# RSA assessment process and outcome

## Introduction

During MRC/HRC's 2022 FSC surveillance audit, the following Corrective Action (2022.4) was identified:

☒ **Non-Conformity Evidence**  ☐ **Observation Justification and/or Explanation**

*The Representative Sample Area analysis conducted by HRC/MRC does not fully document the ecosystems that would naturally exist on the FMU and assess the adequacy of their protection on the landscape. The organization has developed and identified a list of 33 ecosystems which naturally occur on the management unit, but these have not all been mapped on the FMU or assessed as to the adequacy of their representation and protection on the landscape. HRC has designated a list of specific RSAs, but there is not an adequate explanation of why these ecosystems were chosen. The organization must document the ecosystems that would naturally exist on the FMU and assess the adequacy of their representation and protection in the landscape.*

In November of 2022, MRC/HRC convened a team of internal ecologists and scientists to begin work on a new RSA analysis to ensure all required steps of the RSA assessment process were followed. Our goal was to correctly review and assess the potential ecosystems and successional stages that would naturally exist on the FMU and assess their adequacy of representation and protection in the landscape and then to assign RSAs for any ecosystems where existing areas within the landscape are not of adequate protection, size, and configuration to serve as representative samples. In concept this process is simple, however, it took several months of review, gathering data sets, checking sites in the field, and confirming the existence of sites on our timberlands. In the end, a total of ten ecosystem types were identified (Table 1) as needing RSAs on the timberlands, covering a total of 644.73 acres. Additionally, the RSA team reviewed and determined appropriate management prescriptions for these stands with professional knowledge of those systems and management required to maintain them.

Table 1. RSA types and associated acres.

| TYPE | ACRES |
|---|---|
| BISHOP PINE FOREST | 9.88 |
| CALIFORNIA BLACK OAK FOREST AND WOODLAND | 51.3 |
| CHAPARRAL | 16.72 |
| CLIFF AND OUTCROP | 57.31 |
| COASTAL SCRUB | 52.33 |
| MARSH | 35.12 |
| MONTANE RIPARIAN | 26.74 |
| GRASSLAND | 70.44 |
| OREGON WHITE OAK WOODLAND | 145.98 |
| TANOAK WOODLAND | 178.89 |
| TOTAL | 644.73 |

The team involved in this process included: Sal Chinnici (Director, Forest Sciences), Josh Petitmermet (Manager, Forest Inventory) James Regan (Lead Botanist, HRC), Hayley Ross (Stewardship Project Manager), and Sarah Billig (Director, Stewardship). In addition, other members of the Forestry and Forest Sciences staff were consulted regarding individual site characteristics.

## Assessment Process

The assessment process required the following steps, which will be detailed in the following sections of this document:

1. Assess ecoregion.
2. Define scale and existing information to complete this analysis.
3. Identify all existing natural communities, ecosystems, forest types, etc.
4. Identify missing types, analyze if this is an error or if restoration is needed.
5. Conduct gap analysis for all considered potential and existing types and identify types that need RSAs
6. Assess successional types for additional RSAs.
7. Assess need for RSA type 3 – protected areas for species, communities, and community types not captured in other areas of the standard.
8. Assess the need to protect outstanding examples of common community types.
9. Develop management prescriptions for each identified RSA.

### Step 1: Ecoregion definition

Appendix D of the US Forest Management Standard (V1-0 approved July 8, 2010) states, "For the purposes of Representative Sample Areas (RSA) assessments, a "landscape" is defined as an ecological section as defined by Cleland (2005), which is an update of the Bailey/USFS classification system." (page 107). Team member Sarah Billig downloaded the ecological sections from the website: https://data.fs.usda.gov/geodata/edw/datasets.php?dsetCategory=geoscientificinformation)[1]. Both MRC and HRC properties are almost completely subsumed within section 263a – Northern California Coast Range. They are in Province 263 – California Coastal Steppe-Mixed Redwood-Forest; Division 260 – Mediterranean Division, and Domain 200 – Humid Temperate Domain. Therefore, ecoregion 263a is our "landscape" to utilize for gap analysis.

