

Chapter 10

Conservation Measures for Fish and Wildlife



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10 CONSERVATION MEASURES FOR FISH AND WILDLIFE

10.1 Introduction

Chapter 10 proposes conservation measures for all fish and wildlife species covered under our HCP/NCCP. Since the habitat requirements and proposed protection measures for aquatic species differ from those of terrestrial species, we have organized our conservation measures under these 2 categories.

Table 10-1 Covered Fish and Wildlife

Aquatic Species	Terrestrial Species
<ul style="list-style-type: none"> • coho salmon • Chinook salmon • steelhead • red-legged frog • coastal tailed frog 	<ul style="list-style-type: none"> • northern spotted owl • marbled murrelet • Point Arena mountain beaver

10.1.1 Aquatic overview

The conservation measures for aquatic species focus on aquatic habitat. As a result, they are fairly brief and often cross reference Chapter 8, *Conservation Measures for Aquatic Habitat*.

10.1.2 Terrestrial overview

The conservation measures for terrestrial species focus on 3 very different animals—a forest raptor, a seabird, and a rodent—and are much more detailed than the aquatic measures. Most of the discussion in this chapter is actually about 2 of these animals: the northern spotted owl and the marbled murrelet. These 2 species make the “front page,” as it were, because they play a major role in our HCP/NCCP.

- *Northern spotted owl*
The northern spotted owl is the species that potentially will experience the most impact from covered activities. The reason is that they occur over a very large area, namely all across the plan area. Their forest habitat is the one most threatened by timber operations. To protect them in a systematic way that is also biologically relevant requires detailed planning.
- *Marbled murrelet*
Unlike the northern spotted owl, marbled murrelets occupy a very small area on covered lands—Alder Creek. While murrelets scour the ocean to feed on fish and other marine organisms, they inhabit forested areas where they can breed in old growth trees and nest high in forest canopy. Aside from Russian Gulch, Lower Alder Creek is the only place in Mendocino County where long-term, continuous murrelet activity occurs. For this reason, MRC is proposing special protection for Lower Alder Creek as part of a regional effort to restore murrelets in Mendocino County.
- *Point Arena mountain beaver*
The Point Arena mountain beaver is also geographically isolated within Mendocino County. As their name implies, mountain beavers occur primarily around Point Arena, a narrow peninsula jutting ½ mile into the Pacific Ocean.

There are many more mountain beaver burrow systems outside the plan area than inside it. Since mountain beavers prefer herbaceous ground cover rather than tree canopy cover, their habitat is relatively more plentiful on coastal bluffs and in coastal scrub. With many burrow systems scattered throughout their small geographic range, mountain beavers are in a much better recovery position than murrelets. Therefore, MRC conservation measures propose a basic approach, relying on surveys and protections for existing burrow systems.

10.1.3 Measure up

A primary thrust of the MRC conservation effort is habitat protection. Certainly, measurement is key to that effort. In providing protection, particularly for terrestrial species, MRC creates buffer areas around species habitat. Determining the distance of those buffers in a forest with rough terrain and various slope gradients requires different types of measurement. MRC has used slope distance for any measurement ≤ 250 ft and horizontal (or map) distance for any measurement more than > 250 ft.¹

10.2 Aquatic species

10.2.1 Chinook salmon, coho salmon, and steelhead

10.2.1.1 Overview

The conservation measures for coho salmon, Chinook salmon, and steelhead protect aquatic habitat and strive to improve the abundance and distribution of anadromous salmonids throughout the plan area. Although each of the covered salmonids occurs in very different habitats, MRC intends to protect all fish habitat with very conservative measures. Descriptions of the habitat for coho, Chinook, and steelhead are in sections 4.2.5, 4.3.5, and 4.4.5 respectively.

Chinook salmon tend to occur only in the lowest reaches of some of the largest watersheds in the plan area. Coho salmon occupy smaller coastal watersheds as well as the lower and middle reaches of larger watersheds. Steelhead occur in the lower, middle, and uppermost reaches of all of the watercourses in the plan area accessible to fish. Conservation measures for steelhead will protect many miles of watercourses, even where Chinook and coho salmon do not occur. In Hollow Tree Creek, for example, conservation measures applied to headwater areas where only steelhead occur will directly improve habitat further downstream for Chinook and coho salmon. Improving water temperatures, increasing habitat complexity, improving riparian function, and reducing sediment will contribute to habitat improvement for all 3 species regardless of which species may be present in a watercourse at the time we apply our aquatic conservation measures.

Many factors may limit anadromous populations, including

- Freshwater conditions.
- Ocean conditions.
- Timber harvest.
- Disease.
- Genetic integrity.
- Fishing pressure (in the ocean and rivers).

¹ MRC defines horizontal (or map) distance as the measured distance between 2 points on a map, while slope distance is the measured distance between 2 points on the ground.

- Temporary or anthropogenic barriers to migration.
- Hatcheries.
- Predation.

Improvement in any one of these factors does not ensure the population will be stable or increase. Moreover, MRC can only influence aquatic conditions within the plan area and downstream; we cannot control the marine environment which influences the number of adult salmonids returning from the sea to spawn in freshwater streams on our land. However, it is entirely possible that improving freshwater conditions will increase the number of out-migrants and returning adults.

10.2.1.1.1 Protecting salmonid life stages

MRC has chosen to protect and conserve the 3 covered salmonids in all their freshwater life stages. Each of these life stages has unique habitat requirements for which MRC provides a network of Aquatic Management Zones (AMZs). Since all these life stages may be present in all fish-bearing watercourses at any time, we will use standard conservation measures for all Class I (i.e., fish-bearing) watercourses, regardless of which salmonid species is present. This approach provides a simple means of protecting all Class I watercourses and avoids problematic approaches such as single species management.

10.2.1.1.2 Annual salmonid monitoring basins

Each year, MRC will conduct surveys for salmonid presence in our Annual Salmonid Monitoring Basins (ASMB). We selected basins in which we own all or most of the land to ensure that results reflect our own practices as opposed to activities outside our control. Those basins include

- Hollow Tree Creek.
- Cottaneva Creek.
- Hardy Creek.
- Juan Creek.
- Howard Creek.
- North Fork Noyo River.
- Big River (above South Fork Big River).
- South Fork Big River.
- Albion River.
- South Fork Albion River.
- North Branch North Fork Navarro River.
- South Branch North Fork Navarro River.
- Greenwood Creek.
- Elk Creek.
- Mallo Pass Creek.
- Alder Creek.
- South Fork Garcia River.
- Ackerman Creek.

10.2.1.2 Biological goals and objectives

Goals and Objectives for Coho Salmon, Chinook Salmon, and Steelhead	
Goals	
G§10.2.1.2-1	Maintain and improve anadromous salmonid distribution throughout the plan area.
G§10.2.1.2-2	Maintain and improve aquatic habitat.
Objectives	
Major Drainage Basins	
O§10.2.1.2-1	Maintain presence of <ul style="list-style-type: none"> ▪ Steelhead in 100% of the ASMB where baseline data and new information indicate their presence. ▪ Coho salmon in 100% of ASMB, where baseline data and new information indicate their presence. <p>NOTE MRC considers anadromous salmonid species <i>present</i> if we detect them once during 3 annual consecutive surveys in a basin. We will consider that basin able to <i>support</i> the new species only if we detect them on 2 or more occasions in a continuous 6-year time period.</p>
Distribution	
O§10.2.1.2-2	Maintain steelhead in 90% of sampling sites throughout the plan area, where baseline data and new information indicates their presence.
O§10.2.1.2-3	Maintain coho salmon in 85% of sampling sites throughout the plan area, where baseline data and new information indicates their presence. <p>NOTE MRC set objectives for coho salmon and steelhead distribution at less than 100% to account for natural variations in flow and temporary barriers, such as log jams, which may impede accessibility. When we detect new fish species in a sampling site, we will consider that sampling site able to support the new species only if we detect them on 2 or more occasions in a continuous 6-year time period.</p>
Chinook Salmon Monitoring Reaches	
OS10.2.1.2-4	Maintain Chinook salmon in the Chinook Salmon Monitoring Reaches (CSMR) currently identified for annual monitoring: Hollow Tree Creek and North Fork Noyo River (see <i>HCP/NCCP Atlas</i> , MAPS 3A-3C).

10.2.1.3 Conservation measures

 Conservation Measures for Coho Salmon, Chinook Salmon, and Steelhead	
C§10.2.1.3-1	See 8.2, <i>Riparian and Wetland Areas</i> .
C§10.2.1.3-2	See 8.3, <i>Sediment Inputs</i> .
C§10.2.1.3-3	See 8.4, <i>Hydrologic Change</i> .
C§10.2.1.3-4	See Appendix E, <i>Roads, Landings, and Skid Trails</i> .
C§10.2.1.3-5	See Appendix T, <i>Master Agreement for Timber Operations</i> .

10.2.1.3.1 Treatment of fish barriers

Although MRC does not have an explicit plan to treat fish barriers, they are a top priority for restoration work. Section 8.3.3.2.1 explains how MRC prioritizes road work. As of 2010, MRC will have removed 34 fish barriers throughout the plan area. The lineal extent of habitat upstream of these barriers, which is, in effect, an enhanced or restored area, is 106,433 ft—roughly 20 miles. MRC will continue to treat all man-made fish barriers as a high priority in order to improve and increase the amount of fish habitat; we will report annually on treatment of fish passage barriers and miles of stream enhanced (see D.9).

10.2.1.3.2 CDFG recovery strategy for coho salmon

CDFG, with the assistance of recovery teams representing diverse interests and perspectives, created the *Recovery Strategy for California Coho Salmon*, a guide for recovering coho salmon on the north and central coasts of California. Released in 2004, the *Recovery Strategy* has the primary objective of returning coho salmon to a level of sustained viability. At the same time, it aims to protect the genetic integrity of both its Southern Oregon/Northern California Coast (SONCC) ESU and its Central California Coast (CCC) ESU so that they can be delisted. In that case, there will be no further need for regulations or other protections under CESA.

CDFG has subdivided each coho salmon ESU into watershed recovery units. The recovery units are groups of smaller drainages related hydrologically, geologically, and ecologically. CDFG considers these units as unique and important components of an ESU. To provide consistency with existing resource databases, CDFG aligned recovery units with the geographic divisions of the CALWATER 2.2a system, the standard watershed mapping system used by the State of California. The CALWATER classification system includes (from largest to smallest) hydrologic regions, hydrologic units (HU), hydrologic areas (HA), hydrologic subareas (HSA), and planning watersheds. HSAs come into play when there are environmental conditions distinct from the hydrologic unit (HU) and specific recovery recommendations are warranted.

MRC intends to incorporate, wherever pertinent, the CDFG *Recovery Strategy* into our HCP/NCCP. We have designated 3 geographic recovery units within our plan area—the South Fork Eel River HA, the Mendocino Coast HU, and the Russian River HU. The South Fork Eel River HA is the only recovery unit within the plan area which belongs to the SONCC ESU; the other 2 units (Mendocino Coast HU and Russian River HU) belong to the CCC ESU.

In keeping with the CDFG *Recovery Strategy*, Appendix Z details the watershed recommendations for the hydrologic areas of South Fork Eel River, Mendocino Coast, and the Russian River, along with the MRC proposals to comply with these recommendations and, where relevant, to incorporate them in our HCP/NCCP.

10.2.1.3.3 NOAA draft recovery strategy for coho salmon

In March 2010, NOAA Fisheries Service released a public review draft of their “Recovery Plan for the ESU of Central California Coast Coho Salmon.” NOAA estimates that the plan will be finalized by 4th quarter 2011. MRC has identified numerous conservation measures for watersheds which NOAA designates as coho *core areas* in their recovery plan. Our implementation of these measures will accelerate over the course of our HCP/NCCP. For example, we have committed to upgrading our roads to HCP/NCCP standards and increasing levels of LWD in order to restore and improve habitat conditions at a faster pace in coho core areas. Elements of the final NOAA plan will be incorporated into Appendix Z, *Coho Recovery Strategies*.

10.2.1.3.4 Basic comparison of CDFG and NMFS strategy

CDFG recovery units generally correspond to CALWATER hydrologic units. These units are 2 hierarchical levels above planning watersheds. Within their coho strategy, CDFG ranks entire basins for recovery efforts. Most of the MRC plan area has a ranking of 5, meaning the land has a high potential for restoration and management.

The NMFS recovery plan is more specific to planning watersheds. Low coho populations concentrated in small portions of a stream make the coho subject to catastrophic loss from a single event, such as a landslide. NMFS identifies the best sub-watersheds, known as coho core areas, for protection and restoration.

10.2.1.4 Rationale

Natural habitat for anadromous salmonid species is within streams and rivers. Chapter 8, *Conservation Measures for Aquatic Habitat*, details how MRC will maintain and enhance aquatic habitat by addressing rising temperatures and sediment in our watercourses.

10.2.2 Red-legged frog

10.2.2.1 Overview

MRC has undertaken efforts to identify the baseline distribution of red-legged frogs throughout the plan area (MRC 2008). As of 2011, we have identified 119 potential breeding sites, of which 11 had red-legged frogs present and 9 were documented breeding sites. By Year 2 of HCP/NCCP implementation, the baseline distribution will be complete.

The conservation measures for red-legged frogs (California and northern) focus on protecting habitat and maintaining red-legged frog occupancy in breeding sites in the plan area. Appendix N, *Amphibian Monitoring*, describes the survey methods MRC will follow to locate breeding sites. The *HCP/NCCP Atlas* (Maps 9a-c) shows the surveyed planning watersheds for red-legged frogs.

In Chapter 8, we presented conservation measures to enhance aquatic habitat, including that of adult (post-metamorphic) red-legged frogs, for example, C§8.2.3.5.1-1 to C§8.2.3.5.1-12 (wetlands, wet areas, and wet meadows) and C§8.2.3.5.2-1 to C§8.2.3.5.2-12 (seeps and springs). In this sub-section, we present more specific conservation measures for both potential and documented red-legged frog breeding sites that will maintain or improve both embryonic and larval rearing habitat. Taken in conjunction, these conservation measures will provide adequate protection for all life stages of red-legged frogs.

10.2.2.1.1 Potential red-legged frog breeding habitat

We identify potential breeding habitat for red-legged frogs during baseline distribution surveys (M§13.6.2.1-1). Table 10-2 outlines the characteristics of potential breeding sites. If we survey a potential breeding site and determine that it is occupied by larval or embryonic life stages of red-legged frogs, we consider it a documented breeding site.

Table 10-2 Characteristics of Potential Red-legged Frog Breeding Sites

Characteristics of Potential Red-legged Frog Breeding Sites	
Habitat	Site must have standing, slow, or still water (lentic environment).
Depth	Site, measured during high water conditions, must have water to a depth of 10 in. or more (USFWS 2002).
Persistence of Water	<p>Site must retain water, given average rainfall, until June 1st and meet 1 of the following criteria:</p> <ol style="list-style-type: none"> 1. Presence of hydrophytic or obligatory wetland plant species and presence of aquatic invertebrate life. 2. Presence of aquatic phases or newly metamorphosed amphibian species which use “pond type” habitats for reproduction (northwestern salamanders, pacific newts, bullfrogs, etc), excluding pacific tree frogs. <p>NOTE Pacific tree frogs are not good indicators of water persistence; they often use water puddles to breed which dry up before the larvae complete metamorphosis.</p> <ol style="list-style-type: none"> 3. Presence of fish species.

10.2.2.1.2 Red-legged frog management units

Red-legged frogs may not use the same breeding site each season, especially when there are several breeding sites within close proximity to one another. In those instances, the species may use some sites in one season and different sites the next season. Consequently, MRC assigned each *potential* or *documented* breeding site to a Red-Legged Frog Management Unit (RLFMU). According to our data, variation in breeding site selection occurs when sites are within 1000 ft of each other. An RLFMU, therefore, encompasses all sites within this distance. As of 2009, the number of documented or potential breeding sites in each RLFMU has ranged from 1 to a maximum of 6.

10.2.2.2 Biological goals and objectives

Goals and Objectives for Red-legged Frogs	
Goals	
G§10.2.2.2-1	Manage for well distributed meta-populations (i.e., partially isolated sub-populations) of red-legged frogs.
G§10.2.2.2-2	Maintain and manage red-legged frog habitats for native species.
Objectives	
Distribution	
O§10.2.2.2-1	Establish the baseline distribution of both potential and documented red-legged frog breeding sites by Year 2 of HCP/NCCP implementation.
Occupancy	
O§10.2.2.2-2	Maintain red-legged frogs in 100% of the red-legged frog management units

Goals and Objectives for Red-legged Frogs	
	(RLFMU), where baseline surveys and new surveys indicate their presence. NOTE MRC considers red-legged frogs <i>present</i> if we detect them once during 3 annual consecutive surveys. Since red-legged frogs live approximately 6 years, this survey period covers about half their life expectancy.
Habitat	
O§10.2.2.2-3	Maintain habitat quality (e.g., maximum depth and surface area) at 90% of potential breeding sites identified during distribution surveys, including water drafting sites. NOTE MRC set habitat objectives at less than 100% to account for the temporary nature of some sites; for example, pools upstream of log jams may dissipate after the log jam shifts.
O§10.2.2.2-4	Create amphibian habitat when constructing new water drafting ponds in the course of covered activities.

10.2.2.3 Conservation measures

Our conservation measures for red-legged frogs will

- Enhance aquatic habitat.
- Minimize disturbance to wet areas, wet meadows, and breeding habitats.
- Control non-native species (bullfrogs).
- Ensure that breeding habitats remain available throughout the plan area.

Maintaining the quality and quantity of potential red-legged frog breeding habitats will ensure that other native amphibians using “pond type” habitats will also persist throughout the life of our HCP/NCCP. Maintaining potential breeding habitats (i.e., habitats not yet occupied by red-legged frogs) also provides the means for an expansion of red-legged frog distribution.

Our conservation measures for AMZs provide protection to red-legged frogs within the buffered areas of all watercourses (see section 8.2.3). MRC expects habitat in the AMZs to improve in quality and quantity during the term of our HCP/NCCP; this will result in improved habitat for red-legged frogs as well. Conservation measures for wetlands, wet areas, wet meadows, seeps, and springs provide additional protection to red-legged frogs that breed or reside in aquatic habitats other than watercourses (see C§8.2.3.5.1-1 to C§8.2.3.5.1-12 for wetlands, wet areas, and wet meadows as well as C§8.2.3.5.2-1 to C§8.2.3.5.2-12 for seeps and springs).

! Effective April 16, 2010, USFWS designated 1.6 million ac in California as critical habitat for the red-legged frog. The area covers 27 counties, including Mendocino County. Our HCP/NCCP plan area falls within the boundaries of this designated critical habitat (see HCP/NCCP Atlas, MAPS 9A-C). Because of the conservation measures in our HCP/NCCP, however, this critical habitat unit lying within the plan area will not be adversely impacted.

Pre-project surveys

To minimize or avoid take, MRC will require pre-project surveys before heavy equipment enters any buffered area (i.e., EEZs or ELZs) near aquatic habitats with visible standing water during the time of the proposed activity (i.e., seeps, springs, wet areas, wet meadows, or wetlands). The pre-project surveys will consist of 1 survey conducted during the day and a second survey conducted at night. The daytime survey will be a 30-minute time-constrained search (TCS) for any life stages of the red-legged frog in the water, under woody debris, or anywhere within the buffered area. The nocturnal survey will be a 30-minute TCS that uses eye-shine techniques to detect adult life stages near the wet feature. Surveyors will complete their work within 10 days of the documented survey proposal. In the event we detect a red-legged frog, the buffer will remain an EEZ. MRC will obtain approval of the wildlife agencies for other actions, if relevant circumstances fall outside these guidelines.

 Conservation Measures for Red-legged Frogs	
Disturbance Minimization	
C§10.2.2.3-1	<p>Follow these standards in maintaining documented red-legged frog breeding sites (both natural and man-made):</p> <ul style="list-style-type: none"> ▪ Maintain and manage vegetation after July 1. ▪ Do not conduct vegetation management more than once every 3 years. ▪ Limit vegetation management to 50% of the breeding site's perimeter.
C§10.2.2.3-2	Maintain a 25 to 50 ft equipment limitation or exclusion zone (ELZ or EEZ) around wetlands, wet areas, wet meadows, seeps, and springs, excluding existing roads (see C§8.2.3.5.1-1, C§8.2.3.5.1-2, and C§8.2.3.5.2-3).
C§10.2.2.3-3	<p>Maintain a 50 ft equipment exclusion or limitation zone (EEZ or ELZ) around all potential and documented red-legged frog breeding sites excluding existing roads.</p> <p>NOTE If MRC needs to enter an EEZ with equipment, we will conduct pre-project surveys as described in section 10.2.2.3.</p>
C§10.2.2.3-4	<p>Limit water drafting on documented red-legged frog breeding sites (both natural and man-made):</p> <ul style="list-style-type: none"> ▪ Do not draft more than 50% of pond volume before July 1. ▪ Do not draft more than 80% of pond volume after July 1. ▪ Do not draft when egg masses are present. ▪ Use a screen with a mesh size less than 1/8 in. and an approach velocity of 0.33 ft/sec or less.
C§10.2.2.3-5	Ensure that all pump intakes are screened and, if feasible, are at least 6 in. off the bottom of the waterbody; follow the water-drafting prescriptions in Appendix E, <i>Roads, Landings, and Skid Trails</i> , E.7.
Bullfrog Control Plan	
C§10.2.2.3-6	<p>Construct new ponds with drain fixtures, where topographically possible.</p> <p>NOTE MRC will do this as the opportunity arises during covered activities with the concurrence of the wildlife agencies.</p>

 Conservation Measures for Red-legged Frogs	
C§10.2.2.3-7	<p>Control bullfrog populations if they are present in 1 or more documented red-legged frog breeding sites in a planning watershed, according to the following order of priority:</p> <ol style="list-style-type: none"> 1. Remove bullfrog egg masses from the site. 2. Attempt to remove (e.g., gig, shoot, trap, and seine) metamorphic bullfrogs (i.e., frogs with legs) at least once a week until the CPUE (catch per unit effort of time) declines to < 1 bullfrog per hour—evidence that the bullfrog population has been reduced. 3. Drain a pond manually or mechanically during bullfrog invasion if there is no drain fixture. <p style="margin-left: 40px;">NOTE MRC will not drain ponds to control bullfrogs if there are larval forms of red-legged frogs in the pond. Moreover, it is not possible to drain some large ponds manually.</p>
Take Minimization	
C§10.2.2.3-8	<p>Conduct pre-project surveys to determine the presence of covered aquatic species when proposing that heavy equipment enter into an EEZ or ELZ of any wet feature (wet areas, seeps, springs, wet meadows, and wetlands), including potential and documented red-legged frog breeding sites.</p>
Habitat Conservation	
C§10.2.2.3-9	<p>Maintain at least 75% of both maximum depth and maximum total surface area of potential breeding sites as measured during baseline distribution surveys.</p>
C§10.2.2.3-10	<p>Construct new ponds with drain fixtures, where topographically possible.</p> <p style="margin-left: 40px;">NOTE MRC will do this as the opportunity arises during covered activities with the concurrence of the wildlife agencies.</p>
C§10.2.2.3-11	<p>See 8.2, <i>Riparian and Wetland Areas</i>.</p>
C§10.2.2.3-12	<p>See 8.3, <i>Sediment Inputs</i>.</p>
C§10.2.2.3-13	<p>See 8.4, <i>Hydrologic Change</i>.</p>
C§10.2.2.3-14	<p>See Appendix E, <i>Roads, Landings, and Skid Trails</i>.</p>
C§10.2.2.3-15	<p>Prohibit herbicide use within 150 ft of habitat occupied by red-legged frogs or within an AMZ of a Class I or Class II stream unless the wildlife agencies concur.</p>

10.2.2.4 Rationale

Habitat for red-legged frogs includes streams or rivers, ponds, wetlands, and almost any other aquatic feature used by foraging or hydrating adult frogs. With C§10.2.2.3-1 through C§10.2.2.3-15, we identified specific conservation measures for both potential and documented breeding habitats to protect the sensitive early life stages of red-legged frogs. Upon metamorphosis, juvenile red-legged frogs disperse throughout aquatic habitats. Conservation measures C§8.2.3.5.1-1 through C§8.2.3.5.1-12 and C§8.2.3.5.2-1 through C§8.2.3.5.2-12 also address aquatic habitat for all life stages of red-legged frogs.

10.2.3 Coastal tailed frogs

10.2.3.1 Overview

MRC has undertaken efforts to identify the baseline distribution of coastal tailed frogs throughout the plan area. As of 2009, we surveyed 356 sites, 75 of which had coastal tailed frogs present. By Year 2 of HCP/NCCP implementation, the baseline distribution will be complete.

On average once every 7-8 years, MRC will monitor all occupied streams identified during baseline distribution surveys, new surveys, or incidental observations throughout the term of our HCP/NCCP. Monitoring will focus on (1) determining whether coastal tailed frogs continue to remain present in occupied sites and (2) determining the relative abundance of coastal tailed frogs at occupied sites. Over time, information on the occupancy and relative abundance of coastal tailed frogs throughout all occupied streams in the plan area should provide a sufficient source for effectiveness monitoring data. In any given year, there will be at least 10 streams monitored for occupancy and relative abundance; on average, MRC will cycle through 13% of occupied sites per year.

10.2.3.2 Biological goals and objectives

Goal and Objectives for Coastal Tailed Frogs	
Goal	
G§10.2.3.2-1	Maintain or enhance baseline distribution of larval coastal tailed frogs.
Objectives	
Distribution	
O§10.2.3.2-1	Establish a baseline distribution of larval coastal tailed frogs by Year 2 of HCP/NCCP implementation.
O§10.2.3.2-2	Maintain larval coastal tailed frogs in 95% of sites where either the baseline distribution survey, incidental observation, or a new survey indicates their presence. NOTE MRC set the distribution objective at less than 100% to account for sampling error.

10.2.3.3 Conservation measures

Our conservation measures for coastal tailed frogs focus on enhancing aquatic habitat. Coastal tailed frogs occur in both Class I and Large Class II watercourses. Consequently, measures developed for watercourses, such as riparian conservation measures, as well as measures to reduce sediment and minimize hydrologic change will benefit coastal tailed frogs (see sections 8.3 and 8.4).

Our conservation measures for AMZs provide protection to coastal tailed frogs within the buffered areas of all watercourses (see section 8.2.3). MRC expects habitat in the AMZs to improve in quality and quantity during the term of our HCP/NCCP; this will result in improved habitat for coastal tailed frogs as well. Our conservation measures for wetlands, wet areas, wet meadows, seeps, and springs provide additional protection to coastal tailed frogs that breed or reside in aquatic habitats other than watercourses (see C§8.2.3.5.1-1 through C§8.2.3.5.1-12 and C§8.2.3.5.2-1 through C§8.2.3.5.2-12).

Pre-project surveys

To minimize or avoid take, MRC will require pre-project surveys before heavy equipment enters any buffered area (i.e., equipment exclusion or limitation zones) near aquatic habitats (i.e., seeps, springs, wet areas, wet meadows, or wetlands). This restriction does not apply to use of existing roads. The surveys will attempt to locate any life stage of covered aquatic species within the buffer. If the surveyors find covered species, MRC will employ conservation measures to avoid direct take. Surveyors will complete their work within 10 days of the documented survey proposal. Our HCP/NCCP Atlas (Maps 11a-c) shows the surveyed planning watersheds for coastal tailed frogs.

The pre-project surveys will consist of 1 survey conducted during the day and a second survey conducted at night. The daytime survey will be a 30-minute time-constrained search (TCS) for any life stages of coastal tailed frog in the water, under woody debris, or anywhere within the buffered area. The nocturnal survey will be a 30-minute TCS that uses eye-shine techniques to detect adult life stages nearby the wet feature.

MRC will require pre-project surveys only if there is visible standing water in the wet feature during the proposed activity. If that is the case, MRC will conduct 1 daytime survey and 1 nocturnal survey prior to the proposed activity. In the event we detect a coastal tailed frog, the buffer will remain an EEZ. MRC will obtain approval of the wildlife agencies for other actions, if relevant circumstances fall outside these guidelines.

 Conservation Measures for Coastal Tailed Frogs	
Disturbance Minimization	
C§10.2.3.3-1	Maintain a 25 to 50-ft equipment limitation or exclusion zone (ELZ or EEZ) around wetlands, wet areas, wet meadows, seeps, and springs, excluding existing roads.
Take Minimization	
C§10.2.3.3-2	Conduct pre-project surveys to determine the presence of covered aquatic species when proposing that heavy equipment enter into the EEZ or ELZ of any wet feature (wet areas, seeps, springs, wet meadows, and wetlands).
Habitat Conservation	
C§10.2.3.3-3	Designate and manage all basins or sub-basins with breeding coastal tailed frogs present as Large Class II regardless of their drainage area size (see Table 8-1). NOTE If MRC finds only an adult life stage of coastal tailed frog, we will conduct a second survey for larval forms to evaluate if the sub-basin supports breeding frogs. If we find larvae, we will manage the sub-basin as a Large Class II.
C§10.2.3.3-4	See 8.2, <i>Riparian and Wetland Areas</i> .
C§10.2.3.3-5	See 8.3, <i>Sediment Inputs</i> .
C§10.2.3.3-6	See 8.4, <i>Hydrologic Changes</i> .
C§10.2.3.3-7	See Appendix E, <i>Roads, Landings, and Skid Trails</i> .
C§10.2.3.3-8	See Appendix T, <i>Master Agreement for Timber Operations</i> .
C§10.2.3.3-9	Prohibit herbicide use within an AMZ of a Class I or Class II stream unless the wildlife agencies concur.

