15 percent.

- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	250
Normal Years	150
Unfavorable Years	50

- e. Ecological dynamics: Successive years of above-average precipitation may result in considerable die-off of many species of native shrubs, especially shadscale. With shadscale die-off, short-lived perennials such as desert trumpet and wirelettuce will initially increase. White bursage, a long-lived opportunistic species will also initially increase.

With a loss of perennial cover, non-native annual grasses and forbs such as red brome, schismus and filaree will readily invade this site. White burrobush is a perennial invader on this site.

f. Major plant community types:

Shadscale Scrub or Shadscale Series--The historic site potential is characterized by low, intricately branched, often spiny shrubs, 0.3 to 0.6 meters tall, with a continuous, intermittent or open canopy dominated by *Atriplex confertifolia*. Perennial grasses and forbs are common. Annuals are seasonally present. The composition of the annual vegetation differs from year to year, depending on the time and amount of rainfall. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3003

Growth Curve Name--Shadscale

Description: Growth starts in early spring; flowering and seed set occur by August. Plants may break dormancy after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	35	20	10	5	5	0	0	0	0

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3024

Growth Curve Name--Big galleta

Description: Some green up in spring; dormant May and June; most growth occurs after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB017NV) Limy Hill 3-5" P.Z.

(030XB001NV) Limy Hill 5-7" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB121CA) Calcareous Hill 5-7" P.Z. [LATR2 important shrub; ACSP12 dominant grass]

(030XB122CA) Calcareous Loam 3-5" P.Z. [LATR2 important shrub; more productive site]

(030XB002NV) Loamy Hill 5-8" P.Z. [EPNE important shrub; ACHY dominant grass]

c. This ecological site description is based on the following documentation:

Sampling technique

___ NV-ECS-1

___ SCS-Range 417

2 Other

5. Soils

a. The soils that characterize this site are very shallow and shallow and well drained. They are formed in colluvium and residuum from mainly volcanic sources. Surface textures are extremely gravelly sandy loams. Subsurface textures are very gravelly sandy loams. Available water capacity is very low and permeability is moderately rapid. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 0 to 8 inches to slightly fractured unweathered bedrock.

Representative Soil Map Units

403 Haleburu-Upspring complex, 8-50 percent slopes

6. Wildlife Communities

a. This site provides habitat for mammals such as Merriam's kangaroo rats, desert woodrats, long-tailed pocket mice, black-tailed jackrabbits and coyotes. Desert bighorn sheep may also occur.

b. This site provides habitat for reptiles such as side-blotched lizards, western whiptails and chuckwallas.

c. Birds common to this site include horned larks, common ravens, loggerhead shrikes, black-throated sparrows and raptors.

B. Ecological Site Interpretations

1. Livestock Grazing

a. Season of Use--Other Mgt. Considerations: This site has limited value for livestock grazing due to the steep slopes, low productivity and lack of stock water. Shadscale is considered valuable browse for cattle and sheep. Shadscale is often eaten during the early spring before spines mature. The seeds are also readily eaten by livestock. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. During favorable years, perennial and annual forbs and

grasses provide additional forage.

- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	150	

2. General Management Considerations

- a. Military Operations--The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water is the main limitation on this site. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Shadscale and white bursage are effective shrubs for revegetation of disturbed sites. Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is medium. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Upspring	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

- a. Non-native species occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Ovis canadensis nelsoni*--Nelson's bighorn sheep
Species of special concern
 - Sauromalus obesus*--Common chuckwalla
Federal species of concern
 - Eremophila alpestris*--Horned lark
Federal and State species of concern
 - Lanius ludovicianus*--Loggerhead shrike
Federal and State species of concern

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. Saltbush species, such as shadscale, are generally resistant to fire because of a low volatilization rate. White bursage possesses limited sprouting ability but can rapidly re-establish from seed. Fire damage to big galleta varies; depending on whether plants are dormant when burned. If plants are dry, damage may be severe because the live center may be burned out. Big galleta may resprout from rhizomes. Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. A rapid, cool fire may top-kill desert needlegrass but may not

burn deep into the root crown, allowing for
resprouting.

9. Typical Site Location

NE1/4 Sec. 5, T5N R7E
Approximately 13 miles southwest of Ludlow, CA

Lavic SE Quadrangle
UTM 11S 0567038e 3823720n (Datum=NAS-C)
San Bernardino Co., CA

Moist Granitic Drain

Plant Symbol: CHLI2-PSSP3

Site Number: 030XB131CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs in drainageways of inset fans. Elevation is 1065 to 2900 feet. Slopes range from 0 to 4 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 73 degrees F.
- b. The average frost-free period is 240 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Mojave Desert Wash Scrub or Catclaw Acacia Series. Desertwillow and smoketree dominate this community. Potential vegetative composition is about 10 percent grasses, 15 percent forbs, and 75 percent shrubs and trees.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (75 percent):

Symbol	Common Name	% Composition (air-dry weight)
CHLI2	Desertwillow	30-50
PSSP3	Smoketree	15-25
HYSA	White burrobush	5-10
SSSS	Other shrubs	10-20**
ATPO	Allscale saltbush	
EPCA2	California ephedra	
LATR2	Creosotebush	
ACGR	Catclaw	
BEJU	Sweetbush	
PETH4	Thurber sandpaper plant	
SEAR8	Desertsenna	
AMDU2	White bursage	
ENFR	Bush encelia	

ISAR Bladderpod
PESC4 Schotts pygmycedar

** Allow no more than 5 percent of each species of this group, and no more than 20 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	5-10
PPGG	Other perennial grasses	2-5**
ACSP12	Desert needlegrass	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	
ARAD	Sixweeks threeawn	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
ERIN4	Desert trumpet	
STPA2	Wirelettuce	
ASER	Desert milkweed	
EUPO3	Sandmat	
AAFF	Other annual forbs	T-10
CHFR	Fremont pincushion	
NADE2	Leafy nama	
ATPL	Parachute plant	
SACO6	Chia	

** Allow no more than 3 percent of each species of this group, and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 10 to 30 percent.

- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	1800
Normal Years	1500
Unfavorable Years	1000

- e. Ecological dynamics: As ecological condition deteriorates white burrobush, desert trumpet, wirelettuce and white bursage will initially increase. Continued surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such as smoketree and desert

willow. Species likely to invade this site include saltcedar and introduced annual grasses and forbs such as schismus, red brome, red-stem filaree and Russian thistle.

f. Major plant community types:

Mojave Desert Wash Scrub--The historic site potential is characterized by a shrubby, diverse, open community dominated by *Chilopsis linearis ssp. arcuata* and *Psorothamnus spinosus*. Perennial grasses and forbs are sparse. Annual forbs and grasses are seasonally present and are abundant in years of above average precipitation. This site is inherently unstable due to the occurrence and frequency of flooding.

g. Plant Growth Curve

Growth Curve Number--CA3021

Growth Curve Name--Desertwillow

Description: Growth starts in spring; flowering occurs mostly in May and June, but may also occur after summer rains. Fruits ripen from late summer to fall and capsules persist over winter.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	15	35	15	10	5	5	5	0	0

Growth Curve Number--CA3020

Growth Curve Name--Smoketree

Description: Most of the year this plant is leafless, although leaves will emerge with rains. Flowering occurs from March through November, with peak flowering usually from May into July. Seeds mature throughout the summer, with peak seed production in July.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	25	25	15	5	5	5	0	0

Growth Curve Number--CA3011

Growth Curve Name--White burrobush

Description: Growth starts in early spring; flowering and seed set occur by June. Plants go dormant as a result of drought stress. New twig and leaf growth is initiated after summer and winter rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	30	20	10	0	5	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

- (030XB136CA) Dry Wash
- (030XB145CA) Valley Wash

(030XB005NV) Limy 5-7" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

- (030XB136CA) Dry Wash [CHLI2-PSSP3 absent; less productive site]
- (030XB145CA) Valley Wash [CHLI2-PSSP3 minor trees; less productive site]
- (030XB050NV) Dry Wash [CHLI2-PSSP3 absent; less productive site]
- (030XB103NV) Granitic Drain 5-7" P.Z. [CHLI2 minor component; less productive site]

c. This ecological site description is based on the following documentation:

- Sampling technique
- 5 NV-ECS-1
- SCS-Range 417
- Other

5. Soils

a. The soils that characterize this site are very deep and excessively drained. They are formed in stratified alluvium from mixed sources. Surface textures are very gravelly loamy coarse sands and gravelly coarse sands. Subsurface horizons are stratified lenses of gravelly through extremely gravelly coarse sands and very gravelly and extremely gravelly loamy coarse sands. Available water capacity is very low and permeability is rapid and very rapid. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches. This site is subject to frequent flooding.

Representative Soil Map Units

- 272 Arizo association, 0-4 percent slopes, frequently flooded
- 310 Carrizo association, 2-4 percent slopes, frequently flooded

6. Wildlife Communities

- a. Mammals occurring on this site include long-tailed pocket mice, Merriam's kangaroo rats, cactus mice, woodrats, coyotes and black-tailed jackrabbits.
- b. Common lizards include zebra-tailed lizards, desert spiny lizards, long-tailed brush lizards, side-blotched lizards and western whiptails. Western shovel-nosed snakes also occur.
- c. Birds occurring on this site include Costa's hummingbirds, Northern mockingbirds, phainopeplas, blue-gray and black-tailed gnatcatchers, lesser goldfinches, house finches,

horned larks, common ravens, loggerhead shrikes, verdins, Gambel's quail, and several species of wrens and sparrows. Desert willow provides nesting sites for songbirds and cover for other wildlife species. The sucrose in desert willow nectar is a good energy source for bees and hummingbirds. Smoketree provides nesting sites for verdins and gnatcatchers.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited value for livestock grazing due to low productivity. Desert willow and smoketree are considered to be unpalatable to livestock. Use of desert willow by livestock generally indicates over-browsing or overstocking of the range. Following fire, however, desert willow sprouts may be highly palatable. White burrobush seeds are grazed by domestic sheep. Annual forbs and grasses provide abundant forage during favorable years.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre		
	air dry	AUM/AC	AC/AUM
Normal Years	1200		

2. General Management Considerations

- a. Military Operations--Vehicle use in washes may alter the vegetation and channel morphology. This may result in increased peak flows, accelerated erosion, soil blowing and barren areas. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover. Channel width and depth will also increase. Gully stabilization methods include straw bale checkdams, rock riprap and sand bags. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Dry washes are known to be zones of high animal activity in the desert. The abundance of insects attracts both birds and mammals to the wash. The occurrence of taller statured shrubs also provide wildlife cover, thus the washes serve as wildlife corridors. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

Close roads and trails no longer being used and revegetate using native species indigenous to this site. Restore channel morphology where impacted. Water developments would also increase the species diversity of this site.

- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Desert willow and smoketree are effective soil stabilizers and are usually transplanted from nursery stock. White burrobush is a short-lived species, although the seeds have high viability and germination rates compared to other desert shrubs.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Summer annuals and non-native plants should be removed from around the transplanted shrubs to reduce competition for water. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low to low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Carrizo	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*

6. Recreation and Aesthetics

- a. This site is valued for open space and those interested in desert ecology. Desert willow, smoketree and wildflowers provide spectacular floral displays especially in years with above average precipitation.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Eremophila alpestris*--Horned lark
Federal and state species of concern
 - Lanius ludovicianus*--Loggerhead shrike
Federal and state species of concern
 - Cynanchum utahense*--Utah vine milkweed
Species of limited distribution

8. Fire

- a. This site is usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Desert willow is able to sprout from the root crown following top-kill by fire. Smoketree is top-killed by fire and surviving roots may resprout. White burrobush establishes quickly after fire via off-site seeds and sprouting.

9. Typical Site Location

SW1/4 Sec. 17 T4N R10E
Approximately 14 miles southwest of Amboy, CA
Lead Mountain Quadrangle
UTM 11S 0595577e 3809884n (Datum=NAS-C)
San Bernardino Co., CA

Outwash Plain

Plant Symbol: ATPO-AMDU2/ACHY
 Site Number: 030XY046NV

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on sand sheets, alluvial flats and lake plains. Elevation is 595 to 2735 feet. Slopes range from 0 to 15 percent, but slope gradients of 2 to 4 are most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 62 to 74 degrees F.
 b. The average frost-free period is 240 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Desert Saltbush Scrub or Allscale Series. This community is dominated by allscale saltbush and creosotebush. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.
 b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATPO	Allscale saltbush	25-45
AMDU2	White bursage	10-20
LATR2	Creosotebush	5-15
ATCA2	Fourwing saltbush	2-10
SSSS	Other shrubs	5-15**
EPNE	Nevada ephedra	
LYCIU	Wolfberry	
SUMO	Mojave seablite	
ENCEL	Encelia	

** Allow no more than 5 percent of each species of this group, and no more than 15 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
ACHY	Indian ricegrass	2-8
PPGG	Other perennial grasses	2-8**
ACSP12	Desert needlegrass	
AAGG	Other annual grasses	1-3

** Allow no more than 2 percent of each species of this group, and no more than 8 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	1-8**
SPAM2	Desert globemallow	
ERIN4	Desert trumpet	
TIOB	Honeysweet tidestromia	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
ERIOG	Buckwheat	

** Allow no more than 2 percent of each species of this group, and no more than 8 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 10 percent.
 d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	400
Normal Years	300
Unfavorable Years	150

e. Ecological dynamics: As ecological condition deteriorates perennial grasses decrease. Allscale saltbush may initially increase but with continued site degradation allscale will also decrease. Non-native annuals such as schismus and Russian thistle will invade this site. White burrobush is a pioneer species on this site.

f. Major plant community types:

Desert Saltbush Scrub or Allscale Series --This is a xerophytic phase of saltbush scrub with limited salt tolerance. This series usually consists of low, grayish, microphyllus shrubs, 0.3 to 1 meter tall, with some succulent species. Shrubs are widely spaced with total cover typically low. Stands are dominated by allscale. Annuals are seasonally present. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3007

Growth Curve Name--Allscale Saltbush

Description: Growth begins in early spring; flowering and seed set occur by October.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	15	30	20	10	5	5	5	0	0	0

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

- (030XY047NV) Alluvial Plain
- (030XY129CA) Gypsic Flat 3-5" P.Z.
- (030XB019NV) Limy 3-5" P.Z.
- (030XB005NV) Limy 5-7" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

- (030XY047NV) Alluvial Plain [More productive site; AMDU2, LATR2 minor components]

c. This ecological site description is based on the following documentation:

- Sampling technique
- _1_ NV-ECS-1
- ___ SCS-Range 417
- _4_ Other

5. Soils

a. The soils that characterize this site are somewhat excessively drained and very deep. They are formed in mixed alluvium. Surface textures are sands, loamy

sands and loamy fine sands. Subsurface textures are loamy sands, very gravelly coarse sands to gravelly sands. These soils are saline and/or alkaline. Available water capacity is very low to low and permeability is rapid. Wind erosion hazard is moderate to severe. Effective rooting depth is 60 inches or more.