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[1] Note some of the web links noted in this report note that actual physical link address while others use a hyper link copied from the website. Each of these sites was easy to find with a simple internet search if the hyper-link does not work in the electronic version of this document.
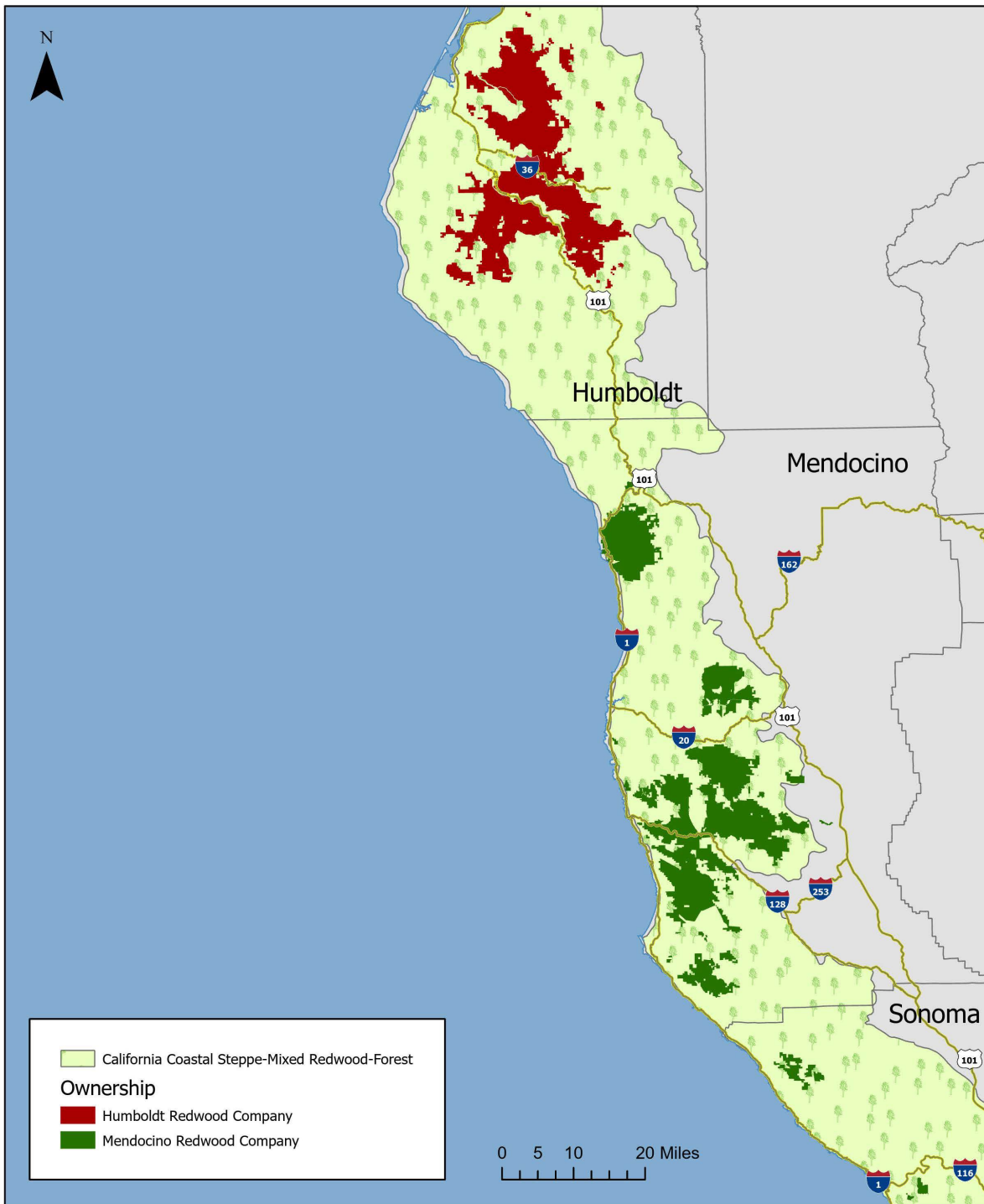
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Figure 1. Map of MRC and HRC timberlands within ecoregion extent.

## Step 2: Define scale and existing information to complete this analysis.

Understanding the scale at which polygons would be assessed for potential inclusion as an RSA was important to determine how the team would go about the analysis. The evaluation was made significantly more difficult due to the lack of mapping of S1, S2, and S3 communities by the state Natural Heritage Program (California Natural Diversity Database [CNDDB]). However, the mapping effort is currently ongoing[2] on both MRC and HRC currently. Once results are available, MRC and HRC will review this assessment to determine if any changes need to be made. Applicability guidance for indicator 6.3.a.2 in the standard (p 38) states, "In states where S1, S2 or S3 communities are not mapped by the Natural Heritage Program, the best available data for S1-3 communities' occurrences and finest resolution of classification commonly available in that state should be used." The RSA team decided to utilize any mapping available to 1 -acre in size (these are the minimum mapping units used in the CNDDB); however, given the lack of detailed information available the team decided to use the Alliance level rather than the Associations due to the lack of detailed mapping by the state Natural Heritage Program. When data exists, we will map a minimum mapping unit of a 1-acre polygon (i.e., botany surveys identify a rare habitat that is not protected within the landscape); typically, however, potential RSAs will be identified at the scale of a forest stand – the resolution at which most of our data exists.