10.2.3.4 Rationale

Coastal tailed frogs occur in both Class I and Large Class II watercourses. Chapter 8, *Conservation Measures for Aquatic Habitat*, details how MRC will implement riparian conservation measures and reduce stream sediment to benefit coastal tailed frogs.

10.3 Wildlife Species

10.3.1 Northern spotted owl

10.3.1.1 Overview

The northern spotted owl is a species of concern in northern California. During the 80-year term of our HCP/NCCP, MRC proposes to increase the population of spotted owls in the plan area and boost spotted owl conservation in our region. Our conservation measures take aim at both spotted owl territories and the overall landscape.

Recently, MRC biologists have begun to detect barred owls—competitors of spotted owls—with increased frequency. We have based our conservation strategy for spotted owls on our historical knowledge of spotted owl biology in the plan area and throughout northern California. Barred owls are a new threat to spotted owl success in the plan area. Only as barred owl detections began to increase sharply in late 2006 did we begin to think seriously about this threat. The goals and objectives in our HCP/NCCP for spotted owls presume that we will develop measures to manage barred owl populations or that the wildlife agencies will give us authorization to actively control barred owl populations within spotted owl territories. In addition, we may need to seek permits from USFWS and CDFG outside the directives of our HCP/NCCP to actively control barred owl populations within spotted owl territories. MRC intends to maintain and increase spotted owls by growing habitat and following established conservation measures. If our biologists can actively manage barred owl populations, we believe our overall plan will succeed.

Territory scale

MRC will provide spotted owl territories producing the greatest number of offspring with protection that exceeds 2007 take-avoidance standards.² Moderately productive territories will receive protection approximately equivalent to 2007 take-avoidance. Territories that do not produce offspring will receive very limited protection. By focusing our protection on the territories that produce the most offspring, we will enhance the population viability of northern spotted owls on our land.

Landscape scale

MRC will protect and recruit wildlife trees in every PTHP, providing more potential nest trees. In addition, we will continue to grow nesting/roosting habitat and, thereby, multiply the opportunities for spotted owl incursion.

² Essentially, take-avoidance standards are a 1000 ft disturbance buffer during breeding season; a 500 ft no-harvest core area at all times; and a ½ mile helicopter buffer during breeding season.

10.3.1.1.1 Defining terms

DEFINITION

An owl **territory** is an area defended by a single owl or a pair of owls against members of the same species—generally during the breeding season.

An **activity center** (AC) is a location pin-pointed on a map where a single owl or a pair of owls nests or consistently roosts during the breeding season (see *HCP/NCCP Atlas*, MAPS 14A-C).³

The **initial activity center** (IAC) is the nest or spot around which MRC establishes a new core area for a spotted owl territory; a spotted owl territory may have different IACs in different core areas that may or may not overlap.

A **core area** is forest habitat surrounding an activity center that MRC will manage as a no-harvest zone because it is critical to nest-site selection and survival of the spotted owl.

An **extended protection area** is 267 ft beyond the core area of a spotted owl territory with high protection and 500 ft beyond the core area of a territory with moderate protection, where MRC maintains existing habitat quality.

Suitable habitat consists of forested stands with the characteristics needed by northern spotted owls for nesting, roosting, foraging, and dispersal.

Nesting and roosting habitat, in general, has trees at least 16 in. dbh and more than 60% canopy closure.

Foraging habitat, in general, has trees at least 11 in dbh and 40% or more canopy closure.

10.3.1.1.2 Activity centers and core areas

The extent of a core area varies according to the amount of protection that MRC provides an activity center. Subsequent sub-sections explain these levels of protection. For activity centers receiving high protection, a core area is essentially a circle with a radius of 1000 ft circumscribed around the initial activity center; in land area, this equals 72 ac.⁴ MRC has chosen to increase the core area to 80 ac. As a result, the actual shape of any specific core area will vary from the shape of a “perfect circle” (Figure 10-1). The 1000-ft radius acts as a *minimum boundary* between the activity center and any timber operations. During the spotted owl breeding season, MRC protects this area within 1000 ft of an activity center from disturbance. Outside the core area, an additional extended protection area (267 ft from the core area boundary) maintains existing habitat quality (Figure 10-1).

³ Although there can be multiple roost sites in a territory within a single year, MRC biologists will select the roost site to receive activity center status according to the flowchart in Appendix K, *Northern Spotted Owl Data and Protocol*, Figure K-4. Activity centers for the same owl or pair of owls can occur in different locations each year.

⁴ $A = \pi r^2$, i.e., $A = 3.14 * (1000 \text{ ft})^2 = 3140000 \text{ ft}^2$. $3140000 \text{ ft}^2 / 43560 \text{ ft}^2 \text{ per ac} = 72 \text{ ac}$.

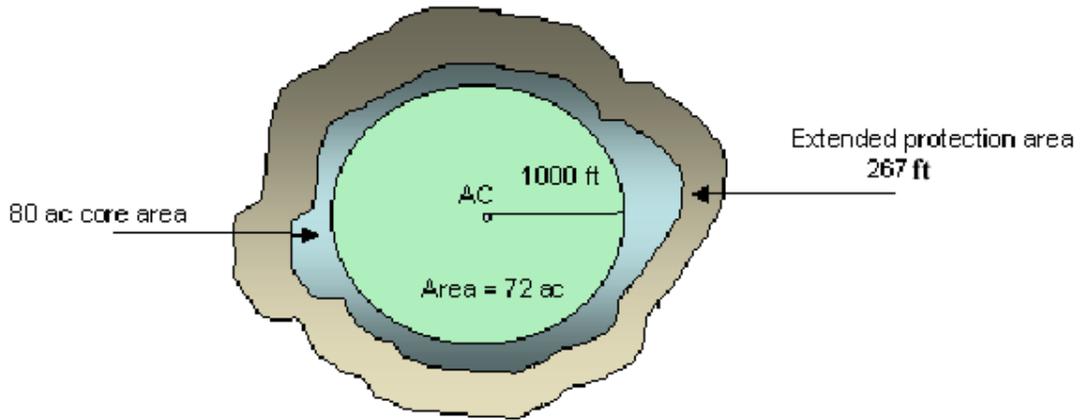


Figure 10-1 Habitat Management for Spotted Owls with High Protection

Figure 10-2 depicts an activity center with moderate protection that includes an 18-ac core area and a disturbance buffer, during the breeding season, of at least 1000 ft from the activity center in all directions.

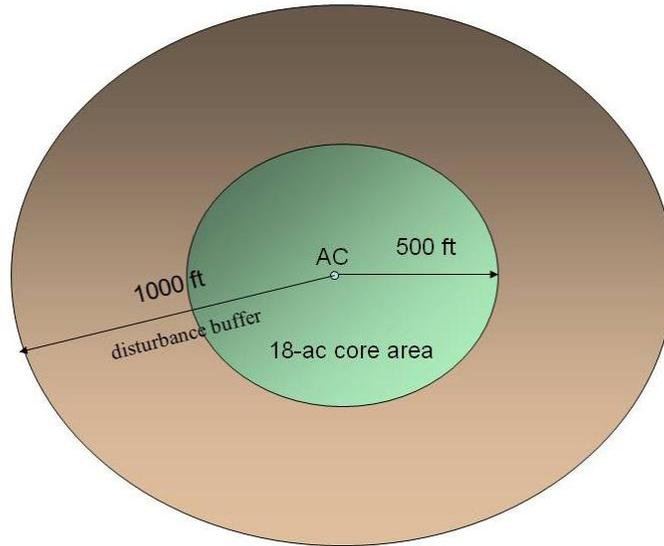


Figure 10-2 Habitat Management for Spotted Owls with Moderate Protection

10.3.1.1.3 Mobile activity centers

A spotted owl may have different activity centers with different core areas in different years or multiple activity centers in the same core area in different years. Core areas may or may not overlap; they may also be completely or partially on covered lands. Figure 10-3 depicts a portion of the plan area on which an owl has used several different activity centers with different core areas—1 completely in the plan area and the other 2 partly in the plan area.

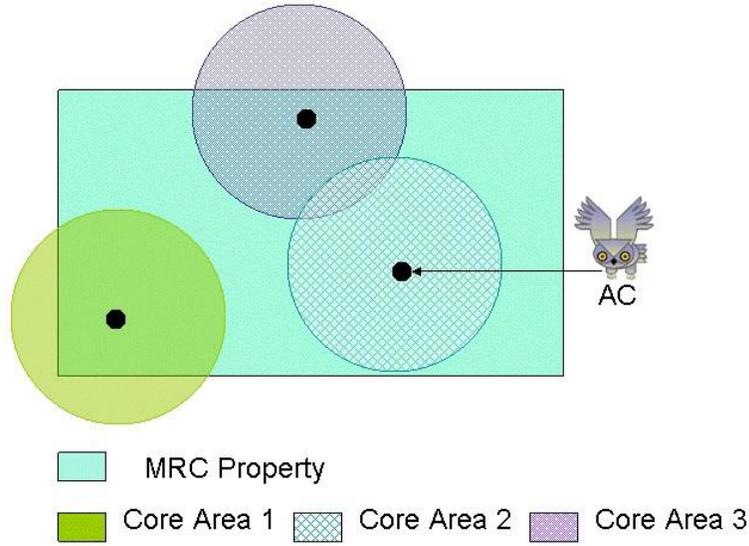


Figure 10-3 Territory with Three Separate Activity Centers

10.3.1.1.4 Real world example of activity centers and core areas

To put “flesh” on this concept of core areas and disturbance buffers, Figure 10-4 shows a 2006 aerial photo⁵ of Rockport forest. Super-imposed on the photo is a graphic depicting activity centers and core areas of 2 northern spotted owls (MD481 and MD513) actually located in this area. The yellow dots denote their activity centers. Because the owls are receiving moderate protection, they have at least an 18 ac core area (represented by the inner circle with the 500 ft radius) and a disturbance buffer (represented by the outer circle with the 1000 ft radius).

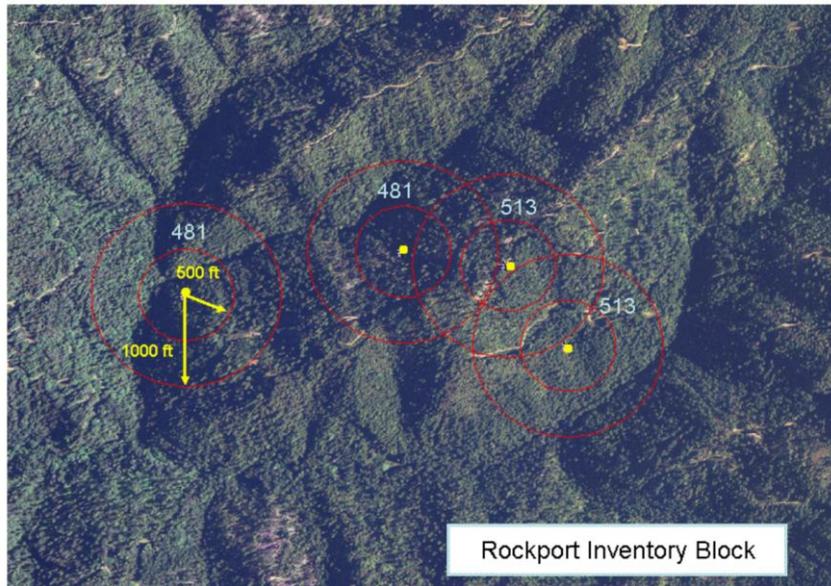


Figure 10-4 Activity Centers and Core Areas in Aerial Photo

⁵ The photo is from a U.S. Department of Agriculture website (<http://datagateway.nrcs.usda.gov/NextPage.asp>) accessed December 2006. In Figure 10-4, the core areas and distance buffers are in horizontal distances. The aerial photo and the super-imposed graphic are synched to scale.

10.3.1.1.5 Protection levels

The conservation measures for the northern spotted owl are designed to provide protections both at the territory and landscape scale. MRC has created 3 protection levels—high, moderate, and limited. We are basing our protections for owl territories on their recent and historic productivity and on their consistent length of occupation (see Table 10-3).

Territory scale

Owls that produce the most offspring initially receive more protection than 2007 take-avoidance standards. Owls that produce fewer offspring receive protection approximately equivalent to 2007 take-avoidance standards. Owls that have not successfully reproduced receive limited protection. Providing limited protection to owls that have not reproduced gives MRC operational flexibility when we approach owl territories. In any event, spotted owl territories, even with limited protection, have at least a 500-ft disturbance buffer. In addition to these protections, MRC will generally give an activity center not associated with a known territory limited protection as long as we are meeting the population objectives for spotted owls (O§10.3.1.2-1 and O§10.3.1.2-2).

We believe this strategy is more effective than 2007 take-avoidance standards. With 2007 take-avoidance standards, a territory that is not producing offspring receives standard protection. However, single owls often move about frequently—from one activity center to another and back again. With 2007 take-avoidance standards each of these activity centers, whether occupied or not, would be protected with core areas for up to 3 years. Owls in highly productive territories, however, tend to remain for longer periods in the same core area; 2007 take-avoidance standards, in effect, protect more core areas for single and less productive owl pairs than for highly productive owl pairs. MRC, on the other hand, provides fewer protections to the less productive owls and greater protection to the more productive owls, including a larger core area.

Landscape scale

On the landscape scale, MRC will provide adequate foraging and nesting/roosting⁶ habitat to protect the current population of northern spotted owls and increase their population by 20% during the term of our HCP/NCCP. As of June 2010, approximately 86% of the plan area is a mix of foraging and nesting/roosting habitat. About 65% is foraging habitat and about 21% nesting/roosting habitat. This offers more than the minimal dispersal habitat under the 50-11-40 rule (Thomas et al. 1990). The intent of the 50-11-40 rule is to provide a forested condition sufficient to sustain dispersing owls between conservation areas. The rule calls for 50% of stands to have trees averaging 11 in. dbh and 40% canopy closure. Although the 50-11-40 rule originally applied to habitat in each quarter township, MRC applies the same rule to the entire plan area. Additionally, our HCP/NCCP has habitat objectives for minimum nesting/roosting habitat within each inventory block. Current predictions from the MRC landscape model indicate that the amount of suitable habitat on our land will not drop below 60% during the term of our HCP/NCCP; this means there will always be enough dispersal habitat for fledging owls. Moreover, there will be an increase in nesting/roosting habitat over the term of our HCP/NCCP that will provide additional areas for new territories. This is key since nesting/roosting habitat provides for all the life functions of spotted owls (e.g., breeding, feeding, resting), while foraging habitat does not.

⁶ MRC considers nesting and roosting habitat a single habitat type; generally if roosting habitat is available (i.e. large trees with dense canopy), then nesting habitat is available as well (i.e., stands with some nest structures). Some biologists do classify these 2 types separately. Since they generally occur concurrently, MRC lumps them together. In terms of our management activities, there is no distinction between nesting/roosting habitat.

Assumptions of strategy

In proposing our conservation strategy for northern spotted owls, we assumed that

1. Survival of spotted owls depends on the amount of nesting/roosting habitat available to them. Temporal variation in populations is linked to climate patterns (Franklin et al. 2000) and, potentially, to prey base. By increasing nesting/roosting habitat, MRC will conserve current spotted owl populations, increase their numbers, and balance their distribution across our land.
2. Owls in territories that produce more fledglings should receive greater levels of protection. This approach improves the survival of very productive adults and, thereby, enhances survival of the species.
3. Nesting/roosting habitat and foraging habitat are an equivalent resource for foraging spotted owls. Reassigning habitat in the MRC landscape model from foraging to nesting/roosting will result in a similar density and productivity of spotted owls, unless nesting/roosting habitat is a limiting resource.
4. MRC is making habitat assignments based on a correct assessment of the features that spotted owls use and require in their habitat selection.
5. MRC will receive authorization from the wildlife agencies to control barred owls in order to make a positive contribution to spotted owl populations.

10.3.1.1.6 Proposed projects requiring owl surveys

DEFINITION

Disturbance, in this context, is the presence, sound, and movement of people using vehicles or mechanized equipment that adversely affects spotted owls, especially during their breeding season.

MRC will survey new and continuing projects for owl territories; these projects include only PTHPs or management actions that would cause disturbance or reduce suitable habitat. Surveys may extend different distances based on the type of project proposed. A monitoring program (13.9.1.3-1) addresses additional surveys for our overall HCP/NCCP monitoring effort.

For northern spotted owls, MRC will apply disturbance protections only during the breeding season;⁷ disturbance protections will apply to most road work⁸ including road construction, blasting, log yarding, log loading, timber felling, hauling, and use of heavy equipment. MRC will compile survey results into a report forwarded to the wildlife agencies at the end of each year. Our survey protocol is in Appendix K, *Northern Spotted Owl Data and Protocol*.

⁷ By prior agreement with the wildlife agencies, MRC defines the breeding season from February 1 through August 31. If we determine, however, that the owls in a territory are absent or non-nesting, or if their nesting efforts have failed, we will consider the breeding season over for owls in that territory. Section 10.3.1.3.1 lists the conditions under which the conservation measures for the breeding season do not apply.

⁸ MRC will not provide disturbance protections for the following operations: (1) emergency maintenance to remove and replace failed culverts, bridges, and rock slides; (2) maintenance, use, or hauling on mainlines; and (3) work and blasting in mainline rock pits identified in our HCP/NCCP Atlas.

10.3.1.2 Goals and objectives

Goals and Objectives for Northern Spotted Owls	
Goals	
G§10.3.1.2-1	Contribute to overall population increases and species recovery in northern California.
G§10.3.1.2-2	Maintain well-distributed and productive owl populations in the plan area.
G§10.3.1.2-3	Increase the owl nesting/roosting habitat by allowing a larger proportion of stands to progress and persist to a point where they have characteristics suitable for owl nesting and roosting.
Objectives	
Population Objective 1	
O§10.3.1.2-1	Maintain at least 28 Level-1 territories and 67 Level-2 territories during the first 60 years of the HCP/NCCP.
Population Objective 2	
O§10.3.1.2-2	Increase to 34 Level-1 territories and 80 Level-2 territories by Year 75 of the HCP/NCCP.
Distribution Objective 1	
O§10.3.1.2-3	Achieve by Year 40 of the HCP/NCCP a distribution of spotted owl territories in each inventory block that is proportionate to its potential nesting/roosting habitat, i.e., an inventory block with 10% of the total potential nesting/roosting habitat in the plan area should have at least 10% of the Level-1 and Level-2 territories specified in the population objectives (see Table 10-7).
Distribution Objective 2	
O§10.3.1.2-4	Achieve by Year 75 of the HCP/NCCP a distribution of spotted owl territories in each inventory block that exceeds <i>Distribution Objective 1</i> by 20% (see Table 10-7).
Habitat Objective 1	
O§10.3.1.2-5	Achieve by Year 40 of the HCP/NCCP a landscape configuration in which 23% of all potential habitat is nesting/roosting habitat, while still maintaining separate objectives for each inventory block (Table 10-10).
Habitat Objective 2 (+75 years)	
O§10.3.1.2-6	Achieve by Year 75 of the HCP/NCCP a landscape configuration in which 25% of all potential habitat and 25% of each inventory block are nesting/roosting habitat (see Table 10-10).

10.3.1.2.1 Revising objectives for additions and deletions to the plan area

During the 80-year term of our HCP/NCCP, MRC will likely acquire additional land. In such cases, we will protect all owls in the newly acquired land with moderate protection until we collect 3 years of reproduction data that will determine the productivity of the new owl territory.

Likewise, MRC may sell land during the term of our HCP/NCCP. Buying or selling land may require an adjustment of the population objectives for spotted owls. Whether we adjust Population Objective 1 or Population Objective 2 will depend on the year of the land purchase or sale. In Years 1 through 60, we will adjust Population Objective 1. Subsequently, we will adjust Population Objective 2.

The criteria for the adjustment are as follows:

OWL TERRITORIES - YEARS 1 THROUGH 60 OF HCP/NCCP IMPLEMENTATION

- MRC will increase or decrease the number of Level-1 owl territories by 1 for every 7615 ac added to or subtracted from the plan area, respectively. The total number of acres in the plan area (213,244) divided by the total number of Level-1 owl territories (28) equals 7615.
- MRC will increase or decrease the number of Level-2 owl territories by 1 for every 3182 ac added to or subtracted from the plan area, respectively. The total number of acres in the plan area (213,244) divided by the total number of Level-2 owl territories (67) equals 3182.

EXAMPLE

In Year 5 of HCP/NCCP implementation, MRC adds 10,000 ac to the plan area.⁹ Since 10,000 is more than 7615 but less than 15,230 (i.e., $2 * 7615$), we would increase the number of Level-1 territories in Population Objective 1 from 28 to 29, i.e., by 1. Likewise, since 10,000 is more than 3182 but less than 12,728 (i.e., $4 * 3182$), we would increase the number of Level-2 territories in Population Objective 1 from 67 to 70, i.e., by 3. The territory with the greatest productivity would receive high protection; the 3 territories with the next greatest productivity would receive moderate protection. All other owl territories in the newly acquired land would receive limited protection.

OWL TERRITORIES - YEARS 61 THROUGH 79 OF HCP/NCCP IMPLEMENTATION

- MRC will increase or decrease the number of Level-1 owl territories in Population Objective 2 by 1 for every 6271 ac added or subtracted from the plan area respectively. The total number of acres in the plan area (213,244) divided by the total number of Level-1 owl territories (34) equals 6271.
- MRC will increase or decrease the number of Level-2 owl territories by 1 in Population Objective 2 for every 2665 ac added or subtracted from the plan area respectively. The total number of acres in the plan area (213,244) divided by the total number of Level-2 owl territories (80) equals 2665.

EXAMPLE

In Year 65 of HCP/NCCP implementation, MRC adds 20,000 ac to the plan area. Since 20,000 is more than 6271 but less than 25,084 (i.e., $4 * 6271$), we would increase the number of Level-1 territories in Population Objective 2 from 34 to 37, i.e., by 3. Likewise, since 20,000 is more than 2665 but less than 21,320 (i.e., $8 * 2665$), we would increase the number of Level-2 territories in Population Objective 2 from 80 to 87, i.e., by 7. The 3 territories with the greatest productivity would receive high protection; the 7 territories with the next greatest productivity would receive moderate protection. All other owl territories in the newly acquired land would receive limited protection.

INDIVIDUAL INVENTORY BLOCKS - YEARS 1 THROUGH 80 OF HCP/NCCP IMPLEMENTATION

- Adjustment of population objectives based on future land purchases and sales will require adjustment of inventory block totals if the purchase or sale increases or decreases the total acreage of an individual inventory block.

⁹ In any given year, MRC may add or delete acres to the plan area. For the calculations in this section, we are interested only in the net result. For example, if in Years 1-60, MRC added 15,000 ac to the plan area but also sold 5000 ac, MRC would add 1 Level-1 territory to Population Objective 2, since 10,000 net acres is more than 7165 ac but less than 15,230 ac ($2 * 7615$).

10.3.1.2.2 Population objectives

Productivity levels

MRC has divided its northern spotted owl territories by productivity level. The productivity level is an indicator of how many fledglings the northern spotted owls within a territory have produced (Table 10-3). In initially determining productivity for Level 1 through Level 5, we assigned territories based on information from 2007 and previous years.

DEFINITION

Baseline productivity is the mean number of fledglings produced per year in what is now the plan area, calculated with historical data from 1989 to 2007 and accepted by the wildlife agencies as the basis for target objectives in O§10.3.1.2-1 and O§10.3.1.2-2.

Territories in Level 1 through Level 3 must have had activity centers on covered lands in the last 3 years they were located (see *HCP/NCCP Atlas*, MAPS 14A-C), except for territories found within Navarro River Redwoods State Park, of which the baseline number is 5. The park is a long, narrow strip of land; in many cases, an activity center of a spotted owl is on that strip but the core area of the owl is primarily in the plan area. Most of the foraging activities of these park owls also occur in the plan area. Table 10-5 shows the baseline number and distribution of territories by productivity level and inventory block, i.e., the data as of 2007.

Table 10-3 Productivity Levels and Locations of Northern Spotted Owl Territories

Productivity Levels and Locations of Northern Spotted Owl Territories	
Productivity Level and Location	Description
	All Level-1, Level-2, and Level-3 territories must be on covered lands or within Navarro River Redwoods State Park in the last 3 years they were located.
Level 1 on covered lands	<ul style="list-style-type: none"> Territories that produce > 0.8 fledglings per year as determined by a 10-year running average
Level 2 on covered lands	<ul style="list-style-type: none"> Territories that produce > 0 and ≤ 0.8 fledglings per year as determined by a 10-year running average Territories which are newly discovered and awaiting completion of at least 3 years of productivity surveys, only if the number of Level 1 and Level 2 owls are below objectives
Level 3 on covered lands	<ul style="list-style-type: none"> Territories that produce 0.0 fledglings per year as determined by a 10-year running average Territories which are newly discovered and awaiting completion of at least 3 years of productivity surveys, only if the objectives for Level-1 and Level-2 owls are met
Level 4 off covered lands	<ul style="list-style-type: none"> Territories that have had activity centers in the last 3 years which are outside the plan area but within 1000 ft (305 m) of the MRC property line

NOTE

While surveying the plan area boundary from 2002-2007, MRC gathered information on off-property territories. We surveyed approximately 90% of the boundary area. Although we made every effort, at that

Productivity Levels and Locations of Northern Spotted Owl Territories

Productivity Level and Location	Description
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time, to survey all known territories within 1000 ft of covered lands, we placed a higher priority on locating territories within covered lands. We identified 22 Level-4 territories and surveyed 10 of the 22 in 4 out of 6 years and 4 of the 22 in 5 out of 6 years. The baseline number for Level-4 territories, therefore, is 22. The stated percentages in the following definitions are percentages of this baseline.

- 4A Owls

MRC designates Level-4A territories. Their number will not exceed 77% of their baseline (.77 * 22) or 17 territories. Our initial list of Level-4A territories is in Appendix K, *Northern Spotted Owl Data and Protocol*. MRC selects Level-4A territories primarily on our current knowledge of a territory’s productivity and secondarily on the impact its selection will have on timber harvest operations. The wildlife agencies have reviewed and approved our list of Level-4 territories. MRC can replace a Level-4A territory with a Level-4B territory if the Level-4B territory produces at an equal or greater level than the Level-4A territory. In addition, if a Level-4A territory becomes abandoned, MRC can replace it with the highest producing Level-4B territory. The wildlife agencies must approve all changes to Level-4A and Level-4B territories submitted in the MRC annual report.
- 4B Owls

Level-4B territories are adjacent to MRC covered lands; they are either known to be mid-to-low level producers or they are designated as such by MRC biologists. The number of territories we have designated 4B is 5, i.e. 23% of the Level-4 baseline. The actual number of Level-4B territories may increase over time, if the total number of Level-4 territories exceeds the baseline.

NOTE

MRC selected—and the wildlife agencies reviewed and approved—our assignments of Level-4A and Level-4B territories. The initial list is in Appendix K, *Northern Spotted Owl Data and Protocol*.

Level 5
on/off covered lands

- Territories that have had activity centers in the last 3 years which are both inside and outside the plan area.

NOTE

The spotted owls within these territories are within 1000 ft of the MRC property line. In the baseline distribution, there are 26 Level-5 territories. Unlike Level-4 territories, there is no sub-division of Level-5 territories by productivity; they will all receive moderate protections regardless of productivity.

Methodology for determining baseline productivity levels

MRC surveys to determine the number of fledglings produced in each spotted owl territory. Covering the time period 2001-2008, Table 10-4 shows the number of surveys for the Level-1 through Level-3 territories, as well as the Level-4 and Level-5 territories. For example, in 2001, MRC surveyed 108 (i.e., 86%) of the possible 125 Level-1 through Level-3 territories 3 times or more.

Table 10-4 Spotted Owl Survey Percentages

Level-1 through Level-3 Northern Spotted Owl Territories									
Possible # of Territories	Minimum # of Surveys	2001	2002	2003	2004	2005	2006	2007	2008
125	1	118/94%	118/94%	114/91%	119/95%	124/99%	124/99%	120/96%	121/97%
	2	114/91%	114/91%	107/86%	114/91%	121/97%	122/98%	119/95%	115/92%
	3	108/86%	108/86%	96/77%	104/83%	117/94%	117/94%	105/84%	108/86%
Level-4 and Level-5 Northern Spotted Owl Territories									
52	1	40/77%	39/75%	29/56%	37/71%	40/77%	44/85%	37/71%	33/63%
	2	33/63%	33/63%	20/38%	32/66%	35/67%	38/73%	23/44%	24/46%
	3	22/42%	27/52%	13/25%	23/44%	25/48%	29/56%	14/27%	18/35%

TABLE NOTES

- Level-4 territories are off MRC land and Level-5 territories are on and off MRC land but within 1000 ft of the MRC property line.
- The number of possible territories is, in reality, a sliding scale. Every year we find new territories. Moreover, a spotted owl does not necessarily occupy each identified territory in a given year. The data in Table 10-4 is our best determination for the number and percentage of owl territories surveyed from 2001-2008.

In some instances, however, we could not determine whether owls produced fledglings; this was because of factors such as weather conditions and turnover within owl territories, i.e., 1 owl moving out and another owl moving in. As a result, we sometimes had difficulty finding an owl during daytime surveys or getting an owl to take mice during a survey. In such situations, we assigned the owl a status of *nesting unknown*. In our survey results, we considered these instances a *missed year*. All survey results, including how many fledglings were located in each territory per year, are entered into a database. Refer to Appendix K, *Northern Spotted Owl Data and Protocol*, Table K-1.