Representative Soil Map Units

- 160 Bluepoint association, 4-30 percent slopes
- 180 Hypoint, saline-Cajon dry association, 0-4 percent slopes
- 252 Bristolake-Carrizo association, 0-4 percent slopes
- 296 Arizo-Hypoint, saline association, 2-8 percent slopes

6. Wildlife Communities

- a. This site provides habitat for little pocket mice, Merriam's and desert kangaroo rats and black-tailed rabbits. Coyotes also frequent this site. Allscale and creosotebush provide valuable forage and cover to small mammals.
- b. This site provides habitat for lizards such as western whiptail, side-blotched lizard, zebra-tailed lizard and desert iguana. Sidewinders may also occur.
- c. Birds common to this site include horned larks, common ravens, sage and Brewer's sparrows and Leconte thrashers.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: Allscale is a highly palatable plant for domestic livestock and provides valuable forage during the winter and early spring months. Overgrazing can eliminate this species from the site. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. Creosotebush is unpalatable to livestock, but provides shade to domestic sheep. During favorable years, annual forbs and grasses provide additional forage.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	AUM/AC	AC/AUM
	air dry		
Normal Years	300		

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation can result in accelerated erosion, soil blowing and barren areas. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Vehicle activity off of designated tank trails and roads can result in loss of vegetative cover and increased erosion. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Allscale saltbush, white bursage, fourwing saltbush and creosotebush are valuable for erosion control and cover restoration. Direct seeding should be done during the fall and winter months when low soil temperatures and high soil moisture are favorable for germination. Transplanting seedlings is more effective than direct seeding. The soil profile should be irrigated prior to transplanting and supplemental irrigation is recommended for the first growing season. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low to low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Bluepoint	A	49	55	63
Bristolake	A	49	55	63
Hypoint	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. Russian thistle, *Salsola tragus*, occurs in heavily disturbed areas. Other non-native plants include schismus, *Schismus* spp., and red-stem filaree, *Erodium cicutarium*.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Eremophila alpestris--Horned lark
 Federal and State species of concern
Toxostoma lecontei--LeConte's thasher
 State species of concern

8. Fire

- a. The foliage of the saltbushes appears to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill aboveground portions of the saltbushes. Creosotebush and white bursage possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

NW1/4, Sec. 10, T4N R11E
 Approximately seven miles southwest of Amboy, CA
 Lead Mountain NE Quadrangle
 UTM 11S 0608941e 3812990n (Datum=NAS-C)
 San Bernardino Co., CA

Saline Flat 3-5" P.Z.

Plant Symbol: ALOC2-SUMO

Site Number: 030XY132CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on convex hummocks on alluvial flats. Elevation is 590 to 655 feet. Slopes range from 4 to 15 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 5 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 69 to 75 degrees F.
- b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Desert Sink Scrub or Iodinebush Series. Iodinebush and Mojave seablite dominate this community. Potential vegetative composition is about 5 percent grasses, 5 percent forbs, and 90 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (90 percent):

Symbol	Common Name	% Composition (air-dry weight)
ALOC2	Iodinebush	50-65
SUMO	Mojave seablite	10-20
ATCA2	Fourwing saltbush	5-15
SSSS	Other shrubs	2-10**
ATPO	Allscale saltbush	
LATR2	Creosotebush	
AMDU2	White bursage	
HYSA	White burrobush	

** Allow no more than 2 percent of each species of this group and no more than 10 percent in aggregate

Grasses and Grass-like Plants (5 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-5**
DISP2	Inland saltgrass	
AAGG	Other annual grasses	T-2
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-5**
SEVE	Western sea-purslane	
AAFF	Other annual forbs	T-5
MONU	Nuttall monolepis	
GECA2	Desert sunflower	
OLLI	Oligomeris	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

- c. Approximate ground cover (basal and crown) is 2 to 10 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	150
Normal Years	100
Unfavorable Years	50

- e. Ecological dynamics: This site is characterized by low productivity with little plant diversity. Disturbance would allow for the introduction of non-native species such as schismus, *Schismus spp.* and Russian thistle, *Salsola tragus*.

f. Major plant community types:

Desert Sink Scrub or Iodine Bush Series: This is a halophytic phase of saltbush scrub on soils with available groundwater and high concentrations of salt or alkali. The historic site potential is characterized by an open canopy with low total cover and widely spaced succulent chenopods growing on small hummocks. Perennial grasses and forbs are sparse. Annuals are seasonally present. This site is associated with a playa and may be intermittently flooded.

g. Plant Growth Curve

Growth Curve Number--CA3029

Growth Curve Name--Iodinebush

Description: Growth begins in spring; flowering occurs from June to August. Seeds mature by October.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	25	30	15	10	5	0	0	0

Growth Curve Number--CA3010

Growth Curve Name--Mojave seablite

Description: Growth begins in early spring; flowering occurs from July to September.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	30	15	10	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
(030XY129CA) Gypsic Flat 3-5" P.Z.
(030XY046NV) Outwash Plain
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
(030XY127CA) Sodic Dune 3-5" P.Z. [ATCA2-SUMO dominant shrubs; more productive site]
- c. This ecological site description is based on the following documentation:
Sampling technique
1 NV-ECS-1
___ SCS-Range 417
1 Other

5. Soils

- a. The soils that characterize this site are very deep and well drained. They are formed in mixed alluvium. Surface textures are very fine sandy loams. The surface texture is flocculated due to the extremely high salt concentrations. Subsurface textures are fine sandy loams, loams and silt loams. Available water capacity is very low and permeability is moderate. Wind erosion hazard is moderate. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches.

Representative Soil Map Units

253	Amboy-Crater-Gypboy association, 0-15 percent slopes
902	Typic Haplosalids-Gypboy association, 0-15 percent slopes

6. Wildlife Communities

- a. This site has low species diversity. Small mammals that may occur include round-tailed ground squirrels and Merriam's kangaroo rats. Coyotes and black-tailed jackrabbits may also occur.
- b. Lizards common to this site include western whiptails and zebra-tailed lizards.
- c. Birds occurring on this site include horned larks, black-throated sparrows, loggerhead shrikes and common ravens.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited value for livestock grazing due to very low productivity and lack of stock water. Iodinebush and Mojave seablite are considered poor forage for livestock.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	100	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation can result in soil compaction reduced infiltration rates, accelerated erosion, soil blowing, barren areas and the introduction of non-native plants.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Removal of non-native species and an appropriate monitoring program are also recommended.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Transplanting seedlings is more effective than direct seeding. The soil profile should be irrigated prior to transplanting and supplemental irrigation is recommended for the first growing season. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is medium. Hydrologic soil group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Gypboy	B	68	72	77

5. Poisonous Plants and/or Non-native Plants

- a. Schismus, *Schismus spp.* occurs in disturbed areas. Saltcedar, *Tamarix ramosissima*, occurs in washes and bomb craters that intermittently hold water.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Eremophila alpestris--Horned lark
 Federal and state species of concern
Lanius ludovicianus--Loggerhead shrike
 Federal and state species of concern

8. Fire

- a. This community is usually unaffected by fire because of low fuel loads. The foliage of the chenopods appears to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill the aboveground portions. These species can reestablish sites through an abundance of wind-dispersed seed from adjacent unburned sites.

9. Typical Site Location

SW1/4 Sec. 6, T5N R11E
 Approximately 7 miles west 1 mile south of Bagdad, CA
 Amboy Crater Quadrangle
 UTM 11S 0603339e 3822869n (Datum=NAS-C)
 San Bernardino Co., CA

Saline Hill 3-5" P.Z.

Plant Symbol: ATHY-AMDU2/ACSP12

Site Number: 030XB152CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on steep sideslopes of mountains on all exposures. Elevation is 2100 to 4500 feet. Slopes range from 15 to 75 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 100 degrees F). The average annual precipitation ranges from 2 to 7 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 70 degrees F.
- b. The average frost-free period is 200 to 300 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Desert Saltbush Scrub or Desert-holly Series. This community is dominated by desert holly and white bursage. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATHY	Desert holly	60-75
AMDU2	White bursage	5-15
LATR2	Creosotebush	2-5
SSSS	Other shrubs	5-15**
ATCO	Shadscale	
ENFA	White brittlebush	
LEFR2	Desert alyssum	
XYTOT	Mojave aster	
PLPL	Arrowleaf	
LYAN	Anderson wolfberry	
KRGR	White ratany	

** Allow no more than 3 percent of each species of this group and no more than 15 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
ACSP12	Desert needlegrass	2-8
PPGG	Other perennial grasses	2-8**
PLRI3	Big galleta	
ERPU8	Fluffgrass	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 3 percent of each species of this group and no more than 8 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-8**
SPAM2	Desert globemallow	
ERIN4	Desert trumpet	
STEPH	Wirelettuce	
MIBI8	Wishbone herb	
AAFF	Other annual forbs	T-10
PEEM	Emory rocklily	
AMTE3	Bristly fiddleneck	
ERIOG	Buckwheat	
CRYPT	Cryptantha	

** Allow no more than 2 percent of each species of this group and no more than 8 percent in aggregate

- c. Approximate ground cover (basal and crown) is 3 to 10 percent.
- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	250
Normal Years	150
Unfavorable Years	50

- e. Ecological dynamics: As ecological condition deteriorates, the perennial grasses decrease. The opportunistic shrubs such as desert holly, white bursage and shadscale increase. Desert trumpet and wirelettuce will also increase. Invaders on this site include non-native species such as red-stem filaree, red brome and schismus. White burrobush is the primary perennial pioneer species.

f. Major plant community types:

Desert Saltbush Scrub or Desert-holly Series--The historic site potential is comprised of low, grayish microphyllous shrubs, 0.3 to 1 meter tall, with some succulent species. Total cover often low, with bare ground between the widely spaced shrubs. Stands typically are strongly dominated by a single *Atriplex* species. Perennial grasses and forbs are sparse. Annual grasses and forbs are seasonally present. Pockets of cryptogamic crust have developed in between the surface rock and vegetation. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3005

Growth Curve Name--Desert holly

Description: Growth starts in early winter; flowering and seed set occur by April.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10	25	30	20	10	0	0	0	0	0	0	5

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB001NV) Limy Hill 5-7" P.Z.

(030XB077NV) Steep South Slope

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB126CA) Saline Slope 3-5" P.Z. [PLR13, POSE dominant grasses]

(030XB130CA) Lava Flow 3-5" P.Z. [LYAN important shrub; more productive site]

c. This ecological site description is based on the following documentation:

Sampling technique

 2 NV-ECS-1

 SCS-Range 417

 Other

5. Soils

a. The soils that characterize this site are shallow and very shallow. They are formed in colluvium and residuum from mainly volcanic sources. Surface textures are extremely gravelly sandy loams. Subsurface textures are very gravelly sandy loams, sandy loams and fine sandy loams. Available water capacity is very low and permeability is moderate. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 4 to 14 inches to unweathered rhyolite bedrock.

Representative Soil Map Units

403	Upspring saline minor component in Haleburu-Upspring complex, 8-50 percent slopes
407	Lithic Torriorthents minor component in Haleburu-Pacific Mesa-Sunrock complex, 15-75 percent slopes
420	Lithic Torriorthents minor component in Dalvord-Goldroad-Rock outcrop association, 15-75 percent slopes

6. Wildlife Communities

a. This site provides habitat for small mammals such as antelope ground squirrels, desert woodrats, and canyon and long-tailed pocket mice.

b. This site provides habitat for lizards, such as the western whiptail, desert collared lizard, and chuckwalla; and snakes such as gopher, coachwhip, western patch-nosed and speckled rattlesnake. Depth to bedrock is a restrictive feature to burrowing reptiles, such as the desert tortoise.

c. Birds common to this site include black-throated sparrows, rock wrens, common ravens and raptors.

B. Ecological Site Interpretations

1. Livestock Grazing

a. Season of Use-Other Mgt. Considerations: This site has limited use for livestock grazing due to low production, steep slopes and lack of stock water. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. Creosotebush is unpalatable to livestock. During favorable years, annual grasses and forbs provide additional forage.

b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	150	

2. General Management Considerations

- a. Military Operations--The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water is the main limitation on this site. Water developments would greatly increase the diversity of species.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Desert holly and white bursage are effective for erosion control and slope stabilization. Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is medium to high. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Lithic Torriorthents	D	84	86	88
Upspring saline	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

- a. Non-native species occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Sauromalus obesus--Common chuckwalla
Federal Species of Concern

8. Fire

- a. The foliage of the saltbushes appears to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill the aboveground portions of the saltbushes. White bursage and creosotebush possess limited sprouting ability and can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

SE1/4, Sec. 12, T6N R5E
Approximately 15 miles southwest of Ludlow, CA
Galway Lake Quadrangle
UTM 11S 0555000e 3830900n (Datum=NAS-C)
San Bernardino Co., CA

Sandhill 3-5" P.Z.

Plant Symbol: LATR2/PLRI3

Site Number: 030XB150CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on thick sand sheets. Elevations are 1830 to 3025 feet. Slopes range from 0 to 8 percent.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 70 degrees F.

b. The average frost-free period is 240 to 300 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Creosotebush Scrub or Big Galleta Series. This community is dominated by creosotebush and big galleta. Potential vegetative composition is about 60 percent grasses, 15 percent forbs, and 25 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (25 percent):

Symbol	Common Name	% Composition (air-dry weight)
LATR2	Creosotebush	5-15
AMDU2	White bursage	2-10
SSSS	Other shrubs	5-10**
EPCA2	California ephedra	
OPEC	Staghorn cholla	
BRIN	Wooly brickellbush	
ENFR	Bush encelia	
PETH4	Thurber sandpaper plant	
LEFR2	Desert alyssum	
PSEM	Emory dalea	
ATCA2	Fourwing saltbush	
KRGR	White ratany	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

Grasses and Grass-like Plants (60 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	50-65
ACHY	Indian ricegrass	5-15
PPGG	Other perennial grasses	T-5**
SPCR	Sand dropseed	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
CRCA5	California croton	2-5
PPFF	Other perennial forbs	2-8**
STEPH	Wirelettuce	
AAFF	Other annual forbs	T-20
DICA4	Desert dicoria	
OEDE2	Triangle eveningprimrose	
ABVI	Desert sandverbena	
BAPL3	Wooly marigold	
ACCO3	Frostmat	
CRYPT	Cryptantha	

** Allow no more than 2 percent of each species of this group, and no more than 8 percent in aggregate

c. Approximate ground cover (basal and crown) is 10 to 20 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	1000
Normal Years	700
Unfavorable Years	450

e. Ecological dynamics: Surface disturbance may reduce plant cover, density and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use and an assortment of environmental factors (topography, rainfall, soil type). As ecological condition deteriorates, big galleta and other perennial grasses decrease.

Short-lived perennials such as bush encelia, California croton and wirelettuce will initially increase. Continued surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such as creosotebush and California ephedra. White bursage, a long-lived opportunistic species may initially increase. With a loss of perennial cover, non-native annual grasses and forbs such as schismus, red-stem filaree and Russian thistle will readily invade this site. White burrobush and wirelettuce are the primary perennial pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or Big Galleta Series--

The historic site potential is characterized by an open two-tiered canopy less than 2 meters tall with creosotebush in the upper tier over the lower one of white bursage and big galleta. A spectacular display of annual forbs occurs during years of above-average precipitation. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3024

Growth Curve Name--Big galleta

Description: Some green up in spring; dormant May and June; most growth occurs after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--CA3004

Growth Curve Name--White bursage

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3022

Growth Curve Name--Indian ricegrass

Description: Growth starts in early spring with most growth occurring from April to May. Flowering and seed set occur by July. Dormancy occurs during the hot summer months.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	30	35	5	0	5	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB137CA) Granitic Loam 3-5" P.Z.

(030XB005NV) Limy 5-7" P.Z.

(030XB148CA) Sandy Plain 3-5" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB134CA) Cobbly Claypan 5-7" P.Z. [AMDU2 dominant shrub, ACHY minor grass]

(030XB137CA) Granitic Loam 3-5" P.Z. [AMDU2 dominant shrub; less productive site]

(030XB148CA) Sandy Plain 3-5" P.Z. [More productive site]

c. This ecological site description is based on the following documentation:

- Sampling technique
- _4_ NV-ECS-1
- _1_ SCS-Range 417
- _4_ Other

5. Soils

a. The soils that characterize this site are very deep and somewhat excessively drained. They are formed in sandy eolian material blown from mixed rock sources. Surface textures are sands, coarse sands and loamy fine sands. Subsurface textures are sands, loamy coarse sands, loamy sands and coarse sands. Available water capacity is low and permeability is rapid. Wind erosion hazard is severe. Effective rooting depth is 60 inches or more.

