Carbonate Habitat Management Strategy

April 29, 2003

Flowers of the plant species addressed by this strategy, from left to right: Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), Cushenbury milk-vetch (*Astragalus albens*), Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*), Parish's daisy (*Erigeron parishii*)

Prepared by Todd G. Olson *for*
San Bernardino National Forest Association

SAN BERNARDINO
NATIONAL FOREST ASSOCIATION

Acknowledgments

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Plant illustrations are by Fred M. Roberts, Jr., and plant photographs are by Scott Eliason, all used with permission.

The following organizations and their representatives actively participated in the working group that developed this strategy (listed alphabetically): BLM California Desert District; Butterfield family; California Native Plant Society; County of San Bernardino; Cushenbury Mine Trust; Gresham, Savage, Nolan & Tilden, LLP; McKay & McKay; Mitsubishi Cement Corporation; OMYA California Inc.; San Bernardino National Forest; Sentinel Mining; Specialty Minerals Inc.; United States Fish and Wildlife Service; White & Leatherman BioServices.

Carbonate Habitat Management Strategy

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I. Introduction

On August 24, 1994, five plants that are associated with the carbonate geology of the northeastern San Bernardino Mountains and adjacent Lucerne Valley were listed as threatened or endangered under the federal Endangered Species Act of 1973, as amended (the "ESA"). Four of these plants occur on commercially valuable limestone deposits. The public interest in protecting these plant species is thus in conflict with the public and private interest in mining the coincident limestone deposits.

This Carbonate Habitat Management Strategy (the "CHMS," referring both to this document and the program it describes) is the product of years of effort by interested mining companies, claim holders, landowners, conservation interests, and government agencies to develop a strategy to resolve this conflict in a mutually-agreeable manner with an approach that can also be utilized by other parties in the future on a voluntary basis.

1. Background

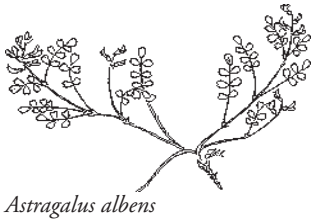
From the 1950s, various claim holders and mining companies have been extracting limestone from the northeastern San Bernardino mountains. In recent years, annual production has been running at about three million tons of cement-grade limestone, at a value of about $100 million, and 1.5 million tons of high-brightness limestone, at a value of about $75 million. Much of this mining activity is occurring on mining claims established under the Mining Law of 1872, as amended (the "Mining Law") on federal land under the jurisdiction of the U. S. Department of Agriculture Forest Service (the "Forest Service") or the U. S. Department of Interior Bureau of Land Management (the "BLM"). Collectively, the Forest Service and the BLM shall be referred to as the "Resource Management Agencies," each with respect to land under its jurisdiction. A portion of the mining activity also occurs on privately-owned land under the jurisdiction of the County of San Bernardino (the "County").

Carbonate Plants

- Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*) (federal endangered)
- Cushenbury milk-vetch (*Astragalus albens*) (federal endangered)
- Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*) (federal endangered)
- Parish's daisy (*Erigeron parishii*) (federal threatened)

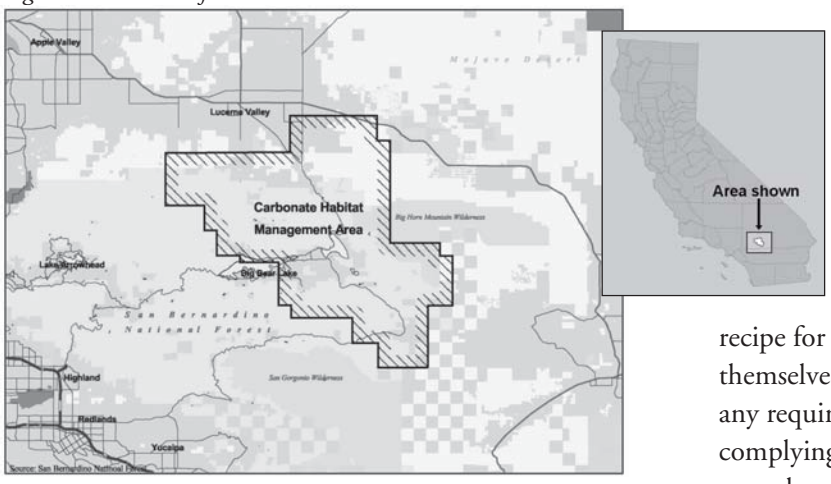
Eriogonum ovalifolium

In 1994, the four plant species shown in the box on this page (the "Carbonate Plants") were listed under the ESA. Each of these species occurs only in the vicinity of the northeastern San Bernardino mountains, and each occurs almost exclusively on carbonate soils that often coincide with economically valuable limestone deposits. (A fifth carbonate plant species, the San Bernardino Mountains bladderpod, *Lesquerella kingii* var. *bernardina*, was listed as endangered at the same time that the other four were listed, but the bladderpod does not coincide with economic limestone deposits, so it is not addressed by the CHMS.)

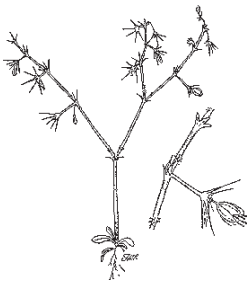


Astragalus albens

Figure 1: Location of CHMA



Absent a regional strategy for the preservation of the Carbonate Plants, ongoing limestone mining activities could come into direct conflict with the ESA. *Map 1* and *Map 2* in *Appendix I* illustrate the potential conflict by showing the locations of the carbonate soils, the Carbonate Plants, existing mining claims, and existing mining activity. Being aware of this situation, certain mining interests, conservation interests, and government agencies (collectively, the "Working Group") began to develop the CHMS in October 1999 to resolve this potential conflict. For purposes of planning and analysis, the Working Group identified an area of approximately 160,000 acres in the northeast San Bernardino Mountains, which encompasses nearly all of the habitat for the Carbonate Plants, as the Carbonate Habitat Management Area (the "CHMA"; *see Figure 1*). The CHMA is characterized by substantial limestone deposits and encompasses nearly the entire known geographic range of the Carbonate Plants (except one occurrence of Parish's daisy habitat near Pioneertown, approximately ten miles east of the CHMA boundary). The majority of the CHMA is within the San Bernardino National Forest (the "SBNF"), but large and important portions occur on federal lands managed by the BLM and on private lands.



Oxytheca parishii

The CHMS, as set forth in this document, is the culmination of the efforts of the Working Group. It provides a means for forming a reserve system for the Carbonate Plants (the "Habitat Reserve" or the "Reserve") while allowing mining activities to proceed under a streamlined and expedited ESA compliance process. The CHMS is voluntary as to private mining interests; it imposes no regulatory burden on existing claims or privately owned property, but it provides a clear recipe for ESA compliance for those who desire to avail themselves of it. Mining interests remain free to seek any required ESA compliance without utilizing or complying with the CHMS. Governmental authorities may also use the CHMS as a framework for establishing land use regulations or policies within the CHMA but, except for any commitments made by the Resource Management Agencies in consultation with the United States Fish and Wildlife Service (the "USFWS"), they are not required to do so.

Erigeron parishii

The time scale over which limestone reserves are mined is measured in decades. In order to be useful, the CHMS is intended to be operational for fifty years or more, and the Habitat Reserve is intended to be in place in perpetuity. Although the CHMS is subject to amendment over time in accordance with its terms (*see* Section 17(b)), it has no established date of termination.

The following section describes the objectives of the CHMS in some detail.

2. Objectives

The goals of the CHMS are to facilitate economic limestone mining activity while conserving the Carbonate Plants under a sensible and efficient regulatory regime. Each of these three goals may be regarded as in the public interest, though different members of the public will have different degrees of interest in each of them. The specific objectives of the CHMS can be categorized by the three types of goals: economic, conservation, and regulatory.

(a) Economic objectives. The economic objectives of the CHMS are as follows:

(i) To increase the regulatory certainty that the most valuable mineral deposits within the CHMA may be mined in the future.

(ii) To protect the availability of limestone resources that are vital to the construction industry in the southwestern region of the United States.

(iii) To protect the viability of the mining-based economy of the northeastern San Bernardino Mountains and Lucerne Valley region.

(iv) To provide a definitive, streamlined process for future mining activities within the CHMA to comply with ESA regulation of the Carbonate Plants.

(v) To provide a framework for streamlining National Environmental Policy Act ("NEPA") requirements for future mining activities. Such streamlining would not be available unless and until the CHMS is incorporated into future land use plans for lands managed by the Resource Management Agencies within the CHMA ("Federal Land Plans").

(vi) To reduce the costs and time associated with County processing of mining-related land use applications by providing a comprehensive approach to addressing impacts to the Carbonate Plants under the California Environmental Quality Act ("CEQA").

(vii) To help avoid the need for future ESA listings of species that occur within the CHMA and to provide a process for addressing such listings if they are proposed or occur.

(b) Conservation objectives. The conservation objectives of the CHMS are as follows:

(i) To maintain and manage the geomorphic and ecological processes of the landscape in large, well-placed blocks of habitat where the Carbonate Plants are found within the CHMA such that the Carbonate Plants are likely to persist indefinitely.

(ii) To avoid "jeopardy" to the continued existence of the Carbonate Plants (as defined in Section 7 of the ESA and its regulations).

(iii) To avoid "destruction or adverse modification" of critical habitat for the Carbonate Plants (as defined in Section 7 of the ESA and its regulations).

(iv) To contribute to the recovery and ultimate de-listing of the Carbonate Plants under the ESA.

(v) To help avoid the need for future ESA listings of species that occur within the CHMA.

(vi) If other species that occur within the CHMA are listed under the ESA in the future, to avoid jeopardy to those species (as defined in Section 7 of the ESA and its regulations).

(vii) To provide a mechanism for tracking both the loss and conservation of habitat for the Carbonate Plants over time.

(c) Regulatory objectives. The regulatory objectives of the CHMS are as follows:

(i) To streamline the application of the ESA to mining activities within the CHMA.

(ii) To provide a biological basis for addressing the Carbonate Plants in future Federal Land Plans.

(iii) To streamline the County's CEQA review of the biological impacts of mining projects on private land within the CHMS.

(iv) To streamline the County's implementation of the California Surface Mining and Reclamation Act of 1975, as amended ("SMARA") within the CHMA.

(v) To provide a means for the BLM to comply with certain stipulations with respect to the CHMS in *Center for Biological Diversity* vs. *BLM*, Case No. C-00-0927 WHA (JCS) in the United States District Court, Northern District of California, San Francisco Division.

(vi) To provide a means for the Forest Service to comply with certain stipulations in *Southwest Center for Biological Diversity* vs. *Sprague*, Case No. C 98-2434 SC in the United States District Court, Northern District of California.

The CHMS attempts to provide an integrated approach to reconciling and achieving the economic, conservation, and regulatory objectives listed above.

The following section develops the strategy further by describing the scope of the CHMS.

3. Scope

The scope of the CHMS can be described in terms of the regulated activities that it addresses, the governmental regulations that it addresses, the biological species that it addresses, and the geographical plan area within which it applies.

CHMS Scope Summary

- *Activities:* covers mining activities
- *Regulation:* offers compliance with the ESA and potential streamlining under NEPA, SMARA, County land use regulations, and related CEQA requirements
- *Species:* addresses the four Carbonate Plants
- *Plan area:* applies within the CHMA

(a) Activities. The CHMS provides a procedure for surface and subsurface mining activities (the "Covered Activities") to comply with certain environmental regulations (*see* subsection *(b)* below). All activities that are incidental to mining activities are included as Covered Activities, including, without limitation, *(i)* exploration, *(ii)* overburden removal, *(iii)* extraction, *(iv)* keeping of waste piles, *(v)* reclamation, *(vi)* milling and other processing of extracted material, *(vii)* transportation of extracted material, and *(viii)* construction of facilities and infrastructure related to the above activities.

(b) Regulations. The regulatory framework for the CHMS is summarized in the box to the right. The regulations addressed by the CHMS are as follows:

(i) ESA. The primary regulatory focus of the CHMS is to provide mining interests with a means of obtaining compliance with the ESA ("ESA Compliance"; *see* Section 11) for Covered Activities with respect to the Carbonate Plants and any other species addressed by the CHMS in the future (*see* subsection *(c)* below). More specifically, the CHMS is intended to be attached to a biological assessment as the basis for a consultation between the Resource Management Agencies and the USFWS under Section 7 of the ESA (the "CHMS Section 7 Consultation"). The biological assessment required by Section 7 of the ESA shall be prepared by the Forest Service in cooperation with the BLM for submission to the USFWS. It is intended that on the strength of the CHMS, the USFWS will be able to issue a programmatic biological opinion (the "CHMS Biological Opinion") that will authorize activities on federal land that comply with the CHMS as being in compliance with the ESA, even if such activities result in the loss of species or habitat addressed by the CHMS. Because it will be mining interests who provide compensation under the CHMS and who are the ultimate beneficiaries of ESA Compliance under the CHMS, this document refers to the mining interests as the parties who "obtain" ESA Compliance, even though it is actually the Resource Management Agencies who are complying with the ESA by means of the CHMS. The CHMS Biological Opinion shall specifically address any of the "Initial Furnace Transactions" (defined in Section 9(d) below) that require ESA Compliance and that have been well-defined by the time that a biological assessment is submitted to the USFWS. Activities that receive ESA Compliance through the CHMS shall not be required to undergo a separate consultation with the USFWS under Section 7 of the ESA.

(ii) NEPA. No NEPA analysis will be performed on the CHMS directly because the CHMS involves no present "federal decision," as defined under NEPA. However, the CHMS may indirectly facilitate regulatory streamlining under NEPA. By providing a strategy for addressing impacts to the Carbonate Plants and

Summary of CHMS Regulatory Framework

- CHMS will exist independent of any other public or private plan
- The CHMS Biological Opinion will be issued on the CHMS alone
- The CHMS and the CHMS Biological Opinion will be available for incorporation into individual mining plans and Federal Land Plans
- No independent NEPA analysis will be done on the CHMS
- Individual mining plans may use the CHMS prior to the completion of revised Federal Land Plans, but such federal plans may result in streamlining of the NEPA process for subsequent mining plans

their habitats, future Federal Land Plans may be able to incorporate the CHMS into their NEPA compliance strategy such that project compliance with the CHMS satisfies certain project-level requirements of NEPA. Then, the NEPA compliance documents for individual projects could address impacts to those species by cross-referencing the applicable Federal Land Plan and its associated NEPA documentation. The availability of such streamlining under NEPA is not automatic; it will depend upon how the Resource Management Agencies write their Federal Land Plans and associated NEPA documentation.

(iii) County land use regulations and implementation of SMARA. The County is the land use jurisdiction for mining activities on private land within the CHMA. It also administers SMARA within the CHMA. The County shall adopt standardized conditions of approval that are consistent with the CHMS to potentially streamline the processing of mining and reclamation applications (and the associated CEQA review) that it administers. See Section 13(c) for a more detailed description of the County's commitments under the CHMS.

(c) Species. Initially, the CHMS directly addresses only the Carbonate Plants and their habitats, so ESA Compliance is only with respect to those four species. The CHMS provides a process, however, for applying to the USFWS to have the CHMS address additional species that may be proposed for listing or listed under the ESA in the future (*see* Section 17(c)). In the event that such additional species become addressed by the CHMS, ESA Compliance will be regarded as addressing such additional species as well.

(d) Plan area. The CHMS applies only to Covered Activities that occur within the CHMA. See paragraph 3 of Section 1 for a description of the CHMA.

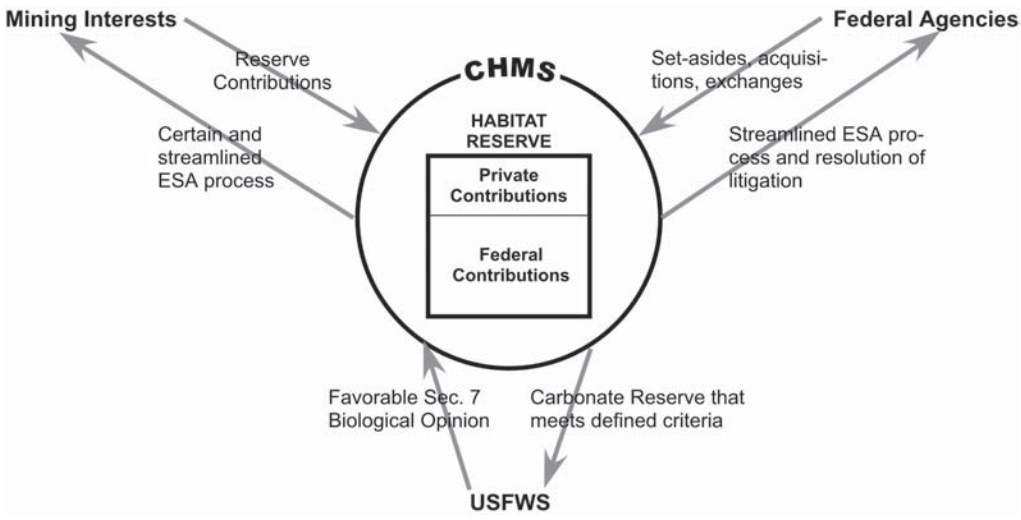
A Covered Activity within the CHMA *may*, but *is not required to,* utilize the CHMS to obtain ESA Compliance and other regulatory streamlining that may be offered by the Resource Management Agencies or the County through the CHMS in the future.

4. Strategy Overview

The CHMS is essentially a strategy for streamlining ESA compliance for mining activities and building a reserve for the Carbonate Plants over time that is designed to provide for their long-term survival and recovery. This section summarizes this strategy, which is described in much greater detail in the balance of this document. This section is not intended to summarize the overall document, but rather to highlight how the CHMS is designed to meet the competing interests of the mining industry and conservation of the Carbonate Plants. For more detailed descriptions of the concepts summarized in this section, see the sections cross-referenced in this section. In the event of a conflict between the summary information provided in this section and the more detailed provisions of the following sections, the latter shall control.

(a) Meeting competing objectives. The CHMS attempts to meet its competing economic, conservation, and regulatory objectives by improving the prospects of achieving each of the three types of objective. The key pieces of the strategy, as depicted in *Figure 2*, are

Figure 2: CHMS Strategy Overview



that *(i)* mining interests will make contributions to the reserve and obtain increased regulatory certainty and permit streamlining (*see* Sections 8(c), 11), *(ii)* the Resource Management Agencies will make contributions to the reserve (*see* Sections 8(a)–(b), (e)) and obtain the streamlining of their compliance process under Section 7 of the ESA (*see* Section 11), as well as the means to resolve litigation against them, and *(iii)* the USFWS will issue a favorable CHMS Biological Opinion (*see* Section 3(b)(i)) and obtain increased certainty that a Habitat Reserve will be achieved that meets the survival and recovery needs of the Carbonate Plants (*see* Section 9).

Currently within the CHMA, some land is being mined and a limited amount of land has been set aside for permanent conservation, but most of the land is neither being mined nor is dedicated to conservation (*see Map 1* and *Map 2* in *Appendix I*). The CHMS will, in an orderly fashion, allow certain lands to be added to the mining category so long as a sufficient amount of land is being contributed to the Habitat Reserve for permanent conservation (*see* Sections 8(c), 11). To provide a means of tracking these different land uses over time, the CHMS uses the land category designations shown in the box below, which are grouped based upon whether they are mining uses, conservation uses, or not yet committed to any particular use (*see* Section 5).

Over time, some of the uncommitted category lands (D, P, and X) will be systematically converted to the mining categories (M1, M2, and F), on the one hand, and to the Habitat Reserve (E), on the other hand. This progression is depicted in *Figure 3*. The following subsections explain in more detail how this will occur.

Land Use Categories

Mining Uses

M1: Approved under Mining Plan

M2: ESA compliant, not yet subject to a mining plan

F: Auxiliary mining use (minor amount of land)

Conservation Uses

E: Established reserve (Habitat Reserve)

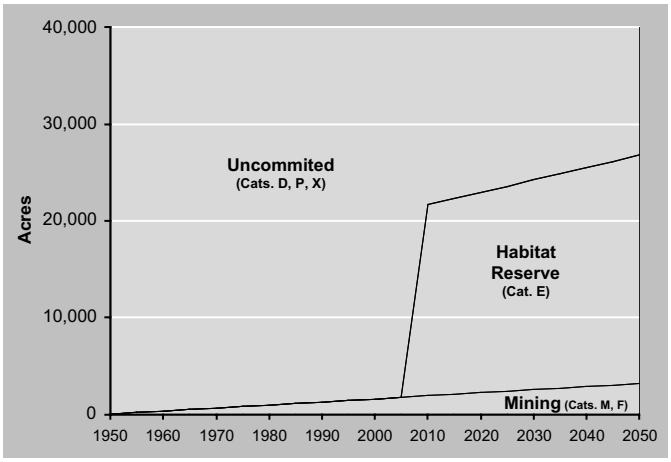
Uncommitted

D: Default (federal)

P: Private

X: Transfer (fed. land earmarked for exchange)

Figure 3: Land Use Shift over Time



The data reflected here are based upon rough estimates of historical and projected changes in land use over time assuming that the CHMS goes into effect. To be conservative, no federal land exchanges or acquisitions and no reintroductions of Carbonate Plants on reclaimed land are assumed, but the federal contributions comprising the Initial Habitat Reserve are *assumed.*

(b) Conservation toolbox. A number of different tools are available to build the Habitat Reserve and achieve the objectives of the CHMS, as listed in the "toolbox" shown on page 12 and described in detail in Section 8. The CHMS provides the mechanisms needed to coordinate the use of many different conservation tools. One key mechanism provided under the CHMS is a method of measuring Conservation Value for the Carbonate Plants in terms of "Conservation Units" (*see* Section 7(a)). The Conservation Value of any parcel of land can be measured in terms of Conservation Units using only a geographical information system ("GIS") database developed by the Forest Service and without the need for new field surveys (Section 7(b)–(f)). Conservation Units provide the CHMS with a common way to measure both conservation and loss of habitat values, facilitating the use of various conservation tools in many different combinations.

The CHMS takes the further step of creating a Conservation Value commodity known as "Conservation Credits" (Section 7(a)). Any landowner or claim holder within the CHMA may contribute land or claims to the Habitat Reserve and receive Conserva-

CHMS "Toolbox"

- **Federal designations—**dedication of existing unclaimed federal land to the Habitat Reserve
- **Federal purchases—**purchase of private land and mining claims using federal funds
- **Project compliance—**contributions to the Habitat Reserve (of land or claims) by mining interests in exchange for ESA Compliance
- **Conservation banking—**contributions to the Habitat Reserve (of land or claims) by private parties in exchange for tradable Conservation Credits
- **Federal land exchanges—**exchanges of federal land for private land or claims with high habitat value for contribution to the Habitat Reserve
- **Revegetation—**voluntary contribution of revegetated reclaimed mining land in exchange for ESA Compliance or Conservation Credits

tion Credits (Section 10 introduction and (b)–(c)). Those Conservation Credits may be used to obtain ESA Compliance (*see* subsection *(c)* below and Sections 10(a) and 11) or "banked," that is, held for future use or sale to another private party (Sections 8(d) and 10(a)). *Figure 4* on page 12 depicts the creation and use of Conservation Credits. The Forest Service will administer the processes of *(i)* giving private parties Conservation Credits for making Reserve Contributions; *(ii)* processing applications for ESA Compliance; and *(iii)* tracking the ownership and transfer of Conservation Credits (*see* Section 10(f)).

(c) Permit streamlining. The primary benefit to mining interests under the CHMS is that their ESA Compliance requirements are easy to determine, and the ESA Compliance process is streamlined, simple, and quick (*see* Section 11). A party wishing to obtain ESA Compliance undertakes a three-step process, as shown in the box below.

The CHMA is divided into five "Administrative Units" (*see* Section 6; also referred to as simply a "Unit"). As soon as certain conservation objectives are satisfied within a Unit (*see* subsection *(d)(ii)* below and Section 9(b)(i)), mining projects within that Unit may use the process described above to obtain ESA Compliance.

(d) Conservation measures. The permit streamlining described above is possible under the ESA because of the CHMS's provision of the Habitat Reserve as a means of conserving large, well-placed blocks of high-quality habitat for the Carbonate Plants in perpetuity (*see* Section 9). The coordinated implementation of the CHMS can provide a much more cohesive and significant reserve for these species than would occur in the absence of such a coordinated conservation strategy. The CHMS provides the following measures to ensure that the Habitat Reserve will provide sufficient conservation of the Carbonate Plants:

The Streamlined ESA Compliance Process

1. Calculate the number of Conservation Credits required to obtain ESA Compliance for the project (3 × the Conservation Value of the land to be mined)
2. Obtain the required Conservation Credits by making Reserve Contributions *or* by purchasing Conservation Credits from another party
3. Submit the required Conservation Credits and sign the CHMS Memorandum of Understanding

The Forest Service processes the paperwork and issues a concurrence letter to the applicant which serves as evidence that the project has satisfied the requirements of the ESA for the Carbonate Plants

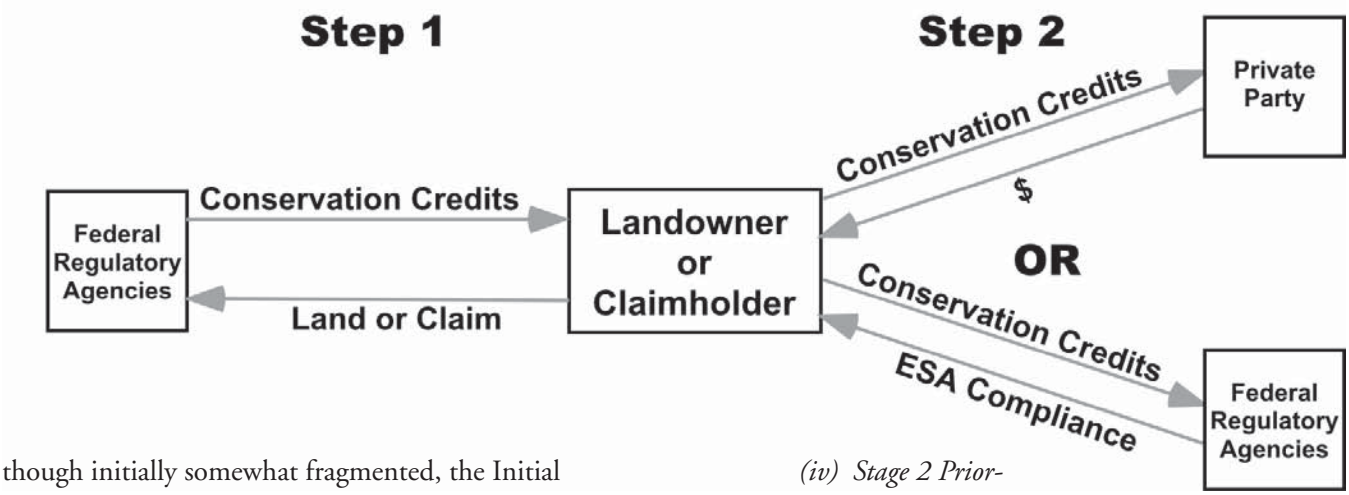
Definitions

"Conservation Value" means the value of land for the conservation of the Carbonate Plants, as measured in "Conservation Units" (*see* Section 7 introduction and Section 7(a))

"Reserve Contribution" means a contribution to the Habitat Reserve in the form of either *(i)* granting privately owned land, *(ii)* relinquishing a mining claim, *(iii)* restricting a mining claim or privately owned land for conservation purposes subject to later redemption by offering equivalent Conservation Value in another form, or *(iv)* granting or relinquishing the surface rights of privately-owned land or a mining claim while retaining the right to conduct subsurface mining (*see* Section 10(b))

(i) Initial Habitat Reserve. The "Initial Habitat Reserve" shown on *Map 3* in *Appendix I* (*see* Section 9(a)) consists of lands to be managed by the Resource Management Agencies as part of the Habitat Reserve from the outset of CHMS implementation. It provides 19,264 acres of permanently preserved habitat at the very outset—about 30% of the Conservation Value contained in the entire CHMA—before any loss of Carbonate Plants will occur under the CHMS. Al-

Figure 4: Creation and Use of Conservation Credits



though initially somewhat fragmented, the Initial Habitat Reserve provides a core conservation area across the entire CHMA from the very outset.

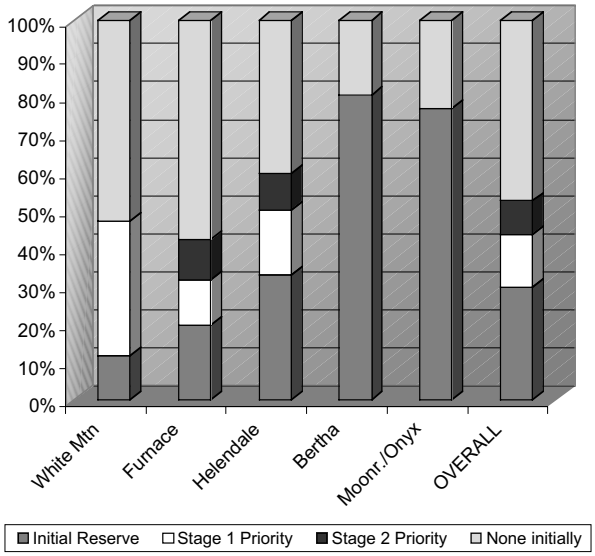
(ii) Stage 1 Priority Areas. No loss of habitat for Carbonate Plants may occur under the CHMS within any Administrative Unit until most of the valuable Carbonate Plant habitat in the "Stage 1 Priority Areas" within such Unit (*see Map 3* in *Appendix I*) has been added to the Habitat Reserve (*see* Section 9(b)(i)). Such habitat in the Stage 1 Priority Areas plus the portion of the Initial Habitat Reserve within each Unit provide a solid base of conservation within each Administrative Unit *that must be part of the Reserve before any loss of Carbonate Plants can occur within that Unit under the CHMS.*

(iii) Furnace Unit Stage 1 Priority Areas. Much preliminary work has been done so that the Furnace Unit Stage 1 Priority Areas can be added to the Reserve as soon after the adoption of the CHMS as possible. Specifically, a series of transactions that utilizes nearly the entire "toolbox" of conservation tools is being assembled (Section 9(d)). *Map 6* in *Appendix I* shows how the Habitat Reserve may be configured if all such transactions were to occur. These transactions will be prepared to close simultaneously after adoption of the CHMS and upon the closing of any federal land exchanges or purchases necessary to complete the transactions. Federal legislation may be sought to give the Resource Management Agencies authority to complete land transactions on an expedited basis (*see* Section 16).