MRC used historic survey information to calculate a baseline productivity that determines whether an owl territory is designated Level 1, Level 2, or Level 3. We designate a territory as Level 4 or Level 5 based on whether the owl's most recent location was on or off covered lands. MRC used Louisiana Pacific (LP) data from 1989-1998 and collected new data from 1999-2007 to determine baseline productivity and productivity trends of spotted owls. If we were unable to assess the number of fledglings produced in a specific year, we omitted that year from our calculations. To calculate the mean, we included all years in which the territory was surveyed through the 2007 breeding season. All baseline territories had to be in the plan area for 3 years with the exception of those found on Navarro River Redwoods State Park. MRC counted territories as Level-4s and Level-5s if they were within 1000 ft of our property line.

Methodology for determining productivity after HCP/NCCP commencement

Prior to timber operations in each calendar year, MRC will again assess owl productivity by calculating the 10-year running average of each owl territory; we will then re-assign a productivity level to each territory. The 10-year timeframe takes into account the annual variability of spotted owl productivity, while not exceeding their typical reproductive lifespan.

MRC will use the number of owl territories in each productivity level to determine whether we are meeting our numerical population objectives. Level-1 and Level-2 territories must have at least 3 years of productivity data. MRC will automatically assign any new owl territories to Level 3 and provide limited protection while collecting 3 years of productivity data. If, however, we did not meet our owl population objectives in the year prior to such an assignment, we will provide moderate protection to the new territories.

An owl territory, unoccupied for 3 consecutive years, is abandoned. MRC will not assess an abandoned territory for productivity until there is evidence of re-occupation. When we determine that an owl territory is re-occupied, we will immediately re-start productivity calculations. For example, the territory MD236 in the Albion had 1 fledgling in 2011, 0 in 2012, 3 in 2013 and 1 in 2014. MD 236 was abandoned from 2015-2017. In 2018, either a spotted owl establishes its territory in MD236 for the first time or a spotted owl re-establishes its territory in MD236. The 10-year running average for MD236 is reset to 0 for 2018. In the event a spotted owl territory may only appear abandoned due to barred owl invasion, MRC has adjusted our protocol to require additional surveys.

With implementation of our HCP/NCCP, the 28 spotted owls which produce the greatest number of offspring receive high protection for each 5-year period of the plan (Table 10-6). The following conditions apply:

- If, after the first 5-year period, MRC assesses more than 28 owl territories as Level-1 producers, we will assign high protection to the top 28 producers, using a 10-year running average; the remaining Level-1 producers will receive moderate or limited protection.
 - If there is a tie in the productivity of the 10-year running average, MRC will assign high protection to the owl territory with the greatest productivity in the last 5 years.
 - If MRC requires further tie breakers, we will obtain approval of the wildlife agencies on the appropriate protection assignment.
- If, after the first 5-year period, MRC assesses less than 28 owl territories as Level 1 producers or less than 67 owl territories as Level 2 producers, we will assign high protection to the top 28 producing territories and moderate protection to at least 67 owl territories.
- If, after the first 5-year period, MRC assesses less than 22 owl territories as Level 1 producers or less than 54 territories as Level 2 producers for 2 consecutive years, we will implement contingency strategies (see section 10.3.1.2.5). MRC will decide which additional owl territories should receive the high protection and which moderate protection; however, MRC must receive approval for these decisions from the wildlife agencies.

MRC will assess productivity and protection levels for each owl territory and submit this information in a report to the wildlife agencies annually. This will include all owl activity centers known to be within 1000 ft of the plan area. Prior to operations in any calendar year, the wildlife agencies and MRC must concur that all assignments of protection levels to NSO territories coincide with our HCP/NCCP. Unless the contingency strategies trigger a change, protection levels lock in place for a 5-year period.

10.3.1.2.3 Distribution objectives

DEFINITION

Baseline distribution is the number of Level-1 and Level-2 spotted owl territories in each MRC inventory block, calculated with historical data from 1989-2007 and accepted by the wildlife agencies as the basis for target objectives in O§10.3.1.2-3 and O§10.3.1.2-4.

MRC inventory blocks have different acreages, management histories, site classes, and stocking levels. As a result, there is an uneven distribution of owl territories across the inventory blocks. MRC is targeting a distribution of Level-1 and Level-2 territories proportionate to the amount of potential nesting/roosting habitat available throughout the inventory blocks, i.e., a more even distribution. We will meet this objective for owl distribution directly or indirectly—directly by locating new territories and indirectly by growing additional acres of nesting/roosting habitat (see Appendix U, *Inventory Strategy*, section U.7). Table 10-7 shows the baseline and projected distribution of northern spotted owl territories in the plan area.

Methodology for determining distribution objective

To define the distribution objective, we established a target number of territories for each inventory block based on acreage of potential nesting/roosting habitat. Across approximately 213,244 ac, MRC designated 28 territories as Level 1 and 67 territories as Level 2. The potential number of Level-1 and Level-2 territories is proportionate to the potentially suitable habitat within an inventory block. For example, Navarro West has 11% of the potential nesting/roosting habitat (Table 10-7) and, therefore, should have 11% of the Level-1 and Level-2 territories. By this reasoning, Navarro West should have 3 Level-1 territories in 40 years ($0.11 * 28 = 3.08$) and 7 Level-2 territories ($0.11 * 67 = 7.37$). Navarro West has 11 Level-1 territory and 7 Level-2 territories in the 2007 baseline distribution (Table 10-7).

Methodology for defining spotted owl habitat

MRC defined habitat types for northern spotted owls using information from the plan area (Pious 1994; Appendix K, *Spotted Owl Data and Protocol*, section K.3) relevant information from current literature; and input from the wildlife agencies. Table 10-8 shows the 24 MRC structure classes, located in MAPS 13A-C, and their assigned spotted owl habitat types. In general, nesting/roosting habitat has trees at least 16 in. dbh and more than 60% canopy closure. Foraging habitat has trees at least 11 in dbh and 40% or more canopy closure (CDF 2007, 14 CCR 895.1, 10). This also serves as dispersal habitat based on the 50-11-40 guideline. Table 10-9 is a reiteration of Table 10-8, sorted by “dominant size class.” Together the tables provide a crosswalk between forest stand conditions and northern spotted owl habitat. Such information assists MRC foresters in stand typing. Appendix U (section U.7) has information on how MRC actually assigns owl structure classes and habitat types.

10.3.1.2.4 Habitat objectives

MRC designed our habitat objectives to allow for a 20% increase in the population of productive spotted owls over the term of our HCP/NCCP. Our objectives focus on nesting/roosting habitat which appears to be the limiting factor for spotted owls in the plan area. Deliberately conservative, we designate only the highest quality habitat as nesting/roosting.

Using a proportional assessment (10.3.1.4.4), we have determined the number of nesting/roosting acres required to produce an increase in the number of spotted owl territories after 40 and 80

years of HCP/NCCP implementation. Table 10-10 shows the acres of nesting/roosting habitat within each inventory block at the start of HCP/NCCP implementation, as well as the required acres at Year 40 and Year 75.

MRC proposes to apply more uneven-aged silviculture over the term of our HCP/NNCP, as detailed in our Timber Management Plan (TMP). Currently, we use special prescriptions in tanoak-dominated stands, such as variable retention and rehabilitation, to restore them to conifer, and uneven-aged techniques in conifer-dominated stands. While over time, more stands will grow into nesting/roosting habitat than currently exist, most nesting/roosting stands will rotate between foraging and nesting/roosting habitat during a typical harvest cycle.

Table 10-5 2007 Northern Spotted Owl (NSO) Territories by Inventory Block

Baseline Distribution												
MRC Inventory Block	Level 1		Level 2		Level 3		Level 4		Level 5		TOTAL	
	> 0.80 Fledglings (on property)		> 0 and ≤ 0.80 Fledglings (on property)		0 Fledglings (on property)		(off property last 3 years)		Activity Center within 1000 ft of MRC Property (on and off property last 3 years)			
	NSOs	% of NSOs	NSOs	% of NSOs	NSOs	% of NSOs	NSOs	% of NSOs	NSOs	% of NSOs	NSOs	% of NSOs
Albion	4	20%	6	30%	4	20%	5	25%	1	5%	20	100%
Big River	1	6%	11	64%	1	6%	2	12%	2	12%	17	100%
Garcia	0	0%	3	21%	3	21%	2	15%	6	43%	14	100%
Navarro East	1	5%	9	43%	6	28%	3	14%	2	10%	21	100%
Navarro West	11	45%	7	29%	3	13%	0	0%	3	13%	24	100%
Noyo	1	6%	8	50%	3	19%	1	6%	3	19%	16	100%
Rockport	0	0%	13	48%	7	26%	5	19%	2	7%	27	100%
South Coast	10	36%	10	36%	2	7%	4	14%	2	7%	28	100%
Ukiah	0	0%	0	0%	0	0%	0	0%	0	0%	0	100%
Total	28	17%	67	40%	29	17%	22	13%	21	13%	167	100%

Table 10-6 Conservation Strategies for Years 0-60 of the HCP/NCCP

Conservation Strategies for Northern Spotted Owls Years 0-60 of HCP/NCCP			
Productivity Level and Location	Protection Levels		
	High	Moderate	Limited
Level 1 (>0.80 fledglings) on covered lands	28	Territories exceeding 28 will receive either moderate or limited protection.	Territories exceeding 28 will receive either moderate or limited protection.
Level 2 (>0 and ≤ 0.80 fledglings) on covered lands	< 28 Level-1s, some Level-2s will receive high protection.	67	Any territories exceeding 67 level 2s will receive limited protection unless the territory is needed to meet productivity objectives for Level-1 territories.
Level 3 (0 fledglings) on covered lands	Some may receive high protection if MRC is not meeting population objectives.	Some will receive moderate protection, if MRC is not meeting population objectives.	28+ Any additional non-productive territories or potentially productive territories beyond NSO population objectives will receive limited protection.
Level 4 off covered lands	0	17	5 New territories off covered lands will receive limited protection.
Level 5 on and off covered lands but within 1000 ft of MRC property line	0	21	0 Throughout the term of the HCP/NCCP, all Level-5s will receive moderate protection.

Table 10-7 Distribution of NSO Territories to Meet Distribution Objectives

Inventory Block	2007 Baseline Distribution of NSO ¹⁰			Year 40 of HCP/NCCP Distribution of NSOs (Distribution Objective 1)			Year 75 of HCP/NCCP Distribution of NSOs (Distribution Objective 2)		
	Level-1	Level-2	Total	Level-1	Level-2	Total	Level-1	Level-2	Total
Albion	4	6	10	2	5	7	2	6	8
Big River	1	11	12	4	11	15	5	13	18
Garcia	0	3	3	2	5	7	2	6	8
Navarro East	1	9	10	4	10	14	5	12	17
Navarro West	11	7	18	3	7	10	4	8	12
Noyo	1	8	9	3	6	9	4	7	11
Rockport	0	13	13	5	12	17	6	14	20
South Coast	10	10	20	5 ¹¹	11	16	6	13	19
Ukiah	0	0	0	0	0 ¹²	0	0	1	1
Total	28^a	67^a	95	28^a	67^a	95	34^b	80^b	114

TABLE NOTES

^a Population Objective 1^b Population Objective 2

Table 10-8 Structure Classes for Categorizing NSO Habitat

Structure Classes for Categorizing NSO Habitat				
Structure Class	Tree Type	Dominant Size Class (in.)	% Minimum Canopy	NSO Habitat Type
0	Non-forested	0	0	Non-suitable
1	Mixed Hardwoods	<8	<40	Non- Suitable
2	Mixed Hardwoods	>16	<40	Non-Suitable
3	Mixed Hardwoods	<16	>40	Non- Suitable
4	Mixed Hardwoods	>16	>40	Foraging
5	Mixed Hardwoods	<16	>60	Non-suitable
6	Mixed Hardwoods	>16	>60	Foraging
7	Mixed Conifers/Hardwoods	<16	<40	Non-Suitable
8	Mixed Conifers/Hardwoods	16-24	<40	Non-Suitable
9	Mixed Conifers/Hardwoods	<16	>40	Non-Suitable
10	Mixed Conifers/Hardwoods	> 8	>40	Foraging

¹⁰ As explained earlier in this sub-section, 2007 is the baseline date for NSO distribution. The 40- and 80-year dates begin from the actual implementation date, which is projected to be 2012.¹¹ While mathematically, South Coast should decrease from 10 to 4 Level-1 spotted owl territories ($0.16 \times 28 = 4.48$) MRC biologists added an additional Level-1 territory to correct for rounding error. This allows for an integer sum (28).¹² While mathematically, the Ukiah block should increase from 0 to 1 Level-2 spotted owl territories ($0.01 \times 67 = 0.6$), MRC biologists instead allowed for 0 Level-2 territories to correct for rounding error.

Structure Classes for Categorizing NSO Habitat				
Structure Class	Tree Type	Dominant Size Class (in.)	% Minimum Canopy	NSO Habitat Type
11	Mixed Conifers/Hardwoods	<8	>60	Non- Suitable
12	Mixed Conifers/Hardwoods	16-24	>60	Foraging
13	Conifer	<8	<40	Non-Suitable
14	Conifer	16-24	<40	Non-Suitable
15	Conifer	24-32	<40	Non-Suitable
16	Conifer	>32	<40	Non-Suitable
17	Conifer	<16	>40	Foraging
18	Conifer	16-24	>40	Foraging
19	Conifer	24-32	>40	Foraging
20	Conifer	>32	>40	Foraging
21	Conifer	<16	>60	Foraging
22	Conifer	16-24	>60	Nesting/Roosting
23	Conifer	24-32	>60	Nesting/Roosting
24	Conifer	>32	>60	Nesting/Roosting

Table 10-9 Stand Typing

Stand Typing				
Structure Class	Tree Type	Dominant Size Class (in.)	% Minimum Canopy	NSO Habitat Type
22, 23, 24	Conifer	> 16	> 60	Nesting/roosting
20,18, 19	Conifer	> 16	40-60	Foraging
14, 15, 16	Conifer	> 16	< 40	Non-suitable
6	Mixed Hardwood	> 16	> 60	Foraging
4	Mixed Hardwood	> 16	40-60	Foraging
2	Mixed Hardwood	> 16	< 40	Non-suitable
12	Mixed Conifer/Hardwood	> 16	> 60	Foraging
8	Mixed Conifer/Hardwood	> 16	< 40	Non-suitable
21	Conifer	8-16	> 60	Foraging
17	Conifer	8-16	40-60	Foraging
13	Conifer	8-16	< 40	Non-suitable
5	Mixed Hardwood	8-16	> 60	Non-suitable
3	Mixed Hardwood	8-16	40-60	Non-suitable
3	Mixed Hardwood	8-16	< 40	Non-suitable
9	Mixed Conifer/Hardwood	8-16	> 60	Non-suitable
9	Mixed Conifer/Hardwood	8-16	40-60	Non-suitable
7	Mixed Conifer/Hardwood	8-16	< 40	Non-suitable
13	Conifer	< 8	> 60	Non-suitable
13	Conifer	< 8	40-60	Non-suitable
13	Conifer	< 8	< 40	Non-suitable

Stand Typing				
Structure Class	Tree Type	Dominant Size Class (in.)	% Minimum Canopy	NSO Habitat Type
3	Mixed Hardwood	< 8	> 60	Non-suitable
3	Mixed Hardwood	< 8	40-60	Non-suitable
1	Mixed Hardwood	< 8	< 40	Non-suitable
9	Mixed Conifer/Hardwood	< 8	40-60	Non-suitable
9	Mixed Conifer/Hardwood	< 8	40-60	Non-suitable
7	Mixed Conifer/Hardwood	< 8	< 40	Non-suitable

10.3.1.2.5 Contingencies

A key part of our HCP/NCCP process is not simply setting goals and objectives but designing contingency plans if those goals and objectives are not met.¹³

A **contingency** is an alternate plan for an unexpected event.

DEFINITION

A **contingency trigger** is the numeric threshold that initiates implementation of an alternate plan.

Contingencies for population and distribution objectives

MRC may or may not achieve our population objectives for northern spotted owls. Failure to achieve our objectives may be the result of management practices or it may be completely out of our control, e.g., the spotted owl population may decline as the result of climate changes, viruses similar to West Nile, or expansion of barred owl populations. Through monitoring and consultation with the wildlife agencies, MRC will attempt to isolate the causes of any decline in the spotted owl population. Finding actual causes can be a long and elusive process. In the interim, we have developed contingency strategies for declines in Level-1 and Level-2 owl territories—those that are the most productive and receive the highest protections.

In designing the contingency strategies, MRC has balanced the requirement to maintain a specific number of spotted owls across our forests against the effort to grow more owl habitat and distribute spotted owls across our inventory blocks. The intent of our conservation and contingency measures is an increased owl population that is biologically more secure to threats of natural disaster and environmental change as they disperse across our forests. Our assumption is that if we grow more owl habitat in inventory blocks that are deficient in spotted owls, spotted owls will disperse and build new territories in these deficient blocks. If our assumption proves incorrect, we will put contingency strategies into play.

The population contingencies fall into distinct time periods, as Figure 10-5 illustrates. In addition, our contingency strategies reflect a *cascade* approach, with both ongoing continuity and adjustments as environmental and biological factors change and as the endpoint for our

¹³ Like the goals, objectives, and conservation measures, we have given the contingencies a code: Y§10.3.1.2.5-n. The letter “Y” suggests a divergence of a path in 2 directions and the need to make a decision.

HCP/NCCP draws closer. Initially, we focus on a population objective—maintaining the same number of Level-1 and Level-2 owls that were present in MRC forests at the start of our HCP/NCCP. We do not expect, at this early stage, for there to be much movement among the owl population. As 20 years pass, though, we turn our attention to the distribution of the owl population. In the intervening decades, we do expect to see the establishment of new owl territories in deficient inventory blocks where habitat has had time to grow and mature. In the final 20 years, we focus on a new population objective as owls re-distribute across our forests and the number of Level-1 and Level-2 owl territories increase by our projections.

A key element in project management, particularly one as complex as our HCP/NCCP, is to create milestones or checkpoints to track progress toward a goal. We need to know before a deadline whether efforts are veering off course or are right on target. Earlier, MRC specified population and distribution objectives for northern spotted owls (O§10.3.1.2-1 through O§10.3.1.2-4). With milestones established in the contingency strategies, we begin tracking our progress toward these objectives through annual owl survey reports—right at the start of HCP/NCCP implementation. We do not wait until 40 or 75 years have elapsed to see if we are meeting these objectives. At these milestones, we implement specific measures if contingency conditions arise. If the number of Level-1 and Level-2 owl territories falls 20% or more below Population Objective 1 (O§10.3.1.2-1) in years 2012-2071 or Population Objective 2 (O§10.3.1.2-2) in years 2072-2092, this constitutes a contingency and triggers a corrective response.

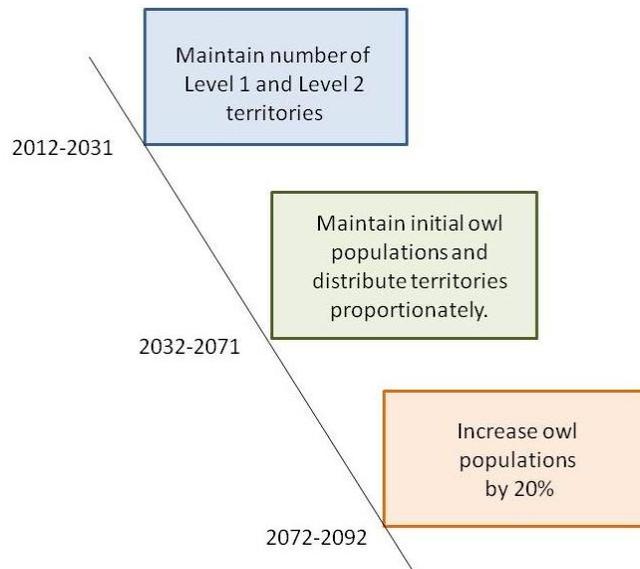


Figure 10-5 Contingency Timelines

MRC purposely chose a 20% variance as the population contingency. From owl surveys on our land, we know that owl productivity (i.e., the number of owl fledglings per year) has varied by more than 20% even with moderate protection roughly equivalent to 2007 *take-avoidance* standards. We do not know the reason for these historical variances. By agreeing to set aside, grow, and protect habitat on a continuous and consistent basis and by implementing measures to limit owl disturbances, MRC is doing all that we realistically and economically can to ensure the survival of the spotted owl on our land. Throughout the term of our HCP/NCCP, our goal is to meet or exceed the specified population objectives. At any one point in time, however, we may find ourselves ahead or behind our projections. As shortfalls occur, we anticipate that natural

correction will eventually occur as well. The contingency strategies indicate when those shortfalls exceed the acceptable variance and mandate a change in the standard measures.

Later in this sub-section, we provide the step-by-step procedures for responding to each contingency. Many of these procedural steps are repetitious; as we said, the cascade approach implies continuity. However, as a brief introduction, we highlight some of the basic distinctions in the contingency strategies.

YEARS 2012-2092

CONTINGENCY: Y§10.3.1.2.5-1

MRC will determine whether or not we meet each objective for northern spotted owls. If a territory falls below its assigned productivity level, for example, MRC will designate another territory which is producing the minimum number of fledglings for that productivity level. In the case of a Level-1 territory for which no replacement is available, we may combine 2 or more Level-2 territories to replace it. These territories must produce in sum the minimum number of fledglings for the productivity level of the replaced territory. MRC will afford each territory its designated protection level. When MRC combines 2 or more territories for this purpose, we will count them as a single territory for assessing whether we must implement the contingencies described below for population, distribution, and habitat objectives.

YEARS 2012-2031

CONTINGENCY: Y§10.3.1.2.5-2

In the first 20 years of our HCP/NCCP, MRC will determine if either Level-1 or Level-2 owl territories fall 20% below the initial contingency trigger, or 20% below *Population Objective 1* (O§10.3.1.2-1). Within deficient inventory blocks (see Table 10-7), MRC will initially provide high protection to all Level-1 territories and moderate protection to all Level-2 and Level-3 territories. In doing so, we expect owl population numbers to rebound.

YEARS 2032-2071

CONTINGENCY: Y§10.3.1.2.5-3

During the middle 40-years of our HCP/NCCP, our concern shifts to distribution of those owl territories and growth of required habitat to support that distribution. In this time period, the contingency event remains essentially the same—a 20% drop in owl territories below *Population Objective 1* (O§10.3.1.2-1). However, our response to declines in owl territories is different than in the preceding 20 years. MRC will only increase protections for owl territories in inventory blocks that have not met (a) *Distribution Objective 1* (O§10.3.1.2-3) or (b) the *2007 Baseline Distribution and 40-Year Habitat Requirement* (see Table 10-7 and Table 10-10). The reason for this difference in response is subtle. This contingency period overlaps the last 20 years of the first 40-year period and the first 20-years of the last 40-year period of our HCP/NCCP. In this pivotal time period, instead of assuming that declines in owl population automatically require a response of heightened protection, MRC will consider the number of owl territories and the acreage of owl habitat in each inventory block. Because MRC is seeking a more proportionate distribution of owl territories across our land, we expect some of the inventory blocks to show a decrease in owl population during the first 40 years of our HCP/NCCP.

YEARS 2072-2092

CONTINGENCY: Y§10.3.1.2.5-4

During the last 20 years of our HCP/NCCP, MRC will continue a similar course; however, in each inventory block, MRC must now meet either (a) *Distribution Objective 2* (O§10.3.1.2-4) or (b) the *2007 Baseline Distribution and 75-Year Habitat Requirement* (see Table 10-7 and Table 10-10) As a result of our efforts to grow and protect owl habitat and to encourage owl dispersal for more proportionate distribution across the plan area, we project that by end of our HCP/NCCP term the number of Level-1 and Level-2 owl territories will increase by 20% over *Population Objective 1* (O§10.3.1.2-1).

In effect, contingency strategies provide protection equivalent to 2007 *take-avoidance* standards until the causes of decline can be determined and, if possible, corrected. If the declines cannot be corrected, *moderate* protection will extend to the end of our HCP/NCCP term. The contingency strategies also force MRC to backtrack and evaluate current population and habitat conditions against baseline conditions and targeted objectives to see when and where breakdowns began to occur. This information may help us to determine direct causes for owl population declines and propose effective responses. If contingencies occur, MRC will meet with the wildlife agencies to determine cause of declines and appropriate responses. We will include all declines and responses in our annual monitoring report.

TIME PERIOD: 2012-2092

CONTINGENCY: Y§10.3.1.2.5-1

CONTINGENCY TRIGGER

A territory designated Level-1 falls to a lower productivity level.

INTENT OF CONTINGENCY MEASURE

Ensure that MRC maintains the spotted owl population objectives for the entire term of our HCP/NCCP.

CROSS REFERENCES

Territory = northern spotted owl territory

STRATEGIC RESPONSE 1

1. Replace a Level-1 territory with another Level-1 territory.
2. In the event that a replacement Level-1 territory is not available, MRC can combine 2 or more territories that produce, in combination, at least as many fledglings as the minimum number of fledglings for a Level-1 territory; these will receive high protection.

EXAMPLE

A Level-1 territory called MD095 produces an average of 1.2 fledglings over a 10-year period. After a drop in productivity, this Level-1 territory becomes a Level-2 territory. We now have to replace MD095 with another territory producing >0.8 fledglings (the minimum number for a Level-1 territory), or combine 2 or more territories producing, in combination, >0.8 fledglings. The combined territories then receive high protection.

TIME PERIOD: 2012-2031

CONTINGENCY: Y§10.3.1.2.5-2

INITIAL CONTINGENCY TRIGGER

For 2 consecutive years, the total number of Level-1 or Level-2 owl territories falls 20% below *Population Objective 1* (O§10.3.1.2-1), i.e. there are less than **22** Level-1 or 54 Level-2 territories.

INTENT OF CONTINGENCY MEASURE

Maintain *Population Objective 1* (O§10.3.1.2-1) across MRC forests and *2007 Baseline Distribution* within individual inventory blocks.

CROSS REFERENCES

2007 Baseline Distribution (see Table 10-7)

Population Objective 1 (O§10.3.1.2-1) = 28 Level-1 and 67 Level-2 territories.

Distribution Objective 1 (O§10.3.1.2-3)—Table 10-7

STRATEGIC RESPONSE 2

1. MRC will determine which inventory blocks are not meeting their *2007 Baseline Distribution*, even if that decrease is only 1 territory.
2. Within deficient inventory blocks, MRC will provide all Level-1 territories with high protection and all Level-2 and Level-3 territories with moderate protection. We will re-check territory numbers each year and continue these contingency protections until deficient inventory blocks rebound to their *2007 Baseline Distribution* for 2 consecutive years. If necessary, MRC will maintain protections until the next contingency time period begins.
3. If after 5 years the deficient inventory blocks are still below their *2007 Baseline Distribution*, MRC will “isolate” these inventory blocks from the rest of covered lands. MRC will subtract the number of Level-1 and Level-2 territories represented by these isolated inventory blocks in the *2007 Baseline Distribution* from the total number of Level-1 and Level-2 territories in *Population Objective 1*. This will be the *Adjusted Population Baseline*. Following is an example of such an adjustment.

NOTE

MRC initially establishes an objective of 28 Level-1 territories and 67 Level-2 territories. In 2015, the Albion inventory block experiences a decrease of 2 Level-1 territories; Navarro West inventory block, a decrease of 5 Level-1 territories. In 2020, 5 years after the first sign of a decline, the number of territories in Albion and Navarro West has still not rebounded to their *2007 Baseline Distribution*. To determine if future declines trigger contingency measures, MRC subtracts the baseline numbers for Level-1 territories in the Albion and Navarro West (4+11) from *Population Objective 1* (28) to get 13. A 20% decline from 13 is 10—the new *contingency trigger* for Level-1 territories. We also subtract the baseline numbers for Level-2 territories in the Albion and Navarro West (6 + 7) from *Population Objective 1* (67) to get 54. A 20% decline from 54 is 43 — the new *contingency trigger* for Level-2 territories. In this example, starting in 2020, the *contingency trigger* would then be to maintain 13 Level-1 territories and 43 Level-2 territories—outside the deficient inventory blocks.

4. MRC will manage the deficient inventory blocks separately from the rest of covered lands. This separate management policy will return the deficient inventory blocks essentially to moderate protection roughly equivalent to *2007 take avoidance* standards. However, if there is evidence, after 5 years, that some owls in a deficient inventory block have

benefited from the increased protection, MRC will maintain high and moderate protections originally prescribed for the owl territories in that inventory block. MRC will consult with the wildlife agencies about the validity of the evidence before taking this action. Otherwise, MRC will immediately provide moderate protection to all owl territories in the deficient inventory blocks, regardless of their productivity level. We will continue this moderate protection until the deficient inventory blocks meet their *2007 Baseline Distribution* or the strategic response for years 2032-2071 takes effect. If necessary, MRC will maintain protections until the next contingency time period begins. Contingency trigger calculations after deficient inventory blocks rebound are as follows:

- a. If a deficient inventory block rebounds to its *2007 Baseline Distribution*, MRC will add the number of Level-1 and Level-2 territories represented by these isolated inventory blocks in the *2007 Baseline Distribution* to the Adjusted Population Baseline. MRC will use this Adjusted Population Baseline in calculating subsequent contingency triggers.
- a. If all the deficient inventory blocks rebound, MRC will return to the initial contingency trigger. In the above example, if Albion and Navarro West rebounded to their *2007 Baseline Distribution*, the *contingency trigger* would return to 22 Level-1 territories and 54 Level-2 territories, rather than 10 and 43 respectively.