Representative Soil Map Units

- 105 Cajon-Arizo-Bluepoint complex, 2-8 percent slopes
- 110 Bluepoint sand, 2-8 percent slopes
- 205 Bluepoint-Pipeflat-Cajon association, 0-4 percent slopes

6. Wildlife Communities

a. Small mammals occurring on this site include round-tailed ground squirrels, white-tailed antelope squirrels, little pocket mice and desert kangaroo rats. Black-tailed

- jackrabbits, badgers and coyotes may also occur.
- b. Reptiles common to this site include lizards such as Mojave fringe-toed lizards, side-blotched lizards, zebra-tailed lizards, side-blotched lizards, long-tailed brush lizards and western whiptails. This site also provides habitat for several species of snakes including western shovel-nosed snakes, sidewinders and glossy snakes. The sandy subsurface textures of may be a restrictive feature to burrowing reptiles.
- c. Birds common to this site include horned larks, common ravens, loggerhead shrikes, LeConte's thrashers and several species of sparrows.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: Big galleta and Indian ricegrass are highly palatable to cattle and horses. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. White bursage is one of the major forage species of feral burros, especially in winter. Creosotebush is unpalatable to livestock. Domestic sheep use this shrub for shade. During favorable years, annual forbs and grasses provide abundant forage.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	700	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation can result in accelerated erosion, severe soil blowing and barren areas.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails may destroy small mammal burrows. Removal of weedy species with an appropriate monitoring program is

recommended. Water developments would increase the species diversity of this site.

- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White bursage is valuable for erosion control and cover restoration. Big galleta has moderate potential for erosion control and long-term revegetation and low potential for short-term revegetation projects. Big galleta is somewhat effective at holding blowing sand because of its isolated, clumped growth form. Creosotebush may also be used to rehabilitate disturbed sites. Once established, creosotebush may improve sites for annual forbs and grasses. Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

A good stand of Indian ricegrass is also effective in controlling wind erosion. Drilling Indian ricegrass seed in late fall at a depth of 2.5cm is recommended. Deep planting the seed provides favorable moisture relations in the seedbed, protection from wind deflation and protection from granivores.

4. Watershed

- a. Runoff is negligible to very low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Bluepoint	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. Russian thistle, *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include schismus, *Schismus arabicus*, and red-stem filaree, *Erodium*

cicutarium.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).

Eremophila alpestris--Horned lark

Federal and State species of concern

Lanius ludovicianus--Loggerhead shrike

Federal and State species of concern

Uma scoparia--Mojave fringe-toed lizard

Species of Special Concern (state level)

Cynanchum utahense--Utah vine milkweed

Species of limited distribution

Penstemon albomarginatus--White-margined beardtongue

Federal candidate

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. If non-native annual forbs and grasses are present, the intensity and frequency of fires will increase significantly. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. Fire damage to big galleta varies, depending on whether plants are dormant when burned. If plants are dry, damage may be severe because the live center may be burned out. Big galleta may resprout from rhizomes. Indian ricegrass sustains slight damage by fire and can reestablish via seed dispersed from adjacent unburned areas. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

SE1/4, Sec. 3, T3N R8E;

Approximately three miles north of Deadman Lake

Deadman Lake SW Quadrangle

UTM 11S 0579844e 3803367n (Datum=NAS-C)

San Bernardino Co., CA

Sandy Plain 3-5" P.Z.

Plant Symbol: LATR2/PLRI3

Site Number: 030XB148CA

A. Physical Characteristics

1. Physiographic Features

- a. This site occurs on sand sheets and alluvial plains. Elevation is 2235 to 2800 feet. Slopes range from 0 to 4 percent.

2. Climatic Features

- a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 100 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 70 degrees F.
- b. The average frost-free period is 240 to 300 days.

3. Interpretive Plant Community

- a. The representative natural plant community is Mojave Creosotebush Scrub or Big Galleta Series. Creosotebush and big galleta dominate this community. Potential vegetative composition is about 70 percent grasses, 15 percent forbs, and 15 percent shrubs.
- b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
LATR2	Creosotebush	5-15
SSSS	Other shrubs	2-10**
AMDU2	White bursage	
OPEC	Staghorn cholla	
KRGR	White ratany	
EPCA2	California ephedra	
ACSP	Rayless goldenhead	

** Allow no more than 2 percent of each species of this group and no more than 10 percent in aggregate

Grasses and Grass-like Plants (70 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	50-65
ACHY	Indian ricegrass	10-20
PPGG	Other perennial grasses	2-5**
SPCR	Sand dropseed	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
CRCA5	California croton	2-8
PPFF	Other perennial forbs	2-5**
SPAM2	Desert globemallow	
AAFF	Other annual forbs	T-20
ABVI	Desert sandverbena	
OEDE	Triangle eveningprimrose	
BAPL	Wooly marigold	
OECL	Browneyed eveningprimrose	
MAGL3	Desert dandelion	
CRYPT	Cryptantha	
CHST	Steve's duskymaiden	
ASTRA	Milkvetch	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

- c. Approximate ground cover (basal and crown) is 10 to 20 percent.

- d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	1400
Normal Years	1000
Unfavorable Years	700

- e. Ecological dynamics: Surface disturbance may reduce plant cover, density and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use and an assortment of environmental factors (topography, soil type). As ecological condition deteriorates big galleta and other perennial grasses decrease. Short-lived perennials such as rayless goldenhead and California croton will initially increase. Continued

surface disturbance may reduce the cover of the short-lived perennials as well as the long-lived perennials such as creosotebush, white ratany and California ephedra. White bursage, a long-lived opportunistic species may initially increase. With a loss of perennial cover, non-native annual grasses and forbs such as schismus, red-stem filaree and Russian thistle will readily invade this site. White burrobush is a primary perennial pioneer species.

f. Major plant community types:

Mojave Creosotebush Scrub or Big Galleta Series--The historic site potential is characterized by an open two-tiered canopy less than 2 meters tall with creosotebush in the upper tier over a dense stand of big galleta and Indian ricegrass. A spectacular display of annual forbs occurs during years of above-average precipitation. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3024

Growth Curve Name--Big galleta

Description: Some green up in spring; dormant May and June; most growth occurs after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--CA3022

Growth Curve Name--Indian ricegrass

Description: Growth starts in early spring with most growth occurring from April to May. Flowering and seed set occurs by July. Dormancy occurs during the hot summer months.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	30	35	5	0	5	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB137CA) Granitic Loam 3-5" P.Z.

(030XB150CA) Sandhill 3-5" P.Z.

(030XB005NV) Limy 5-7" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB137CA) Granitic Loam 3-5" P.Z. [AMDU2 dominant shrub; less productive site]

(030XB150CA) Sandhill 3-5" P.Z. [Less productive site]

(030XB039NV) Limy Fan 5-7" P.Z. [MUPO2 present]

c. This ecological site description is based on the following documentation:

Sampling technique

1 NV-ECS-1

2 SCS-Range 417

3 Other

5. Soils

a. The soils that characterize this site are very deep and somewhat excessively drained. They are formed in eolian and alluvial deposits. Surface textures are sands. Subsurface textures are sands, fine sandy loams, loamy sands and silt loams. These soils are moderately to very strongly alkaline. Available water capacity is low and permeability is rapid. Wind erosion hazard is very severe. Effective rooting depth is 60 inches or more.

Representative Soil Map Units

100	Cajon- <u>Pipeflat</u> association, 2-8 percent slopes
205	Bluepoint- <u>Pipeflat</u> -Cajon association, 0-4 percent slopes

6. Wildlife Communities

a. Small mammals occurring on this site include round-tailed ground squirrels, little pocket mice, and Merriam's and desert kangaroo rats. Black-tailed jackrabbits and coyotes are also common.

b. Reptiles occurring on this site include several species of lizards including Mojave fringe-toed lizards, long-tailed brush lizards, side-blotched lizards, and western whiptails. Common snakes include western shovel-nosed snakes, glossy snakes and sidewinders. The sandy subsurface soil textures may be a restrictive feature for burrowing reptiles, such as the desert tortoise.

c. Birds common to this site include horned larks, common ravens, loggerhead shrikes, LeConte's thrashers and several species of sparrows. Raptors observed on this site include northern harriers, sharp-shinned hawks and American kestrels.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: Big galleta and Indian ricegrass are highly palatable to cattle and horses. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. Creosotebush is unpalatable to livestock. Domestic sheep use this shrub for shade. During favorable years, annual forbs and grasses provide abundant forage.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	1000	

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and soil structure can result in soil compaction reduced infiltration rates, accelerated erosion, severe soil blowing and barren areas.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails can destroy small mammal burrows. Removal of weedy species with an appropriate monitoring program is recommended. Water is the main limitation to this site. Water developments would increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts.
Big galleta has moderate potential for erosion control and long-term revegetation and low potential for short-term revegetation projects. Big galleta is somewhat effective at holding blowing sand because of its isolated, clumped growth form. Creosotebush and white bursage are also valuable for erosion control and cover restoration. Once established, creosotebush may improve sites for annual forbs and grasses.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended.

A good stand of Indian ricegrass is also effective in controlling wind erosion. Drilling Indian ricegrass seed in late fall at a depth of 2.5cm is recommended. Deep planting the seed provides favorable moisture relations in the seedbed, protection from wind deflation and protection from granivores.

4. Watershed

- a. Runoff is very low. Hydrologic group B--soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Pipeflat	B	68	72	77

5. Poisonous Plants and/or Non-native Plants

- a. Russian thistle, *Salsola tragus*, Russian thistle, occurs in heavily disturbed areas. Other non-native plants occurring on this site include schismus, *Schismus barbatus*, and red-stem filaree, *Erodium cicutarium*.

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on

endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).

Uma scoparia--Mojave fringe-toed lizard
Species of special concern (state level)

Eremophila alpestris--Horned lark
Federal and State species of concern

Lanius ludovicianus--Loggerhead shrike
Federal and State species of concern

Cynanchum utahense--Utah vine milkweed
Species of limited distribution

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh

environment and the slow rate of recovery. Fire damage to big galleta varies; depending on whether plants are dormant when burned. If plants are dry, damage may be severe because the live center may be burned out. Big galleta may resprout from rhizomes. Indian ricegrass sustains slight damage by fire and can reestablish via seed dispersed from adjacent unburned areas. White bursage and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed.

9. Typical Site Location

SE1/4 Sec. 13 T3N R6E

Approximately 15 miles north of Joshua Tree, CA

Goat Mountain Quadrangle

UTM 11S 0564131e 3800842n (Datum=NAS-C)

San Bernardino Co., CA

Shallow Gravelly Loam 5-7" P.Z.

Plant Symbol: CORA-MESP2/PLRI3-ACSP12

Site Number: 030XB151CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on sideslopes of mountains on all exposures. Elevation is 3195 to 4400 feet. Slopes range from 8 to 50 percent.

2. Climatic Features

a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 100 degrees F). The average annual precipitation ranges from 4 to 7 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 63 degrees F.

b. The average frost-free period is 180 to 240 days.

3. Interpretive Plant Community

a. The representative natural plant community is Blackbush Scrub or Black Bush Series. This community is dominated by blackbrush, spiny menodora, big galleta and desert needlegrass. Potential vegetative composition is about 15 percent grasses, 15 percent forbs, and 70 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (70 percent):

Symbol	Common Name	% Composition (air-dry weight)
CORA	Blackbrush	35-50
MESP2	Spiny menodora	5-15
EPNE	Nevada ephedra	5-15
LATR2	Creosotebush	2-8
YUSC2	Mojave yucca	1-3
SSSS	Other shrubs	10-20**
KRER	Range ratany	
KRGR	White ratany	
PSARS	Mojave indigo bush	
AMDU2	White bursage	

XYTOT	Mojave aster
THMO	Turpentinebroom
KRLA2	Winterfat
LYAN	Anderson wolfberry
ERFA2	California buckwheat
ACGR	Catclaw acacia
LEFR2	Desert alyssum
ENAC	Acton encelia
ECPO2	Hedgehog barrel cactus

** Allow no more than 5 percent of each species of this group and no more than 20 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	5-10
ACSP12	Desert needlegrass	2-5
PPGG	Other perennial grasses	2-5**
ERPU8	Fluffgrass	
ACHY	Indian ricegrass	
AAGG	Other annual grasses	T-5

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
SPAM2	Desert globemallow	2-5
PPFF	Other perennial forbs	2-8**
ERIN4	Desert trumpet	
STEPH	Wirelettuce	
ASTRA	Milkvetch	
AAFF	Other annual forbs	T-10
OECL	Browneyed eveningprimrose	
PHACE	Phacelia	
CRYPT	Cryptantha	
ERIAS	Eriastrum	

** Allow no more than 2 percent of each species of this group and no more than 8 percent in aggregate

c. Approximate ground cover (basal and crown) is 20 to 35 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	300
Unfavorable Years	200

e. Ecological dynamics: Blackbrush is a long-lived dominant on older, undisturbed geomorphic surfaces. Succession occurs at a very slow rate. Increasing in cover and density, this shrub becomes more dominant over time. Following a fire, blackbrush decreases or is removed from the community and California buckwheat and the perennial grasses will increase. Non-native annual grasses and forbs, such as red brome, schismus and red-stem filaree are post-fire invaders on this site. Current knowledge indicates that the return of blackbrush may take many years.

f. Major plant community types:

Blackbush Scrub or Black Bush Series--The historic site potential is characterized by low, often intricately branched shrubs, 0.5 to 2 meters tall, with an open or continuous canopy. This site is dominated by blackbrush. Perennial grasses and forbs are common. Annuals are seasonally present. Pockets of cryptogamic crust have developed between the surface rock fragments. This site is stable in this condition.

g. Plant Growth Curve

Growth Curve Number--CA3018

Growth Curve Name--Blackbrush

Description: Growth starts in early spring; flowering and seed set occur by July.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	30	35	20	5	0	0	0	0	0	0

Growth Curve Number--CA3013

Growth Curve Name--Spiny menodora

Description: Growth starts in spring, flowering and seed set occur by June.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	30	35	20	5	0	0	0	0	0	0

Growth Curve Number--CA3024

Growth Curve Name--Big galleta

Description: Some green up in spring; dormant May and June; most growth occurs after summer rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	10	0	0	15	40	10	0	0	0

Growth Curve Number--AZ3087

Growth Curve Name--Desert needlegrass

Description: Growth starts in spring; most growth occurs in summer and seed set occurs by late summer.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	25	20	15	15	5	0	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB001NV) Limy Hill 5-7" P.Z.

(030XB145CA) Valley Wash

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB029NV) Shallow Gravelly Loam 5-7" P.Z.

[MESP2, EPNE minor components]

(030XB143CA) Shallow Granitic Loam 5-7" P.Z.

[LATR2 important shrub; more productive site]

(030XB144CA) Shallow Granitic Slope 5-7" P.Z.

[ACSP12 dominant grass; less productive site]

c. This ecological site description is based on the following documentation:

Sampling technique

1 NV-ECS-1

___ SCS-Range 417

3 Other

5. Soils

a. The soils that characterize this site are shallow and very shallow and well drained. They are formed in residuum and colluvium from granitic sources. Surface textures are very gravelly loamy coarse sands, loamy coarse sands and loamy sands. Subsurface textures are very gravelly sandy loams, coarse sandy loams and sandy loams. Available water capacity is very low and permeability is moderately rapid. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 8 to 20 inches to hard granitic bedrock.

Representative Soil Map Units

190 Lavabed-Dalvord association, 8-50 percent slopes

6. Wildlife Communities

a. Small mammals occurring on this site include white-tailed antelope squirrels, Botta's pocket gophers, little and long-tailed pocket mice, Merriam's kangaroo rats, cactus mice and southern grasshopper mice. Black-tailed jackrabbits, bobcats and coyotes also occur.

b. Reptiles occurring on this site include zebra-tailed lizards, long-nosed leopard lizards, desert spiny lizards, side-blotched lizards, desert night lizards and western whiptails. The depth to bedrock is a restrictive feature for burrowing reptiles such as the desert tortoise, although desert tortoises may occur in

adjacent washes.

- c. Songbirds common to this site include mourning doves, lesser nighthawks, ash-throated flycatchers, horned larks, verdins, cactus wrens, rock wrens, mountain bluebirds, loggerhead shrikes, house finches and several species of sparrows. Red-tailed hawks also occur.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has limited use for livestock grazing due to low productivity and lack of stock water. Blackbrush is fair winter browse for sheep and cattle. It is better utilized by sheep and goats than cattle. Nevada ephedra is rated good to fair forage for goats and fair to poor for cattle and sheep. The spines of spiny menodora keep it from being heavily utilized by livestock. Big galleta is highly palatable to cattle and horses. Desert needlegrass produces considerable basal foliage and is valuable forage while young. During favorable years, annual forbs and grasses provide additional forage on this site.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre		
	air dry	AUM/AC	AC/AUM
Normal Years	300		

2. General Management Considerations

- a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and the soil crust and structure can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing and barren areas. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Water is the main limitation on this site; thus, water developments would increase the species diversity.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any

revegetation efforts.

