

Chapter 11

Conservation Measures for Rare Plants



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11 CONSERVATION MEASURES FOR RARE PLANTS

11.1 Introduction

Anything you do to a forest—including “hands off” management—may result in benefit to some species and harm to others. Therefore, drawing a boundary around a rare plant population within a forest will not necessarily guarantee its survival; it may still “wink out.” Protecting rare plants is particularly problematic in a working forest, where forest management is primarily focused on growing and harvesting certain species of trees. Forest management involves roads, heavy equipment, logging crews, environmental changes, and many other factors that can threaten rare plants. Also, a complete picture of which plants inhabit a particular forest and where they are located takes considerable effort to develop. Nevertheless, MRC is committed to conserving rare plants on our land.

Chapter 11 describes the key elements of rare plant conservation for our HCP/NCCP, including how to

- Define conservation goals and objectives for covered rare plants.
- Select rare plant species covered under the plan.
- Survey for covered plants in accordance with CDFG guidelines.
- Create management categories for conservation objectives and measures.
- Assign covered species to the appropriate management category.
- Focus protections on management categories, groups of species, or individual species.

Included in this chapter are discussions on the intent behind key conservation measures, such as buffer width, buffer management, limits of take, and translocation.

Comprehensive long-term monitoring and adaptive management are a key part of the conservation strategy for covered rare plants described in Chapter 13, *Monitoring and Adaptive Management*, section 13.10. MRC will use long-term monitoring to evaluate the effectiveness of our conservation measures. If monitoring shows that we are not meeting our conservation objectives, MRC may obtain approval from the wildlife agencies to change our conservation measures. Adaptive management is the process of implementing conservation measures, monitoring results, and adjusting conservation measures based on those results.

11.1.1 Defining basic terms

DEFINITION

Occurrence is a location where a plant is found; an occurrence can consist of a single individual or a group of individuals, which may include several sub-groups.¹

Recovery is reduction of threats and attainment of individual numbers and geographic range to the extent that listing as threatened or endangered is no longer warranted.

Translocation is the transfer of live plants or plant parts (seeds, cuttings, rhizomes, etc.) from one location to another, in order to establish them and promote reproduction.

¹ Single occurrences are, by definition, separated from the nearest occurrence(s) by ¼ mile or more (CDFG 2005). An occurrence may or may not be equivalent to a biological population. MRC does not define our monitoring and management units with ¼ mile delimiters.

Take for plants, in a general sense, means the loss of individuals through direct or indirect means.²

Management category is an element in an ordered scale that characterizes the management objectives and protections MRC will apply to an area or a covered rare plant.

11.2 Biological goals and objectives

Goals and Objectives for Covered Rare Plants	
Goals	
G§11.2-1	Conserve the natural communities, habitats, and occurrences of covered rare plant species found in the plan area.
G§11.2-2	Contribute to the recovery of covered rare plant species in the plan area that are listed as <i>threatened</i> or <i>endangered</i> by CDFG or USFWS.
G§11.2-3	Manage and conserve rare plant species that are not listed as <i>threatened</i> or <i>endangered</i> so that listing remains unnecessary.
Objectives	
Management Category 1 (MC1)	
O§11.2-1	Maintain all covered rare plant occurrences in the plan area at stable-to-increasing ³ levels of abundance and distribution (i.e., occurrence trend is stable-to-increasing).
O§11.2-2	Avoid ⁴ or minimize ⁵ mortality of individual plants.
O§11.2-3	Minimize direct and indirect adverse impacts to occurrences, such as ground disturbances, accelerated erosion, accelerated sedimentation, fuel spills, slash deposition, and increases in number or cover of invasive pest plants.
O§11.2-4	Retain existing site conditions of importance to covered rare plants, such as microclimatic factors (sun/shade levels, humidity); soil factors (soil structure, soil moisture regime, soil compaction level); local hydrology; ground disturbance levels; and plant species composition of the community and habitat.
Management Category 2 (MC2)	
O§11.2-5	Maintain a stable-to-increasing number of occurrences in each inventory block where the covered species is known (i.e., species trend is stable-to-increasing).
O§11.2-6	Maintain, on average, stable-to-increasing levels of abundance and distribution for the covered species throughout its range in the plan area (i.e., species trend is stable-to-increasing).
O§11.2-7	Minimize ⁴ mortality of individual plants.

² See section 1.7.1.

³ Definitions for trend conditions (i.e., *stable*, *increasing*, and *decreasing*) must be species-specific and will be a component of the protocols for effectiveness monitoring (Chapter 13). In general, definitions will incorporate parameters for self-sustainability, such as area occupied by the rare plant species, number or cover of rare plants in the occurrence, and measures of viability like seed production.

⁴ *Avoid*, in this context, means zero take.

⁵ *Minimize*, in this context, means the lowest number permitted, as described in the conservation measures under “standard limits of take.”

Goals and Objectives for Covered Rare Plants	
O§11.2-8	Reduce direct and indirect adverse impacts, such as ground disturbances, accelerated erosion, accelerated sedimentation, fuel spills, slash deposition, and increases in number or cover of invasive pest plants.
O§11.2-9	Minimize changes in site conditions of importance to rare plants, such as microclimatic factors (sun/shade levels, humidity); soil factors (soil structure, soil moisture regime, soil compaction level); local hydrology; ground disturbance levels; and plant species composition of the community and habitat.
Management Category 3 (MC3)	
O§11.2-10	Maintain stable-to-increasing levels of abundance and distribution within all inventory blocks where the covered species is found (i.e., species trend is stable-to-increasing).
O§11.2-11	Reduce mortality of individual rare plants, as feasible.
O§11.2-12	Reduce, as feasible, direct and indirect adverse impacts, such as ground disturbance, accelerated erosion, accelerated sedimentation, fuel spills, slash deposition, and increases in number or cover of invasive pest plants.
O§11.2-13	Minimize, as feasible, changes in site conditions of importance to rare plants, such as microclimatic factors (sun/shade levels, humidity); soil factors (soil moisture regime, soil compaction level); local hydrology; ground disturbance levels; and plant species composition of the community and habitat.
Management Category 4 (MC4)	
O§11.2-14	Maintain number and size of occurrences in the plan area so that the species continues to qualify for its current S rank or an S rank that denotes greater abundance (see section 11.5.1).
O§11.2-15	Reduce mortality of individual rare plants, as feasible.
O§11.2-16	Maintain stable-to-increasing occurrences in the plan area, mainly through community-based conservation measures.

11.3 Summary of the Conservation Strategy for Rare Plants

MRC will conserve all covered rare plant species through community-based conservation measures, category-based conservation measures, or a combination of both. We will implement *species-specific* conservation measures supported by relevant biological information (see section 11.8).

11.3.1 Community-based measures

MRC will implement community-based conservation measures on all of our covered lands. Community-based measures will be the primary means of conservation for covered rare plants known or expected mainly in areas where covered activities rarely take place. These communities and habitats include

- Closed-cone forest (including pygmy and Bishop pine forests, see *HCP/NCCP Atlas*, MAPS 8A-C).
- Some permanent wetlands (marshes, bogs, fens).
- Rocky outcrops, including serpentine.

- Oak woodlands.

If covered activities must be carried out in these communities, MRC will avoid or minimize their effects on these areas, and, where applicable, implement categorical conservation measures for any affected rare plant occurrence.

11.3.2 Category-based measures

Category-based measures will be the primary means of conservation for covered rare plants known or expected in areas where covered activities will take place on a regular basis. Figure 11-1 provides a flowchart for the implementation of a category-based conservation strategy for covered rare plants. Unless specified otherwise, the processes are ongoing for the 80-year period of the HCP/NCCP.

11.3.2.1 Survey results

Using survey guidelines recommended by CDFG (2009), MRC will survey areas where covered activities, such as a PTHP, could affect covered rare plants. Prior to any field operations, we will submit to the wildlife agencies, along with a PTHP, the results of the surveys using a standard report format included in the *MRC Rare Plant Survey Handbook* (2007). MRC will file documentation of covered rare plant locations detected during rare plant surveys with the CNDDDB (see section 11.5).

11.3.2.2 Core occurrences

DEFINITION

The **core occurrence area** is the portion of a CNDDDB occurrence that is a continuous grouping subject to covered activities.

The core occurrence area may include all or part of a CNDDDB occurrence (see section 11.5). A CNDDDB occurrence may extend beyond MRC land or into an area not subject to covered activities; those portions of the CNDDDB occurrence are not included in the core occurrence area. In the field, MRC will define the core occurrence area as one or more convex polygons that encompass all individuals. We will initially identify and mark core occurrence areas during rare plant surveys. Prior to timber harvesting or other covered activities, we will install permanent markers as specified in the conservation measures for each management category. Anticipating the possibility that markers may be damaged or removed, we will use global positioning system (GPS) data to define a core occurrence area in the event marker relocation is required. To protect the viability of individuals located on the outer margin of the core occurrence area, we will establish and mark the outer limits of the core occurrence area at least 5 ft from any visible plant parts, such as branches and surface roots. Before each stand entry, as a component of monitoring, we will check the limits and markers of the core occurrence area and adjust limits and marker locations, if needed, to encompass the current limits of the core occurrence area. More information on the identification and marking of the core occurrence area is in the *MRC Rare Plant Survey Handbook* (2007) and in section 13.10.

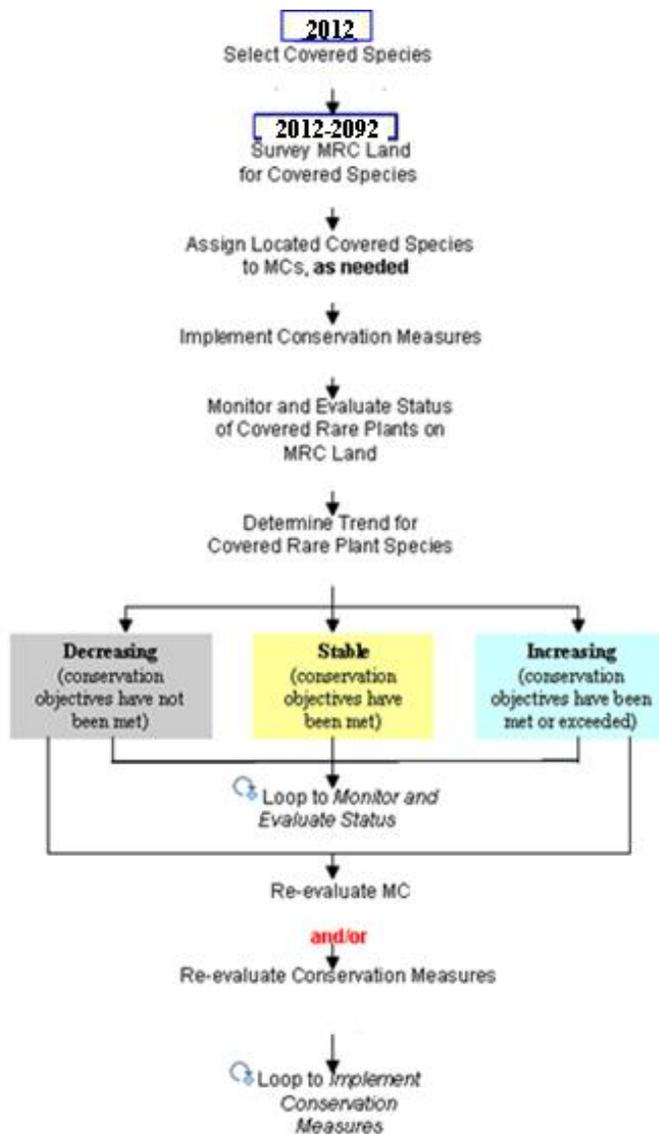


Figure 11-1 Flowchart of Category-based Conservation Strategy

11.3.2.3 Assigning management categories

If MRC detects occurrences of covered rare plants in areas where covered activities could affect them, we will implement appropriate conservation measures. To determine which category-based conservation measures should apply, MRC will assign covered rare plants to 1 of 4 management categories, based primarily on their statewide rarity and threat level and modified by characteristics of species biology, statewide distribution, occurrence size, occurrence location, and the biological and conservation significance of the occurrences in the plan area. We will assign management categories only to covered rare plants found on our land. Plants in Management Category 1 (MC1) receive the highest levels of protection and restriction; they are closely monitored. Plants in Management Category 4 (MC4) receive the lowest levels of protection and restriction; they are monitored only if warranted, as determined through adaptive management.