Example Data		
	Level-1 Territories	Level-2 Territories
<i>Population Objective 1</i>	28	67
Albion	4	6
Navarro West	11	7
<hr/>		
Year 2015		
Albion	1	6
Navarro West	3	9
<hr/>		
Year 2020	No change	No change
<hr/>		
Adjusted Population Baseline	$28 - (4 + 11) = 13$	$67 - (6+7) = 54$
Contingency Calculation	$20\% \text{ of } 13 = 2.6$ $13 - 3 = 10$	$20\% \text{ of } 54 = 10.8$ $54 - 11 = 43$
Adjusted Population Objective for Year 2020	13	43

TIME PERIOD: 2032-2071

CONTINGENCY: Y§10.3.1.2.5-3

INITIAL CONTINGENCY TRIGGER

For 2 consecutive years, the total number of Level-1 or Level-2 territories falls 20% below *Population Objective 1* (O§10.3.1.2-1), i.e. there are less than 22 Level-1 or 54 Level-2 territories.

INTENT OF CONTINGENCY MEASURE

Maintain *Population Objective 1* (O§10.3.1.2-1) across MRC forests and *Distribution Objective 1* within individual inventory blocks.

CROSS REFERENCES

2007 Baseline Distribution (see Table 10-7)

Population Objective 1 (O§10.3.1.2-1) = 28 Level-1 and 67 Level-2s

Distribution Objective 1 (O§10.3.1.2-3)—see Table 10-7

Habitat objective 1 (O§10.3.1.2-5)—see Table 10-10.

STRATEGIC RESPONSE 3

1. MRC will determine which inventory blocks are not meeting either (a) their *Distribution Objective 1* or (b) their *2007 Baseline Distribution* and *Habitat Objective 1*.
2. Within deficient inventory blocks, MRC will immediately provide all Level-1 territories with high protection and all Level-2 territories with moderate protection. In addition, we will extend moderate protection to all Level-3 territories. We will re-check territory numbers each year and continue these contingency protections until deficient inventory blocks meet (a) *Distribution Objective 1*; or (b) their *2007 Baseline Distribution* and *Habitat Objective 1*, or (c) 5 years elapse.
3. If after 5 years, the deficient inventory blocks are still not meeting (a) their *Distribution Objective 1* or (b) their *2007 Baseline Distribution* and *Habitat Objective 1*, MRC will “isolate” these inventory blocks from the rest of covered lands. MRC will subtract the number of Level-1 and Level-2 territories represented by these isolated inventory blocks in *Distribution Objective 1* from the total number of Level-1 and Level-2 territories in *Population Objective 1*. This will be the *Adjusted Population Baseline*.
4. MRC will manage the deficient inventory blocks separately from the rest of covered lands. MRC will extend moderate protection to all owl territories in the deficient inventory blocks, regardless of their productivity level. We will continue this moderate protection until the deficient inventory blocks meet (a) *Distribution Objective 1*; or (b) their *2007 Baseline Distribution* and *Habitat Objective 1*; or (c) the strategic response for years 2072-2092 takes effect. However, if there is evidence, after 5 years, that some owls in a deficient inventory block have benefited from the increased protection, MRC will maintain high and moderate protections originally prescribed for the owl territories in that inventory block. MRC will consult with the wildlife agencies about the validity of the evidence before taking this action.
5. Contingency trigger calculations after deficient inventory blocks rebound are as follows:
 - If a deficient inventory block rebounds to its *Distribution Objective 1*, MRC will add the number of Level-1 and Level-2 territories represented by these isolated inventory blocks in *Distribution Objective 1* to the Adjusted Population Baseline. MRC will use this *Adjusted Population Baseline* in calculating subsequent contingency triggers.
 - If a deficient inventory block rebounds to its *2007 Baseline Distribution* and its *Habitat Objective 1*, MRC will add the number of Level-1 and Level-2 territories represented by these isolated inventory blocks in the *2007 Baseline Distribution* to the Adjusted Population Baseline. MRC will use this Adjusted Population Baseline in calculating subsequent contingency triggers.
 - If all the deficient inventory blocks rebound, we will return to the initial contingency trigger of 22 Level-1 or 54 Level-2 territories.

TIME PERIOD: 2072-2092

CONTINGENCY: Y§10.3.1.2.5-4

INITIAL CONTINGENCY TRIGGER

For 2 consecutive years, the total number of Level-1 or Level-2 territories falls 20% below *Population Objective 2* (O§10.3.1.2-2), i.e., there are less than 27 Level-1 or 64 Level-2 territories.

INTENT OF CONTINGENCY MEASURE

Achieve and maintain *Population Objective 2* (O§10.3.1.2-2) and *Distribution Objective 2* (O§10.3.1.2-4).

CROSS REFERENCES

2007 Baseline Distribution (see Table 10-7)

Population Objective 2 (O§10.3.1.2-2) = 34 Level-1 and 80 Level-2 territories

Distribution Objective 1 (O§10.3.1.2-3)—see Table 10-7

Habitat objective 1 (O§10.3.1.2-5)—see Table 10-10.

STRATEGIC RESPONSE 4

1. MRC will determine which inventory blocks are not meeting either (a) their *Distribution Objective 2* or (b) their *2007 Baseline Distribution* and *Habitat Objective 2*.
2. Within deficient inventory blocks, MRC will immediately provide all Level-1 territories with high protection and all Level-2 territories with moderate protection. In addition, we will extend moderate protection to all Level-3 territories. We will re-check territory numbers each year and continue these contingency protections until deficient inventory blocks meet (a) *Distribution Objective 2*; or (b) their *2007 Baseline Distribution* and *Habitat Objective 2*; or (c) 5 years elapse; or (d) the term of our HCP/NCCP ends.
3. If after 5 years, the deficient inventory blocks are still not meeting (a) their *Distribution Objective 2* or (b) their *2007 Baseline Distribution* and *Habitat Objective 2*, MRC will “isolate” these inventory blocks from the rest of covered lands. In subsequent calculations to determine whether Level-1 or Level-2 territories fall 20% below *Population Objective 2*, MRC will exclude the number of territories in these isolated inventory blocks. If additional inventory blocks experience decreases, we will follow the same procedure.
4. MRC will manage the deficient inventory blocks separately from the rest of covered lands. This separate management policy will return the deficient inventory blocks essentially to *2007 take avoidance* standards. MRC will extend moderate protection to all owl territories in the deficient inventory blocks, regardless of their productivity level. We will continue this moderate protection until the deficient inventory blocks meet (a) *Distribution Objective 2*; or (b) their *2007 Baseline Distribution* and *Habitat Objective 2*; or (c) the term of our HCP/NCCP ends. However, if there is evidence, after 5 years, that some owls in a deficient inventory block have benefited from the increased protection, MRC will maintain high and moderate protections originally prescribed for the owl territories in that inventory block. MRC will consult with the wildlife agencies about the validity of the evidence before taking this action.
5. Contingency trigger calculations after deficient inventory blocks rebound are as follows:
 - If a deficient inventory block rebounds to its *Distribution Objective 2*, MRC will add the number of Level-1 and Level-2 territories represented by these isolated inventory blocks in *Distribution Objective 2* to the Adjusted

TIME PERIOD: 2072-2092

Population Baseline. MRC will use this Adjusted Population Baseline in calculating subsequent contingency triggers.

- If a deficient inventory block rebounds to its *2007 Baseline Distribution* and its *Habitat Objective 2*, MRC will add the number of Level-1 and Level-2 territories in the *2007 Baseline Distribution* to the *Adjusted Population Baseline* in calculating subsequent contingency triggers.
- If all the deficient inventory blocks rebound, we will return to the initial contingency trigger of 28 Level-1 or 66 Level-2 territories.

Contingencies for habitat objectives

CONTINGENCY: Y§10.3.1.2.5-5

Table 10-10 shows the required acreage of nesting/roosting habitat to meet *Habitat Objectives 1* (O§10.3.1.2-5) and *Habitat Objective 2* (O§10.3.1.2-6). This requirement is in the contingencies for *Population Objective 2* (O§10.3.1.2-2) and *Distribution Objective 2* (O§10.3.1.2-4). In defining the habitat objectives, MRC projected an increase in nesting/roosting habitat throughout the term of our HCP/NCCP. Recent research indicates the need for a mix of suitable and unsuitable habitat within each owl territory (Franklin et al. 2000). MRC projects that, 40 years after initiation of our HCP/NCCP, nesting/roosting habitat will comprise 23% of all potential habitat; 75 years after initiation, nesting/roosting will comprise 25% of all potential habitat as well as 25% of each inventory block. Several inventory blocks, of course, will likely have even more nesting/roosting habitat than this 25% minimum requirement.

Table 10-10 Potential, Actual, and Projected Spotted Owl Habitat in the Plan Area

Inventory Block	HCP/NCCP Implementation					
	2012	2012	2012	2012	+ 40 Years	+ 75 Years
	Plan Area (ac)	Potential Nesting Roosting (ac)	% of Potential Nesting Roosting	Actual Nesting/Roosting (ac)	Habitat Objective 1 Nesting/Roosting (ac)	Habitat Objective 2 Nesting/Roosting (ac)
Albion	14,797	14,526	7%	6604	5116	3629 ¹⁴
Big River	33,480	33,058	16%	3852	6059	8265
Garcia	14,906	14,434	7%	2535	3072	3609
Navarro E.	30,863	30,508	15%	2367	4997	7627
Navarro W.	23,549	23,120	11%	7951	6866	5780
Noyo	19,350	19,318	9%	2156	3493	4830
Rockport	38,427	38,272	18%	7579	8574	9568
South Coast	34,281	33,446	16%	11094	9728	8362
Ukiah	3,591	2,466	1%	0	309	617
TOTAL	213,244	209,148	100%	44,137	48,214¹⁵	52,287

¹⁴ In order to correct for rounding error, the amount of nesting/roosting habitat shown in Table 10-10 for the Albion tract is slightly higher than 25% at year 75.

¹⁵ This tabulated number is slightly greater than the 23% total nesting/roosting required by year 40 (i.e. $0.23 * 209,148 = 48,104$ ac); however, this will be the actual acreage MRC will use to determine if we are meeting our overall habitat objective. Using the larger number should ensure that we meet our long-term habitat objective.

To meet this final objective, MRC recognizes that some inventory blocks must produce a large amount of nesting/roosting habitat, while other inventory blocks already have more than the required amount. In order to re-distribute the owls more evenly across covered lands, we will increase nesting/roosting in inventory blocks deficient in such habitat. The amount of habitat in inventory blocks with a current surplus of nesting/roosting habitat may decline by Year 40 of our HCP/NCCP. In each case, we will manage the increases and decreases incrementally. For example, in the Navarro East inventory block, there are 2367 ac of nesting/roosting habitat at the start of HCP/NCCP implementation. Our habitat objectives require that this block will increase to 7627 ac of nesting/roosting by the end of our HCP/NCCP term. In order to manage habitat growth in Navarro East, MRC subtracts 2367 ac from 7627 ac to get 5260 ac—the required amount of new nesting/roosting acreage. Half of 5260 ac is 2630 ac of nesting/roosting habitat. In 40 years, therefore, our objective for the Navarro East is 4997 ac of nesting/roosting habitat (2367 + 2630 = 4997); in 75 years, 7627ac (4997 +2630).

Contingencies for barred owls

CONTINGENCY: Y§10.3.1.2.5-6

Barred owls are dispersing into northern California and forcing spotted owls from their territories. In fact, we indicated in section 5.2.6.3 that the number of barred owl territories MRC biologists have detected within 1 km of spotted owl territories has increased steadily from 2005-2010, namely, 1 in 2005, 4 in 2006, 6 in 2007, and 9 in 2008, 4 in 2009, 22 in 2010. Whether these barred owls will displace the spotted owls from their territories is uncertain, but likely. To date, there are no recommended practices for discouraging barred owls from invading spotted owl territories. If effective non-lethal techniques become available, MRC will implement them, whenever feasible. Otherwise, when MRC biologists locate a barred owl in a spotted owl territory, we will apply the following contingencies:

1. MRC will seek information from the wildlife agencies on (a) whether control or removal is the best option when a barred owl invades a spotted owl territory and (b) the approved method for control or removal.
2. MRC will obtain authorization from the wildlife agencies before initiating any effort to control or remove barred owls (M§13.9.1.4-7) and undertake agency-approved measures as soon as practicable.
3. MRC, upon recognizing the arrival of a barred owl in a spotted owl territory, will freeze both the productivity and protection levels of that territory until (a) the barred owl abandons or is removed from the territory or (b) a spotted owl replaces the barred owl or (c) 3 years elapse.
4. MRC will re-initiate a spotted owl productivity assessment, skipping over the years in which a barred owl occupied a spotted owl territory and commencing with the barred owl's abandonment of or removal from the territory.
5. MRC will conclude that we have done all we can to manage barred owls, if the wildlife agencies concur with us that any of these conditions pertain: (a) effective non-lethal measures are not available; (b) the wildlife agencies do not authorize measures for control; or (c) implementation of control measures is not effective.

6. MRC will, subsequent to the conditions in #5 and with the approval of the wildlife agencies, designate the Level-1 and Level-2 territories occupied by barred owls as Northern Spotted Owl Recovery Territories (NSORT).
7. MRC will
 - Retain the core area with the most nesting/roosting habitat within each recovery territory (Figure 10-6, Core Area B).
 - Retain the core area with the most foraging habitat, if there is no nesting/roosting habitat or develop habitat in the core area at the direction of the wildlife agencies.

NOTE

To develop habitat, MRC might, for example, reduce the density of trees to provide more openings, thin trees to provide more flyways, or thin from below to accelerate the growth of nesting/roosting habitat.

- Maintain at least 500 ac of suitable habitat within 0.7 miles of the initial activity center (IAC) of the retained core area (Figure 10-6, Core Area B) or maintain the existing suitable habitat if it is already less than 500 ac.
- Include all NSORT, regardless of their productivity level, in calculations to determine whether we meet the population and distribution objectives for northern spotted owls.

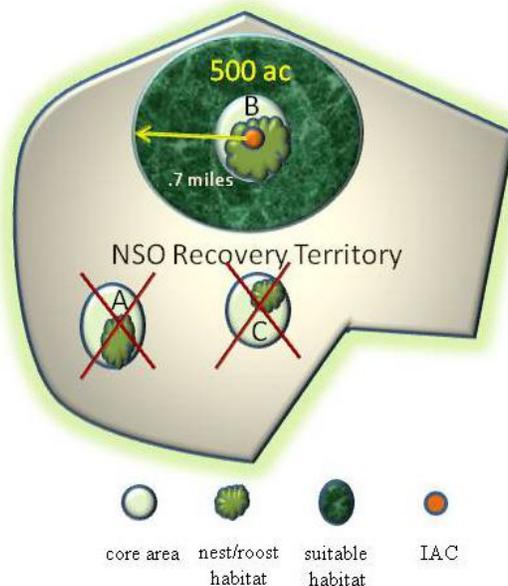


Figure 10-6 Retaining Core Area and Suitable Habitat in NSO Recovery Territory

10.3.1.3 Conservation measures

10.3.1.3.1 Conservation measures by protection level

MRC stratifies protections based on habitat and season (breeding and non-breeding). For operational purposes and by agreement between MRC and the wildlife agencies, the breeding season for northern spotted owls is February 1–August 31. Conservation measures for breeding season do not apply under the following conditions:

- Northern spotted owls in the territory are either absent or not nesting.
- Northern spotted owls in the territory have completed their nesting attempt but failed to produce a fledgling.

- Fledgling(s) in moderate or high protection areas have been out of their nest for at least 2 weeks and are capable of independent sustained flight.
- Fledgling(s) in limited protection areas are capable of independent sustained flight.
- Operations proposing “disturbance only”¹⁶ within 1000 ft of spotted owl activity centers with moderate protections are after July 30th.



During emergencies, a vehicle can stop at any location in the plan area.

Territories with high protection

 Conservation Measures for NSO Territories with High Protection	
Habitat	
C§10.3.1.3.1-1	Provide, on covered lands, a core area of at least 80 contiguous ac (32 ha) which is 500 ft (153 m) from the initial activity center and off-limits to harvest.
C§10.3.1.3.1-2	Adhere to MRC guidelines for selecting a core area in the order of priority given below: <ol style="list-style-type: none"> 1. Create a circular buffer around the initial activity center with a 500-ft radius. 2. Select 80 ac of contiguous nesting/roosting habitat, if available. 3. Supplement any deficiencies in the desired 80 ac with the next-best contiguous habitat. 4. Locate the habitat on same side of a topographic divide, such as a ridge, if possible.
C§10.3.1.3.1-3	Protect core areas that are within both covered lands and state parks in proportion to the amount of core area acreage on covered lands. EXAMPLE A core area adjoins both the plan area and Navarro River Redwoods State Park, such that 60 ac are in the plan area and 20 ac on park land. MRC will protect the 60 ac of the core area that are in the plan area.
C§10.3.1.3.1-4	Retain suitable habitat (a) within 1000 ft of the initial activity center and (b) within the extended protection area (i.e., 267 ft beyond the periphery of the core area) and ensure that any harvests maintain or increase the pre-harvest mean stand diameter (MSD).
C§10.3.1.3.1-5	Maintain at least 500 ac of suitable habitat within 0.7 miles of the activity center or maintain the existing suitable habitat if, prior to harvest, it is already less than 500 ac. NOTE The forester will ensure that MRC meets the minimum habitat criteria post-harvest. Additionally, the forester will confirm via air photos or past harvest plans that the habitat typing is correct and current. If there is a disagreement about the habitat typing before, during, or after harvest, the forester will meet with the disputant at the stand in question to resolve the concern. If there is still disagreement, the disputing agency will work with MRC to agree upon a sampling intensity and protocol to determine canopy cover and habitat typing of the stand.

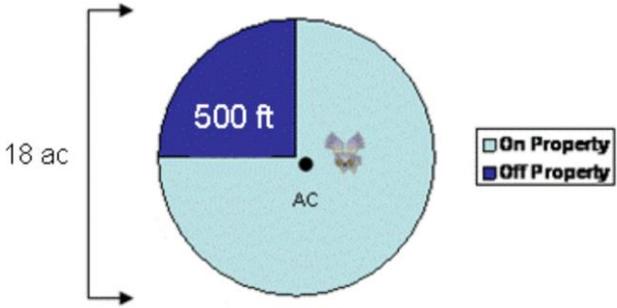
¹⁶ Disturbance for spotted owls includes road work (excluding emergency road maintenance), road construction, blasting, log yarding, log loading, timber felling, hauling, and use of heavy equipment.

 Conservation Measures for NSO Territories with High Protection	
C§10.3.1.3.1-6	Permit fire control lines for prescribed burning within a core area only with approval of the wildlife agencies.
C§10.3.1.3.1-7	<p>Mark and retain all known nest trees of northern spotted owls and protect them, if possible, with 4 screen trees.</p> <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> <p>DEFINITION A screen tree creates a barrier of protection (e.g., from wind) for an adjacent tree and for wildlife that might be occupying it. It must have intermingling limbs above or equal to the height of the canopy of the tree to be screened. Its tree tops must be at least half the height of the tree to be screened.</p> </div> <p>NOTE Conservation measures C§10.3.1.3.1-7 through C§10.3.1.3.1-9 still apply when a spotted owl has abandoned its core area and moved into another core area.</p>
C§10.3.1.3.1-8	<p>Follow this procedure if a tree to be screened does not have at least 4 screen trees:</p> <ul style="list-style-type: none"> ▪ Use 2 times the canopy spread as the distance within which to assess and retain potential screen trees. ▪ Select, as the screen tree, the tallest tree in the assessment quadrant which is, at minimum, ½ the height of the tree to be screened. <p>NOTE If no trees meet this criterion, do not retain additional trees.</p> <div style="text-align: center; margin: 10px 0;">  </div> <ul style="list-style-type: none"> ▪ Select screen trees in open non-screened quadrants, if possible.
C§10.3.1.3.1-9	Permit harvesting of a screen tree only if (a) there are at least 6 screen trees; (b) felling will not damage the tree to be screened; and (c) removing the harvested tree will not damage the tree to be screened.
C§10.3.1.3.1-10	Restrict construction of new roads to locations outside of the core area.
Breeding Season	

 Conservation Measures for NSO Territories with High Protection	
C§10.3.1.3.1-11	<p>Conduct only the following operations within 1000 ft (305 m) of a current spotted owl activity center:</p> <ul style="list-style-type: none"> ▪ Use of mainline haul roads and maintenance of mainline haul roads as designated in the <i>HCP/NCCP Atlas</i> (MAPS 14A-C). <p>NOTE Maintenance includes actions necessary to use the roads, e.g., knocking down water bars, grading, and watering. Maintenance does not include actions that would be considered reconstruction of roads under the California Forest Practice Rules (CDF 2006, p. 14), such as changing the prism of the road. MRC will retain any trees felled for maintenance in forest adjacent to roads within the core area.</p> <ul style="list-style-type: none"> ▪ Use of public roads. ▪ Use and maintenance of existing MRC roads which are at least the same distance from the current AC as a public road or mainline haul road. ▪ Use of pickups and ATVs on existing roads.
C§10.3.1.3.1-12	Permit helicopter operations, including service landings, only 2640 ft (805 m) or more from a spotted owl activity center, measured and marked according to map distance.
C§10.3.1.3.1-13	Allow a logging vehicle to stop only for safety reasons when within 1000 ft (305 m) of a nest site known to be currently active, unless the vehicle is on a mainline road.
C§10.3.1.3.1-14	Permit prescribed burning within ¼ mile of an occupied activity center only with the approval of the wildlife agencies.
C§10.3.1.3.1-15	Survey for spotted owls when operations could result in disturbance or reduction of suitable habitat (see Appendix K, <i>Northern Spotted Owl Data and Protocol</i> , section K.5.1.8).
Non-breeding Season	
C§10.3.1.3.1-16	Prohibit harvest or forest management within the core area.
C§10.3.1.3.1-17	<p>Conduct only the following operations within the core area:</p> <ul style="list-style-type: none"> ▪ Use and maintenance of existing roads. ▪ Reconstruction of any truck road only if MRC has exhausted all other alternative measures that might result in less impact. ▪ Use of cable corridors and tailholds: <ul style="list-style-type: none"> – Fell only trees that may hang up cable lines. – Leave all trees felled for the cable corridor on the forest floor for woody debris. – Yard logs only outside the core area. – Exclude nest or screen trees from felling. – Fell trees for cable corridors away from nest or roost trees so that no damage can occur to nest trees, screen trees, or roost trees.
C§10.3.1.3.1-18	Permit helicopter operations—including service landings—that are at least 1000 ft (305 m) from an activity center, measured and marked according to map distance.

 Conservation Measures for NSO Territories with High Protection	
C§10.3.1.3.1-19	Survey for spotted owls when operations could result in reduction of suitable habitat (see Appendix K, <i>Northern Spotted Owl Data and Protocol</i> , section K.5.1.8).

Territories with moderate protection

 Conservation Measures for NSO Territories with Moderate Protection	
Habitat	
C§10.3.1.3.1-20	Adhere to MRC guidelines for selecting a core area: <ul style="list-style-type: none"> ▪ Select nesting/roosting habitat over foraging habitat. ▪ Select contiguous habitat over isolated habitat. ▪ Select habitat located proximal to the activity center relative to a topographic divide, such as a ridge.
C§10.3.1.3.1-21	Provide a core area of at least 18 contiguous ac (7 ha) that are <i>no-harvest</i> with a minimum distance of 500 ft (152 m) to the initial activity center.
C§10.3.1.3.1-22	Retain suitable habitat that is within the extended protection area (i.e., 500 ft beyond the periphery of the core area) prior to harvest and ensure that harvested areas maintain or increase pre-harvest mean stand diameter.
C§10.3.1.3.1-23	Mark and retain all known nest trees of northern spotted owls and protect them with screen trees (see C§10.3.1.3.1-7).
C§10.3.1.3.1-24	Permit fire control lines for prescribed burning within a core area only with the approval of the wildlife agencies.
C§10.3.1.3.1-25	Maintain at least 500 ac of suitable habitat within 0.7 miles of the activity center or maintain the existing suitable habitat if, prior to harvest, it is already less than 500 ac.
C§10.3.1.3.1-26	Protect core areas that are both on and off MRC property in proportion to the amount of acreage that is actually on MRC property. <p>EXAMPLE A core area consists of a circle with a 500 ft radius. Within this 18-ac circle, 75% of the land is on covered lands. The rest of the core area is on other property. MRC will protect $0.75 * 18$ or 14 ac.</p> <div style="text-align: center;">  <p>MRC maintains a minimum of 14 ac (75%) of the core area</p> </div>
Breeding Season	

 Conservation Measures for NSO Territories with Moderate Protection	
C§10.3.1.3.1-27	<p>Conduct only the following operations within 1000 ft (305 m) of the current activity center:</p> <ul style="list-style-type: none"> ▪ Use of mainline haul roads and maintenance of mainline haul roads as designated in the <i>HCP/NCCP Atlas</i> (MAPS 14A-C). <p>NOTE Maintenance does not include actions that would be considered reconstruction of roads under the California Forest Practice Rules (CDF 2006, 14), such as substantial change in the prism of the road.</p> <ul style="list-style-type: none"> ▪ Use of public roads. ▪ Use and maintenance of existing MRC roads that (1) are located at least the same distance from the current spotted owl activity center as a public road or mainline haul road; or (2) are existing seasonal roads ≥ 500 ft (152 m) from the current activity center and in use during the time the spotted owl territory has been active. <p>NOTE Maintenance does not include actions that would be considered reconstruction of roads under the California Forest Practice Rules (CDF 2006, 14), such as substantial change in the prism of the road.</p> <ul style="list-style-type: none"> ▪ Use of pickups and ATVs on existing roads. ▪ Use of a road if an owl pair is upgraded from limited to moderate protection and has successfully reproduced while the AC was within 500 ft (152 m) of the road. <p>NOTE The assumption is that the road disturbance has not disrupted the owls since they have already reproduced.</p>
C§10.3.1.3.1-28	<p>Permit helicopter operations—including service landings—that are at least 2640 ft (805 m) from an activity center, measured and marked according to map distance.</p>
C§10.3.1.3.1-29	<p>Permit prescribed burning within $\frac{1}{4}$ mile of an occupied activity center only with the approval of the wildlife agencies.</p>
C§10.3.1.3.1-30	<p>Allow a logging vehicle to stop only for safety reasons when within 1000 ft (305 m) of a nest site known to be currently active, unless the vehicle is on a mainline road.</p>
C§10.3.1.3.1-31	<p>Retain any trees, felled for allowable maintenance, in the forest adjacent to roads within the core area.</p>
C§10.3.1.3.1-32	<p>Survey for spotted owls when operations could result in disturbance or reduction of suitable habitat (see Appendix K, <i>Northern Spotted Owl Data and Protocol</i>, section K.5.1.8).</p>
Non-breeding Season	
C§10.3.1.3.1-33	<p>Prohibit harvest or forest management within the core area.</p>

 Conservation Measures for NSO Territories with Moderate Protection	
C§10.3.1.3.1-34	Conduct only the following operations within the core area: <ul style="list-style-type: none"> ▪ Use of cable corridors and tailholds: <ul style="list-style-type: none"> – Fell only trees that may hang up cable lines. – Yard logs only outside the core area. – Exclude nest or screen trees from felling. – Leave all trees felled for the cable corridor on the forest floor for woody debris. – Fell trees for cable corridors away from nest or roost trees to limit damage to these trees ▪ Use and maintenance of existing roads.
C§10.3.1.3.1-35	Permit helicopter operations—including service landings—that are at least 1000 ft (305 m) from an activity center.
C§10.3.1.3.1-36	Survey for spotted owls when operations could result in reduction of suitable habitat (see Appendix K, <i>Northern Spotted Owl Data and Protocol</i> , section K.5.1.8).
C§10.3.1.3.1-37	Permit construction of new roads inside the core area only if MRC maintains habitat thresholds.

Territories with Limited Protection

 Conservation Measures for NSO Territories with Limited Protection	
Habitat	
C§10.3.1.3.1-38	Mark and retain all known nest trees of northern spotted owls and protect them with screen trees (see C§10.3.1.3.1-7).
Breeding Season	
C§10.3.1.3.1-39	Protect a 500-ft (152-m) no-harvest buffer during the breeding season.
C§10.3.1.3.1-40	Permit helicopter operations—including service landings—that are at least 1320 ft (402 m) from an activity center.
C§10.3.1.3.1-41	Survey for spotted owls when operations could result in disturbance (see Appendix K, <i>Northern Spotted Owl Data and Protocol</i> , sections K.5.1.3 and K.5.1.9.2).

Level-4 Territories

 Conservation Measures for NSO Territories Off Property	
Non-breeding Season	
C§10.3.1.3.1-42	Mark and retain all known nest trees of northern spotted owls and protect them with screen trees.
Habitat	
C§10.3.1.3.1-43	Level 4A Apply C§10.3.1.3.1-20 through C§10.3.1.3.1-37.
C§10.3.1.3.1-44	Level 4B Apply C§10.3.1.3.1-38 through C§10.3.1.3.1-41

 Conservation Measures for NSO Territories Off Property	
Breeding and Non-breeding Seasons	
C§10.3.1.3.1-45	Level 4A Apply C§10.3.1.3.1-20 through C§10.3.1.3.1-37.
C§10.3.1.3.1-46	Level 4 B Apply C§10.3.1.3.1-38 through C§10.3.1.3.1-41

Level-5 Territories

 Conservation Measures for NSO Territories On/Off Property	
Habitat	
C§10.3.1.3.1-47	Apply C§10.3.1.3.1-20 through C§10.3.1.3.1-37.
Breeding Season	
C§10.3.1.3.1-48	Apply C§10.3.1.3.1-20 through C§10.3.1.3.1-37.
Non-breeding Season	
C§10.3.1.3.1-49	Apply C§10.3.1.3.1-20 through C§10.3.1.3.1-37.