Blackbrush has medium erosion control potential, low establishment requirements and low long and short-term revegetation potential. Nevada ephedra forms dense, spreading colonies, which make it valuable for soil stabilization. Creosotebush may also be used to rehabilitate disturbed sites. Once established, creosotebush may improve sites for annual forbs and grasses. Big galleta has moderate potential for erosion control and long-term revegetation and low potential for short-term revegetation projects. Big galleta is somewhat effective at holding blowing sand because of its isolated, clumped growth form. Desert needlegrass may be used for revegetation in areas of light disturbance, but it is susceptible to excessive trampling. Transplants are more effective than direct seeding, although Nevada ephedra seedlings are very tolerant of drought and generally establish well following fall or winter seedings. Planting seedlings in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Summer annuals and non-native species should be removed from around transplants to reduce competition for water. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is medium. Hydrologic group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Lavabed	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

- a. Non-native species occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus spp.*

6. Recreation and Aesthetics

- a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
- Gopherus agassizii*--Desert Tortoise
Federal and State threatened
- Eremophila alpestris*--Horned lark
Federal and State species of concern
- Lanius ludovicianus*--Loggerhead shrike
Federal and State species of concern

8. Fire

- a. Desert communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. Blackbrush and creosotebush possess limited sprouting ability, thus, can be killed by high intensity fires. Both species are very slow to re-invade burned areas. Nevada ephedra and desert needlegrass are reported to resprout from the root crown after fire damages aboveground vegetation. Fire damage to big galleta varies; depending on whether plants are dormant when burned. If plants are dry, damage may be severe because the live center may be burned out. Big galleta may resprout from rhizomes.

9. Typical Site Location

NE1/4 Sec. 30, T7N R5E
Approximately 18 miles southwest of Ludlow, CA
Sunshine Peak Quadrangle
UTM 11S 0546330e 3837015n (Datum=NAS-C)
San Bernardino Co., CA

Sodic Dune 3-5" P.Z.

Plant Symbol: ATCA2-SUMO
 Site Number: 030XY127CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on partially stabilized sand dunes and shrub-coppice dunes. Elevation is 1745 to 2915 feet. Slopes range from 0 to 15 percent.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent to 45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 64 to 75 degrees F.
 b. The average frost-free period is 240 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Stabilized and Partially Stabilized Desert Dunes or Fourwing Saltbush Series. This community is dominated by fourwing saltbush and Mojave seablite. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.
 b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATCA2	Fourwing saltbush	50-60
SUMO	Mojave seablite	10-20
ATPO	Allscale saltbush	5-15
SSSS	Other shrubs	T-10**
LATR2	Creosotebush	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	T-5**
SPAI	Alkali sacaton	
DISP	Inland saltgrass	
AAGG	Other annual grasses	T-5

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	T-5**
AAFF	Other annual forbs	T-10
BAPL	Woolly marigold	
OEDE	Triangle evening primrose	
GECA2	Desert sunflower	

** Allow no more than 2 percent of each species of this group, and no more than 5 percent in aggregate

c. Approximate ground cover (basal and crown) is 10 to 20 percent.
 d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	700
Normal Years	500
Unfavorable Years	300

e. Ecological dynamics: As ecological condition deteriorates the perennial grasses will decrease. Fourwing saltbush and Mojave seablite will increase. Non-native annual forbs and grasses such as Russian thistle and schismus will invade this site.

f. Major plant community types: Stabilized and Partially stabilized Desert Dunes or Fourwing Saltbush Series--The historic site potential is wind blown sand accumulations that are stabilized or partially stabilized by shrubs, scattered low annuals and perennial grasses. The total cover increases as the dunes are progressively stabilized. This site is characterized by an open to fairly dense stand of

shrubs dominated by *Atriplex canescens*, *A. polycarpa* and *Suaeda moquinii*. Perennial grasses are sparse. Annuals are seasonally present. Dunes will retain water just below the surface allowing the perennial vegetation to survive long drought periods. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3008

Growth Curve Name--Fourwing Saltbush

Description: Growth begins in spring to early summer, flowering occurs in May through September; fruit ripens from October to December, with seed dispersal from October through April. Seed may remain on the plants for one to two years.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	35	15	10	5	5	0	0	0

Growth Curve Number--CA3010

Growth Curve Name--Mojave Seablite

Description: Growth begins in early spring; flowering occurs from July to September.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	20	30	15	10	5	0	0	0

Growth Curve Number--CA3007

Growth Curve Name--Allscale Saltbush

Description: Growth begins in early spring; flowers and sets seed by October.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	15	30	20	10	5	5	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 - (030XY047NV) Alluvial Plain
 - (030XY154CA) Dune 3-5" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 - (030XB142CA) Sandy 5-7" P.Z. [KRLA2 co-dominant; ACHY dominant grass; less productive site]
 - (030XY133CA) Sodic Sand 3-5" P.Z. [LATR2 important shrub; less productive site]
 - (030XY154CA) Dune 3-5" P.Z. [PRGLT dominant shrub; more productive site]
- c. This ecological site description is based on the following documentation:
 - Sampling technique
 - _2_ NV-ECS-1

1 SCS-Range 417

___ Other

5. Soils

- a. The soils that characterize this site are very deep and somewhat excessively drained. They are formed in sandy eolian material blown from recent alluvium. Surface textures are loam sands and loamy fine sands. Subsurface textures are loamy fine sands and fine sands. Available water capacity is low and permeability is rapid. Wind erosion hazard is severe. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches.

Representative Soil Map Units

- 901 Bluepoint, minor component in Typic Haplosalids
- 903 Typic Torriorthents minor component in Typic Haplosalids, clayey

6. Wildlife Communities

- a. This site provides habitat for small mammals such as desert kangaroo rats and southern grasshopper mice. Coyotes and black-tailed jackrabbits may also occur. Fourwing saltbush is a preferred browse for rabbits and small mammals. The seeds are also readily eaten.
- b. This site provides habitat for reptiles such as Mojave fringe-toed lizards, western whiptails, side-blotched lizards and sidewinders. The sandy textures of the soil are a restrictive feature for burrowing reptiles, such as the desert tortoise.
- c. Birds common to this site include common ravens, loggerhead shrikes, horned larks, blue-gray gnatcatchers, and several species of sparrows. Upland game birds and small nongame birds readily eat seeds of fourwing saltbush.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: Allscale and fourwing saltbush are valuable browse for domestic livestock. Fourwing saltbush has fair to good forage value for domestic sheep and goats, and at least fair forage value for cattle. Fourwing saltbush can withstand heavy grazing, however, overgrazing can eliminate allscale saltbush from this site.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM_
Normal Years	500	

2. General Management Considerations

a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation can result in accelerated erosion, severe soil blowing, barren areas and the introduction of non-native weedy species. Off-road vehicle use may destroy small mammal burrows.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Removal of non-native species and an appropriate monitoring program are also recommended.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Fourwing saltbush has been widely used for rehabilitating sites in southern and northern desert shrublands. Seed may be broadcast or drill-seeded, but broadcasting often produces better results. Seeding success is generally sporadic. Seedlings, which tend to be more drought tolerant and less susceptible to predation, may be transplanted. Seedlings are generally transplanted during the early spring, since three weeks or more of good soil moisture are required for establishment.

4. Watershed

a. Runoff is very low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Bluepoint	A	49	55	63
Typic Torriorthents	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

a. Russian thistle, *Salsola tragus*, occurs in heavily disturbed areas. Schismus, *Schismus arabicus*, also occurs.

6. Recreation and Aesthetics

a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Uma scoparia*--Mojave fringe-toed lizard
Species of Special Concern (state level)
 - Eremophila alpestris*--Horned lark
Federal and State species of concern
 - Lanius ludovicianus*--Loggerhead shrike
Federal and State species of concern

8. Fire

a. The foliage of the chenopods appear to have fire-retarding qualities associated with the salt content of the leaves. A severe fire, however, will typically kill the aboveground portions. If burned, saltbushes can resprout from the root crown or underground portions of the stem. These species can also reestablish sites through an abundance of wind-dispersed seed from adjacent unburned sites.

9. Typical Site Location

SE1/4 Sec. 23, T7N R6E
 Approximately 10 miles southwest of Ludlow, CA
 Lavic Lake Quadrangle
 UTM 11S 0561600e 3837500n (Datum=NAS-C)
 San Bernardino Co., CA

Sodic Sand 3-5" P.Z.

Plant Symbol: ATCA2-LATR2

Site Number: 030XY133CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on partially stabilized sand dunes and shrub-coppice dunes. Elevation is 595 to 1935 feet. Slopes range from 4 to 30 percent.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 70 to 75 degrees F.

b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Stabilized and Partially Stabilized Desert Dunes or Fourwing Saltbush Series. Fourwing saltbush and creosotebush dominate this community. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
ATCA2	Fourwing saltbush	35-50
LATR2	Creosotebush	15-25
ATPO	Allscale saltbush	5-15
SSSS	Other shrubs	2-10**
HYSA	White burrobush	
AMDU2	White bursage	
SUMO	Mojave seablite	

** Allow no more than 3 percent of each species of this group and no more than 10 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-8**
ACHY	Indian ricegrass	
PLRI3	Big galleta	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	T-5**
CRCA5	California croton	
HEUN2	Desertlily	
AAFF	Other annual forbs	T-10
OEDE2	Triangle eveningprimrose	
GECA2	Desert sunflower	
PAARA	Spanish needle	
BAPL	Wooly marigold	
CRYPT	Cryptantha	
PLOV	Desert Indianwheat	
OECL	Browneyed eveningprimrose	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	700
Normal Years	500
Unfavorable Years	300

e. Ecological dynamics: As ecological condition deteriorates the perennial grasses will decrease. Fourwing saltbush and creosotebush will increase. Non-native annual forbs and grasses such as Russian thistle and schismus will invade this site.

f. Major plant community types:

Stabilized and Partially stabilized Desert Dunes or Fourwing Saltbush Series--The historic site potential is wind blown sand accumulations, which are stabilized or partially stabilized by shrubs, scattered low annuals and perennial

grasses. The total cover increases as the dunes are progressively stabilized. This site is characterized by an open stand of shrubs dominated by *Atriplex canescens*, *A. polycarpa* and *Larrea tridentata*. Perennial grasses are sparse. Annuals are seasonally present. Dunes will retain water just below the surface allowing the perennial vegetation to survive long drought periods.

g. Plant Growth Curve

Growth Curve Number--CA3008

Growth Curve Name--Fourwing Saltbush

Description: Growth begins in spring to early summer, flowering occurs in May through September, fruit ripens from October to December, with seed dispersal from October through April. Seed may remain on the plants for one to two years.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	35	15	10	5	5	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occurs by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--CA3007

Growth Curve Name--Allscale Saltbush

Description: Growth begins in early spring; flowers and sets seed by October.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	10	15	30	20	10	5	5	5	0	0	0

4. Site Documentation

- a. Principal sites that commonly occur in association with this potential plant community include:
 - (030XY127CA) Sodid Dune 3-5" P.Z.
 - (030XY046NV) Outwash Plain
 - (030XY129CA) Gypsic Flat 3-5" P.Z.
 - (030XY154CA) Dune 3-5" P.Z.
- b. Competing sites (and their differentiae) which are similar to this potential plant community:
 - (030XY127CA) Sodid Dune 3-5" P.Z. [SUMO important shrub; more productive site]
 - (030XY154CA) Dune 3-5" P.Z. [PRGLT dominant species]

c. This ecological site description is based on the following documentation:

- Sampling technique
- _2_ NV-ECS-1
- _1_ SCS-Range 417
- _2_ Other

5. Soils

- a. The soils that characterize this site are very deep and somewhat excessively drained. They are formed in sandy eolian material blown from recent alluvium. Surface textures are sands and loamy fine sands. Subsurface textures are sands and fine sands. Available water capacity is low and permeability is rapid. Wind erosion hazard is very severe. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches.

Representative Soil Map Units

151 Rositas sand, 4-30 percent slopes

6. Wildlife Communities

- a. This site provides habitat for small mammals such as round-tailed ground squirrels, desert kangaroo rats and southern grasshopper mice. Coyotes and black-tailed jackrabbits also occur. Fourwing saltbush is a preferred browse for rabbits and small mammals. The seeds are also readily eaten.
- b. Reptiles common to this site include Mojave fringe-toed lizards, long-tailed brush lizards, western whiptails, side-blotched lizards and sidewinders. The sandy subsurface soil textures may be a restrictive feature for burrowing reptiles, such as the desert tortoise.
- c. Birds common to this site include common ravens, loggerhead shrikes, horned larks, LeConte's thrasher, blue-gray gnatcatchers and several species of sparrows. Upland game birds and small nongame birds readily eat seeds of fourwing saltbush.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: Allscale and fourwing saltbush are valuable browse for domestic livestock. Fourwing saltbush has fair to good forage value for domestic sheep and goats, and at least fair forage value for cattle. Fourwing saltbush can withstand heavy grazing, however, overgrazing can eliminate allscale saltbush from this site.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site

evaluation must be made.

Pounds/acre	air dry	AUM/AC	AC/AUM
Normal Years	500		

2. General Management Considerations

a. Military Operations--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and can result in accelerated erosion, severe soil blowing, barren areas and the introduction of non-native plant species.

3. Ecosystem Management

a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Off-road vehicle use may destroy small mammal burrows. Removal of non-native plant species and an appropriate monitoring program are also recommended.

b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. Fourwing saltbush has been widely used for rehabilitating sites in southern and northern desert shrublands. Seed may be broadcast or drill-seeded, but broadcasting often produces better results. Seeding success is generally sporadic. Seedlings, which tend to be more drought tolerant and less susceptible to predation, may be transplanted. Seedlings are generally transplanted during the early spring, since three weeks or more of good soil moisture are required for establishment. Creosotebush may also be used to rehabilitate disturbed sites. Once established, creosotebush may improve sites for annual forbs and grasses.

4. Watershed

a. Runoff is very low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Hydrologic Soil Series	Hydrologic Group	Conditions & Runoff Curves		
		Good	Fair	Poor
Rositas	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

a. Schismus, *Schismus spp.* and Russian thistle, *Salsola tragus*, occur in disturbed areas.

6. Recreation and Aesthetics

a. This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers may also attract visitors during the spring.

7. Threatened and Endangered Plants and Animals

a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).

Uma scoparia--Mojave fringe-toed lizard
Species of Special Concern (state level)

Eremophila alpestris--Horned lark
Federal and state species of concern

Lanius ludovicianus--Loggerhead shrike
Federal and state species of concern

Toxostoma lecontei--LeConte's thrasher
State species of concern

8. Fire

a. Fourwing saltbush is reportedly tolerant of fire. It is characterized by a low volatilization rate, which renders the plant somewhat fire-resistant. If burned, fourwing saltbush can resprout from the root crown or underground portions of the stem. This species can also reestablish some sites through an abundance of wind-dispersed seed from adjacent unburned sites. Creosotebush is very flammable and is poorly adapted to fire, due to its limited sprouting ability. Factors such as season of burning, fuel quantity, fire intensity and age of existing shrubs will affect the ability of creosotebush to resprouting.

9. Typical Site Location

NE 1/4, Sec. 11, T5N R10E;
Approximately 8 miles southwest of Amboy, CA
Bagdad SW Quadrangle
UTM 11S 0600697e 3822641n (Datum=NAS-C)
San Bernardino Co., CA

Steep South Slope

Plant Symbol: ENFA/PLRI3

Site Number: 030XB077NV

A. Physical Characteristics

1. Physiographic Features

a. This site typically occurs on steep southerly exposures of hills and mountains. At lower elevations, this site occurs on all exposures. Elevation is 850 to 3500 feet. Slopes range from 15 to 75 percent, but slope gradients of 30 to 75 percent are most typical.