A variety of data sets were reviewed for use in this analysis. Internal data sets include MRC and HRC's forest inventory data, previous RSA analyses and polygons, rare plant surveys, and aerial photos from both timberlands. External data utilized in the analysis included the following:

A.  LANDFIRE provided two datasets used in this analysis, (1) Existing vegetation type (EVT) and (2) Biophysical settings (BPS). EVT represents the current distribution of the terrestrial ecological system classifications developed by NatureServe. The EVT dataset was downloaded from the following location: LANDFIRE Program: Data Product Mosaic Downloads[i] and was last updated in 2020. BPS represents the vegetation system that may have been dominant on the landscape prior to European settlement. This data set is based on both current biophysical settings and approximate historical disturbance regimes. We downloaded this data set from: LANDFIRE Program: Data Product Mosaic Downloads last updated in 2016.
B.  The California Natural Resources Agency provided two relevant datasets, (1) California Conservation Easements Database (CCED) last updated in 2022, and (2) the California Protected Areas Database (CPAD). The CCED contains lands protected under Conservation Easements while the CPAD contains lands that are owned in fee and protected by public agencies and non-profit

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[2] The information about the project is located here: e: https://wildlife.ca.gov/Data/VegCAMP. **"Fine-scale Vegetation Sampling and Mapping of the Northern California Coast and Coast Ranges:** This project began in the Spring of 2022 and will produce a vegetation classification for the Northern California Coast and Coast Ranges as well as a map covering 1.17 million acres within the Northern California Coast. Over six million acres will be sampled between spring of 2022 and fall of 2023 to develop the vegetation classification. Sampling is scheduled to be completed by the end of 2023 and mapping is scheduled to be completed by the end of 2025."

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organizations. Importantly, these datasets included an assessment of acres by Gap Status in each polygon (Gap Status 1, 2, 3, or 4). The CCED database was downloaded from this site: California Conservation Easement Database - Datasets - California Natural Resources Agency Open Data. While the CPAD was downloaded from this site: California Protected Areas Database - California Protected Areas Database 2023a release - California Open Data.

## Step 3: Identification of all existing natural communities, ecosystems, forest types, etc. as well as those that would have existed prior to European settlement.

Existing natural communities were identified based on best available data. This was a multi-step process beginning with using existing forest inventory tree list data to map potential habitat types on MRC/HRC timberlands as a function of relative canopy cover (Table 1). Cover types were initially assigned with standard thresholds found in Alliance assignment guidance documentation[3](the two- and four-letter cover types that do not end in "7") but this process failed to adequately describe a significant portion of the mixed redwood / Douglas-fir / tanoak stands that occur across the ownership. To reduce the number of acres without categorization a second "XYZ7" classification system was added to better delineate these acres, assigning the remaining unclassified stands where the combination of redwood, Douglas-fir, and tanoak comprised more than 70% of relative canopy cover to a code with each species listed in order or relative abundance followed by a "7" to indicate a 70% threshold. The addition of the XYZ7 classifications reduced the number of unknown / unclassified acres to less than 2% of the acres under ownership (Table 2).

Table 2. Ruleset for Assigning Internal Forest Type as a Function of Relative Canopy Cover[4]

| Internal Forest Type | Relative Cover Requirements | Cover Types |
|---|---|---|
| Redwood Forest | RW > 50% or RW + DF + TO > 70% with redwood leading or second to tanoak | RW, RDT7, RTD7, TRD7 |
| Douglas-fir Forest | DF > 50% | DF |
| Douglas-fir tanoak Forest | DF > 25% and TO > 25% or RW + DF + TO > 70% with Douglas-fir leading or second to tanoak | DFTO, DRT7, DTR7, TDR7 |
| Tanoak Forest | TO > 50% | TO |
| Black Oak Woodland | BO > 50% | BO |

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[3] The guidance can be found in the following document: Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, CA. 1300 pp. CNPS. [2023]. A Manual of California Vegetation, Online Edition. http://www.cnps.org/cnps/vegetation/; searched on [2/1/23]. California Native Plant Society, Sacramento, CA

[4] Excludes an additional ten cover types that were included in classification logic but returned no on-ownership acres during the analysis and one cover type that was assigned to a single stand but rejected as an artifact of unrelated modeling processes.