10.3.1.3.2 Conservation measures for mobile activity centers

DEFINITION

Mobile activity center refers to the fact that northern spotted owls generally do not use the same nest or roost in the same location in consecutive years; they move from spot to spot.

Activity centers are located within a territory. MRC will assign only 1 activity center to a territory per year, based on nest sites, number of observations, and presence of whitewash or pellets (see Appendix K, *Northern Spotted Owl Data and Protocol*, section K.5.4). We will protect up to 3 core areas established in 3 separate years for each known territory based on its productivity level. In reality, we expect this situation to be rare. In addition, we will protect the core area of each activity center, according to the protocol cited above, unless the activity center is abandoned.¹⁷

 Conservation Measures for Mobile Activity Centers	
Territories with High or Moderate Protection	
C§10.3.1.3.2-1	Ensure that breeding season protections are always given to the most current activity center.

¹⁷ An activity center can be abandoned while a territory remains active. A spotted owl territory covers the entire area that an owl or pair of owls defends during a breeding season.

 Conservation Measures for Mobile Activity Centers	
C§10.3.1.3.2-2	<p>Maintain a nest-site core area through at least 3 breeding seasons (Figure 10-7).</p> <p style="text-align: center;">EXAMPLE</p> <p>Year 0: Spotted owl is in nest, and initial activity center and core area is established.</p> <p>Year 1: Spotted owl is not in the core area, but the core area remains.</p> <p>Year 2: Spotted owl is not in the core area, but the core area remains.</p> <p>Year 3: Spotted owl is not in the core area, so core area is abandoned.</p>
C§10.3.1.3.2-3	<p>Maintain a roost site core area through at least 2 breeding seasons unless in Year 0 a spotted owl is detected 1 time only in the roost site.¹⁸</p> <p style="text-align: center;">EXAMPLE</p> <p>Year 0: Spotted owl is in roost site; initial activity center and core area is established.</p> <p>Year 1: Spotted owl is not in the core area, but the core area remains.</p> <p>Year 2: Spotted owl is not in core area, so core area is abandoned.¹⁹</p>
Territories with Limited Protection	
C§10.3.1.3.2-4	<p>Surround a spotted owl’s most recent activity center with a 500 ft buffer during the breeding season.</p>

Graphical representations

Figure 10-7 through Figure 10-9 graphically represents the application of the conservation measures for mobile activity centers. Figure 10-7 shows that once an owl is spotted in a nest and a core area established, MRC must protect that core area from harvest even if the owl has apparently moved on and is not spotted again in that core area for 3 years. Only at the end of the breeding season in Year 3, with no further owl sightings recorded in the interim, can MRC harvest the designated core area.

Figure 10-8 and Figure 10-9 depict 2 different scenarios for mobile activity centers. In Scenario 1, an owl moves its activity center 3 times in 3 years but still stays within the original core area. MRC does not designate a new core area based on each new activity center but protects the habitat of the originally designated core area. We do, however, apply disturbance measures to all current activity centers.

In Scenario 2, MRC establishes a core area for an owl activity center. The following year the owl moves outside this core area. MRC establishes a new core area around the new activity center, while simultaneously protecting the original core area. Another year passes and the owl again returns to the original core area. MRC extends protection to both core areas. Only if the owl “abandons” 1 or both of these core areas over the course of 4 breeding seasons (i.e., Year 0 through Year 3), can MRC harvest in the abandoned core area.

¹⁸ To conclude that a spotted owl roosted only 1 time in Year 0, MRC must conduct at least 4 visits (4 daytime walk-ins; or 3 daytime walk-ins and 1 nocturnal survey; or 2 daytime walk-ins and 2 nocturnal surveys) with no detections after the single location. In addition, the following year (Year 1) MRC must conduct at least 4 visits (4 daytime walk-ins; or 3 daytime walk-ins and 1 nocturnal survey; or 2 daytime walk-ins and 2 nocturnal surveys) to conclude the owl has not roosted in the core area again. This means that MRC can consider the core area abandoned after the end of the breeding season in Year 2. All visits must be properly spaced to meet the survey protocol specified in Appendix K, *Northern Spotted Owl Data and Protocol*, section K.5.3.2.2).

¹⁹ If the same spotted owl is nesting outside the core area, MRC considers the owl territory unoccupied for the year.

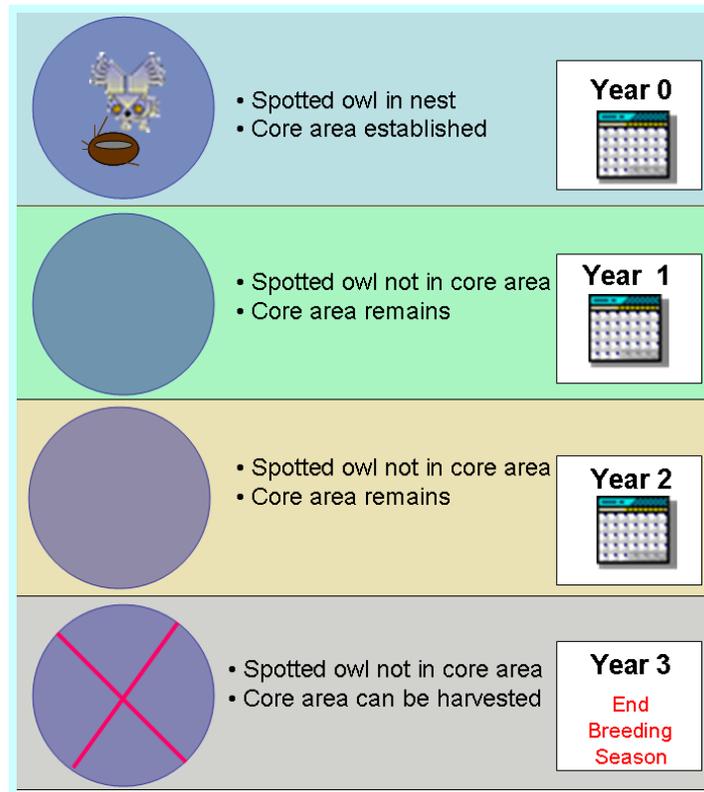


Figure 10-7 Maintaining Nest Site Core Area

Scenario 1
 NSO Mobility within Original Core Area

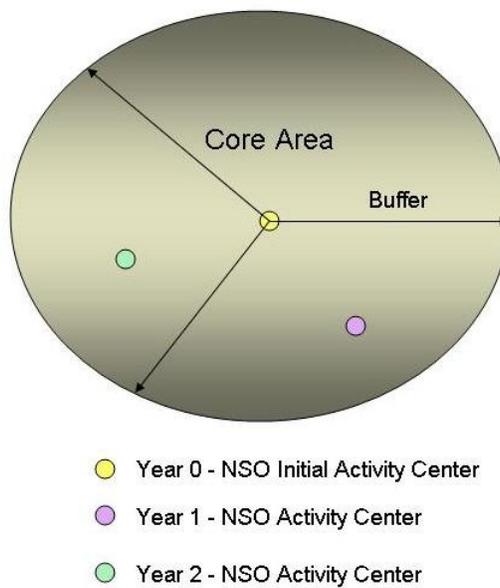


Figure 10-8 Scenario 1 - Mobile Activity Centers

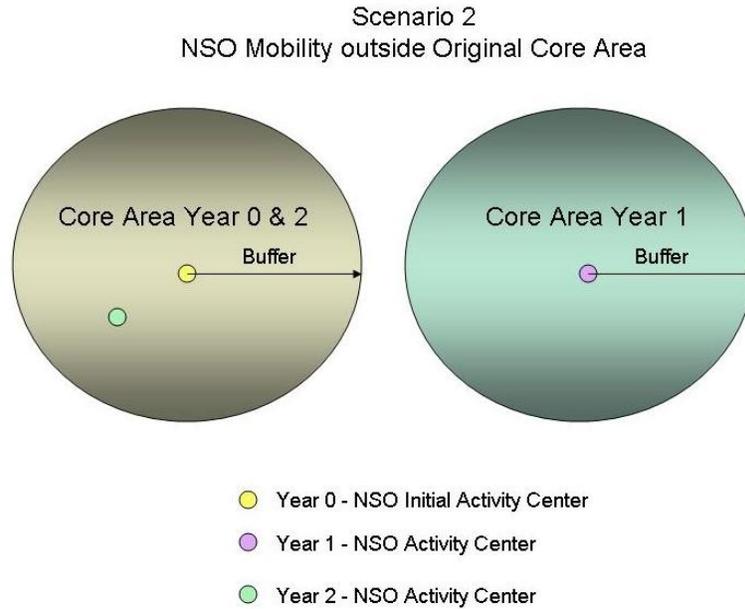


Figure 10-9 Scenario 2 - Mobile Activity Centers

10.3.1.3.3 Recovery strategy for the northern spotted owl

In September 2010, USFWS released its *2010 Draft Revised Recovery Plan for the Northern Spotted Owl*. The plan states that “Currently, the most important range-wide threats to the spotted owl are competition with barred owls, ongoing loss of suitable habitat as a result of timber harvest and uncharacteristic wildfire, and loss of amount and distribution of suitable habitat as a result of past activities and disturbance” (USFWS 2010, 30).

In Table 10-11, each excerpt from the USFWS recovery plan is succeeded by the anticipated MRC action to comply with USFWS recommendations or incorporate them in our HCP/NCCP.

Table 10-11 USFWS Draft Recovery Criteria and MRC Response

Recovery Action 1	Establish an inter-organizational spotted owl implementation team (“Northern Spotted Owl Recovery Implementation Team”) to oversee the implementation of the Recovery Plan.
MRC Action	MRC will provide expertise and information to the spotted owl implementation team as needed.
Recovery Criterion 1	Stable Population Trend: The overall population trend of spotted owls throughout the range is stable or increasing over 10 years, as measured by a statistically reliable monitoring effort.
MRC Action	MRC is providing ongoing monitoring of population trends of spotted owls in our forestlands as part of our validation monitoring efforts (M§13.9.1.4-1)

Recovery Criterion 2	Adequate Population Distribution: Spotted owl subpopulations within each province (i.e., recovery unit, excluding the Willamette Valley Province) achieve viability, as measured by the HexSim population model or some other appropriate quantitative measure.
MRC Action	MRC conservation objectives aim to achieve well-distributed owl populations (O§10.3.1.2-3 and O§10.3.1.2-4).
Recovery Criterion 3	Continued Maintenance and Recruitment of Spotted Owl Habitat: There is no net loss in nesting/roosting or foraging habitat throughout the range, as measured by effectiveness monitoring efforts or other reliable habitat monitoring programs.
MRC Action	MRC conservation objectives should result in well-distributed owl habitat across covered lands (O§10.3.1.2-5 and O§10.3.1.2-6).
Recovery Action 2	Continue annual monitoring of the population trend of spotted owls to determine if the population is decreasing, stationary, or increasing.
MRC Action	MRC will use its various demographic studies to contribute to the evaluation of spotted owl population trends ((M§13.9.1.4-1)
Recovery Action 3	Conduct occupancy inventory or predictive modeling needed to determine if Recovery Criteria 1 and 2 have been met.
MRC Action	MRC will continue to complete occupancy monitoring on our Level-1, Level-2, and strategic Level-3 owls throughout the term of the HCP/NCCP (M§13.9.1.3-1).
Recovery Action 4	Use the habitat modeling process described . . . to identify, and test the efficacy of numerous habitat conservation network scenarios at conserving spotted owl habitat. Use the results from this effort to inform decisions concerning both the possible development of a habitat conservation network and potential revisions to spotted owl critical habitat.
MRC Action	MRC will continue to use our internal habitat typing and provide results of field validation and verification of assessments to the wildlife agencies, as requested.
Recovery Action 5	In west-side forests managed for spotted owl habitat we recommend land managers implement silvicultural techniques in plantations, overstocked naturally regenerated stands and modified younger stands to accelerate the development of structural complexity and biological diversity that will benefit spotted owl recovery.
MRC Action	MRC is not testing habitat development methods for owls, however, we will be testing the efficiency of various silvicultural treatments in accelerating the growth of marbled murrelet habitat (M§13.9.2.2-2).
Recovery Action 10	Manage habitat-capable lands within occupied spotted owl sites across all ownerships to retain extant spotted owl pairs and resident singles.
MRC Action	MRC conservation strategy covers both spotted owl pairs and resident singles. Our strategy provides the greatest protection for spotted owls that are the most productive while extending lesser protections for non-productive owls. Retaining and increasing habitat across our forestlands should increase the spotted owl population over time.
Recovery Action 11	In all areas of Federal and non-Federal lands where pre-fire management is focused towards the development of spotted owl habitat, post-fire silvicultural modifications should concentrate on spotted owl habitat restoration and conserving spotted owl habitat elements that take the most time to develop or recover (e.g., large trees, snags, downed wood).
MRC Action	MRC has not included specific pre-fire management in our HCP/NCCP; however, our conservation strategies focus on conserving and recruiting key habitat elements that take the most time to develop or recover (such as wildlife trees, snags, and downed wood).

Recovery Action 12	Design and conduct experiments on forest stand structure to better understand relationships between spotted owl habitat, spotted owl prey, and spotted owl demographic response, and the effects of various thinning prescriptions on spotted owls.
MRC Action	MRC has proposed several validation monitoring studies to address the affect of forest structure on spotted owls, e.g., M§13.9.1.4 (Effect of Hardwood Density on Northern Spotted Owls); M§13.9.1.4-5 (Effect of Habitat on Productivity of Northern Spotted Owls); and M§13.9.1.4-4 (Effect of Harvest within 1000 ft of NSO Territories with Limited Protection). We will share the results of these studies with the wildlife agencies and other researchers.
Recovery Action 13	Standardize province-specific habitat definitions across the range of the spotted owl using a collaborative process.
MRC Action	MRC will test and verify our habitat definitions throughout the term of our HCP/NCCP. In addition, we will participate in efforts to standardize habitat definitions.
Recovery Action 14	Encourage applicants to develop Habitat Conservation Plans/Safe Harbor Agreements that are consistent with the recovery objectives.
MRC Action	MRC initiated our HCP/NCCP long before the current USFWS recovery plan was developed; however, we believe our plan is consistent with the objectives of that recovery plan.
Recovery Action 15	As appropriate and within the boundaries of our authority, the Service encourages the establishment of a work group to develop a comprehensive set of business and economic incentives that facilitate creative opportunities for non-Federal landowners to engage in management strategies consistent with the recovery objectives.
MRC Action	MRC will assist in this effort wherever possible.
Recovery Action 16	Monitor for sudden oak death and avian diseases (e.g., WNV, avian flu, Plasmodium spp.) and address as necessary.
MRC Action	MRC will continue to monitor, over the term of the HCP/NCCP, for sudden oak death through anecdotal reports of our foresters and for West Nile Virus through samples taken as part of our banding program.
Recovery Action 20	If barred owl removal is determined to be most effectively and humanely implemented through shooting of individuals, work with the State of California to modify their regulations so this important recovery activity can occur in compliance with all applicable laws.
MRC Action	MRC will control barred owls as part of its conservation strategy if the wildlife agencies concur and we can obtain appropriate permits (see contingency Y§10.3.1.2.5-6).
Recovery Action 21	Establish a technical work group of entities involved with barred owl research and management (Federal and State agencies, Tribes, timber industry, universities, and nongovernmental organizations) to coordinate actions relative to barred owl research, management, monitoring, and public outreach.
MRC Action	MRC will provide information and staff for these efforts as requested.
Recovery Action 22	Analyze existing data sets from the demographic study areas relative to the effects of barred owls on spotted owl site occupancy, reproduction, and survival.
MRC Action	MRC will provide information as requested even though our forestlands are not currently part of a demographic study area.
Recovery Action 23	Establish protocols to detect barred owls and document barred owl site status and reproduction.

MRC Action	MRC is tracking and collecting reproductive information on barred owls as they are located.
Recovery Action 24	Ensure that protocols adequately detect spotted owls in areas with barred owls.
MRC Action	MRC has updated our survey protocols (see Appendix K) to reflect additional requirements for determining if a territory is inactive in a given year. We will schedule extra surveys beyond our annual surveys if we do not detect spotted owls. Finally, we will use wildlife callers for nocturnal surveys to increase the likelihood of spotted owl detections.
Recovery Action 25	Analyze resource partitioning of sympatric barred owls and spotted owls.
MRC Action	MRC welcomes research proposals from interested academics although we currently have no monitoring programs specifically related to such efforts.
Recovery Action 26	Create and implement an outreach strategy to educate the public about the threat of barred owls to spotted owls.
MRC Action	MRC will continue to share our information on barred owls to the public as part of our stakeholder outreach.
Recovery Action 27	Expedite permitting of experimental removal of barred owls.
MRC Action	MRC will control barred owls as part of its conservation strategy if the wildlife agencies concur and we can obtain appropriate permits (see contingency Y§10.3.1.2.5-6).
Recovery Action 28	Design and implement large-scale control experiments to assess the effects of barred owl removal on spotted owl site occupancy, reproduction, and survival.
MRC Action	MRC will study the effect of barred owl removal on proximal spotted owl territories as part of our monitoring effort (M§13.9.1.4-7).
Recovery Action 29	Manage the negative effects of barred owls on spotted owls so that Recovery Criterion 1 can be met.
MRC Action	MRC will control barred owls as part of its conservation strategy if the wildlife agencies concur and we can obtain appropriate permits (see contingency Y§10.3.1.2.5-6).
Recovery Action 30	Develop mechanisms for land-owners and land-managers to support barred owl management using a collaborative process.
MRC Action	MRC will participate in this process.
Recovery Action 32	To the maximum extent practicable, maintain all of the older and more structurally complex multilayered conifer forests on Federal and non-Federal lands across the range of the spotted owl, allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These forests are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees.
MRC Action	MRC will retain all un-harvested old growth stands. We may harvest in old-growth patches already lightly harvested to accelerate the development of old growth. In addition, we will retain all individual old growth trees in the plan area along with nearby screen trees.

Recovery Action 33	Convene an expert panel to develop a comprehensive vulnerability assessment (USFWS 2009) with recommendations for land managers and stakeholders engaged in spotted owl recovery. This interdisciplinary panel should include technical expertise on spotted owl and barred owl ecology, impacts of climate change in the Pacific Northwest, and the ecology of forested ecosystems.
MRC Action	MRC will provide information or staff members to this panel as requested.
Recovery Criterion 4	Post-delisting Monitoring: To monitor the continued stability of the recovered spotted owl, a post-delisting monitoring plan has been developed and is ready for implementation with the States of Washington, Oregon, and California.
MRC Action	MRC will monitor spotted owls for the 80-year term of our HCP/NCCP even if they are delisted by the wildlife agencies.
Recovery Action 34	Develop a post-delisting monitoring plan ready for implementation with the States of Washington, Oregon, and California.
MRC Action	MRC will monitor spotted owls for the 80-year term of our HCP/NCCP even if they are delisted by the wildlife agencies.

10.3.1.4 Rationale

10.3.1.4.1 Rationale for productivity levels

Our rationale in designating protection levels based on productivity is that owls that produce the most fledglings should receive the most protection. Owls that produce fewer fledglings should receive less protection. Moreover, we increase the effectiveness of our conservation measures if we concentrate our efforts on owls that generally remain in the same stand and produce more fledglings.

To assess appropriate productivity cut-offs for owls, we first examined whether our baseline productivity was comparable to other similarly managed areas in northern California. The productivity rate of owl pairs on covered lands was 0.58 fledglings/pair from 1989 to 2007. This number compared well with other lands: Humboldt Redwood Company (HRC) 0.67 fledglings/pair;²⁰ Willow Creek Study Area 0.61 fledglings/pair (Franklin et al. 2010); and Simpson Timber Company, 0.63 fledglings/pair from 1992 to 2002 (Simpson Resource Company 2003). Next, we decided that our cut-off between high producers and mid-level producers should be greater than the mean fledge productivity per northern spotted owl pair ($0.80 > 0.58$). Using data from 1998 through 2007, MRC biologists calculated the number of owl territories producing > 0.80 fledglings each year. We used all productivity information from 1998-2007 to calculate mean productivity. The mean number of owl territories from 1998-2007 that produced a mean annual productivity > 0.80 was 29.90 with a standard error of 0.91. Research from a demographic study in Willow Creek indicated that the mean number of fledglings produced there contributed to a population trend that could not be differentiated from stationary (Franklin et al. 2002).

We based our conservation measures on the premise that northern spotted owls that receive greater protection will have greater survival rates and be able to remain productive in their territories for a longer period of time. In addition, our regional analysis of spotted owls (Appendix K, *Northern Spotted Owl Data and Protocol*, section K.4) indicates that if all Level-3

²⁰ John Hunter (USFWS) relayed this information to Sarah Billig (MRC) in a discussion on 2/5/2004. This number is a running average over 12 years. Until 2008, HRC lands were owned by Pacific Lumber Company (PALCO).

territories disappeared completely from our landscape and if every other landowner in Mendocino County followed the same conservation strategy (i.e., harvest within 500 ft of owls with limited protection), “empty” territories would still be within a reasonable dispersal distance for both male and female northern spotted owls (Forsman et al. 2002).

MRC is protecting 95 of the 120 territories in southern Mendocino County needed to maintain a population of northern spotted owls (USFWS 1992). This is a large portion of the regional goal even though MRC only owns approximately 28% of the timberland production zone in Mendocino County (Shih 2002).

To determine an appropriate cut-off point for the 3 productivity levels, MRC developed a frequency histogram based on baseline productivity. In our analysis, we did not count a final status of “nesting unknown” (NU) in the calculations (Figure 10-10). In Level-1 territories, owls produce > 0.8 fledglings per year; in Level 2, > 0.00 but < 0.8 fledglings per year; in Level 3, no fledglings per year. Figure 10-10 shows spotted owl territories and the mean number of fledglings produced per year as of 2007. In Figure 10-11, for NU=0, we calculated means for all territories visited in the year; for NU=omitted, we calculated means using all territories with a final nesting status for the year. Calculations for the baseline production of spotted owl territories in our HCP/NCCP use NU=omitted.

10.3.1.4.2 Rationale for increased population objective

Over the term of our HCP/NCCP, MRC will be growing additional nesting/roosting habitat, as projected by our landscape model and in line with our habitat definitions. Our rationale is that an increase in this habitat will allow for a larger owl population. In the second half of our HCP/NCCP timeline, MRC proposes increasing the population of productive owls by managing for a 20% increase in Level-1 and Level-2 territories and increasing the total number of Level-1 and Level-2 territories from 95 to 114. Table 10-7 shows that Level-1 territories will increase from 28 to 34; Level-2 territories will increase from 67 to 80.

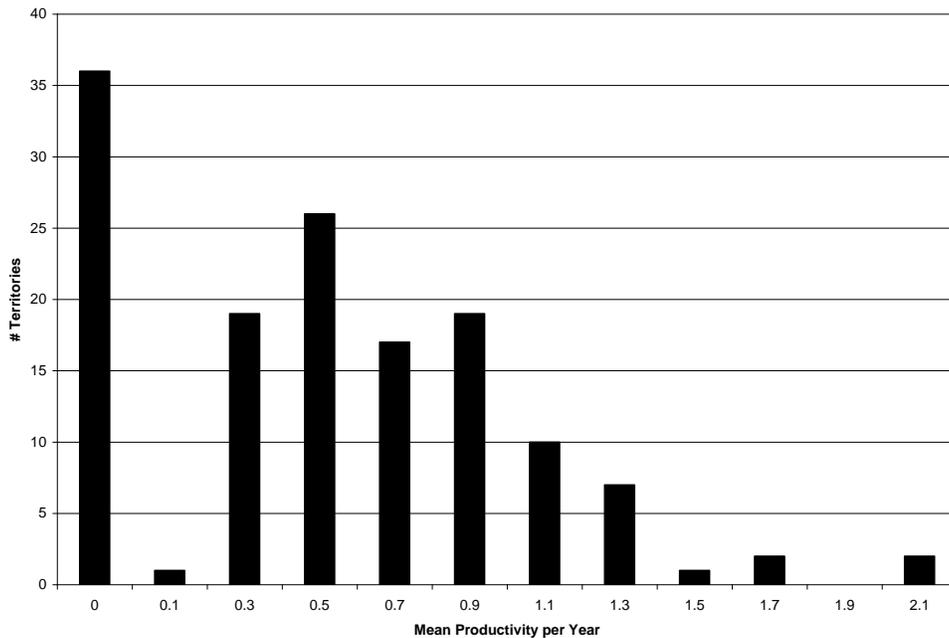


Figure 10-10 Territories with Mean Productivities per Year (1998-2007)

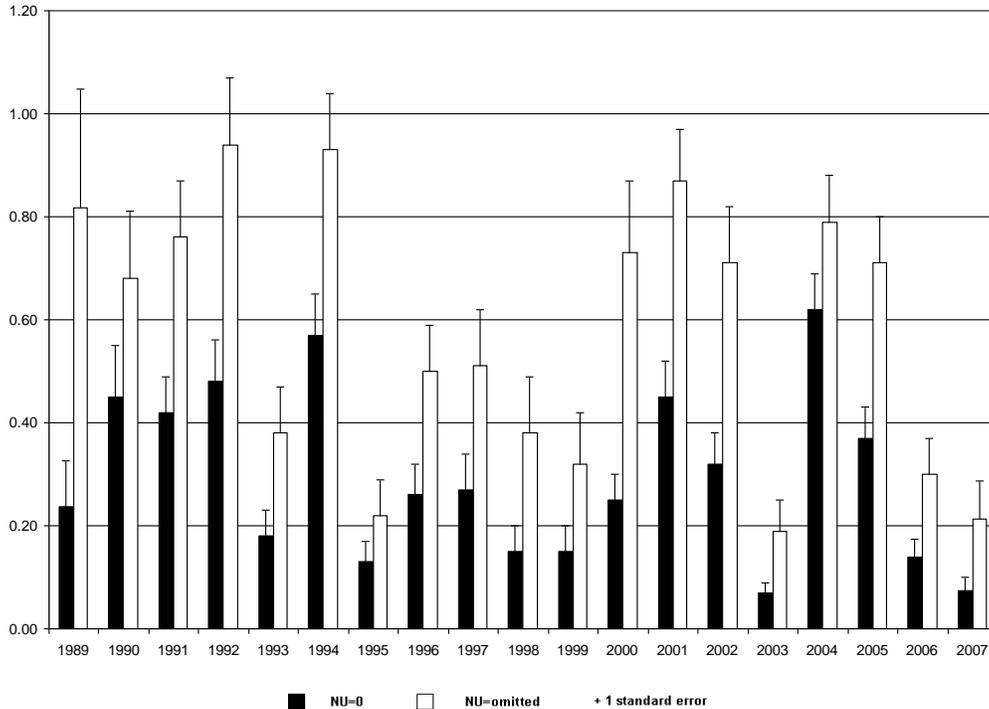


Figure 10-11 Mean Number of Fledglings per Spotted Owl Territory (1989-2007)

10.3.1.4.3 Rationale for population objective contingencies

Our baseline number of spotted owls by productivity level is a snapshot in time and does not necessarily reflect the variability of a typical spotted owl population. Spotted owl reproduction is known to vary widely over time (Franklin et al. 2002) and, even with unchanging habitat conditions, populations may change because of climatic variation (Franklin et al. 2000). In one study site, variation in fecundity was 82% between a mean of 0.2 fledglings per pair per year in bad years and 1.1 fledglings per pair per year in good years (Franklin et al. 2010).

Our productivity has varied from a low of 0.19 fledglings per territory per year to a high of 0.94 fledglings per territory per year. To assess the level of variation in owl productivity on MRC timberland, we compared productivity rates by year. Using 1998 as a starting year for assessing the number of Level-1 territories on covered lands (Table 10-12), the variation in the fewest number of Level-1s (26 in 1998 and 1999) and the mean number of Level-1s (29.9) is approximately 13% ($29.9 - 26 = 3.9$, $3.9/29.9 = 0.1304$). Though our fledgling productivity per territory per year also varies from the mean (0.58 fledglings per territory per year) by greater than 20%, we decided in consultation with the wildlife agencies that a 20% decline was a more appropriate cut-off than the range of variability in number of Level-1s represented by our data, i.e., 13%.

Given recent fluctuations in spotted owl productivity across the north coast of California, we believe the natural variability is greater than 13% in mean productivity. In order to allow for inherent variability in this population, we added a requirement that the number of Level-1 territories or Level-2 territories be less than 20% of the baseline during 2 consecutive years. This will restrict the likelihood that contingencies occur due to a single poor reproductive year.

Table 10-12 shows the number of Level-1 territories on all MRC land (including non-covered lands) from 1998-2007; we use the last 10 years of data to calculate running averages every year.

Table 10-12 Running Average of Level-1 Territories

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Mean	Standard Error
Level-1 Territories	26	26	33	33	29	29	28	33	33	29	29.70	0.96

10.3.1.4.4 Rationale for habitat objectives

In defining the habitat objectives, we projected an increase in nesting/roosting habitat throughout the term of the plan. Research (Franklin et al. 2000) indicates that owls with a mix of suitable and unsuitable habitat within their territories have greater fitness than those with a solid block of suitable or unsuitable habitat. For our 2007 baseline, MRC documented 95 productive owls in our plan area. Approximately 21% of our plan area (or potential habitat) is nesting/roosting habitat. Increasing our population of productive owls by 20% would mean there will be 114 owls in our plan area by Year 2075. To proportionally support 114 owls, we will need 25% of our forest land in nesting/roosting habitat (95:114::21:x, where x=25). Our objective within the first 40 years of our HCP/NCCP is that 23% of potential habitat will be nesting/roosting habitat and that spotted owls will re-distribute more evenly across the plan area. After 75 years, the objective is that 25% of potential habitat will be nesting/roosting habitat and that the number of owls will increase to 114. Moreover, MRC landscape models predict that, throughout the term of our HCP/NCCP, suitable habitat on covered lands will not drop below 60% and, therefore, MRC will comply with the 50-11-40 recommendation (see section 10.3.1.1.5).