(iv) Stage 2 Priority Areas. The Stage 2 Priority Areas shown on *Map 3* in *Appendix I* are also targeted for addition to the Habitat Reserve utilizing the "toolbox" described above (*see* Section 9(b)(ii)). No loss of habitat for Carbonate Plants may occur under the CHMS *at any time* within any Stage 2 Priority Area. Furthermore, the CHMS provides incentives for land within Stage 2 Priority Areas to be added to the Reserve (*see* Section 9(b)(iii)).

The Initial Habitat Reserve and the Stage 1 and Stage 2 Priority Areas together form the basis for securing a core of Habitat Reserve within each Administrative Unit. *Figure 5* shows the percentage of the Conservation Value in each of these categories by Unit, and *Table 5* on page 24 provides more detailed data on

Figure 5: Types of Habitat Protection by Unit (by % of Conservation Value)



these categories. Note, however, that the CHMS does not prevent private parties from seeking compliance with the ESA apart from the CHMS in any portion of the CHMA, including within Priority Areas. Initially, only the Initial Habitat Reserve areas are completely protected from mining activity.

(v) Compensation Ratio. A "Compensation Ratio" of 3:1 is required for any loss of Carbonate Plant habitat that is allowed under the CHMS (*see* Section 11(a)). This ratio is measured in terms of Conservation Value. Before a mining activity can be allowed under the CHMS, the applicant must add land worth 3 units of Conservation Value to the Habitat Reserve for each unit of Conservation Value to be lost to the proposed mining activity. Adjustments are made to the Conservation Value calculations to encourage both reserve formation and mining in compact formations with a minimum of perimeter (*see* Section 7(e)). Also, compensation must be provided *in advance* of the loss of habitat, so *preservation of habitat will necessarily stay ahead of loss of habitat at a minimum of a 3:1 ratio* under the CHMS (as measured in Conservation Value). Within each Unit, a substantial portion of such project compensation may initially occur in the Priority Areas.

(vi) Federal land contributions. Federal land contributions made to the Habitat Reserve are *in addition to* project compensation that occurs under the CHMS (*see* Section 8(a)–(b), (e)–(f)). All federal land exchanges and purchases that add to the Habitat Reserve therefore increase the ratio of preservation to habitat loss to be *in excess of 3:1.* Major initial acquisitions of rich habitat for Carbonate Plants are targeted under the CHMS, (primarily in the Furnace Unit Priority Areas), which would add significant value to the Reserve.

(vii) Private land contributions. There is currently no federal protection of plant species listed under the ESA that occur on privately-owned lands. The CHMS provides incentives for the contribution of private land with high Conservation Value to the Habitat Reserve, thus providing permanent protection of habitat for Carbonate Plants on lands that are not currently subject to the ESA.

The following parts provide a complete description of all of the matters introduced in this overview section. ❀

Carbonate Habitat Management Strategy

II. Components

The CHMS is built on a framework of four key components: Land use categories *are established for purposes of tracking the status of land within the CHMA as committed for mining activities, committed for conservation, or uncommitted.* Administrative Units *have been identified as logical administrative subareas within the CHMA. A method is established for measuring* Conservation Value *for the Carbonate Plants. Finally,* conservation tools *are set forth as the various means by which the Reserve Criteria can be satisfied. The four sections of this Part II provide a detailed description of each of these four components.*

5. Land Use Categories

All land within the CHMA is classified into seven land use categories, which are described in this section and summarized in the box on page 16. The CHMS is fundamentally a matter of shifting lands of relatively high mineral value into categories that permit mining activities and shifting other lands of relatively high Conservation Value into the Habitat Reserve. The land use categories are established to provide a means of describing and tracking the shifting of land uses over time.

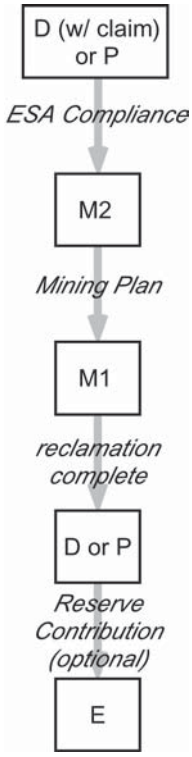
Two key points are critical to understanding the land use categories. First, because the CHMS is a voluntary program, the land use categories do not affect the rights of landowners or claims holders on land that has not been voluntarily subjected to the CHMS. Second, the categorization of land is dynamic; it *will* change over time. Only lands in "Category E," the conservation category (*see* subsection *(b)* below), cannot change once they are in that category, as Category E represents land permanently set aside as part of the Habitat Reserve.

Map 3 in *Appendix I* shows the expected status of land categories within the CHMA at the commencement of CHMS implementation. The progression of lands through the mining cycle is depicted in *Figure 6*; and the various categories are described in detail in the following paragraphs.

(a) Mining Category lands. The following three land use categories are mining-related categories; lands in these categories may be referred to as "Mining Category" lands.

(i) Category M1: Fully Permitted. This category represents land that either *(a)* has been mined in the past and has not yet been reclaimed (including receiving approval and release for completed reclamation); or *(b)* has been approved under a Mining Plan (as defined in this subsection). Once a Category M1 parcel has been successfully reclaimed in accordance with its Mining Plan, the parcel reverts to Category D or Category P (*see* subsection *(c)* below) and can be re-categorized again in the future. The Conservation Value associated with such a reclaimed parcel is not changed automatically, but may be changed by changing the "Habitat Inventory" in accordance with Section 14(d). A "Mining Plan" is defined as a mining plan of operations (in the case of a claim on federal land) or a mining and reclamation plan (in the case of mining on private land)

Figure 6: Mining Cycle



Land Use Categories Summary

Mining Categories:

M1: Fully Permitted
Land that either *(i)* has been approved under a Mining Plan or *(ii)* is currently impacted by mining activity.

M2: CHMS Compliant
Land with ESA Compliance under the CHMS, but no Mining Plan.

F: Auxiliary Use
Federal lands made available to private mining operations for uses that are auxiliary to mining activities, such as haul roads, utility corridors, and water wells; little land will be in this category.

Conservation Category:

E: Established Reserve
Land permanently committed to the Habitat Reserve.

Uncommitted Categories:

D: Default
All federal land not otherwise designated; includes any claimed federal land contributed as a "Relocatable Contribution."

P: Private
Privately-owned land that has not been categorized as M1, M2, or E; includes any private land contributed as a "Relocatable Contribution."

X: Transfer
Federal lands having little or no habitat value for the Carbonate Plants that have been designated for transfer out of federal ownership.

that has been approved by the requisite federal or County authorities.

(ii) Category M2: CHMS Compliant. This category represents land that has obtained ESA Compliance under the CHMS, but is not yet subject to a Mining Plan. Once Category M2 land comes under a Mining Plan, it will be automatically redesignated as M1.

Categories M1 and M2 may be referred to collectively as "Category M."

(iii) Category F: Auxiliary Use. This category includes small acreages of federal land needed for a mining operation, such as haul roads, utility corridors, and well sites, that are not under private ownership or claim by the mining operator. Under Section 11(b) below, the Resource Management Agencies may create such Category F lands as an inducement for a landowner or claim holder to place lands in Category E.

(b) Conservation Category lands. The following land use category is for land committed to conservation; lands in this category may be referred to as "Conservation Category" lands:

Category E: Established Reserve. This category includes all land that has been permanently committed to the Habitat Reserve. Land in this category cannot be changed to any other category. Category E includes some private land within the CHMA that was under permanent conservation easement at the commencement of the CHMS. The methods of protecting additions to Category E lands are described in Section 9(f).

(c) Uncommitted Category lands. The following three land use categories are not committed to either mining activities or the Habitat Reserve; lands in these categories may be referred to as "Uncommitted Category" lands.

(i) Category D: Federal Default. This category is the default category and includes all federal lands within the CHMA that are not otherwise designated. Category D land can become Category M2 by obtaining ESA Compliance. It can become Category E land if it is made part of the Habitat Reserve as described in Section 10 below. It can also be shifted into Category F, P, or X if it later meets the qualifications for inclusion in one of those categories. Category D will also include federal land contributed as a "Relocatable Contribution" under Section 10(b)(ii). The Resource Management Agencies shall manage Category D lands in accordance with the applicable Federal Land Plans, which may, but are not required by the CHMS, to provide protections for Carbonate Plants.

(ii) Category P: Private Default. This category includes all privately-owned land within the CHMA that has not been designated in Categories M or E.

Category P will also include private land contributed as a Relocatable Contribution under Section 10(b)(ii).

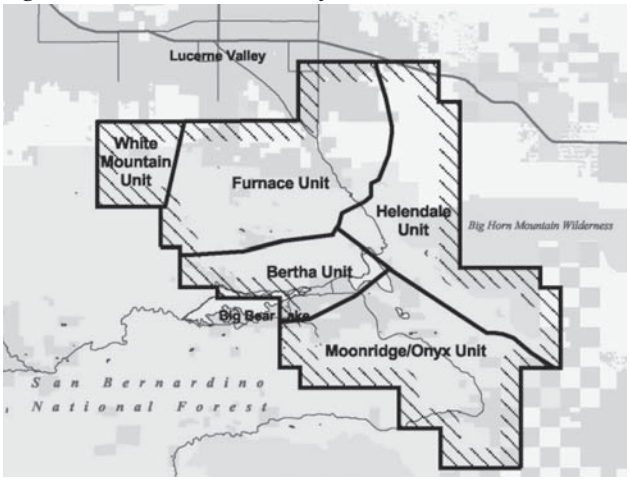
(iii) Category X: Transfer. This category includes federal lands that have been designated for transfer out of federal ownership. It is intended that the Resource Management Agencies will select parcels for Category X because they have commercial value but no significant habitat value for the Carbonate Plants or other public use value (the commercial value may be for uses other than mining). Once Category X parcels are transferred to private ownership, they become Category P. If such parcels subsequently obtain ESA Compliance, they convert to Category M2.

6. Administrative Units

For purposes of administering the CHMS across the 160,000-acre CHMA, the CHMA has been divided into five subareas ("Administrative Units" or "Units"): White Mountain, Furnace, Helendale, Bertha, and Moonridge/Onyx. The general location of these Administrative Units is shown on *Figure 7*.

Of the five Units, only White Mountain, Furnace, and Helendale have any expected potential for conflict between mining activity and the Carbonate Plants. The other two Units, Bertha and Moonridge/Onyx, encompass 61,751 acres of land, but contain only about 88 acres of known habitat for Carbonate Plants (exclusively Cushenbury buckwheat), all of which is part of the Initial Habitat Reserve. The Bertha and Moonridge/Onyx Units are included in the CHMA in order to strengthen the basis of analysis for the CHMS Biological Opinion by including most of the range of the Carbonate Plants in the area analyzed.

Figure 7: Administrative Units of the CHMA



In order to assure that the conservation of habitat under the CHMS is broadly distributed across the CHMA, Reserve "Priority Areas," as defined in Section 9(b), have been identified for each of the three Units with existing or expected mining activity. The Priority Areas include a good representation of important habitat for Carbonate Plants that exist in each Unit, and both rules and incentives have been established for the addition of the Priority Areas to the Habitat Reserve (*see* Section 9(b)).

7. Conservation Value

Mining interests obtain ESA Compliance under the CHMS by contributing a certain amount of land to the Habitat Reserve to offset impacts to habitat on land to be mined. But because the Conservation Value (or "CV") of various parcels of land varies dramatically within the CHMA, the trade-off cannot be measured in raw acres of land, lest land of low Conservation Value be used to compensate for the mining of land of high Conservation Value. The CHMS addresses this problem by providing a means for evaluating land within the CHMA in terms of its Conservation Value per acre for the Carbonate Plants. This section describes how the Conservation Value of any parcel of land within the CHMA may be evaluated using a common method of measurement.

(a) Conservation Units and Conservation Credits. The unit of measurement of Conservation Value is referred to as a "Conservation Unit," and may be abbreviated, "CU." The "currency" of the CHMS is "Conservation Credits"; a Conservation Credit represents one Conservation Unit of value. Measuring Conservation Value in terms of Conservation Units is used in a variety of ways under the CHMS, including:

- As a basis for determining the number of Conservation Credits that will be given to a party who makes a Reserve Contribution of a particular parcel of land (*see* Section 10(c));
- As a basis for determining the Reserve Contribution or the number of Conservation Credits that will be required in order to obtain ESA Compliance for a particular parcel of land under the CHMS (*see* Section 11(a)); and
- As a basis for monitoring the growth of the Habitat Reserve (*see* Section 14(b)–(c) below).

The balance of this section describes how a parcel of land is evaluated in terms of Conservation Units.

Definitions

"Occupied Habitat" means land designated on the Habitat Inventory as occupied habitat for one or more of the Carbonate Plants; excludes Revegetated Habitat

"Suitable Habitat" means land designated on the Habitat Inventory as suitable habitat for one or more of the Carbonate Plants, but not occupied; excludes Revegetated Habitat

"Revegetated Habitat" means mining land that has been revegetated and meets all of the requirements for obtaining conservation credit set forth in Exhibit E; different amounts of conservation credit are available depending upon what revegetation success criteria are met

"Other Beneficial Habitat" means land that is designated on the Habitat Inventory as undisturbed natural land that provides some geomorphological, hydrological, or habitat configuration benefit to the Carbonate Plants; excludes land in any of the other habitat categories listed above

(b) Application of multipliers. The Conservation Value, in terms of Conservation Units, of any parcel of land within the CHMA can be determined by dividing the parcel into parts based upon the type of habitat on each part (*see* box above for definitions of habitat types), and multiplying the acreage of each part by the applicable multiplier from *Table 1*. In addition, the Resource Management Agencies shall apply a minimum 1.0 CV/acre to any land required for the "Priority Areas" in accordance with Section 9(b)(iii).

(c) Source of data. The data to be used to evaluate the Conservation Value of land for purposes of the CHMS is the Forest Service's official GIS database for the CHMS that identifies all land within the CHMA by the habitat categories shown in the definitions box in the left column (the "Habitat Inventory"). Accordingly, *no new field surveys shall be required* to evaluate the Conservation Unit value of a parcel, although a party may seek to have the Habitat Inventory revised under Section 14(d)(iv). The initial Habitat Inventory is depicted on *Map 4* in *Appendix I*, and statistics from the Habitat Inventory are presented in *Appendix D*. The Habitat Inventory will be updated periodically in accordance with Section 14(d). The basis for the development of the initial Habitat Inventory and the criteria for modifying the Habitat Inventory are described in *Appendix C*. The Forest Service shall make the initial Habitat Inventory and each update available to the public by such digital and/or hard copy methods as it deems appropriate from time to time.

Table 1: Conservation Value Multipliers

1.75 ×	acres containing Occupied Habitat for *all four* Carbonate Plants
1.50 ×	acres containing Occupied Habitat for *any three* of the Carbonate Plants
1.25 ×	acres containing Occupied Habitat for *any two* of the Carbonate Plants
1.00 ×	acres containing Occupied Habitat for *any one* of the Carbonate Plants
0.50 ×	acres containing Suitable Habitat for any one or more of the Carbonate Plants
0.25–1.00 ×	acres containing Revegetated Habitat (depending on the success criteria met; *see Table 2*)
0.25 ×	acres containing Other Beneficial Habitat
0.00 ×	all other acres (acres containing no habitat benefiting the Carbonate Plants)

Table 2: Conservation Value Multipliers for Revegetated Habitat

A conservation multiplier of between 0.25 and 1.00 per acre will apply to Revegetated Habitat as follows (see Section (a) of the Revegetation Guidelines for a more complete description):

0.25 per acre of Revegetated Habitat without Carbonate Plants

0.50 per acre of Revegetated Habitat with at least one Carbonate Plant

An additional 0.20 per acre of Revegetated Habitat that meet enhanced success criteria

An additional 0.10 per acre for each additional Carbonate Plant species occurring (for an addition to the multiplier of up to 0.30 per acre)

Table 3: Conservation Value Totals

Unit	Total Acres	Total Cons. Value*
White Mountain	10,573	922 CU
Furnace	47,578	10,544 CU
Helendale	40,560	8,865 CU
Bertha	17,474	827 CU
Moonridge/Onyx	44,277	1,072 CU
TOTAL	**160,462**	**22,230 CU**

*Excludes the 1.0 CU/acre minimum CV potential in the final configuration of the Priority Areas

(d) Initial Conservation Values within the CHMA. The Conservation Values of land within the CHMA as of the commencement of the CHMS are depicted on *Map 5* in *Appendix I*. *Table 3* provides a statistical breakdown of the total Conservation Value existing within each Administrative Unit within the CHMA.

(e) Adjusted Conservation Value. Conservation Value takes into account the inherent habitat characteristics of any given parcel within the CHMA, but it does not take into account the *configuration* in which the habitat lies. Generally speaking, when habitat is more connected and has fewer edges where human activities could disrupt reserve function, it is of greater value to the species that it supports. To take this into account, the CHMS uses the concept of "Adjusted Conservation Value" or "ACV."

Adjusted Conservation Value takes into account the net increase or net decrease in edge (*see* the definition of "edge" in the box below) resulting from both new Reserve Contributions and new mining activities. When a Reserve Contribution is made, net increases in reserve edge will result in a discount in Conservation Value, and net decreases in Reserve edge will result in a bonus in Conservation Value. Conversely, when a new mining activity receives ESA Compliance under the CHMS, net increases in mining edge will result in an increase in required habitat compensation, and net decreases in mining edge will result in a decrease in required habitat compensation. In making these edge adjustments, edges creating an interface between Conservation Category lands and Mining Category lands are deemed to have a greater negative impact than edges that create an interface either between Conservation Category lands and Uncommitted Category lands or between Mining Category lands and Uncommitted Category lands.

Definition

"edge" means the line where land of one of the three types of land use categories (Mining Category, Reserve Category, or Uncommitted Category) meets another of the three types; for purposes of determining whether Mining Category land shares an edge with Reserve Category land, any Reserve Category land that is within one-fifth (1/5) mile of Mining Category land shall be deemed to share an edge with the Mining Category land

Specifically, Adjusted Conservation Value is calculated as follows:

(i) For the newly proposed Conservation Category or Mining Category lands, multiply the lineal mileage of *new edge* (that is, *excluding* the edge where the new Conservation Category land meets existing Conservation Category land or where the new Mining Category land meets existing Mining Category land) of the proposed land area by the corresponding CU/mile factors in *Table 4*.

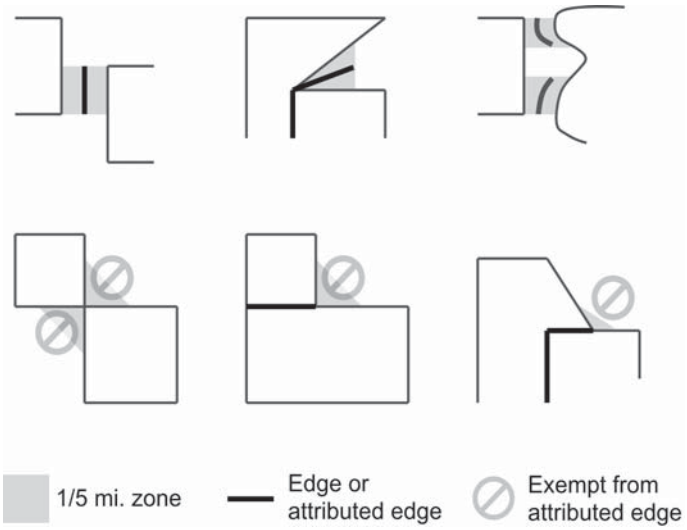
Table 4: Edge Adjustments by Land Use Category

Edge Interface by Land Use Category			Adjustment per Lin. Mile
New Cat.		***Exist. Adj. Cat.***	
E	*vs.*	M or F	24 CU
E	*vs.*	D, P, or X	12 CU
M or F	*vs.*	D, P, or X	12 CU
M or F	*vs.*	E	24 CU

(ii) For any existing edge *eliminated* by the new proposed Conservation Category or Mining Category lands (that is, the edge where the new Conservation Category land meets existing Conservation Category land or where the new Mining Category land meets existing Mining Category land), multiply the lineal mileage of such edge as it existed before the proposed change by the corresponding CU/mile factors in *Table 4*.

Note that for purposes of determining whether Mining Category land shares an edge with Conservation Category land, a shared edge will be attributed in cases where a Conservation Category boundary is within one-fifth (1/5) mile of Mining Category land, though the two boundaries do not physically touch.

Figure 8: Illustrations of Attributed Edges



The length of the attributed edge shall be the length of an imaginary line that is half way between the two parcels for the distance that such line is in the 1/5-mile zone between the two parcels. Such 1/5-mile proximities that are formed by parcel lines that meet at angles of ninety (90) degrees or more shall be exempt from this attributed edge treatment. The attributed edge concept is illustrated in *Figure 8*.

(iii) Subtract the result in *(ii)* above from the result in *(i)* above to arrive at the "Net Edge Adjustment."

(iv) In the case of a Reserve Contribution, *subtract* the Net Edge Adjustment from the Conservation Value of the parcel to obtain the Adjusted Conservation Value; in the case of an area of proposed mining activity, *add* the Net Edge Adjustment to the Conservation Value of the parcel to obtain the Adjusted Conservation Value (note that the Net Edge Adjustment can be a positive or a negative number and can therefore result in an ACV that is either greater or less than the unadjusted Conservation Value).

The following formulae summarize the calculation of Adjusted Conservation Value:

$$ACV_{\text{Reserve Contribution}} = CV - (\text{Net Edge Adjustment})$$

$$ACV_{\text{Mining Proposal}} = CV + (\text{Net Edge Adjustment})$$

A positive Net Edge Adjustment value is always regarded as a detriment to the habitat for Carbonate Plants. As reflected in the formulas above, that detriment is translated into a *decrease* in the Conservation Value recognized for Reserve Contributions and as an *increase* in the Conservation Value for which compensation would be required for a mining proposal.

The examples shown in *Appendix G* demonstrate how this calculation is made and how it operates as an incentive to configure both Reserve Contributions and mining activities so as to keep habitat connected and minimize edge effects. *Appendix F* includes worksheets for valuing Reserve Contributions and ESA Compliance requirements; these worksheets incorporate the procedure for calculating Adjusted Conservation Value and Net Edge Adjustment.

(f) Application of Adjusted Conservation Value. Adjusted Conservation Value, measured in Conservation Units, is a concept of measurement. When determining the number of Conservation Credits to be given for a particular Reserve Contribution, the permanence of the contribution must also be taken into account (*see* Section 10(c)(iii)). To determine the number of Conservation Credits that will be required to obtain ESA Compliance for a particular mining activity, the "Compensation Ratio" must be applied (*see* Section 11(a)).

The following section concludes this part on "components" by describing the key tools that are available to form the Habitat Reserve.

8. Conservation Tools

Several different tools can be used to assemble a Habitat Reserve that meets the CHMS objectives. This section describes some of the key tools, roughly in order of their expected importance. These tools are catalogued in this section without suggesting how they might work together to implement the CHMS. The purpose of having a variety of tools available is to make it possible to choose the best tool or tools for a given situation; not all of the tools are appropriate for all circumstances. Part III: Implementation, which follows this section, shows how the various tools are put to use to form the Habitat Reserve.

(a) Federal designations. Most of the habitat for the Carbonate Plants is located on federal lands managed by the Resource Management Agencies. Much of that habitat is under mining claim and is therefore not within the control of the federal agencies to provide full protection from future mining. The Initial Habitat Reserve land shown on *Map 3* in *Appendix I* is not, however, under existing claim and shall be designated by the Resource Management Agencies as Habitat Reserve. The means by which federal land is designated Habitat Reserve is by protecting it in the manner described in Section 9(f), which may allow for public use that is compatible with the intended purpose of the Habitat Reserve.

(b) Federal purchase. Since much of the habitat for the Carbonate Plants is on privately-owned land or federal land that is subject to mining claims, tools are needed to induce private parties to sell (or exchange; *see* subsections *(e)* and *(f)* below) their privately-owned land or mining claims for the Habitat Reserve, as follows:

(i) Types of purchase. The federal government may purchase two types of interest under the CHMS. Such purchases must be made in accordance with all applicable federal laws and regulations. Also, protections against third-party claims, as provided in Section 9(f), must be in place prior to or concurrent with such acquisitions. The two types of interest that the federal government may purchase are :

(A) Private property in fee, including patented mining claims.

(B) Mining claims on federal lands (by paying for the relinquishment of such claims); purchases of unpatented claims may require special federal legislation.

(ii) Willing sellers. Because the CHMS is a voluntary program, any purchases pursuant to the CHMS will be between the federal agencies and willing private sellers. The use of eminent domain is not a tool for implementing the CHMS.

(iii) Prioritization. When funds are available, purchases will be prioritized under the CHMS so as to obtain the greatest contribution to the Habitat Reserve for the dollar spent. The definition of Conservation Unit can be valuable for this purpose, because it allows potential purchases to be ranked based upon Conservation Units/dollar (or, "CU/$")—a direct measure of conservation value preserved for each dollar spent. A direct purchase component of the CHMS also provides the opportunity to obtain some parcels whose value to the Habitat Reserve is not fully reflected by the CU /$ measure. Such parcels may include, for example, ones that provide key linkages between other conserved parcels or important habitat that is particularly susceptible to loss to mining activities.

(c) Project compliance. A core feature of the CHMS is that it provides a procedure for obtaining ESA Compliance for new mining activities, as detailed in Section 11. The compensation required for obtaining ESA Compliance is the offering of Conservation Credits that represent Reserve Contributions. The effect is that land is added to the Habitat Reserve, and private parties obtain ESA Compliance. Project compliance represents the mining industry's primary contribution to the CHMS and is a primary means of building the Habitat Reserve by adding to the Initial Habitat Reserve.

(d) Conservation banking. Private parties who hold claims or land within the CHMA with Conservation Value may obtain Conservation Credits—either by making Reserve Contributions or by purchasing them from other private parties—and hold them for future use or sale rather than immediately use them to obtain ESA Compliance. This practice may be referred to as "conservation banking" because it results in a "bank" of credits for the party who makes the Reserve Contribution, which may be held, sold, or used in the future, as detailed in Section 10(a). Regardless of how the Conservation Credits are used, when a party makes a Reserve Contribution and obtains credits, the size of the Habitat Reserve is immediately increased.

(e) Exchanges for federal lands. The Resource Management Agencies may hold certain lands that have commercial value, but little or no Conservation Value or other public use value. An additional way to increase the Habitat Reserve is for the federal government to exchange such lands for privately owned land that has substantial Conservation Value and set aside the land received for the Habitat Reserve, as discussed

in subsection *(a)* above. The federal land being traded to a private party need not be located within the CHMA. Such exchanges must be made in accordance with all applicable federal laws and regulations. Also, protections against third-party claims, as provided in Section 9(f), must be in place prior to or concurrent with such acquisitions.

(f) Fee-for-claims swaps. The Forest Service and the BLM could also exchange surplus lands for mining claims that have substantial Conservation Value and designate the land received as Habitat Reserve, as discussed in subsection *(a)* above. As with exchanges for fee-owned land, federal land being traded to a private party need not be located within the CHMA. Such exchanges must be made in accordance with all applicable federal laws and regulations. Protections against third-party claims, as provided in Section 9(f), must be in place prior to or concurrent with such acquisitions. Such exchanges may also require special federal legislation.

(g) Revegetation. Land that has been mined need not result in a permanent biological loss. Once a mining operation is complete in a particular location, SMARA and federal regulations require that the land be reclaimed, including that it be revegetated. Furthermore, the CHMS provides incentives to meet revegetation success criteria included in the "Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions" set forth in *Appendix E* (the "Revegetation Guidelines"). When land has been successfully revegetated, the landowner or claim holder may, but is not required to, make a Reserve Contribution of such land and receive either ESA Compliance or Conservation Credits (*see* Section 12(b) and *Table 2* on p. 18). Such contributions are yet another way that the Habitat Reserve can be increased over time.

(h) Other contributions. Land may also be added to the Habitat Reserve by means of contributions for regulatory compliance other than ESA Compliance under the CHMS, such as for CEQA compliance or NEPA compliance that is not related to the Carbonate Plants.

Special legislation may be sought to appropriate funds for the types of transactions described in subsections (b), (e), and (f) above and possibly to assist in the implementation of various transactions. Special legislation is discussed in more detail in Section 16.

The following part describes how the conservation tool kit described in this section, as well as each of the other elements or components described in this *Part II,* are to be used to implement the CHMS. ❀

Carbonate Habitat Management Strategy

III. Implementation

This part describes the implementation of the CHMS—the nuts and bolts of how it will operate to meet the objectives set forth in Section 2. It begins with an overview of how the Habitat Reserve will be formed over time. It then details both how private parties will make Reserve Contributions toward the formation of the Habitat Reserve and how mining interests may obtain ESA Compliance under the CHMS. It concludes by describing the role that revegetating reclaimed mining areas can play in building the Habitat Reserve and helping mining interests obtain ESA Compliance.

9. Reserve Formation

Forming the Habitat Reserve over time is how the CHMS meets its conservation objectives. This section describes how the Habitat Reserve is formed under the CHMS and how the CHMS becomes fully operational within each Administrative Unit as specified reserve formation objectives are met. *Table 5* on page 24 summarizes the acreage and Conservation Value of the various components of the Reserve.

(a) Initial Habitat Reserve. The Habitat Reserve is seeded by the Initial Habitat Reserve (*see* Section 4(d)(i)) prior to any private Reserve Contributions under the CHMS. The Resource Management Agencies have agreed to designate these lands as Habitat Reserve in accordance with Section 8(a) because they are able to do so without interfering with the interests of private parties.

(b) Priority Areas. The CHMS gives high priority to the acquisition of land for the Habitat Reserve within the areas designated on *Map 3* of *Appendix I* as "Stage 1 Priority Areas" and "Stage 2 Priority Areas" (collectively, the "Priority Areas"). These areas include important habitat for the Carbonate Plants as well as the potential for preserving large contiguous blocks of habitat and connecting land. The following tools, which include both incentives and rules, shall be in effect under the CHMS to facilitate the addition of land within the Priority Areas to the Reserve:

(i) Stage 1 Priority Area requirement. Within any Administrative Unit, the following must be added to the Habitat Reserve before any loss of habitat may be authorized under the CHMS within that Unit: *(A)* 100% of the Occupied Habitat that occurs in the Stage 1 Priority Areas; *(B)* 85% of the Suitable Habitat that occurs within the Stage 1 Priority Areas; and *(C)* sufficient additional land to preserve such Occupied and Suitable Habitat in one contiguous patch ("Connective Land"). The determination of the sufficiency of the Connective Land shall be in the discretion of the applicable Resource Management Agency. Upon the addition of all such lands to the Habitat Reserve, ESA Compliance may be obtained in the Unit, and the Unit is deemed to be "Activated." This provision assures a substantial amount of important habitat will be included in the Habitat Reserve within a Unit in advance of any habitat loss within that Unit under the CHMS. No Stage 1 Priority Areas are designated for the Bertha or Moonridge Onyx Units because mining activity is not expected to occur there.