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| White Oak Woodland | WO > 30% | WO |
|---|---|---|
| Bishop Pine Monterey Pine Forest | BP > 15% or MP > 30% | BPMP |
| California Bay-Laurel Forest | CL > 30% | CL |

Table 3. Acres by Internal Forest Type and Ownership[5].

| Internal Forest Type | MRC Acres | HRC Acres | Total Acres |
|---|---|---|---|
| Redwood Forest | 83,808 | 128,237 | 212,045 |
| Douglas-fir Forest | 13,631 | 19,806 | 33,437 |
| Douglas-fir Tanoak Forest | 91,667 | 30,203 | 121,869 |
| Tanoak Forest | 35,048 | 23,171 | 58,220 |
| Black Oak Woodland | 52 | - | 52 |
| White Oak Woodland | 589 | 31 | 620 |
| Bishop Pine Monterey Pine Forest | 247 | - | 247 |
| California Bay-Laurel Forest | 119 | 41 | 160 |
| Non-Forest | 4,497 | 6,722 | 11,219 |
| Unknown | 2,761 | 2,912 | 5,673 |
| Total | 232,420 | 211,123 | 443,543 |

Given that these results came from tree lists derived from both on-the-ground inventory plots and extrapolations of those plots to other stands, they were supplemented with more precise data and mapping where available (i.e., from types discovered during rare plant surveys) for the final RSA product.

Identification of pre-European types was more of a challenge for this assessment. The best dataset we identified is called BPS (Biophysical settings) and is developed by LANDFIRE. This dataset represents the types that may have been dominant on the landscape prior to settlement and is described as, "an approximation of the historical disturbance regime."[6] The map units in this model are based on NatureServe's Ecological Systems classifications. The RSA team reviewed best available information in both the new FSC-US Standard Draft and the existing FSC-US standard (V1.0); and found this source of

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[5] All acres are rounded up to the nearest integer. It is important to note this type of rounding results in rounding errors that can cause total acres to not match property acres. Where rounding errors caused a mismatch in total acres with property acres – the RSA team used best judgment to ensure numbers matched.
[6] LANDFIRE Program: Data Products - Vegetation - Biophysical Settings referenced by Sarah Billig on 7/31/2023.

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information to be the best provided – including checking the websites and information referenced in those standards.

We took each of our internal types and cross-walked them to the EVT and BPS types to better understand how they fit within each and to begin understanding what communities or vegetation types might be missing on our landscape that could potentially exist. Table 3 shows the crosswalk of our internal types to BPS types.

Table 4. Crosswalk of internal types to EVT and BPS types.

| Internal type | EVT and BPS type |
|---|---|
| Redwood Forest | California Coastal Redwood |
| Douglas-fir Forest | Mediterranean California-Mixed Evergreen Forest |
| Douglas-fir tanoak Forest | Mediterranean California-Mixed Evergreen Forest |
| Tanoak Forest | Mediterranean California-Mixed Evergreen Forest |
| Black Oak Woodland | Mediterranean California Lower Montane Black Oak Conifer Forest and Woodland |
| Bishop-Pine-Monterey Pine Forest | California Coastal Closed-Cone Conifer Forest and Woodland |
| California Bay-Laurel Forest | Mediterranean California-Mixed Evergreen Forest |
| White Oak Woodland | Mediterranean California Mixed Oak Woodland |
| Non-Forest | Developed, Open Water, or Barren |
| Unknown | Unknown |

Additional internal types were identified via rare plant surveys and are included in Table 4 with a crosswalk.

Table 5. Crosswalk of types identified via rare plant surveys to EVT and BPS types.

| Types identified via botany surveys | EVT and BPS types |
|---|---|
| Redwood-bishop pine | California Coastal Closed-Cone Conifer Forest and Woodland |
| Red Alder | California Montane Riparian Systems |
| Slough sedge swards | California Montane Riparian Systems |
| Madrone forest | Mediterranean California-Mixed Evergreen Forest |
| California Brome – blue wildrye prairie | North Pacific Montane Grassland |
| California Oatgrass Prairie | North Pacific Montane Grassland |
| Mixed Oak Forest | Mediterranean California-Mixed Evergreen Forest |
| Live Oak Woodland | Mediterranean California-Mixed Evergreen Forest |

Other sources of data included the previous RSA assessment which mapped features such as grasslands, brush, scrub and chaparral, deciduous riparian areas, marsh, bishop pine forests, serpentine outcrops/rock outcroppings, and marsh – these types were also included in the new assessment for gap analysis.