10.3.1.4.5 Rationale for distribution objective contingency

In order to increase the number of productive owls and re-distribute the owl population more equally across the plan area, MRC will grow nesting/roosting habitat in inventory blocks where nesting/roosting habitat is deficient. After 40 years, 23% of the potential habitat in the plan area will be in nesting/roosting habitat; inventory blocks initially deficient in nesting/roosting habitat will show an increase in nesting/roosting acreage. By the end of our HCP/NCCP term, 25% of all inventory blocks will be nesting/roosting habitat. While MRC anticipates that owls will re-distribute more evenly across covered lands with the growth of new nesting/roosting habitat, we cannot guarantee that they will. The distribution objective contingency allows for MRC to stay out of contingency measures if an inventory block is maintaining the number of productive owls it started with and has grown the projected habitat (trending towards 25% habitat at the end of the term). Table 10-10 show actual, potential, and projected nesting/roosting habitat acres for each inventory block.

10.3.1.4.6 Rationale for limitations on non-emergency stopping

MRC recognizes that individual spotted owls may become habituated to humans as a result of monitoring techniques, i.e., walk-in monitors using live mice to assess nesting status. Often, field staff report spotted owls following them back to their trucks at the end of a status check, or showing up by the roadside immediately after they leave the truck. Unfortunately, there are currently no alternatives to mousing that allow for assessment of spotted owl occupancy, nesting status, and productivity status. We believe the best way to reduce owl habituation to humans is to limit parking near nest sites during logging operations. To accomplish this, we will allow logging

vehicles to stop only for safety reasons when within 1000 ft (305 m) of a nest site known to be currently active, unless the vehicle is on a mainline road.

10.3.1.4.7 Validation of habitat typing

MRC validated nesting/roosting criteria using on-the-ground data collection from 2005. Appendix K (section K.3.2, *MRC methods for nest site evaluation*) has a description of the nest site study. We assumed that owl nests would only be found in nesting/roosting habitat. The data included tree type, size class, and canopy cover. MRC correlated data collected at each nest site to a structure class and habitat type in our landscape model. After categorizing the nest sites into habitat types (Table 10-13), we found that 61% of nest sites were identified as nesting habitat. We generally categorized the other nest sites as foraging habitat, and classified 7 sites as non-suitable. This analysis did not evaluate productivity relationships with structure class or nest site selection per se. However, since we classified the majority of our sites, we are confident that our nesting/roosting definitions include the most important factors for nesting/roosting habitat.

Table 10-13 Habitat Typing of NSO Nest Sites Surveyed in the Plan Area

Habitat Typing of NSO Nest Sites Surveyed in the Plan Area		
2005 Totals		
Structure Class	# of Nest Sites	Assigned NSO Habitat
24	15	Nesting/Roosting
23	18	Nesting/Roosting
22	20	Nesting/Roosting
21	9	Foraging
20	2	Nesting/Roosting
18	1	Foraging
17	1	Foraging
10	15	Foraging
6	2	Foraging
5	6	Non-suitable
1	1	Non-suitable

TABLE NOTE

Nest Sites (n=90)

10.3.2 Marbled murrelet

10.3.2.1 Overview

MRC conservation measures for marbled murrelets provide (1) buffers for existing timber stands in the Lower Alder Creek planning watershed that are known to have murrelet activity; (2) management alternatives specifically geared to develop and accelerate new habitat in this same area; and (3) stands outside of the Lower Alder Creek drainage with special restrictions to promote growth of murrelet habitat at an accelerated pace. Currently, Lower Alder Creek is the only location in the plan area where murrelet behavior suggests that murrelets actually occupy the area rather than just travel through it. Occupancy is important since Mendocino County has largely been a *distribution gap* for murrelet populations along the California coast.

Lower Alder Creek is a high gradient stream surrounded by steep rocky slopes with many windswept and deformed trees. Portions of Lower Alder Creek contain patches of old-growth redwood and Douglas fir that serve as habitat for marbled murrelets. Many of the mature second-growth conifers, particularly Douglas fir, are deformed from disease and storm damage; in this condition, they may contain nesting platforms suitable for marbled murrelets. Much of the potential habitat in Lower Alder Creek is atypical compared to what is commonly described as

murrelet nesting habitat elsewhere in the murrelet's range (e.g., moss covered, decadent old growth trees). Unique growing conditions, rugged topography, relatively short distance to the coast, and logging limited in some areas by difficult terrain have allowed a murrelet population to persist in Lower Alder Creek over the years. Previous landowners harvested much of the old growth from Lower Alder Creek in the 1920s and 1950s; the remnant patches of old growth are typically where murrelet core areas occur. Additionally, because few murrelets have been detected outside of Lower Alder Creek in Mendocino County, this location may be one of the last remaining refuges here for the marbled murrelet.

Outside the Lower Alder Creek area, MRC has proposed protocols for murrelet surveys, as well as protections in lieu of surveys. If MRC decides not to survey an area with potential habitat trees, we must follow protection measures. In addition, MRC will not harvest any tree that has a high likelihood of being a potential habitat tree for murrelets. This is a major concession for a private landowner. In effect, we are protecting more trees than necessary.

Our HCP/NCCP will contribute to the conservation efforts for marbled murrelets in California. The core of our plan protects the existing murrelet population in the Lower Alder Creek watershed. Barring unforeseen circumstances, our protections will maintain this population and give it the opportunity to increase even more as surrounding areas produce potential murrelet habitat and nest trees. MRC will offer the wildlife agencies the chance to purchase some of these forested stands. In discussions with the wildlife agencies, we have designated 6 potential areas. Additionally, MRC will retain all trees that have a high potential to become murrelet nest trees even if our surveys indicate that a tree or stand is currently not occupied by murrelets. We believe these measures, in addition to other measures relevant to AMZ protections and high retention areas, will have a positive impact on murrelet survival in the plan area.

10.3.2.1.1 Murrelet management areas

MRC has designated the area in Lower Alder Creek where the primary effort for murrelet conservation will focus as the Lower Alder Creek Management Area (LACMA). Within LACMA are 3 regions, each with different conservation measures. Appendix L, Figure L-1 provides a map of these regions, while Figure 10-12 is a very simplified depiction. MAPS 7A-D in the *HCP/NCCP Atlas* show known occurrences of marbled murrelets in the plan area.

A. Lower Alder Creek Core Area (LACCA)—167 ac

This includes all areas within Lower Alder Creek that MRC identifies as occupied or presumed occupied by murrelets or that have Type I and Type II old-growth stands. Though we currently know of only 4 such stands, others may become part of LACCA in the future. We determined all core areas by the stand boundaries of the occupied trees. Going forward with our HCP/NCCP, we will continue to determine core areas by locating occupied trees, assigning them to a stand, and delimiting the boundaries of that stand.

Protections

MRC intends to protect existing habitat in LACCA.

B. Lower Alder Creek Habitat Area (LACHA)—471 ac

This is the area between and around occupied stands (core areas) in Lower Alder Creek. MRC believes this area has the best potential to become occupied in the future and, therefore, we are accelerating the growth of new murrelet habitat at these locations through silvicultural treatments. Additional habitat is important because murrelet decline may be due to a decline in nesting habitat

(Cooperider et al. 2000). If LACHA becomes completely occupied habitat, we will merge its designated core areas into 1 core area.

Protections

MRC intends to protect existing habitat elements in these areas and connect the “islands” of murrelet habitat through management to accelerate habitat growth.

C. Lower Alder Creek Buffer Area (LACBA)—599 ac

This area provides extra protection for LACMA from wildfires, wind throw, increased predation, and rising temperatures—all likely edge effects. The minimum width of the LACHA buffer is 300 ft.

DEFINITION

Edge effects are changes in ecological communities and factors at the boundaries of habitat

Protections

MRC intends to manage this area so that it can absorb surrounding impacts, such as timber harvest, and leave the interior habitat for murrelets undisturbed.

Lower Alder Creek Management Area (LACMA)

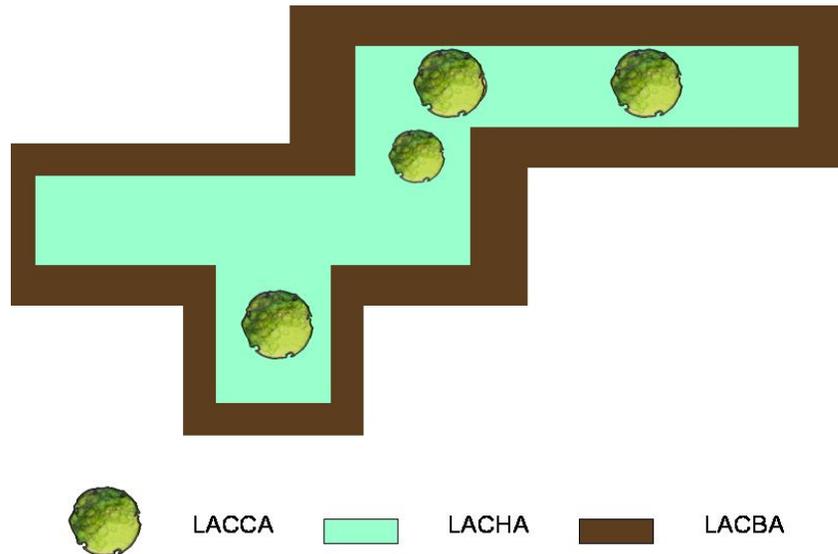


Figure 10-12 Murrelet Areas in Lower Alder Creek

10.3.2.1.2 Survey efforts

LACMA

In order to distinguish between occupied and unoccupied areas in the habitat area or buffers, MRC will survey according to the accepted protocol at the time, including any amendments by USFWS or CDFG. Within LACMA, there are 2 enhancements to the current protocol:

1. MRC will create survey stations that cover 10 ac rather than the 30 ac recommended by

- the Pacific Seabird Group (PSG).²¹
2. MRC will survey for murrelet occupancy in all proposed PTHPs or other projects; surveys that indicate non-occupancy will be applicable for 2 years.

Areas outside LACMA

Section 10.3.2.3.3, explains how MRC actually locates potential murrelet habitat in areas outside LACMA. In the event potential murrelet habitat is, in fact, located, a forester can then decide whether to survey for murrelets.

- If a forester decides not to survey for murrelets in a PTHP or other project area outside LACMA, the pre-determined protections for the area must apply.
- If a forester decides to survey for murrelets, MRC must complete surveys according to the accepted protocol at the time, including any amendments by USFWS or CDFG. Surveys outside of LACMA that indicate *probable non-occupancy* will be applicable for a period of 15 years.

Radar monitoring plan

MRC will conduct radar surveys in Lower Alder Creek to determine trends in annual murrelet activity in that drainage (M§13.9.2.1-1). In addition, we will conduct 2 surveys every year on the Albion River, the Navarro River, and Greenwood Creek (M§13.9.2.1-2). For other watercourses that have a high likelihood of murrelet activity, we will survey on a rotating basis (M§13.9.2.2-3). This rotation will include annual surveys of 2 watercourses; in total, MRC will survey 10 watercourses over the course of 5 years. Although MRC will decide the rotation slots for the watercourses, we must, by agreement with the wildlife agencies, complete the rotating surveys in order to get the benefits of distinguishing primary murrelet trees from secondary murrelet trees, along with the separate protections that each will receive (see sections 10.3.2.3.5 and 10.3.2.3.6).

10.3.2.2 Biological goals and objectives

Goals and Objectives for Marbled Murrelets	
Goals	
G§10.3.2.2-1	Protect the murrelet population and its habitat in Lower Alder Creek.
G§10.3.2.2-2	Protect and increase potential murrelet habitat across the plan area.
Objectives	
O§10.3.2.2-1	Retain permanently all trees defined as primary murrelet habitat trees.
O§10.3.2.2-2	Retain permanently all sites occupied ²² by marbled murrelets.
O§10.3.2.2-3	Maintain murrelet presence in the Navarro River watershed and in drainages in which, in the future, MRC biologists detect murrelets.

²¹ Survey stations of 10 ac result in a more intensive survey. To cover the recommended 30 ac requires, in effect, 3 surveys and increases the likelihood of detection if murrelets are actually in the area.

²² According to the latest version of the marbled murrelet protocol, an occupied site is one in which “murrelets have been observed exhibiting sub-canopy behaviors, which are behaviors that occur at or below forest canopy and that strongly indicate that the site has some importance for breeding” (Mack et al. 2003, 3).

Goals and Objectives for Marbled Murrelets	
O§10.3.2.2-4	Provide opportunities for the wildlife agencies to analyze or purchase conservation easements in 6 MRC areas compatible for development of murrelet habitat and for murrelet colonization.
O§10.3.2.2-5	Maintain a stable or increasing (i.e. non-declining) number of murrelet radar detections at LACMA.

10.3.2.3 Conservation measures

The conservation measures for murrelets cover 3 distinct areas, which receive different levels of protection based on the likelihood of murrelet use.

1. **LACMA**
Since murrelets continually use LACMA, MRC has a separate management policy for this area, which safeguards and benefits the existing murrelet population, as well as accelerating habitat growth.
2. **Murrelet Habitat Recruitment Stands (MHRS)**
Even though LACMA is the primary location for marbled murrelets in the plan area, MRC recognizes the need to prepare for a potential catastrophe in LACMA, such as a fire or severe windstorm, which would severely damage murrelet habitat. Such preparation includes designating other potential sites encompassing potential habitat for murrelet dispersal and occupation. MRC has mapped 6 murrelet habitat areas (22 stands) because of their old-growth characteristics (O§10.3.2.2-4). These 6 areas, designated Murrelet Habitat Recruitment Stands (MHRS), are in 5 separate inventory blocks—6 stands in Big River; 6 in South Coast; 4 in Rockport; and 3 each in the Navarro West and Albion inventory blocks (see *HCP/NCCP Atlas*, MAPS 6A-C). These areas will provide habitat for potential murrelet re-colonization.

The wildlife agencies may purchase these areas once they issue a permit to MRC. MRC will notify the wildlife agencies at least 2 years before harvesting any of these stands to allow the agencies an opportunity to analyze the value of the stands and decide whether to purchase them in order to accelerate murrelet habitat. MRC will not harvest in these stands for at least 20 years from HCP/NCCP commencement. MRC may, with the agreement of the wildlife agencies, designate different stands in the future that are dispersed across our timberland. We have focused our initial efforts on locating stands close to the coast to provide a better likelihood of murrelet occupation. The process for selecting future stands is (a) to select a stand that is either Type I or Type II old growth and (b) give priority to stands most likely to provide murrelet habitat (Table 10-15).

3. **Murrelet Habitat Zones (MHZ)**
In addition to LACMA and MHRS, MRC has designated 3 Murrelet Habitat Zones (*HCP/NCCP Atlas*, MAPS 6A-C); each zone receives protection based on the likelihood that murrelets will use or occupy these areas (*HCP/NCCP Atlas*, MAPS 7A-D.)
 - A. **Zone 1**
This is (1) the area north of Juan Creek in the Rockport inventory block; (2) any location in the plan area that is within 5 miles (8.0 km) of the coast; (3) any

area within the Lower Alder Creek planning watershed that is within 5-10 miles of the coast and on the bottom 1/3 of a hillslope (as measured from Class I or large Class II watercourses).

B. Zone 2

This is any location in the plan area (excluding those in Zone 1) that is 5-10 mi (8-16 km) from the coast and at the bottom 1/3 of a hillslope (as measured from Class I or large Class II watercourses).

C. Zone 3

This is (1) any location in the plan area that is >10 mi (16 km) from the coast or (2) any area that is 5-10 mi (8-16 km) from the coast and at the upper 2/3 of a hillslope (as measured from Class I and large Class II watercourses).

Occupied habitat in these areas will receive the same protection as current USFWS and CDFG standards. During the breeding season, USFWS and CDFG standards include a ¼ mile disturbance buffer around occupied stands. Outside the breeding season, the standards mandate a 300 ft no-harvest buffer around occupied stands.

Other areas will receive high, moderate, or limited protection based on the likelihood that murrelets are present. MRC may assume murrelet presence or survey to determine murrelet status. If we choose not to survey, we will extend more protection to an area than it would have received had we surveyed and determined it to be unoccupied. There is, of course, a small chance that an un-surveyed area may actually contain an occupied stand and, therefore, will receive less protection than it would have if the area had been surveyed and the occupied stand uncovered. However, MRC believes that the probability of encountering murrelets in these un-surveyed areas is extremely low and the protections are adequate based on that low probability.

In addition, the conservation measures focus on 3 time-frames: general, breeding season, and non-breeding season. Table 10-14 defines these timeframes.

Table 10-14 Timeframes for Marbled Murrelet Conservation Measures

General	Breeding Season	Non-breeding Season
LACMA, Occupied Marbled Murrelet Areas, and MHRS		
Apply at all times of the year	Apply February 15-September 15	Apply outside the breeding season
All Other Covered Lands		
Apply March 15 – September 15		

10.3.2.3.1 LACMA

Lower Alder Creek Core Areas (LACCA)

 Conservation Measures for LACCA	
General	
C§10.3.2.3.1-1	Prohibit forest management operations, including timber harvest and road-building.
C§10.3.2.3.1-2	Prohibit public entry into a core area, e.g., for firewood cutting or recreation.

LACMA - Breeding Season

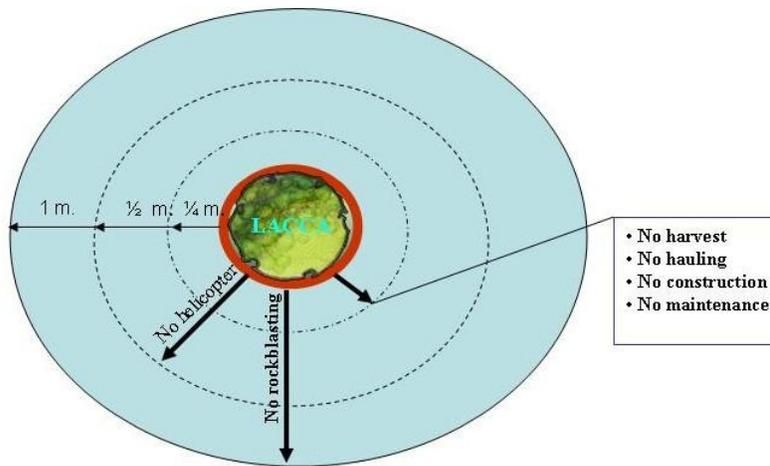


Figure 10-13 General LACMA Protections for Breeding Season

Lower Alder Creek Habitat Areas (LACHA)

 Conservation Measures for LACHA	
General	
C§10.3.2.3.1-3	Conduct timber management only to create and enhance habitat for marbled murrelets.
C§10.3.2.3.1-4	Obtain approval of the wildlife agencies before submitting a PTHP for any proposed forest management in LACMA.
C§10.3.2.3.1-5	Obtain approval of the wildlife agencies before altering vegetation or maintaining roads.
C§10.3.2.3.1-6	Provide the wildlife agencies with a map of the entire project area before initiating any activity.
C§10.3.2.3.1-7	Permit fire control lines for prescribed burning within LACHA only with approval of the wildlife agencies.

 Conservation Measures for LACHA	
C§10.3.2.3.1-8	<p>Treat logging debris—between September 15th and March 24th in the 1st year following any harvest conducted in LACHA—with means approved by the wildlife agencies, such as:</p> <ul style="list-style-type: none"> • Lopping slash so that a minimal amount remains as ladder fuels. • Removing felled trees < 24 in. dbh to a landing. • Cutting the top 50 ft off any felled tree > 24 in. dbh and removing this 50-ft segment to a landing. • Bucking and limbing, in the forest, any segments of tree stems remaining on the ground. • Lopping any residual slash, after the above operations have been completed, that is more than 30 in. high.
Breeding Season	
C§10.3.2.3.1-9	Conduct timber operations only if (a) an MRC survey shows that murrelets are not occupying any area within a ¼ mile of a proposed project; (b) the operations are at least a ¼ mile beyond a core area periphery; (c) the operations are at least 100 ft (23 m) away from potential habitat trees; and (d) the operations occur within the time period of 2 hours after sunrise to 2 hours before sunset.
C§10.3.2.3.1-10	Permit vehicular traffic within ¼ mile of a core area periphery or within 100 ft of potential murrelet habitat trees for (a) maintenance and hauling on mainline routes; (b) vehicles on existing seasonal or permanent roads which are 1 ton or less; or (c) all terrain vehicles (ATVs) on existing roads.
C§10.3.2.3.1-11	Permit prescribed burning within ¼ mile of LACHA only with approval of the wildlife agencies.
C§10.3.2.3.1-12	Permit helicopter operations if they are at least ½ mile from a core area periphery and an MRC survey shows that murrelets are not occupying any area within a ½ mile of the helicopter operations.
C§10.3.2.3.1-13	Conduct blasting only if (a) it is at least 1 mi (1.6 km) from a core area periphery; (b) it is within the time period of 2 hours after sunrise to 2 hours before sunset; and (c) an MRC survey shows that murrelets are not occupying any area within 1 mile of the blasting.
C§10.3.2.3.1-14	Conduct all road maintenance as well as rock and log hauling from 2 hours after sunrise to 2 hours before sunset.
C§10.3.2.3.1-15	Prohibit public entry, e.g., for firewood cutting or recreation.
Non-breeding Season	
C§10.3.2.3.1-16	Permit vehicular traffic within 300 ft (91 m) of a core area periphery or within 100 ft (23 m) of potential murrelet habitat trees for (a) maintenance and hauling on mainline routes; (b) vehicles on existing seasonal or permanent roads which are 1 ton or less; or (c) all terrain vehicles (ATVs) on existing roads.
C§10.3.2.3.1-17	Conduct timber operations only if (a) an MRC survey shows that murrelets are not occupying any area within 300 ft (91 m) of a proposed project; (b) the project is at least 300 ft beyond a core area periphery; (c) the operations are 100 ft (23 m) away from potential habitat trees; and (d) the operations are within the time period of 2 hours after sunrise to 2 hours before sunset.

 Conservation Measures for LACHA	
C§10.3.2.3.1-18	Create a required cable corridor only if (a) an MRC survey shows that murrelets are not occupying any area within 300 ft (91 m) of the cable corridor; (b) trees are felled away from potential habitat; and (c) operations are within the time period of 2 hours after sunrise to 2 hours before sunset.
C§10.3.2.3.1-19	Permit helicopter operations if they are at least 500 ft from a core area periphery and an MRC survey shows that murrelets are not occupying any area within 500 ft of the operations.
C§10.3.2.3.1-20	Conduct all maintenance and hauling (a) at least 300 ft (92 m) from a core area periphery and (b) within the time period of 2 hours after sunrise to 2 hours before sunset.
C§10.3.2.3.1-21	Maintain a consistent “viewshed” for radar monitoring sites.

LACMA – Non-breeding Season

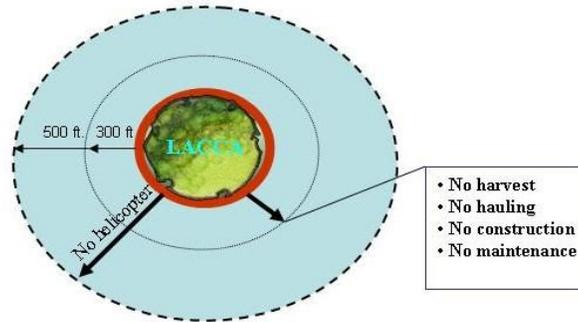


Figure 10-14 General LACMA Protections for Non-breeding Season

Lower Alder Creek Buffer Areas (LACBA)

 Conservation Measures for LACBA	
General	
C§10.3.2.3.1-22	Conduct timber management only to provide buffering and protection for LACCA and LACHA.
C§10.3.2.3.1-23	Obtain approval of the wildlife agencies before submitting a PTHP for any proposed forest management in LACMA.
C§10.3.2.3.1-24	Permit fire control lines for prescribed burning within LACBA only with approval of the wildlife agencies.
C§10.3.2.3.1-25	Obtain approval of the wildlife agencies before altering vegetation or maintaining, constructing, or reconstructing roads.
C§10.3.2.3.1-26	Provide the wildlife agencies with a map of the entire project area before initiating any activity.

 Conservation Measures for LACBA	
C§10.3.2.3.1-27	Treat logging debris—between September 15 th and March 24 th in the 1 st year following any harvest conducted in LACHA—with means approved by the wildlife agencies, such as: <ul style="list-style-type: none"> ▪ Removing felled trees < 24 in. dbh to a landing. ▪ Cutting the top 50 ft off any felled tree > 24 in. dbh and removing this 50-ft segment to a landing. ▪ Bucking and limbing, in the forest, any segments of tree stems remaining on the ground. ▪ Lopping any residual slash, after the above operations have been completed, that is more than 30 in. high.
C§10.3.2.3.1-28	Prohibit public entry, e.g., for firewood or recreation.
Breeding Season	
C§10.3.2.3.1-29	Conduct timber operations only if an MRC survey shows that murrelets are not occupying any area within a ¼ mile of a proposed project and the operations are (a) at least a ¼ mile beyond a core area periphery; (b) at least 100 ft (23 m) away from potential habitat trees; and (c) within the time period of 2 hours after sunrise to 2 hours before sunset.
C§10.3.2.3.1-30	Permit vehicular traffic within ¼ mile of a core area periphery or within 100 ft of potential murrelet habitat trees for (a) maintenance and hauling on mainline routes; (b) vehicles on existing seasonal or permanent roads which are 1 ton or less; or (c) all terrain vehicles (ATVs) on existing roads.
C§10.3.2.3.1-31	Permit helicopter operations if they are at least ½ mile from a core area periphery and an MRC survey shows that murrelets are not occupying any area within a ½ mile of the helicopter operations.
C§10.3.2.3.1-32	Conduct blasting only if (a) it is at least 1 mi (1.6 km) from a core area periphery; (b) it is within the time period of 2 hours after sunrise to 2 hours before sunset; and (c) an MRC survey shows that murrelets are not occupying any area within 1 mile of the blasting.
C§10.3.2.3.1-33	Permit prescribed burning within ¼ mile of LACBA only with approval of the wildlife agencies.
C§10.3.2.3.1-34	Conduct all maintenance and hauling from 2 hours after sunrise to 2 hours before sunset.
Non-breeding Season	
C§10.3.2.3.1-35	Harvest to create a required cable corridor only if (a) an MRC survey shows that murrelets are not occupying any area within 300 ft of the cable corridor; (b) trees are felled away from potential habitat; and (c) operations are within the time period of 2 hours after sunrise to 2 hours before sunset.
C§10.3.2.3.1-36	Conduct timber operations only if (a) an MRC survey shows that murrelets are not occupying any area within 300 ft of a proposed project; (b) the project operations are at least 300 ft beyond a core area periphery; (c) the operations are at least 100 ft (23 m) away from potential habitat trees; and (d) the operations are within the time period of 2 hours after sunrise to 2 hours before sunset, unless harvest is required for a cable corridor and (i) trees are felled away from potential habitat, and (ii) operations are within the time period of 2 hours after sunrise to 2 hours before sunset.

 Conservation Measures for LACBA	
C§10.3.2.3.1-37	Permit vehicular traffic within 300 ft (91 m) of a core area periphery or within 100 ft (23 m) of potential murrelet habitat trees for (a) maintenance and hauling on mainline routes; (b) vehicles on existing seasonal or permanent roads which are 1 ton or less; or (c) all terrain vehicles (ATVs) on existing roads.
C§10.3.2.3.1-38	Permit helicopter operations if they are at least 500 ft from a core area periphery and an MRC survey shows that murrelets are not occupying any area within 500 ft of the helicopter operations.
C§10.3.2.5.1-39	Conduct all maintenance and hauling only within the period from 2 hours after sunrise to 2 hours before sunset.

10.3.2.3.2 Murrelet habitat recruitment stands (MHRS)

 Conservation Measures for Murrelet Habitat Recruitment Stands (MHRS)	
C§10.3.2.3.2-1	Identify and prioritize MHRS with the wildlife agencies within 2 years of HCP/NCCP approval.
C§10.3.2.3.2-2	Provide at least 2-years notice to the wildlife agencies prior to submitting a PTHP containing or adjacent to an MHRS in order to allow the wildlife agencies to analyze the MHRS and possibly purchase it at a mutually agreed upon price prior to approval of the PTHP. NOTE MRC may at any time identify potential murrelet habitat as a conservation easement and provide the wildlife agencies the opportunity to purchase it. If the wildlife agencies decide to purchase any potential or designated habitat, they may apply silviculture based on stand conditions and on habitat enhancement for murrelets.
C§10.3.2.3.2-3	Prohibit harvest in MHRS during the first 20 years of HCP/NCCP implementation.

Table 10-15 shows sample criteria, provided by CDFG, for prioritizing MHRS which the wildlife agencies may want to purchase during the term of our HCP/NCCP. The ranking parameter is based on acres, adjusted by a multiplier or factor. This factor reflects our preliminary assessment about the potential of such stands to grow into murrelet habitat. The wildlife agencies will evaluate actual stands as funds become available.