11.3.2.4 Objectives for management categories

MRC intends proposed conservation measures to achieve the objectives for a species in its management category. Conservation measures

- Define, mark, and protect the core occurrence area and buffer area.
- Manage invasive plants within the core occurrence area and buffer area.
- Provide for incidental take, variances to the standard take provisions, and translocation.

If we do not meet our objectives or conditions warrant, MRC may change conservation measures through adaptive management. Adaptive management for covered rare plants will be an interactive, long-term process that includes (1) monitoring and targeted studies, (2) evaluation of the effectiveness of conservation measures based on monitoring results, and (3) warranted adjustments in conservation measures. Chapter 13, *Monitoring and Adaptive Management*, provides details on compliance and effectiveness monitoring of rare plants (section 13.10.3); an explanation of targeted studies to fill in any information gaps on rare plant species (section 13.10.2.2); and the implementation process for adaptive management (section 13.10.4).

11.4 Survey methodology

MRC will conduct surveys for covered rare plants that adhere to CDFG (2009) guidelines for botanical surveys. All surveyors will also follow the guidance in the *MRC Rare Plant Survey Handbook* (2007). Botanists, biologists, or foresters employed or contracted by MRC will conduct the rare plant surveys. MRC will provide special training to foresters and biologists who will conduct rare plant surveys. We will invite wildlife agency personnel who have direct involvement in covered rare plant issues and in our HCP/NCCP to attend the training. Training will include instruction on use of the *MRC Rare Plant Survey Handbook*; rare plant field identification skills; use of field survey forms to document occurrences; and report preparation. During surveys, all surveyors will use local reference collections (e.g., Mendocino College of the Redwoods Herbarium) and reference populations; they will consult with recognized experts to verify rare plant identifications. When covered activities are proposed for pygmy forest, chaparral, most perennial wetlands (lakes, marshes, bogs, and fens), and serpentine areas (including rocky outcrops as well as all serpentine-influenced communities and habitats), professional botanists with North Coast experience will complete or supervise rare plant surveys. Detection and identification of some rare plants within these communities and habitats require the special skills and experience of a professional botanist.

11.4.1 Key elements of the CDFG rare plant survey guidelines

Following is a summary of the key elements of the CDFG rare plant survey guidelines, along with a brief notation on MRC compliance:

- **Timing**
Surveys must be conducted at a seasonally appropriate time of year when rare plants can be detected and are in identifiable condition; usually this will be during the flowering season.

NOTE

MRC will make more than 1 visit to encompass the flowering periods of potentially occurring covered plants in each PTHP area where suitable habitat exists. Chapter 6, *Covered Plant Species*, addresses habitat requirements.

- **Floristic surveys**

Surveys must be floristic in nature, which requires that plants observed during the rare plant survey be identified to the taxonomic category (e.g., species, genus, or family) necessary to determine whether they are rare plants. An acceptable floristic survey may include a plant list containing some plants that are identified only to genus, if those plants are in genera or families that do not include any covered rare plants. The wildlife agencies will consider floristic surveys acceptable even if they do not include every non-covered species found in the survey area.
- **Documentation**

Proper documentation for a newly detected occurrence of a rare plant includes a voucher specimen (unless this might jeopardize the occurrence's continued existence); photograph of the plant and its habitat; map of the rare plant occurrence; estimate of the number of individuals or area occupied; and submission of a *Field Survey Form* to CNDDDB. In revisiting previously documented occurrences, the surveyor will also complete and submit a *Field Survey Form* to CNDDDB.

NOTE
MRC will deposit voucher specimens in a California herbarium associated with an *academic institution* (see *MRC Rare Plant Survey Handbook*).
- **Knowledge and experience of the surveyor**

Persons familiar with plants in the local area as well as with knowledge of plant taxonomy and experience in conducting floristic surveys should conduct the rare plant surveys.
- **Reporting**

MRC will submit results of rare plant surveys in a standardized format. We will either include these results with a PTHP submittal or amend the results to an approved PTHP. If we amend the survey to an approved PTHP, CDFG will have 15 days to review the survey results before MRC commences operations. During operations, the standard conservation measures for covered rare plants will apply. MRC will submit a CNDDDB *Field Survey Form* for each newly detected occurrence and for re-visits to previously known occurrences. We will include a *Field Survey Form* in the rare plant survey report except for incidental discoveries, such as a casual detection of a rare plant outside the context of a survey. For incidental discoveries, MRC will prepare a *Field Survey Form* and include GIS information (see section 11.4.3).

NOTE
MRC will notify USFWS in the event a surveyor discovers a federally listed plant.

Detailed steps for fulfilling the requirements of the CDFG rare plant survey guidelines, including the key elements summarized above, are included in the *MRC Rare Plant Survey Handbook*.

11.4.2 Frequency and conditions of rare plant surveys

MRC will survey⁶ the plan area for rare plants at least 2 times during the term of the HCP/NCCP; certain conditions may trigger additional surveys (11.4.2.1). In any event, MRC expects rare plant surveys to detect the majority of rare plant occurrences that persist on covered lands, where timber harvest has been the predominant land use for up to 100 years. We acknowledge that, on occasion, a rare plant occurrence may not be detected, and, as a result, may be affected by

⁶ *Survey* includes all visits within 1 year needed to locate and identify covered rare plants in an area where a covered activity will take place; typically, MRC will complete a survey within a single calendar year.

covered activities. Our HCP/NCCP requires that we conserve all covered rare plant species, as well as their communities and habitats. We anticipate meeting this goal by protecting the majority of the covered rare plant occurrences found on our land. Within a 3-year window prior to the start of any proposed covered activity, MRC will conduct rare plant surveys.

Throughout the term of our HCP/NCCP, the wildlife agencies may re-survey any location in the plan area where MRC-sponsored rare plant surveys have been completed. If re-surveys by the wildlife agencies find a significant number of rare plant occurrences undetected during the MRC-sponsored rare plant surveys, MRC and the wildlife agencies will re-evaluate the frequencies of the rare plant surveys required by the HCP/NCCP and modify those schedules if warranted (see section 13.2.2.2)

11.4.2.1 PTHP areas

Rare plant surveys in PTHP areas will follow these guidelines:

- Conduct 2 surveys (one prior to each of the first 2 entries into a stand) once the HCP/NCCP has been approved; stand entry is defined as entry for tractor (or other ground-disturbing) site preparation, ground-disturbing vegetation management, and timber harvest.

NOTE

CDFG will accept surveys conducted during the interim period between the approval of the Planning Agreement and the approval of the HCP/NCCP as 1 of the 2 required surveys, if they are conducted and reported in compliance with the CDFG rare plant survey guidelines (CDFG 2009).

- Conduct 1 additional survey if
 - A PTHP area shows a change in absolute tree canopy cover (meaning cover of trees \geq 30 ft tall) of 40% or more (e.g., a change from 10% to 50% or a change from 20% to 60%) since the previous rare plant survey.

NOTE

Change in tree cover triggers an additional survey because it results in environmental changes that may provide new habitat for rare plants unable to survive under the original conditions.

- A PTHP area shows the presence of species, recorded in earlier surveys, that CDFG previously did not consider rare.

11.4.2.2 Activities not related to PTHPs

This sub-section covers the frequency and conditions of rare plant surveys for activities not related to a PTHP, e.g., rock pit expansion and ground-disturbance outside PTHP areas. The discussion excludes roads and landing activities, covered in subsection 11.4.2.3.

- Conduct 1 survey in areas where completion of a proposed covered activity will result in long-term or permanent loss of suitable habitat for rare plants due to on-going disturbance.

EXAMPLE

For rock pit expansion, MRC will only conduct 1 survey because this type of disturbance is long-term and precludes recovery. We will implement conservation measures for any covered rare plants found during this survey. The 1-survey standard is consistent with development projects throughout California that result in long-term or permanent loss of suitable habitat for rare plants.

- Conduct 2 surveys in areas where disturbance from proposed covered activities is temporary, meaning recovery of habitat suitable for rare plants is possible within the timeframe of our HCP/NCCP.

NOTE

MRC will conduct the 2nd survey the next time we propose covered activities for the area if more than 10 years have elapsed.

11.4.2.3 Roads and landings

The frequency and conditions for rare plant surveys in areas with proposed covered activities for roads and landings are as follows:

- **New roads and landings**
 - Survey all routes of proposed new roads and landings 1 time.
 - Monitor all new roads and landings 1 time during the first growing season after construction of new roads or landings to specifically detect covered rare plants that may appear in response to disturbance.

NOTE

This is not a second rare plant survey.

- **Reconstructed roads and landings**
 - Survey roads and landings 1 time if MRC has not used them for covered activities within 5-10 years and did not previously survey them.

NOTE

5-10 years is long enough for habitat recovery to occur, so MRC will conduct a rare plant survey before opening the road or using the landing. MRC will not survey roads and landings if covered activities have occurred in 4 years or less because such activities would have eliminated any rare plants, making habitat recovery unlikely in that time frame.

- Survey roads and landings 1 time if MRC has not used them for covered activities for more than 10 years, even if they previously surveyed them.
- **Regular road maintenance**

MRC will not survey for rare plants prior to routine road maintenance that typically occurs more frequently than once in 5 years (e.g., grading, waterbar installation, minor bank slough removal, road bank vegetation brushing, non-crossing culvert replacement, or existing crossing maintenance).

11.4.3 Tracking rare plant surveys

MRC will track the history of survey coverage using GIS technology. We will create a survey frequency overlay for our land, showing the number of rare plant surveys that have been completed for each PTHP area. Each mapped PTHP area will be linked to a spreadsheet that includes basic information, such as

- Survey date.
- Surveyor.
- Target list of covered species.
- Occurrences of covered species found.
- Tree canopy cover.
- Reference to rare plant survey reports for the PTHP.
- Indication of whether previous surveys met CDFG guidelines.

MRC will also use GIS tracking for rare plant occurrences detected outside the context of a rare plant survey, i.e., *incidental discoveries*, and provide this information annually to the wildlife agencies as part of compliance monitoring.

11.4.4 Rare plant surveys vs. monitoring

Rare plant surveys are distinct from monitoring. Rare plant occurrences detected during surveys (and *incidental discoveries* made during the course of other activities) will be part of the MRC monitoring program, as appropriate. Monitoring protocols will require revisiting some rare plant occurrences on a regular basis over the term of our HCP/NCCP. Chapter 13 (M§13.10.3-1) outlines the effectiveness monitoring program for status and trend of covered rare plants.

11.5 Management Categories for Covered Rare Plant Species

MRC will assign to each covered rare plant species found on our land a management category based primarily on its statewide rarity and threat status, as denoted by its S rank (section 11.5.1) and associated threat code. Additional factors that may modify this status are

- Likelihood of impacts to the covered species or its habitat from covered activities.
- Species sensitivity to disturbance.
- Viability of the species, as expressed by size and area of its occurrences throughout its California range.
- Geographic range of the species, meaning occurrences in the plan area that represent range limits or that are disjunct from the central or main geographic distribution.
- Distribution in the plan area, including overall range and number of occurrences.
- Documented trend in the plan area.

11.5.1 Use of S ranks in assigning management categories

The S rank is a measure of statewide abundance and, inversely, of rarity. MRC will use the most current S rank when assigning covered species to a management category. There are several reasons for using the S rank as the primary factor in assigning management categories. S ranks have been assigned to all special-status plants (state and federal listing status apply only to a few), and provide a more fine-grained evaluation of status than the conservation categories of *CNPS Inventory*. S ranks are part of the element⁷ ranking system used by the nationwide natural heritage network (NatureServe 2004), which includes CNDDDB (Bittman 2001). The natural heritage system of element ranking includes G or global (total distribution) ranks and S or statewide ranks of relative rarity and threat. The S ranks for California species are assigned by CNDDDB,⁸ using the general guidelines shown in Table 11-1 (CDFG 2010). Usually a species is ranked on the more restrictive criteria. For example, a species with S1 values for a number of element occurrences and S2 values for a number of individuals and an inhabited area would be ranked S1. Appendix R, *Plant Rankings*, provides complete definitions of G and S ranks. Special characteristics of species biology and distribution, as well as occurrence characteristics (e.g., size, viability, extant vs. extirpated), may modify S rank assignments (NatureServe 2004).