(ii) Stage 2 Priority Area loss prohibition. Even after a Unit has been Activated, no loss of habitat may be authorized under the CHMS within any Stage 2 Priority Area until the following are added to the Habitat Reserve *within that Stage 2 Priority Area: (A)* 100% of the Occupied Habitat; *(B)* 85% of the Suitable Habitat; and *(C)* sufficient Connective Land to preserve such Occupied and Suitable Habitat in one contiguous patch. The determination of the sufficiency

of the Connective Land shall be in the discretion of the applicable Resource Management Agency.

(iii) Conservation Value enhancement. Ordinarily, only Occupied Habitat has a Conservation Value of 1.0 CV/acre or more. In order to assist the meeting of the Stage 1 and Stage 2 Priority Area requirements described in subsections *(i)* and *(ii)* above, the applicable Resource Management Agency may, in negotiations with a prospective contributor of land to the Reserve, assign a minimum Conservation Value of 1.00 CU/acre to any portion of land within the Priority Area that is contributed to the Reserve. Although such minimum value assignments shall be in the discretion of the Resource Management Agency, the agency *must* make such minimum value assignments as to any land that it determines is *necessary* to meet the requirements of subsection *(i)* or *(ii)* above. This provision is intended to provide significant incentive for private parties to make Reserve Contributions in the Priority Areas in configurations that will help meet CHMS objectives.

Table 5: Reserve Formation Statistics

	Occ. Hab. (acres)	Cons. Val. (CU)	Occ. Hab. (% of Unit)	Cons. Val. (% of Unit)
White Mountain	*99*	*922*		
Initial Reserve	10	109	10%	12%
Stage 1 Prior.	57	326	58%	35%
Stage 2 Prior.	-		0%	0%
Total IR + S1 + S2	67	435	68%	47%
Furnace	*1,545*	*10,544*		
Initial Reserve	202	2,094	13%	20%
Stage 1 Prior.	452	1,234	29%	12%
Stage 2 Prior.	418	1,125	27%	11%
Total IR + S1 + S2	1,072	4,453	69%	42%
Helendale	*1,460*	*8,865*		
Initial Reserve	218	2,934	15%	33%
Stage 1 Prior.	633	1,513	43%	17%
Stage 2 Prior.	335	842	23%	9%
Total IR + S1 + S2	1,186	5,289	81%	60%
Bertha	*73*	*827*		
Initial Reserve	73	663	100%	80%
Stage 1 Prior.	-	-	0%	0%
Stage 2 Prior.	-	-	0%	0%
Total IR + S1 + S2	73	663	100%	80%
Moonridge/Onyx	*15*	*1,072*		
Initial Reserve	15	824	100%	77%
Stage 1 Prior.	-	-	0%	0%
Stage 2 Prior.	-	-	0%	0%
Total IR + S1 + S2	15	824	100%	77%
Total	*3,192*	*22,230*		
Initial Reserve	518	6,624	16%	30%
Stage 1 Prior.	1,142	3,073	36%	14%
Stage 2 Prior.	753	1,967	24%	9%
Total IR + S1 + S2	2,413	11,664	76%	52%

(c) Means of Adding Priority Areas to the Reserve. It is left to the various interested parties to engage in activities that will help add the Priority Areas to the Habitat Reserve. Drawing from the conservation tools described in Section 8, the three primary activities that are likely to be used to add Priority Areas to the Reserve are as follows:

(i) Federal acquisitions. The Resource Management Agencies may enter into purchase and sale agreements and exchanges to acquire land and claims from private parties for addition to the Habitat Reserve (*see* Sections 8(b), (e), and (f)). Some such purchases may require a congressional appropriation (*see* Section 16(a)), and both purchases and exchanges may be benefited by special streamlining legislation (*see* Section 16(b)).

(ii) Contingent Contributions. Private parties may make "Contingent Contributions" (*see* Section 10(d))—contingent offers of Reserve Contributions

that are not effective until the completion of the contribution of a Stage 1 Priority Area to the Habitat Reserve. Several parties could make such Contingent Contributions, and each of their Reserve Contributions would become effective simultaneously when transactions that would complete the addition of the Stage 1 Priority Area are all prepared to close. This tool can help resolve the "chicken and egg" problem that would otherwise exist before a Unit is Activated by the addition of its Stage 1 Priority Areas to the Habitat Reserve.

(iii) Ordinary Reserve Contributions. Priority Areas may also be added to the Habitat Reserve by means of direct Reserve Contributions for Conservation Credits.

(d) Furnace Unit Stage 1 Priority Areas. A series of transactions for the addition of the Furnace Unit Stage 1 Priority Areas to the Reserve (the "Initial Furnace Transactions") is well along in development. It is anticipated that some or all of these transactions shall be described in the biological assessment that is submitted to the USFWS to initiate the CHMS Section 7 Consultation. *Map 6* in *Appendix I* shows how the Habitat Reserve may be configured if all such transactions were to occur.

(e) Incremental Reserve growth. After the Initial Habitat Reserve is established, the Habitat Reserve will continue to grow as parties voluntarily make Reserve Contributions to obtain ESA Compliance or to bank Conservation Credits. Because of the requirements of subsection *(b)* above, much of this incremental growth is likely to occur in the Priority Areas initially. Because the "Compensation Requirement" (*see* Section 11(a)) for obtaining ESA Compliance is based on a 3:1 "Compensation Ratio," the overall pace of growth of the Habitat Reserve beyond the Initial Habitat Reserve will be at least three times the pace of loss of habitat caused by mining activity (in terms of Conservation Value).

(f) Means of protecting Habitat Reserve lands. It is the intention of the CHMS that all Habitat Reserve lands be protected from mining activity in perpetuity and be subjected only to public uses that are compatible with management of the Reserve for its intended purpose. The Resource Management Agencies shall manage the Habitat Reserve lands consistent with this intent within the bounds of their existing regulatory authority. The Forest Service shall also manage Category D lands containing habitat for Carbonate Plants in the same manner as for Habitat Reserve lands until such time, if any, that a Mining Plan is approved over such habitat.

When an interest in land is contributed to the Reserve, it shall be relinquished to the Resource Management Agency in the manner required by Section 10(b), which varies depending on the type of Reserve Contribution made. Regardless of the type of Reserve Contribution, however, the land interest must also be immediately protected from new mining claims in a manner that is satisfactory to the Resource Management Agency. The following are examples of alternative means by which land may be protected from new mining claims, some of which require an intermediate step before the interest is finally conveyed to the Resource Management Agency:

(i) If the land had been previously or concurrently "withdrawn from mineral location," then new claims would be precluded by federal law once the contributor relinquished a claim on the land.

(ii) The land or claim could be transferred to an intermediary in trust for the Resource Management Agency until the land is made subject to a mineral withdrawal.

(iii) The party making the Reserve Contribution could retain title to the land or mining claim and attach a surface use restriction to the land. This would protect the land from surface use and occupancy by the owner and also avoid exposing the land to new third-party claims. Once the underlying area has been subjected to a mineral withdrawal, the contributor would relinquish the interest to the Resource Management Agency. Note that this kind of temporary surface use restriction should not be confused with the "Surface Entry Restriction" mentioned under Section 10(b)(iii).

(iv) Special legislation could be sought to provide an efficient and permanent means of protecting

lands contributed to the Habitat Reserve (*see* Section 16(c)).

The mechanisms described in subsections *(ii)* and *(iii)* above could be used to batch lands for mineral withdrawal so that withdrawals can be processed in bulk rather than in a piecemeal fashion. Note that a small portion of the Habitat Reserve consists of privately-owned land subject to permanent conservation easement.

(g) Adaptivity of reserve design. The CHMS has mechanisms that allow the design of the Habitat Reserve to adapt to new information over time, as follows:

(i) First, the Habitat Inventory is subject to regular revision based upon the best available biological information at a given time (*see* Section 14(d)). As the Habitat Inventory will drive both incentives to preserve appropriate areas and the required portions of the Priority Areas to be preserved, revision of the Habitat Inventory is an important tool of adaptive reserve design.

(ii) Second, because of the revegetation requirements of the "Reclamation Regulations" (*see* Section 11(c)), combined with the incentives of the CHMS to introduce or reintroduce Carbonate Plants when revegetating (*see* Section 12 and the Revegetation Guidelines), most land within the CHMA that is currently habitat for the Carbonate Plants will be available to be managed for the Carbonate Plants in the long run, including land that is mined in the shorter run. So eventually all current habitat for the Carbonate Plants effectively becomes available for the Reserve, providing ultimate flexibility to manage for the benefit of the Carbonate Plants.

(iii) Third, if changed conditions or unforeseen circumstances could mean that continued operation of mining activities pursuant to the CHMS would result in jeopardy to the Carbonate Plants, then the Resource Management Agencies must re-initiate the CHMS Section 7 Consultation and limit or suspend operations under the CHMS until a solution is adopted that meets the needs of the Carbonate Plants (*see* Section 14(e)). Although the CHMS contains many provisions to avoid re-initiation, this tool is available if necessary to protect the Carbonate Plants. This is a last-resort adaptive management and reserve design tool.

10. Conservation Credits

Private parties may make Reserve Contributions by relinquishing mining claims or transferring ownership to the Resource Management Agency for inclusion in the Habitat Reserve. Such parties will receive Conservation Credits for making such Reserve Contributions. The number of Conservation Credits that a party receives for making a reserve contribution is based upon the Conservation Value, measured in Conservation Units, of the land contributed, subject to certain adjustments that are described in this section. The reason a private party would want to make a Reserve Contribution is that the Conservation Credits can be used to obtain ESA Compliance and therefore have economic value.

(a) Use of Conservation Credits. A party may make a Reserve Contribution and immediately use the resulting Conservation Credits to obtain ESA Compliance. Alternatively, a party may hold the resulting credits, thereby "banking" them for future use. A party holding Conservation Credits (a "Credit Holder") may do any of the following with them:

- Use them ("spend" them) to obtain ESA Compliance;
- Sell them to another party for whatever price the market will bear; or
- Hold them for future ESA Compliance or sale.

One advantage of receiving Conservation Credits to use for ESA Compliance rather than making a direct contribution of land is that the payments in Conservation Credits can precisely match the compliance requirement, avoiding overcompensating to obtain ESA Compliance. For example, if ESA Compliance on a particular parcel requires 500 Conservation Credits, but the parcel that the landowner has to offer would yield 700 Conservation Credits, the landowner or claim holder could make a Reserve Contribution of the whole parcel and receive ESA Compliance *plus*

"change" in the amount of 200 Conservation Credits, which may be used later or sold to another party. Conversely, if the party seeking ESA Compliance needed 500 Conservation Credits, but had a parcel that would yield only 400 Conservation Credits, that party could make up the difference by purchasing 100 Conservation Credits from another private party that was banking some credits. The use of Conservation Credits thereby makes the compliance process more efficient.

(b) Types of Reserve Contribution. There are two basic types of Reserve Contribution: a "Permanent Contribution" and a "Relocatable Contribution." Either of these basic types could also be a "surface rights contribution."

(i) Permanent Contributions. A Permanent Contribution is an absolute, permanent grant of private land or relinquishment of a mining claim. To make a Permanent Contribution is to relinquish a parcel or a claim and receive Conservation Credits in exchange. Permanent Contributions receive the full number of Conservation Credits with no deduction for lack of permanence.

(ii) Relocatable Contributions. Relocatable Contributions leave some flexibility with the contributor. Rather than making a grant of land or relinquishment of a claim, a Relocatable Contribution is made by entering into an agreement whereby the contributor agrees not to disturb the land during the term of the agreement (a "Use Restriction Agreement"). Use Restriction Agreements are for a term of twenty (20) years each. The form of and procedure for engaging in Use Restriction Agreements shall be at the discretion of the respective Resource Management Agencies. Use Restriction Agreements must be recorded against the subject land or mining claim.

At any time during the term, the contributor may replace the land covered by the Use Restriction Agreement with a different Reserve Contribution of equal value. Because a Relocatable Contribution necessarily limits what can be done on the parcel from a conservation management perspective, the Conservation Credits given for a Relocatable Contribution will be reduced by 50% of what would have been received for a Permanent Contribution of the same land. Only Permanent Contributions shall be regarded as adding land to the Habitat Reserve, so only Permanent Contributions will be counted in determining whether a Priority Area has been added to the Reserve. Land under a Relocatable Contribution shall be regarded as Category D if on public land and Category P if on private land.

A replacement contribution during the term of the Use Restriction Agreement may be either a Permanent Contribution or a different parcel of land as a Relocatable Contribution, but the replacement contribution must yield at least the same number of Conservation Credits as the original contribution (the contributor would receive "change" in the form of additional Conservation Credits if the replacement contribution yields a greater number of Conservation Credits than the original Relocatable Contribution). Making a replacement contribution *does not* reset the 20-year term of the Use Restriction Agreement. One option the contributor would always have would be to make a Permanent Contribution of the same land included in the Relocatable Contribution and receive additional Conservation Credits (the number of Conservation Credits that the land would yield as a Permanent Contribution at the time the contribution is converted *less* the number of Conservation Credits previously received for the Relocatable Contribution). The Use Restriction Agreement shall provide that, if by the end of the term of such agreement the contributor has not converted to a Permanent Contribution of land, then the land then under the Use Restriction Agreement shall automatically be converted to a Permanent Contribution, and the contributor will receive the excess Conservation Credits for doing so.

For purposes of calculating the Conservation Value of land contributed under a Use Restriction Agreement, the Habitat Inventory at the time of the contribution shall control for the life of the Use Restriction Agreement, but the Conservation Value of any replacement contribution shall be measured based upon the Habitat Inventory as of the time of the replacement contribution. When a permanent contribution is made of land already under a Use Restriction Agreement, the Habitat Inventory at the time of the permanent contribution shall control.

The availability of the Relocatable Contribution option gives mining interests some flexibility in the management of their holdings. Even though fewer Conservation Credits would be received by the contributor, the party may choose to make a Relocatable Contribution, for example, because:

- The mineral value of the land is not certain at the time of the contribution, so the contributor wants to reserve the right to replace the contribution with other land if the mineral value is determined to be high; or
- The contributor believes that the Conservation Value of the land may increase in the future—either because of discovery of additional Occupied Habitat on the land, because revegetation activities (*see* Section 12) may increase the Conservation Value, or because the contribution of adjacent lands may improve the Adjusted Conservation Value (*see* Section 7(e)) in the future—and the contributor therefore wants to wait until the Conservation Value is increased before making a Permanent Contribution of the land.

Providing such flexibility is a benefit to the contributor, but it is also of value from a conservation standpoint. The relocation feature temporarily limits conservation management options, but it effectively provides double the amount of land as long as the relocation option remains open (because only 50% of the normal number of Conservation Credits is given for Relocatable Contributions). In any event, no later than the end of the term of the agreement, the Relocatable Contribution must be replaced by a Permanent Contribution, which could be a portion of the original Relocatable Contribution.

(iii) Surface rights contributions. The surface rights to land, whether in the form of a claim or fee title, may be offered as either a Permanent or Relocatable Contribution, even if the subsurface is subject to mining. In such cases, the right of surface entry would be restricted on the portion of land comprising the Reserve Contribution. Such restriction shall be documented using an instrument that is recorded against the subject land or mining claim (a "Surface Entry Restriction"). The form of Surface Entry Restrictions shall be at the discretion of the respective Resource Management Agencies. The Conservation Credits available for such surface rights shall be calculated in the same manner as for other Reserve Contributinos. See Section 11(d) below regarding obtaining ESA Compliance for subsurface mining.

(c) Receiving Conservation Credits for Reserve Contributions. Parties making Reserve Contributions receive "payment" in the form of Conservation Credits. The number of Conservation Credits that will be given for a specified contribution shall be calculated as follows:

(i) Start with the *Conservation Value* of the land contributed, measured in Conservation Units in accordance with Section 7(b)–(c);

(ii) Subtract the Net Edge Adjustment to arrive at the Adjusted Conservation Value in accordance with Section 7(e); and

(iii) Multiply the result in *(ii)* by a *permanence factor*, which is 1.00 for Permanent Contributions and 0.50 for Relocatable Contributions.

The formula for determining the number of Conservation Credits that will be given for a Reserve Contribution can be summarized as:

Conservation Credits = (CV – Net Edge Adjustment) × permanence factor

Appendix G provides several examples of Conservation Credit calculations; *Appendix F* includes a worksheet for valuing the Reserve Contribution of a given parcel.

(d) Contingent Contributions. Private parties may make a Reserve Contribution *contingent* on either *(i)* Activation of a particular Administrative Unit (based upon the completion of the addition of the entire Stage 1 Priority Area to the Habitat Reserve) or *(ii)* approval of a Mining Plan for a particular project (a "Contingent Contribution"). Contingent Contributions shall be documented by an escrowed contribution agreement between the contributor and the applicable Resource Management Agency. Once the specified contingency(ies) are satisfied, the Reserve Contribution escrow shall close, the subject land shall be transferred to the Resource Management Agency, and the contributor shall receive Conservation Credits. Conservation Credits obtained in this way may be freely used for any purpose listed in Section 10(a). Applicants may, but are not required to, specify in the

contribution agreement particular mining lands that may be covered using the Conservation Credits obtained by means of a particular Contingent Contribution. The Compensation Requirement for lands so specified are locked in so long as the Conservation Credits that are obtained from the Contingent Contribution are applied to obtain ESA Compliance for the specified lands.

(e) Land and claims qualifying for contribution. Generally, any land or mining claim within the CHMA may be contributed to the Habitat Reserve for the requisite number of Conservation Credits calculated in accordance with subsection *(c)* above; *provided, however,* that *(i)* the land or claim must meet any land acceptance criteria established by the applicable Resource Management Agency with respect to the physical condition or title to the land or claim and *(ii)* any claim made after October 1, 1999 must be a valid claim under the Mining Law before it may be contributed (there is no validation requirement for earlier claims). October 1, 1999 coincides with the time when the Working Group began to develop the notion of accepting relinquishment of claims for conservation credit; the purpose of accepting only validated claims made after that date is to avoid any possibility or appearance of parties making claims of questionable mineral value just to obtain conservation credit.

(f) Credit Registration. The Forest Service shall record the *creation*, *use*, and *transfer* of Conservation Credits (*see* box below) in a database to be referred to as the "Credit Registry." The Forest Service shall maintain the Credit Registry either through a person or office within the Forest Service or by contracting with and overseeing an outside party to fulfill all or part of that function. The Forest Service may delegate some or all of its administrative functions, including any collection of credit registration fees, to another agency or to a private party. Each creation of Conservation Credits shall be evidenced by a concurrence letter issued by the Forest Service that establishes the number of Conservation Credits created and identifies the party who holds them (a "Credit Verification Letter"). The Conservation Credits evidenced by a Credit Verification Letter may be sold or traded until used to obtain ESA Compliance. Any such transfer shall be evidenced by a new Credit Verification Letter issued in the name of the transferee. The Forest Service may adopt more detailed procedures for credit registration and may revise them from time to time as it deems appropriate. An example of such procedures is set forth in *Appendix H*, but the Forest Service may choose, for example, to adopt simplified procedures for situations in which a mining interest does not wish to hold Conservation Credits, but rather desires to apply them immediately to obtain ESA Compliance (combining the *creation* and *use* of credits into one step).

Types of Conservation Credit Transactions

- *Creation:* When a private party makes a Reserve Contribution, Conservation Credits are created and given to that party
- *Use:* Parties seeking ESA Compliance must use or "spend" Conservation Credits as compensation for the habitat loss to be caused by the complying project
- *Transfer:* Conservation Credits may be freely bought, sold, and traded at whatever price the market will bear

11. ESA Compliance

Mining activities within the CHMA may, but are not required to, obtain ESA Compliance under the CHMS Biological Opinion by complying with the terms of the CHMS. As explained in Section 9(b)(i), ESA Compliance through the CHMS is available within an Administrative Unit only after the Unit has been Activated. This section describes the requirements for obtaining ESA Compliance for a proposed mining activity under the CHMS.

(a) Compensation Requirement. The basic requirement for obtaining ESA Compliance is that Conservation Credits must be given to compensate for the habitat loss that would occur as a result of the proposed mining activity (the "Compensation Requirement"). The amount of the Compensation Requirement for a given parcel is 3 × the Adjusted Conservation Value of the land whose surface is to be disturbed as a result of the proposed mining activity. Compensation is not required for portions of a claim whose surface is not to be disturbed. The ratio of Reserve Contribution requirement to the amount of habitat loss shall be re-

ferred to as the "Compensation Ratio." The Compensation Ratio of 3:1 was selected as a ratio that would result in a sufficient contribution from project compliance to meet the biological objectives of the CHMS when combined with Reserve contributions from other sources (*see* Section 8). *Appendix F* includes a worksheet for calculating the Compensation Requirement for a given parcel.

(b) Auxiliary use areas (Category F lands). In order to make it feasible for a landowner or claim holder to make a Reserve Contribution of certain lands and proceed with a mining activity, the Resource Management Agency may offer right-of-way, well access, or other special use of land not under the ownership or claim of the private party. Such areas are designated as Category F lands under the CHMS. The creation of Category F lands is in the discretion of the Resource Management Agencies with jurisdiction over the underlying land and may traverse Category D or Category E lands, so long as the allowed use is determined by the Resource Management Agency to be compatible with the Habitat Reserve. There shall be no Compensation Requirement for the use of any Category F lands over which the applicant is given access or use rights.

As an example, a mining operator may control land that has substantial conservation value, but which must be traversed to obtain access to an operational area. The Resource Management Agency may be able to induce such operator to make a Reserve Contribution of the parcel if the landowner can retain a right-of-way across the contributed land. Such right-of-way would be managed by the Resource Management Agency as part of the Reserve, subject to the right-of-way retained by the operator. The bulk of the contributed parcel would be designated as Category E, and the right-of-way portion would be designated as Category F.

(c) Mining Plan and reclamation compliance. Most mining activities will be subject to a Mining Plan issued by the applicable Resource Management Agency. In addition, mining operations within the CHMA are subject to certain preexisting reclamation requirements, which may include, depending on location and other factors, reclamation standards under SMARA; a Memorandum of Understanding between the Forest Service, BLM, and the State of California signed October 1992 regarding the application of SMARA on federal lands in California; the Forest Service regulations under 36 CFR 228; and the 1991 Big Bear District Mining Reclamation Standards (all such reclamation regulations that exist from time to time shall be referred to collectively as the "Reclamation Regulations"). A party which has obtained ESA Compliance under the CHMS must remain in substantial compliance with all applicable Reclamation Regulations in all respects in order to maintain ESA Compliance under the CHMS.

(d) Compliance for subsurface mining. Covered Activities that involve subsurface mining may obtain ESA Compliance through the CHMS. In such cases, the Compensation Requirement will be measured according the area of surface disturbance, calculated in the manner set forth in subsection *(a)* above. No compensation will be required for subsurface activities that do not have direct surface impacts. The ESA Compliance obtained for the surface impacts of subsurface mining activities does not cover impacts from surficial failure or other unexpected surface disturbances. Such types of disturbance will not be addressed by the CHMS Biological Opinion and must therefore be separately addressed outside of the CHMS if they occur. See Section 10(b)(iii) above regarding the ability to offer the surface as a Reserve Contribution.

(e) Compliance Verification Letter. Upon meeting all of the requirements for obtaining ESA Compliance under the CHMS with respect to a parcel, the Forest Service shall issue to the applicant a concurrence letter acknowledging the satisfaction of the requirements for obtaining ESA Compliance with respect to such parcel (a "Compliance Verification Letter.") Note that the project may also require a concurrence letter from the USFWS as part of the NEPA compliance process for the project for the USFWS to verify that the project is in compliance with the ESA in accordance with the CHMS.

(f) Credit for avoidance of areas approved for mining. If at any time after obtaining ESA Compliance for an area, the landowner or claim holder determines that certain portions of that area need not be disturbed, then the landowner or claim holder may, in its discre-

tion, have the area removed from the ESA Compliance area. Upon application for such removal, the Forest Service shall issue a revised Compliance Verification Letter removing such area from ESA Compliance and a Credit Verification Letter to return to the applicant the number of Conservation Credits previously given by the applicant as compensation for prospective habitat loss on the subject land area. If a Mining Plan had already been issued covering such area, then the applicant must present to the Resource Management Agency a revised Mining Plan or an amendment to the Mining Plan showing the subject area removed from mining. Upon issuance of the revised Compliance Verification Letter, the Forest Service shall automatically update the Habitat Inventory to show the type of habitat existing on the removed area. The applicant may also, in its discretion, take the further step of making a Reserve Contribution of the subject area in exchange for additional Conservation Credits, using the normal contribution procedure set forth in Section 10. The process set forth in this subsection may be employed at any time in the mining and reclamation process so long as the area to be removed from ESA Compliance has not been disturbed.

(g) Effect of ESA Compliance. Once a mining activity has obtained ESA Compliance:

- Covered Activities on the subject land are deemed to be in compliance with the CHMS Biological Opinion, and thus with the ESA, with respect to the species addressed by the CHMS;
- The subject land is moved to Category M2 (and from there to Category M1 once a Mining Plan is in place for the land);
- The Habitat Inventory is updated to show the subject land as nonhabitat (*see* Section 14(d)(i));
- Covered Activities on the subject property cannot be affected by subsequent changes in the Habitat Inventory on the subject land; and
- Covered Activities on the subject property will benefit from any subsequent modifications to the CHMS that add to the species addressed by the CHMS.

ESA Compliance under the CHMS is subject to any re-initiation of the CHMS Section 7 Consultation, as described in Section 14(e).

As described in Section 3(b)(iii), the County shall adopt standardized conditions of approval consistent with the CHMS that may apply on a project-by-project basis to applications for mining and reclamation activities that are regulated by the County.

12. Revegetation

One characteristic of mining activities is that they have a conclusion, and after their conclusion the underlying land has an opportunity to regenerate habitat. The CHMS incorporates this opportunity to "recycle" the land as an important component of the strategy.

(a) Reclamation Regulations. As stated in Section 11(c) above, for a mining activity to maintain ESA Compliance under the CHMS, the activity must maintain substantial compliance with applicable Reclamation Regulations. Such regulations may include mandatory revegetation standards.

(b) Optional Reserve Contributions. As an incentive for mining interests to meet and exceed the revegetation requirements of the Reclamation Regulations, a landowner or claim holder who reclaims and revegetates mining land to meet the criteria for Revegetated Habitat (*see* box on page 18 and the Revegetation Guidelines) may make a Reserve Contribution of such land and receive Conservation Credits. Since the Habitat Inventory will show areas that have been granted ESA Compliance to have no habitat, the landowner or claim holder will want to first have the land resurveyed and request that the Habitat Inventory be updated to reflect the existence of Revegetated Habitat on the land. Section 14(d) describes the procedure for updating the Habitat Inventory. As shown in Section 7(b) and Section (a) of the Revegetation Guidelines, the Conservation Value of Revegetated Habitat varies based upon the success criteria that are met on each revegetated parcel.

(c) ESA coverage for revegetated areas. Conservation of the Carbonate Plants will benefit if mining interests make attempts to revegetate with Carbonate Plants beyond what is required under the Reclamation Regulations. Mining interests may desire to make such

attempts both to find the most effective techniques for successfully revegetating with Carbonate Plants and to apply those techniques to successfully revegetate areas for Conservation Credits. Such effort are potentially discouraged, however, by the fact that the species are protected by the ESA and that success in revegetating areas could become a hindrance to future mine planning. This situation may occur, for example, if *(i)* the revegetation effort was only partially successful, so the landowner or claim holder would get too few Conservation Credits to make a Reserve Contribution worthwhile or *(ii)* it is later discovered that mineral deposits on the land are of greater value than the potential to receive Conservation Credits. To avoid such potential disincentives for revegetation efforts, losses of Carbonate Plants on land within the CHMA that becomes occupied by Carbonate Plants due to private revegetation activities shall be authorized under the terms and conditions described in Section (d) of the Revegetation Guidelines.

The following part, on CHMS administration, details the various parties and procedures that will be involved in administering the CHMS. ❀

IV. Administration

All of the concepts important to the CHMS have been described in the preceding parts. This part provides details regarding how the CHMS is to be administered, monitored, and funded. It also includes a section on federal legislation that may be sought to assist in implementing the CHMS and a section on how the CHMS may be amended.

13. Parties and Responsibilities

The CHMS contemplates the coordination of efforts by a number of parties to implement its provisions. The roles of the various parties are described throughout this document, but they are summarized and sometimes elaborated upon in this section. This section concludes with a description of a "Memorandum of Understanding" (subsection *(g)* below), which will set forth the understanding of the Resource Management Agencies, the County, the California Native Plant Society ("CNPS"), the private parties who intend to enter into the Initial Furnace Transactions, and each other party who receives either a Credit Verification Letter or a Compliance Verification Letter in the future (collectively, the "MOU Parties") regarding their respective roles in the CHMS.

(a) Resource Management Agencies. As the Resource Management Agencies, the Forest Service and the BLM have land use jurisdiction over land within the CHMA. The responsibilities of the Resource Management Agencies under the CHMS are summarized as follows:

(i) Coordinate the mining and land use regulations administered by the Resource Management Agencies with the provisions of the CHMS to facilitate the use of the CHMS by applicants to obtain ESA Compliance, such as by coordinating the administration of the Federal Land Plans with the CHMS.

(ii) In processing applications for mining activities, accept compliance with the CHMS as compliance with the Federal Land Plans, the ESA, and other federal laws and regulations with respect to impacts on the Carbonate Plants (subject, however, to review under NEPA).

(iii) Manage those portions of the Habitat Reserve that fall under their respective jurisdictions in a manner that is consistent with the CHMS (*see* Section 9(f)).

(iv) Facilitate federal land designations as contemplated by the CHMS to help form the Habitat Reserve (*see* Section 8(a)).

(v) Facilitate federal land purchases and exchanges as contemplated by the CHMS to help form the Habitat Reserve (*see* Section 8(b), (e), and (f)).

(vi) Facilitate acceptance by the federal government of title to privately owned land contributed to the Habitat Reserve under the CHMS.

(vii) Notify the MOU Parties if at any time Congress or the Secretary of the Interior determines that all or any part of the Habitat Reserve is no longer necessary to provide for the conservation of the Carbonate Plants and, as a consequence, an existing mineral withdrawal or other use restriction has been removed as to such land.

