

SOWING CIRCLE &  
OCCIDENTAL ARTS AND ECOLOGY CENTER

Summary of the  
WILDLANDS STEWARDSHIP PLAN



15290 Coleman Valley Road, Occidental, California 95465  
August, 2015

California Forest Incentives Program Project #12-NCR-50N-07  
CA State contract #8A13302

## California Forest Improvement Plan

**Property Name:** Occidental Arts & Ecology Center

**Property Location Address:** 15290 Coleman Valley Rd, Occidental CA

**Owner Name (s):** Sowing Circle LLC

**Plan Authors and Contributors:** Harold C. Appleton, RPF; Lindsay Dailey, Wildlands Program Director; Brock Dolman, WATER Institute, Permaculture & Wildlands Program Director; Jim Coleman, Wildlands Preserve Manager

This management plan outlines the conditions and capability of property resources, documents the landowner's objectives and decisions and identifies potential resource improvement projects. It is meant to be a flexible and educational document that considers a planning horizon of at least 5 years but may include objectives that require a much longer time period. This management plan template meets management plan requirements for grant agreements and other provisions available through CAL FIRE, NRCS, USFS, and the American Tree Farm Association. Signature Pages are provided to document acceptance of this management plan in meeting those requirements.

This Forest Management Plan is provided as a guide to help you accomplish the objectives that you have for your forest. This Forest Management Plan will guide you in achieving the benefits of managing your forest and forest related resources. With this Forest Management Plan, you are eligible to participate in the California Department of Forestry and Fire Protections California Forest Improvement Program (CFIP), US Forest Service's Forest Stewardship Program (USFS), the American Forest Foundation's American Tree Farm System (ATFS) and The Natural Resources Conservation Service (NRCS) programs. This plan will need to be reviewed and approved by representatives for each of the programs that are providing funding.

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## 1. **Overview**

The Wildlands Stewardship Plan (Plan) describes the natural resources of the property owned by Sowing Circle LLC and leased to the Occidental Arts & Ecology Center (OAEC) for their educational campus, and details specific actions for protecting and enhancing forest, grassland, wetland, and aquatic habitats. The document serves both as a repository of historical land use and management, goals to guide the management of the land, as well as a set of guidelines for future projects. It is intended to be a dynamic document with information appended or projects modified as projects are completed and new information collected. In order to make the Plan useful as a fundraising aid, it also includes information that is required by many public agencies and private foundations for grant applications. The Plan was funded by a grant from CalFire, through the California Forest Improvement Program (CFIP).

This Plan is designed to be used in many different ways - as a source of information for residents, owners, land managers, teachers, students and visitors; as a practical handbook for managing the land; and as a learning tool for other land managers throughout California to gain knowledge about how to manage their land. Chapter 2 provides historical and scientific information about the land and its plant and animal communities. Chapter 3 identifies goals for the stewardship of OAEC. Chapters 4 and 5 identify specific activities to protect and enhance natural resources. Sources of information and help are found in Chapters 8 and 9. The Appendices contain specifications for stewardship activities, plant and wildlife lists, details of erosion sites and other information that could be used independently of the Plan.

This document is a summarized version of the Plan, focusing on the management goals and strategies for the various plant communities. Both the full version and summary of the Plan can be found on OAEC's website at [www.oaec.org](http://www.oaec.org).

## 2. **The Site**

### **Owners:**

Sowing Circle LLC

Members include: Nick Allen, David Berman, Brock Dolman, Kendall Dunnigan, Doug Gosling, Dave Henson, Martha Kowalick, Katy Mamen, Susan McGovern, and Adam Wolpert.