⁷ The word element, in this context, means a rare plant, animal, or natural community.

⁸ Phone conversation between Ann Howald (Garcia and Associates) and R. Bittman (CDFG) on October 20, 2004

Table 11-1 Criteria for S Ranks for California Species

State Rank	Number of Element Occurrences	Number of Individuals	Area Inhabited (acres)	Comments
S1	< 6	< 1000	< 2000	Assign threat codes 1-3, if possible.
S2	6 ≥ 20	1000 ≥ 3000	2000 ≥ 10,000	Assign threat codes 1-3, if possible.
S3	21 ≥ 80	3001 ≥ 10,000	> 10,000 – 50,000	Assign threat codes 1-3, if possible.
S4	> 80	> 10,000	> 50,000	Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5				Secure - Common, widespread, and abundant in the state.

In the element ranking system, the S1, S2, and S3 ranks are usually accompanied by a threat code (CDFG 2005). CNDDDB botanists assign a threat code if the necessary information is available (Table 11-2).

Table 11-2 CNDDDB Threat Codes

Code	Threat Level
1	Seriously endangered in California
2	Fairly endangered in California
3	Not very endangered in California

S ranks and their threat codes are subject to change if new information becomes known; however, status reviews are conducted on an as-needed basis only—usually in response to a request for review.⁹ MRC can request status reviews of covered species if (1) occurrence numbers have changed significantly on our land or elsewhere in California; or (2) threat conditions have changed significantly. Prior to a request for a status review, we will submit to CNDDDB adequate scientific data on the status of occurrences on our land, including information on occurrence size, habitat quality, viability estimates, data on threats, and other relevant information collected during monitoring. This data may be in various formats acceptable to CNDDDB, such as the CNDDDB *Field Survey Form* accompanied by maps or digital data with locations of occurrences. CNDDDB staff responds to requests for status review as soon as they are received, within staffing capabilities.¹⁰ Under our HCP/NCCP, CDFG will complete status reviews within 60 days unless CDFG informs MRC that staffing limitations mandate a longer review period. CDFG will inform MRC in writing of status changes that affect the base rank of covered species as soon as these changes have been entered into the database.

Although the criteria for assigning S ranks are explicit, information quality and information gaps can affect the ability of CNDDDB botanists to assign an appropriate S rank. MRC will take a conservative approach with the following S ranks:

- Covered species with S ranks consisting of a range (e.g., S2-S3).

⁹ Email to Ann Howald, Garcia and Associates, from R. Bittman, CDFG, on October 20, 2004.

¹⁰ Email to Ann Howald, Garcia and Associates, from R. Bittman, CDFG, on October 20, 2004.

- Covered species with no assigned S rank due to poor information (S?).
- Covered species with an historic S rank (SH), meaning that the species or occurrence has not been seen for 20 years or more, but suitable habitat still exists (CDFG 2005).

A conservative approach means that, for a covered species with an atypical S rank, MRC will review the occurrence data and assign a base management category that affords the highest level of protection supported by the data. For example, MRC will assign a species with an S rank of S2-S3 to a management category consistent with an S rank of S2. Likewise, we will assign a species with an SH rank to a management category based on the number of recently verified (non-historic) occurrences. For example, we would assign an SH species with 12 occurrences, of which only 1 has been verified in the last 20 years, to a management category of S1 which has a range of 1-6 occurrences. Assignments of base management categories are subject to modification for all species (section 11.5.2.1), whether their S ranks are typical or atypical.

11.5.2 Assigning covered rare plant species to management categories

Assignment of a covered rare plant species to the appropriate management category requires knowledge of the specific characteristics of occurrences of that species in the plan area, such as location and size. Consequently, MRC will only assign covered species with at least 1 known occurrence on our land to management categories. While we could assign covered species with no known occurrences on our land to a *preliminary* management category based on current S rank and threat code, we have not done so for our HCP/NCCP because these assignments would be subject to constant change and would not influence the implementation of conservation measures.

MRC will periodically review the management category assignments for all covered rare plant species. In the review process, MRC will consider changes in S rank, changes in taxonomy, new monitoring information from the plan area, surveys conducted throughout the range of the species in California, and studies on the biology and ecology of the species. MRC and the wildlife agencies have agreed upon the initial management category assignments in our HCP/NCCP through a consensus process in which all parties evaluated the same data and applied the same criteria. During the term of our HCP/NCCP, these assignments may change after consultation with the wildlife agencies.

11.5.2.1 Modifiers for management categories

MRC and the wildlife agencies will apply 6 modifiers, listed below, in assigning a covered rare plant to a management category. These modifiers take into account important characteristics unaccounted for by S ranks alone. We will apply the modifiers in order of perceived significance. Modifiers, if applicable, can upgrade or downgrade the management category of a species by 1 level only; the exception is the second modifier, *communities and habitats in the plan area*. If none of the modifiers apply, MRC will assign a species to a management category based on its current S rank. The modifying factors are as follows:

1. Sensitivity to disturbance

Species that are tolerant of, or dependent upon, disturbance to assure their long-term survival, such as early successional species and “fire-followers,” will be downgraded 1 level. Observations from North Coast timberlands and other evidence indicate that these species often can successfully co-exist over the long-term in actively harvested timberlands; they may actually benefit from some types of logging disturbance (Berg and Bittman 1988, Pickart et al. 1991, Hiss and Pickart 1992, Jirak 2001, Doell 2004). MRC will use targeted studies to learn more about the life cycles of these

species and their long-term responses to timber harvesting, and to modify category-based conservation measures or develop species-specific conservation measures, if warranted. Species that are known or suspected to be intolerant of disturbance, based on observations, published sources, and other relevant information, will be upgraded 1 level.

2. Communities and habitats in the plan area

Species whose base management category is 2 or 3 (derived from S rank alone) will be transferred to Management Category 4 if all of the following conditions apply:

- a. They are found solely or primarily in communities and habitats where covered activities are expected to occur infrequently: pygmy forest; closed-cone pine forest; true chaparral (Holland 1986); permanent wetlands, such as lakes, marshes, bogs, and fens; on rocky outcrops, including serpentine; and in serpentine-influenced communities, such as serpentine grasslands, serpentine seeps, etc.
- b. They are common within the communities and habitats where they occur.
- c. They include occurrences that are found on land whose management goals include the protection of natural resources such as rare plants (e.g., state parks, county parks, and public and private preserves).

MRC will protect these species primarily through community-based conservation measures, as called for in the NCCPA.

3. Viability

Long-term survival of a rare plant occurrence is less likely if the occurrence consists of a low number of individuals or is restricted to a small area. Either of these circumstances makes the occurrence more susceptible to random, unpredictable changes (stochastic events) capable of eliminating the entire occurrence (Gilpin and Soule 1986). In addition, small populations, especially if they are isolated, are more subject to loss of genetic diversity from inbreeding and other causes, which can result in reduced viability (Falk and Holsinger 1991). Species consisting mainly of occurrences of a low number of individuals or covering a small area will be more vulnerable to loss of entire occurrences and to a downward status trend. To compensate for this inherent vulnerability, the management category of these species will be upgraded 1 level.

4. Geographic range

Peripheral populations, which are those at the geographic limit of a species range or disjunct from its main or central area of distribution, are accorded special evolutionary and conservation significance (Leppig 2006). Lammi et al. (1999) state that small peripheral populations can be genetically as viable as larger populations; therefore, they have significant evolutionary and conservation value. The long-term survival of a species may depend on its peripheral populations, which may contain unique genotypes that are more capable of surviving under changing environmental conditions or that lead to future speciation (Lesica and Allendorf 1995, Nielsen et al. 2001). When a species is subject to a dramatic reduction in range (i.e., more than 75%), peripheral populations survive more frequently than do core populations, according to Channell and Lomolino (2000). In recognition of the potential significance of peripheral populations, the management category of a covered species

will be upgraded 1 level if any of its occurrences in the plan area defines a range limit for the species (e.g., *Pleuropogon hooverianus*), or is disjunct from the main or central distribution by more than 100 miles (e.g., *Juncus supiniformis*, if ever found in the plan area).

5. Distribution in the plan area

Species that have a base management category of 2 or 3 and that are widely distributed in the plan area (i.e., in 4 or more inventory blocks), will be downgraded 1 level. Species whose base management category is 2 or 3 and that are narrowly distributed in the plan area (i.e., in a single inventory block), will be upgraded 1 level. This modifier will not apply to species with S ranks of S1.1, S1.2 and S1.3, in recognition of their overall rarity. If an occurrence extends into 2 inventory blocks, MRC will count the occurrence in only 1 of the blocks.

6. Documented trend in the plan area

MRC will determine trend for all covered rare plant species with 1 or more occurrences in the plan area. For our HCP/NCCP, the trend for a covered species will be based only on the occurrences of that species found in the plan area. The trend condition for each species will be evaluated as *increasing*, *stable*, or *decreasing*. Definitions for these trend conditions will be species-specific and will use factors that indicate likelihood of long-term survival, such as number of occurrences, occurrence size, occurrence area, reproductive capacity, and other factors. MRC will develop definitions for species-specific trend conditions and determine trend as information becomes available from monitoring results and other sources. Chapter 13 (section 13.10.2.1) includes an example of definitions for trend conditions for a covered plant species. When MRC has accumulated enough monitoring data to determine trend, we will use trend as a modifying factor during the periodic reviews of management category assignments that are part of HCP/NCCP implementation. If MRC and the wildlife agencies determine that the documented trend for a species is *increasing*, MRC will downgrade the management category 1 level. If the trend is *stable*, we will not modify the management category. If the trend is *decreasing*, we will upgrade the management category 1 level.

Table 11-13 shows the criteria for assigning covered rare plants to management categories. Table 11-14 lists the management categories for the covered rare plant species currently known in the plan area.

Table 11-3 Process for Assigning Management Categories (MC)

Process for Assigning Management Categories (MC)			
MC	Protection Level	S Rank and Threat Code ^a	Modifying Factors ^b
1	Highest level of concern and conservation effort	S1.1 S1.2 S1.3	Sensitivity to disturbance <ul style="list-style-type: none"> If life history suggests that the species is an early successional species or is tolerant of disturbance (e.g., <i>Astragalus agnicidus</i>, <i>Sidalcea malachroides</i>),

Process for Assigning Management Categories (MC)			
MC	Protection Level	S Rank and Threat Code ^a	Modifying Factors ^b

			<p>transfer to MC2 unless the species is known from only 1 occurrence in the plan area. Otherwise, assign species to MC1.</p> <p>Trend</p> <ul style="list-style-type: none"> • If there is an increasing trend, change the category to MC2. • If there is a decreasing or stable trend, maintain the category as MC1.
2	Intermediate level of concern and conservation effort	S2.1 S2.2 S3.1	<p>Communities and habitats in the plan area</p> <ul style="list-style-type: none"> • If the species (1) is found solely or primarily in a community or a habitat type where covered activities are unlikely to occur, (2) is common within the communities and habitats where it occurs, and (3) includes populations that are protected on public lands, transfer to MC4. Otherwise, review modifier below. <p>Viability</p> <ul style="list-style-type: none"> • If the typical number of individuals per occurrence, for the species throughout its range, is fewer than 100 (e.g., <i>Boschniakia hookeri</i>, <i>Lilium maritimum</i>), or the reproductive rate of the species is known to be low, transfer to MC1. Otherwise, review next bullet. • If the typical area occupied by a single occurrence, for the species throughout its range, is less than 1/10 of an acre (e.g., <i>Boschniakia hookeri</i>, <i>Lilium maritimum</i>), transfer to MC1. Otherwise, review modifier below. <p>Geographic range</p> <ul style="list-style-type: none"> • If any MRC occurrence defines a range limit for the species (e.g., <i>Pleuropogon hooverianus</i>), transfer to MC1. Otherwise, review next bullet. • If any MRC occurrence is disjunct (separated from) other occurrences of the species by a distance greater than 100 miles (e.g., <i>Juncus supiniformis</i>), transfer to MC1. Otherwise, review modifier below. <p>Distribution in the plan area</p> <ul style="list-style-type: none"> • If occurrences are found in only 1 inventory block, transfer to MC1. Otherwise, review next bullet. • If occurrences are found in 4 or more inventory blocks, transfer to MC3. Otherwise, review modifiers below. <p>Sensitivity to disturbance</p> <ul style="list-style-type: none"> • If life history data demonstrates or strongly suggests