(viii) Work with the USFWS to develop and implement a plan for monitoring the effectiveness of, compliance with, and biological conditions under the CHMS.

(ix) Monitor the implementation of the CHMS for consistency with the CHMS Biological Opinion and immediately report to the MOU Parties any potential or realized inconsistencies.

(x) Monitor the CHMA for conditions that could require re-initiation of the CHMS Section 7 Consultation and immediately report any such conditions to the MOU Parties.

(xi) In the event of a re-initiation of the CHMS Section 7 Consultation, suspend or partially suspend operation of the CHMS, if required by Section 7(d) of the ESA, and report the suspension to the MOU Parties (*see* Section 14(e)).

(b) Forest Service. The Forest Service has the following responsibilities in addition to those under subsection *(a)* above:

(i) Maintain and update the Habitat Inventory in accordance with Section 14(d).

(ii) Administer the Credit Registry and related functions in accordance with Section 10(f).

(iii) Carry out the regular reporting functions for the CHMS described in Section 14(b).

(iv) Receive, maintain, and make publicly available records and reports it receives pursuant to the CHMS, such as revegetation reports (*see* the Revegetation Guidelines) and various monitoring reports (*see* Section 14).

(v) Manage those Category D lands that fall under its jurisdiction in a manner that is consistent with the CHMS (*see* Section 9(f)).

(c) County. The County has jurisdiction over mining reclamation under SMARA, and it has land use jurisdiction over the private lands located within the CHMA. The County shall adopt standardized conditions of approval for addressing impacts to Carbonate Plants by proposed mining and reclamation projects in a manner that is consistent with the CHMS. Such conditions of approval shall apply under SMARA, the County land use ordinances, and CEQA, subject to the approval of the Board of Supervisors on a project-by-project basis. Specifically, such conditions of approval shall provide for *(i)* habitat compensation requirements consistent with the Compensation Requirements set forth in the CHMS (*see* Section 11) and *(ii)* revegetation standards and incentives consistent with the Revegetation Guidelines and the revegetation incentives set forth in the CHMS (*see* Section 12 and the Revegetation Guidelines).

(d) USFWS. The responsibilities of the USFWS under the CHMS derive from the ESA and are as follows:

(i) Issue the CHMS Biological Opinion in response to the CHMS Section 7 Consultation.

(ii) Work with the Resource Management Agencies to develop and implement a plan for monitoring the effectiveness of, compliance with, and biological conditions under the CHMS.

(iii) Respond to any re-initiation of the CHMS Section 7 Consultation in a manner that is consistent with the ESA and the CHMS Biological Opinion (*see* Section 14(e)).

(iv) In the event of a re-initiation of the CHMS Section 7 Consultation, advise the Resource Management Agencies of any obligations with respect to Section 7(d) of the ESA that require any suspension of operations.

(e) CNPS. CNPS has been an active participant in the Working Group, representing the conservation interests of the Carbonate Plants and assuring that from their perspective, the CHMS provides a good and practical solution to the conflicts between the public economic interest in ongoing carbonate mining and the public interest in conserving the Carbonate Plants within the CHMA.

(f) Applicants. The private applicants that receive ESA Compliance under the CHMS must do as follows in order to maintain ESA Compliance:

(i) Remain in compliance with the ESA with respect to the covered mining project, taking into account that Covered Activities on the subject land are deemed to be in compliance with the ESA.

(ii) Remain in substantial compliance with all Reclamation Regulations that apply to the covered mining project.

(iii) Conduct any future mining operations occurring within the area covered by the CHMS prior to the consummation of the Initial Furnace Transactions in a manner which is consistent with the terms of the CHMS.

(iv) Comply with the terms of any Use Restriction Agreements entered into by the applicant under the CHMS in connection with making Relocatable Contributions (*see* Section 10(b)(ii)).

(v) Comply with the terms of any Surface Entry Restrictions entered into by applicant under the CHMS in connection with making surface right Reserve Contributions (*see* Section 10(b)(iii)).

(g) Memorandum of Understanding. The MOU Parties shall enter into a Memorandum of Understanding (the "MOU") to set forth the understanding of the MOU Parties regarding their respective responsibilities and activities under the CHMS. In the event of any conflict between the provisions of this document and the provisions of the MOU, the MOU shall control. The MOU will be signed by the MOU Parties as follows:

(i) Prior to initiation of the CHMS Section 7 Consultation, the Resource Management Agencies, the County, CNPS, and the private parties who intend to enter into the Initial Furnace Transactions will sign the MOU.

(ii) Effective upon the Activation of the Furnace Unit, the private parties who are part of the Initial Furnace Transactions as applicants for ESA Compliance will sign the MOU again, this time in their status as parties obtaining ESA Compliance. Such parties shall sign a separate amendment for each Compliance Verification Letter they are to obtain.

(iii) Subsequent applicants for ESA Compliance (after the applicants who are part of the Initial Furnace Transactions) will sign the MOU by means of an amendment prior to obtaining ESA Compliance. Such parties shall sign a separate amendment for each Compliance Verification Letter they are to obtain.

(iv) Parties making Reserve Contributions will sign an amendment to the MOU prior to obtaining Conservation Credits with respect to such contributions. Such parties shall sign a separate amendment for each Credit Verification Letter they are to obtain.

14. Monitoring

Several monitoring mechanisms are built into the CHMS to assure that it achieves its economic, conservation, and regulatory objectives.

(a) Monitoring under Section 7. Pursuant to Section 7 of the ESA, the Resource Management Agencies and the USFWS shall work together to develop and implement a plan for monitoring the effectiveness of, compliance with, and biological conditions under the CHMS. Such monitoring may overlap with the monitoring provisions described in the following subsections.

(b) Regular reporting. The following regular review and reporting activities shall be conducted under the CHMS:

(i) The Forest Service shall make Credit Registry information available to the public (*see* Section 10(f)).

(ii) The Forest Service shall conduct an annual review of the progress of the CHMS over the prior fiscal year (October 1 to September 30), report the following information to the MOU Parties and the USFWS, and make such information available to the public upon request, by each January 31 following the fiscal year under review:

(A) Changes in land categories over the calendar year (e.g., "D-to-E," "D-to-M2," "M2-to-M1," etc.);

(B) For each Administrative Unit, the Conservation Value contained within each land category;

(C) A summary of Conservation Credit transactions over the year;

(D) A summary of federal land designations, purchases, and exchanges over the year; and

(E) Any amendments to the CHMS (*see* Section 17(b)) that have been made during the year.

(c) Reserve formation. The Forest Service shall monitor the contribution of land within Priority Areas. Once all Stage 1 Priority Area lands within an Administrative Unit have been added to the Reserve, the Forest Service shall report to the MOU Parties and the USFWS that such Unit has been Activated (*see* Section 9(b)(i)).

(d) Habitat Inventory. The Habitat Inventory is intended to reflect the existence of Occupied Habitat, Suitable Habitat, Revegetated Habitat (including the level of success criteria met), and Other Beneficial Habitat, as those terms are more particularly defined in *Appendix C*, the box on page 18, and in Section (a) of the Revegetation Standards. The issuance of Conservation Credits (*see* Section 10(f)) and the measurement of Compensation Requirements (*see* Section 11(a)) are based upon the Habitat Inventory, and such actions are not reviewable based upon subsequent changes in the Habitat Inventory. However, the Habitat Inventory shall be updated from time-to-time by the Forest Service based upon new information, and changes in the Habitat Inventory will affect subsequent issuances of Conservation Credits and ESA Compliance. The circumstances under which the Forest Service shall make changes to the Habitat Inventory are as follows:

(i) Automatically upon issuance of a Compliance Verification Letter. The Forest Service shall automatically change the Habitat Inventory *on land covered by a Compliance Verification Letter* upon issuance of such letter to show the subject land as nonhabitat (in anticipation of disturbance of any existing habitat).

(ii) On initiative of the applicable Resource Management Agency. The Forest Service shall change the Habitat Inventory *on federal lands* (including lands subject to unpatented claims) whenever the applicable Resource Management Agency develops or otherwise obtains new biological information that it deems reliable that indicates a change is warranted based upon the habitat definitions. In any event, the Habitat Inventory shall be updated based upon the best available biological information no less than every 5 years.

(iii) On initiative of the County. The Forest Service shall change the Habitat Inventory *on private lands under the jurisdiction of the County* whenever the County develops or otherwise obtains new biological information that it deems reliable that indicates a change is warranted based upon the habitat definitions set forth in *Appendix C*.

(iv) On initiative of a private party. The Forest Service shall change the Habitat Inventory *on lands owned or claimed* by a private party when such party offers new biological information that the County (in the case of privately-owned land) or the applicable Resource Management Agency (in the case of an unpatented claim) deems reliable indicating that a change is warranted based upon the habitat definitions set forth in *Appendix C*.

Some examples of reasons that the Habitat Inventory may be inaccurate and require adjustment are:

- Inaccuracy of prior survey information.
- Naturally-occurring changes in environmental conditions and/or species dispersal patterns.
- Occurrence of undisturbed habitat on lands mapped as M1 or M2 when the underlying landowner or claim holder takes the necessary steps to obtain credit for them in accordance with Section 11(f).
- Meeting of revegetation success criteria (resulting in new Revegetated Habitat; *see* box on p. 18 and Section (a) of the Revegetation Guidelines).
- Habitat disturbance, whether authorized or unauthorized.

(e) Section 7 re-initiation. Under certain circumstances, the ESA and its regulations may require that the CHMS Section 7 Consultation be re-initiated and the CHMS Biological Opinion be reassessed. The conditions for re-initiating consultation set forth in the Section 7 regulations are:

- The amount or extent of incidental take is exceeded [not applicable to plants];
- New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in [the biological] opinion;
- The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in [the biological] opinion; or
- A new species is listed or critical habitat designated that may be affected by the action.

Such re-initiation should be avoided, if at all possible, in order to maintain the regulatory certainty and streamlining provided by the CHMS. In the event that any Resource Management Agency determines that a condition exists or may be developing that could trigger re-initiation, such party shall report the condition to the MOU Parties. The MOU Parties may then consider whether to take any action to avoid or eliminate the condition that could lead to re-initiation. In the event that the triggering condition is the proposed or new listing of a species that may be affected by mining projects in the CHMA, then the MOU Parties may include in its consideration the possibility of amending the CHMS in accordance with Section 17(c) to address such species.

In the event re-initiation occurs in spite of any efforts of the MOU Parties, the USFWS has the authority under Section 7(d) of the ESA to issue a letter to the Resource Management Agencies stating that they have an obligation to suspend operations covered by the CHMS Biological Opinion. In such event, the Resource Management Agencies shall suspend operation of the CHMS only to the extent that it determines that Section 7(d) of the ESA requires such suspension. The Resource Management Agencies shall limit any such suspensions to the greatest extent possible (such as to only certain geographical areas, species, and/or types of activities) while still achieving compliance with the ESA.

The USFWS shall work closely with the MOU Parties during any re-initiation of the CHMS Section 7 Consultation in an effort keep the CHMS intact with as little disruption as possible to the expectations of the various MOU Parties.

15. Funding

Two types of costs require funding under the CHMS. The primary cost is that of acquiring land for the Habitat Reserve. The secondary type of cost is for administration of the CHMS, specifically for carrying out the various monitoring and reporting functions, maintaining the Habitat Inventory, maintaining the Credit Registry, and managing the Habitat Reserve. The balance of this section describes how these various costs will be funded.

(a) Reserve formation. All contributions of land to the Habitat Reserve involve a societal cost—the cost of foregoing uses of the land other than conservation in perpetuity. It is the intent of the CHMS that this cost be shared by the public sector and the private sector.

The following are the various ways, direct and indirect, that the cost of acquiring land for the Habitat Reserve shall be borne, with the first four constituting the public sector's share, and the last one constituting the private sector's share:

(i) Federal designations of unclaimed land;

(ii) Federal lands offered in exchange for claims or private land;

(iii) Federal Land & Water Conservation Fund (the "LWCF") (the Resource Management Agencies have made application for funding from this source);

(iv) Special congressional appropriations (*see* Section 16(a)); and

(v) Reserve Contributions made for Conservation Credits (which indirectly constitutes compensation to obtain ESA Compliance).

(b) Administrative costs. The administrative costs of the CHMS are likely to be small in comparison to the land acquisition costs, but provision must be made to cover these costs if the CHMS is to succeed. Administrative costs will be covered as follows:

(i) The Resource Management Agencies shall commit the federal budgetary resources necessary to manage the Habitat Reserve as part of their ordinary responsibilities for the lands under their jurisdiction;

(ii) The Forest Service shall commit the additional budgetary resources necessary to carry out the various monitoring and reporting functions required of it by the CHMS, maintain the Habitat Inventory, and maintain the Credit Registry; and

(iii) If the Forest Service deems it necessary, it may obtain supplemental funding for its administrative functions by charging *credit registration fees* in accordance with Section 10(f) for the handling of vari-

ous types of Conservation Credit transactions; the Forest Service shall set any such fees from time-to-time to cover actual uncovered costs and shall report to the MOU Parties the calculations used to size any such fees; the Forest Service may delegate some or all of its administrative functions, including any collection of credit registration fees, to another agency or to a private party.

16. Legislation

Federal legislation would be helpful in three primary ways for implementing the CHMS: to fund federal land purchases, to streamline the federal land exchange process, and to give the Resource Management Agencies the authority to permanently dedicate federal land to the Habitat Reserve. This section further describes the legislation that may be sought.

(a) Funding for land purchases. Although a significant amount of unclaimed federal land is available to set aside for the Habitat Reserve, much of the best habitat for the Carbonate Plants corresponds with claimed or privately owned land containing mineral deposits. Demand for ESA Compliance will result in some level of Reserve Contributions that will help in the addition of land from the Priority Areas to the Reserve, but such demand is insufficient to meet the objective of adding to the Reserve, in contiguous blocks, 100% of the Occupied Habitat and 85% of the Suitable Habitat contained within each Priority Area (*see* Section 9(b)), even in the very long term. Adding such Priority Area lands to the Reserve will require the federal government to purchase a significant amount of land (*see* Section 8(b)).

Since most current mining activity is within the Furnace Unit, and the Furnace Unit contains some of the best habitat for the Carbonate Plants, it is the intent of the MOU Parties to facilitate the addition of Furnace Unit Priority Areas to the Habitat Reserve as soon as possible after adoption of the CHMS and the issuance of the CHMS Biological Opinion. Fortunately, some of the best habitat for Carbonate Plants in the Furnace Unit is owned or claimed by parties who are willing, at least in concept, to sell their land or claims as part of the Initial Furnace Transactions (*see* Sections 4(d)(iii), 9(d)).

Some federal funding may be available administratively through the LWCF, and the Resource Management Agencies have applied for such funds. If such funds become available, they could play an important role in land purchases. The key to adding Priority Area lands to the Reserve (*see* Section 9(b)) is to be able to "escrow" several transactions that can all close at once. Federal legislation may be introduced to specifically appropriate LWCF monies and to streamline the process for applying such monies to complete the purchase of Priority Area lands. Some appropriated funds may be earmarked for one or more particular purchases, whiles others may be part of an "opportunity fund" available for miscellaneous purchases as the opportunities arise to purchase important habitat land at a good price.

(b) Assistance with implementing purchases and land exchanges. The administrative process required to consummate the purchase of land with federal funds or federal land exchanges involves land appraisals, mineral valuations, and claims validations that can require a significant amount of time to complete. The CHMS could benefit from legislation that streamlines both *(i)* the process of using any specially-appropriated funds obtained from the legislation described in subsection *(a)* above and *(ii)* the land exchange process for transfers of federal land to the private sector in exchange for the transfer of private habitat lands to the Resource Management Agencies for the Habitat Reserve. Such legislation could also direct specific transactions to occur at specified prices or exchange values. Such legislation can increase the contribution that federal land purchases and exchanges can make to the CHMS.

(c) Permanent reserve dedication. Finally, it would be desirable to increase the certainty of permanent protection of the Habitat Reserve by providing a means for permanent dedication of federal lands under the jurisdictions of the Forest Service and the BLM to the Habitat Reserve. Such dedication would presumably consist of a combination of a permanent mineral withdrawal and a permanent land allocation to management consistent with the intended purposes for the Habitat Reserve under the CHMS. Ideally, under such

legislation, the processes established in the CHMS would serve as the processes for determining what land is appropriate a legislative Habitat Reserve designation.

All of the MOU Parties have a strong interest in supporting federal legislation as outlined above. The CHMS provides no formal process for pursuing such legislation, but leaves it to the MOU Parties to do so.

17. Amendment

It is important that certain kinds of changes can be made to the CHMS that will give it the ability to adapt to new information and circumstances without an unduly burdensome process. It is equally important that the CHMS be fundamentally stable, reliable, and predictable in order to maximize its integrity and usefulness to all of the MOU Parties. To strike a balance between flexibility and stability, the balance of this section describes a two-tier CHMS modification process, followed by a description of how new ESA listings can be addressed under the CHMS.

(a) Administrative changes. Throughout the CHMS are references to adjustments and modifications that may be made by the Resource Management Agencies in their discretion. Such actions are to be regarded as part of the normal operation of the CHMS and not as amendments so long as they are consistent with the other provisions of the CHMS. Examples of such actions include, without limitation, modification of the Habitat Inventory, changes in the Credit Registry procedures, and determination of the means of making CHMS data available to the public.

(b) Amendments. Any modification to the CHMS that does not qualify as an administrative change under subsection *(a)* above shall be regarded as an "Amendment." Amendments shall require *(i)* the approval of all MOU Parties that could be adversely affected by the proposed Amendment and *(ii)* the concurrence of the USFWS. Certain Amendments may result in a condition that triggers re-initiation of the CHMS Section 7 Consultation, in which case the Amendment would not become effective unless it is also incorporated into a revised, favorable CHMS Biological Opinion as a result of the re-initiation process.

(c) Addressing new ESA listings. If additional species (other than the Carbonate Plants) that occupy portions of the CHMA are proposed for listing or are listed as threatened or endangered under the ESA, and mining activities addressed by the CHMS may affect such species, then the MOU Parties may elect to initiate an Amendment process to attempt to address such additional species under the CHMS. The following provisions would apply to such a process:

(i) Upon proposal of such a species for listing, the MOU Parties may work with the Resource Management Agencies to conference with the USFWS and to obtain a conference opinion that upon the listing of such species, any take of the species pursuant to the CHMS shall not jeopardize the continued existence of such species. The MOU Parties may choose, by unanimous agreement among the affected parties, to modify the CHMS by an Amendment in order to help achieve such a conference opinion. In accordance with the ESA and its regulations, upon the listing of the species, such a favorable conference opinion would automatically be deemed to be a new biological opinion resulting from a re-initiation of the CHMS Section 7 Consultation, and suspension of the operation of the CHMS would be avoided.

(ii) Any Amendment that is made outside of the process described in subsection *(i)* above would require re-initiation of the CHMS Section 7 Consultation, but the availability of ESA Compliance for the Carbonate Plants under the CHMS would not be suspended, except potentially where the newly-listed species may be affected (*see* subsection *(iii)* below).

(iii) The availability of ESA Compliance under the CHMS may, if required under Section 7(d) of the ESA, be suspended in areas in which the newly-listed species may be affected.

(iv) Any proposed Amendment shall attempt to integrate any land under Habitat Reserve designations and management for the newly-listed species into the existing CHMS framework to the greatest extent possible.

(v) In deliberating on the revised CHMS Biological Opinion, the USFWS shall take into account and give credit for habitat of the newly-listed species

that is or will be included in either *(A)* the Habitat Reserve or *(B)* other permanent reserve or conservation areas within the CHMA that are protected by conservation easements or pursuant to other conservation planning efforts (such as the "West Mojave Plan," a multi-jurisdictional habitat conservation plan under preparation, with the BLM as the federal lead agency).

Carbonate Habitat Management Strategy

Appendices

Appendix A: Glossary of Terms

All of the terms in this glossary are also defined in the section of the CHMS indicated in parenthesis. In some cases, the definitions in the body of the CHMS are more detailed and are only summarized here. In the event of any conflict between a definition in the body of the CHMS and a definition in this glossary, the definition in the body of the CHMS shall control.

Activated—the status of an Administrative Unit within which the required portions of the Stage 1 Priority Areas have been added to the Habitat Reserve, thereby allowing ESA Compliance to be obtained for mining projects within such Unit under the CHMS (Section 9(b)(i))

ACV—abbreviation for Adjusted Conservation Value (Section 7(e))

Adjusted Conservation Value—the Conservation Value of an area adjusted by the Net Edge Adjustment for that area (Section 7(e); *see also* "ACV")

Administrative Unit—a subarea of the CHMA established for purposes of administering the CHMS; there are five Administrative Units: White Mountain, Furnace, Helendale, Bertha, and Moonridge/Onyx (Section 6; *see also* "Unit")

Amendment—a modification to the CHMS that does not qualify as an administrative change (Section 17(b))

BLM—the U. S. Department of Interior Bureau of Land Management (Section 1)

Carbonate Plants—the four species listed under the ESA that occur within the CHMA and are addressed by the CHMS (Section 1)

Category M1, Category M2, etc.—see the definitions in Section 5 and the box on page 14

CEQA—California Environmental Quality Act (Section 2(a)(vi))

CHMA—Carbonate Habitat Management Area (Section 1 & *Figure 1*)

CHMS—Carbonate Habitat Management Strategy, referring both to this document and the program it describes (Section 1 introduction)

CHMS Biological Opinion—the programmatic biological opinion rendered by the USFWS under Section 7 of the ESA for the CHMS (Section 3(b)(i))

CHMS Section 7 Consultation—the Section 7 Consultation between the Resource Management Agencies and the USFWS, which will result in the CHMS Biological Opinion (Section 3(b)(i))

CNPS—the California Native Plant Society (Section 13 introduction)

Compensation Ratio—the required ratio of Reserve Contribution requirement to the amount of habitat loss to be caused by a project, both measured in Conservation Units; the Compensation Ratio is 3:1 (Section 11(a))

Compensation Requirement—the number of Conservation Credits that must be given to obtain ESA Compliance for mining activities on a given parcel (Section 11(a))

Compliance Verification Letter—a concurrence letter acknowledging the satisfaction of the requirements for obtaining ESA Compliance with respect to a particular parcel of land (Section 11(e))

Connective Land—land added to the Reserve within a Priority Area sufficient to connect all of the Occupied Habitat and Suitable Habitat in that Priority Area into one contiguous patch (Section 9(b)(i))

conservation banking—obtaining Conservation Credits, either by making Reserve Contributions or by purchasing them from other private parties, and holding them for future use or sale rather than immediately using them to obtain ESA Compliance (Section 8(d))

Conservation Category—the conservation land use category, which is Category E (Section 5(b))

Conservation Credit—the "currency" of the CHMS given to private parties in exchange for Reserve Contributions; a Conservation Credit represents one Conservation Unit of Conservation Value (Section 7(a))

Conservation Unit—the unit of measurement of Conservation Value under the CHMS (Section 7(a); *see also* "CU")

Conservation Value—the value of land for the conservation of the Carbonate Plants, as measured in Conservation Units (Section 7 introduction & box on page 9; *see also* "CV")

Contingent Contribution—a Reserve Contribution that is made contingent on either *(i)* ESA Compliance becoming available in a particular Administrative Unit (based upon the addition of the entire Stage 1 Priority Area to the Habitat Reserve) or *(ii)* approval of a Mining Plan for a particular project (Section 10(d))

County—County of San Bernardino (Section 1)

Covered Activities—mining activities that can obtain the benefit of ESA Compliance under the CHMS (Section 3(a))

Credit Holder—the registered owner of some number of Conservation Credits (Section 10(a))

Credit Registry—a database maintained by the Credit Registrar that tracks the creation, use, and transfer of Conservation Credits under the CHMS (Section 10(f))

Credit Verification Letter—a concurrence letter issued by the Forest Service that establishes the creation or transfer in ownership of a specified number of Conservation Credits (Section 10(f))

CU—abbreviation for Conservation Unit (Section 7(a))

CV—abbreviation for Conservation Value (Section 7 introduction)

edge—the line where land of one of the three type of land use categories (Mining Category, Reserve Category, or Uncommitted Category) meets another of the three types (box on bottom of page 15; Section 7(e)(ii))

ESA—federal Endangered Species Act of 1973, as amended (Section 1 introduction)

ESA Compliance—compliance with the ESA for Covered Activities with respect to the Carbonate Plants and any other listed species addressed by the CHMS in the future (Sections 3(b)(i), 11)

Federal Land Plan—a land use and management plan that covers Forest Service or BLM land within the CHMA (Section 2(a)(v))

Forest Service—the U. S. Department of Agriculture Forest Service (Section 1)

GIS—geographical information system (Section 4(b))

Habitat Inventory—the Forest Service's official GIS database for the CHMS that identifies habitat types within the CHMA (Sections 7(c), 14(d))

Habitat Reserve—the reserve system for the Carbonate Plants to be formed pursuant to the CHMS (Section 1)

Initial Furnace Transactions—the initial transactions toward the addition of the Furnace Unit Stage 1 Priority Areas to the Reserve (Sections 4(d)(iii), 9(d))

Initial Habitat Reserve—the Habitat Reserve at the commencement of CHMS implementation, prior to any private Reserve Contributions under the CHMS (Sections 4(d)(i), 9(a))

LWCF—Land and Water Conservation Fund (Section (15(a)(iii))

Mining Category—any of the mining-related land use categories, which include Categories M1, M2, and F (Section 5(a))

Mining Law—the Mining Law of 1872, as amended (Section 1)

Mining Plan—a mining plan of operations (in the case of a claim on federal land) or a mining and reclamation plan (in the case of mining on private land) (Section 5(a)(i))

MOU—the memorandum of understanding setting forth the understanding of key parties regarding the responsibilities and activities of those parties with respect to the CHMS (Section 13(g))

MOU Parties—the Resource Management Agencies, the County, CNPS, the private parties who intend to enter into the Initial Furnace Transactions, and each

other party who receives either a Credit Verification Letter or a Compliance Verification Letter in the future (Section 13 introduction)

NEPA—National Environmental Policy Act (Section 2(a)(v))

Net Edge Adjustment—an adjustment to the Conservation Value of an area used to arrive at Adjusted Conservation Value (Section 7(e))

Occupied Habitat—land designated on the Habitat Inventory as occupied habitat for one or more of the Carbonate Plants; excludes Revegetated Habitat (box on page 14)

Other Beneficial Habitat—land that is designated on the Habitat Inventory as undisturbed natural land that provides some geomorphological, hydrological, or habitat configuration benefit to the Carbonate Plants; excludes all other habitat categories that provide some benefit to the Carbonate Plants (box on page 14)

Permanent Contribution—a Reserve Contribution in the form of an absolute, permanent grant of privately owned land or relinquishment of a mining claim (Section 10(b)(i); *see also* "Relocatable Contribution")

Priority Area—any Stage 1 Priority Area or Stage 2 Priority Area (Section 9(b))

Reclamation Regulations—collectively, all existing reclamation requirements outside of the CHMS that apply to a given mining operation, which may include, depending on location and other factors, reclamation standards under SMARA; a Memorandum of Understanding between the Forest Service, BLM, and the State of California signed October 1992 regarding the application of SMARA on federal lands in California; the Forest Service regulations under 36 CFR 228; and the 1991 Big Bear District Mining Reclamation Standards (Section 11(c))

Relocatable Contribution—a Reserve Contribution in the form of an agreement not to disturb certain land and to allow it to be managed as part of the Habitat Reserve, but reserving the right to substitute a different Reserve Contribution in the future (Section 10(b)(ii); *see also* "Permanent Contribution")

Reserve—the Habitat Reserve (Section 1)

Reserve Contribution—a contribution to the Habitat Reserve in the form of either *(i)* granting privately owned land, *(ii)* abandoning a mining claim, *(iii)* restricting a mining claim or privately owned land for conservation purposes subject to later redemption by offering equivalent Conservation Value in another form, or *(iv)* granting or relinquishing the surface rights of privately-owned land or a mining claim while retaining the right to conduct subsurface mining (box on page 9; Section 10(b))

Resource Management Agency—the Forest Service or the BLM, each with respect to the land under its jurisdiction (Section 1)

Revegetated Habitat—mining land that has been revegetated and meets all of the requirements for obtaining conservation credit set forth in the Revegetation Guidelines (box on page 14; Section (a) of *Appendix E*)

Revegetation Guidelines—the "Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions" set forth in *Appendix E* (Section 8(g))

SBNF—the San Bernardino National Forest (Section 1)

SMARA—the California Surface Mining and Reclamation Act of 1975, as amended (Section 2(c)(iv))

Stage 1 Priority Area—an area within the CHMA so designated on *Map 3* in *Appendix I*; certain portions of the Stage 1 Priority Areas within a Unit must be added to the Habitat Reserve for such Unit to be Activated (Section 9(b); *see also* "Priority Area")

Stage 2 Priority Area—an area within the CHMA so designated on *Map 3* in *Appendix I*; although there is no requirement that Stage 2 Priority Areas be added to the Habitat Reserve before loss of habitat may occur within a Unit, no loss of habitat may occur under the CHMS within any Stage 2 Priority Area (Section 9(b); *see also* "Priority Area")

Suitable Habitat—land designated on the Habitat Inventory as suitable habitat for one or more of the Carbonate Plants; excludes Occupied Habitat and Revegetated Habitat (box on page 14)

Surface Entry Restriction—an instrument that is recorded against fee-owned land or a mining claim re-

stricting the surface entry rights of the landowner or claim holder; a Surface Right Restriction is a method of making a Reserve Contribution of the surface of land (Section 10(b)(iii))

Uncommitted Category—any of the land use categories that do not indicate a commitment to either mining activities or the Reserve, which include Categories D, P, and X (Section 5(c))

Unit—an Administrative Unit (Section 6)

Use Restriction Agreement—an agreement used to make a Relocatable Contribution whereby the contributor agrees not to disturb a parcel of land during the term of the agreement (Section 10(b)(ii))

USFWS—United States Fish and Wildlife Service (Section 1)

West Mojave Plan—a multi-jurisdictional habitat conservation plan under preparation, with the BLM as the federal lead agency (Section 17(c)(v))

Working Group—certain mining interests, conservation interests, and government agencies that have been working together since October 1999 to develop the CHMS (Section 1) ❀

Appendix B: Species Accounts

1. Cushenbury buckwheat

Cushenbury buckwheat—*Eriogonum ovalifolium* Nutt. var. *vineum* (Stokes) Jepson

(a) Author. Andrew C. Sanders, Herbarium, Department of Botany and Plant Sciences, University of California, Riverside, CA 92521-0124

(b) Management status. Federal: Endangered; California: S1.1, G5T1 (CDFG, 1998); CNPS: List 1B, RED code 3-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Cushenbury buckwheat is endemic to California and is restricted to dry calcareous (primarily limestone) slopes of the northern San Bernardino Mountains (Reveal, 1993). Most populations are on lands within the boundary of the San Bernardino National Forest, but the taxon does extend slightly onto BLM and private lands along the southern edge of the WMPA. The overall range of this plant extends from White Mountain southeast to Mineral Mountain on the north side of Rattlesnake Canyon.