**Lessee:** The Occidental Arts & Ecology Center, a 501c3 non-profit

### **Location** (see Figure 1):

15290 Coleman Valley Road, Occidental, Sonoma County, CA

GPS: N38.411162° W122.955382°

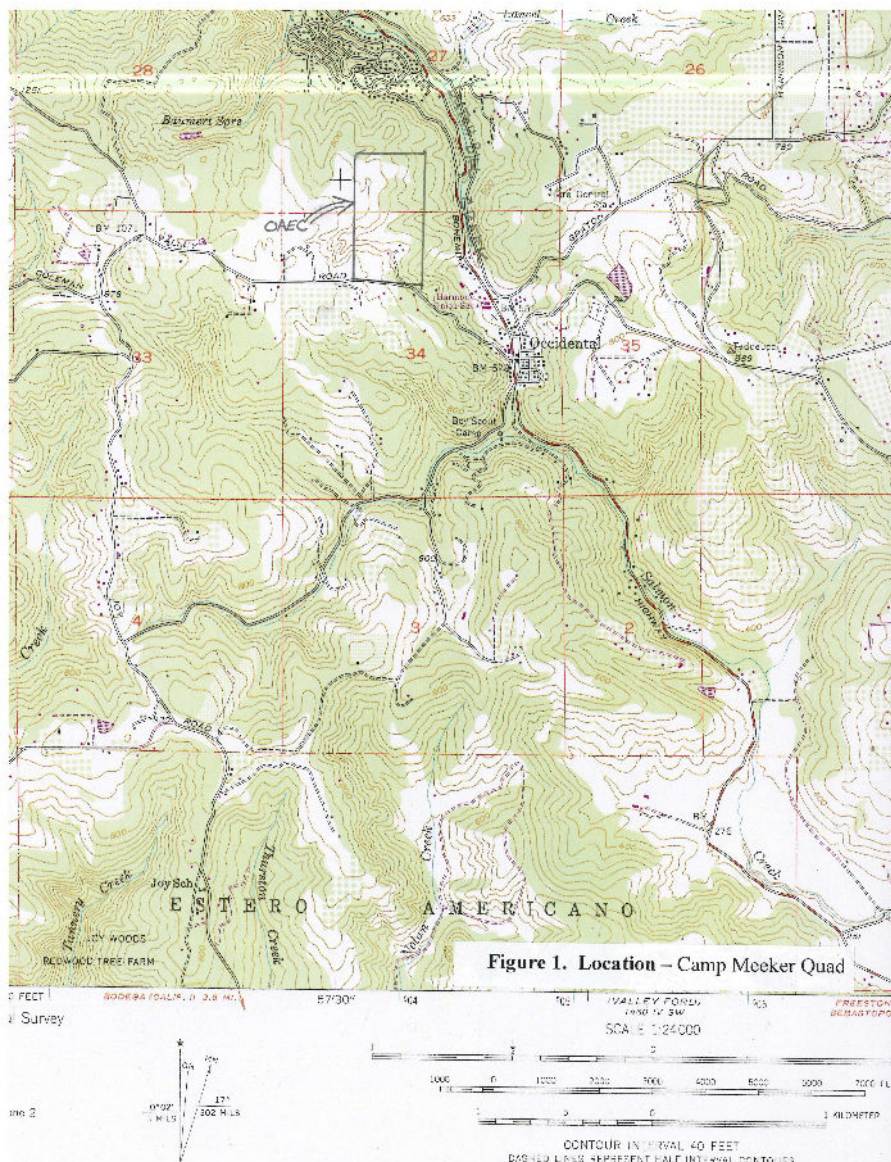
APN: 074-160-034

USGS: Camp Meeker Quadrangle

NE 1/4 of NW1/4 of Sec 34 and

SE ¼ of SW ¼ of Sec 27, T7N, R10W, MDB&M

Figure 1. Location – USGS Camp Meeker Quadrangle



## General Description:

The Occidental Arts & Ecology Center's 80-acre site is located in the headwaters of the Dutchbill Creek Watershed – a tributary to the lower Russian River Basin, approximately one mile west of the town of Occidental on Coleman Valley Rd. The property is Zoned LEA B6 100 Combining District SR (see Appendix 2).

The 80.26 acres is home to both Sowing Circle and OAEC and provides for a dynamic community of people and their richly diverse gardens, orchards and ornamental landscapes. Well-known for its agro-diversity of cultivated crops in the organic 3-acre "Mother Garden," OAEC is also home to a 70-acre Wildlands Preserve or "Grandmother Garden," a precious heritage of native biodiversity. As land stewards both Sowing Circle

and OAEC are committed to ensuring the health and viability of the land under their care.

### **3. History**

OAEC's landbase is located within the ancestral territory of the Coast Miwok and Southern Pomo people that have inhabited the Sonoma Coast for over 12,000 years. During the many thousands of years that the Coast Miwok and Southern Pomo people (now organized as the Federated Indians of Graton Rancheria) thrived by sustaining themselves on the land, they actively managed the landscape with small-scale disturbances such as digging, low-intensity burning, coppicing, distributing seed and hunting. These intentional disturbances, contrary to common thinking about human disturbances upon the environment in the modern era, were crucial processes that maintained the tremendous biodiversity of flora and fauna that Northern California is known for. In fact, one could argue that the native people were in fact the keystone species responsible for maintaining this biodiversity that supports a vast breadth of human and non-human life.