Process for Assigning Management Categories (MC)

MC	Protection Level	S Rank and Threat Code ^a	Modifying Factors ^b
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			<p>that the species is intolerant of disturbance (e.g., <i>Lilium maritimum</i>), transfer to MC1. Otherwise, review next bullet.</p> <ul style="list-style-type: none"> • If life history data demonstrates or strongly suggests that the species is an early successional species or is tolerant of disturbance, transfer to MC3. Otherwise, assign species to MC2. <p>Trend</p> <ul style="list-style-type: none"> • If there is an increasing trend, change the category to MC3. • If there is a decreasing trend, change the category to MC1. • If there is a stable trend, maintain the category as MC2.
3	Lower level of concern and conservation effort	S2.3 S3.2 S3.3	<p>Communities and habitats in the plan area</p> <ul style="list-style-type: none"> • If the species (1) is found solely or primarily in a community or a habitat type where covered activities are unlikely to occur, (2) is common within the communities and habitats where it occurs, and (3) includes populations that are protected on public lands, transfer to MC4. Otherwise, review modifier below. <p>Viability</p> <ul style="list-style-type: none"> • If the typical number of individuals per occurrence, for the species throughout its range is fewer than 100 (e.g., <i>Boschniakia hookeri</i>, <i>Lilium maritimum</i>), or the reproductive rate of the species is known to be low, transfer to MC2. Otherwise, review next bullet. • If the typical area occupied by a single occurrence, for the species throughout its range is less than 1/10 of an acre (e.g., <i>Boschniakia hookeri</i>, <i>Lilium maritimum</i>), transfer to MC2. Otherwise, review modifier below. <p>Geographic range</p> <ul style="list-style-type: none"> • If any MRC occurrence defines a range limit for the species (e.g., <i>Pleuropogon hooverianus</i>), transfer to MC2. Otherwise, review next bullet. • If any MRC occurrence is separated from other occurrences of the species by more than 100 miles, transfer to MC2. Otherwise, review modifier below. <p>Distribution in the plan area</p> <ul style="list-style-type: none"> • If occurrences are found in only 1 inventory block, transfer to MC2. Otherwise, review next bullet.

Process for Assigning Management Categories (MC)			
MC	Protection Level	S Rank and Threat Code ^a	Modifying Factors ^b

- If occurrences are found in 4 or more inventory blocks, transfer to MC4. Otherwise, review modifier below.

Sensitivity to disturbance

- If life history data demonstrates or strongly suggests that the species is intolerant of disturbance (e.g., *Lilium maritimum*), transfer to MC2. Otherwise, review next bullet.
- If life history data demonstrates or strongly suggests that the species is an early successional species or is tolerant of disturbance, transfer to MC4. Otherwise, assign species to MC3.

Trend

- If there is an increasing trend, change the category to MC4.
- If there is a decreasing trend, change the category to MC2.
- If there is a stable trend, maintain the category as MC3.

4 Minimal concern and conservation effort

S4
S5

Trend

- If there is a decreasing trend, change the category to MC3.

TABLE NOTES

^a

- If no threat code is given, assign the species based on a threat code of 1.
- If the S rank consists of a range, assign the species based on the higher rarity status (e.g., a species with S2-S3 would be assigned based on S2).
- If an S rank has not been given because all or most occurrences are historic (SH?—meaning that records are old and status has not been determined for more than 20 years), assign the species to the management category that is consistent with the number of non-historic occurrences.

^b

Modifying factors are listed in order from most important to least important. If modifying factors apply, each species will be downgraded or upgraded by no more than one management category level, with the exception of species with S ranks of 2.1 and 2.2 that qualify for downgrading to MC4 under the criterion *Communities and habitats in the plan area* (section 11.5.2.1 #2).

^c

Monitoring will track the condition of MC4 species. If the status of an MC4 species declines, MRC will consider changes in conservation measures.

Table 11-4 Management Categories (MC) for Rare Plants in the Plan Area

Management Categories (MC) for Rare Plants in the Plan Area			
Common Name Scientific Name	S Rank	MC	Rationale
Humboldt milk-vetch <i>Astragalus agnicidus</i>	S1.1	Not assigned	MC is not assigned because species-specific measures will be implemented (see section 11.8.2). Species is known to be early successional and tolerant of disturbance (Berg and Bittman 1988; Jirak 2001). MRC occurrences were found in 6 inventory blocks (Big River, Garcia, Navarro East, Noyo, Rockport, and South Coast).
small groundcone <i>Kopsiopsis hookeri</i>	S1-S2	1	Use S1.1 as base rank (threat level not determined). Base MC1 is unchanged because no modifiers apply.
pygmy cypress <i>Hesperocyparis pygmaea</i>	S2.2	4	Downgrade to MC4 because species is found primarily in pygmy forest, where it is common. Species is protected at several state parks where management is directed toward natural resource preservation. Covered activities will be infrequent within a very small area of pygmy forest.
swamp harebell <i>Campanula californica</i>	S3.2	3	Base rank of MC3 is unchanged because no modifiers apply. Species is only present in 2 inventory blocks of the plan area (South Coast and Garcia).
Oregon goldthread <i>Coptis laciniata</i>	S3.2	2	Upgrade to MC2 because the typical number of individuals per occurrence throughout the species' range is usually fewer than 100.
coast lily <i>Lilium maritimum</i>	S2.1	1	Upgrade to MC 1 because occurrences typically are small in area and number of individuals. Additional information (not used as modifier) is that the species is sensitive to soil compaction and tolerant of reduction in canopy cover. Species is only present in 2 inventory blocks of the plan area (Garcia and South Coast).
Bolander's beach pine <i>Pinus contorta</i> ssp. <i>bolanderi</i>	S3.2	4	Downgrade to MC 4 because species is found primarily in pygmy forest, where it is common. Species is protected at several state parks where management is directed toward natural resource preservation. Covered activities will be infrequent, if at all, in pygmy forest and a minimal area will be affected.
white-flowered rein orchid <i>Piperia candida</i>	S3.2	2	Upgrade to MC2 because the number of individuals per occurrence throughout the species' range is low and the species is

Management Categories (MC) for Rare Plants in the Plan Area			
Common Name Scientific Name	S Rank	MC	Rationale
North Coast semaphore grass <i>Pleuropogon hooverianus</i>	S1.1	1	intolerant of disturbance. Species has the highest statewide levels of rarity and threat. No modifiers apply. MRC occurrences represent the eastern limit of the species' range. Species is only present in 1 inventory block of the plan area (Ukiah).
maple-leaved checkerbloom <i>Sidalcea malachroides</i>	S3-S4.2	4	Downgrade to MC 4. Species is somewhat tolerant of disturbance. Species is present in 5 inventory blocks of the plan area (Albion, Garcia, Rockport, Navarro West, and South Coast).
long-beard lichen <i>Usnea longissima</i>	S4.2	Not assigned	MC has not been assigned because species-specific measures will be implemented (see section 11.8.1). Observations (Doell 2004) indicate this lichen is tolerant of disturbances related to timber harvesting. MRC occurrences found in 7 inventory blocks (Albion, Big River, Garcia, Navarro West, Navarro East, Rockport, and South Coast). Occurrences often characterized by 1 or few <i>source</i> trees, that retain this lichen over the long-term, and few-to-many <i>sink</i> trees, ¹¹ with transient lichen presence (Peterson 2005).

11.6 Conservation Measures for Covered Rare Plants

This section describes the conservation measures, organized by management category, which MRC will implement for covered rare plant species found in the plan area. In the case of long-beard lichen and Humboldt milk-vetch, MRC has not assigned a management category because species-specific measures apply.

As indicated by the criteria in Table 11-3, the rarest and most threatened covered rare plant species are assigned to Management Category 1. These are afforded the highest level of protection, meaning that conservation measures place greater restrictions on covered activities and that covered species are managed more actively. Covered rare plant species assigned to Management Category 2 are somewhat more abundant and are less threatened than those assigned to Management Category 1; they receive an intermediate level of protection. Covered rare plant species assigned to Management Category 3, while still considered rare, are more abundant and widespread than species assigned to Management Category 2. Since these species have moderate-to-low threat levels, they receive less protection than those in Management Categories 1 and 2. Management Category 4 species are plants that are even more abundant and widespread than those in Management Categories 1-3; they are minimally threatened by covered activities. Species-based conservation measures for these species are minimal; however, MRC will implement community-based conservation measures to protect these plants. Our intention is that

¹¹ Refer to section 11.8.1 for a brief explanation of the terms *source* and *sink* trees.

proposed conservation measures be adequate to meet the objectives for each species within its management category (section 11.5).

MRC will implement *species-specific* conservation measures when necessary and when supported by scientific information. In contrast to measures for species assigned to management categories, species-specific measures are tailored to meet the precise needs of individual species. At present, MRC is proposing species-specific conservation measures only for long-beard lichen (section 11.8.1) and Humboldt milk-vetch (section 11.8.2). MRC and the wildlife agencies may periodically review any conservation measure and modify it, if conditions warrant a change.

11.7 Categorical Conservation Measures for Rare Plants

11.7.1 Conservation measures for management category 1 (MC1)

MRC assigns the rarest and most threatened plant species to Management Category 1. This affords the plant species the highest level of protection in that the conservation measures place greater restrictions on covered activities and manage the covered species more intensely.

 Standard Conservation Measures for Management Category 1	
Communications	
C§11.7.1-1	Instruct all field personnel working in the vicinity of covered species occurrences, particularly operators of heavy equipment and those who apply pesticides, to comply with conservation measures, especially in locations with activity restrictions for core occurrence areas and buffers.
Core Occurrence Area	
C§11.7.1-2	Install a marking system that will persist throughout the term of the HCP/NCCP to designate environmentally sensitive areas along roads, such as core occurrences areas.
C§11.7.1-3	Mark the boundaries of a core occurrence area at regular intervals with painted t-posts, with stakes and colored flags, with clearly visible marks on retained trees, or with other means, so that the occurrence boundary maintains its integrity and is easily identifiable during activity and monitoring periods.
C§11.7.1-4	Mark the outer limits of the core occurrence area at least 5 ft beyond any visible parts (e.g., branches, surface roots) of a covered rare plant; use GPS data, as required, to define the core occurrence and ensure relocation if markers are damaged or removed.
C§11.7.1-5	Mark groups of plants within a core occurrence area, using methods described above, to facilitate avoidance and monitoring.
C§11.7.1-6	Restrict operations to use of existing truck roads, landings, and rock pits, as well as any activities intended to conserve rare plants, such as weed control.
C§11.7.1-7	Avoid all activities, including those outside the core occurrence and buffer areas, which result in significant alterations in surface water hydrologic conditions within the core occurrence area and adversely affect covered rare plants.