2. Climatic Features

a. The climate on this site is arid characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 6 inches with most falling as rain from November to March. Approximately 30 percent-45 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 70 to 78 degrees F.

b. The average frost-free period is 300 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Creosotebush Scrub or Brittlebush Series. This community is dominated by white brittlebush and creosotebush. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, and 80 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (80 percent):

Symbol	Common Name	% Composition (air-dry weight)
ENFA	White brittlebush	70-80
LATR2	Creosotebush	2-10
AMDU2	White bursage	T-5
KRAME	Ratany	T-5
KRER	Range ratany	
KRGR	White ratany	
SSSS	Other shrubs	2-10**
EPNE	Nevada ephedra	
ECPO2	Hedgehog barrel cactus	
XYTOT	Mojave aster	

CHTE4	Needleleaf rabbitbrush
PSARS	Mojave indigo bush
PLPL	Arrowleaf
PESC4	Schotts pigmycedar
BEJU	Sweetbush
OPBA2	Beavertail pricklypear
ACGR	Catclaw acacia
ECEN	Hedgehog cactus
ECPO2	Hedgehog barrel cactus
TRCA8	California trixis

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

Grasses and Grass-like Plants (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPGG	Other perennial grasses	2-15**
PLRI3	Big galleta	
ACSP12	Desert needlegrass	
ERPU8	Fluffgrass	
ARIST	Threeawn	
AAGG	Other annual grasses	T-5
BOBA2	Sixweeks grama	

** Allow no more than 2 percent of each species of this group, and no more than 15 percent in aggregate

Forbs (10 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	T-10**
ERIN4	Desert trumpet	
MIBI8	Wishbone herb	
STEPH	Wirelettuce	
SPAM2	Desert globemallow	
AAFF	Other annual forbs	T-10
PLOV	Desert Indianwheat	
AMTE3	Bristly fiddleneck	
CRYPT	Cryptantha	
PEEM	Emory rocklily	

** Allow no more than 3 percent of each species of this group, and no more than 10 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	250
Unfavorable Years	100

e. Ecological dynamics: The steep rocky habitat protects this site from extensive ecological site degradation by livestock grazing or off-road vehicle use. White brittlebush is an early colonizer of disturbed sites, often replacing long-lived perennials in post-fire communities. White burrobush is also a pioneer species on this site.

f. Major plant community types:

Mojave Creosotebush Scrub or Brittlebush Series--The historic site potential is characterized by widely spaced shrubs less than a meter tall occurring on hot, dry, rocky slopes. White brittlebush dominates this site. Perennial grasses and forbs are sparse. White brittlebush is allelopathic and produces a toxic, water-soluble substance that inhibits the growth of several winter annuals. A sparse cryptogamic crust is present in undisturbed areas. This site is stable in this condition.

g. Plant Growth Curves

Growth Curve Number--CA3012

Growth Curve Name--White brittlebush

Description: Growth starts in early spring; flowering and seed set occur by July. Dormancy occurs during the hot summer months. Late summer and fall rains will break dormancy.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	35	20	0	0	10	5	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. Late summer and fall rains will break dormancy.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB017NV) Limy Hill 3-5" P.Z.

(030XB001NV) Limy Hill 5-7" P.Z.

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB001NV) Limy Hill 5-7" P.Z. [AMDU2 dominant; less productive site]

(030XB099NV) Gravelly Ridge 5-7" P.Z. [AMDU2 important shrub; less productive site]

c. This ecological site description is based on the following documentation:

Sampling technique

_10 NV-ECS-1

1 SCS-Range 417

5 Other

5. Soils

a. The soils that characterize this site are shallow to very shallow and well drained to somewhat excessively drained. They are formed in alluvium and colluvium from granitic and volcanic rocks. Surface and subsurface textures are extremely gravelly or very gravelly coarse sandy loams or loamy coarse sands. Available water capacity is very low and permeability is moderate to moderately rapid. Wind erosion hazard is slight to negligible due to surface rock fragments. Effective rooting depth is 0 to 8 inches to bedrock.

Representative Soil Map Units

- 141 Sunrock-Haleburu-Lava Flows association, 15-75 percent slopes
- 142 Sunrock-Pacific Mesa association, 8-75 percent slopes, rubbly
- 145 Sunrock-Sunrock,dry-Lava flows complex, 8-30 percent slopes, extremely stony
- 416 Goldroad-Dalvord-Rock outcrop association, 15-50 percent slopes
- 420 Dalvord-Goldroad-Rock outcrop association, 15-75 percent slopes

6. Wildlife Communities

a. This site provides habitat for small mammals such as canyon mice, long-tailed pocket mice, white-tailed antelope squirrels and desert woodrats, which prefer rocky habitats. This site provides habitat for desert bighorn sheep. White brittlebush is a browse species of the desert bighorn.

b. Reptiles that prefer a rocky habitat and occur on this site include the chuckwalla, western whiptail, side-blotched and desert collared lizard. The depth to bedrock is restrictive to burrowing reptiles, such as the desert tortoise.

c. Birds common to this site include common ravens, rock wrens, Say's phoebes, black-throated sparrows and sage sparrows.

B. Ecological Site Interpretations

1. Livestock Grazing

a. Season of Use--Other Mgt. Considerations: The limiting factors for livestock grazing are the steep, rocky slopes and low forage productivity. White brittlebush has low forage value for livestock.

b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	250	

2. General Management Considerations

- a. Military Operations--The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Water is the main limitation on this site. Water developments would greatly increase the diversity of species and would aid in the distribution and population size of the desert bighorn sheep.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts. White brittlebush is valuable for rehabilitating low maintenance landscapes, critical stabilization areas and other disturbed areas. It is easily transplanted and can be established by direct seeding during the fall or early spring months.

4. Watershed

- a. Runoff is medium to high. Hydrologic soil group D--soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent water-table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Goldroad	D	84	86	88
Sunrock	D	84	86	88

5. Poisonous Plants and/or Non-native Plants

- a. Non-native species occurring on this site include red brome, *Bromus rubens*; red-stem filaree, *Erodium cicutarium*; and schismus, *Schismus* spp.

6. Recreation and Aesthetics

- a. This site has value for open space and those interested in desert ecology. Flowering shrubs and wildflowers are aesthetically pleasing in the spring.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
Sauromalus obesus--Chuckwalla Federal Species of Concern
Ovis canadensis nelsoni--Nelson's bighorn sheep Species of special concern

8. Fire

- a. White brittlebush is often top-killed or completely killed by fire. The wind-dispersed seeds readily invade post-fire environments and often become well established. The likelihood of white brittlebush recovery from fire by sprouting is greater on cool, less xeric sites where fires are often less severe.

9. Typical Site Location

NW1/4 Sec. 12, T3N R11E
 Approximately seven miles north of Cleghorn Lakes
 Cleghorn Lakes Quadrangle
 UTM 11S 0611427e 3803241n (DATUM=NAS-C)
 San Bernardino Co., CA

Valley Wash

Plant Symbol: HYSA-LATR2/PLRI3

Site Number: 030XB145CA

A. Physical Characteristics

1. Physiographic Features

a. This site occurs on along drainageways of inset fans. Elevation is 620 to 4700 feet. Slopes range from 2 to 8 percent.

2. Climatic Features

a. The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, somewhat dry summers (70 to 110 degrees F). The average annual precipitation ranges from 2 to 7 inches with most falling as rain from November to March. Approximately 30 percent of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 57 to 73 degrees F.

b. The average frost-free period is 180 to 360 days.

3. Interpretive Plant Community

a. The representative natural plant community is Mojave Wash Scrub. White burrobush, creosotebush and catclaw acacia are the dominant species on this site. Potential vegetative composition is about 15 percent grasses, 15 percent forbs, and 70 percent shrubs.

b. The following table lists the major plant species and percentages by weight, air dry, of the total plant community that each contributes in an average production year. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors.

Shrubs and Trees (70 percent):

Symbol	Common Name	% Composition (air-dry weight)
HYSA	White burrobush	15-25
LATR2	Creosotebush	5-15
ACGR	Catclaw acacia	3-15
AMDU2	White bursage	2-5
SSSS-	Other shrubs and	
TTTT	trees	10-25**
BEJU	Sweetbush	
ENFR	Bush encelia	

ENFA	White brittlebush
PESC4	Schotts pigmycedar
EPNE	Nevada ephedra
ATPO	Allscale saltbush
SEAR8	Desertsenna
PETH4	Thurber sandpaper plant
PSSP3	Smoketree
KRGR	White ratany
HYEM	Desert lavender
PHCA8	Mesquite mistletoe
VIPA	Goldeneye
SAME	Bladdersage
LYAN	Anderson wolfberry

** Allow no more than 5 percent of each species of this group and no more than 25 percent in aggregate

Grasses and Grass-like Plants (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PLRI3	Big galleta	5-10
PPGG	Other perennial grasses	2-5**
ACHY	Indian ricegrass	
ACSP12	Desert needlegrass	
ERPU8	Fluffgrass	
AAFF	Other annual grasses	T-10
BOBA2	Sixweeks grama	
ARIST	Threeawn	

** Allow no more than 2 percent of each species of this group and no more than 5 percent in aggregate

Forbs (15 percent):

Symbol	Common Name	% Composition (air-dry weight)
PPFF	Other perennial forbs	2-10**
SPAM2	Desert globemallow	
ASER	Desert milkweed	
EUPO3	Sandmat	
ASSU	Rush milkweed	
SAHI2	Hairy milkweed	
CUPA	Coyote melon	
AAFF	Other annual forbs	T-10
MAGL3	Desert dandelion	
STEXE	Small wirelettuce	
SACO6	Chia	
ESGL	Desert goldpoppy	
DAWR	Sacred datura	
MIBI	Bigelow monkeyflower	

** Allow no more than 2 percent of each species of this group, and no more than 10 percent in aggregate

c. Approximate ground cover (basal and crown) is 5 to 15 percent.

d. The historical plant community will produce approximately the following amounts of air-dry herbage per acre:

Estimated Total Annual Production	
	Air-Dry Weight lbs./acre
Favorable Years	500
Normal Years	350
Unfavorable Years	200

e. Ecological dynamics: Surface disturbance may reduce plant cover, density and diversity of this site. These changes can be very subtle or extremely obvious depending on the intensity of use, rate of use and an assortment of environmental factors (topography, soil type). Short-lived perennials as well as the long-lived perennials such as creosotebush, white bursage and catclaw acacia may decrease in cover. Species likely to invade this site include saltcedar and non-native annual grasses and forbs such as schismus, red brome, red-stem filaree and Russian thistle.

f. Major plant community types:

Mojave Wash Scrub--The historic site potential is a diverse community with an open canopy of shrubs and scattered trees. Perennial grasses and forbs are common. Annuals are seasonally present and are abundant in years of above average precipitation. This site is inherently unstable due to the occurrence and frequency of flooding.

g. Plant Growth Curve

Growth Curve Number--CA3011

Growth Curve Name--White burrobush

Description: Growth starts in early spring; flowering and seed set occur by June. Plants go dormant as a result of drought stress. New twig and leaf growth is initiated after summer and winter rains.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	25	30	20	10	0	5	5	0	0	0

Growth Curve Number--CA3015

Growth Curve Name--Creosotebush

Description: Growth starts in early spring, flowering and seed set occur by July. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some vegetation may break dormancy and produce a flush of growth.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	30	20	10	0	10	5	0	0	0

Growth Curve Number--AZ3091

Growth Curve Name--Catclaw acacia

Description: Greens up in spring; flowers in May and June; pods mature between July and September.

Percent of total production per month:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	15	10	15	30	15	10	0	0

4. Site Documentation

a. Principal sites that commonly occur in association with this potential plant community include:

(030XB131CA) Moist Granitic Drain

(030XB005NV) Limy 5-7" P.Z.

(030XB103NV) Granitic Drain 5-7" P.Z.

(030XB001NV) Limy Hill 5-7" P.Z.

(030XB077NV) Steep South Slope

b. Competing sites (and their differentiae) which are similar to this potential plant community:

(030XB128CA) Cobbly Wash [HYEM-ACGR dominant shrubs]

(030XB050NV) Dry Wash [ATPO important shrub; less productive]

(030XB136CA) Dry Wash [SEAR8 important shrub; less productive]

(030XB149CA) Gravelly Wash [More productive site; ACGR absent]

(030XB103NV) Granitic Drain 5-7" P.Z. [PSSP3 dominant species]

(030XB131CA) Moist Granitic Drain [CHLI2-PSSP3 dominant species; more productive site]

c. This ecological site description is based on the following documentation:

Sampling technique

 9 NV-ECS-1

 SCS-Range 417

 2 Other

5. Soils

a. The soils that characterize this site are very deep and excessively drained soils. They are formed in mixed alluvium. Surface textures are extremely gravelly sands and loamy sands. Subsurface horizons are stratified lenses of extremely gravelly coarse sands, very gravelly coarse sands and very gravelly loamy coarse sands. Available water capacity is very low. Permeability is very rapid. Wind erosion hazard is negligible due to surface rock fragments. Effective rooting depth is 60 inches or more. Water tables are greater than 60 inches. This

site is subject to frequent flooding.

Representative Soil Map Units	
292	Arizo association, 2-4 percent slopes
294	Arizo complex, 2-4 percent slopes
310	Carrizo association, 2-4 percent slopes, frequently flooded
316	Carrizo-Carrizo warm association 2-4 percent slopes, frequently flooded

6. Wildlife Communities

- a. Mammals commonly occurring on this site include white-tailed antelope squirrels, long-tailed pocket mice, Merriam's kangaroo rats, cactus and canyon mice, coyotes and black-tailed jackrabbits.
- b. Reptiles commonly occurring on this site include lizards such as the zebra-tailed, desert horned, desert spiny, long-tailed, side-blotched and western whiptail. Speckled rattlesnakes and coachwhips may also occur. Desert tortoises frequently den in the banks and berms of washes and feed on vegetation occurring in the wash.
- c. Birds common to this site include mourning dove, Costa's hummingbirds, verdins, black-tailed gnatcatchers, Northern mockingbirds, phainopeplas, lesser goldfinches, house finches and Brewer's and white-crowned sparrows. Raptors that occur include red-tailed hawks and prairie falcons. Catclaw acacia's spiny branches provide cover for numerous songbirds, and nesting habitat for verdins.

B. Ecological Site Interpretations

1. Livestock Grazing

- a. Season of Use--Other Mgt. Considerations: This site has low value for livestock grazing due to low productivity. White burrobush seeds are readily eaten by domestic sheep. Creosotebush is unpalatable to livestock. Catclaw acacia is considered poor forage for livestock. It may be browsed in the early spring when twigs are green but is otherwise seldom eaten. Annual forbs and grasses provide abundant forage during favorable years.
- b. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made.

	Pounds/acre	
	air dry	AUM/AC AC/AUM
Normal Years	350	

2. General Management Considerations

a. Military Operations--Vehicle use in washes may alter the vegetation, and channel morphology. This may result in increased peak flows, accelerated erosion, soil blowing and barren areas. The frequency of flash flooding may also increase with increased surface runoff and loss of vegetative cover. Channel width and depth will also increase. Gully stabilization methods include straw bale checkdams, rock riprap and sand bags. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover.

3. Ecosystem Management

- a. Wildlife Habitat--Dry washes are known to be zones of high animal activity in the desert. An abundance of insects attracts both birds and mammals to the wash. The occurrence of taller statured shrubs also provide wildlife cover, thus the washes serve as wildlife corridors. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Restore channel morphology where impacted. Water developments would also increase the species diversity of this site.
- b. Revegetation of Disturbed Areas--Species indigenous to this site are recommended for any revegetation efforts.

White burrobush is a short-lived species, although the seeds have high viability and germination rates compared to other desert shrubs. Creosotebush, is a long-lived species, which once established may improve the site for annuals that grow under its canopy by trapping fine soil, organic matter and seeds. Creosotebush can be used for long-term stabilization and for improvement of desert tortoise habitat. Catclaw acacia has shown varying success when transplanted onto disturbed sites. Seedlings should be grown in tall containers to allow for the development of a deep root system.

Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall

has been sparse. Summer annuals and non-native plants should be removed from around the transplanted shrubs to reduce competition for water. Protection from rodents is also recommended.

4. Watershed

- a. Runoff is very low and low. Hydrologic soil group A--soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained to excessively drained sands or gravel. Hydrologic conditions: good--greater than 70 percent ground cover (includes litter, grass and brush overstory); fair--30 to 70 percent ground cover; poor--less than 30 percent ground cover.