Table 10-15 Criteria for Prioritizing MHRS

Criteria for Prioritizing MHRS				
Scale	Variable	Ranking Parameter	Factor	Rationale or Assumption
Internal characteristics of stand	Availability of nest structure	>5 trees per acre with >5 possible permanent nest	1.4	More nest sites, more nest trees, greater value

Criteria for Prioritizing MHRS				
Scale	Variable	Ranking Parameter	Factor	Rationale or Assumption
		platforms		
		>2 trees per acre with >5 possible permanent nest platforms	1.2	Value declines as nest sites and trees decline
		>5 trees per acre with >2 but <5 possible permanent nest platforms	1.3	Value declines as nest sites and trees decline
		>2 trees per acre with >2 but <5 possible permanent nest platforms	1.1	Value declines as nest sites and trees decline
	Level of nest tree canopy			
		<10% of the canopy of potential nest trees rise above the general stand canopy	1.2	Canopy protects nests from predators and climate by reducing its exposure
		<33% of the canopy of potential nest trees rise above the general stand canopy	1	Some exposure but still substantial screening from the stand canopy
		>50% of the canopy of potential nest trees rise above the general stand canopy	0.8	Exposure reduces value
	Needs and constraints of existing stand management			
		Stand value high; no need for active management	1.4	Stand appears to already provide good nesting habitat
		High potential for constructive active management	1.3	Number of releasable trees is high; easy access for operations and little likelihood of damage
		Low potential for constructive active management	1	Number of releasable trees is low; more possibility for damage from logging.
<hr/>				
	Characteristics of stand location			
		Stand enhanced by being adjacent to reserve	1.3	<ul style="list-style-type: none"> Stand size is an important descriptor of

Criteria for Prioritizing MHRS				
Scale	Variable	Ranking Parameter	Factor	Rationale or Assumption
				habitat occupancy. <ul style="list-style-type: none"> • Location adjacent to parks or consistent easements functionally increases the stand size.
		Stand enhanced by being adjacent to AMZ	1.2	<ul style="list-style-type: none"> • AMZ can act as a buffer to designated stands • Stands in a "V" confluence have essentially a double-wide AMZ on 2 sides
		Stand enhanced by being adjacent to mature stands	1.1	Locations adjacent to mature stands, which are managed to remain mature stands, can enhance the functional size of the designated stand.
		Management in adjacent stand unlikely to enhance value of murrelet habitat	1	Size of the designated stand is not enhanced by adjacent conditions.
		Management in adjacent stand inimical to murrelet use	0.5	Management in adjacent stand reduces the value of the potential habitat for murrelets, e.g., no enhancement of stand, attraction for predators, etc.
<hr/>				
	Characteristics of stand landscape			
		Zone (accounts for distance to ocean, slope position)	1.3	
		Stand located in Zone 1	1.3	Table 10-16
		Stand located in Zone 2	1.0	Table 10-16
		Stand located in Zone 3	0.7	Table 10-16
		Colonizable		Enhances metapopulation functions and spreads risks

Criteria for Prioritizing MHRS				
Scale	Variable	Ranking Parameter	Factor	Rationale or Assumption
		Stand located adjacent to occupied watersheds (but not in Alder Creek)	1.3	<ul style="list-style-type: none"> Colonization (or undetected use) more likely due to proximity of murrelets Spreads out risks (e.g., wildfire, disease, etc.)
		Stand located in or adjacent to watersheds with lands managed for murrelets or lands already meeting murrelet habitat definitions (e.g., old-growth park)	1.1	"Managed for murrelets" means active management.
		Stand located in or adjacent to watersheds with lands consistent with murrelets	1.0	"Consistent with murrelets" means passive management of mature second-growth forests (e.g., some of the parks)
		Stand not located near known occupied watersheds or watersheds with lands managed for murrelets or consistent with murrelets	0.8	Less likely to be colonized due to distance

10.3.2.3.3 Assessment for potential murrelet habitat in MHZs

MRC will assess potential murrelet habitat within and near a PTHP boundary based on (a) the zone within which the PTHP is located (Table 10-16); (b) the yarding method (e.g., helicopter yarding requires a larger area); and (c) the blasting requirements. The assessment area for murrelets will be the entire area within 800 ft (244 m) of the harvest boundary of a PTHP in Zone 1 and 400 ft (122 m) of the harvest boundary of a PTHP in Zones 2 and 3 (see Figure 10-15). In addition, MRC will assess potential murrelet habitat ½ mile from any helicopter yarding unit and 1 mile from any blasting area. We will use aerial photos and other available information to assess any areas outside the activity boundary; these assessments will include field visits to evaluate suspect areas. We will survey for murrelet trees and, depending on their location, assign a protection level or conduct further surveys. Protections will depend on the number and proximity of murrelet habitat trees.

10.3.2.3.4 Determination of potential murrelet habitat trees

MRC will designate conifer trees with these specifications as potential murrelet nest trees:

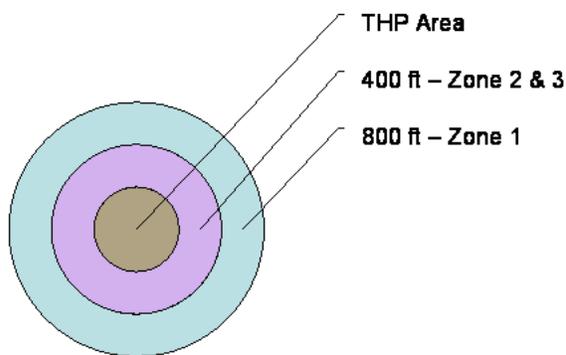
Size (dbh)	Diameter must equal or exceed <ul style="list-style-type: none"> 48 in (122 cm) for redwood. 36 in (91 cm) for Douglas-fir.
-------------------	---

- 36 in (91 cm) for grand fir.
- 36 in (91 cm) for Sitka spruce.
- 30 in (76 cm) for western hemlock.
- 30 in (76 cm) for all other conifers.

Habitat elements

At least 1 platform that is

- Capable of retaining an egg, such as a broken top, an elevated burl, a debris accumulation, or a branch that is more than 6 in. (10 cm) in diameter and nearly horizontal (i.e., + or - 45° angle from horizontal).
- Within the canopy of a stand and below the highest treetop within a 300 ft radius.
- Sheltered directly above by at least 50% canopy cover.



**Murrelet Habitat Assessment
Outside LACMA**

Figure 10-15 Murrelet Habitat Assessment for the MHZs

10.3.2.3.5 Primary murrelet trees

Primary murrelet trees exhibit the characteristics listed in section 10.3.2.3.4; in addition, they have at least 1 platform which is 9 in. or more in diameter.

10.3.2.3.6 Secondary murrelet trees

In order to provide a simple and conservative process for assessing potential murrelet trees, MRC established the criteria cited in section 10.3.2.3.4. Strict adherence to these criteria would retain excessive numbers of trees unlikely to harbor murrelet nests. Some potential murrelet trees have only a slight possibility that murrelets will ever use them. Secondary murrelet trees are usually second- growth conifers. As a general rule, MRC will retain all potential murrelet habitat trees. However, MRC may harvest some of these trees with 6-9 in. platforms or, at best, provide them limited protection, as long as we meet the following conditions:

- MRC does not harvest old-growth trees.
- MRC implements the required and optional portions of our radar plan for monitoring watercourses (M§13.9.2.1-2 and M§13.9.2.2-3).
- MRC does not detect murrelets within the watershed or performs a follow-up survey, with approval of the wildlife agencies, to narrow the extent of murrelet activity within the watershed.

If MRC detects 1 or more murrelets during radar monitoring, we will obtain approval of the wildlife agencies on the appropriate course of action. Moreover, we will complete more audio-visual surveys to assess whether we should treat trees with 6-9 in. platforms in an area where we detected murrelets in secondary murrelet trees. There are only 2 watercourses outside of LACMA where there have been credible radar detections of murrelet-type activity and quality murrelet habitat nearby, namely Navarro River and Russell Brook. For this reason, we will treat all potential murrelet trees in the Navarro watershed up to the eastern boundary of the Navarro West inventory block and all trees within the Russell Brook watershed as primary murrelet trees until we meet with the agencies to discuss murrelet activity there. MRC will consult with the wildlife agencies during the audio-visual surveys.

10.3.2.3.7 On-the-ground judgments and training

MRC will use their best on-the-ground assessment to identify potential murrelet trees; however, in some cases, identification may be impossible from the ground. It is difficult to identify platforms in second-growth stands. To ensure consistency in assessment, MRC will hold a training session for forest managers on the characteristics of murrelet trees and on the specifications for primary and secondary murrelet trees. We will invite the wildlife agencies to participate in our training sessions. Refresher courses and training for new forest managers will occur as needed. Our annual report will include a summary of these training sessions, along with the names of individuals attending each session.

If, in implementing this plan, MRC biologists determine that other methods or criteria should be used in assessing murrelet trees, we will obtain the approval of the wildlife agencies on any alternative measures.

10.3.2.3.8 Determination of protection levels with surveys

MRC will only implement occupied, high, or moderate protective measures for the MHZs if surveys indicate murrelets are present but not occupying a timber stand or if we decide not to survey. Based on survey results, MRC will respond in 1 of 3 ways:

1. If a survey does not detect murrelets, MRC will provide limited protection (i.e., retain the tree and all screen trees) to the identified trees.
2. If a survey detects murrelets but they are not occupying a stand, MRC will provide limited protection to the identified trees (i.e., retain the murrelet tree and all screen trees).²³
3. If a survey detects murrelets and they are occupying a stand, MRC will apply the protection measures for occupied stands (C§10.3.2.3.11-1 through C§10.3.2.3.11-9).

On the other hand, if MRC decides not to survey either for presence or occupancy, we will apply conservation measures C§10.3.2.3.11-1 through C§10.3.2.3.11-9 for high protection areas, C§10.3.2.3.12-1 through C§10.3.2.3.12-9 for moderate protection areas, and C§10.3.2.3.13-1 through C§10.3.2.3.13-2 for limited protection areas, as outlined in Table 10-16.

²³ MRC must complete surveys with positive detections according to occupancy protocol or the wildlife agencies will consider the stand occupied.

DEFINITION	High protection areas in MHZs are most likely to have murrelets.
	Moderate protection areas in MHZs are somewhat likely to have murrelets.
	Limited protection areas in MHZs are least likely to have murrelets.

Table 10-16 Protection Levels for Marbled Murrelet (MAMU) Habitat in the MHZs

MAMU Habitat Type	Zone 1	Zone 2	Zone 3
Type I old-growth stands	High	High	Moderate
Type II old-growth stands	High	Moderate	Moderate
> 4 primary MAMU trees each within 100 ft ^a (30 m) of another MAMU tree	High	Moderate	Moderate
> 2 primary MAMU trees each within 100 ft (30 m) of another MAMU tree	High	Moderate	Limited
2 primary MAMU trees within 100 ft (30 m) of each other	Moderate	Limited	Limited
1 primary MAMU tree or any number of secondary murrelet trees	Limited ^b	Limited	Limited

TABLE NOTES
^a The 100-ft distance provides a means for assessing the proximity of potential habitat trees. We believe that as the number of trees that are each within 100 ft of another MAMU tree increases, the likelihood of murrelets using the trees increases.
^b If future research indicates that marbled murrelets are using single trees for nesting in Mendocino County, MRC will provide single murrelet trees in Zone 1 with moderate protection.

10.3.2.3.9 Additional murrelet disturbance measures

In July 2006, USFWS published new guidelines for activities occurring in or near potential murrelet habitat. During murrelet breeding season, the sound level of a proposed activity determined the required disturbance buffer (USFWS, 8-14-2006-2887). USFWS distinguished 5 noise levels: low = < 70 db; moderate = 71-80 db; high = 81-90 db; very high = 91-100 db; extreme = 101-110 db. Using Table 10-17 and Table 10-18, MRC classified each logging operation into decibel levels to determine appropriate disturbance buffers for un-surveyed potential murrelet habitat and occupied murrelet habitat.

Table 10-17 Disturbance Buffers Based on Sound Levels

Disturbance buffer	Anticipated Sound Level				
	Low (<70)	Moderate (71-80 db)	High (81-90 db)	Very High (91-100)	Extreme (101-110 db)
	None	200 ft ²⁴	500 ft	1320 ft	1320 ft

Table 10-18 Disturbance Buffers for Various Activities²⁵

Activity	Decibels	Noise Level	Buffer
Chainsaw	83	High	500 ft
Log truck	77	Moderate	200 ft
Backhoe	84	High	500 ft
Cat skidder	81	High	500 ft
Dump truck	85	High	500 ft
Log Loader	83	High	500 ft
Bulldozer	84	High	500 ft
Rock Drills and Jackhammers	97	Very High	1320 ft
Large tree felling (dominants and co-dominants)	92	Very high	1320 ft
Jake brake on truck	94	Very high	1320 ft
Yarder tower whistles	95	Very high	1320 ft

10.3.2.3.10 Occupied murrelet habitat

 Conservation Measures for Occupied Murrelet Habitat in the Murrelet Habitat Zones (MHZs)	
Breeding Season	
C§10.3.2.3.10-1	Limit approaches to at least a distance of 0.25 mi (0.4 km) from identified habitat tree(s) unless it involves (a) maintenance or hauling on mainline haul routes, (b) the use of non-mainline roads if they are farther away from an identified habitat tree than the mainline road, (c) use of a vehicle ≤ 1 ton on existing seasonal or permanent roads; or (d) all terrain vehicles (ATVs) on existing trails.
C§10.3.2.3.10-2	Permit prescribed burning within ¼ mile of occupied murrelet stands only with approval of the wildlife agencies.
C§10.3.2.3.10-3	Permit fire control lines for prescribed burning within occupied murrelet stands only with approval of the wildlife agencies.
C§10.3.2.3.10-4	Permit helicopters at least 0.50 mile (0.8 km) from identified habitat trees.
C§10.3.2.3.10-5	Conduct blasting at least 1 mile (1.6 km) from identified habitat trees.

²⁴ The original USFWS guidelines recommend a 165-ft disturbance buffer; MRC has increased the buffer to 200 ft at the request of USFWS.

²⁵ MRC may consult with the wildlife agencies if we have evidence that specific equipment performing a specific job generates less noise than stated here. If the wildlife agencies agree, MRC will establish a disturbance buffer based on the criteria in Table 10-17.

 Conservation Measures for Occupied Murrelet Habitat in the Murrelet Habitat Zones (MHZs)	
C§10.3.2.3.10-6	Conduct all maintenance and hauling within 0.25 miles of identified habitat trees only from 2 hours after sunrise to 2 hours before sunset.
Non-breeding Season	
C§10.3.2.3.10-7	Conduct harvest operations and construction of new roads at least 300 ft (92 m) away from identified habitat trees.
C§10.3.2.3.10-8	Permit helicopters at least 500 ft (152 m) away from identified habitat trees.
C§10.3.2.5.10-9	Conduct all maintenance and hauling within 300 ft (92 m) of identified habitat trees only from 2 hours after sunrise to 2 hours before sunset.

10.3.2.3.11 Murrelet habitat in high protection areas

 Conservation Measures for Murrelet Habitat in the Murrelet Habitat Zones (MHZs) High Protection Areas					
Breeding Season					
C§10.3.2.3.11-1	<p>Conduct operations defined in Table 10-18 at their prescribed distance from habitat trees.</p> <p>NOTE This constraint does not apply to (a) use or maintenance of mainline roads for log hauling or (b) use of non-mainline roads that are farther from the potential habitat trees than a mainline or public road.</p>				
C§10.3.2.3.11-2	<p>Conduct operations not defined in Table 10-18 at least 800 ft (244 m) from habitat trees.</p> <p>NOTE This constraint does not apply to (a) use or maintenance of mainline roads for log hauling or (b) use of non-mainline roads that are farther from the potential habitat trees than a mainline or public road.</p>				
C§10.3.2.3.11-3	Permit helicopters at least 0.25 mile (0.40 km) away from potential habitat trees.				
C§10.3.2.3.11-4	Conduct blasting at least 1 mile (1.6 km) away from potential habitat trees.				
Non-breeding Season					
C§10.3.2.3.11-5	<p>Conduct harvests at least 100 ft (30 m) away from potential habitat trees.</p> <p>NOTE This constraint does not apply to operations where tree felling is necessary for a cable corridor.</p>				
C§10.3.2.3.11-6	<p>Conduct harvests between 100-200 ft (61 m) from habitat trees in accordance with the following silvicultural prescriptions or obtain approval of the wildlife agencies for alternative prescriptions more suitable for a specific stand.</p> <table border="1" data-bbox="578 1625 1263 1829"> <thead> <tr> <th>Buffer</th> <th>Buffer Silvicultural Prescription</th> </tr> </thead> <tbody> <tr> <td>100-200 ft (30-60 m)</td> <td> <ul style="list-style-type: none"> • $\geq 175 \text{ ft}^2$ post-management • 70% post-management canopy closure • No harvesting of existing old-growth or potential murrelet trees </td> </tr> </tbody> </table>	Buffer	Buffer Silvicultural Prescription	100-200 ft (30-60 m)	<ul style="list-style-type: none"> • $\geq 175 \text{ ft}^2$ post-management • 70% post-management canopy closure • No harvesting of existing old-growth or potential murrelet trees
Buffer	Buffer Silvicultural Prescription				
100-200 ft (30-60 m)	<ul style="list-style-type: none"> • $\geq 175 \text{ ft}^2$ post-management • 70% post-management canopy closure • No harvesting of existing old-growth or potential murrelet trees 				

 Conservation Measures for Murrelet Habitat in the Murrelet Habitat Zones (MHZs) High Protection Areas	
C§10.3.2.3.11-7	Permit helicopters that are at least 300 ft (92 m) away from habitat trees or known Type I or Type II old-growth stands unless they have been surveyed according to currently accepted protocols without murrelet detections.
C§10.3.2.3.11-8	Retain all primary murrelet trees and screen trees.
C§10.3.2.3.11-9	Permit harvest of secondary murrelet trees if a ground survey determines that it is unlikely murrelets are occupying the surrounding area. NOTE MRC will not harvest old-growth trees under this provision.

10.3.2.3.12 Murrelet habitat in moderate protection areas

 Conservation Measures for Murrelet Habitat in the Murrelet Habitat Zones (MHZs) Moderate Protection Areas	
Breeding Season	
C§10.3.2.3.12-1	Conduct operations defined in Table 10-18 at their prescribed distance from habitat trees. NOTE This constraint does not apply to (a) use or maintenance of mainline roads for log hauling or (b) use of non-mainline roads that are farther from the potential habitat trees than a mainline or public road.
C§10.3.2.3.12-2	Conduct operations not defined in Table 10-18 at least 400 ft (153 m) from habitat trees. NOTE This constraint does not apply to (a) use or maintenance of mainline roads for log hauling or (b) use of non-mainline roads that are farther from the potential habitat trees than a mainline or public road.
C§10.3.2.3.12-3	Permit helicopters at least 0.25 mile (0.40 km) away from potential habitat trees.
C§10.3.2.3.12-4	Conduct blasting at least 1 mile (1.6 km) away from habitat trees by line of sight and at least 0.5 miles (0.80 km) away by map distance.
Non-breeding Season	
C§10.3.2.3.12-5	Conduct harvests at least 75 ft (23 m) away from habitat trees unless tree felling is necessary for a cable corridor NOTE This constraint does not apply to operations where tree felling is necessary for a cable corridor. In these cases, MRC will leave all felled trees on the ground and will fell trees away from potential habitat trees. Additionally, MRC will make every reasonable effort to avoid felling trees within 50 ft (15 m) of potential habitat trees.

 Conservation Measures for Murrelet Habitat in the Murrelet Habitat Zones (MHZs) Moderate Protection Areas					
C§10.3.2.3.12-6	<p>Conduct harvests between 75-200 ft (22-60 m) from habitat trees in accordance with the following silvicultural prescriptions or obtain approval of the wildlife agencies for alternative prescriptions more suitable for a specific stand.</p> <table border="1" data-bbox="613 415 1235 674"> <thead> <tr> <th>Buffer</th> <th>Buffer Silvicultural Prescriptions</th> </tr> </thead> <tbody> <tr> <td>200 ft (61 m)</td> <td> <ul style="list-style-type: none"> • $\geq 175 \text{ ft}^2$ post-management basal area • 60% post-management canopy closure • No harvesting of existing old growth or potential murrelet trees </td> </tr> </tbody> </table>	Buffer	Buffer Silvicultural Prescriptions	200 ft (61 m)	<ul style="list-style-type: none"> • $\geq 175 \text{ ft}^2$ post-management basal area • 60% post-management canopy closure • No harvesting of existing old growth or potential murrelet trees
Buffer	Buffer Silvicultural Prescriptions				
200 ft (61 m)	<ul style="list-style-type: none"> • $\geq 175 \text{ ft}^2$ post-management basal area • 60% post-management canopy closure • No harvesting of existing old growth or potential murrelet trees 				
C§10.3.2.3.12-7	<p>Permit helicopters at least 200 ft (61 m) away from habitat trees or known Type I or Type II old growth stands unless they have been surveyed according to currently accepted protocols without murrelet detections.</p>				
C§10.3.2.3.12-8	<p>Retain all potential murrelet trees and screen trees.</p>				
C§10.3.2.3.12-9	<p>Permit harvest of secondary murrelet trees if a ground survey determines that it is unlikely murrelets are occupying the surrounding area.</p> <p>NOTE MRC will not harvest old growth trees under this provision.</p>				

10.3.2.3.13 Murrelet habitat in limited protection areas

 Conservation Measures for Murrelet Habitat in the Murrelet Habitat Zones (MHZs) Limited Protection Areas	
Breeding and Non-breeding Season	
C§10.3.2.3.13-1	<p>Retain all primary murrelet habitat trees.</p>
C§10.3.2.3.13-2	<p>Permit harvest of secondary murrelet trees if a ground survey determines that it is unlikely murrelets are occupying the surrounding area.</p>

10.3.2.3.14 Hendy woods state park

MRC will place a 200 ft vegetative buffer around its border with Type I old growth in Hendy Woods State Park. The silviculture will follow the buffer prescription for Type I old-growth stands (C§9.4.3.1-3). This is the only old-growth grove known to be directly adjacent to covered lands. The intent of this action is to provide additional protections for potential murrelet habitat.

10.3.2.3.15 Post termination conservation measures

MRC will maintain LACMA core areas plus connective acreage (i.e., approximately 200-300 ac) for at least 60 years from the issuance of our permit. If any MHZ becomes occupied prior to termination of the plan, MRC will retain these, unharvested, for at least 60 years from the issuance of our permit. Currently 6 areas are MHRS. In addition, MRC will retain a maximum of 200 occupied acres in the plan area for at least 60 years from the issuance of our permit.

10.3.2.3.16 Marbled murrelet recovery plan

USFWS approved the marbled murrelet recovery plan in 1997. The recovery objective is to maintain or increase the productivity of the murrelet population while minimizing threats to their survival. The highlighted text in Table 10-19 is verbatim from the USFWS recovery plan. Each excerpt is succeeded by the anticipated MRC action to comply with its recommendations or incorporate them in this HCP/NCCP.

Table 10-19 USFWS Recovery Criteria and MRC Response

USFWS Recovery Criteria and MRC Response	
Criterion 1	Establish 6 Marbled Murrelet Conservation Zones and develop landscape-level management strategies for each zone (USFWS 1997c, p. vi).
MRC Action	USFWS has yet to develop a management plan for Recovery Zone 5, the category into which all of our forestlands fall.
Criterion 2	Identify and protect terrestrial and marine habitat areas within each Marbled Murrelet Conservation Zone (USFWS 1997c, p. vi).
MRC Action	MRC will cultivate the Lower Alder Creek Management Area (LACMA) for marbled murrelet habitat (C§10.3.2.3.1-3). This area is approximately 1237 ac and has occupied stands. We have also agreed that the wildlife agencies may purchase any MHRS that could provide future habitat for marbled murrelets (C§10.3.2.3.2-2).
Criterion 3	Monitor marbled murrelet populations and habitat and survey potential breeding habitat to identify potential nesting areas (USFWS 1997c, p. vi).
MRC Action	MRC is monitoring with radar our only known murrelet population to follow trends each year in the number of detections in and around Lower Alder Creek (M§13.9.2.1-1). In addition, we will conduct surveys or provide appropriate protections for all potential breeding habitat identified during pre-harvest assessments similar to the USFWS recovery plan (10.3.2.1.2).
Criterion 4	Implement short-term actions to stabilize the murrelet population (USFWS 1997c, p. vi).
MRC Action	MRC will not harvest occupied stands in the Lower Alder Creek area. Moreover, after intensive surveys to detect any murrelet nesting, we will manage all other areas within LACMA for habitat improvement. In addition, we will retain any occupied stands outside of LACMA.
Criterion 5	Implement long-term actions to stop population decline and increase marbled murrelet population growth. (USFWS 1997c, p. vi)

USFWS Recovery Criteria and MRC Response

MRC Action	<p>MRC will maintain and promote potential breeding habitat through various conservation measures:</p> <ul style="list-style-type: none"> • Protection measures for Class I and Class II AMZ to recruit murrelet habitat. • Retention of Type I old growth and primary habitat trees, along with limited harvest within Type II old-growth stands, in order to protect and enhance late-seral value and existing habitat. • Easement protections to grow murrelet habitat.
Criterion 6	Initiate research on survey and monitoring protocols, population estimates, limiting factors, disturbance effects, and additional life history data. (USFWS 1997c, p. vii)
MRC Action	MRC will cooperate with researchers and generally provide access to our lands for scientific studies, if approach and timing of the studies is relevant and feasible.
Criterion 7	Establish a Regional West Coast Data Center.
MRC Action	MRC will provide information and data to regional efforts and respond to additional data requests from agency members, as time permits.

For Recovery Zone 5, the USFWS recovery plan states:

The population is so small that immediate recovery efforts may not be successful at maintaining this population over time and longer term recovery efforts (e.g., developing new potential habitat) may be most important (USFWS 1997 129).

LACMA is entirely within Recovery Zone 5. MRC is managing LACMA to develop new potential murrelet habitat as well as to provide a buffer from wind and fire for existing habitat. We will maintain and promote murrelet habitat with

- Protections for Class I and Class II AMZ.
- Retention of Type I old growth and primary murrelet habitat trees.
- Limited harvest of Type II old growth.
- Easements.
- Recruitment of new murrelet trees in upland stands through the conservation measures for wildlife trees, snags, and screen trees.
- Designation of 6 Murrelet Habitat Recruitment Stands (MHRS) in 5 inventory blocks as backup in the event there is a catastrophe in LACMA.

10.3.2.4 Rationale

10.3.2.4.1 Rationale for overall approach in LACMA

MRC designed the Lower Alder Creek Murrelet Area (LACMA) to protect the population of murrelets using the Lower Alder Creek drainage. Protections focus on Type I and Type II old growth stands, as well as stands known to have been used by murrelets or stands with high potential for murrelet occupancy. These core areas are off limits to most management operations. Around these stands, we also designate a zone in which MRC may only undertake measures

designed to accelerate habitat growth and value. With the required approval of the wildlife agencies, MRC can manage vegetation in these habitat areas. Finally, we will designate an area for vegetation management to buffer core and habitat areas from adjacent activities and to reduce edge effects (such as wind, solar radiation, and predation) as Chen et al. (1995) suggest.²⁶ This will also reduce adverse effects on the interior habitat for murrelets.

10.3.2.4.2 Rationale for protection levels

Murrelet nests are generally in old-growth stands. Fewer nests are in stands with residual old-growth trees interlaced with second growth trees. In defining a grouping of potential habitat trees, MRC uses 100 ft as the maximum distance between trees in the group. In our professional judgment, this is the distance at which large trees have enough canopy overlay to qualify as 1 clump.

10.3.2.4.3 Rationale for MHZ and associated protection levels

MRC believes murrelets are most likely to use areas within 5 miles of the coast with a higher density of large trees. Though murrelets will use an area 5-10 miles inland in lower drainages, these areas are less likely to be used than areas closer to the coast. Murrelets are least likely to use areas more than 10 miles inland and at the tops of ridges, or areas with fewer potential habitat trees. We know of no occupied murrelet behavior beyond 10 miles of the coast in Recovery Unit 5. Due to a recent discovery of 2 stands 7 and 8.5 miles inland in which murrelets were exhibiting occupancy behavior,²⁷ we set up an intermediate zone of 5-10 miles on the lower 1/3 of a slope. We also followed the advice of our HCP/NCCP Science Panel in defining these zones (Noss 2003, 52). However, we have not actually found an occupied stand in the plan area that was more than 5 miles from the coast; additionally, we are not aware of any detections of murrelets more than 10 miles from the coast in Mendocino County. For graphical representations, see the Marbled Murrelet Protection Zone maps in Appendix B, *HCP/NCCP Atlas* (MAPS 6A-C).

Table 10-20 Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
1976	Russian Gulch State Park	05/09/1976	2	unknown	Paton and Ralph 1988	Ground
1988	East of town of Mendocino	11/16/1988	2	0.6	Paton and Ralph 1988	Ground
1994	Lower Alder Creek (4 survey stations, surveyed 24 times)	06/04/1994 06/11/1994 06/18/1994 06/25/1994 07/02/1994 07/08/1994 07/09/1994	486 (mean per survey = 20)	2.2-4.2	MRC	Ground

²⁶ The size of LACMA (1237 ac) is fairly large and fits into the recommendation of Chen et al (1995) to retain larger forest patches.

²⁷ This information came in an e-mail from Scott Fullerton (Campbell Group) to Sarah Billig (MRC) on 2/23/06.