## Step 4: Identify missing types from BPS dataset, analyze if this is an error or if restoration is needed.

RSA team then proceeded to overlay BPS feature data set over MRC and HRC timberlands using GIS software. Acreages of each type within MRC and HRC timberlands were calculated using ESRI-software analytics. Table 5 documents the acres of each BPS type identified on MRC and HRC timberlands.

Table 6. Acres of each type identified on HRC and MRC timberlands from the BPS feature overlay.

| BPS type | Acres MRC | Acres HRC | Total Acres |
|---|---|---|---|
| California Coastal Redwood | 217,891 | 84,771 | 302,662 |
| Mediterranean California Mixed Evergreen Forest | 1,926 | 111,529 | 113,455 |
| Mediterranean California Dry-Mesic Mixed Conifer Forest and Woodland | 3,167 | 1,094 | 4,261 |
| Klamath-Siskiyou Lower Montane Serpentine Mixed Conifer Woodland | 13 | 41 | 53 |
| California Coastal Closed-Cone Conifer Forest and Woodland | 455 | 0 | 455 |
| California Montane Jeffrey Pine (Ponderosa Pine) Woodland | 202 | 0 | 202 |
| North Pacific Maritime Mesic-Wet Douglas-fir Western Hemlock Forest | 0 | 103 | 103 |
| North Pacific Oak Woodland | 1,790 | 2.2 | 1,792 |
| Mediterranean California Mixed Oak Woodland | 895 | 27 | 922 |
| Mediterranean California Lower Montane Black Oak Conifer Forest and Woodland | 1,413 | 184 | 1,597 |
| California Montane Blue Oak Foothill and Pine Woodland and Savannah | 273 | 0 | 273 |
| California Mesic Chaparral | 101 | 2 | 103 |
| California Montane Woodland and Chaparral | 85 | 5 | 90 |
| Northern and Central California Dry Mesic Chapparal | 256 | 0 | 256 |
| Northern California Coastal Scrub | 6 | 1 | 7 |
| Klamath-Siskiyou Xeromorphic Serpentine Savanna and Chaparral | 0 | 61 | 61 |
| California Mesic Serpentine Grassland | 0 | 71 | 71 |
| North Pacific Montane Grassland | 112 | 49 | 161 |
| California Montane Riparian Systems | 2,559 | 10,244 | 12,803 |
| Pacific Coastal Marsh Systems | 14 | 7 | 21 |
| Klamath-Siskiyou Cliff and Outcrop | 3 | 0 | 3 |
| Mediterranean California Coastal Bluff | 14 | 0 | 14 |
| Mediterranean California Northern Coastal Dune | 2 | 0 | 2 |
| Developed, Open Water, or Barren | 492 | 1,054 | 1,545 |

The RSA team proceeded to discuss the types that were identified via the BPS dataset overlay that do not exist in our current typing assessment. The chapparal/scrub types do exist on the timberlands and the team decided to review those types when determining if RSAs need to be assigned. Rocky outcrops exist on both timberlands and will be included in the RSA assessment (they are typically protected due to harboring sensitive species such as the Peregrine falcon). The team agree that the Klamath-Siskiyou Lower Montane Serpentine Mixed Conifer Woodland; Mediterranean California Mesic Mixed Forest and

Woodland, and California Mesic Serpentine Grassland should not exist on either timberland – these are likely an error in the model. The team spent much more time discussing the North Pacific Maritime Mesic-Wet Douglas-fir Western Hemlock Forest. The HRC botanist went back to botany surveys where hemlocks were detected in the understory and reviewed those stands for inclusion. After discussion, it was determined that those hemlocks were likely never the dominant species in the stand and thus should not be included (the BPS model showed one or two potential locations on HRC lands).

## Step 5: Conduct gap analysis for all considered potential and existing types and identify types on the timberlands that should be identified as RSAs.

Once the team had reviewed the existing and modelled pre-European settlement types and acreage, we moved to assessing gaps for protection in these types per Indicator 6.4.a., "The forest owner or manager documents the ecosystems that would naturally exist on the FMU and assesses the adequacy of their representation and protection in the *landscape* (see Criterion 7.1) …. For an area that is not located on the FMU to qualify as a Representative Sample Area (RSA), it should be under permanent protection in its natural state."