There is a recent report of what is possibly this plant from the southern Sierra Nevada Mountains, but the identification has not yet been confirmed. This discovery is discussed in greater detail in the Natural History section, below.

(d) Natural history. Cushenbury buckwheat (Polygonaceae) was originally described as a distinct species, *Eriogonum vineum*, by Small (1898) from plants collected near Rose Mine by S.B. Parish (#3170) in 1894. At that time Small confused it with plants from farther north and cited a specimen from Oregon as representing this taxon also. It is now believed that this plant is endemic to the San Bernardino Mountains, with the possible exception of a small population in the southern Sierra Nevada.

Cushenbury buckwheat is a long-lived prostrate to mound-forming shrub that typically occurs on rocky slopes, often in cracks on bedrock or on otherwise stable slopes, but is also known from deeper soils derived from decomposed carbonates. It is typically not found in disturbed areas (either naturally or by man), nor is it usually found along washes or on canyon bottoms, unlike Parish's daisy (*Erigeron parishii)*, another limestone endemic that often occurs nearby. But, it has occasionally been found colonizing abandoned haul roads, as at Furnace Canyon (pers. obs., 1998). It is the only variety of *Eriogonum ovalifolium* found in the San Bernardino Mountains, though other varieties occur elsewhere on similar substrates. It has never been found away from carbonate substrates and appears to be more common on the higher value limestones than it is on the economically unimportant dolomites. It is thus, based on information from a survey done for a consortium of mining companies in 1992 (Tierra Madre, 1992), particularly vulnerable to destruction by limestone mining (Sanders, 1992).

Cushenbury buckwheat plants are very compact with short woody stems spreading a few centimeters over the ground. They have been described as "forming large silver mats" resembling "boulders of the limestone it occurs on" (T. Krantz, label notes, UCR). The foliage mounds seldom rise more than 4 in. (10 cm) above the surrounding rocks or soil. However, when the plants begin flowering, they send up inflorescences 1-5 in. (2-12 cm) above the foliage. The several to many short woody stems spread and ascend over a very small patch of ground from a thick woody base above a deep and well-developed woody taproot. The short branches hold many small round-obovate leaves with blades 0.16-0.5 in. (4-12 mm) long and slightly narrower. The petioles are distinct and ca. 0.12-0.24 in. (3-6 mm) long. The foliage is densely covered with tangled, white, rather felty, hairs on both surfaces. The leaves densely cover the upper parts of the stems and are densely grouped so that the ground is generally not visible through the plant. This overall plant density is partly caused by the dried leaves which do not fall from the plant but simply turn a dark brown color and cling to the older parts of the stem. This presumably provides insulation for the plant as well as added protection from water loss through the stems.

Cushenbury buckwheat seems to share many general ecological characteristics with the other varieties of *E. ovalifolium.* It is a perennial of open areas and appears intolerant of extensive shading, preferring full sunlight, and typically occurs between shrubs rather than under them (White, 1997). *Eriogonum ovalifolium* is not a species well adapted to competing for light, but it is very competitive on sites where tall and fast growing species are excluded by moisture deficiencies, wind, winter cold, or nutrient deficiencies. The compact "cushion" habit probably serves to reduce moisture loss on windy ridges as is true for other species of similar life form (Walter, 1973). The short annual growth intervals and consequent low stature makes all races of *E. ovalifolium* poor competitors on sites that are capable of supporting tall or dense vegetation. However, sites where moisture stress is combined with high insolation are highly favorable for plants such as this one. The nutrient deficiencies of limestone soil, exacerbated by the high pH which interferes with mineral uptake, doubtless serve to further reduce competition by fast growing species.

Winter cold is another major ecological factor that affects interior and montane species in the temperate zone. Cushenbury buckwheat, and other low growing cushion species, may be regularly covered by snow during the period of the year when soil moisture is unavailable because the ground is frozen, and when, in arid areas, the humidity of the air may still be very low. When covered with snow, Cushenbury buckwheat is subjected to even less moisture stress than it would be if exposed to the dry air. Under snow, the relative humidity is at virtually 100% and wind effects are excluded. Even when exposed, the low dense form of the plant shelters much of it from direct wind effects. The dense covering of wool on the leaves is evidence that moisture and not light is a major controlling factor for this species. Such a woolly covering will greatly reduce the amount of light striking the chloroplasts in the leaf tissue, but this tomentum also forms a layer of dead air at the leaf surface and may reduce water loss due to wind.

The inflorescence consists of a leafless peduncle (flowering stem) that supports a group of involucres that form a single head-like unbel of cream-white to reddish flowers, with green to reddish midribs, at the tip. The flowers are perfect (possess both male and female parts). Cushenbury buckwheat is distinguished from other mat-forming buckwheats in the San Bernardino Mountains by its compact cushion-form habit, large solitary heads of cream-white to maroon flowers, and round-obovate leaves. There are two similar buckwheat species in the general region. Perhaps the most grossly similar species in the area is southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum)*, which occurs in a different habitat (pebble plains) and which has narrower leaves and smaller heads. Its general lifeform is very similar to Cushenbury buckwheat. Skree buckwheat (*Eriogonum saxatile*) is also quite similar, and occurs in the same general areas, but has a more open form and occurs primarily on loose granitic soils on slides and along washes. It is also less long-lived and is seldom conspicuously woody. Its leaf morphology is very similar, but its open cymose inflorescence is quite different from the compact head of Cushenbury buckwheat.

Based on a relatively small sample of herbarium specimens, it appears that Cushenbury buckwheat fruits ripen primarily in about July following the main May-June flowering period, but must ripen later for later flowerings (see below). This would make the seeds ready for germination at the time of any summer rains in August/September, assuming the seeds do not remain dormant for a lengthy period following dispersal. It appears that the relatively large perianth may dry around the fruit, with the achenes remaining attached to the receptacle, and that this whole unit is involved in dispersal, with the dried tepals acting as wings. Wind is thus probably important for local dispersal. Wind is not, however, very effective over long distances. Seed dispersal has not been studied in this species (or variety), but Stokes (1936) thought that birds may play a role in the dispersal of all *Eriogonum* seeds based on various observations of birds and their behaviors. She thought that seeds stored in the crop of a bird killed by a predator might serve to establish new populations in areas distant from existing populations. She also mentioned wind, rain and streams as dispersal agents, but presented no data to support these ideas. Given the extremely restricted distribution of Cushenbury buckwheat, it is not clear that long-dis-

tance dispersal has ever occurred and it certainly does not appear to be a common phenomenon. The rest of the varieties of *E. ovalifolium* occur north of the Mojave Desert, such as in the Inyo-White Mtns. and Sierra Nevada (Reveal, 1968) as well as through the Great Basin (e.g., Kartesz, 1988; Welsh et al, 1987; Reveal, 1968). It thus does appear that long distance dispersal occurred at some point, unless there was formerly suitable habitat across the Mojave Desert. There are scattered limestone outcrops on the Mojave Desert that would have supported pinyon woodland when, during the Pleistocene, this more mesic vegetation occupied what are now desert flats (Raven and Axelrod, 1978). These limestone hills could perhaps have served as stepping stones across the desert for populations of *Eriogonum ovalifolium*. It should also be noted that *Eriogonum ovalifolium* in general is not restricted to limestone. Other varieties of the species commonly occur on granite or general alluvium in sagebrush scrub (Reveal, 1968; Welsh et al., 1987). Thus it is possible that this taxon entered the range on other substrates, but then became restricted to limestone by competitive exclusion and subsequent refinement of existing adaptations.

The flowers are relatively large and are clustered into conspicuous head-like umbels. The flowers fade to pink or red at maturity (i.e., probably after pollination) and primarily bloom in May and June. There can be later flowering, for example in September (e.g., Derby and Krantz, s.n., UCR), but the extent of such late flowering or its environmental triggers are unknown. The flowers often dry to a yellowish color in herbarium specimens, but whether this may reflect the original color of some populations is unknown and unlikely. Few collectors of this species appear to bother recording flower color. White (#4012, UCR) has recorded the color of young flowers as "dull white w/reddish vein at centers of "petals" and reddish anthers". Maile Neel (pers. comm.) reports that there is flower color variation within populations and that fresh flowers vary from creamy white to yellowish and that some are pinkish to maroon even when newly opened. She also reports that not all individuals have flowers that turn reddish in age. Clearly, there is need for further study of the trends in flower color in this plant.

Pollination of this plant has only recently been studied, and small insects are almost certainly its pollinators (S. Morita, pers. comm., 1998). The flower color changes to red suggest that the pollinator may be a bee, but such have rarely been observed on the species and Morita (pers. comm., 1998) thinks the pollinators may be generalist flower visitors, rather than a specialist such as a bee. In the summer of 1998 Morita observed nearly 100 insect species visiting this plant, including potential pollinators, plant feeders and others. She noted that because it is relatively late flowering, it is one of the few nectar sources available in its habitat at the time it flowers and so may be heavily visited for that reason. The generalists that are potentially pollinators included many flies, particularly tachinids and bee-flies (Bombylidae), but also many smaller species, such as chloropids. A small species of bee-fly was locally common on the flowers. Two species of small solitary bees (Andrenidae and Halictidae) were also seen visiting, but these were very few (Morita, pers. comm., 1998). Exactly which species serve as effective pollinators has not yet been determined.

Among the plant feeders present were a leaf beetle (Chrysomelidae) which was seen eating the flowers, soft-winged flower beetles (Dasytidae) which were present in the flowers, and various hemipterans, including the small milkweed bug (*Lygaeus*), various plant bugs (Miridae), and stink bugs (Pentatomidae). Grasshoppers (Acrididae) and their nymphs were also present and probably feed on the foliage of the Cushenbury buckwheat.

(e) Habitat requirements. This taxon is apparently restricted to carbonate slopes on the north side of the San Bernardino Mountains. As noted above, it seems to display a preference for limestone rather than dolomite, but this needs confirmation. It also seems to prefer stable slopes with bedrock outcropping, and is rarely found on unstable slopes or along active washes. It can be locally common where it is found, but more commonly is present as scattered individuals. Cushenbury buckwheat occurs primarily in pinyon-juniper woodland but also descends into Joshua tree woodland, mixed desert and blackbrush scrub and extends upward into Jeffrey pine-western juniper woodland (Munz, 1974; Skinner and Pavlik, 1994; Gonella

and Neel, 1995). Among its typical associates are: single-needled pinyon (*Pinus monophylla*), big-berried manzanita (*Arctostaphylos glauca*), curl-leaf mountain-mahogany (*Cercocarpus ledifolius*), Shockley's rock cress (*Arabis shockleyi)*, rose sage (*Salvia pachyphylla*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*C. nauseosus*), big sagebrush (*Artemisia tridentata*), pine needlegrass (*Stipa pinetorum*), canyon live-oak (*Quercus chrysolepis*), nevada forsellesia (*Forsellesia nevadensis*), green Mormon tea (*Ephedra viridis*), blackbrush (*Coleogyne ramosissima*), Coville's dwarf abronia (*Abronia nana covillei*), yellow cryptantha (*Cryptantha confertiflora*), Utah juniper (*Juniperus osteosperma*), small-cup buckwheat (*Eriogonum microthecum*), and Parish's daisy (*Erigeron parishii*).

Based on specimens at UCR, populations occur at elevations between 4800 and 6500 ft. (1450 and 1982 m), though Munz (1974) reports "ca. 5000-5500 ft." (1500-1675 m) and Reveal (1993) reports 1500-2100 m (5000-7000 ft.). Recent plot-based sampling has found it between 4680 and 7840 ft. (M. Neel, pers. comm.), and Melody Lardner (pers. comm.) reports that the Forest Service has the species mapped up to 8100 ft. elevation.

(f) Population status. Cushenbury buckwheat is naturally very restricted in its distribution, but has additionally suffered a large but unquantified population decline due to limestone mining (Krantz, 1988; Gonella and Neel, 1995). There are no populations that are secure from mining activity and most are within areas subject to massive disturbance within the next few decades.

Populations of this long-lived plant appear stable in areas where they are undisturbed (pers. obs.), but its habitat has been heavily disturbed and many plants destroyed by mines, haul roads, waste dumps and other mining related activities in recent decades (Krantz, 1988).

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2. Cushenbury milk-vetch

Cushenbury milk-vetch—*Astragalus albens* Greene

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(b) Management status. Federal: Endangered; California: S1.1, G1 (CDGF, 1998); CNPS: List 1B, R-E-D code 3-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Cushenbury milk-vetch is found in the northeast end of the San Bernardino Mountain range in San Bernardino County, California. With rare exceptions, it is restricted to carbonate and carbonate-related soils and outcrops from 4000-6600 ft. (1300-2000 m). Its range extends from a ridgetop just east of Dry Canyon to the southeast through Lone Valley, east of Baldwin Lake, to upper Burns Canyon. An unverified population at Box 'S' Springs, two to three miles northwest of Cushenbury at 3600 ft. (1100 m), is its northernmost and lowest reported location.

(d) Natural history. Cushenbury milk-vetch is an herbaceous member of the pea family (Fabaceae), and was first collected by Parish and Parish (Greene, 1885). Several prostrate stems, each 2-12 in. (0.5-3 cm) long, emerge from the base. The leaves and stem have appressed silvery-white hairs, giving the plant a smooth, sleek, gray appearance. The pinnately-compound leaves have 5-9 leaflets which are elliptic to oval-shaped, have obtuse tips, and are each 0.2-0.4 in. (5-10 mm) long. Flowers occur in racemes on 0.8-2.0 in. (2-5 cm) long peduncles. The calyces are about 0.16 in. (4 mm) long, and also bear the silky silvery-white hairs. The papillionaceous corolla is pink to purplish, with both banner and keel 0.3-0.4 in. (7-10) mm in length, exceeding the wing length. The sessile fruits have two locules, are about 0.4-0.7 in. (10-18 mm) long, crescent-shaped, three-sided, and densely strigose (Hickman, 1993; Munz, 1974; Barneby, 1964). This fruit shape helps to distinguish the Cushenbury milkvetch from Bear Valley milk-vetch (*A. leucolobus)* which may also grow sympatrically on carbonate soils (USFWS 1997). It also resembles Mojave milk-vetch (*A. mohavensis)* from the northern Mojave Desert, but Mojave milk-vetch is not pubescent, as is the Cushenbury milk-vetch (Isely, 1984).

Cushenbury milk-vetch has been described both as an annual and as a short-lived perennial herb (Barneby, 1964; Greene, 1885; Hickman, 1993; Munz, 1974; Skinner and Pavlik, 1994). Little is known of its life history. Greene reported that a "good proportion" of the plants flower precociously and are monocarpic, especially in years of low rainfall (Greene, 1885). However, it is not known whether the plants typically flower and fruit the first year, how long they live, or what conditions might cause them to act as annuals in some cases or perennials in other cases. Flowering occurs from late March to mid-June. Pods ripen at least as early as May, and become stiff and papery with long hairs as they mature.

Pollen vectors are most likely small bees, given the flower shape and color (Faegri and Van der Pijl, 1978). It is not known if this species is self-compatible. Most

Cushenbury milk-vetch reproduction presumably occurs by seed, and seeds have been found to have high viability (Tierra Madre Consultants, 1996). Vegetative reproduction has never been reported. Seeds require scarification, and greenhouse experiments have shown that seedlings are susceptible to damping off when grown in pots (Tierra Madre Consultants, 1996). It has long been known that seeds remain dormant in the soil during drought years (Greene, 1885), but the numbers of viable seeds present in the soil and the length of time they can remain viable is unknown. The extent of seed predation, the numbers and kinds of seed predators, and seed dispersal mechanisms are also unknown.

(e) Habitat requirements. Generally Cushenbury milk-vetch is restricted to carbonate soils (Gonella and Neel, 1995; Tierra Madre Consultants, 1992), but one account reported populations from non-carbonate soils. Subsequent surveys have not supported this finding (Tierra Madre Consultants, 1992), and it is likely that these plants were on carbonate alluvium that had been deposited over granite bedrock, as is often the case in populations below 5000 ft. (1600 m) elevations (USFWS, 1997). More recently, Cushenbury milk-vetch plants have been found on granitic soil (Psomas and Associates, 1996), but it is likely that these plants fell into the site, along with some carbonate substrate, during a debris slide. It is expected that, as larger species move into the disturbed area, the Cushenbury milk-vetch plants will be eliminated (Psomas and Associates, 1996). It often occupies areas with an open canopy, less litter accumulation (2.3%), higher per cent calcium (average 21.3%), and shallower slope angles (average 12.1) than other carbonate sites that do not support these plants (Gonella and Neel, 1995; USFWS, 1994).

Cushenbury milk-vetch has been reported from Joshua tree woodland and blackbush scrub communities, but is most commonly found in pinon-juniper woodland. It has been reported growing with dominant species Utah juniper *(Juniperus osteosperma)*, joint fir *(Ephedra viridis),* paper bag plant *(Salazaria mexicana), mo*untain mahogany *(Cercocarpus ledifolius),* Mojave yucca *(Yucca schidigera*), manzanita *(Arctostaphylos glauca)*, flannel bush *(Fremontodendron californicum),* Great Basin sagebrush *(Artemisia tridentata),* and needlegrass (*Stipa coronata)* (CDFG 1997; Gonella and Neel, 1995).

(f) Population status. It has been estimated that there are between 5000-10,000 Cushenbury milk-vetch plants throughout the entire range (USFWS, 1997), and the total number probably varies annually depending on rainfall (Barneby, 1964; USFWS, 1997). Estimates from previous surveys in 1988 indicated a total of just over 2000 plants (Barrows, 1988), but more detailed surveying in subsequent years with greater rainfall led to the increase in estimated number of plants. The population center with the most dense population is most likely in Lone Valley, with 3172 Cushenbury milk-vetch plants found at the proposed Right Star mine site in 1991 (USFS, 1992). However, the variation due to environmental conditions, coupled with the unknown nature of the soil seed population and inability to survey all potential habitat, make it very difficult to develop any reliable estimate of population size.

(g) Constraints to Recovery and Restoration.

(i) Natural recolonization. There appears to be some potential for natural recolonization of slightly disturbed sites by Cushenbury milk-vetch (Barrows, 1988; Tierra Madre Consultants, 1992; USFWS, 1997). This species has been observed on little used roads and on two small quarries that have been abandoned for 20 to 25 years (USFS, 1992). There is no indication that they can tolerate continuous disturbance or high levels of disturbance, such as active quarrying or continual usage of roads (Sanders 1992; Tierra Madre Consultants, 1992). That this species can tolerate a degree of disturbance does not mean that disturbed sites are preferred. At Right Star mine site in Lone Valley, there were significantly fewer Cushenbury milkvetch plants per acre in previously disturbed areas than in adjacent undisturbed areas. A greater proportion of juvenile plants were found in undisturbed areas, possibly indicating more recruitment when there is less disturbance (USFS, 1992).

(ii) Propagation. It is uncertain whether Cushenbury milkvetch plants could be propagated in a greenhouse for purposeful revegetation. Although an attempt to germinate seeds was successful as long as

seeds were scarified, the necessity to keep soil moist for seedling establishment encouraged the growth of the root rot fungus, *Pythium*, which probably caused death of all of the seedlings in the study (Tierra Madre Consultants, 1996). In a trial revegetation program at Gordon Quarry, Cushenbury milk-vetch plants were salvaged, potted, and kept in a greenhouse prior to relocation and transplant to a field site, but all plants died in the greenhouse. However, plants were observed later in the Gordon Quarry, evidently recolonizing naturally (Tierra Madre Consultants, 1992).

(iii) Genetic characteristics. Cushenbury milk-vetch populations experience extreme fluctuations due to amounts of annual precipitation (Barneby, 1964; USFWS, 1994). This could possibly lead to genetic bottlenecks, which could result in loss of genetic diversity (Barrett and Cohn, 1991). However, recent isozyme research has shown a surprisingly high degree of heterozygosity for an endemic species (Neel, 1999). The maintenance of genetic diversity through years with low populations is likely due to the soil seed bank. Although there are currently no seedbank data, Cushenbury milk-vetch population increases following rainy seasons indicate that seeds must persist in the soil for at least several years.

Human disturbances, such as road building and quarry excavation, cause habitat fragmentation which might eventually restrict gene flow and also lead to loss of genetic diversity and long term population viability (Beeby, 1993).

(h) Research needs.

(i) Reserve location and design. Further research is needed to obtain information necessary for appropriate selection of reserve sites as well as for management of Cushenbury milk-vetch. The specific areas already designated may turn out to be the best locations for recovery plan reserves, and it would be a good strategy to secure these lands as temporary reserves as soon as possible before any more habitat is destroyed. However, just because these areas have the highest number of carbonate endemic species, establishment of reserves in these locations does not ensure long-term population viability of any or all of the carbonate endemic taxa involved. Establishing a reserve for all carbonate endemics does not take into account habitat preferences for each species to be protected (Gonella and Neel, 1995). In addition, these areas may not represent the genetic diversity present within this taxon, and may not represent the ecological range of the taxon, both of which are important criteria in establishing effective reserves (Neel, 1999).

It is recommended that reserves should be set up at a variety of elevations and geographic locations, so that random events, such as fires or flash floods, would not impact all reserves at one time (White, 1997; Neel, 1995), and that each reserve site should include unoccupied habitat into which the species can move in the future (White, 1997).

(ii) Life history research needs. If data were available on recruitment and reproductive success in various areas within its range, efforts could be directed toward establishing reserves in those sites where the Cushenbury milk-vetch gets established and produces viable seed most readily. Research is needed to determine if the plants always flower and fruit the first year, how long they live, and what conditions influence their life history strategy. This information would be useful in conservation management by helping to predict future reproductive effort and population fluctuations.

If seed bank information were available (such as seed bank population size, numbers and kinds of seed predators, and the extent of seed predation) the genetic repercussions of random population variation due to climate could be more predictable, potential rates of recolonization of disturbed areas might also be determined with more accuracy, and there would be greater precision in determining how large preserves and buffers must be to maintain population viability. If seed dispersal mechanisms were known, there would be a better understanding of potential for natural recolonization.

(iii) Research on habitat requirements. It would be helpful to obtain information about mycorrhizal associations (White, 1997), and to use available information about soil mineral nutrient content and texture preferences for this species (Gonella and Neel, 1995); reserves could be established and revegetation efforts

could be directed only in areas which meet those requirements. To understand data gleaned from monitoring population fluctuations, it is imperative to know how rainfall affects population size from year to year, so these effects can be separated from those from human activities.

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3. Cushenbury oxytheca

Cushenbury oxytheca—*Oxytheca parishii* var. *goodmaniana*

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(b) Management status. Federal: Endangered; California: S1.1, G4?T1 (CDFG, 1998); CNPS: List 1B RED code 3-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Cushenbury oxytheca is endemic to the San Bernardino Mountains of southern California and is restricted to the dry carbonate slopes on the north side of the range. It has never been found outside of this limited area.

(d) Natural history. Cushenbury oxytheca is an annual herb of the buckwheat family (Polygonaceae). It is poorly known and was almost unknown before it began to be studied as a result of the realization that most of its limited habitat was subject to elimination by limestone mining. Little has been published on the natural history of the plant and much of what follows is based on personal observation and the study of a limited number of herbarium specimens. It occurs on

dry open slopes, mostly in loose scree and talus derived from limestone (Hickman, 1993; pers. obs.).

Oxytheca plants germinate in the fall following the first rains and exist as a vegetative rosette through the winter months. The basal rosette consists of relatively broad, oblong-obovate, green leaves, which are followed in the spring by a slender leafless inflorescence. As the inflorescence matures the leaves wither and dry, so that by the time of late flowering or fruit ripening the plant typically has no living leaves at all. All late season photosynthesis is presumably carried on by the green stems and the involucral bracts. The flowers are white with a reddish midrib, and are apparently insect pollinated. Specific pollinators, germination requirements, seed longevity, and most other aspects of the biology of this species are largely unknown, but there are some recent observations on the insect associates of this plant.

Based on limited observations in the summer of 1998, it appears that the insect pollinators of this species are generalists, such as various flies and possibly small beetles (S. Morita, pers. comm.), rather than highly specialized pollinators tied closely to this species. Small gray beetles of the family Dasitidae were found visiting the flowers (S. Morita, pers. comm.). At least two plant feeding insects have been identified attacking this species, including the bordered plant bug (Largidae: *Largus cinctus californicus*), which is a generalist sap feeder, and an otherwise unidentified leaf beetle (Chrysomelidae) which was observed eating the flowers (S. Morita, pers. comm.). In addition to the above, a number of big-eyed bugs (Lygaeidae: *Geocoris*) were found on the plants (S. Morita, pers, comm.), but these were probably predators on other insects rather than plant feeders (G. Ballmer, pers. comm.).

The taxonomy of Cushenbury oxytheca is in need of clarification, with respect to the distinctiveness of this taxon relative to the other two varieties of *Oxytheca parishii* in the San Bernardino Mountains, var. *parishii* and var. *cienegensis*. Cushenbury oxytheca is most readily separated from the other two San Bernardino Mountains varieties by its possession of only four (or rarely 5) involucral awns (Reveal, 1989). These awns are also shorter (ca. 2-3 mm) and more slender and inconspicuous than those in the other two varieties. Parish's oxytheca (var. *parishii*) is the most widespread and distinctive variety with its numerous (10-36) long (ca. 4-4.5 mm) awns on the involucral lobes. These awns are thicker and much more conspicuous than those in the other varieties. It is also the most widespread variety, due to its habitat preferences — openings on granitic slopes in yellow pine forest. It is widespread from Big Bear, west through the Crestline/Arrowhead area, and then continuing through the San Gabriel Mountains to the mountains of Ventura County (Reveal, 1989). Variety *cienegensis* is the most poorly known of the three varieties and the one most similar to variety *goodmaniana*. It is intermediate in involucral awn number (7-10) and length (3-4 mm) between the other two varieties. Variety *cienegensis* occurs on various substrates from Tip-Top Mountain to Cienega Seca near Onyx Peak, and plants near Tip-Top Mountain are on limestone and appear to be morphologically transitional toward var. *goodmaniana*. Being recently described (Ertter, 1980), and not being in an area of high environmental impact, this variety has received much less attention from botanists and environmental consultants than has Cushenbury oxytheca. All three varieties are illustrated in the Jepson Manual (Hickman, 1993).

(e) Habitat requirements. Cushenbury oxytheca occurs only on carbonate slopes, usually steep ones, and almost always on loose scree or talus. This preference is revealed in the data from the only published results from plot-based population sampling of limestone endemics in the San Bernardino Mountains (Gonella and Neel, 1995). Cushenbury oxytheca was never (0 of 30 plots) found on sample plots centered on Cushenbury milkvetch (*Astragalus albens*) plants but was fairly regularly found on plots lacking this species (Gonella and Neel, 1995). Cushenbury milkvetch is a species typical of stable, often bedrock, slopes. Likewise, Cushenbury oxytheca appears to be negatively correlated with the presence of Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), another species which prefers stable slopes (Gonella and Neel, 1995). However, recent surveys conducted by Rancho Santa Ana Botanic Garden for the U.S. Forest Service did find Cushenbury oxytheca growing with *Astragalus albens* and *Eriogonum ovalifolium* var. *vineum* in some areas (V. Sosa, pers. comm.).

Populations occur at elevations between 4000 and 7800 ft. (1200-2380 m) in the pinyon-juniper woodland (Reveal, 1989) and Jeffrey pine-western juniper (M. Neel, pers. comm.) vegetation zones which, of course, occurs on the desert-facing slope of the mountains. In this zone air movement is primarily descending and hence often removes moisture from vegetation, rather than depositing moisture as rain as it does on the coastal slope. The resulting lack of rainfall and consequent substrate aridity makes it important that plants be either early flowering or deep rooted, so that they can take advantage of the limited water supply. Cushenbury oxytheca is late flowering (May-June), but has a relatively long straight taproot and presumably is able to tap into supplies of soil moisture below the surface where low atmospheric humidity results in moisture being removed from the soil.

The loose gravel and rock substrate preferred by Cushenbury oxytheca has several important ecological characteristics that may favor this species. The first and most obvious is that, because the slopes are unstable, it is difficult or impossible for larger, potentially competing, trees and shrubs to become established. This leaves the habitat open for smaller annuals like Cushenbury oxytheca to occupy. A second noteworthy characteristic is the coarse and well-aerated character of the substrate, which permits rapid infiltration of rainfall and thus less moisture loss to runoff than would otherwise be expected. It is probable, also, that soil moisture in occupied talus is supplemented by runoff from rocky slopes, cliffs and bedrock outcrops above, where those are present. The loose character of the soil also permits the easy penetration of roots and the coarse surface material serves as a "ock mulch" to retard the loss of soil moisture to the atmosphere. These characteristics permit plant growth after the soil surface has dried.

(f) Population status. Cushenbury oxytheca was found at nine of 88 sites sampled on carbonate substrates in the San Bernardino Mountains in 1992 and 1993 (Gonella and Neel, 1995), which clearly indicates that it is more widespread than formerly known though still uncommon. A total of at least 50 populations were known as of 1998 (V. Sosa, pers. comm.), which is a substantial increase from the four known in 1992 (Tierra Madre, 1992), or the 15 reported more recently (USFWS, 1997). It is apparent that a clear understanding of the abundance and distribution of this plant within its narrow range is still developing.

Populations of Cushenbury oxytheca do not appear to exhibit a general downward trend, given the population fluctuations that are normal in an annual plant, at sites where it is not being directly impacted by mining (pers. obs.). Populations are highly variable (White, 1997) at any given site, but plants can be locally common after particularly favorable years. Populations vary in response to rainfall and other climatic conditions, so that at a given site where there was a substantial population one year there may be few to none the next. Even in years when no plants are present, a living seed bank remains. However, large parts of its range are under heavy pressure by mining interests and so overall Cushenbury oxytheca has certainly declined significantly over recent decades. It has been estimated that over 1600 acres of potential habitat for the various carbonate endemics had been lost to mining by 1993 (Gonella and Neel, 1995). Unfortunately, because this plant was little collected and never censused prior to the 1980s, the historical pattern of its population sizes and distribution is unknown, except by inference. At best, we can infer former distributions based on habitat type and general range. Sites that are now mined down to bedrock, but which are in areas which were formerly suitable habitat, must be presumed to have formerly supported this plant. A quantitative survey of the abundance and distribution of this species has recently been completed and this has revealed that the species is more widespread than formerly known (V. Sosa, pers. comm.), though it is still seen to be very restricted in its distribution.