 Standard Conservation Measures for Management Category 1	
C§11.7.1-8	<p>Fell trees, only for safety purposes, into a core occurrence area but do not harvest them.</p> <p style="text-align: center;">NOTE If this need arises, MRC will notify the wildlife agencies before felling occurs. The wildlife agencies have 15 working days to respond before MRC can proceed with the planned felling operations.</p>
C§11.7.1-9	Avoid using site preparation within designated core areas unless the wildlife agencies concur.
C§11.7.1-10	Avoid piling slash within designated core areas.
Buffer Width	
C§11.7.1-11	<p>Ensure that the buffer width is 150 ft for forested sites (subject to timber harvest and other covered activities) and 50 ft for all other sites.</p> <p style="text-align: center;">NOTE MRC can reduce the buffer width—while still providing adequate protection—because of factors such as topographic characteristics (e.g., north slope situation); silvicultural practices (e.g., single tree selection); or adjacent stand conditions (e.g., uneven-aged management). Such reduction requires MRC to obtain the approval of the wildlife agencies.</p>
C§11.7.1-12	Mark the outer edge of the buffer area with colored flagging or its equivalent, before covered activities begin; flagging must be clearly visible throughout the period when covered activities are taking place.
Buffer Management during Timber Operations	
C§11.7.1-13	Use only non-ground-disturbing types of site preparation (e.g., chainsaw brush cutting).
C§11.7.1-14	<p>Use silviculture that results in cover approximately equivalent to that found in the core occurrence area with the harvest at least meeting the basal area and canopy requirements (derived from Class I and Large Class II AMZ, inner and middle bands).</p> <p style="text-align: center;">NOTE MRC will obtain the approval of the wildlife agencies on exceptions for early successional species and others that prefer open conditions.</p>
C§11.7.1-15	Retain the approximate spatial and species mix and size distribution of tree species (conifers and hardwoods) found in the local area.
C§11.7.1-16	Fell trees away from a core occurrence area, whenever possible.
C§11.7.1-17	Treat the buffer area as an ELZ, allowing for use of existing roads, landings, and rock pits.
C§11.7.1-18	Avoid significantly altering surface water hydrologic conditions in ways that could adversely affect covered rare plants.

 Standard Conservation Measures for Management Category 1	
Invasive Pest Plant Management¹²	
C§11.7.1-19	Control ¹³ invasive pest plants within 50 ft ¹⁴ of all covered rare plant individuals, using methods that are feasible and effective, and that minimize impacts to non-target species, during both the 1 st and 2 nd years following covered activities.
Take Provisions	
C§11.7.1-20	Avoid or minimize take to the maximum degree feasible.
C§11.7.1-21	Permit take only if required for normal operations.
C§11.7.1-22	Permit take only for occurrences > 250 individuals ¹⁵ , except for roads, landings, and rock pits (see below).
C§11.7.1-23	Describe in project documents (e.g., PTHPs) the amount of take anticipated from covered activities.
C§11.7.1-24	Restrict activities causing take to the period between seed set and the breaking of dormancy, if feasible.
C§11.7.1-25	Consult with the wildlife agencies, if normal operations require higher take limits than those specified in C§11.7.1-26 and C§11.7.1-29.
Take for Roads, Landings, and Rock Pits	
C§11.7.1-26	<p>Permit take of covered rare plant individuals growing in previously established roads, landings, and rock pits, if avoidance is infeasible, and adhere to the following limits:</p> <ul style="list-style-type: none"> ▪ For occurrences < 250 individuals, take of up to 2% of the individuals within a single occurrence, per each single- or multiple-year project. ▪ For occurrences of 251-500 individuals, take of up to 5% of the individuals within a single occurrence, per each single- or multiple-year project. ▪ For occurrences > 500 individuals, take of up to 10% of the individuals within a single occurrence, per each single- or multiple-year project. <p style="margin-left: 40px;">NOTE Feasible minimization includes: (1) minimizing grading of roadbed and roadsides; (2) running logging trucks and other equipment in tire tracks only; (3) enforcing seasonal restrictions; and (4) applying other restrictions.</p>

¹² Invasive pest plants, which MRC will control, include those species listed by Cal-IPC (2006) and the CDFA (2004) that pose a significant risk to rare plants in the plan area. At a minimum, these include: yellow star-thistle (*Centaurea solstitialis*), bull thistle (*Cirsium vulgare*), jubata grass (*Cortaderia jubata*), Scotch broom (*Cytissus scoparius*), French broom (*Genista monspessulana*), and Harding grass (*Phalaris aquatica*). MRC will undertake control of additional species of invasive pest plants if they interfere, demonstrably, with the survival or reproduction of covered rare plants.

¹³ Control, with regard to invasive pest plant management, means kill, eliminate, or remove to the maximum degree possible.

¹⁴ This is based on a “take-avoidance” distance of 50 ft cited in the MRC Planning Agreement (2003).

¹⁵ Definition of *individual* varies with growth form of the species, and will be defined accordingly; for spreading clonal species, area may be used as a surrogate, for example, a take limit of 2% would allow take of plants within an area equivalent to 2% of the total area occupied by the species.

 Standard Conservation Measures for Management Category 1	
C§11.7.1-27	<p>Spread soil from road berms (which need to be removed for proper road drainage and on which rare plants are growing) in roadside areas that MRC will manage as EEZs for a minimum of 2 years.</p> <p style="text-align: center;">NOTE If these sites are not colonized by rare plants within 2 years, MRC will remove EEZ restrictions. If these sites are colonized by rare plants within 2 years, MRC will continue to manage them as EEZs as long as the rare plants persist in those locations.</p>
C§11.7.1-28	<p>Donate, for scientific purposes and whenever possible, any rare plant that is incidentally taken and not used in translocation; this includes collecting and preserving voucher specimens, as well as salvaging live plants and seeds for researchers, seed banks, or botanic gardens.</p> <p style="text-align: center;">NOTE If MRC gets no willing takers for a specific species, we will advise the wildlife agencies and no longer make donations of that species unless the wildlife agencies identify a recipient.</p>
Take for All Other Covered Activities	
C§11.7.1-29	<p>Permit take, in the case of occurrences > 250 individuals, as follows:</p> <ul style="list-style-type: none"> ▪ Take of up to 2% of the individuals within a single occurrence, per stand entry, for PTHPs. ▪ Take of up to 2% of the individuals within a single occurrence, per year, for other activities, without approval of the wildlife agencies.
Variances	
C§11.7.1-30	<p>Seek approval in writing from the wildlife agencies if requesting changes to core area management, buffer management, or buffer width; include the variances in a PTHP subject to public comment.</p>
C§11.7.1-31	<p>Ensure that requested variances are consistent with the objectives of the conservation strategy.</p>
Translocation	
Non-compensatory¹⁶	
C§11.7.1-32	<p>Notify the wildlife agencies when MRC will perform a non-compensatory translocation.</p>
C§11.7.1-33	<p>Mark and map the location of the translocation in the field.</p>
C§11.7.1-34	<p>Describe in writing the result of the translocation for the wildlife agencies.</p>
Compensatory translocation¹⁷	
C§11.7.1-35	<p>Obtain approval from the wildlife agencies before implementing.</p>

¹⁶ A non-compensatory translocation (a) is not mitigation; (b) is permitted on a voluntary basis when take does not exceed standard levels; (c) does not require approval from the wildlife agencies; (d) is opportunity-driven and conducted on an ad hoc basis; (e) does not require an experimental approach; (f) is intended only to expand the area occupied by the rare plant within an occurrence or to increase the number of subgroups within an occurrence, not to establish new occurrences; and (g) uses as propagules only plants that are unavoidably taken.

¹⁷ A compensatory translocation (a) is an allowed form of mitigation when take exceeds standard levels; (b) requires approval from the wildlife agencies; (c) requires an experimental approach; and (d) may be used to establish new occurrences or to expand an existing occurrence.

 Standard Conservation Measures for Management Category 1	
C§11.7.1-36	Mark and map the location of the translocation in the field.
C§11.7.1-37	Provide thorough written documentation of methods, results, and conclusions for the wildlife agencies.

11.7.1.1 Intent of the buffer

A buffer minimizes the impact of covered activities on a core occurrence area by creating a zone of protection around it where MRC will maintain habitat conditions favorable to the rare plant. These conditions include microclimatic factors, such as humidity, temperature, and solar radiation; hydrology and soil characteristics; and populations of beneficial mycorrhizal fungi and potential pollinators. In addition, buffers limit disturbances from covered activities, such as soil compaction and vegetation removal. For early successional species that prefer more open conditions, silviculture within the buffer may aim for a canopy cover that is approximately equivalent to that found within the core occurrence area, rather than one meeting the basal area and canopy requirements of, say, inner and middle bands of Class I and Large Class II AMZ.

MRC and the wildlife agencies have based the size of buffer widths specified in our HCP/NCCP on their best professional judgment. In the case of rare plant occurrences, there is no standard for buffer widths in managed timberland. MRC will examine the effectiveness of buffer width and buffer management through targeted studies described in Chapter 13 (section 13.10.2.2).

11.7.1.2 Intent of take provisions

The conservation measures for species in Management Category 1 avoid incidental take to the maximum degree feasible.¹⁸ If avoidance or minimization measures prevented MRC from using existing roads or accessing PTHP areas, the take provisions would be infeasible. The wildlife agencies have not established quantitative standards for take limits for rare plants. The limits of take described in the conservation measures prohibit take in all circumstances unless take is essential for normal operations, such as road and landing use. When MRC cannot avoid take, we must limit it to the smallest possible number of individual plants by restricting essential activities. In all cases, the conservation objectives for MCI species strive to maintain every occurrence in the plan area at stable-to-increasing levels of abundance and distribution. In the event that MRC must exceed the limits of take, the wildlife agencies must approve higher take limits. Even if MRC receives such approval, the wildlife agencies may still require compensatory measures, such as habitat improvements or translocations. MRC will select the most effective compensatory measures with the approval of the wildlife agencies.

Limits of take that allow for a loss of up to 2% of individuals (or up to 10% for roads, landings, and rock pits) within an occurrence per year do not imply that a 2% loss each year is permissible. Over the 80-year term of the HCP/NCCP, most of the plan area will only be subject to impact for a few years. The limits of take defined in this plan are flexible enough to accommodate covered activities that may take place in 2 or more successive years. MRC will typically complete stand entries for timber harvest in a single year; harvests will occur on a rotation of 20 years or more. Occurrences in PTHP areas in which there has been incidental take, therefore, will have 20 years or more of recovery time between timber harvests. Apart from timber harvests, we cannot predict the number of consecutive years to complete other covered activities, but this will typically be 1-3

¹⁸ MRC defines *feasible* as capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.

years. Pre- and post-harvest monitoring, discussed in Chapter 13 (M§13.10.3-1), will track the status and trend of covered rare plants over the term of our HCP/NCCP. If monitoring determines that MRC is not meeting our conservation objectives or that conservation measures are more restrictive than required to achieve those objectives, MRC and the wildlife agencies may reconsider take provisions through adaptive management.

Our HCP/NCCP does not permit take for occurrences of fewer than 250 individuals, with the exception of essential operations on roads, landings, and rock pits. This restriction, which applies to Management Categories 1 through 3, encourages self-sustainability for small occurrences. Small occurrences are more susceptible to losses from random, unpredictable circumstances, as well as from anthropogenic disturbances. Researchers have used Minimum Viable Population (MVP) analyses, based on mathematical models, to calculate the minimum number of individuals that a population must maintain to survive over the long-term (Gilpin and Soule 1986). There are no MVP analyses for any of the rare plants covered under our HCP/NCCP; such analyses are unlikely in the near future due to the time and expense required for data collection. As Gilpin and Soule (1986) discuss, estimating MVPs is complex and there is no “magic number” that is universally applicable to all species. The proposed standard of 250 individuals, however, is a reasonable starting point, given the other protections provided by our HCP/NCCP. This standard is subject, as well, to modification through adaptive management.

If MRC anticipates that a covered activity will result in take, we will calculate the standard take limits prior to implementation of the covered activity. The standard take limits are the maximum number of individuals that MRC can take without special permission from the wildlife agencies. In our calculation, we will use the total number of individuals within the core occurrence area, as counted or estimated during the most recent rare plant survey or monitoring census conducted prior to the submission of a PTHP. MRC will report the calculated take limit in a PTHP, along with an estimate of the maximum number of individuals we expect to take after full implementation of avoidance and minimization measures. If the expected take exceeds the standard take limits, MRC will request from the wildlife agencies a variance in the standard take limits. If the wildlife agencies grant the variance, MRC will implement mitigation as compensation for exceeding the standard take limits.