We followed the intent language on page 47 of the FSC-US standard to determine where areas off the FMU could qualify as RSAs (Gap Status 1 and 2). For this review, we utilized the datasets, California Protected Areas Database (CPAD) and the California Conservation Easements Datasets (CCED). These datasets were overlaid with the EVT types outside the timberlands to assess acres in Gap Status 1 or 2 for each EVT type identified (as well as BPS types if they existed outside the timberlands). Both datasets provide acres in Gap Status 1, 2, 3, and 4. However, since polygons were broken down into acres by each Gap Status (i.e., one polygon could have acres in status 1 and 4); we considered polygons only with Gap Status 1 or 2 as Representative Sample Areas outside the FMU.

Table 7 depicts the acres by type outside the FMU but within the ecoregion that have Gap Status 1 and 2. Using this information, the team reviewed each and used professional judgment and general intent from the FSC-US standard to determine if an RSA designation was warranted on the timberlands, Guidance on adequacy of representation and protection of RSAs in the landscape:

> As a general guideline, if at least five (5) multiple samples of a specific ecosystem type are protected in a landscape (e.g., ecological section) then no additional samples for that RSA purpose need to be protected on the FMU. Five is not to be considered an absolute number; fewer or more might be appropriate in some cases. (Page 47, FSC-US Standard V1-0).

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Table 7. Analysis of EVT/BPS types and need for RSAs on the FMU.

| Type | FMU acres | FMU polygons | Ecoregion acres[7] (Gap 1, 2) | Ecoregion polygons (Gap 1, 2) | RSA on FMU? | Notes |
|---|---|---|---|---|---|---|
| California Coastal Closed-Cone Conifer Forest and Woodland/Bishop Pine | 459 | 15 | 2,537 | 2,384 | Yes | Identify RSAs for rare associations, also provide RSAs because of global rarity. |
| Mediterranean California Lower Montane Black Oak Conifer Forest and Woodland | 52 | 1 | 81 | 236 | Yes | While there are an appropriate number of polygons (236), the acres are very low indicating small, scattered patches while this stand is a larger polygon. |
| Mediterranean California Mixed Oak Woodland | 589 | 24 | 6,546 | 11,207 | No | Well protected outside FMU |
| California Coastal Redwood | 235,325 | 7,617 | 131,645 | 24,859 | No | Well protected outside FMU |
| Mediterranean California-mixed evergreen forest | 91,657 | 2,655 | 115,193 | 45,156 | No | Well protected outside FMU |
| North Pacific Montane Grassland | 2 | 2 | 0 | 0 | Yes | Recommend RSA – odd that none found on this typing. Additional grassland from previous RSA efforts will also be included to determine which areas to designate. |
| Klamath-Siskiyou Lower Montane Serpentine Mixed Conifer Woodland | 0 | 0 | 55 | 17 | No | Should not exist on FMU |

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[7] Assessed from CPAD and CCED datasets within the ecoregion but outside FMU.

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| Type | FMU acres | FMU polygons | Ecoregion acres[7] (Gap 1, 2) | Ecoregion polygons (Gap 1, 2) | RSA on FMU? | Notes |
|---|---|---|---|---|---|---|
| **Mediterranean California Mesic Mixed Conifer Forest and Woodland** | 0 | 0 | 762 | 548 | No | Should not exist on FMU |
| **North Pacific Maritime Mesic-Wet Douglas-fir Western Hemlock Forest** | 0 | 0 | 0 | 0 | No | Should not exist on FMU |
| **California Chaparral and scrub (all types)** | 0 | 0 | 64 | 175 | Yes | Part of the team analysis involved mapping these types so some could be designated as RSAs. |
| **California Mesic Serpentine Grassland** | 0 | 0 | 27 | 130 | No | Should not exist on FMU. |
| **Cliff and Outcrops** | 0 | 0 | 51 | 130 | Yes | Rocky outcrops/cliffs are included and were re-mapped for this effort to assess RSAs. |

## Step 6: Assess successional types and the need for additional protection, if any.

In addition, the RSA team assessed successional stages and the need for additional RSA assessment of any successional stages on the FMU. This assessment was conducted using the California Wildlife Habitat Relationship to seral state framework established in the HRC Habitat Conservation Plan for tree-based community types in total (excluding vegetation stages that are not tree types). Table 8 shows acres by seral stage (open, young, mid, and late).