Cushenbury oxytheca is a naturally restricted endemic, but populations have apparently been further reduced by mining activity within its range, based on the widespread disturbance of carbonate habitats (Gonella and Neel, 1995).

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4. Parish's daisy

Parish's daisy—*Erigeron perishii* Gray

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(b) Management status. Federal: Threatened; California: S2.1, G2 (CDFG, 1998); CNPS: List 1B, RED code 2-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Parish's daisy is endemic to southern California and is restricted to the dry calcareous (primarily limestone) slopes of the San Bernardino Mountains, with a few collections from generally granitic areas at the east end of the San Bernardino Mountains and in the Little San Bernardino Mountains. The substrate at the sites where the species was collected away from the major carbonate deposits has often not been clearly specified and needs clarification. Most of the populations are on lands within the boundary of the San Bernardino National Forest. This species is reported by Nesom (1993) only from Cushenbury Canyon on the north slope of the San Bernardino Mountains, but specimens exist documenting its occurrence in many other nearby areas. There are reported to be 50 occurrences (USFWS, 1997) but many of these probably represent reports of different parts of single populations. Specific localities include: mouth of Marble Canyon (BLM land); Arctic Canyon, Bousic Canyon, Furnace Canyon, Grapevine Canyon, Cactus Flat (head of Cushenbury Canyon); Cushenbury Spring; Horsethief Flat, near Blackhawn Canyon, limestone outcrop 1.5 mi. (2.5 km) NE of Baldwin Lake, 6200 ft. (1890 m); 8 miles (13.3 km) S of Warren's Well [= site of Yucca Valley Airport], and E of Long Canyon, 3600 ft.(1100 m). The latter two localities are in the Little San Bernardino Mountains.

There have been, over the years, a number of reports and collections that indicate that this species occurs in the Eastern Mojave Desert in the vicinity of the Ivanpah Mountains but these have all, upon examination, proved to be errors, usually based on the vaguely similar *Erigeron concinnus* (H. & A.) Torr. & Gray [=*E. pumilus* var. *concinnoides*] and the species has never been reported from that area by any major flora (e.g., Nesom, 1993; Munz, 1974). It has also been erroneously reported from other areas based on the related *E. utahensis* (USFWS, 1997), which occurs on limestone slopes in the Providence Mountains (Nesom, 1993).

The Cactus Flat locality is somewhat dubious in that the habitat is not typical (largely or entirely granitic instead of calcareous) and it is based only on an

old Marcus Jones collection. It is probable that Jones was camped at Cactus Flat and collected the *Erigeron* in the carbonate either below in Cushenbury Canyon, above in the Lone Valley area, or around Blackhawk Mtn. Jones is fairly notorious for generalized localities based on the site where he stayed and collected out from (e.g., Barstow, Blythe, etc.) and he is responsible for highly dubious records from a number of locations. There are also comparable problems with the Little San Bernardino Mountains locality, in that two of the three collections are by Edmund Jaeger. Jaeger had a life-long habit of intentionally misplacing or blurring collection sites slightly in order to protect the identity of his favored camping localities (P. Roos, pers. comm.). One of his Parish's daisy specimens, in fact, is merely labeled "Joshua Tree National Monument", but is generally presumed to be from the same site as his more precisely located specimen taken four days earlier. There is a more recent reported collection by P. Leary from the same area, which means that the species probably does occur, although the identity of the Leary specimen (presumably located in the herbarium at Univ. of Nevada, Las Vegas) seems not to have been confirmed. A search for the species in the late 1980s failed to find the Little San Bernardino Mountains locality and did not find any suitable habitat (either suitable washes or carbonates) in the area where it was reported. At least some people think the species was erroneously mapped (K. Barrows, pers. com., 1997). The CNDDB (CDFG, 1989) reports this locality as having the plant "growing out of a steep slope beneath pinyon pine" which is a somewhat unusual habitat for the species given the its preference for washes and loose soil elsewhere, but the plant does occur on dry slopes in the San Bernardino Mountains. The most serious peculiarity of this site is that there is no carbonate rock reported in the area (Dibblee, 1967a), and the labels of the collected specimens do not specify substrate.

(d) Natural history. Parish's daisy is an herbaceous perennial with a long simple tap root that extends for some distance (perhaps 50 cm) into the loose carbonate alluvium, which the species favors. This species was first described by Asa Gray in 1884 from specimens collected by S.B. Parish (#1251) at Cushenbury Springs in May 1881 (Ferris, 1960; Krantz, 1979). Though, oddly, the second edition (apparently unaltered) of the original description (Gray, 1888) merely says "rocky caÒons, borders of the Mojave Desert, S.E. California, *Parish*." Later authors must be relying on additional information derived from the label on the type specimen, since their locality descriptions are more expansive than the original description.

The stems are erect or ascending and may be either numerous or rather few on each plant, but on mature plants are typically at least 20 in number. The stems tend to be faintly zig-zag rather than straight. They arise from a somewhat woody base that usually bears the remains of previous years branches. The plants are 3-12 in. (7-30 cm) tall and have the stems and foliage covered with a conspicuous, loose, whitish to grayish appressed pubescence. This pubescence is particularly thick and persistent on the stems and these often stand out as whiter than the leaves. The older leaves appear to gradually lose pubescence so that they are often greener than the rest of the plant. The pubescence is often described as silvery-white. The leaves are slender and entire.

The flower heads are solitary on bracted, almost leafy, peduncles, but there are commonly 2-4 peduncles per stem. The total number of heads on a mature plant can easily equal 50 in a given season. The heads bear lavender ray flowers and yellow disk flowers.

The method of pollination is unknown for Parish's daisy, but is certainly by insects, based on the conspicuously colored flowers. Likely candidates include bees, butterflies or long-tongued flies, based on the known pollinators of other composites of similar general flower structure. Seed dispersal is unstudied as is the relative importance of seeds versus possible vegetative spread in the maintenance and expansion of populations, though seedlings have been reported at several sites (Krantz, 1979) and are probably the predominant mode of reproduction. Flowering is reported to occur from May to July (Krantz, 1979), but the peak of flowering seems to be from mid May to mid June. At least in some years a few plants continue flowering into July and some even into August (M. Provance, pers. com., 1998). Flower heads have been found to be attacked by insect larvae [Tephritid flies?] but the extent

and effect of such damage is unknown, though reported to be "not widespread" (Krantz, 1979).

(e) Habitat requirements. Parish's daisy is largely restricted to carbonate substrates, but has been found on other rock types occasionally. Plants appear to be most commonly found either along washes on the canyon bottoms or on loose alluvial deposits on adjacent benches, but are also regularly found on steep rocky slopes. It appears that the Pioneertown site is primarily granitic, but along the washes where the species occurs there are reported to be some carbonate materials washed down from higher elevations (K. Barrows, pers. com., 1997). This is not certain and needs to be confirmed. There is limestone in the general vicinity (Dibblee, 1967b). It may be that the apparent carbonate preference is based on reduced competition from other plants on this substrate. Certain non-carbonate sites that are otherwise ecologically favorable could thus support the species. Two of the collections that appear to be from granitic areas are old (old collections are more frequently inaccurate or vague in their site data than more recent ones) and do not specify the substrate at the site where the plant was collected. However, there are recent reports of this species on non-calcareous, decomposed granite, slopes within the carbonate region on the north slope of the San Bernardino Mountains (M. Provance, pers. comm., 1998). These reports are very few, however. All sites where the soil was actually tested have been found to have strongly alkaline soils, regardless of predominant origin (M. Provance, pers, comm., 1998). This implies that even the granitic areas may have been somewhat influenced in their soil chemistry by drift from adjacent carbonate slopes.

Parish's daisy occurs, based on available specimens, at elevations from 3700-6600 ft. (1125 - 2012 m), though Nesom (1993) gives a range of 800-2000 m (2625-6560 ft.). The low end of the range given by Nesom seems definitely to be in error as that elevation (2625 ft.) would put the species far out onto the flats of the Mojave Desert, where it has never been collected.

(f) Population status. This species is naturally of rather restricted distribution and is probably largely confined to a very specific substrate that is not of wide occurrence within its range. That particular substrate (limestone) has become economically valuable in recent years and so many populations have been destroyed or damaged by limestone mining.

Parish's daisy is clearly declining, much habitat has been destroyed by limestone mining, but is still among the more common of the carbonate endemics of the San Bernardino Mountains. This species was reported to be "abundant on stony hillsides at Cushenberry Springs" by Hall (1907), which suggests a change in abundance over the past 90 years, but this is obviously not conclusive since the precise meaning of "abundant" in Hall's mind is unknown. It is possible that Hall never actually saw the plant at this site, since he notes that as of the date he wrote only Parish had collected it. He may have based his description of daisy abundance on notes on one of Parish's collections or on discussions with Parish (whom he knew personally). If Hall had seen it himself, at a suitable season, it seems likely he would have collected the plant.

Parish's daisy seems better able to recover after disturbance than some carbonate endemics. There is considerable need for clarification of its distribution and substrate preference at the eastern end of the San Bernardino Mountains (Pioneertown area) and in Joshua Tree National Park. These are areas where the reported occurrence is based on just a few specimens, often very old or poorly located (especially with respect to substrate). There were fewer than 25 occurrences of this species known prior to its listing as threatened by the USFWS, with a total of ca. 16,000 individuals reported. But, that occurrence total has since been increased to ca. 50 (USFWS, 1997). There are several problems with both the original estimate and this expansion based on the newer "occurrence" estimate. The largest problem is that it is not at all certain that the various reported occurrences actually represent separate populations or that some of the individuals reported in one "occurrence" are not also reported again in another.

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Appendix C: Habitat Definitions

*The calculation of Conservation Value under the CHMS (*see *Section 7) depends upon the definitions of "Occupied Habitat," "Suitable Habitat," and "Other Beneficial Habitat." This appendix explains how available data has been and will be used to determine whether land falls into these categories. Under the CHMS, Conservation Value can also be established for various categories of revegetated habitat, whose definitions are found in Appendix E.*

As described in Sections 7(c) and 14(d), the Habitat Inventory officially establishes the habitat categories that apply to any given parcel of land within the CHMA. The Forest Service maintains the Habitat Inventory as a set of digital GIS files.

(a) Habitat definitions for the initial Habitat Inventory. The initial Habitat Inventory for the CHMS has been established and is represented in the habitat statistics in *Appendix D* and by *Map 4* in *Appendix I.* The initial Habitat Inventory has been accepted by the MOU Parties as the official Habitat Inventory of the CHMS and will be the basis for the biological assessment prepared by the Resource Management Agencies to initiate the CHMS Section 7 Consultation and for the CHMS Biological Opinion from the USFWS that results from such consultation. Except as modified in accordance with Section 14(d), the initial Habitat Inventory controls for purposes of determining Conservation Values under the CHMS. The habitat models that were used to develop the GIS database for the initial Habitat Inventory are described in a memorandum dated September 5, 2001 from Sean Redar and Scott Eliason to the U.S. Fish and Wildlife Services (Redar and Eliason (2001); available from the Forest Service upon request). Based on those habitat models, the habitat category definitions for the initial Habitat Inventory were established in accordance with the following:

(i) Occupied Habitat. Habitat that is known to be occupied by one or more species of Carbonate Plants. Currently, these data are based on field survey information gathered over approximately the last 15 years. The Occupied Habitat data layer includes a wide range of precision, from approximately 30 meters down to approximately 1 meter. This range is based on improving GPS technology over time and differing mapping techniques. Despite this range of precision, the current occupied habitat layer is considered to be accurate and is the best available information.

(ii) Suitable Habitat. Habitat that possesses the qualities necessary to support occurrences of Carbonate Plant occurrences, but is not known to be occupied. These are areas where undiscovered occurrences are most likely to be found in the future, and are also areas that are likely to be occupied over long periods of time as the distribution of carbonate plants changes across the landscape. These are also important areas that support many species of plants and animals (including pollinators) that are associated with the Carbonate Plants. The data underlying the current mapping of Suitable Habitat, derived from the model described in Redar and Eliason (2001), are considered to be fairly accurate. Aerial photo interpretation and limited ground-truthing has verified the model, though much of the suitable habitat has not been verified in the field. Despite this uncertainty, the current Suitable Habitat layer represents the best available information.

(iii) Other Beneficial Habitat. Undisturbed natural land that provides some geomorphological, hydrological, or habitat configuration benefit to the Carbonate Plants, but excluding Occupied Habitat and Suitable Habitat. The layer for Other Beneficial Habitat was developed heuristically with reference to *(A)* available geological and hydrological information and *(B)* the locations of mapped patches of Occupied Habitat and Suitable Habitat.

(b) Habitat definitions for modifications to the Habitat Inventory. As the Habitat Inventory is revised

over time in accordance with Section 14(d), it is necessary to apply clear and consistent data standards. Applying such data standards over time will eventually remove discrepancies in the precision of Occupied Habitat polygons and uncertainties in the Suitable Habitat layer and will ensure that Conservation Value derived from these layers is uniformly applied. These standards include survey protocols, suitable habitat criteria, mapping standards (both for the field and for the digital Habitat Inventory), and attribute data and metadata requirements. All of these standards are in draft form and available from the Forest Service upon request.

*(c) **Conservation Value mapping.*** As the Occupied Habitat and Suitable Habitat layers are refined based on future fieldwork, the Conservation Value layer will be updated with the same level of precision. Although the current Conservation Value map (*Map 5* in *Appendix I*) was created with 30 meter resolution raster data, future revisions should result in a more precise mapping of Conservation Value. At any time, calculations should be based on the best (i.e., most recent, accurate, and precise) data available. ❀

Appendix D: Habitat Statistics

The following tables provide an account of the habitat data in the current Habitat Inventory by Unit, habitat type, and land use category. All figures are given in acreage, except the summary of Conservation Value within each Unit, which is given in Conservation Units. "All Occupied Habitat" may be less than the sum of the Occupied Habitat of each of the Carbonate Plants because some acreage is occupied with more than one of the Carbonate Plants. Critical Habitat is the Carbonate Habitat that has been designated as critical habitat by the USFWS.

White Mountain Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**922**	-	-	701	112	109	326	
Occ Hab, E. ovalifolium	**29**	-	-	21	8	-	7	
Occ Hab, A. albens	**-**	-	-	-	-	-	-	
Occ Hab, O. parishii	**68**	-	-	58	-	10	53	
Occ Hab, E. parishii	**21**	-	-	12	9	-	-	
All Occupied Habitat	**99**	-	-	80	9	10	57	
Suitable Habitat	**1,331**	-	-	1,065	198	68	416	
Other Beneficial Habitat	**619**	-	-	349	-	270	231	
Total habitat acreage	**2,049**	**-**	**-**	**1,494**	**207**	**348**	**704**	
Critical Habitat	**435**	-	-	335	-	100	308	

Furnace Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**10,544**	-	1,045	4,597	2,918	2,094	1,234	1,125
Occ Hab, E. ovalifolium	**592**	-	29	352	166	53	219	115
Occ Hab, A. albens	**507**	-	11	383	74	66	198	182
Occ Hab, O. parishii	**342**	-	7	198	61	81	146	28
Occ Hab, E. parishii	**530**	-	14	266	243	35	119	192
All Occupied Habitat	**1,545**	-	47	915	426	202	452	418
Suitable Habitat	**14,077**	-	1,442	6,785	4,067	2,832	1,265	1,212
Other Beneficial Habitat	**6,753**	-	1,114	2,096	1,665	1,882	329	304
Total habitat acreage	**22,375**	**-**	**2,603**	**9,796**	**6,158**	**4,916**	**2,046**	**1,934**
Critical Habitat	**6,050**	60	213	3,362	1,876	729	1,423	1,314

Helendale Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**8,865**	-	-	5,862	72	2,934	1,513	842
Occ Hab, E. ovalifolium	**592**	-	-	454	4	137	218	123
Occ Hab, A. albens	**695**	-	-	663	7	25	386	165
Occ Hab, O. parishii	**108**	-	-	80	6	23	82	-
Occ Hab, E. parishii	**478**	-	-	416	-	64	228	132
All Occupied Habitat	**1,460**	-	-	1,243	15	218	633	335
Suitable Habitat	**13,356**	-	-	8,825	111	4,492	1,522	895
Other Beneficial Habitat	**2,571**	-	-	685	18	1,863	224	154
Total habitat acreage	**17,387**	**-**	**-**	**10,753**	**144**	**6,573**	**2,379**	**1,384**
Critical Habitat	**5,430**	19	-	3,848	95	1,481	1,674	924

(Continued on the following page)

White Mountain Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**922**	-	-	701	112	109	326	
Occ Hab, E. ovalifolium	**29**	-	-	21	8	-	7	
Occ Hab, A. albens	**-**	-	-	-	-	-	-	
Occ Hab, O. parishii	**68**	-	-	58	-	10	53	
Occ Hab, E. parishii	**21**	-	-	12	9	-	-	
All Occupied Habitat	**99**	-	-	80	9	10	57	
Suitable Habitat	**1,331**	-	-	1,065	198	68	416	
Other Beneficial Habitat	**619**	-	-	349	-	270	231	
Total habitat acreage	**2,049**	**-**	**-**	**1,494**	**207**	**348**	**704**	
Critical Habitat	**435**	-	-	335	-	100	308	

Furnace Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**10,544**	-	1,045	4,597	2,918	2,094	1,234	1,125
Occ Hab, E. ovalifolium	**592**	-	29	352	166	53	219	115
Occ Hab, A. albens	**507**	-	11	383	74	66	198	182
Occ Hab, O. parishii	**342**	-	7	198	61	81	146	28
Occ Hab, E. parishii	**530**	-	14	266	243	35	119	192
All Occupied Habitat	**1,545**	-	47	915	426	202	452	418
Suitable Habitat	**14,077**	-	1,442	6,785	4,067	2,832	1,265	1,212
Other Beneficial Habitat	**6,753**	-	1,114	2,096	1,665	1,882	329	304
Total habitat acreage	**22,375**	**-**	**2,603**	**9,796**	**6,158**	**4,916**	**2,046**	**1,934**
Critical Habitat	**6,050**	60	213	3,362	1,876	729	1,423	1,314

Helendale Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**8,865**	-	-	5,862	72	2,934	1,513	842
Occ Hab, E. ovalifolium	**592**	-	-	454	4	137	218	123
Occ Hab, A. albens	**695**	-	-	663	7	25	386	165
Occ Hab, O. parishii	**108**	-	-	80	6	23	82	-
Occ Hab, E. parishii	**478**	-	-	416	-	64	228	132
All Occupied Habitat	**1,460**	-	-	1,243	15	218	633	335
Suitable Habitat	**13,356**	-	-	8,825	111	4,492	1,522	895
Other Beneficial Habitat	**2,571**	-	-	685	18	1,863	224	154
Total habitat acreage	**17,387**	**-**	**-**	**10,753**	**144**	**6,573**	**2,379**	**1,384**
Critical Habitat	**5,430**	19	-	3,848	95	1,481	1,674	924

Appendix E: Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions

The following guidelines and success criteria have been developed to provide consistency in revegetating lands disturbed by mining activities in carbonate habitat within the CHMA. The intent herein is to provide specific guidelines and success criteria for revegetation of native plants and habitats and introduction of Carbonate Plants in conjunction with mining reclamation. The revegetation objectives promoted by these guidelines are to set a successional trajectory toward a specified target vegetation as closely as practicable and to promote the reintroduction of listed plant species to reclaimed sites, where applicable. These guidelines and success criteria were prepared for incorporation into the CHMS, and those portions which are not specific to Carbonate Plants may also be incorporated into other planning documents, as appropriate, subject to public review. These guidelines are supplemental to revegetation requirements contained in the Reclamation Regulations. Except as specifically indicated to the contrary, capitalized terms in this appendix shall have the meanings ascribed to them in the CHMS, of which this appendix is a part.

(a) Credit for successful revegetation and introduction of Carbonate Plants. Operators or claim holders may elect to introduce one or more Carbonate Plant species onto mines or other disturbed sites undergoing or having completed reclamation. Where introduction is successful, these operators or claim holders may (but are not required to) make a Reserve Contribution of the sites for conservation credit in accordance with Section 10 of the CHMS using the conservation multipliers set forth below in this Section. To qualify for such credit, revegetation must be carried out and its success measured in accordance with this *Appendix E*. "Introduction," as used in this appendix, includes both reintroduction of Carbonate Plants that occurred on the site prior to mining disturbance and introduction of Carbonate Plants onto the site when there were no previously known occurrences. The applicable multipliers for purposes of determining the Conservation Value of Revegetated Habitat are as follows:

(i) 0.25 per acre for successful revegetation in accordance with the revegetation success criteria described in Section (b)(iii) below without meeting success criteria for Carbonate Plants under Section (c)(i) below.

(ii) 0.50 per acre or sites meeting the success criteria described in Section (c)(i) below for at least one of the Carbonate Plants.

(iii) An additional 0.20 per acre for sites that meet the enhanced success criteria described in Section (b)(iv) below.

(iv) An additional 0.10 per acre will be added for each additional Carbonate Plant species (i.e., in excess of one) that meets the success criteria on the site, for an addition to the multiplier of up to 0.30 per acre.

Occurrences of Carbonate Plants that meet the success criteria set forth in this appendix will be mapped and credited using the same data and mapping standards that apply to Occupied Habitat on natural surfaces (*see Appendix C*).

(b) General revegetation guidelines and success criteria. The following revegetation guidelines are required as a condition of receiving conservation credit for revegetation areas under the CHMS, and subsections *(i)–(iii)* and *(v)* of this subsection *(b)* may be incorporated, subject to public review, into future Federal Land Plans. The County may also adopt subsections *(i)–(iii)* and *(v)* as conditions of future reclamation plans under SMARA. For revegetation under the CHMS, in the event of any conflict between the guidelines set forth in this Section (b) and revegetation guidelines in a future Federal Land Plan that are applicable in a particular case, the guidelines in such Federal Land Plan shall control. Because revegetation practice

continues to evolve, practitioners should remain current with the literature and advances in the field. They also should contact SBNF, the BLM California Desert District, and the County for recommendations on revegetation practice.

(i) Target vegetation. The "target vegetation" for each revegetation site will be selected based on existing reference data for the appropriate vegetation zone or site-specific sampling (collectively, the "Baseline Data"), at the agreement of the applicant and the applicable Resource Management Agency. Reference data within the CHMA were derived from plot-based vegetation sampling taken across more than 600 plots between 1990 and 1998. Future sampling may result in an update and revision to these data. These data will be made available upon request by the Mountaintop District Botanist on the SBNF.

(ii) Soil inventory. Soil resources (all available topsoil or "growth medium") will be inventoried for volume and reclamation suitability during the planning stages, and soils inventory results will be included in the revegetation plan. To avoid the need for extended soil stockpiling, the use of soil salvaged from a new quarry site for reclamation of another (closed) quarry or waste dump will be encouraged.

(iii) Success criteria. All operations will be required to document full compliance with the applicable reclamation plan and associated regulations. The following additional criteria must be met to receive conservation credit under the CHMS. These criteria may be incorporated into revised Federal Land Plans (due for completion in 2004), subject to public review, after which these criteria would apply to future mining and reclamation plans on the SBNF and in the California Desert Conservation Area.

(A) Reclamation. Meet or exceed all reclamation requirements under the mining and reclamation plan for the site and under the applicable Reclamation Regulations, and maintain the mining operation in full compliance with the Mining Plan.

(B) Cover. Achieve a mean native vegetation cover percentage of at least 50% of the mean native cover value specified in the Baseline Data.

(C) Density. Achieve a mean density of each of three climax/dominant species for that vegetation zone that is at least 50% of the specified mean densities for those species in the Baseline Data.

(D) Richness. Achieve a mean species richness (average species count per 0.1 acre sample plot or other unit area as applicable, depending on sample methods) that is at least 50% that of the value specified in the Baseline Data.

(E) Non-native species cover. Non-native species cover will be no more than an absolute cover of 15%, and annual monitoring data will show a downward trend, documented by a declining regression coefficient (negative *b value*) over the monitoring period.

(F) Aggressive/invasive weeds. On the date of approval by the applicable Resource Management Agency, none of the following species of highly invasive exotic species (the "Invasive Exotics"), will occur within the revegetated site:

- *Arundo donax*
- *Pennisetum setaceum*
- *Tamarix* spp.
- *Elaeagnus angustifolia*
- *Ricinus communis*
- *Spartium junceum*
- *Verbascum thapsus*
- *Nicotiana glauca*
- *Linaria* spp.

All occurrences of Invasive Exotics must be documented and removed upon detection, and the reports required in Section (b)(v)(B) below must document any removal and confirm that all these species are absent from the site. Such removal may be performed at any time without being regarded as "Manipulation" that is otherwise prohibited during certain periods (*see* following paragraph of this subsection (F). The list of Invasive Exotics may be modified by the SBNF in cooperation with the BLM, the County, and appropriate stakeholders, including the mining industry. It will be limited to non-native species which show the potential to spread rapidly and are practical to completely eradicate. It will exclude non-native species that are wide-

spread within the CHMA and not practical to completely eradicate. Thus, brome grasses (*Bromus* spp.), weedy mustards (*Brassica* spp., *Sisymbrium* spp., *Hirschfeldia incana*), Russian thistle (or tumbleweed, *Salsola* spp.), and storksbill (*Erodium* spp.) would not be appropriate.

In applying the foregoing criteria, only the habitat patches that meet the criteria, applying the habitat definitions and mapping standards set forth in *Appendix C*, shall be regarded as revegetated and qualify for conservation credit (upon updating the Habitat Inventory to reflect the revegetation success) If such patches are part of a larger reclamation site, only those areas that meet the criteria shall be eligible for conservation credit. The operator's final monitoring report will provide quantitative data that will determine whether or not the foregoing success criteria have been met. The final monitoring data will generally be submitted ten years following initiation of revegetation, though an operator may choose to finalize the work earlier or later, depending on individual circumstances. Regardless of the date of final monitoring, the revegetated site shall not be subject to enhancement (e.g. by irrigation, weeding, supplemental planting, or seeding; collectively, "Manipulation"), subject to the exception specified under criterion *(F)* above, during a minimum three years prior to the final data collection.

(*iv*) *Enhanced success criteria*. The following success criteria are required to receive an additional 0.2 CU/acre added to the Conservation Value multiplier under the Section (a)(i) above. These criteria are not required if the additional conservation credit is not sought, and there is no intention to incorporate these enhanced criteria into future Federal Land Plans or County conditions of approval except as they relate to conservation value under the CHMS.

(*A*) *Standard revegetation*. Satisfy all the standard success criteria under Section (b)(iii), above.

(*B*) *Cover*. Achieve a mean native vegetation cover percentage of at least 75% of the mean native cover value specified in the Baseline Data.

(*C*) *Native herbaceous component*. Achieve a relative abundance of three native herbaceous species with relative abundance equivalent to or greater than that specified in the Baseline Data.

(*D*) *Richness*. Achieve a mean species richness (average species count per 0.1 acre sample plot or other unit area as applicable, depending on sample methods) that is at least 75% that of the value specified in the Baseline Data.

(*E*) *Non-native species relative abundance*. Do not exceed the average relative abundance of non-native species specified in the Baseline Data.

(*F*) *Ecosystem Function*. Demonstrate at least one quantitative measure of ecosystem function as described in Section (c)(i)(E). Section (c)(i)(E) itself requires demonstration of at least one such measure as part of the standard introduction success criteria, so a party desiring to meet both the enhanced success criteria of this subsection *(iv)* and the standard introduction success criteria of Section (c)(i)(E) must demonstrate *two* quantitative measures of ecosystem function.

(v) Monitoring and revegetation reporting requirements. Each mining reclamation plan must include a revegetation plan. This plan will specify target vegetation, reference data, acres that will undergo active revegetation, and a revegetation schedule. To document progress under the revegetation plan, monitoring and periodic reporting will be required. Phased plans may compile these reports into a combined report where an area covered under a single mine plan has revegetation ongoing at different stages.

(A) Annual monitoring. Operators will monitor revegetation sites annually, making each of the following observations and measures, which will be recorded and provided to the applicable Resource Management Agency or County in periodic monitoring reports (*see* subsection *(B)* below):

(1) Survival of container plantings (where applicable);

(2) Germination of seeded species, noting distribution and abundance;

(3) List of native "volunteer" species, noting distribution and abundance;

(4) Measurements of vegetation cover, target species density, total species richness (list), and wildlife observations;

(5) Signs of erosion/soil loss;

(6) List of non-native species, with descriptions of abundance, distribution, and measures to control/eradicate; and

(7) Recommendations for any other needed remedial action (e.g., repairs to irrigation system, re-seeding, erosion control, or other).

(B) Reporting. On large revegetation sites, quantitative data collected and presented in the interim and final monitoring reports must be randomly sampled with sufficient replication to analyze and document the data with 90% confidence intervals about the mean values, and with a maximum confidence-interval-width of 20% of the mean value. For smaller sites, an alternate sampling protocol may be used so that the total sampling area is at least 50% of the area revegetated.

The following three reports, to be submitted to the applicable Resource Management Agency or the County with a copy provided to the Forest Service, are required to document the monitoring and status of revegetation:

(1) Initial report. This report shall include: *(aa)* detailed site plan, *(bb)* planting palette, *(cc)* propagule (seed, cutting, and container plant) inventory, and *(dd)* soil inventory (where applicable). This report must be prepared and submitted within one year of initiating revegetation.

(2) Interim (*final minus 3) report.* This report shall be made at the initiation of the final 3-year no-Manipulation period and shall mark the initiation of that period. This report shall summarize the monitoring data that is collected annually. It must include status of revegetation and qualitative and quantitative measures each success criterion, and it must specify any remediation prescribed. It shall also include a propagule and soil inventory update. This report is generally prepared during year 7, although may be earlier or later, depending on individual circumstances. If the operator prefers to delay initiating the 3-year period without Manipulation beyond year 7 of the revegetation effort, then a substitute "Year 7" report should be submitted, to include the contents described above and an explanation of the operator's plans for remediation and eventual completion of the revegetation.

(3) Final report. This report shall be prepared and submitted upon completion of reclamation. It shall have the same format and content requirements as the interim report described in subsection *(2)* above. Regardless of the date of final monitoring, the revegetated site shall have had no Manipulation during a minimum three years prior to the final data collection (subject to the exception specified under subsection *(iii)(F)* above for weed control). This report shall document the extent to which the revegetation is successful and shall be used, along with field checks, by the applicable Resource Management Agency to determine whether or not the success criteria set forth in subsection *(iii)* above have been met.