Soil Series	Hydrologic Group	Hydrologic Conditions & Runoff Curves		
		Good	Fair	Poor
Arizo	A	49	55	63
Carrizo	A	49	55	63

5. Poisonous Plants and/or Non-native Plants

- a. Non-native plants occurring on this site include red-stem filaree, *Erodium cicutarium*; red brome, *Bromus rubens*; Russian thistle, *Salsola tragus*; and schismus, *Schismus barbatus*. Saltcedar, *Tamarix ramosissima* occurs in scattered localities.

6. Recreation and Aesthetics

- a. This site is valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs provide spectacular displays especially in years with above average precipitation.

7. Threatened and Endangered Plants and Animals

- a. Planners will refer to state and federal lists of endangered species. Management recommendations will address impacts on endangered species and their critical habitats (refer to Endangered Species Policy and California Endangered Species Handbook).
 - Gopherus agassizii*--Desert Tortoise
Federal and State threatened
 - Escobaria vivipara var. alversonii*--Foxtail cactus
Federal candidate
 - Linanthus arenicola*--Sand linanthus
Rare in California, common elsewhere
 - Castela emoryi*--Crucifixion thorn
Rare in California, common elsewhere
 - Cynanchum utahense*--Utah vine milkweed
Species of limited distribution

8. Fire

- a. This site is usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. White burrobush establishes quickly after fire via off-site seeds and sprouting. Creosotebush possesses limited sprouting ability, thus, can be killed by fire. Catclaw acacia is able to sprout from the root crown following top-kill by fire.

9. Typical Site Location

SE1/4 Sec. 29, T7N R7E;
 Approximately seven miles southwest of Ludlow, CA
 Lavic Lake Quadrangle
 UTM 11S 0567400e 3835820n (Datum=NAS-C)
 San Bernardino Co., CA

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Index of Ecological Sites

<i><u>Site#</u></i>	<i><u>Site Name</u></i>	<i><u>Habitat Type</u></i>
030XY047NV	Alluvial Plain	ATPO/ACHY
030XB128CA	Cobbly Wash	HYEM-ACGR/PLRI3
030XB092NV	Desert Patina	LATR2
030XB136CA	Dry Wash	HYSA-LATR2/PLRI3
030XY154CA	Dune 3-5" P.Z.	PRGLT-ATCA2/ACHY
030XB103NV	Granitic Drain 5-7" P.Z.	PSSP3-ACGR
030XB137CA	Granitic Loam 3-5" P.Z.	AMDU2/PLRI3
030XB099NV	Gravelly Ridge 5-7" P.Z.	ENFA-AMDU2
030XY129CA	Gypsic Flat 3-5" P.Z.	SUMO-ATPO
030XB130CA	Lava Flow 3-5 P.Z.	ATHY-AMDU2
030XB019NV	Limy 3-5" P.Z.	LATR2-AMDU2/PLRI3
030XB005NV	Limy 5-7" P.Z.	AMDU2-LATR2/PLRI3
030XB017NV	Limy Hill 3-5" P.Z.	LATR2
030XB001NV	Limy Hill 5-7" P.Z.	AMDU2-LATR2/PLRI3
030XB153CA	Loamy Hill 5-7" P.Z.	ATCO-AMDU2/PLRI3
030XB131CA	Moist Granitic Drain	CHLI2-PSSP3
030XY046NV	Outwash Plain	ATPO-AMDU2/ACHY
030XY132CA	Saline Flat 3-5" P.Z.	ALOC2-SUMO
030XB152CA	Saline Hill 3-5" P.Z.	ATHY-AMDU2/ACSP12
030XB150CA	Sandhill 3-5" P.Z.	LATR2/PLRI3
030XB148CA	Sandy Plain 3-5" P.Z.	LATR2/PLRI3
030XB151CA	Shallow Gravelly Loam 5-7" P.Z.	CORA-MESP2/PLR13-ACSP12
030XY127CA	Sodic Dune 3-5" P.Z.	ATCA2-SUMO
030XY133CA	Sodic Sand 3-5" P.Z.	ATCA2-LATR2
030XB077NV	Steep South Slope	ENFA/PLRI3
030XB145CA	Valley Wash	HYSA-LATR2/PLRI3

Table 20.—Listing of Point Data
(Absence of data means data not recorded)

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
144	11-001	95/03/07			030xb137ca	
407	11-003	95/03/07	555812	3839467		
407	11-003	95/03/07	555812	3839467		
407	11-004	95/03/07				
120	11-005	98/07/01	554795	3840036	030xb017nv	
297	11-006	98/07/01	553960	3840563	030xb005nv	
120	11-007	98/07/01	553973	3841117	030xb019nv	
297	11-008	98/07/01	556658	3841397	030xb005nv	
297	11-009	98/07/01	556791	3841284	030xb005nv	
297	11-010	98/07/01	557007	3841173	030xb005nv	
292	11-173	95/03/05	553561	3842232	030xb005nv	
297	11-174	95/03/05	551239	3839808	030xb005nv	
297	11-175	95/03/05			030xb005nv	
144	11-343		554936	3842235	030xb137ca	
407	12-001	95/03/06				
407	12-002	95/03/06	553220	3834390		
407	12-002a					
407	12-003	95/03/06			030xb001nv	
407	12-004	95/03/06	553010	3834500	030xb001nv	
121	12-006	95/03/06			030xb001nv	
419	12-008	95/03/06	550186	3838197	030xb001nv	
297	12-009	98/01/13	550095	3835859	030xb005nv	veg data #12-4
407	12-010		550812	3836218		
407	12-011	98/01/12	550779	3836164		
293	12-014	94/03/28	553960	3838680	030xb092nv	
293	12-015	94/05/30	554030	3839050	030xb092nv	
297	12-016a	94/03/29	551160	3832600	030xb092nv	
121	12-016b	94/05/06	551100	3832600	030xb092nv	
407	12-017	98/09/17	554365	3831561	030xb077nv	veg data #3-12
407	12-018	98/09/17	554382	3831637	030xb001nv	veg data #4-12
190	12-019	98/10/06	545978	3837386	030xb151ca	veg data #12-2
190	12-020	98/10/06	546330	3837015	030xb151ca	Lavabed TL; veg data #6-12
190	12-021	98/10/06	546010	3837580	030xb151ca	
190	12-022	98/10/06	546010	3837629	030xb151ca	veg data
297	12-176	95/03/05	550650	3835270	030xb005nv	veg data #12-3
297	12-177	95/03/05			030xb017nv	
297	12-178	95/03/05	551129	3833740	030xb005nv	
121	12-179	95/03/05	549712	3834013	030xb019nv	
297	12-180	95/03/06	550468	3833870		
297	12-181	95/03/06			030xb019nv	
297	12-182	95/03/06	550686	3835807		
190	12-361	97/08/03	545512	3837842	030xb151ca	
121	13-001	95/03/06			030xb005nv	
121	13-002a	95/03/06	554244	3830076	030xb019nv	
121	13-004	95/03/06			030xb005nv	
270	13-005	98/06/23	548985	3827387	030xb005nv	
120	13-006	98/07/23	550194	3826266	030xb001nv	
131	13-007	98/09/15	551978	3826199	030xb017nv	
131	13-008	98/09/15	551991	3826304	030xb001nv	
407	13-009	98/09/15	553268	3826006	030xb001nv	
407	13-010	98/09/15	553331	3825976	030xb077nv	
406	13-011	98/09/15	548272	3831143	030xb001nv	
406	13-012	98/09/15	548637	3831248	030xb001nv	
121	13-013	98/09/17	554520	3830840	030xb001nv	veg data #4-13
274	13-196	95/03/30	554444	3829876	030xb019nv	
121	13-213	95/03/06	554190	3830140	030xb019nv	
406	13-380	97/10/06	556930	3827364	030xb017nv	veg data #1-13
223	14-001	97/12/28	554778	3822360	030xb017nv	
223	14-002	98/01/16	555359	3822798	030xb092nv	
295	14-003	97/12/25	550013	3821373	030xb005nv	
295	14-004	97/12/25	550191	3820898	030xb019nv	
223	14-006	98/01/14	554925	3822941	030xb001nv	
223	14-007	98/01/14	551313	3822643	030xb137ca	
107	14-008	98/07/23	555562	3819618	030xb005nv	veg data #2-14
107	14-009	98/07/23	554782	3819028	030xb137ca	veg data #3-14
107	14-010	98/07/23	554192	3821622	030xb137ca	

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
274	14-349	97/01/09			030xb092nv	veg data #4-14
295	14-352	97/01/13	549903	3822256		
107	14-359	97/02/08	553693	3820723	030xb137ca	
107	14-365		553865	3820770	030xb137ca	
416	15-001	98/09/02	554988	3816205	030xb001nv	veg data #3-15
416	15-002	98/09/02	554988	3816083	030xb077nv	veg data #4-15
361	16-001	98/05/29	556513	3805222	030xb005nv	
361	16-002	98/05/29	555133	3803436	030xb005nv	
180	16-003	98/07/21	556742	3809394	030xy046nv	
270	16-004	94/05/11	556908	3807730	030xb0	
180	16-350	97/01/10	555541	3809764	030xy046nv	
297	16-351	97/01/13	554119	3810503	030xy046nv	off base
297	21-001	95/03/05	5	38	030xb0	
297	21-002	98/06/25	558096	3839588		
297	21-172	95/03/05			030xb092nv	
297	21-184	95/03/07	557755	3840176	030xb0	
210	22-001a	95/03/05	561827	3838801	030xb0	
903	22-002	95/03/05				
903	22-003	95/03/05				
270	22-004	95/03/07	558642	3832113	030xb0	
279	22-005	95/03/07	562616	3832928	030xb0	
313	22-006	94/03/07	5	38	030xb0	
279	22-007	95/03/29				
295	22-008	95/03/30	5	38	030xb0	
293	22-016a	94/03/10	534699	3866865	030xb0	
293	22-016b	94/05/04	56701	383347	030xb0	
170	22-017	97/12/19	566234	3835316	030xb0	
277	22-017	94/03/22	564289	3835467	030xb0	
170	22-018	97/12/18	566222	3835372	030xb0	
270	22-020	97/12/19	560902	3833070	030xb0	
360	22-021	97/12/19	566958	3835275	030xb0	
360	22-022	97/12/19	566853	3835116	030xb0	
360	22-023	97/12/19	567296	3834652	030xb0	
252	22-024	98/06/26	561069	3834240	030xy046nv	
400	22-025	98/09/16	565854	3836635	030xb077nv	
400	22-026	98/09/16	565891	3836835	030xb001nv	veg data #5-22
400	22-027	98/09/16	565966	3837172	030xb017nv	
210	22-028	98/09/16	561820	3838609	030xb130ca	veg data #2-22
210	22-029	98/09/16	561486	3838597	030xb130ca	veg data #7-22
210	22-030	98/09/16	561386	3838429	030xb130ca	Kentonmill TL;veg data #8-22
145	22-031	98/09/16	557541	3836941	030xb017nv	
145	22-032	98/09/16	557491	3836391	030xb077nv	veg data #9-22
170	22-033	98/10/13	565956	3835262	030xb005nv	
170	22-034	98/10/13	556329	3834932	030xb005nv	
170	22-035	98/10/13	564593	3835240	030xb005nv	
297	22-171	95/03/05	558495	3838654	030xb005nv	Olympus mp
313	22-186	95/03/07	5	38	030xb0	
252	22-187	95/03/07	562963	3836358	030xb0	
252	22-188	95/03/07	560396	3834172	030xb0	
170	22-191	95/03/29	564219	3835441	030xb019nv	
252	22-192	95/03/27	562367	3835768	030xb0	
279	22-193	95/08/27	562835	3834795	030xb0	
276	22-194	95/03/28	565519	3831757	030xb0	
295	22-197	95/03/21	50	38	030xb0	
295	22-198	95/03/30	566044	3836455	030xb0	
	22-291	95/03/29	564219	3835419	030xb0	
279	23-001	98/01/05			030xb005nv	veg data #23-1
407	23-002	98/06/24	2566450	3825922	030xb017nv	
407	23-003	98/06/24	566081	3826233	030xb017nv	
276	23-004	98/06/25	566053	3830686	030xb092nv	veg data #2-23
276	23-005	98/08/27	557440	3825892	030xb092nv	veg data #3-23
130	23-006	98/10/17	565490	3828958	030xb001nv	veg data #4-23
130	23-007	98/09/17	565123	3828869	030xb017nv	veg data #5-23
274	23-010	94/03/09				
121	24-001	98/01/13	558784	3823010	030xb0	
223	24-002	97/12/17	558598	3821695	030xb092nv	

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
223	24-003	97/12/17	558753	3821624	030xb017nv	
223	24-004	98/01/15	559236	3821527	030xb0	
223	24-005	98/01/15	559214	3821489	030xb017nv	
223	24-007	98/01/16	558260	3821877	030xb092nv	
223	24-008	98/05/27	558595	3821634	030xb017nv	
223	24-009	98/05/27	558422	3821615	030xb017nv	
223	24-010	98/01/15	558267	3821661	030xb017nv	
223	24-011	98/05/27	558075	3821439	030xb017nv	Gayspass TL
121	24-012	98/08/27	558998	3823313	030xb092nv	
121	24-013	98/08/27	558923	3823454	030xb005nv	
121	24-015	98/05/27	559026	3819276	030xb001nv	
230	24-016	98/05/27	559566	3819893	030xb005nv	
121	24-017	98/01/12	558976	3819132	030xb0	
121	24-018	98/01/03	558989	3819120	030xb017nv	
121	24-019	98/01/12	559022	3818915	030xb0	
403	24-020	98/06/24	567038	3823720	030xb153ca	Upspring var;veg data #24-2
403	24-021	98/06/24	569941	3823993	030xb153ca	
403	24-022	98/06/24	569941	3823993	030xb153ca	
403	24-023	98/06/24	566913	3823986	030xb153ca	
403	24-024	98/06/24	567187	3822781	030xb153ca	veg data #24-3
274	24-025	98/08/17	561462	3821023	030xb019nv	
295	24-026	98/08/26	562533	3817553	030xb005nv	
295	24-027	98/08/25	563925	3817908	030xb005nv	
121	24-028	98/08/27	559182	3823743	030xb005nv	
121	24-342	97/01/02	558673	3822828	030xb0	
279	25-004	97/11/28	565722	3802232	030xb005nv	
231	25-005	98/08/03	566884	3812323	030xb019nv	
231	25-006	98/08/03	566582	3812459	030xb019nv	
292	25-007	98/01/05	558010	3813210	030xb0	
278	25-008	98/01/17	560498	3813992	030xb092nv	
278	25-009	98/01/17	560243	3813793	030xb0	
120	25-010	98/06/23	564782	3815886	030xb017nv	
295	25-011	98/06/23	565623	3814478	030xb005nv	Hypoint mp
295	25-012	98/06/23	565941	3817104	030xb019nv	
231	25-013	98/08/02	568060	3811659	030xb092nv	
279	25-014	98/08/02	565758	3812337	030xb005nv	
278	25-015	98/08/26	56319	381135	030xb005nv	
365	25-016	98/08/26	564005	3814506	030xb005nv	Gravesumit mp
365	25-346		564432	3814733	030xb005nv	veg data #2-25
295	25-385	97/11/26	56218	3813794	030xb0	
365	25-386	97/11/26	565112	3813166	030xb005nv	
279	25-387	97/11/27	5	38	030xb005nv	
901	26-001	98/01/06	557691	3809662	030xb0	
901	26-002	98/01/06	557560	3809849	030xb0	
901	26-003	98/01/06	557406	3809862	030xb0	
278	26-004	98/01/13	561911	3808866	030xb0	
180	26-005	98/01/09	558332	3809313	030xb0	
361	26-006	98/05/28	559735	3804889	030xb005nv	
361	26-007	98/05/28	559446	3806135	030xb005nv	
361	26-008	98/05/28	558265	3806092	030xb005nv	
120	26-009	98/07/21	565830	3805523	030xb0	
105	26-010	98/07/21	560408	3811145	030xb137ca	
231	26-011	98/08/25	568196	3809924	030xb005nv	
230	26-012	98/08/25	567240	3806200	030xb005nv	veg data #2-26
230	26-013	98/08/25	568571	3805143	030xb005nv	
105	26-014	98/09/02	560480	3810078	030xb137ca	
105	26-015	98/09/02	560706	3809770	030xb137ca	
105	26-016	98/09/02	561405	3808316	030xb005nv	
205	27-001	98/05/26	561396	3801526	030xb137ca	
205	27-002	98/05/26	561280	3802184	030xb148ca	
205	27-003	98/08/29	559345	3801815	030xb137ca	
205	27-004	94/02/28	564233	3802802	030xb0	
105	27-005	98/07/07	567741	3802395	030xb137ca	
205	27-053	95/01/02			030xb0	
231	27-056a	95/02/14	566182	3796202	030xb0	
231	27-058	95/02/14	566120	3796268	030xb005nv	Calcio TL;veg data #3-27