11.7.1.3 Intent of translocation

Translocation is the movement of plant propagules (e.g., seeds, bulbs, stems, etc.) from one place to another in order to establish a new self-sustaining group of plants (Howald 1996). Our HCP/NCCP authorizes translocation for covered rare plant species, including species listed by both federal and state agencies. Generally, the wildlife agencies discourage translocations as a means of mitigating project impacts since the documented rate of success is low (Fiedler 1991, Falk et al. 1996). Nevertheless, translocation, along with the avoidance and minimization measures in our HCP/NCCP, may be an appropriate conservation measure in some circumstances. Even low rates of success with source propagules authorized for take can minimize waste, yield important knowledge, and improve distribution and abundance.

For our HCP/NCCP, the wildlife agencies are authorizing both non-compensatory and compensatory translocations. For a specific PTHP, plants will be subject to incidental take; the number of plants which MRC takes must be within standard take limits. This is an example of a non-compensatory translocation. If the number of plants which MRC takes is within standard take limits, there is no required compensation. Moreover, the applicable conservation measures do not require MRC to translocate any of the plants that were part of take. Under these circumstances, however, translocation represents a potential opportunity to reduce the overall loss of plants from

the occurrence. Non-compensatory translocations are voluntary; MRC can make a decision on an ad hoc basis. MRC can choose to use non-compensatory translocations to increase the number of plants or the area occupied by plants within the affected occurrence, but not to “experiment” with establishing a new occurrence elsewhere.

When MRC requests higher-than-standard take limits and the wildlife agencies give project-specific approval, MRC can implement compensatory translocation. Under these circumstances, MRC would conduct translocations as controlled experiments and provide complete written documentation to the wildlife agencies of our methods, results, and conclusions. Compensatory translocations could increase the number of plants or the area occupied by plants within the affected occurrence; it could also establish a new occurrence in an area previously unoccupied by the covered rare plant species. Translocation of rare plants removed as a result of a covered activity, such as road maintenance, reduces “waste” of the species.

11.7.2 Conservation measures for management category 2 (MC2)

MRC assigns plant species to Management Category 2 that are more abundant and less threatened than those in Management Category 1 (Table 11-3). In Management Category 2, plant species receive an intermediate level of protection.

 Standard Conservation Measures for Management Category 2	
Communications	
C§11.7.2-1	Instruct all field personnel working in the vicinity of covered species occurrences, particularly operators of heavy equipment and those who apply pesticides, about complying with conservation measures, especially in locations with activity restrictions for core occurrence areas and buffers.
Core Occurrence Area	
C§11.7.2-2	Install a marking system along roads to designate environmentally sensitive areas, such as core occurrence areas; ensure the system persists throughout the period when the HCP/NCCP is in effect.
C§11.7.2-3	Mark the boundaries of a core occurrence area at regular intervals with painted t-posts, with stakes and colored flags, with clearly visible marks on retained trees, or with other means, so that the occurrence boundary maintains its integrity and is easily identifiable during activity and monitoring periods.
C§11.7.2-4	Mark the outer limits of the core occurrence area at least 5 ft beyond any visible parts (e.g., branches, surface roots) of a covered rare plant; use GPS data, as required, to define the core occurrence and ensure relocation if markers are damaged or removed.
C§11.7.2-5	Mark groups of plants within a core occurrence area, using methods described in C§11.7.2-4, to facilitate avoidance and monitoring.
C§11.7.2-6	Avoid using site preparation within designated core areas unless the wildlife agencies concur.
C§11.7.2-7	Avoid piling slash within designated core areas.
Buffer Width	
C§11.7.2-8	Ensure that the buffer width is 50 ft.

 Standard Conservation Measures for Management Category 2	
C§11.7.2-9	<p>NOTE MRC can reduce the buffer width—if still providing adequate protection—because of factors such as topographic characteristics (e.g., north slope situation); silvicultural practices (e.g., single tree selection); or adjacent stand conditions (e.g., uneven-aged management). Such reduction requires approval of the wildlife agencies.</p> <p>Mark the outer edge of the buffer area with colored flagging or its equivalent before covered activities begin; flagging must be clearly visible throughout the period when covered activities are taking place.</p>
Core Area Management during Timber Operations	
C§11.7.2-10	<p>Ensure that post-harvest stands meet the basal area and canopy requirements of the inner and middle bands of Class I and Large Class II AMZs.</p> <p>NOTE MRC will obtain approval of the wildlife agencies on early successional species and others that prefer open conditions.</p>
C§11.7.2-11	Retain the approximate distribution of conifers and hardwoods found in the core occurrence area.
C§11.7.2-12	Fell trees away from the core occurrence area, whenever possible.
C§11.7.2-13	Treat a core occurrence area as an ELZ, allowing for use of existing roads, landings, and rock pits.
C§11.7.2-14	Avoid significantly altering surface water hydrologic conditions in ways that could adversely affect covered rare plants.
Buffer Management during Timber Operations	
C§11.7.2-15	<p>Ensure that post-harvest stands meet the basal area and canopy requirements of the inner and middle bands of Class I and Large Class II AMZs.</p> <p>NOTE MRC will obtain approval of the wildlife agencies on early successional species and others that prefer open conditions.</p>
C§11.7.2-16	Retain the approximate distribution of trees (conifers and hardwoods) found in the local area.
C§11.7.2-17	Fell trees away from a core occurrence area, whenever possible.
C§11.7.2-18	Treat the buffer area as an ELZ, allowing for use of existing roads, landings, and rock pits.
C§11.7.2-19	Avoid significantly altering surface water hydrologic conditions in ways that could adversely affect covered rare plants.
C§11.7.2-20	Prepare sites without creating ground disturbances.
Invasive Pest Plant Management	
C§11.7.2-21	Control invasive pest plants within 50 ft of all covered rare plant individuals, using methods that are feasible and effective, and that minimize impacts to non-target species, during both the 1 st and 2 nd years following covered activities.
Take Provisions	
C§11.7.2-22	Avoid or minimize take to the maximum degree feasible.
C§11.7.2-23	Permit take only if required for normal operations.

 Standard Conservation Measures for Management Category 2	
C§11.7.2-24	Permit take only for occurrences > 250 individuals, ¹⁴ except for roads, landings, and rock pits (see C§11.7.2-28).
C§11.7.2-25	Describe in project documents (e.g., PTHPs) the amount of take anticipated from covered activities.
C§11.7.2-26	Restrict activities causing take to the period between seed set and the breaking of dormancy, if feasible.
C§11.7.2-27	Consult with the wildlife agencies, if normal operations require higher take limits than those specified in C§11.7.2-28 and C§11.7.2-31.
Take for Roads, Landings, and Rock Pits	
C§11.7.2-28	<p>Permit take of covered rare plant individuals growing in previously established roads, landings, and rock pits, if avoidance is infeasible, and adhere to the following limits:</p> <ul style="list-style-type: none"> ▪ For occurrences < 250 individuals, take of up to 5% of the individuals within a single occurrence, per each single- or multiple-year project. ▪ For occurrences > 250 individuals, take of up to 10% of the individuals within a single occurrence, per each single- or multiple-year project. <p>NOTE Feasible minimization includes: (1) minimizing grading of roadbed and roadsides; (2) running logging trucks and other equipment in tire tracks only; (3) enforcing seasonal restrictions; and (4) applying other restrictions.</p>
C§11.7.2-29	<p>Spread soil from road berms (which need to be removed for proper road drainage and on which rare plants are growing) in roadside areas that MRC will manage as EEZs for a minimum of 2 years.</p> <p>NOTE If these sites are not colonized by rare plants within 2 years, MRC will remove EEZ restrictions. If these sites are colonized by rare plants within 2 years, MRC will continue to manage them as EEZs as long as the rare plants persist in those locations.</p>
C§11.7.2-30	<p>Donate, for scientific purposes and whenever possible, any rare plant that is incidentally taken and not used in translocation; this includes collecting and preserving voucher specimens, and salvaging live plants and seeds for researchers, seed banks, or botanic gardens.</p> <p>NOTE If MRC gets no willing takers for a specific species, we will advise the wildlife agencies and no longer make donations of that species unless the wildlife agencies identify a recipient.</p>
Take for All Other Covered Activities	
C§11.7.2-31	<p>Permit take, in the case of occurrences > 250 individuals, as follows:</p> <ul style="list-style-type: none"> ▪ Take of up to 5% of the individuals within a single occurrence, per stand entry, for PTHPs. ▪ Take of up to 5% of the individuals within a single occurrence, per year, for other activities, without approval of the wildlife agencies.
Variations	

 Standard Conservation Measures for Management Category 2	
C§11.7.2-32	Seek approval in writing from the wildlife agencies if requesting changes to core area management, buffer management, or buffer width; include the variances in a PTHP subject to public comment.
C§11.7.2-33	Ensure that requested variances are consistent with the objectives of the conservation strategy.
Translocation	
Non-compensatory	
C§11.7.2-34	Notify the wildlife agencies when MRC will perform a non-compensatory translocation.
C§11.7.2-35	Mark and map the location of the translocation in the field.
C§11.7.2-36	Describe in writing the result of the translocation for the wildlife agencies.
Compensatory translocation	
C§11.7.2-37	Obtain approval from the wildlife agencies before implementing.
C§11.7.2-38	Mark and map the location of the translocation in the field.
C§11.7.2-39	Provide thorough written documentation of methods, results, and conclusions for the wildlife agencies.

11.7.2.1 Intent of take provisions

The take provisions for species in Management Category 2 avoid incidental take to the maximum degree feasible. In the conservation measures, limits of take prohibit take unless it is essential for normal operations. The overall intent is to achieve the conservation objectives for Management Category 2. If operations in the field require higher take limits, MRC must seek approval from the wildlife agencies.

Limits of take that allow for a loss of up to 5% of individuals (or up to 10% for roads, landings, and rock pits) within an occurrence per year do not imply that a 5% loss each year is permissible. Over the 80-year term of our HCP/NCCP, most of the plan area will only be subject to impact for a few years. The limits of take defined in this plan are flexible enough to accommodate covered activities that may take place in 2 or more successive years. MRC will typically complete stand entries for timber harvest in a single year; harvests will occur on a rotation of 20 years or more. Occurrences in PTHP areas in which there has been incidental take, therefore, will have 20 years or more of recovery time between timber harvests. Apart from timber harvests, we cannot predict the number of consecutive years to complete other covered activities, but this will typically be 1-3 years. Pre- and post-harvest monitoring, discussed in Chapter 13 (M§13.10.3-1), will track the status and trend of covered rare plants over the term of our HCP/NCCP. If monitoring determines that MRC is not meeting our conservation objectives or that conservation measures are more restrictive than required to achieve those objectives, MRC and the wildlife agencies may reconsider take provisions through adaptive management.

11.7.3 Conservation measures for management category 3 (MC3)

MRC assigns plant species to Management Category 3 that, while still considered rare, are more abundant and widespread and less threatened than those in Management Category 2. In Management Category 3, plant species receive less protection than species in either Management Category 1 or Management Category 2.