Table 8 acres by seral stages on the FMU.

| Seral stage | Acres | Percentage | Notes |
|---|---|---|---|
| **Open** | 777 | <1% | Green Diamond has more acres in this category |
| **Young** | 92,304 | 23% | |
| **Mid** | 262,684 | 64% | |
| **Late** | 52,492 | 13% | |

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The team reviewed this table to determine if RSAs need to be assigned for seral stages. The most limited stage was open stands – these types are well represented on other timberlands in the ecoregion and are commonly developed by the practice of clear-cutting. Our focus on uneven-aged management necessarily limits the number of open stands, however; a move to more variable retention over the next twenty years to re-initiate stand development on stands that require restoration will open more acres. Late seral is well protected within marbled murrelet (*Brachyramphus marmoratus*) conservation areas throughout HRC; and designated old growth and northern spotted owl (*Strix occidentalis caurina*) core habitat areas on both MRC and HRC.

## Step 7: Assess need for RSA type 3 – protected areas for species, communities, and community types not captured in other areas of the standard.

In addition to assessing Existing Vegetation Types for a gap analysis, the RSA team also reviewed rare plant surveys for rare communities that did not rise to the level of HCVF. In assessing these communities, we identified one additional natural community identified in rare plant surveys that should be designated and protected as RSAs. We list these natural communities below.

**Oregon White oak Woodland:** 145.98 acres

Additionally, in reviewing the previous RSA assessment (which was done quite differently than this analysis) we identified the following types that also should be assessed as RSAs under RSA Type 3.

**Montane Riparian:** 26.7 acres

**Marsh:** 35.12 acres

We also identified tanoak woodlands as needing additional RSA protection as RSA type 3 due to their importance for wildlife.

**Tanoak woodland:** 178.89 acres

## Step 8: Assess the need to protect "outstanding examples of common community types."

In reviewing potential areas of outstanding examples of common community types – one outstanding example came up several times. Specifically, the Marbled Murrelet Conservation Areas which are examples of old growth and late seral or potential late seral redwood (and mixed redwood/Douglas-fir stands). The team agrees that these stands meet the bar as Representative Sample Areas, but since they are already protected as High Conservation Value Areas – agreed it was not necessary to list these stands as Representative Sample Areas also as they are already highly protected and conserved.

## Step 9: Develop management prescriptions for each identified RSA

The team developed specific management prescriptions for each identified RSA based on best-available knowledge. These management prescriptions were reviewed with internal experts. Listed below is each RSA with a description and management prescription for designated RSAs.

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1. **Bishop Pine Forest. Acres:** 9.88. **Description:** Typically, Bishop Pine Forest is distinguished from pygmy forest (an HCVF) by the prevalence of bishop pine and redwood/Douglas-fir. Moderate disturbance can mimic fire as a mechanism for regeneration in bishop pine forest. This forest type is preserved outside the timberland's properties on coastal California State Parks. Due to its global rarity, the RSA team decided to provide RSAs for this type.
   **Management prescriptions:** Management activities should be avoided in bishop pine, if feasible. When conducting management activities in these stands, the activities must result in an improvement of key bishop pine stand characteristics (i.e., retain bishop pine trees, restrict tractors to designated skid trails, etc.). Road construction to allow access to adjacent timber stands will occur only if the potential alternatives cause more environmental harm than constructing through the Bishop Pine Forest.

2. **California Black Oak Forest And Woodland. Acres in RSA:** 51.31. **Description[8]:** This ecological system is found throughout California's middle and inner North Coast Ranges, as well as the southern and eastern Klamath Mountains from 600-1,600 m (1,800-4,850 feet) elevation, and the lower slopes of the western Sierra Nevada. It occurs in valleys and lower slopes on a variety of parent materials, including granitics, metamorphic and Franciscan metasedimentary parent material and deep, well-developed soils. It is characterized by woodlands or forests of Ponderosa Pine with one or more oaks. Douglas-fir may co-occur with Ponderosa Pine particularly in the North Coast Ranges and Klamath Mountains. On most sites, the oaks are dominant, forming a dense subcanopy under a more open canopy of the conifers. Stands may have shrubby understories (in the Klamath Mountains and Sierra Nevada) and, more rarely, grassy understories (in North Coast Ranges). Historical fire in this system was likely high frequency but of low intensity. Conifer species, such as Douglas-fir, become more abundant with wildfire suppression.
   **Management prescriptions:** When timber harvesting or road building occurs in the RSA, all black and white oaks shall be retained except where removal is required for road construction. Harvest or restoration activities shall remove encroaching fir ≤ 12" dbh. If possible, use controlled burning to restore and enhance the natural oak woodland habitat type. All management actions must contribute to restoring and enhancing the stand.