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
231	27-069	95/03/12	566222	3796380	030xb005nv	
231	27-122	95/02/20			030xb019nv	
230	27-123	95/02/20			030xb0	
231	27-124	95/02/21	560682	3848244	030xb019nv	
231	27-125	95/02/21			030xb0	
361	27-126	95/02/23	560229	3798084	030xb005nv	production;v.t.3;old Goatjoe
361	27-127	95/02/23	559648	3797953	030xb0	
361	27-131	95/02/23			030xb005nv	
205	27-143	95/03/21	559641	3802628	030xb0	
205	27-147	95/03/22	563595	3800283	030xb137ca	
205	27-148	95/03/22	564131	3800842	030xb148ca	Pipeflat TL;production & veg data #27-5
205	27-149	95/03/22	564692	3801485	030xb148ca	
205	27-150	95/03/22	564355	3802319	030xb148ca	
205	27-151	95/03/21	559640	3802238	030xb150ca	veg data #2-27
361	27-153	96/10/04				
	27-154	96/10/04				
	27-202	95/06/15		380059	030xb0	
230	27-205	95/07/10	563217	3798623	030xb005nv	old Edalph loc
231	27-209	95/07/26	565332	3798283	030xb0	
205	27-258	96/02/16	561227	3802193	030xb148ca	
205	27-259	96/03/06	562418	3800711	030xb137ca	production & veg data #27-2-3
205	27-260	96/03/06	561177	3801179	030xb0	
231	27-355	97/01/31	562792	3798357	030xb0	
230	27-356	97/02/07	562790	3798361	030xb0	
103	28-001	98/03/30	563671	3792914	030xb137ca	production
103	28-002	98/03/30	564368	3792393	030xb137ca	
203	28-010	95/04/03			030xb019nv	
203	28-011	95/04/03			030xb005nv	
100	28-012	95/04/03	566511	3791333	030xb137ca	
103	28-013	95/04/03	565601	3791222	030xb137ca	
103	28-014	94/03/21	566233	3796427	030xb005nv	
103	28-014		5650	37911	030xb137ca	
103	28-015	95/04/03			030xb019nv	
103	28-016	95/04/04			030xb019nv	
203	28-017	95/04/04			030xb019nv	
372	28-018	95/04/05	563408	3793638	030xb137ca	
103	28-019	98/04/24			030xb005nv	production
231	28-058	95/02/14	566120	3796268	030xb005nv	
372	28-064	95/07/25	576162	3796420	030xb005nv	
203	28-129	95/02/24	567484	3791287	030xb005nv	
103	28-130	95/02/24	591109	3764619	030xb005nv	
103	28-131	95/02/24	564540	3791984	030xb137ca	veg data #2-28
103	28-132	95/02/24	592201	3762040	030xb005nv	
100	28-133	95/02/24	561423	3792936	030xb137ca	veg data #2-28
200	28-137	95/03/16			030xb019nv	
200	28-138	95/03/15			030xb019nv	
203	28-139	95/03/16	568101	3792043	030xb005nv	
203	28-140	95/03/16	567804	3791400	030xb005nv	Desfirex TL;production & veg data #1-28
103	28-208	95/07/21	562912	3794946	030xb005nv	
372	28-211	95/03/15	563013	3794942	030xb005nv	
360	32-001	98/07/02	569970	3834010	030xb019nv	
360	32-002	98/07/02	571012	3834658	030xb005nv	
360	32-003	98/07/02	570856	3834898	030xb019nv	
360	32-004	98/07/01	570912	3833922	030xb005nv	
130	33-001	95/03/31	569543	3825697	030xb017nv	
130	33-002	98/05/06	573249	3825345	030xb019nv	veg data #2-33
130	33-003	98/05/06	573320	3825213	030xb017nv	
130	33-004	98/05/06	571255	3829366	030xb017nv	Owlshead mp
130	33-005	98/05/06	571206	3829411	030xb001nv	veg data #3-33
142	33-006	98/09/18	578145	3826623	030xb077nv	
142	33-007	98/09/18	578616	3826443	030xb001nv	
142	33-008	98/09/18	578070	3826262	030xb017nv	
130	33-056	94/12/26	571543	3829580	030xb092nv	veg data #1-33
130	33-270	96/07/15	569543	3825705	030xb017nv	veg data #33-1

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
130	33-271	96/07/15	570031	3825948	030xb017nv	veg data #33-2
279	33-279	96/07/17	576991	3826736	030xb005nv	veg data #33-3
279	33-281	96/07/17	577075	3826005	030xb019nv	
142	33-9	98/09/18	577335	3826489	030xb017nv	
290	34-001	98/05/05	577441	3821779	030xb019nv	Tonopah mp;veg data #34-5
290	34-002	98/05/05	577479	3821720	030xb019nv	
290	34-003	98/05/05	577175	3821601	030xb019nv	
290	34-004	98/05/19	577246	3821725	030xb019nv	
293	34-005	98/05/19	576542	3822582	030xb019nv	
293	34-006	98/05/19	578501	3824330	030xb092nv	
130	34-007	98/08/28	574885	3823212	030xb017nv	
293	34-008	98/08/28	577465	3823784	030xb019nv	
407	34-009	98/09/10	574928	3819335	030xb001nv	
407	34-010	98/09/10	575220	3818644	030xb001nv	
293	34-017	94/03/30	57501	382399		
279	34-059	95/02/15	575178	3828140		
131	34-272					
293	34-273	96/07/16	574726	3823810	030xb092nv	veg data #2-34
293	34-274	96/07/16	575303	3828039	030xb092nv	veg data #1-34
293	34-275	96/07/16	575539	3824276		
293	34-277	96/07/16				
293	34-278	96/07/17	575483	3824090		
407	34-381	97/10/08	573684	3821817		
120	35-001	98/07/22	571445	3811618	030xb017nv	veg data #10-35
401	35-002	98/07/22	571839	3813990	030xb019nv	
295	35-003	98/07/22	572202	3813042	030xb019nv	
130	35-004	98/09/10	580070	3812072	030xb017nv	
270	35-005	98/09/10	578825	3815954	030xb005nv	
406	35-006	98/09/10	579078	3816019	030xb001nv	
406	35-007	98/09/10	579143	3815916	030xb001nv	
406	35-008	98/09/10	579079	3815749	030xb001nv	
401	35-018	94/05/01	571460	3816200	030xb019nv	
416	35-221	95/12/18	573614	3813792	030xb001nv	
416	35-222	95/12/18	573614	3813711	030xb001nv	veg data #8-35
416	35-224	95/12/18	573627	3813644	030xb001nv	
416	35-225	95/12/18			030xb017nv	
416	35-226	95/12/18			030xb017nv	
416	35-227	95/12/19	573601	3813782	030xb001nv	
423	35-232	95/12/20			030xb017nv	veg data #35-8
295	35-235	95/12/28	573908	3814016	030xb092nv	
274	35-237	95/12/29	574000	3814200		
406	35-238	95/12/29	574017	3814212		
406	35-239	96/01/03	575300	3815800	030xb017nv	Haleburu mp ;veg data #35-9
406	35-242	95/10/04	573684	3813757	030xb017nv	veg data #35-7
423	35-243	96/01/04	576299	3815755	030xb017nv	veg data #35-2
423	35-246a	96/01/08	576975	3815551		
406	35-246b	96/01/09	576900	3813100		
406	35-247	96/01/09				
406	35-250	96/01/10	578600	3814500	030xb001nv	veg data #35-4
406	35-251	96/01/09	578600	3813500	030xb001nv	
406	35-382	97/10/08	573945	3816939	030xb017nv	
110	36-001	98/03/04	577784	3804310	030xb150ca	
110	36-002	98/03/04	577575	3804495	030xb150ca	veg data #36-3
120	36-003	98/07/08	575090	3804948	030xb017nv	
120	36-004	98/07/08	574855	3804233	030xb017nv	
272	36-005	98/07/08	573697	3808850	030xb131nv	veg data #4-36
120	36-006	98/07/22	571064	3809640	030xb017nv	veg data #3-36
231	36-007	98/08/25	569351	3840705	030xb005nv	
416	36-202	95/04/30	579414	3807428	030xb077nv	
416	36-203	95/04/30	579311	3807424	030xb077nv	
416	36-240	96/01/03	579301	3807232	030xb077nv	
416	36-241	96/01/03	579401	3807282	030xb077nv	
416	36-242	96/01/03	579393	3807289	030xb077nv	
231	36-254	96/02/06	570793	3808541	030xb137ca	
120	36-255	96/02/06	572800	3808400	030xb017nv	
230	36-256	96/02/07	570818	3804240	030xb005nv	veg data #36-2

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
120	36-300	96/09/27	572068	3809260	030xb017nv	
120	36-301	96/09/27	572088	3809208	030xb017nv	
151	37-001	95/04/12			030xy133ca	veg data #5-37
110	37-002	98/03/04	579028	3803348	030xb150ca	*production & veg data #3-37
110	37-003	98/03/04	579844	3803367	030xb150ca	
230	37-004	98/07/07	569165	3802548	030xb005nv	Edalph TL
230	37-005	98/07/07	571164	3800697	030xb005nv	
361	37-006	98/07/07	572853	3800001	030xb005nv	
107	37-007	98/07/08	574073	3899546	030xb137ca	
120	37-008	98/07/09	573427	3803590	030xb017nv	
237	37-021	95/02/28			030xb137ca	
151	37-025	95/03/22	578500	3797940	030xy133ca	
151	37-026	95/03/22			030xb004nv	
151	37-027	95/03/22			030xy045nv	veg data #6-37
230	37-049	94/11/28	570324	3798748	030xb019nv	
230	37-050	95/09/16	570931	3798545	030xb005nv	production & veg data #1-37
230	37-051	95/12/01	571922	3798737	030xb005nv	
230	37-052	94/12/07	573333	3798716	030xb137ca	
298	37-055	95/01/18	573300	3798707	030xb103nv	
	37-066	95/03/16	577340	3796960	030xb137ca	
	37-067	95/03/02	576727	3796168	030xb137ca	
203	37-068	95/03/12	576740	3796970	030xb019nv	
107	37-072	95/03/18	577370	3797680	030xb137ca	veg data #2-37,#37-1
110	37-073	95/03/21	577850	3797550	030xb150ca	veg data #37-2
151	37-074	95/03/21	578480	3797740	030xb047nv	
151	37-075	95/04/04	578316	3797523	030xb046nv	
151	37-076	95/04/04	578298	3797297	030xb137ca	
903	37-077	95/04/05	579376	3798133		barren
903	37-078	97/04/06	579240	3798007		barren
107	37-080	95/03/27	577023	3799544	030xb137ca	
107	37-081	95/03/28	575001	3799012	030xb137ca	
107	37-082	95/03/28	577322	3798898	030xb137ca	
237	37-121	95/02/20			030xb005nv	
903	37-199	95/05/16	578375	3799541	030xy046nv	
296	37-200	95/05/25	577949	3800543	030xy046nv	veg data #4-37
420	37-202	95/06/15	055805	380059		
230	37-251		574344		030xy046nv	
361	37-252	96/02/05	571984	3801810	030xb103nv	*production & veg data #37-3
237	37-257	96/02/16	570221	3800342	030xb103nv	
	38-00	95/02/08			030xb005nv	
200	38-001	94/02/22	590629	3780389	030xb019nv	
200	38-002	95/02/08			030xb005nv	
200	38-002	94/06/23	572916	3794557	030xb019nv	
	38-005	95/02/08			030xb005nv	
	38-005	94/03/01	566539	3794960		
	38-006	94/03/02	570808	3796521		
	38-007	94/03/02	569581	3794619	030xb137ca	
	38-007	95/02/08				
203	38-008	95/02/09			030xb005nv	
	38-009	95/02/08			030xb005nv	
200	38-011	95/02/17	592054	3774764	030xb005nv	
	38-012	95/02/25			030xb005nv	
200	38-012	94/04/18	572885	3794583	030xb005nv	
	38-013	95/02/25			030xb137ca	
203	38-019	94/05/02	577422	3795853	030xb005nv	veg data #38-7
100	38-020	94/10/03	570640	3794230	030xb137ca	production & veg data #38-2
203	38-021	94/06/17	574411	3795854	030xb005nv	Narea TL;production
200	38-022	94/08/03	572938	3794588	030xb019nv	
203	38-023	95/03/16			030xb005nv	
203	38-023	94/08/04	572999	3794512	030xb019nv	
200	38-024	94/08/15	573323	3793822	030xb005nv	
200	38-025	94/08/18	572718	3793374	030xb019nv	Macagce TL;production & veg data #38-4
203	38-026	94/08/18	574076	3794936	030xb019nv	veg data #38-9
200	38-027	94/10/20	572718	3793374	030xb019nv	veg data #38-5
203	38-028	94/08/22			030xb005nv	

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
206	38-029	94/08/23	574070	3794906	030xb005nv	
200	38-030	95/04/03			030xb005nv	
	38-031	94/08/30	572867	3795557	030xb137ca	
202	38-031a	95/04/03			030xb145ca	
	38-032	95/04/03			030xb137ca	
	38-032	94/09/06	575248	3796826	030xb137ca	
	38-033	94/09/07	574755	3794674	030xb005nv	
	38-034	94/09/08	573712	3795659	030xb019nv	
332	38-034a	95/04/03			030xb137ca	
237	38-035	94/09/12	573710	3795667	030xb137ca	veg data #38-6
200	38-036	94/09/12	573270	3793379	030xb137ca	
203	38-037	94/09/13	574638	3796122	030xb005nv	
203	38-037	95/04/06	580699	3794790		
151	38-038	95/04/06	580157	3794845	030xb137ca	
160	38-039	95/04/11	571439	3795079	030xy045nv	Bluepoint mp
203	38-040	94/09/15	574639	3795304	030xb005nv	
	38-042	94/09/17	574787	3796505	030xb005nv	
	38-043	94/09/19	572408	3793635	030xb005nv	
	38-044	94/09/20	572235	3793465	030xb019nv	
	38-045	94/09/21	573206	3792700	030xb019nv	
200	38-046	94/09/22	573381	3793046	030xb005nv	
	38-047	94/09/22	569501	3793257		
200	38-048	98/10/07	579789	3891744	030xb019nv	calcio
200	38-049	98/10/07	578658	3893238	030xb019nv	edalph
200	38-050	98/10/07	577396	3892255	030xb019nv	calcio
203	38-054	95/11/18	574006	3794903		
203	38-059	95/02/17	575768	3793565	030xb005nv	veg data #38-3
203	38-060	95/02/17	537715	3796120	030xb005nv	
203	38-062	95/02/27	576940	3796360	030xb005nv	
200	38-063	95/02/27	576280	3796160	030xb005nv	
200	38-064	95/02/27	576200	3796220		
	38-065	95/03/01	575540	3794400	030xb019nv	
203	38-069	95/03/15	577180	3796050	030xb005nv	
203	38-070	95/03/15	577180	3796110	030xb005nv	
203	38-071	95/03/15	577160	3796120	030xb005nv	
203	38-078	95/04/04	579278	3795149	030xb005nv	
203	38-079	98/04/22	578503	3790352	030xb005nv	
203	38-110	95/11/10	571023	3794048	030xb103nv	
298	38-111	95/11/10	572038	3795044	030xb103nv	
100	38-112	95/11/10	572283	3795192	030xb103nv	
200	38-113	95/11/11	571542	3794581	030xb103nv	
100	38-114	95/11/11	571192	3794523	030xb103nv	
298	38-115	95/11/11	572286	3795122	030xb103nv	
200	38-128	95/02/24	593633	3769664	030xb005nv	
200	38-134	95/03/14	570263	3794214	030xb005nv	
200	38-135	95/03/14	569068	3793099	030xb005nv	
	38-206	95/07/17	576041	3795463	030xb005nv	
203	38-207	95/07/20	575093	3795983	030xb005nv	
298	38-210	95/08/02	573324	3795990	030xb103nv	
314	43-001	98/10/15	585594	3824522	030xb019nv	
314	43-002	98/10/15	586864	3825443	030xb019nv	
141	44-001	97/12/30	582285	3820910	030xb077nv	
142	44-002	97/12/30	582265	3820895	030xb077nv	
141	44-003	97/12/30	582300	3820891	030xb077nv	
313	44-004	97/12/26	584580	3820834	030xb136ca	
141	44-005	97/12/31	590526	3818368	030xb077nv	Sunrock mp
141	44-006	97/12/31	590538	3818398	030xb077nv	
141	44-007	97/12/31	590650	3818372		
315	44-008	98/01/06	591477	3820920	030xb092nv	
315	44-009	98/01/13	590689	3821652	030xb092nv	
315	44-010	98/01/13	590689			
313	44-011	98/03/03	582725	3821525	030xb005nv	veg data #1-44
313	44-012	98/03/03	583038	3821981	030xb005nv	veg data #1-44
315	44-014	98/03/03	581351	3822744	060xb019nv	
313	44-015	98/03/31	585020	3820534	030xb005nv	
313	44-016	98/03/31	588406	3824154	030xb019nv	veg data #10-44