 Standard Conservation Measures for Management Category 3	
Communications	
C§11.7.3-1	Instruct all field personnel working in the vicinity of covered species occurrences, particularly operators of heavy equipment and those who apply pesticides, about complying with conservation measures, especially in locations with activity restrictions for core occurrence areas and buffers.
Core Occurrence Area	
C§11.7.3-2	Mark the boundaries of a core occurrence area at regular intervals with painted t-posts, with stakes and colored flags, with clearly visible marks on retained trees, or with other means, so that the occurrence boundary maintains its integrity and is easily identifiable during activity and monitoring periods.
C§11.7.3-3	Mark the outer limits of the core occurrence area at least 5 ft beyond any visible parts (e.g., branches, surface roots) of a covered rare plant; use GPS data, as required, to define the core occurrence and ensure relocation if markers are damaged or removed.
C§11.7.3-4	Limit losses of individual covered rare plants as feasible.
C§11.7.3-5	Treat a core occurrence area as an ELZ, allowing for use of existing roads, landings, and rock pits.
C§11.7.3-6	Minimize significant alterations to surface water hydrologic conditions that could adversely affect covered rare plants.
C§11.7.3-7	Minimize disturbance from site preparation and slash piles.
Buffer Width	
C§11.7.3-8	Ensure that the buffer width is 50 ft. NOTE MRC can reduce the buffer width—if still providing adequate protection—because of factors such as topographic characteristics (e.g., north slope situation); silvicultural practices (e.g., single tree selection); or adjacent stand conditions (e.g., uneven-aged management). Such reduction requires approval of the wildlife agencies.
C§11.7.3-9	Mark the outer edge of the buffer area with colored flagging or its equivalent, before covered activities begin; flagging must be clearly visible throughout the period when covered activities are taking place.
Core Management during Timber Operations	
C§11.7.3-10	Fell trees away from the core occurrence area, whenever possible.
C§11.7.3-11	Minimize direct impacts, where feasible, by felling trees away from plants and by not skidding on plants.
Buffer Management during Timber Operations	
C§11.7.3-12	Fell trees away from a core occurrence area.
C§11.7.3-13	Treat the buffer area as an ELZ.
C§11.7.3-14	Minimize significant alterations to surface water hydrologic conditions that could adversely affect covered rare plants.
Invasive Pest Plant Management	

 Standard Conservation Measures for Management Category 3	
C§11.7.3-15	Control invasive pest plants within 25 ft of all covered rare plant individuals, using methods that are feasible and effective and that minimize impacts to non-target species, during the first year following covered activities.
Take Provisions	
C§11.7.3-16	Avoid or minimize take to the maximum degree feasible.
C§11.7.3-17	Permit take only if required for normal operations.
C§11.7.3-18	Permit take only for occurrences > 250 individuals, except for roads, landings, and rock pits (see C§11.7.3-22).
C§11.7.3-19	Describe in project documents (e.g., PTHPs) the amount of take anticipated from covered activities.
C§11.7.3-20	Restrict activities causing take to the period between seed set and the breaking of dormancy, if feasible.
C§11.7.3-21	Consult with the wildlife agencies, if normal operations require higher take limits than those specified in C§11.7.3-25.
Take for Roads, Landings, and Rock Pits	
C§11.7.3-22	Permit take of covered rare plant individuals growing in previously established roads, landings, and rock pits, if avoidance is infeasible. NOTE Feasible avoidance includes: (1) minimizing grading of roadbed and roadsides; (2) running logging trucks and other equipment in tire tracks only; and (3) other feasible restrictions.
C§11.7.3-23	Spread soil from road berms (which need to be removed for proper road drainage and on which rare plants are growing) in roadside areas that MRC will manage as EEZs for a minimum of 2 years. NOTE If these sites are not colonized by rare plants within 2 years, MRC will remove EEZ restrictions. If these sites are colonized by rare plants within 2 years, MRC will continue to manage them as EEZs as long as the rare plants persist in those locations.
C§11.7.3-24	Donate, for scientific purposes and whenever possible, any rare plant that is incidentally taken and not used in translocation; this includes collecting and preserving voucher specimens, and salvaging live plants and seeds for researchers, seed banks, or botanic gardens. NOTE If MRC gets no willing takers for a specific species, we will advise the wildlife agencies and no longer make donations of that species unless the wildlife agencies identify a recipient.
Take for All Other Covered Activities	
C§11.7.3-25	Permit take, in the case of occurrences > 250 individuals, as follows: <ul style="list-style-type: none"> ▪ Take of up to 10% of the individuals within a single occurrence, per stand entry, for PTHPs. ▪ Take of up to 10% of the individuals within a single occurrence, per year, for other activities, without approval of the wildlife agencies.
Variations	

 Standard Conservation Measures for Management Category 3	
C§11.7.3-26	Seek approval in writing from the wildlife agencies if requesting changes to core area management, buffer management, or buffer width; include the variances in a PTHP subject to public comment.
C§11.7.3-27	Ensure that requested variances are consistent with the objectives of the conservation strategy.
Translocation	
Non-compensatory	
C§11.7.3-28	Notify the wildlife agencies when MRC will perform a non-compensatory translocation.
C§11.7.3-29	Mark and map the location of the translocation in the field.
C§11.7.3-30	Describe in writing the result of the translocation for the wildlife agencies.
Compensatory translocation	
C§11.7.3-31	Obtain approval from the wildlife agencies before implementing.
C§11.7.3-32	Mark and map the location of the translocation in the field.
C§11.7.3-33	Provide thorough written documentation of methods, results, and conclusions for the wildlife agencies.

11.7.3.1 Intent of the take provisions

The take provisions for species in Management Category 3 minimize incidental take, while allowing normal timber harvest operations and other covered activities to proceed with minimal or no restrictions. For existing roads, landings, and rock pits, take is permitted as long as MRC implements feasible avoidance measures and continues to achieve the objectives for MC3 species. If operations in the field require higher take limits, MRC must seek approval from the wildlife agencies.

Limits of take that allow for a loss of up to 10% of individuals within an occurrence per year do not imply that a 10% loss each year is permissible. Over the 80-year term of our HCP/NCCP, most of the plan area will only be subject to impact for a few years. The limits of take defined in our plan are flexible enough to accommodate covered activities that may take place in 2 or more successive years. MRC will typically complete stand entries for timber harvest in a single year; harvests will occur on a rotation of 20 years or more. Occurrences in PTHP areas in which there has been incidental take, therefore, will have 20 years or more of recovery time between timber harvests. Apart from timber harvests, we cannot predict the number of consecutive years to complete other covered activities, but this will typically be 1-3 years. Pre- and post-harvest monitoring, discussed in Chapter 13 (M§13.10.3-1), will track the status and trend of covered rare plants over the term of our HCP/NCCP. If monitoring determines that MRC is not meeting our conservation objectives or that conservation measures are more restrictive than required to achieve those objectives, MRC and the wildlife agencies may reconsider take provisions through adaptive management.

11.7.4 Conservation measures for management category 4 (MC4)

Species that qualify for Management Category 4 are covered species that, locally, are relatively widespread or common; some are in communities where MRC will limit covered activities both

in area and frequency. MRC created this management category to accommodate 3 types of covered species.

Type 1

These are species which CDFG and CNPS may downgrade during the term of our HCP/NCCP. As MRC conducts more plant surveys in compliance with our HCP/NCCP, we expect to detect new occurrences of covered species. As a result, CDFG and CNPS may downgrade the conservation status of some covered species. In 2006, for example, CNPS and CNDDDB botanists conducted a status review of maple-leaved checkerbloom (*Sidalcea malachroides*). Subsequently, they downgraded its status from S3.2 to S4.2. While our HCP/NCCP was still in draft format at that time, MRC changed the management category of maple-leaved checkerbloom from MC2 to MC4.

Type 2

These species (a) are found in communities and habitats in the plan area where covered activities will occur rarely; (b) are relatively common within these communities and habitats; and (c) have sizeable protected populations elsewhere on land whose management goals include the protection of natural resources such as rare plants (e.g., state parks, county parks, and public and private preserves). Examples of this second type are pygmy cypress (*Callitropsis pygmaea*) and Bolander’s beach pine (*Pinus contorta* ssp. *bolanderi*). These covered species are relatively common within the pygmy forest community where, in the plan area, there are no timber harvests and minimal road construction. In addition, these species are protected in several locations on land where natural resource conservation is a priority, such as Jug Handle State Reserve, Van Damme State Park, Salt Point State Park, and the Hans Jenny Pygmy Forest Reserve (managed by The Nature Conservancy and the University of California). MRC will protect species such as pygmy cypress and Bolander’s beach pine primarily through community-based conservation measures, following the stated goals of the NCCPA.

Type 3

These species have a ranking of S4 or S5 which CNPS and CNDDDB botanists may never adjust during the term of our HCP/NCCP.

By including these types of covered species in a management category, MRC expects to provide a level of conservation and monitoring that will ensure their long-term persistence in the plan area.

 Standard Conservation Measures for Management Category 4	
Communications	
C§11.7.4-1	Instruct all field personnel working in the vicinity of covered species occurrences, particularly operators of heavy equipment and those who apply pesticides, to comply with conservation measures.
Core Occurrence Area	

 Standard Conservation Measures for Management Category 4	
C§11.7.4-2	Mark the boundaries of a core occurrence area at regular intervals with painted t-posts, with stakes and colored flags, with clearly visible marks on retained trees, or with other means, so that the occurrence boundary maintains its integrity and is easily identifiable during activity and monitoring periods.
C§11.7.4-3	Mark the outer limits of the core occurrence area at least 5 ft beyond any visible parts (e.g., branches, surface roots) of a covered rare plant; use GPS data, as required, to define the core occurrence and ensure relocation if markers are damaged or removed.
C§11.7.4-4	Avoid impacts to individual covered rare plants to the degree necessary to meet conservation objectives.
Limits of Take	
C§11.7.4-5	Ensure that the number of individuals lost through incidental take is low enough so that a covered rare plant species qualifies for its current S rank or a higher S rank.

11.7.4.1 Intent of the take provisions

There are no specified take limits for species in Management Category 4. Nevertheless, the number of individuals lost through incidental take must be low enough to ensure that the covered species continues to qualify for its current S rank or a higher S rank (indicating a greater number of occurrences), and that some occurrences maintain a stable-to-increasing level in the plan area. Species in this category are relatively widespread and common; MRC protects them through community-based conservation measures. If monitoring demonstrates MRC is not meeting our conservation objectives, the wildlife agencies may require specific take limits and additional conservation measures through adaptive management.

11.8 Conservation Measures for Specific Species

Currently, MRC only has enough data to create species-specific measures for 2 covered plants: long-beard lichen (*Usnea longissima*) and Humboldt milk-vetch (*Astragalus agnicidus*). In the future, we may collect additional information to create, with the approval of the wildlife agencies, species-specific measures for additional covered plants.

11.8.1 Conservation measures for long-beard lichen

DEFINITION

A **source tree** is a dominant, co-dominant, or pre-dominant tree that contains large amounts of long-beard lichen in the canopy and provides propagules for dispersal.

MRC is proposing species-specific conservation measures for long-beard lichen; as a result, we have not assigned this species to a management category. For species like long-beard lichen, species-specific measures will provide a more consistent level of conservation over the long-term than is achievable through the standard conservation measures. Since 2000, many new locations for long-beard lichen in California have been documented (CNDDDB 2006). The December 2005 review proposal (Peterson 2005) recommends CNDDDB rankings of G5.1 and S4.2 and a CRPR-compatible rank of 4. Appendix R, *Plant Rankings*, includes an explanation of G and S ranks in

CNDDDB, as well as CRPR ranks. If CNDDDB staff adopts the rank recommended by the California Lichen Society (CALs), long-beard lichen may not be eligible for protection under CEQA.

The CALs status review proposal (Peterson 2005) points out that there are more than 200 occurrences of long-beard lichen in Humboldt County and in Mendocino County, where most of the California populations are known. The Sonoma County occurrences probably constitute the southern limit of this lichen's range in California and, very likely, in North America. Long-beard lichen populations in other parts of the United States and in Europe have declined in recent years, possibly because of air pollution (Brodo et al. 2001). In light of these factors, MRC will conserve long-beard lichen on our land, regardless of whether it qualifies for future protection under CEQA.

For long-beard lichen, occurrence size typically depends on the number of trees inhabited by this epiphytic lichen, which lives on the surface of forest trees, not by the number of lichen individuals. Determining the number of lichen individuals would require dismantling the organism to count the number of thalli in each occurrence. Estimates of cover are also impractical. According to data from Pacific Lumber Company land in Humboldt County (Peterson 2005), long-beard lichen populations may have a "source and sink" distribution pattern. Source trees contain visibly large amounts of long-beard lichen in the canopy; these sites persist over the long-term and provide lichen fragments that colonize new trees (Keon and Muir 2002). Sink trees, which are smaller and located in the understory, likely result from lichen fragments which source trees emit during high wind events; these sink tree populations are mainly transient. Dispersal of fragments is the main form of reproduction for long-beard lichen (Keon and Muir 2002).