3. **Chaparral. Acres in RSA:** 16.72. **Description:** This ecological system occurs in Mediterranean California in the north and south Coast Ranges and the northern Sierra Nevada, on cool northerly and concave slopes with thin, rocky, soils. These systems are highly variable and spotty in distribution, and the composition of individual stands can be very diverse, especially the shrubs (often individual species have low cover). Structurally, this system is sometimes woodland in character, but it can also be an arborescent chaparral, depending on fire history. Herbaceous-dominated serpentine fens (and bogs) are treated in Mediterranean California Serpentine Fen (CES206.953). **Management Prescriptions:** Do not convert to conifer forest. Avoid management in these areas unless management is applied to restore or enhance the chaparral type.

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[8] This description taken from NatureServe. 2018. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 28 August 2018, page 69-70. Copyright © 2018 NatureServe, 4600 North Fairfax Drive, 7th floor Arlington, VA 22203, U.S.A. All Rights Reserved.

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4. **Cliff and outcrops. Acres in RSA**: 57.3. **Description:** Natural rocky outcrops are at least (a) 1 acre in size with ground cover entirely of rock or (b) near vertical rock faces at least 50 feet high and 100 feet long. **Management prescriptions:** Restrict management in the identified cliff and outcrops areas to only those which will enhance or restore the cliff or outcrop habitat.

5. **Coastal scrub. Acres in RSA**: 52.33. **Description**: Coastal scrub is dominated by coyote brush and other common associates such as California blackberry, poison, Coffeeberry, thimbleberry, yellow bush lupine, mimulus, salal, and blue blossom. It may also be found in association with non-native and native grasses, sedges, and rushes. Some coastal sage species are also present including California sagebrush and buckwheat. **Management prescriptions**: Restrict management in the identified coastal scrub areas to only those which will enhance or restore the coastal scrub habitat.

6. **Marsh. Acres: 35.12 Description:**  Marsh areas are found in several areas on MRC and HRC. These marshes provide important habitat for various amphibian and bird species. Thirty-five acres of marsh habitat are designated as HCVF. **Management prescription:** Follow WLPZ, RMZ and floodplain protections in marsh areas.

7. **Montane Riparian. Acres: 26.74. Description:** Deciduous riparian areas are riparian aquatic management zone stands dominated by hardwood species rather than conifers. This is a somewhat rare habitat type and the areas identified in these 57 acres represent the areas designated as RSA. **Management prescription:** Follow Watercourse and Lake Protection Zone (WLPZ, California Forest Practice Rules) and Riparian Management Zone (RMZ, HRC HCP) measures. Prohibit converting to conifer dominance.

8. **North Pacific Montane Grassland (Grassland). Acres in RSA:** 70.44 **Description:** This ecological system includes open dry meadows and grasslands. Soils tend to be deeper and more well-drained than the surrounding forest soils. Soils can resemble prairie soils and are usually well-drained. **Management Prescriptions:** Prohibit pesticide use for reduction of tanoaks. Prohibit planting conifers. Road building is ok if necessary to avoid undue harm for other sensitive resources, limit width and amount of road within the RSA polygon.

9. **Oregon White Oak Woodland. Acres: 145.98. Description:** White oak is a dominant species of valley oak savanna and low elevation riparian forests in California, providing a critical habitat for many animal and plant species, stabilizing soils in flood plains, and contributing an aesthetic value to the natural landscape. **Management prescriptions:**  When timber harvesting and/or road building occur in the RSA all black and white oaks shall be retained except where removal is required for road construction. Harvest or restoration activities shall remove encroaching fir ≤ 12" dbh. If possible, use controlled burning to restore and enhance the natural oak woodland habitat type.

10. **Tanoak Woodland. Acres: 178.89 Description:** Tanoak is a dominant species or co-dominant species in this type. While uncommon to find tanoak dominant stands on the timberlands that

are naturally tanoak-dominant, this type occurs and maintains naturally in some very rocky areas. Madrone and other hardwood species and shrubs may also occur. **Management prescriptions:** Prohibit pesticide use and planting conifers within these RSA polygons. Thinning operations to reduce fuel-loading or road building are allowed if they do not interfere with the RSA polygon's tanoak dominance or co-dominance.

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Final 9/25/2023