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
313	44-017	98/03/31	586188	3823883	030xb019nv	
290	44-319	96/10/23	581497	3818884	030xb092nv	veg data #3-44, #4-44
290	44-320	96/10/23	581526	3818775	030xb092nv	veg data #5-44
315	44-321	96/10/25	588014	3817943	030xb092nv	veg data #8-44
315	44-322	96/10/24	587982	3818554	030xb092nv	veg data #8-44
143	44-323	96/10/24	587683	3818239	030xb017nv	veg data #6-44
143	44-324	96/11/15	581520	3818775	030xb017nv	veg data #7-44
143	44-325	96/10/24	581522	3818772	030xb017nv	
143	45-001	98/06/05	590052	3815300	030xb017nv	
406	45-002	98/06/05	591723	3814632	030xb017nv	
143	45-003	98/09/09	590212	3816570	030xb017nv	
143	45-004					
315	45-314	97/10/25	591005	3811917	030xb092nv	
315	45-315	96/10/25			030xb092nv	
315	45-316	98/08/12	590169	3812053	030xb092nv	
315	46-001	98/03/02	591762	3810799	030xb092nv	
315	46-002	98/03/02	591466	3801241	030xb092nv	
270	46-003	98/01/29	585992	3805758	030xb005nv	Arizom p; veg data #1-46
110	46-004	98/04/29	587170	3804575	030xb150nv	veg data #2-46
270	46-005	98/04/28	557707	3804747	030xb005nv	
416	46-006					
416	46-007	98/09/09	588713	3811092	030xb001nv	
416	46-008	98/10/02	546330	3837015	030xb001ca	
416	46-230	95/12/19			030xb077nv	veg data #46-1
416	46-231	95/12/19				
416	46-241	96/01/03	580541	3809081	030xb001nv	veg data #4-46
416	46-244	96/01/08	580768	3809118	030xb001nv	
416	46-245	96/01/08	5807	38004	030xb077nv	veg data #5-46
416	46-245-a	96/01/08	580555	3809188	030xb001nv	
	46-249	96/01/10	5798	38113	030xb092nv	
315	46-340	96/12/20	591383	3810451		
203	47-001	98/01/08	588515	3798809	030xb005nv	
416	47-002	98/02/12	590594	3800126	030xb077nv	
203	47-003	98/01/13	587755	3798415	030xb005nv	
203	47-004	98/02/13	587718	3798958	030xb092nv	
130	47-005	98/02/13	588023	3799811	030xb092nv	
416	47-006	98/03/04	586596	3799481	030xb077nv	veg data #2-47
416	47-007	98/03/05	586332	3799084	030xb001nv	veg data #3-47
416	47-008	98/03/05			030xb077nv	
422	47-009	98/03/05	587020	3798142	030xb001nv	veg data #4-47
422	47-010	98/03/05	586954	3798150	030xb019nv	
276	47-011	98/06/17	590783	3796911	030xb092nv	
276	47-012	98/06/17	590387	3798383	030xb019nv	
130	47-013	98/06/16	588869	3798901	030xb019nv	
203	47-014	98/06/17	588420	3798523	030xb005nv	
203	47-015	98/06/17	588540	3797384	030xb005nv	
130	47-016	98/09/10	589163	3800230	030xb001nv	
130	47-017	98/09/10	589198	3800231	030xb092nv	
416	47-219	96/12/17	584288	3803793	030xb001nv	
416	47-220	96/12/17	584011	3803843	030xb001nv	
416	47-228	95/12/19				
416	47-229	95/12/19	584194	3803576	030xb001nv	veg data #47-1
108	48-001	95/02/10	585412	3790417	030xb150ca	
108	48-002	97/12/10	582920	3791394	030xb137ca	
416	48-003	98/02/12	589947	3795881	030xb077nv	
108	48-004	98/03/17	589468	3790639	030xb137ca	veg data #4-48
110	48-005	98/04/22	582441	3793457	030xb150ca	veg data #48-3
108	48-006	98/04/22	582421	3792236	030xb137ca	veg data #1-48
108	48-007	98/04/22	584380	3791270	030xb137ca	veg data #2-48
120	48-008	98/05/13	583116	3790569	030xb001nv	
108	48-009	98/05/13	585709	3790682	030xb137ca	
420	48-010	98/05/15	587021	3790942	030xb001nv	
261	48-011	98/06/17	588862	3793869	030xb092nv	
151	48-079	95/04/04	580584	3795179		
108	48-261	95/03/26	585493	3790449	030xb005nv	
108	48-293	96/09/09	583749	3791791	030xb137ca	veg data #3-48, #48-1

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
108	48-357	97/02/09	585301	3790388		
110	48-358	97/02/09	584547	3792842	030xb148ca	
420	48-376	97/09/20	585217	3793271		
108	49-001	95/02/10				
601	49-002	95/02/10				
108	49-003	95/02/14			030xb137ca	
108	49-004	95/02/10			030xb137ca	
108	49-005	95/02/10			030xb137ca	
108	49-006	95/02/10			030xb137ca	
108	49-007	95/02/16	588700	3786000	030xb137ca	
108	49-008	95/02/16	588600	3786400	030xb137ca	
108	49-009	95/02/16			030xb137ca	
108	49-010	95/02/16				
108	49-011	95/02/16			030xb005nv	
108	49-012	95/02/16				
601	49-013	95/02/16				
108	49-014	95/02/16				
108	49-015	95/02/25				
108	49-016	95/02/25				
108	49-017	95/02/25				
108	49-018	95/02/25				
108	49-019	95/02/25				
108	49-020	95/02/25				
108	49-021	95/02/25				
601	49-022	95/04/10				
108	49-023	98/03/17	589593	3789206	030xb137ca	veg data #1-49
105	49-024	98/03/18	593046	3789531	030xb148ca	veg data #2-49
231	49-025	98/05/12	588181	3789455	030xb005nv	
903	49-026	98/05/12	586902	3785553	030xy129ca	
252	49-027	98/05/12	537588	3784741	030xb019nv	
252	49-028	98/05/12	587495	3784778	030xb046nv	
200	49-029	98/05/13	583125	3790086	030xb137ca	
108	49-030	98/05/13	5887750	3788329	030xb019nv	
601	49-031	98/05/14	587503	3786954	030xb046nv	
108	49-032	98/05/15	588074	3787229	030xb137ca	
903	49-033	98/05/15	586032	3787077		
108	49-035	98/05/23	587996	3787356	030xb005nv	
903	49-057	95/02/10	579376	3798130	barren	playa
601	49-060	95/02/16	587743	3787034		
601	49-060a	95/02/16	587792	3787092		
108	49-061	98/02/16	587797	3787001		
420	49-201	95/04/29	587646	3789507		
420	49-371	97/09/13	587869	3789496		
420	49-373	97/09/13	588011	3788900		
420	49-374	97/09/13	588492	3788701		
420	49-375	97/09/13	588441	3788748		
420	49-377	97/09/21	588223	3788877		
313	54-007	98/06/03	598902	3818795		
252	54-008	97/12/02	506010	3838186	030xy129ca	
253	54-010	97/12/03	601885	3824555	030xy129ca	veg data #54-2
252	54-011	97/12/04	603038	3824379	030xy132ca	veg data #54-1
151	54-012	97/01/23	600697	3822641	030xy133ca	Rositas mp; *production #54-3
151	54-013	97/12/23	600480	3822201	030xy046nv	production
151	54-014	98/04/01	600441	3821986	030xy046nv	
252	54-015	98/04/01	600417	3821739		
253	54-016	97/12/29	602131	3824425	030xy129ca	
253	54-017	97/12/29	602254	3824366	030xy129ca	
253	54-018	97/12/28	603227	3824458	030xy132ca	
253	54-019	98/01/21	602795	3824526	030xy132ca	
252	54-020	98/04/02	600942	3823098	030xy046nv	
252	54-022	98/01/19	599153	3824518	030xy046nv	
252	54-024	98/01/19	598031	3824522	030xy046nv	
252	54-025	98/04/02	597352	3824555	030xb019nv	
252	54-026	98/01/19	599667	3824556	030xy046nv	
313	54-027	98/04/30	598746	3820336	030xy046nv	
313	54-028	98/04/30	598020	3820793	030xb046nv	

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
313	54-029	98/04/30	595378	3821935	030xb019nv	
253	54-030	98/06/02	603338	3822869	030xb132ca	Gypboy TL;veg data #2-54
253	54-031	98/06/02	602671	3822959	030xb132ca	
313	54-307	96/10/01			030xb129ca	veg data #54-1
313	55-005	98/01/21	600910	3813970		
313	55-006	98/06/04	594067	3813833	030xb019nv	
253	55-009	98/04/02	601851	3817430	030xy129ca	
313	55-010	98/05/04	591876	3812327	030xb019nv	
120	55-012	98/06/04	593522	3815794	030xb017nv	Eastrange mp
315	55-013	98/08/12	592932	3815731	030xb092nv	
253	55-303	96/09/31	602985	3816734		veg data #54-2
252	55-304	96/10/25	603114	3811339	030xy129ca	veg data #55-2
	55-305	96/09/30	602451	3816437	030xy046nv	veg data #55-3
253	55-306	98/04/02	601762	3817324	030xy129ca	Prehoda TL;veg data #55-6
315	55-317	96/12/19			030xb092nv	
120	55-331	96/11/15	593025	3816303	030xb001nv	veg data #5-55
120	55-332	96/11/15			030xb017nv	veg data #6-55
313	56-001	98/03/02	596818	3805644	030xb092nv	
313	56-002	98/03/10	596743	3805959	030xb092nv	
313	56-003	98/05/07	594341	3807504	030xb019nv	
313	56-004	98/05/07	595297	3808211	030xb019nv	
313	56-005	98/05/07	595368	3808113	030xb019nv	
310	56-006	98/06/04	594499	3810283	030xb103nv	
310	56-007	98/06/04	595577	3809884	030xb103nv	
315	56-008	98/03/09	6033141	3809870	030xb092nv	Clegorpass TL
314	56-009	98/09/29	599037	3808580	030xb019nv	clegghorn pass like
314	56-010	98/09/29	598320	3807769	030xb019nv	carrizo
282	56-308	96/12/20	603258	3811109	030xb017nv	veg data #1-56
282	56-310	96/10/25	603357	3811171	030xb017nv	Mask TL
313	56-327	96/12/26	600837	3810689	030xb092nv	
276	57-001	98/02/10	596795	3803667	030xb005nv	
130	57-002	98/05/07	597969	3798041	030xb017nv	
274	57-003	98/05/07	598695	3799656	030xb019nv	
416	57-004	98/09/30	592872	3802370	030xb001nv	veg data #1-57
416	57-013	94/03/16	596906	3800282		
276	58-001	98/04/21	593889	3795353	030xb092nv	Twobitter mp
276	58-002	98/04/21	594930	3795560	030xb092nv	
274	58-003	98/03/12	600172	3796116	030xb019nv	
416	58-004	98/02/11	595222	3796627	030xb077nv	
274	58-005	98/03/12	601774	3796518	030xb019nv	
416	58-006	98/02/11	593408	3796471	030xb077nv	
279	58-007	98/03/18	592715	3792275	030xb005nv	
279	58-008	98/03/18	592935	3791477	030xb005nv	
261	58-009	98/03/18	593124	3790791	030xb092nv	
274	58-010	98/04/21	606368	3796671	030xb019nv	
274	58-011	98/04/21	602724	3796745	030xb019nv	
416	58-012	98/02/11	595797	3797247	030xb077nv	
140	64-001	98/09/14	606079	3822572	030xb001nv	
252	65-001	98/04/30	605373	3815105	030xy046nv	
252	65-002	98/06/03	608941	3812990	030xy046nv	Bristolake TL
416	66-001	98/04/06	612925	3806297	030xb077nv	
313	66-002	98/04/16	606451	3706220	030xb050nv	
313	66-003	98/04/16	606117	3706377	030xb005nv	
252	66-004	98/06/03	604440	3810938	030xb019nv	Carrizo mp
315	66-005	98/09/03	603858	3809924	030xb092nv	
297	67-001	98/03/10	607210	3799017	030xb092nv	
297	67-002	98/04/15	607222	3798820	030xb092nv	
297	67-003	98/04/16	607285	3798776		
419	67-005	98/02/26	610038	3797972	030xb005nv	
416	67-006	98/03/13	603781	3797300	030xb077nv	
416	67-007	98/03/13	603818	3797344	030xb077nv	
416	67-008	98/03/12	603879	3797465	030xb001nv	
297	67-009	98/03/26	608570	3796981	030xb005nv	production
416	67-010	98/04/07	611427	3803241	030xb077nv	Goldroad mp; production
416	67-011	98/04/07	611130	3802574	030xb001nv	Dalvord mp; veg data #3-67
416	67-012	98/04/07			030xb001nv	

Table 20.--Listing of Point Data--Continued

Map Unit #	Pit #	Dat Described	UTM		Site #	Additional Notes
			East	North		
297	67-013	98/04/15	608142	3798273	030xb005nv	
297	67-014	98/06/11	608788	3797087	030xb005nv	
419	67-015	98/09/03	610095	3797221	030xb005nv	veg data #4-67, #5-67
419	67-016	98/09/03	610045	3797236	030xb001nv	veg data #6-67
422	67-312	96/12/26	606920	3801923	030xb001nv	veg data #67-1
422	67-313	96/12/26	606923	3801991	030xb017nv	veg data #67-2
419	68-001	98/01/10	610629	3795871		
419	68-002	98/01/10	610755	3795899	030xb001nv	
419	68-003	98/01/23	610384	3795964	030xb001nv	veg data #1-68
419	68-004	98/01/23	610463	3795767	030xb001nv	veg data #1-68
419	68-005	98/01/23	610569	3795798		
419	68-006	98/01/23	610462	3796108		
419	68-007	98/01/23	610454	3796140		
297	68-008	98/09/03	608963	3796720	030xb005nv	
419	68-009	98/09/03	609474	3796824	030xb005nv	
313	76-001	98/04/07	616046	3805448	030xb136ca	
313	76-002	98/04/07	616078	3805279	030xb019nv	
315	76-003	98/08/31	615776	3809345	030xb092nv	
315	76-004	98/01/31	616296	3809289	030xb092nv	
315	76-008	94/03/07				
313	76-009	94/03/08	616571	3805572		
313	76-009n		617860	3806413		
297	76-311	96/10/01			030xb092nv	veg data #1-67