(c) Guidelines and success criteria for introduction of Carbonate Plants. To obtain conservation credit under the CHMS for the introduction of Carbonate Plants into reclamation sites, such introductions must follow the guidelines and meet the criteria described in this Section (c), in addition to satisfying the general revegetation guidelines and success criteria of Section (b) above (note that there is no intent to propose incorporation of these provisions as revegetation requirements in future Federal Land Plans):

(i) Carbonate Plant success criteria. At the end of a minimum 3-year period without Manipulation, the introduced Carbonate Plants occurrences must be documented to show:

(A) Successful reproduction, indicated by seed production, seedling establishment, and survival of seedlings to reproductive state so that the total number of living and reproductively mature plants is at least two times the number originally planted;

(B) A demographic pattern during the minimum 3-year no-Manipulation period in which recruitment to reproductive maturity is greater than or equal to mortality, indicating a stable or growing population;

(C) Expansion of the introduction area, indicated by the presence of progeny of the introduced plants at least 10 meters beyond the bounds of the original seeded or planted area;

(D) Within the introduction area, density (plants/acre) of the Carbonate Plants no less than one standard deviation below the mean density of the same species in natural populations, as documented in Forest Service data (where density in the overall area is below this level, the operator may wish to apply for Conservation Credits on a smaller area); and

(E) Demonstration of least one quantitative measure of ecosystem function; applicable measures include, but are not limited to, soil respiration, mycorrhizal hyphal mass in soil, glomilin assays, pollinator visitation, and wildlife utilization.

(ii) Collection and salvage requirements. Where revegetation includes introduction of Carbonate Plants to mining-reclamation surfaces, the following requirements pertaining to the collection of listed species must be followed in order to obtain conservation credit under the CHMS. Where collection, salvage, and/or planting of these species occurs as part of a Mining Plan, additional standards will apply, as specified under current ESA section 10(a)(1)(A) permits issued for this purpose.

(A) Seed collection. Seed collections of listed species from public land will be at the discretion of the USFWS. Unless other arrangements are made, collections on Forest Service or BLM land will be made under the authority of the applicable 10(a)(1)(A) permit and all conditions in the permit will apply. For collections on all non-federal lands, and on federal lands unless stated otherwise in the permit, the conditions described in the balance of this subsection will apply. No more than five percent of the seeds from any individual plant will be collected. Collections shall not be made from more than five percent of the individuals within a population. Collection methods will be designed to capture the majority of the genetic variation found in the sampled populations, by collecting seed systematically throughout the site and avoiding focusing only on certain plants due to size or location. Collections must avoid harming the source population's long-term viability. At no time will seeds derived from different natural populations be intermingled in revegetation activities. Detailed field information will be recorded at the time of seed collection, including estimated population size, number of individuals sampled, collecting strategy employed, apparent viability of the seed, global positioning satellite ("GPS") coordinates of the collecting location, California Natural Diversity Database element occurrence number (if any), and a photocopy of a USGS topographic map with the collection site identified. Seed collection data will be kept in permanent files and duplicated on the package where the seed is stored.

(B) Collection of cuttings. Seed collections of listed species from public land will be at the discretion of the USFWS. Unless other arrangements are made, collections on Forest Service or BLM land will be made under the authority of the applicable 10(a)(1)(A) permit and all conditions in the permit will apply. For collections on non-federal lands, and on federal lands unless stated otherwise in the permit, the conditions described in the balance of this subsection will apply. No more than five percent of any individual plant will be collected. Collections shall not be made from more than five percent of the individuals within a population. Collections will be made systematically throughout the site to capture the majority of the genetic variation found in the sampled populations. At no time will seeds or plants collected from different natural populations be intermingled in revegetation activities. Individual cuttings will be labeled with numbered metal tags corresponding to collection sites, as described above for seed collections. The tag numbers will be kept in permanent records and will be kept with the cuttings as they are incorporated into an offsite nursery or on-site revegetation sites for long-term monitoring. Tags need not identify every individual cutting, but should identify the source.

(C) Plant salvage. On sites where plants and seeds will be disturbed or destroyed by authorized activities, the limitations above will not apply. Up to 100% of plants or seed may be salvaged for use in concurrent or future reclamation. Maximum effort should be made to salvage listed carbonate plants from sites where mining or other disturbance is approved, and initial clearing and soil removal should be scheduled to

allow for seed salvage at the end of at least one growing season.

(D) Plant and seed return. Plants and seeds will be returned to the same general vegetation zone where they were collected (e.g. blackbush scrub), within no more than 1000 ft. elevation and 5 miles of the collection site, in order to ensure gene pool and ecotype integrity. Where individual plants are introduced onto a reclamation site (e.g., salvaged plants, or plants grown from seed or cuttings off-site), they will be labeled with metal tags for future growth and survival monitoring. The tag numbers will be kept in permanent records. Tag numbers need not identify every individual plant, but will identify their original source and the year they are planted. Where seed is introduced onto a reclamation site, the amount (weight) and seed collection data (above) will be kept in similar records.

(E) Documentation. Methods of Carbonate Plant introduction and progress of the introduction effort must be monitored and reported to the applicable Resource Management Agency in accordance with the monitoring requirements of Section (c)(iv), below. Operators may use Manipulation during the first few years after planting. As provided in Section (c)(i) below, however, revegetation success criteria will not be deemed to have been met until the end of a minimum 3-year period *without* Manipulation.

(iii) Monitoring. The following monitoring and associated documentation are required to determine successful introduction of Carbonate Plants. Introduction sites will also be subject to the revegetation monitoring described in Section (b)(v) below. Under this Section (c), for the first 3 years following planting, introduction sites shall be monitored at least annually to document survivorship and reproduction. After the initial 3-year period, formal monitoring will be done as needed to fulfill the requirements of the interim and final reports described in subsection (iv) below. In addition to the formal monitoring and reporting described here, introduction sites should be qualitatively monitored at least annually. Qualitative monitoring should document general survival and reproductive success of the Carbonate Plants and should document potential problems, such as erosion, excessive herbivory, and damaged irrigation systems.

(A) Marking: Parish's daisy and Cushenbury buckwheat. These are perennial plants, woody at their bases, and therefore capable of being tagged. Each monitoring cycle, each new plant will be tagged and numbered to indicate the year it was detected. Each previously-existing plant will be examined, and its tag number (if present) and condition will be recorded using the following categories:

(1) Healthy/reproductive (i.e., flower or seed);

(2) Healthy/non-reproductive;

(3) Living but evidently unhealthy;

(4) Dead; or

(5) Missing.

After the first three years of monitoring, new plants (not previously tagged) will be considered "progeny" of the plants initially introduced onto the site. Plants will not be tagged if they are too small to physically support the tags or if tagging is likely to damage them. Plants will be considered "established" when they are large enough to tag.

(B) Marking: Cushenbury milk-vetch and Cushenbury oxytheca. These species cannot be tagged due to their life histories. Instead, areas of occupied habitat will be identified using GPS and markers on the ground to define polygons containing a specified number of individual Carbonate Plants. For these species, parents and progeny will not be distinguished, and demographics will be inferred by total counts of individuals within the defined polygons.

(C) Mapping, all four species. The bounds of occupied habitat will be marked with colored flagging and recorded with a GPS unit. These data will be collected and recorded following the SBNF data and mapping standards. During the monitoring period or later in the year, as appropriate, a small sample of seed from introduced plants on the site will be collected and examined for apparent viability ("fill").

(iv) Reporting. Following the first three years of monitoring, a report will be prepared to include data tables of all plants examined, GPS coordinates of the

occupied habitat's boundaries, representative photographs of the overall site and selected individual plants. Following the second monitoring period (generally 4 years later) an interim report will be prepared with the same format and content as the report following the first 3 years, and additionally describing a demographic analysis of the occurrence. The demographic analysis shall consist of *(A)* assembly and graphing of monitoring data to show survivorship rates of plants initially introduced onto the site and their progeny; *(B)* calculation of the estimated half-life for each cohort; and *(C)* calculation and comparison of recruitment rates and death rates. This interim report initiates the final minimum 3-year no-Manipulation period. A final report (generally 3 years later) with the same format and content as the interim report will also summarize the full monitoring dataset and document the extent to which each of the Carbonate Plant success criteria (*see* Section (c)(i) above) have been met. The interim and final reports may be combined with the general revegetation reports described in Section (b)(v)(B), below.

(d) Authorized loss of revegetated areas. Upon issuance of a favorable CHMS Biological Opinion, losses of Carbonate Plants within the CHMA where Carbonate Plants have been introduced by operators or claim holders shall be authorized under the terms and conditions described below. The authorization provided pursuant to this Section provides relief only from the provisions of the ESA and does not relieve an owner or claim holder from any requirements of the Reclamation Regulations with respect to reclaimed or revegetated areas. This authorization also does not relieve the applicant from NEPA, CEQA, or other environmental review of any proposed new land use.

(i) Conditions to authorized loss. Occupied Habitat that occurs as a result of revegetation efforts on reclaimed land within the CHMA may be taken as necessary to carry out mining activities without any Compensation Requirement if the following conditions are met:

(A) The introduction effort, including a precise description of the location, has been reported to the applicable Resource Management Agency or the County in advance of the introduction work itself.

(B) The introduction effort proposed to be lost has complied with all of the seed collection and salvage requirements described in Section (c)(iii) above.

(C) The introduction site to be lost must not be the only remaining living material salvaged (as seed, cuttings, or whole plants) from an occurrence lost to previous land use changes unless a second salvage effort (from the introduced occurrence proposed to be lost) has been approved by the applicable Resource Management Agency or the County. Where operators salvage plant material from sites to be developed as quarries, waste areas, or other facilities, they should carefully plan the locations where these salvaged materials are introduced.

(ii) Coverage provided When all of the conditions set forth in subsection (i) above are satisfied, the following coverage under the CHMS Biological Opinion shall apply:

(A) Any future impacts or proposed impacts to the Carbonate Plants occurring as a consequence of introductions carried out in compliance with this Section (d) will not be subject to further review or enforcement action under the ESA and will not be subject to any Compensation Requirement under the CHMS.

(B) Collection of seed from living plants for purposes of revegetation activities will be permitted on public or private land, in compliance with USFWS permits, as applicable.

(C) All occurrences of Carbonate Plants discovered within a revegetation site implemented under the CHMS shall be treated as resulting from the introduction.

(iii) Not applicable to Reserve Contributions. This Section (d) shall not permit any habitat disturbance on land that has been contributed to the Habitat Reserve as either a Permanent Contribution or a Relocatable Contribution. In the case of a Relocatable Contribution, however, habitat disturbance may be permitted hereunder after the parcel has been replaced in accordance with Section 10(b)(ii) of the CHMS. ❀

Appendix F: Conservation Credit Worksheets

Contents

Reserve Contribution Valuation Worksheet

Use this form to determine the number of Conservation Credits to be received for a given Reserve Contribution of a parcel of land. For multiple discontiguous parcels, use multiple worksheets.

1 Enter the Conservation Value of the parcel

2a Enter the lineal mileage of any portion of the edge of the parcel that meets Uncommitted Category lands

2b Enter the lineal mileage of any portion of the edge of the parcel that meets existing Mining Category lands

2c Enter the lineal mileage of any portion of the edge of the parcel that meets the existing Habitat Reserve *and that was previously Category D or P land*

2d Enter the lineal mileage of any portion of the edge of the parcel that meets the existing Habitat Reserve *and that was previously Category M land*

2e Enter line 2a × 12

2f Enter line 2b × 24

2g Enter line 2c × 12

2h Enter line 2d × 24

2i Enter line 2e + line 2f – line 2g – line 2h (can be a negative number; this result is the Net Edge Adjustment)

3 Enter line 1 – line 2i (if negative, enter 0); this result is the Adjusted Conservation Value

4 If the parcel is being contributed as a Permanent Contribution, enter 1.00; if as a Relocatable Contribution, enter 0.50 (the *permanence factor*)

5 Enter line 3 × line 4; this result is the Conservation Credits that would be given for contributing the parcel

Compensation Requirement Worksheet

Use this form to determine the Compensation Requirement for obtaining ESA Compliance for a given parcel of land. For multiple discontiguous parcels, use multiple worksheets.

1	Enter the Conservation Value of the parcel	
2a	Enter the lineal mileage of any portion of the edge of the parcel that meets Uncommitted Category lands	
2b	Enter the lineal mileage of any portion of the edge of the parcel that meets the existing Habitat Reserve	
2c	Enter the lineal mileage of any portion of the edge of the parcel that meets existing Mining Category lands	
2d	Enter line 2a × 12	
2e	Enter line 2b × 24	
2f	Enter line 2c × 12	
2g	Enter line 2d + line 2e – line 2f (can be a negative number); this result is the Net Edge Adjustment	
3	Enter line 1 + line 2g (if negative, enter 0); this result is the Adjusted Conservation Value	
4	Enter line 3 × 3.00 (the Compensation Ratio); this result is the Compensation Requirement in terms of Conservation Credits	

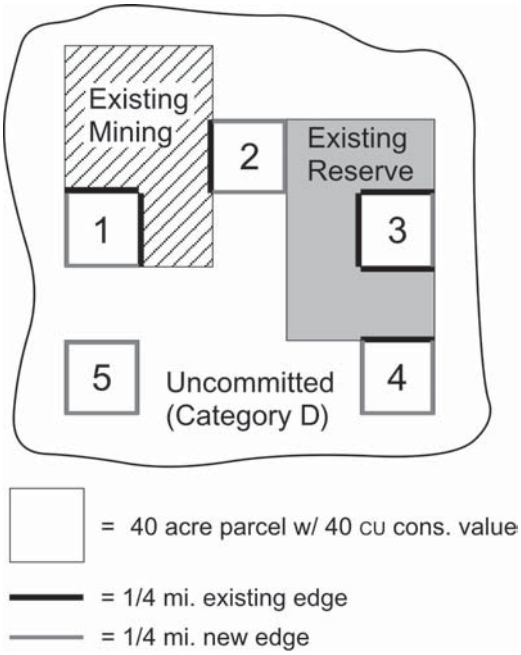
Appendix G: Edge Effect Examples

1. General Edge Effect Examples

Each example on this page involves one of the numbered parcels in the illustration to the right. Each numbered parcel consists of 40 acres and has a Conservation Value of 40 CU (1.00 CU/acre).

The examples in the table below demonstrate how the Net Edge Adjustment operates to affect the number of Conservation Credits given for Reserve Contributions. Each column presents the calculation of the Conservation Credits that would be given for making a Reserve Contribution of one of the numbered parcels in the illustration. The line numbers at the left edge of the table correspond to the line numbers on the Reserve Contribution Calculation Worksheet in *Appendix F.*

The examples in the table on the following page demonstrate how the Net Edge Adjustment operates to affect the Compensation Requirement for ESA Compliance. Each column presents the calculation of the Compensation Requirement for obtaining ESA Compliance to mine one of the numbered parcels in the illustration. The line numbers at the left edge of the table correspond to the line numbers on the Compensation Requirement Worksheet in *Appendix F.*



Conservation Credits Available for Reserve Contributions

		Parcel 1	Parcel 2	Parcel 3	Parcel 4	Parcel 5
1	CV of parcel	40.00	40.00	40.00	40.00	40.00
2a	Edge ag. Uncommitted	0.50	0.50	0.25	0.75	1.00
2b	Edge ag. Mining	0.50	0.25	-	-	-
2c	Edge ag. Reserve (contrib. previously D or P)	-	0.25	0.75	0.25	-
2d	Edge ag. Reserve (contrib. previously Cat. M)	-	-		-	-
2e	Lines 2a x 12	6.00	6.00	3.00	9.00	12.00
2f	Lines 2b x 24	12.00	6.00	-	-	-
2g	Lines 2c x 12	-	3.00	9.00	3.00	-
2h	Lines 2d x 24	-	-	-	-	-
2i	Lines 2e + 2f – 2g – 2h	18.00	9.00	(6.00)	6.00	12.00
3	Lines 1 – 2i (ACV)	22.00	31.00	46.00	34.00	28.00
4	Permanence factor	1.00	1.00	1.00	1.00	1.00
5	**Lines 3 x 4 = Conservation Credits given**	**22.00**	**31.00**	**46.00**	**34.00**	**28.00**

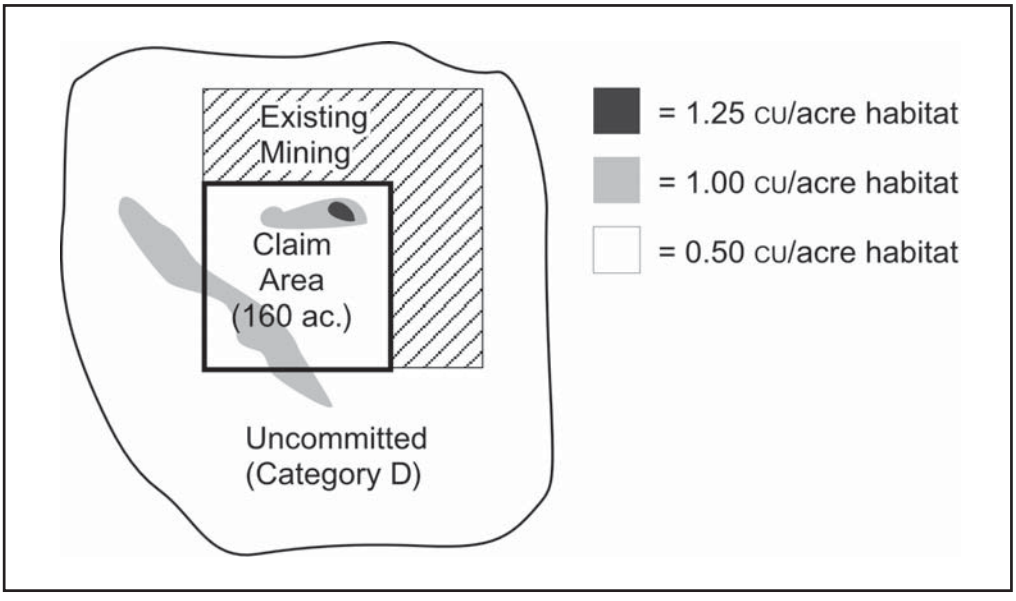
Compensation Requirements for ESA Compliance

		Parcel 1	Parcel 2	Parcel 3	Parcel 4	Parcel 5
1	CV of parcel	40.00	40.00	40.00	40.00	40.00
2a	Edge ag. Uncommitted	0.50	0.50	0.25	0.75	1.00
2b	Edge ag. Reserve	-	0.25	0.75	0.25	-
2c	Edge ag. Mining	0.50	0.25	-	-	-
2d	Lines 2a x 12	6.00	6.00	3.00	9.00	12.00
2e	Lines 2b x 24	-	6.00	18.00	6.00	-
2f	Lines 2c x 12	6.00	3.00	-	-	-
2g	Lines 2d + 2e – 2f	-	9.00	21.00	15.00	12.00
3	Lines 1 + 2g (ACV)	40.00	49.00	61.00	55.00	52.00
4	**Line 3 x 3.00 = ESA Compliance cost**	**120.00**	**147.00**	**183.00**	**165.00**	**156.00**

2. Edge Effect Examples with Curvilinear Edges

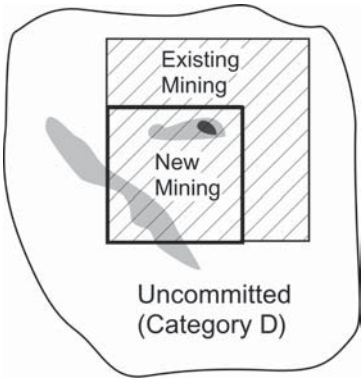
The examples on the following pages show how the Net Edge Effect adjustment affects Conservation Values using the scenario illustrated to the right. Based upon this scenario, a mining company would establish the limits of disturbance taking into account the cost of ESA Compliance and the value and accessibility of the mineral deposits within the claim, as well as other factors. The three examples below compare three configurations of limits of disturbance to provide an idea of how a company might consider the cost of ESA Compliance under the CHMS when establishing limits of disturbance for a mining project. The examples do not attempt to consider mineral value and other factors.

For each example, the cost of ESA Compliance is calculated for the limits of disturbance as shown in the example. Then the Conservation Credits are calculated that would be available for making a Reserve Contribution of the remainder of the claim (the area outside of the limits of disturbance). Note that it is an additional decision of the mining company (or claim holder) whether or not to make a Reserve Contribution of the portion of the claim avoided. If a Reserve Contribution is not made, then the mining company or claim holder retains the option to obtain ESA Compliance for the remainder area and mine it in the future. On the other hand, making a Reserve Contribution of the area would help to minimize the current net cost of ESA Compliance.



Curvilinear Edge Effect Examples: Summaries

Example A



Area of disturbance: 160.0 acres

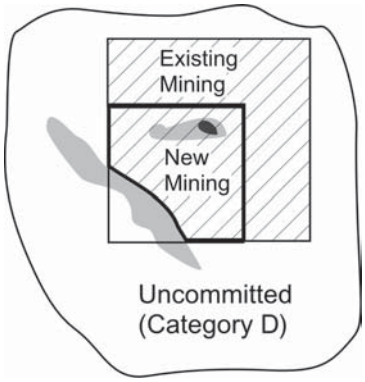
ESA Compliance cost: 285.2 CU (1.78 CU/acre of mining)

Credits for Reserve Contrib. of remainder: n/a

Net ESA Compliance cost after Reserve Contrib.: n/a

Comments: This is a baseline case that simply ignores the habitat present.

Example B



Area of disturbance: 129.5 acres

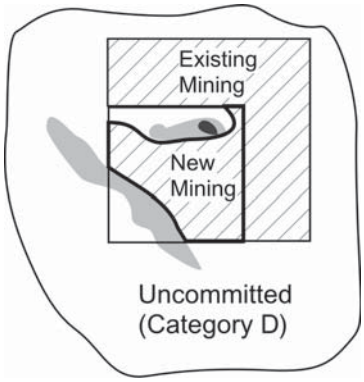
ESA Compliance cost: 206.8 CU (1.60CU/acre of mining)

Credits for Reserve Contrib. of remainder: 7.8 CU (0.26 CU/acre of contribution)

Net ESA Compliance cost after Reserve Contrib.: 198.9 CU (1.54 CU/acre of mining)

Comments: In this case, the limits of disturbance avoid the larger habitat patch but include the smaller habitat patch that is deeper in the mining area. This would be the most efficient design if all land had the same economic value.

Example C



Area of disturbance: 97.6 acres

ESA Compliance cost: 174.9 CU (1.79 CU/acre of mining)

Credits for Reserve Contrib. of remainder: 7.8 CU (0.13 CU/acre of contribution)

Net ESA Compliance cost after Reserve Contrib.: 167.0 CU (1.71 CU/acre of mining)

Comments: This case avoids all habitat patches, but is actually less efficient than both Examples “A” and “B.” This is primarily due to the large Net Edge Adjustments associated with preserving the additional habitat.

This example also demonstrates how the edge adjustment can devalue a Reserve Contribution with high edge effects. The number of Conservation Credits available for contributing the more northerly habitat area is zero for 31.9 acres. The Net Edge Adjustment for this contribution is –25.1 off of a pre-adjusted Conservation Value of 22.0, but the ACV cannot be less than zero.

The detailed calculations behind the summaries above are shown on the following two pages.

Curvilinear Edge Effect Examples: Detailed Calculations

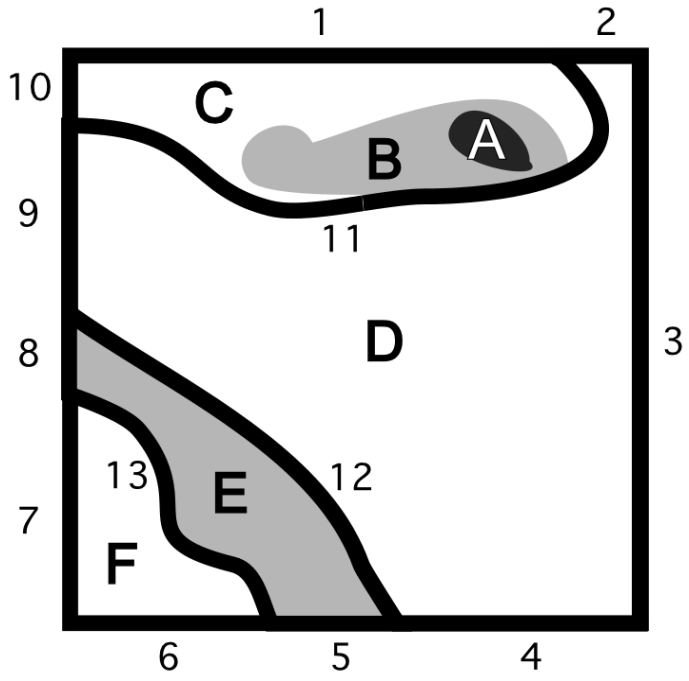
Compensation Requirements for ESA Compliance				
		Examp. A	Examp. B	Examp. C
1	CV of parcel	95.07	70.87	48.82
2a	Edge ag. Uncommitted	1.00	0.84	1.37
2b	Edge ag. Reserve	-	-	-
2c	Edge ag. Mining	1.00	1.00	0.58
2d	Lines 2a x 12	12.00	10.06	16.41
2e	Lines 2b x 24	-	-	-
2f	Lines 2c x 12	12.00	12.00	6.94
2g	Lines 2d + 2e – 2f	-	(1.94)	9.47
3	Lines 1 + 2g (ACV)	95.07	68.92	58.29
4	**Line 3 x 3.00 = ESA Compliance cost**	**285.21**	**206.77**	**174.87**
	ESA Compliance cost per acre of mining	**1.78**	**1.60**	**1.79**

Conservation Credits Available for Reserve Contributions					
		Examp. A	Examp. B	(C1 + C2) Examp. C	C1	C2
1	CV of parcel	-	24.20	46.25	24.20	22.05
2a	Edge ag. Uncommitted	-	0.56		0.56	0.06
2b	Edge ag. Mining	-	0.40		0.40	1.01
2c	Edge ag. Reserve (contrib. previously Uncommitted)	-	-		-	-
2d	Edge ag. Reserve (contrib. previously Mining)	-	-		-	-
2e	Lines 2a x 12	-	6.75		6.75	0.75
2f	Lines 2b x 24	-	9.61		9.61	24.33
2g	Lines 2c x 12	-	-		-	-
2h	Lines 2d x 24	-	-		-	-
2i	Lines 2e + 2f – 2g – 2h	-	16.36		16.36	25.08
3	Lines 1 – 2i (ACV)	-	7.84		7.84	-
4	Permanence factor	1.00	1.00		1.00	1.00
5	**Lines 3 x 4 = Credits for Reserve Contrib. of remainder**	**-**	**7.84**	**7.84**	**7.84**	**-**
	Credits per acre for Reserve Contrib. of remainder	**-**	**0.26**	**0.13**	**0.26**	**-**

Net ESA Compliance cost after Reserve Contrib.			
	Examp. A	Examp. B	Examp. C
Total	285.21	198.93	167.03
Per acre of mining	1.78	1.54	1.71

Curvilinear Edge Effect Example: Areas and Perimeters

Shape Areas/CVs				
Shape	Acreage	CV/ac.	CV	Perim. total
A	1.6787	1.25	2.0984	0.1991
B (incl. A)	11.3651	1.04	11.7848	0.6562
B – A	9.6864	1.00	9.6864	0.8553
C (incl. A & B)	31.8925	0.69	22.0485	1.0761
D	97.6371	0.50	48.8186	1.9402
C + D (incl. A & B)	129.5296	0.55	70.8670	1.8443
E	17.8483	1.00	17.8483	0.8820
F	12.7117	0.50	6.3558	0.6689
E + F	30.5600	0.79	24.2042	0.9631
All	160.0000	0.59	95.0712	2.0000



Perimeter edges (li. mi.)	
Edge1	0.4219
Edge2	0.0781
Edge3	0.5000
Edge4	0.2187
Edge5	0.1094
Edge6	0.1719
Edge7	0.2031
Edge8	0.0781
Edge9	0.1563
Edge10	0.0625
Edge11	0.5917
Edge12	0.4006
Edge13	0.2939

Appendix H: Credit Registration

Private participation in the CHMS consists primarily in "transactions" involving Conservation Credits. Parties can receive Conservation Credits for making Reserve Contributions, and they can "spend" Conservation Credits to obtain ESA Compliance. They can also sell Conservation Credits to another private party. To track the various types of Conservation Credit transactions, the CHMS has a "Credit Registry" administered by the Forest Service. Below is an example of the kinds of procedures that the Forest Service may adopt for credit registration.

Except as specifically indicated to the contrary, capitalized terms in this appendix shall have the meanings ascribed to them in the CHMS document to which this appendix is attached.

(a) Credit Registry. The Credit Registry is a database maintained by the Forest Service that tracks the *creation*, *use*, and *transfer* of Conservation Credits under the CHMS, along with various records and legal documents related to these transactions. The Forest Service may make available certain information from the Credit Registry on the World Wide Web. The basic procedures for the three types of Conservation Credit transactions are described in the following three subsections, which the Forest Service may modify from time to time.

(b) Credit Creation for Reserve Contributions. The following process applies when a landowner or claim holder wishes to make a Reserve Contribution and receive Conservation Credits:

(i) Contribution Assessment. The applicant submits to the Forest Service a "Contribution Assessment Application" that includes *(A)* a plat of the land to be contributed at an appropriate map scale, *(B)* a statement of the intended means of contribution (transfer of ownership, relinquishment of claim, a Use Restriction Agreement (in the case of a Relocatable Contribution), or a Surface Entry Restriction (in the case of a contribution of a split-estate contribution) and *(C)* a contribution assessment fee. Within five (5) business days, the Forest Service will prepare a "Contribution Assessment" that will state, as of the date of issuance, the number of Conservation Credits that would be issued to the applicant if a Reserve Contribution were made of the subject parcel.

(ii) Reserve Contribution Application. If the applicant elects to proceed after receiving the Conservation Value Assessment, the applicant submits to the Forest Service a "Reserve Contribution Application," including *(A)* a completed and signed amendment to the MOU, *(B)* a contribution processing fee (to cover the cost of the land assessment and closing steps described below), and *(C)* a completed and signed grant deed, mine claim quitclaim, Use Restriction Agreement, or Surface Entry Restriction (depending on the intended means of contribution).