A recent study in the Oregon Coast Range by Keon and Muir (2002) examined the growth of long-beard lichen in 4 types of suitable habitat. Studies of habitat characteristics in sites currently occupied by long-beard lichen shaped the definition of suitable habitat. Researchers placed transplants of long-beard lichen in apparently suitable habitat based on predictive modeling. Long-beard lichen grew in all 4 habitat types; growth was greatest in habitats predicted to be least suitable, which were characterized by south to southwest-facing slopes in clear cuts or in stands less than 10 years old. Keon and Muir (2002) noted that long-beard lichen fragments typically travel less than 16 ft (5 m) from their source locations and concluded that dispersal limitations may play a greater role than the availability of suitable habitat in determining the distribution of long-beard lichen in the Oregon Coast Range. To conserve long-beard lichen in timber management areas, Keon and Muir recommend retaining old stands of trees with "significant populations" of long-beard lichen as source locations capable of inoculating other trees.

In the plan area, MRC foresters have documented long-beard lichen from 15 occurrences; future surveys are likely to uncover additional occurrences. Most of these long-beard lichen occurrences exhibit the source and sink distribution pattern observed in other parts of the Pacific Northwest (Peterson 2005, Keon and Muir 2002).

MRC intends the conservation measures for long-beard lichen to (a) conserve the species throughout its range in the plan area; (b) conserve some source and sink complexes; and (c) provide unoccupied habitat suitable for future colonization. We will focus conservation measures on protecting the source trees inhabited by this lichen and retaining other trees that lichen might colonize.

 Standard Conservation Measures for Long-beard Lichen	
C§11.8.1-1	Train foresters and rare plant surveyors in the field to recognize pendant lichens that may be long-beard lichen.
C§11.8.1-2	Search for, identify, and document long-beard lichen source and sink trees during rare plant surveys in PTHP areas.
C§11.8.1-3	Protect up to 10 source trees in any PTHP area. EXAMPLES <ul style="list-style-type: none"> ▪ If the PTHP area has 7 source trees, MRC will protect all 7. ▪ If the PTHP area has 25 source trees, MRC will protect 10 of the 25.
C§11.8.1-4	Prevent the cutting or trimming of protected sources trees, except to ensure the safety of workers.
C§11.8.1-5	Maintain screen trees in the vicinity of source trees to buffer them from wind-throw and other threats and to provide an opportunity for the dispersal of long-beard lichen. NOTE If feasible, MRC will select screen trees that are within the dispersal range for long-beard lichen, i.e., < 16 ft (5 m) from a source tree, and whose retention will not cause source trees to be heavily shaded.
C§11.8.1-6	Protect old-growth trees and snags ¹⁹ and limit harvest in AMZs to provide potential habitat for new occurrences of long-beard lichen.
C§11.8.1-7	Test lichen samples, whenever possible, to determine their identity, using tests recommended by lichenologists.
C§11.8.1-8	Monitor for the presence or absence of long-beard lichen throughout the term of the HCP/NCCP during preparatory fieldwork for PTHP submissions.

11.8.2 Conservation measures for Humboldt milk-vetch

Humboldt milk-vetch is a suffrutescent, perennial member of the pea family, Fabaceae (Hickman 1993). The species is fairly short-lived with an estimated life span of 5 to 10 years (Bencie 1997). Like so many members of the Fabaceae, reproductive success is dependent on some level of disturbance. Botanist R.C. Barneby, the taxon author, surmised that “disturbance of the highly competitive climax woodland and the sudden weedy abundance of *A. agnicidus* are related phenomena” (Barneby 1957). Greenhouse and germination experiments conducted by Pickart and others (1992) have confirmed Humboldt milk-vetch plants have a low tolerance for shade as well as a dependency on both scarification and stratification prior to germination. A CDFG query of the California Natural Diversity Database (CNDDB) revealed that all reported occurrences of Humboldt milk-vetch are associated, in some manner, with timber harvest activities (CDFG 2006).

MRC is proposing species-specific conservation measures for Humboldt milk-vetch; as a result, we have not assigned this species to a management category. Initially we decided that inclusion into Management Category 2 was appropriate for this species due to its early successional behavior and tolerance to disturbance. However, during the drafting of our HCP/NCCP, it became

¹⁹ See section 9.2.1 for a definition of snags and 9.4.1.2 for a definition of old growth.

apparent that some of the conservation measures for MC2 are so restrictive that we would be unable to meet both the biological objectives for covered rare plants and the intent of the take provisions.

MRC intends the conservation measures for Humboldt milk-vetch to (a) conserve the species throughout its range in the plan area and (b) conserve habitat for localized seed banking.

 Standard Conservation Measures for Humboldt Milk-vetch	
Communications	
C§11.8.2-1	Instruct all field personnel working in the vicinity of covered species occurrences, particularly operators of heavy equipment and those who apply pesticides, about complying with conservation measures, especially in locations with activity restrictions for core occurrence areas and buffers.
Core Occurrence Area	
C§11.8.2-2	Mark the boundaries of a core occurrence area at regular intervals with painted t-posts, with stakes and colored flags, with clearly visible marks on retained trees, or with other means, so that the occurrence boundary maintains its integrity and is easily identifiable during activity and monitoring periods.
C§11.8.2-3	Mark the outer limits of the core occurrence area at least 5 ft beyond any visible parts (e.g., branches, surface roots) of a covered rare plant; use GPS data, as required, to define the core occurrence and ensure relocation if markers are damaged or removed.
C§11.8.2-4	Mark groups of plants within a core occurrence area, using methods described above, to facilitate avoidance and monitoring.
C§11.8.2-5	Avoid using site preparation within designated core areas unless the wildlife agencies concur.
C§11.8.2-6	Avoid piling slash within designated core areas.
Core Area Management during Timber Operations	
C§11.8.2-7	Fell trees away from core occurrence areas, whenever possible, in order to create the least direct disturbance to individual plants.
C§11.8.2-8	Establish an ELZ within a 25 ft radius of a core occurrence area's periphery.
C§11.8.2-9	Allow the use of existing roads, skid trails, landings, and rock pits within the ELZ surrounding the core occurrence area.
C§11.8.2-10	Limit road maintenance within the ELZ to grading of running surfaces and creation of drainage structures as specified in Chapter 8, Appendix E, or the Forest Practice Rules.
C§11.8.2-11	Transport spoils from the ELZ no farther than 100 ft from the plant population unless safety or operational needs require otherwise.

 Standard Conservation Measures for Humboldt Milk-vetch	
C§11.8.2-12	Deposit spoils from the ELZ preferably on the outside edge of the road where impacts from traffic and grading are limited or, if necessary, across the road surface or on a turnout or landing.
C§11.8.2-13	Permit roadside brushing and road day-lighting within the ELZ.
C§11.8.2-14	Conduct road maintenance and other covered activities, if feasible, between seed-set in the fall and breaking of dormancy in the spring.
C§11.8.2-15	Do not allow direct ignition or pile burning within the ELZ unless the wildlife agencies concur.
C§11.8.2-16	Do not plant trees within a designated core area.
C§11.8.2-17	Avoid significantly altering surface water hydrologic conditions in ways that could adversely affect covered rare plants.
Invasive Pest Plant Management	
C§11.8.2-18	Control invasive pest plants within 100 ft of a designated core area, using methods that are feasible and effective and that minimize impacts to non-target species, during both the 1 st and 2 nd years following covered activities.
Take Provisions	
C§11.8.2-19	Avoid or minimize take to the maximum degree feasible.
C§11.8.2-20	Permit take only if required for normal operations.
C§11.8.2-21	Describe in project documents (e.g., PTHPs) the amount of take anticipated from covered activities.
C§11.8.2-22	Restrict activities causing take to the period between seed set and the breaking of dormancy, if feasible.
C§11.8.2-23	Consult with the wildlife agencies, if normal operations require higher take limits than those specified in C§11.8.2-24 and C§11.8.2-28.
Take for Roads, Landings, and Rock Pits	
C§11.8.2-24	<p>Permit take of Humboldt milk-vetch individuals growing in previously established roads, landings, and rock pits, if avoidance is infeasible, and adhere to the following limits:</p> <ul style="list-style-type: none"> ▪ For occurrences > 100 reproductive individuals, take of up to 15% of the individuals within a single occurrence, per each single- or multiple-year project. ▪ For occurrences < 100 reproductive individuals, take of up to 10% of the individuals within a single occurrence, per each single- or multiple-year project. <p>NOTE Feasible avoidance includes: (1) minimizing grading of roadbed and roadsides; (2) running logging trucks and other equipment in tire tracks only; and (3) other feasible restrictions.</p>

 Standard Conservation Measures for Humboldt Milk-vetch	
C§11.8.2-25	Seek approval of the wildlife agencies prior to commencement of operations if anticipated take exceeds permitted levels.
C§11.8.2-26	<p>Spread soil from road berms (which need to be removed for proper road drainage and on which rare plants are growing) in roadside areas that MRC will manage as EEZs for a minimum of 2 years.</p> <p>NOTE If these sites are not colonized by rare plants within 2 years, MRC will remove EEZ restrictions. If these sites are colonized by rare plants within 2 years, MRC will continue to manage them as EEZs as long as the rare plants persist in those locations.</p>
C§11.8.2-27	<p>Donate, for scientific purposes and whenever possible, a sampling of Humboldt milk-vetch that is incidentally taken and not used in translocation; this includes collecting and preserving voucher specimens, and salvaging live plants and seeds for researchers, seed banks, or botanic gardens.</p> <p>NOTE If MRC gets no willing takers for a specific species, we will advise the wildlife agencies and no longer make donations of that species unless the wildlife agencies identify a recipient.</p>
Take for All Other Covered Activities	
C§11.8.2-28	<p>Permit take, in the case of occurrences > 100 reproductive individuals, as follows:</p> <ul style="list-style-type: none"> ▪ Take of up to 5% of the individuals within a single occurrence, per stand entry, for PTHPs. ▪ Take of up to 5% of the individuals within a single occurrence, per year, for other activities, without approval of the wildlife agencies.
Variances	
C§11.8.2-29	Seek approval in writing from the wildlife agencies if requesting changes to core area management, buffer management, or buffer width; include the variances in a PTHP subject to public comment.
C§11.8.2-30	Ensure that requested variances are consistent with the objectives of the conservation strategy.
Translocation	
Non-compensatory	
C§11.8.2-31	Notify the wildlife agencies when MRC will perform a non-compensatory translocation.
C§11.8.2-32	Mark and map the location of the translocation in the field.
C§11.8.2-33	Describe in writing the result of the translocation for the wildlife agencies.
Compensatory translocation	
C§11.8.2-34	Obtain approval from the wildlife agencies before implementing.
C§11.8.2-35	Mark and map the location of the translocation in the field.
C§11.8.2-36	Provide thorough written documentation of methods, results, and conclusions for the wildlife agencies.

11.8.2.1 Intent of take provisions

The take provisions for Humboldt milk-vetch should minimize incidental take, while allowing normal timber harvest operations to proceed without unreasonable constraints. Conservation measures for this species prohibit take in all circumstances except for those essential for normal operations. Our overall intent is to achieve the conservation objectives for MC2. If MRC requires higher take limits, the wildlife agencies must approve them.

Limits of take that allow the loss of up to 5% (up to 15% for roads, landings, and rock pits) of individuals within an occurrence per year do not imply that a 5% loss each year is permissible. Over the 80-year term of the HCP/NCCP, most of the plan area will only be subject to impact for a few years. The limits of take defined in this plan are flexible enough to accommodate covered activities that may take place in 2 or more successive years. MRC will typically complete stand entries for timber harvest in a single year; harvests will occur on a rotation of 20 years or more. Occurrences in PTHP areas in which there has been incidental take, therefore, will have 20 years or more of recovery time between timber harvests. Apart from timber harvests, we cannot predict the number of consecutive years to complete other covered activities, but this will typically be 1-3 years. Pre- and post-harvest monitoring, discussed in Chapter 13 (M§13.10.3-1), will track the status and trend of covered rare plants over the term of our HCP/NCCP. If monitoring determines that MRC is not meeting our conservation objectives or that conservation measures are more restrictive than required to achieve those objectives, MRC and the wildlife agencies may reconsider take provisions through adaptive management.