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
		07/22/1994 07/28/1994				
1994	Lower Wages Creek	07/27/1994	2	1.67	Georgia Pacific, Ambrose 1998	Ground
1994	Upper Lower North Fork, 10 mile	08/03/1994	approx. 6	2.8	Georgia Pacific, Ambrose 1998	Ground
1995	Lower Alder Creek (4 survey stations, surveyed a total of 19 times)	05/31/1995 06/07/1995 06/21/1995 07/19/1995 07/26/1995	167 (mean per survey = 8.7)	2.2-4.2	MRC	Ground
1995	Admiral Standley	07/14/1995	2	9.0	Georgia Pacific, Ambrose 1998	Ground
1995	Lower Greenwood Creek	05/25/1995 05/26/1995 06/10/1995 06/24/1995	5 (mean per survey = 1.0)	< 1.0	Louisiana Pacific	Ground
1995	Miller Pond	07/29/1995	2	2.7	Georgia Pacific, Ambrose 1998	Ground
1996	Wages Creek, near Westport	07/24/1996	2	1.5	Georgia Pacific, Ambrose 1998	Ground
1996	Lower Alder Creek	06/14/1996 06/27/1996 07/19/1996	130 (mean per survey = 21.6)	2.2-4.2	MRC	Ground
1997	Skunk Creek	07/29/1997	2	9.75	Georgia Pacific, Ambrose 1998	Ground
1997	Lower Alder Creek	05/16/1997 06/05/1997 07/02/1997	286 (mean per survey = 22)	2.2-4.2	MRC	Ground

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
		07/09/1997 07/23/1997 07/30/1997 08/06/1997				
1998	Lower Alder Creek	05/13/1998 05/20/1998 05/27/1998 06/03/1998 06/09/1998	46 (mean per survey = 9.2)	2.2-4.2	MRC	Ground
1999	Lower Alder Creek	08/03/1999 08/04/1999	8 (mean per survey = 4)	2.2-4.2	MRC	Radar
1999	Lower Greenwood Creek	07/18/1999 07/19/1999 07/27/1999 07/29/1999 07/31/1999	7 (mean per survey = 1.4)	0.5	MRC	Radar
1999	Stewart's Point	07/21/1999	16	3	E. Burkett survey information	Ground
1999	Stewart's Point	07/21/1999	20	2	E. Burkett survey information	Ground
2000	Mouth of the Albion	07/05/2000 07/28/2000 07/30/2000	0	0.5	MRC	Ground
2000	Mouth of the Albion	07/04/2000 07/05/2000 07/28/2000 07/30/2000	13 (mean per survey = 3.3)	0.5	MRC	Radar
2000	Navarro Head	06/28/2000 06/29/2000 07/27/2000	6 (mean per survey = 2.0)	0.5	MRC	Ground
2000	Lower Navarro River	07/29/2000	24	1.1	MRC	Radar
2000	Lower Alder Creek	07/01/2000 07/02/2000 07/23/2000 07/25/2000	120 (mean per survey = 30)	2.2-4.2	MRC	Radar
2000	Greenwood Creek	06/30/2000	30	0.5	MRC	Radar

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
		07/06/2000 07/24/2000 07/26/2000	(mean per survey = 7.5)			
2001	Lower Albion River	06/30/2001 07/01/2001 07/30/2001	6 (mean per survey = 2)	1.1	MRC	Radar
2001	Lower Alder Creek	07/02/2001 07/03/2001 07/31/2001	69 (mean per survey = 7.7)	2.2-4.2	MRC	Ground and Radar
2001	Navarro River, along 128	06/22/2001	5	4.2	MRC	Radar
2001	Navarro River, along 128	06/21/2001	5	1.1	MRC	Radar
2001	Lower Greenwood/Morrison (1 survey, radar detection)	07/05/2001	1	4.7	MRC	Radar
2002	Lower Albion River	07/04/2002 07/30/2002 07/31/2002	3 (mean per survey = 1)	2.9	MRC	Radar
2002	Lower Alder Creek	07/01/2002	11	2.2	MRC	Radar
2002	Lower Elk Creek	07/05/2002 07/22/2002 07/29/2002	2 (mean per survey = 0.67)	0.6	MRC	Radar
2002	Lower Greenwood Creek	07/02/2002 07/21/2002 07/29/2002	0	5	MRC	Radar
2002	Navarro River, along 128	07/03/2002	6	1.1	MRC	Radar
2002	Navarro River, along 128	07/31/2002	0	4.2	MRC	Radar
2002	Navarro River, along 128	07/07/2002	2	7.3	MRC	Radar
2002	Lower Alder Creek	07/10/2002 07/11/2002 07/17/2002 07/26/2002 07/30/2002	8 (mean per survey = 1.6)	4.2	MRC	Radar
2002	West Brushy (in lower Alder Creek)	04/30/2002 07/01/2002 07/08/2002 07/30/2002	120 (mean per survey date = 30)	3.8	MRC	Ground
2002	Lower Alder Creek	4/30/2002 07/01/2002 07/08/2002 07/10/2002 07/12/2002 07/17/2002	12 (mean per survey = 1.7)	2.2	MRC	Ground
2002	Lower Alder Creek, near mouth	07/01/2002	23	1.4	MRC	Ground

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
2003	Lower Alder Creek, mouth	07/23/2003 07/28/2003	67 (mean per survey = 33.5)	1.0	MRC	Radar
2003	Lower Alder Creek, rock quarry	07/24/2003 07/29/2003	11 (mean per survey = 5.5)	2.8	MRC	Radar
2003	West Brushy (in Lower Alder Creek)	07/22/2003 07/25/2003	4 (mean per survey = 2)	4.2	MRC	Radar
2003	Irish Gulch	04/26/2003 06/06/2003 06/24/2003 07/14/2003 07/28/2003	5 (mean per survey = 1), distant detections	2.5	MRC	Ground
2003	Lower Alder Creek	07/01/2003	23	2.8	MRC	Ground
2003	Lower Alder Creek	07/29/2003	53	2.7	MRC	Ground
2003	Lower Alder Creek (near mouth)	07/23/2003	5	1.7	MRC	Ground
2003	Lower Alder Creek	07/24/2003	52	2.9	MRC	Ground
2003	West Brushy (in Lower Alder Creek)	05/06/2003 06/06/2003 07/03/2003 07/17/2003 07/25/2003	43 (mean per survey date = 8.6)	4.2	MRC	Ground
2003	Horsetail (Hawthorne Timber lands)	Unknown	unknown	7.0	Fullerton, e-mail 02/23/06	Ground
2003	Gulch 16 (Hawthorne Timber lands)	Unknown	unknown	8.5	Fullerton, e-mail 02/23/06	Ground
2004	Lower Alder Creek (near mouth)	07/20/2004 07/22/2004	50 (mean per survey = 25)	1.7	MRC	Radar
2004	Lower Alder Creek (rock quarry)	07/21/2004 07/23/2004	24 (mean per survey = 12)	2.8	MRC	Radar
2004	Irish Gulch	07/23/2004	3	2.5	MRC	Ground ²⁸
2004	West Brushy (in Lower Alder Creek)	07/24/2004 07/25/2004	1 (mean per survey = 0.5)	4.2	MRC	Radar
2005	Lower Alder Creek (mouth)	07/17/2005 07/21/2005	50 (mean per survey = 25)	1.7	MRC	Radar
2005	Lower Alder Creek (rock quarry)	07/18/2005 07/22/2005	4 (mean per survey = 2)	2.5	MRC	Radar
2005	West Brushy (in Lower Alder Creek)	07/19/2005 07/20/2005	1 (mean per survey = 0.5)	4.2	MRC	Radar

²⁸ The detections at this survey station actually came from the Lower Alder Creek drainage and were not attributed to this particular project area but rather to the LACMA area.

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
2005	Big River	07/21/2005 07/23/2005	2	5.9	Stacy Martinelli, CDFG	Ground
2007	Lower Alder Creek (mouth)	06/27/2007 07/04/2007 07/11/2007 07/27/2007 07/31/2007	57 (mean per survey = 11.4)	0.5	MRC	Radar
2007	Lower Alder creek (west of rock quarry)	07/17/2007 07/24/2007 07/25/2007 07/26/2007 07/30/2007	13 (mean per survey = 2.8)	1.7	MRC	Radar
2008	Lower Alder Creek (mouth)	07/15/2008 07/18/2008 07/25/2008 07/28/2008 08/01/2008 08/07/2008	192 (mean per survey = 38.4)	0.5	MRC	Radar
2008	Lower Alder Creek (west of rock quarry)	07/09/2008 07/16/2008 07/27/2008 07/29/2008 08/03/2008	2 (mean per survey = 0.4)	1.7	MRC	Radar
2008	Russell Brook A ²⁹	05/07/2008 07/10/2008	13 (mean per survey = 6.5)	16.3	MRC	Radar
2008	Russell Brook B ²⁸	06/20/2008 07/17/2008 07/24/2008	2 (mean per survey = 0.67)	17.5	MRC	Radar
2008	North Fork Garcia River	06/18/2008	3	6.5	MRC	Radar
2008	Navarro River, along 128	06/11/2008	2	1.1	MRC	Radar
2008	Marsh Gulch	07/25/2008	1	1.6	MRC	Ground
2009	Lower Alder Creek (mouth)	07/25/2009 07/28/2009 07/30/2009	165 (mean per survey = 55)	0.5	MRC	Radar
2009	Lower Alder Creek (west of rock quarry)	07/21/2009 07/24/2009 07/26/2009 07/27/2009	36 (mean per survey = 9)	1.7	MRC	Radar
2009	Owl Creek (above Alder Creek)	07/18/2009 07/06/2009	4 (mean per survey = 2)	2.0	MRC	Ground

²⁹ Note these surveys include only “murrelet-type” detections. The detections in Russell Brook were never verified as actual murrelets, based on factors such as flight speed and time of detection as well as observations from biologists on the ground. It was presumed that these detections were more likely band-tailed pigeons than actual murrelets. However, they were classified as “murrelet-type” detections.

Murrelet Detections: Mendocino County (1976-2005) and MRC (1998-2010)						
Year	Location	Dates	Total Annual Detections	Miles Inland	Source	Survey Type
2010	Lower Alder Creek (mouth)	07/20/2010 07/23/2010 07/08/2010 07/16/2010 07/05/2010 07/29/2010 07/26/2010	318 (mean per survey = 45.4)	0.5	MRC	Radar
2010	Lower Alder Creek (west of rock quarry)	07/21/2010 07/22/2010 07/14/2010 07/30/2010 07/23/2010 07/28/2010	73 (mean per survey = 12.2)	1.7	MRC	Radar

MRC protection levels provide protection less than current occupancy standards. These protections will apply when MRC is able to find the requisite number of potential habitat trees nearby. In each case, we provide protections that are greater than if the area had been surveyed and determined to be absent of murrelets. We believe the vast majority of these stands do not have murrelets present; MRC conducted over 250 surveys outside of Alder Creek since 1994 with ground detections only on the Greenwood Creek watershed in 1995. There was also ground detection on Navarro Head in 2000 by surveyors associated with MRC; however, the detected location was not in the plan area. Within our HCP/NCCP Atlas, MAPS 6A-C show our murrelet survey stations and pinpoint our detections. Therefore, if these areas remain un-surveyed, they are likely to receive greater protection than they would under standard protection measures, i.e., no specific protections for absent areas with potential habitat.

10.3.2.4.4 Rationale for additional protection around old-growth

Type I and Type II old-growth stands are the most likely places for murrelet detections outside of the coastal zone. MRC will protect these stands with its old-growth conservation strategy. This strategy provides the greatest protection in zones where trees are densest.

10.3.2.4.5 Rationale for murrelet habitat tree criteria

MRC has based its criteria for murrelet habitat trees on our knowledge of known nest trees within northern California. Size minimums were from measured nest trees in California. According to a summary of dbh of murrelet nest trees in California presented in Carey et al. (2003), mean dbh of murrelet nest trees is 121 in. (308 cm) with a range of 54 in. (139 cm) to 210 in. (533 cm). The MRC minimum size for potential habitat trees is less than the minimum dbh of all measured nest trees in California. Selection of potential tree species includes those in which murrelets have been known to nest, with the exception of red alder. Probably the most important attribute of a potential habitat tree is the presence of platforms with a diameter large enough to hold a murrelet egg (Carey et al. 2003). In California, as Table 10-21 shows, murrelet nests have been located on branches ranging from 6.3-14.6 in., with a mean value of 9.7 in. (24.3 cm). We chose to be conservative and use a minimum of 6 in. (10 cm). Despite the fact that the science panel did not recommend using the amount of cover above the nest as a criterion, MRC chose to include it in describing nest sites (Table 10-21) because of its common acceptance. A study in Oregon, for example, indicated that nest trees had more canopy cover than randomly selected trees (Nelson and Wilson 2002). The mean cover above nests in California was 87% (Nelson 1997). By using a

canopy cover less than the mean for potential murrelet trees, we are allowing more trees to be called potential murrelet trees. This is a conservative approach; it ensures that even trees that may be outside the typical range for murrelet nest trees are still counted as potential trees. Finally, MRC chose to accept the advice of our HCP/NCCP science panel (Noss et al. 2003) that murrelet platforms should be horizontal and + or – 45 degrees, in order to retain a murrelet egg.

Rationale for primary and secondary murrelet tree criteria

While MRC and the wildlife agencies agree that murrelets are more likely to use trees with larger nest platforms, MRC has also categorized a class of secondary murrelet trees. These trees will receive disturbance and habitat protection as shown in Table 10-16. Unlike primary murrelet trees, MRC may harvest secondary murrelet trees if we have met radar and ground survey requirements.

Table 10-21 Characteristics of Murrelet Nest Trees in the Pacific Northwest

Nest Tree Characteristics	California	Oregon	Washington
Tree Species	Coast Redwood (9) Douglas Fir (4) Western Hemlock (1) <i>n</i> = 14	Douglas Fir (32) Western Hemlock (11) Sitka Spruce (1) Western Red Cedar (1) <i>n</i> = 45	Douglas Fir (3) Western Hemlock (3) <i>n</i> = 6
Tree diameter (in.)	121.5 ± 16.4 54.7 - 209.8 14	64.8 ± 3.1 29.9 - 109.8 45	58.9 ± 7.3 34.8 - 86.6 6
Tree height (ft)	239.8 ± 9.2 160.1 - 283.8 14	201.8 ± 6.6 118.1 - 279.2 45	188.3 ± 12.1 148.0 - 213.3 5
Nest branch height (ft)	153.9 ± 10.2 104.0 - 221.5 14	137.5 ± 7.2 44.6 - 245.4 44	111.2 ± 18.0 65.9 - 173.6 6
Branch diameter at nest (in.)	9.7 ± 1.2 6.3 - 14.6 6	13.3 ± 1.5 3.9 - 24.8 12	11.6 ± 3.0 4.2 - 18.1 4
Branch crown position (%)	64.3 ± 3.3 50.0 - 91.0 14	67.8 ± 2.6 26.0 - 98.0 44	63.4 ± 7.7 41.0 - 82.0 5
Nest platform length (in.)	9.6 ± 1.5 3.7 - 16.5 10	21.8 ± 2.8 3.0 - 98.4 44	12.1 ± 2.8 3.9 - 22.4 6
Nest platform width (in.)	7.8 ± 1.6 2.6 - 20.0 10	10.6 ± 0.7 2.8 - 20.8 44	9.8 ± 1.9 3.9 - 15.4 6
Percent moss on platform	42.2 ± 14.7 0 - 100.0 12	89.5 ± 2.7 50.0 - 100.0 31	58.0 ± 19.8 5.0 - 100.0 5
Moss depth on platform (in.)	0.5 ± 0.3 0 - 3.2 12	1.9 ± 0.16 0 - 4.7 43	0.6 ± 0.3 0 - 1.4 5
Percent cover above nest	87.1 ± 7.9 5.0 - 100.0 13	78.1 ± 3.3 5.0 - 100.0 41	89.2 ± 4.4 70.0 - 100.0 6

TABLE NOTES

Data source: USFWS 1997c.

Data reported as mean ± SE, range, and sample size

10.3.3 Point Arena mountain beaver (PAMB)

10.3.3.1 Overview

MRC conservation measures for the Point Arena mountain beaver

- Provide 2007 take-avoidance protections to existing burrow systems.
- Survey for new burrow systems.
- Protect un-surveyed habitat.
- Encourage new habitat for mountain beavers through timber harvest.

In creating opportunities for new colonization of mountain beavers, our measures promote the survival of this species.

For operational purposes and by agreement between MRC and the wildlife agencies, the breeding season for Point Arena mountain beaver is December 1–June 30. The assumption behind our conservation measures is that disturbance is most critical during the breeding season, when MRC applies disturbance measures. MRC may still use existing roads at any time for maintenance, hauling, or administration, without a required survey or buffer.

MRC will also implement specific conservation measures for the Point Arena mountain beaver. Our HCP/NCCP assessment area for the Point Arena mountain beaver is 5 miles inland from the Pacific Ocean, extending from a point 2 miles north of Bridgeport Landing to a point 5 miles south of the town of Point Arena (*HCP/NCCP Information Atlas*, MAP 21). The distribution of the Point Arena mountain beaver on MRC covered lands is not likely to extend beyond this area.

If MRC adds land to the plan area, we will expand the assessment area of the Point Arena mountain beaver to include all areas that USFWS considers within the potential range of this species.

10.3.3.1.1 PAMB surveys

Prior to conducting covered activities, MRC will follow the procedures delineated in Appendix M, *Point Arena Mountain Beaver Protocol*. We will map the distribution of any potential habitat of mountain beaver in the assessment area as we conduct surveys. If we have met our objective for protected burrow systems (O10.3.3.2-1) and our surveys determine that a burrow system is inactive, we will obtain the approval of the wildlife agencies to designate the burrow system as such and release its area from all conservation measures. We will survey for burrows within

- 100 ft of above-ground noise generating equipment, i.e., mechanical equipment that contacts the ground and causes ground vibrations while felling, yarding, removing downed wood, and burning.
- 200 ft of habitat modification.
- 400 ft of habitat removal.
- 500 ft of mechanical equipment that contacts the ground and causes severe ground vibrations.

10.3.3.2 Biological goals and objectives

Goal and Objectives for Point Arena Mountain Beaver	
Goal	
G§10.3.3.2-1	Maintain or increase the population of Point Arena mountain beaver by increasing the amount and quality of their current habitat in the plan area.

Goal and Objectives for Point Arena Mountain Beaver	
Objective	
O§10.3.3.2-1	Maintain or enhance at least 85% of the known burrow systems of Point Arena mountain beaver in the plan area (i.e., 12 of 14). ³⁰
O§10.3.3.2-2	Create at least 1 site of potential habitat for each active burrow system when harvest occurs within the assessment area for Point Arena Mountain Beaver.

10.3.3.2.1 Potential habitat

DEFINITION

Suitable habitat for the Point Arena mountain beaver includes coastal scrub, the edges of conifer forest, and riparian plant communities where there is a cool climate, adequate soil drainage, and many small herbaceous and woody plants.

In order to create habitat to address O§10.3.3.2-2, MRC will

- Assess after harvest whether a managed area meets the habitat description.
- Review the new habitat for burrow systems for 5 years following timber harvest.

Prior to harvest operations, MRC will also assess whether a burrow system is a candidate for adaptive management. Our effectiveness monitoring will address whether a particular timber harvest can create expansion habitat for Point Arena mountain beaver burrow systems (M§13.9.3.1-2). It will evaluate if creating habitat proximal to existing burrow systems is successful. If the evaluation indicates that is successful, MRC may harvest adjacent to existing burrow systems under validation monitoring (M§13.9.3.2-2).

10.3.3.3 Conservation measures

The assumption behind our conservation measures is that disturbance is most critical during the breeding season. The conservation measures, therefore, focus on 3 time-frames: general, breeding season, and non-breeding season. Table 10-22 defines these timeframes.

Table 10-22 Timeframes for PAMB Conservation Measures

General	Breeding Season	Non-breeding Season
Apply at all times of the year	Apply December 1-June 30	Apply outside the breeding season

 Conservation Measures for Point Arena Mountain Beavers (PAMB)	
General	
C§10.3.3.3-1	Prohibit timber operations (including felling, yarding, and construction of firelines) in any contiguous habitat area that is within 200 ft of active PAMB burrows or un-surveyed suitable PAMB habitat. NOTE Patches of habitat are contiguous only if they are less than 50 ft apart.

³⁰ MRC and the wildlife agencies recognize that some of these PAMB burrow systems may eventually become overgrown with vegetation and, consequently, unoccupied. For this reason, we are committed to maintain or enhance at least 85% of the PAMB burrow systems in our baseline distribution.

 Conservation Measures for Point Arena Mountain Beavers (PAMB)	
C§10.3.3.3-2	Prohibit road construction in any contiguous habitat area that is within 400 ft of active PAMB burrows or un-surveyed suitable PAMB habitat.
C§10.3.3.3-3	Prohibit salvage operations within 100 ft of known existing PAMB burrow systems.
C§10.3.3.3-4	Prohibit foot traffic that might cause burrow collapse within 25 ft of active PAMB burrow systems or un-surveyed potential PAMB habitat. ALLOWABLE USE MRC staff may enter the bounds of an active burrow system or un-surveyed potential habitat when surveying for burrows or conducting HCP/NCCP monitoring.
C§10.3.3.3-5	Fell trees away from un-surveyed potential PAMB habitat or active PAMB burrow systems, unless the wildlife agencies approve an alternative treatment within adaptive management.
C§10.3.3.3-6	Construct or reconstruct roads to maintain or enhance hydrologic conditions in the vicinity of PAMB burrow systems. NOTE MRC will only modify local hydrology with the approval of the wildlife agencies.
C§10.3.3.3-7	Prohibit construction of permanent barriers, including fences and permanent openings greater than 50 ft (15 m), which might disrupt dispersal or movement between occupied PAMB colonies.
C§10.3.3.3-8	Conduct rodent control, including trapping, at least 500 ft (152.5 m) away from active PAMB burrows or un-surveyed potential PAMB habitat.
C§10.3.3.3-9	Conduct outdoor rodent control within PAMB assessment areas only with individuals approved as PAMB surveyors.
C§10.3.3.3-10	Restrain domestic dogs on a 6-ft leash in areas containing PAMB burrow systems or un-surveyed potential PAMB habitat.
C§10.3.3.3-11	Conduct blasting at least 500 ft (152.5 m) away from an active PAMB burrow or un-surveyed potential PAMB habitat.
C§10.3.3.3-12	Conduct prescribed burning at least 100 ft away from an active PAMB burrow or un-surveyed potential PAMB habitat.
Breeding Season	
C§10.3.3.3-13	Conduct the following operations (resulting in severe ground disturbance) at least 500 ft (152.5 m) away from an active PAMB burrow or un-surveyed potential PAMB habitat: <ul style="list-style-type: none"> ▪ Use of heavy equipment off roads. ▪ Tractor yarding. ▪ Operation of log landings. ▪ Loading log trucks. ▪ Use of rock pits.

 Conservation Measures for Point Arena Mountain Beavers (PAMB)	
C§10.3.3.3-14	<p>Conduct the following operations (resulting in above-ground noise and ground vibration) at least 100 ft (30.5 m) from an active PAMB burrow system or un-surveyed potential PAMB habitat:</p> <ul style="list-style-type: none"> ▪ Use and maintenance of existing roads for log hauling. ▪ Chainsaw brushing or thinning of non-commercial trees. ▪ Felling commercial trees. ▪ Cable yarding. ▪ Helicopter yarding. ▪ Use of motorized vehicles. ▪ Limbing and bucking. ▪ Maintenance and re-fueling of heavy equipment. ▪ Construction or re-construction of roads. <p>ALLOWABLE USE MRC may yard logs in un-surveyed potential PAMB habitat and occupied PAMB habitat as long as the logs are fully suspended above the habitat. Yarding must occur between 1 hour after sunrise and 1 hour prior to sunset.</p>
C§10.3.3.3-15	<p>Permit the following operations at all times no matter what the distance from active PAMB burrow systems or un-surveyed potential PAMB habitat:</p> <ul style="list-style-type: none"> ▪ Use of mainline roads for log hauling and maintenance of mainline roads as designated by various maps in the HCP/NCCP Atlas. <p>NOTE Maintenance includes actions necessary to use the roads, e.g., knocking down waterbars, grading, and watering. Maintenance does not include actions considered reconstruction of roads under the California Forest Practice Rules (CDF 2006, 14), such as changing the prism of the road. MRC must retain any trees felled for maintenance in forest adjacent to burrow systems or un-surveyed potential habitat.</p> <ul style="list-style-type: none"> ▪ Use of public roads. ▪ Use and maintenance of MRC roads which are at least the same distance from a current active PAMB burrow as a public road or mainline haul road. ▪ Use of pickups and ATVs on roads.
Non-breeding Season	
C§10.3.3.3-16	<p>Conduct the following operations (resulting in severe ground disturbance) at least 100 ft (30.5 m) away from an active PAMB burrow or un-surveyed potential PAMB habitat:</p> <ul style="list-style-type: none"> ▪ Use of heavy equipment off roads. ▪ Tractor yarding. ▪ Operation of log landings. ▪ Loading log trucks. ▪ Use of rock pits. <p>ALLOWABLE USE MRC may schedule these operations within 100 ft (30.5 m) of a known burrow system with prior approval of the wildlife agencies (M§13.9.3.2-2).</p>

 Conservation Measures for Point Arena Mountain Beavers (PAMB)	
C§10.3.3.3-17	<p>Conduct the following operations (resulting in above-ground noise and ground vibration) at least 50 ft from an active PAMB burrow system or un-surveyed potential PAMB habitat:</p> <ul style="list-style-type: none"> ▪ Chainsaw brushing or thinning of non-commercial trees. ▪ Felling commercial trees. ▪ Cable yarding. ▪ Helicopter yarding. ▪ Use of motorized vehicles. ▪ Limbing and bucking. ▪ Maintenance and re-fueling of heavy equipment. ▪ Construction or re-construction of roads. <p>ALLOWABLE USE MRC may yard logs in un-surveyed potential PAMB habitat and occupied PAMB habitat as long as the logs are fully suspended above the habitat. Yarding must occur between 1 hour after sunrise and 1 hour prior to sunset.</p>
C§10.3.3.3-18	<p>Permit the following operations at all times no matter what the distance from active PAMB burrow systems or un-surveyed potential PAMB habitat:</p> <ul style="list-style-type: none"> ▪ Use of mainline roads for log hauling and maintenance of mainline roads as designated by various maps in the HCP/NCCP Atlas. <p>NOTE Maintenance includes actions necessary to use the roads, e.g., knocking down waterbars, grading, and watering. Maintenance does not include actions considered reconstruction of roads under the California Forest Practice Rules (CDF 2006, 14), such as changing the prism of the road. MRC must retain any trees felled for maintenance in forest adjacent to burrow systems or un-surveyed potential habitat.</p> <ul style="list-style-type: none"> ▪ Use of public roads. ▪ Use and maintenance of MRC roads which are at least the same distance from a current active PAMB burrow as a public road or mainline haul road. ▪ Use of pickups and ATVs on roads.

10.3.3.3.2 Point Arena mountain beaver recovery plan

USFWS completed the Point Arena mountain beaver recovery plan in 1998 (USFWS 1998a). The recovery objective is to provide criteria and actions that could result in de-listing the Point Arena mountain beaver. The following highlighted text summarizes points from the USFWS recovery plan (USFWS 1998a, iv-v). Each excerpt is succeeded by the anticipated MRC action to comply with its recommendations or incorporate them in our HCP/NCCP.

Criterion 1	Protect known populations.
MRC Action	MRC will provide protective buffers around occupied and un-surveyed potential habitat. We may employ adaptive management within some of these buffers, with the approval of the wildlife agencies.
Criterion 2	Protect suitable habitat, buffers, and corridors.

MRC Action	MRC will provide protective buffers around occupied and un-surveyed potential habitat. We may employ adaptive management within some of these buffers, with the approval of the wildlife agencies. As part of our validation monitoring, MRC will review harvests within buffers to determine if they provide additional suitable habitat for Point Arena mountain beavers.
Criterion 3	Develop management plans and guidelines.
MRC Action	MRC will generally follow USFWS no-take guidelines. Our conservation goal is to maintain the current existing population and habitat of Point Arena mountain beavers on covered lands. In addition, MRC will create new habitat over the term of our HCP/NCCP with timber harvest and experimental approaches.
Criterion 4	Gather biological and ecological data necessary for conservation of the subspecies.
MRC Action	MRC will study the habitat of Point Arena mountain beavers through our validation monitoring program, including how to create habitat through timber harvest. Moreover, MRC welcomes research proposals related to this species within our forestlands.
Criterion 5	Determine feasibility of, and need for, relocation.
MRC Action	MRC will cooperate with relocation plans if they fit within the management guidelines of our HCP/NCCP.
Criterion 6	Monitor existing populations and survey for new ones.
MRC Action	MRC will monitor the spatial extent of our existing populations every 5 years. Surveys for new sites will occur as part of PTHP process.
Criterion 7	Establish an outreach program.
MRC Action	MRC considers this outside the scope of our current plan.

10.3.3.4 Rationale

Our conservation measures protect Point Arena mountain beavers from the negative effects of timber harvest. MRC does not expect “take” to result from any of these conservation measures. In fact, we expect an increase in potentially suitable habitat for mountain beavers over the course of our HCP/NCCP. We have designed monitoring and adaptive management programs (M§13.9.3.1-1 and M§13.9.3.1-2; M§13.9.3.2-1 and M§13.9.3.2-2) to study the relationship between timber harvests and mountain beaver viability. In addition, we will continue to monitor existing burrow systems to better understand the population and dynamics of mountain beavers on our land. Research suggests that timber harvest may provide colonization opportunities for mountain beavers once the harvest is concluded (Hooven 1973, Neal and Borrecco 1981). If we can create suitable habitat from timber harvest, we expect our HCP/NCCP to protect existing colonies of Point Arena mountain beavers in the plan area and also to provide opportunities for colonization of new burrow systems there.