(iii) Land Assessment. Upon receipt of a complete Reserve Contribution Application, the Forest Service shall perform a "Land Assessment" (by itself and/or through parties with which it subcontracts), which includes the following:

(A) A title search and evaluation of any encumbrances on the subject property;

(B) A Phase I environmental study;

(C) Site reconnaissance to determine the level of human disturbance of the property in the form of *(I)* trash and debris; *(II)* extent of soil and vegetation disturbance from off-road vehicle use, grazing, and other uses; and *(III)* any ongoing use;

(D) If needed in order to supply a correct legal description of the subject property, preparation of a survey, a record of survey, and/or an approved subdivision in compliance with the California Subdivision Map Act; and

(E) A report prepared by the Forest Service (in coordination with the applicable Resource Management Agency, if not the Forest Service) summarizing the contents of the Land Assessment, stating whether

the subject property meets the "Land Acceptance Criteria" established by the applicable Resource Management Agency, and, if not, listing the remedial measures that must be undertaken to meet the Land Acceptance Criteria.

If the subject property does not meet the Land Acceptance Criteria, follow-up Land Assessments may be subject to additional fees. The Forest Service may require applicants to engage outside parties to perform some or all of the Land Assessment work on behalf of the Forest Service, but at the expense of the applicant.

(iv) Closing. Once the subject property is determined to have met the Land Acceptance Criteria, the following steps occur to complete the closing of the Reserve Contribution:

(A) The applicant pays a closing fee to cover costs of title insurance, recordation, and processing the closing;

(B) The Forest Service (in coordination with the applicable Resource Management Agency, if not the Forest Service) verifies the Contribution Assessment, which can change over time with changes in the Habitat Inventory or shifts in the land use categories of adjacent parcels, and obtains the applicant's approval if the Conservation Credits to be issued have decreased;

(C) The Forest Service arranges for a policy of title insurance to be issued to the Resource Management Agency (not required when the contribution is by relinquishment of claims);

(D) The Forest Service files the record of survey, if one was required;

(E) The Forest Service files and/or records the instrument of conveyance (except in the case of a Use Restriction Agreement, which is only accepted, not recorded);

(F) The Forest Service records the transaction in the Credit Registry; and

(G) The Forest Service issues a Credit Verification Letter to the applicant indicating the number of Conservation Credits that have been registered in his/her/its name.

(v) Contingent Contributions (optional). Applicants have the option to make Contingent Contributions pursuant Section 10(d) using the process described in this subsection.

(A) To make a Contingent Contribution, the applicant shall include with its closing fee, paid pursuant to subsection *(iv)(A)* above, *(I)* a request to make the Reserve Contribution a Contingent Contribution, *(II)* a description of the requested contingency or contingencies, and, optionally, *(III)* a "Compliance Evaluation" (*see* subsection *(c)(i)* below) for one or more parcels.

(B) If the application is complete and the requested contingencies are consistent with those permitted under Section 10(d), then the Forest Service shall modify the closing process under subsection *(iv)* above by adding to the closing conditions the satisfaction of the contingencies requested by the applicant.

(C) If the application is either incomplete or the requested contingencies are inconsistent with Section 10(d), then the Forest Service shall reject the application and return it to the applicant.

(D) If the applicant has submitted a Compliance Evaluation, and the Forest Service can verify that the Compensation Requirement stated in the Compliance Evaluation is valid as of the date of application, then the Forest Service shall add an endorsement to the Compliance Valuation to the effect that the Compensation Requirement stated in the Compliance Evaluation is locked in so long as the Compensation Requirement is met entirely using Conservation Credits issuing from the subject Contingent Contribution.

(c) Credit use for ESA Compliance. The following process applies when a mining company, landowner, or claim holder wishes to obtain ESA Compliance using Conservation Credits:

(i) Compliance Evaluation. The applicant submits to the Forest Service a "Compliance Application" that includes *(A)* a project plan, at an appropriate map scale, depicting the land on which mining activity is to occur, with boundary lines separating the limits of surface disturbance from areas not to be disturbed; and *(B)* a fee for processing of the compliance evaluation. Within five (5) business days, the Forest Service will

prepare (in coordination with the applicable Resource Management Agency, if not the Forest Service) a "Compliance Evaluation" that will state, as of the date of issuance, the Compensation Requirement, in terms of Conservation Credits, for mining activities on the subject property. Note that the applicant may be a mining company that does not own the land or claim, but that the owner or claim holder must co-sign all applications required under this subsection *(c)*.

(ii) Compliance Verification Letter. The applicant obtains a Compliance Verification Letter, stating that the proposed project has obtained ESA Compliance under the CHMS, as follows:

(A) The applicant submits to the Forest Service *(I)* one or more Credit Verification Letters with a face value that is greater than or equal to the Compliance Requirement, *(II)* an executed amendment to the MOU adding applicant as a party with respect to the proposed project, and *(III)* payment of a fee for processing the Compliance Verification Letter.

(B) The Forest Service verifies the Compensation Requirement, which can change over time with changes in the Habitat Inventory, and obtains the applicant's approval if the Compliance Requirement has increased.

(C) The Forest Service verifies that no suspension or partial suspension of permitting authority under the CHMS Biological Opinion is in place that applies to the proposed project.

(D) The Forest Service records the transaction in the Credit Registry, issues the applicant a Compliance Verification Letter for the proposed project, and, if necessary, issues a new Credit Verification letter to the applicant for the difference between the number of Conservation Credits shown on the Credit Verification Letter(s) provided by the applicant and the Compliance Requirement.

(iii) Mining Plan. In the process of obtaining a Mining Plan from the Resource Management Agency, the applicant submits the Compliance Verification Letter obtained for the project as evidence of full compliance with the ESA with respect to the Carbonate Plants and any other species that may be addressed by the CHMS in the future. The Resource Management Agency will be required to verify that the limits of surface disturbance shown in the Compliance Verification Letter match the limits of surface disturbance shown in the Mining Plan.

(d) Credit transfer. Any Credit Holder may transfer any number of Conservation Credits registered in his/her/its name to any other party. Such a transfer may be the result of any kind of bargain between the parties or can be a gift or donation from one party to another. For any such transfer to be effective, however, it must be registered in the Credit Registry. The process for transferring Conservation Credits is as follows:

(i) The transferor and transferee both sign a "Transfer Request," with the transferor's Credit Verification Letter attached, providing basic information about the parties and indicating the number of Conservation Credits to be transferred.

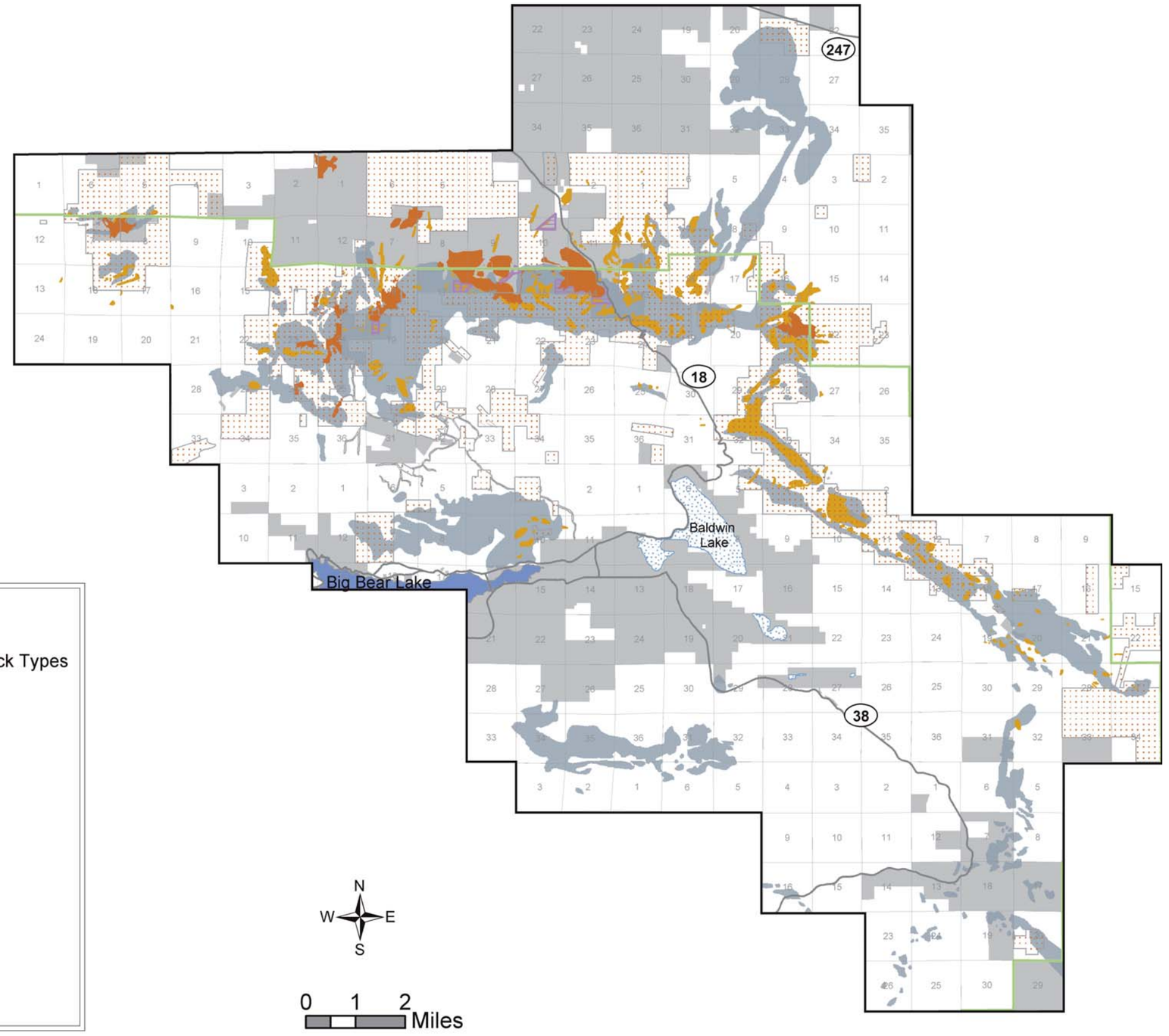
(ii) Either party submits the Transfer Request, along with a fee for processing the transfer, to the Forest Service.

(iii) The Forest Service records the transfer in the Credit Registry and issues a new Credit Verification Letter to the transferee for the number of Conservation Credits transferred and, if applicable, issues a new Credit Verification Letter to the transferor for the difference between the number of Conservation Credits shown on the old Credit Verification Letter and the number of Conservation Credits transferred to the transferee. ❀

Appendix I: Maps

Contents

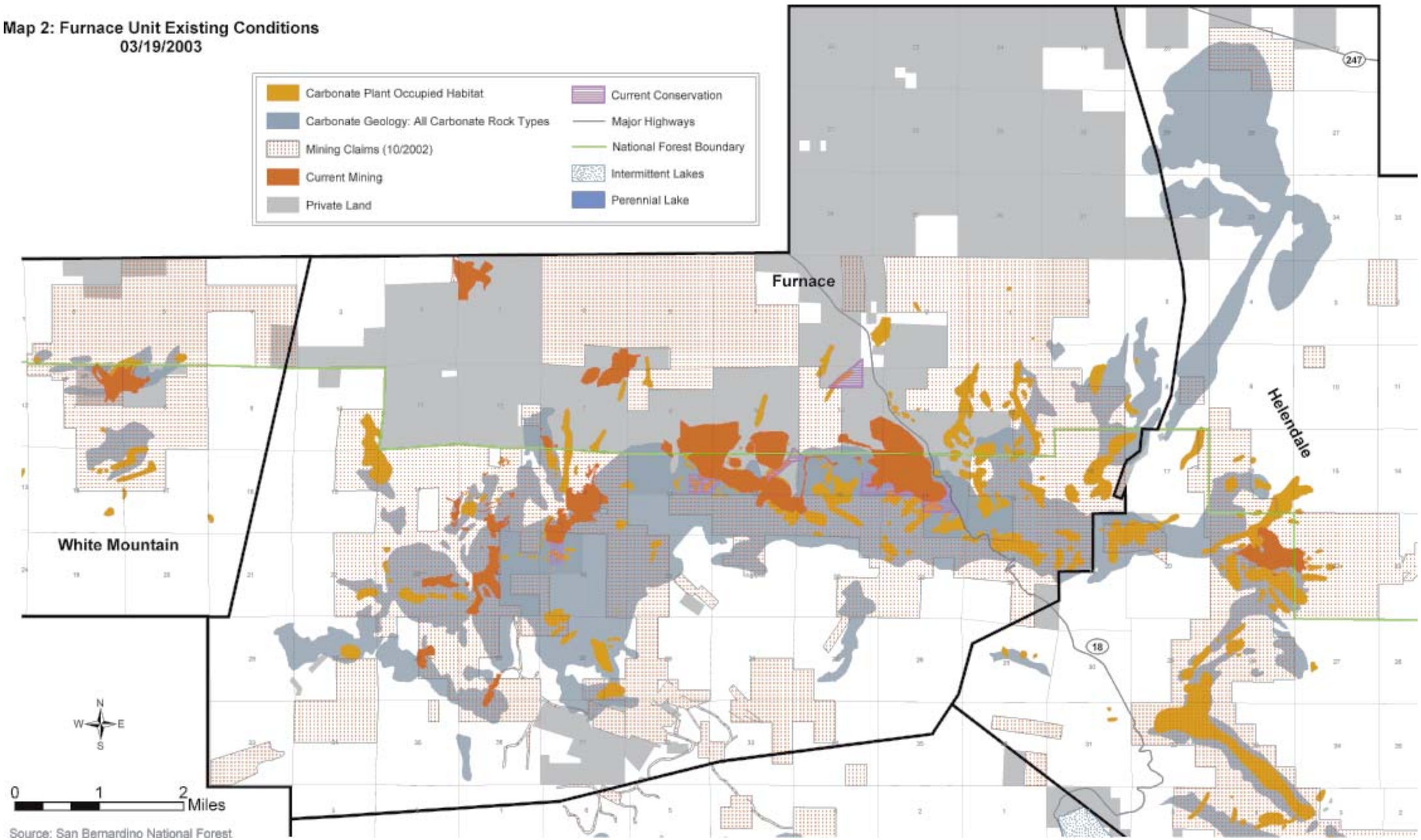
Map 1: Existing Conditions
03/19/2003



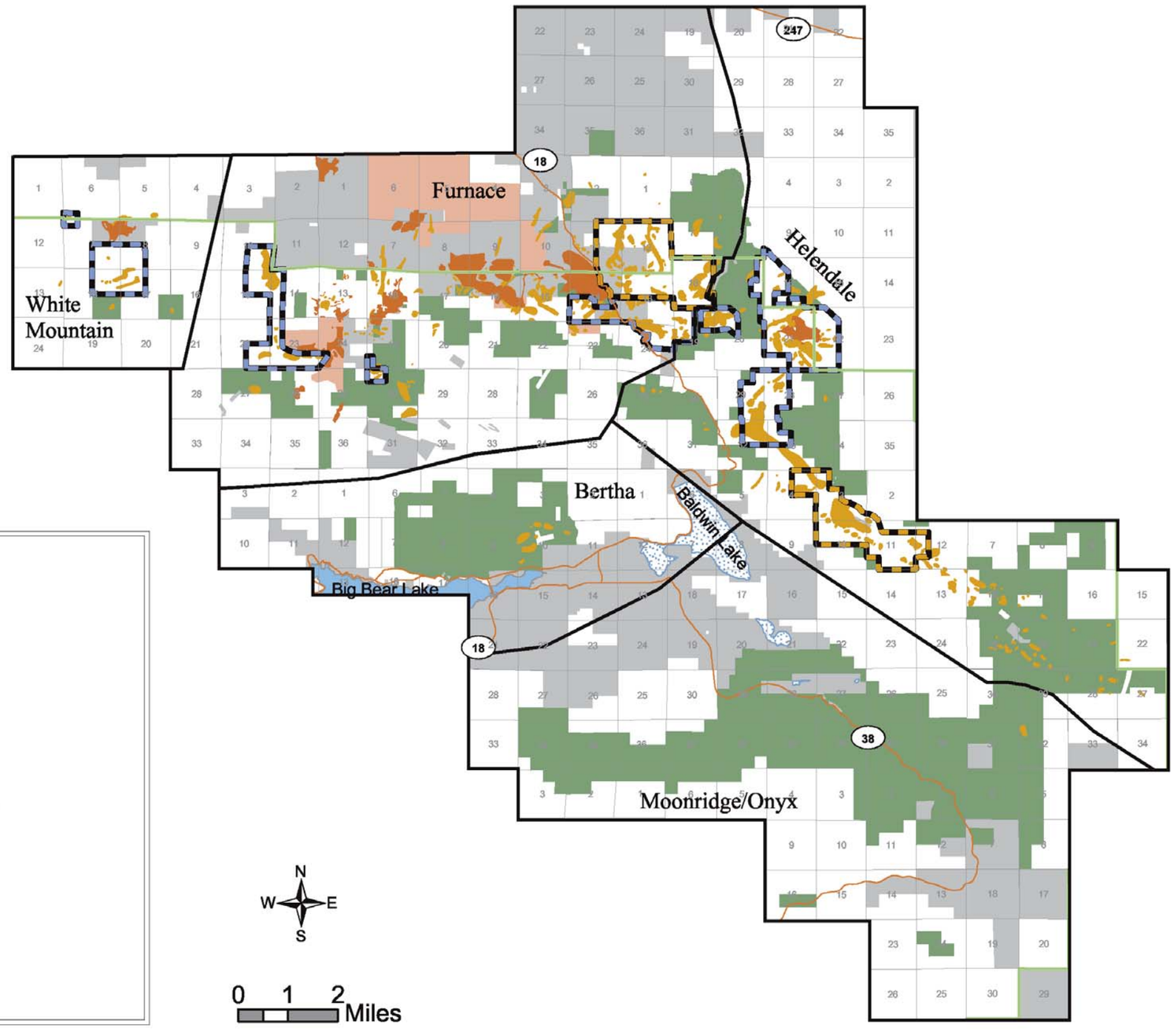
- Carbonate Plant Occupied Habitat
- Carbonate Geology: All Carbonate Rock Types
- Mining Claims (10/2002)
- Current Mining
- Private Land
- Current Conservation
- Major Highways
- National Forest Boundary
- Intermittent Lakes
- Perennial Lake

Source: San Bernardino National Forest

Map 2: Furnace Unit Existing Conditions
03/19/2003



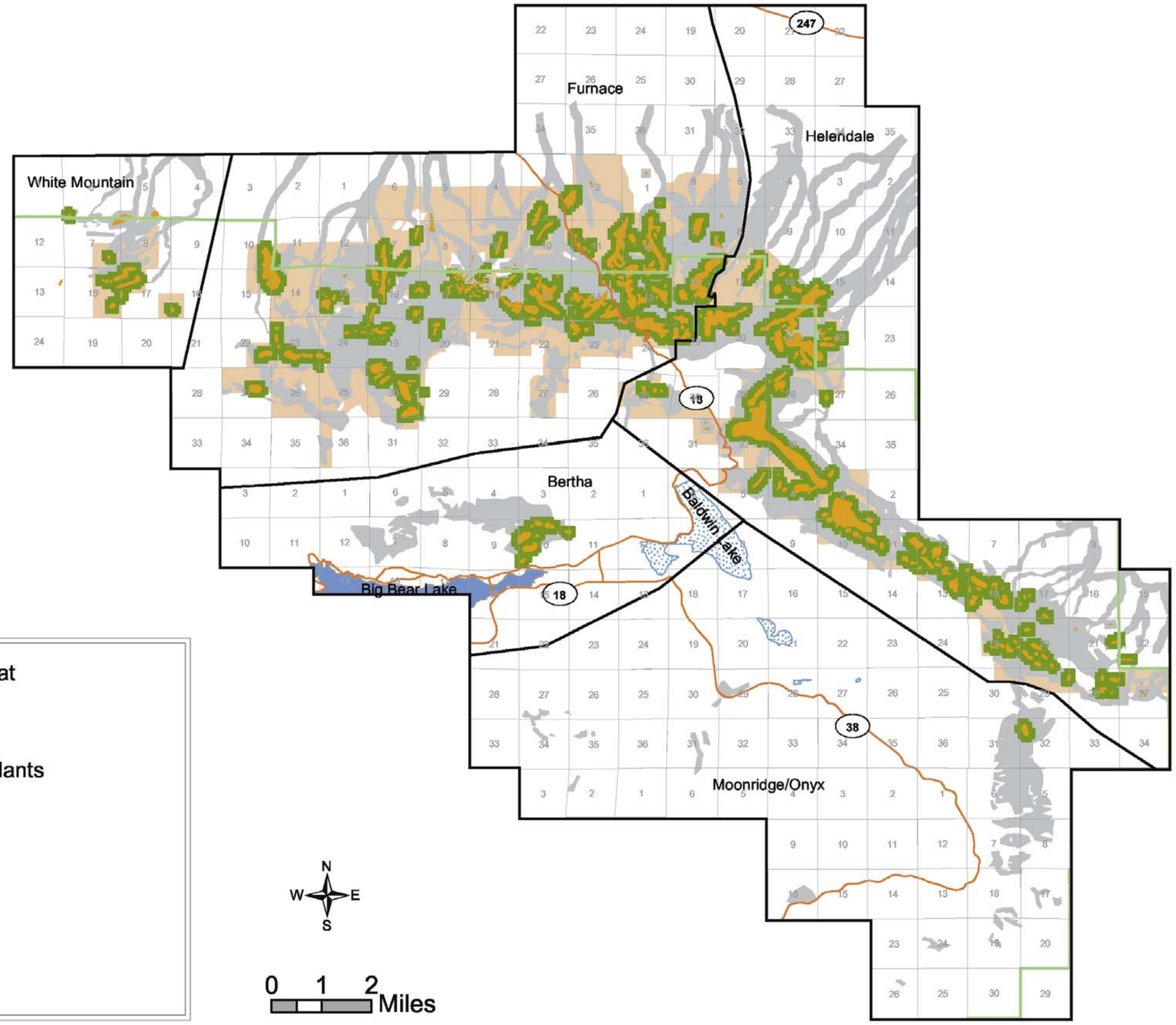
Map 3: CHMS Categories
03/19/2003



- Initial Habitat Reserve (Cat. E)
- Stage 1 Priority Areas
- Stage 2 Priority Areas
- Category D
- Potential Categories M2 & X
- Category M1
- Carbonate Plant Occupied Habitat
- Major Highways
- National Forest Boundary
- Intermittent Lakes
- Perennial Lake
- Private Land

Source: San Bernardino National Forest

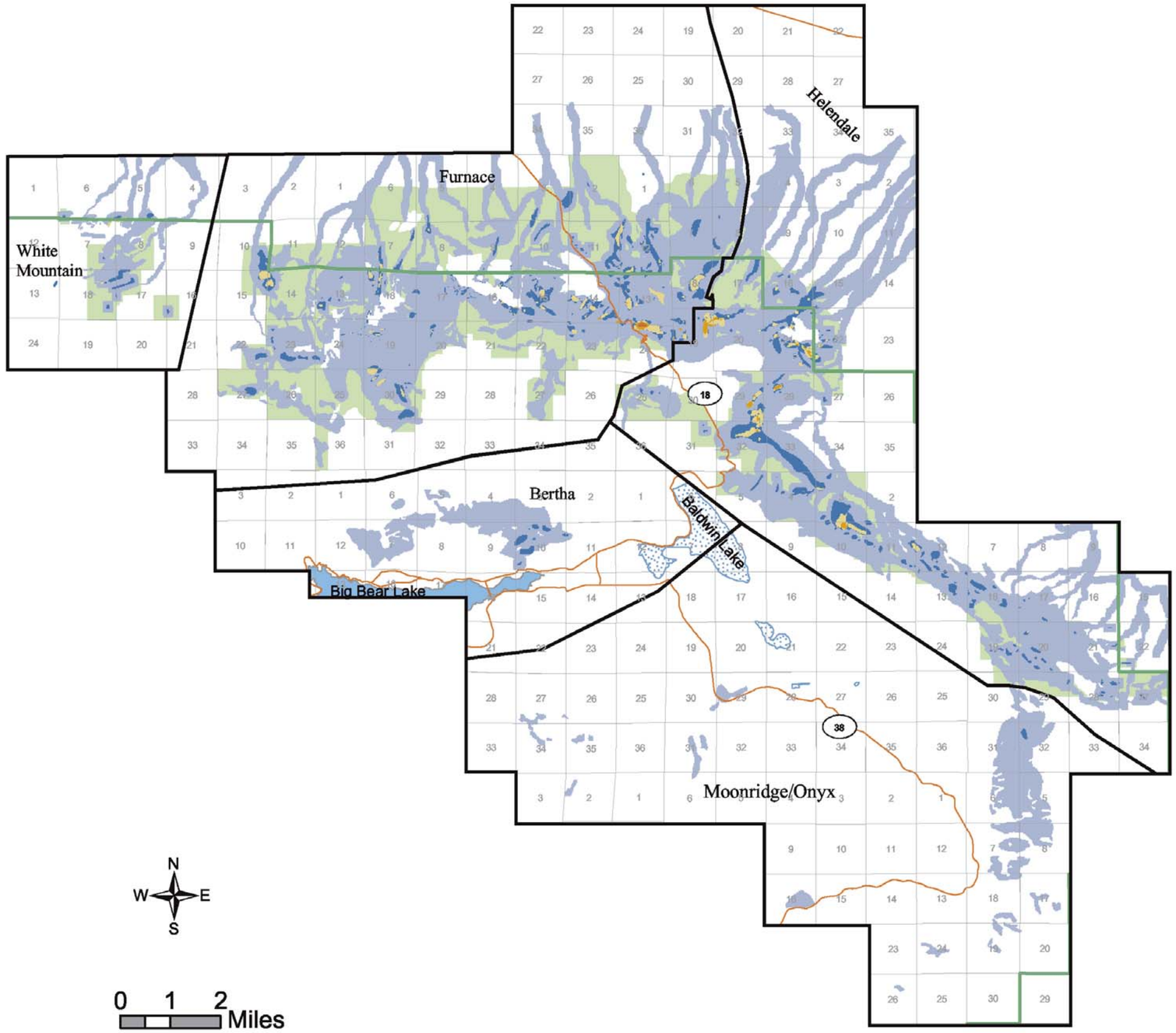
Map 4: Habitat Types
3/19/2003



- Carbonate Plant Occupied Habitat
- Critical Habitat
- Suitable Habitat for Carbonate Plants
- Other Beneficial Habitat
- Major Highways
- National Forest Boundary
- Intermittent Lakes
- Perennial Lake

Source: San Bernardino National Forest

Map 5:
Conservation Value
3/19/2003



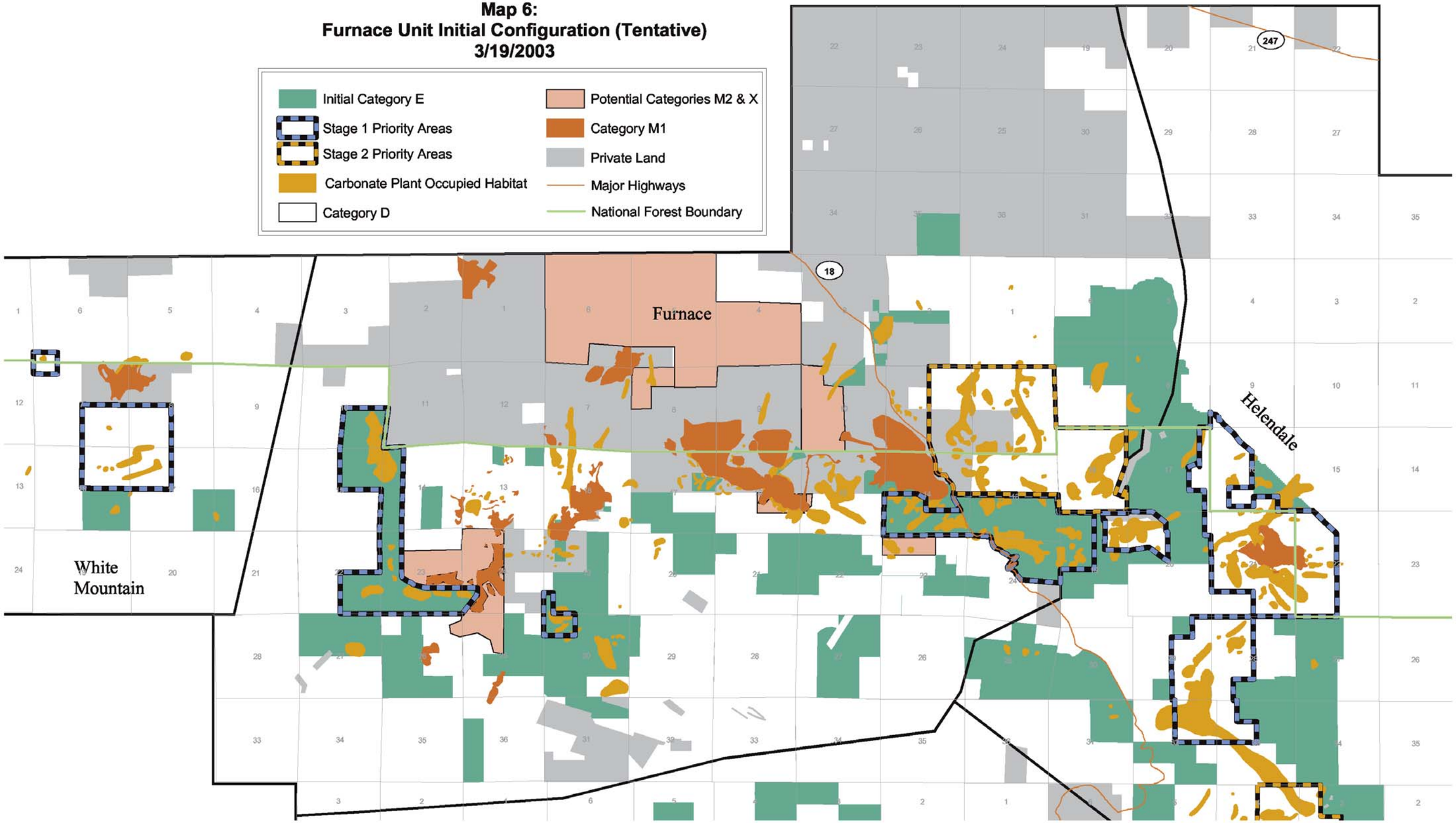
Conservation Value

- 0
- 0.25
- 0.50
- 1.0
- 1.25
- 1.50
- 1.75

- Administrative Units
- Major Highways
- National Forest Boundary
- Intermittent Lakes
- Perennial Lake

Source: San Bernardino National Forest

Map 6:
Furnace Unit Initial Configuration (Tentative)
3/19/2003



Source: San Bernardino National Forest