Archaeological remains of a Coast Miwok village have been found near OAEC just uphill on Coleman Valley Road less than a half-mile away. While no evidence has been found of permanent native settlement of the land, OAEC was surely tended as part of a bioregional landbase that supported the Coast Miwok and Southern Pomo people for hundreds of generations (see Archaeology / Cultural Resources for more information).

In sharp contrast to the land stewardship of California natives, the first European settlers, the White family, arrived on the land that is now known as OAEC in the 1850s as homesteaders, bringing their crops and land management practices from Europe. From the late 1870s through the 1950s, the Francesci family from Italy occupied the land and intensively grazed cattle, managed a woodlot for firewood and timber, and planted vineyards, cherries, and olives over the native vegetation.

The extraction of resources on a larger scale came with the beginning of the logging and railroad era. The railroad through the town of Occidental started operating in 1877, transporting high quality old-growth redwood lumber products out of the area and bringing in supplies and travelers. The first lumber mill near Occidental was built in 1866.<sup>1</sup> Age-dating of redwoods at OAEC shows that the older third growth trees are 85+ years old, indicating a heavy cut of the second-growth in the late 1920s or early 1930s. Subsequent selective harvests are evidenced by smaller stumps and stump sprouts.

After the Francesci's left in the 1950s, a series of landowners inhabited the land for a period of time, including the Somerville's and later the Donnelley's. In response to the destructive deforestation, overgrazing, and resultant erosion and loss of habitat that occurred on the land by the early European settlers, the environmentally-minded landowners of the 70s attempted to restore the land by adopting the common conservationist strategy of the time – to let nature rest by taking a hands-off approach to land management, and allowing nature to heal herself.

In 1974, the land was leased, then purchased the Farallones Institute, a non-profit organization dedicated to experimenting with and promoting various forms of appropriate technology. Under their leadership, a series of buildings were constructed, including: the residential "Solar Suburbia", a series of passive solar designed homes; the barn; the kitchen and dining facility; bathhouse; organic gardens; water supply well and the large irrigation pond.

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<sup>1</sup> (Hill, 1997)

The Farallones Institute sold the property in 1990 to the CS Fund that renamed it the Center for Seven Generations, an organization with the mission of continuing the experimental nature of the site. For the majority of the land outside the core area and gardens both the Farallones Institute and the Center for Seven Generations continued with the “let nature rest” mentality, trusting that nature, if left alone, would naturally regenerate.

In 1993, the Center for Seven Generations decided to sell the property. At this time, a group of biologists, activists, and artists were looking to start an intentional community with a mission of promoting sustainability. In July of 1994, seven Sowing Circle members organized as a General Partnership purchased the property. Later in 2000 Sowing Circle reconstituted as an LLC. The property is structured as a no-equity cooperative. It is owned in equal shares by the ten current owners, all of whom live on site along with five children, three staff that aren’t members of the LLC, and six seasonal interns.

In 1994, members of Sowing Circle also founded the Occidental Arts and Ecology Center, a nonprofit corporation, to develop horticultural, ecological restoration and social justice programs at the facility. While the Sowing Circle and OAEC maintain two distinct legal and financial entities, they share a common vision, and Sowing Circle has contributed an enormous amount of capital, labor and vision towards creating and caring for the OAEC land, gardens, and facilities.

Through the Sonoma Land Trust, a conservation easement was recorded on the property in 1994 to restrict the use of the 1 acre North Garden and the 0.5 acre South Garden, prohibiting the use of herbicides, pesticides, or chemical fertilizers on the site’s organic gardens, as well as the construction of any buildings or structures. The Sonoma Land Trust surveys the easement area annually to ensure compliance, and the gardens covered by the easement must remain certified by California Certified Organic Farmers (CCOF) or a similar successor in perpetuity. This was the first such organic agriculture easement created in the country. The “Mother Garden” is California’s 8<sup>th</sup> oldest certified organic farm.

A continuation of the environmentally-minded land ethic of the 60s and 70s was carried forward with the arrival of Sowing Circle and OAEC, though with a stark difference. In contrast to the “let nature rest” mentality that previously guided land management decisions, OAEC biologists began to recognize the effect of lack of disturbance on the land. While clearly the large-scale clear-cutting and heavily stocked grazing of livestock was devastating to the land, leaving it alone did not appear to be working either.

Ecological observation and study revealed that the various plant communities at OAEC (coastal prairie, mixed hardwood, mixed conifer, and wetland/riparian) are “disturbance dependent” – adapted to a variety of disturbances such as drought, fire, grazing, and burrowing. In many grasslands, disturbance prevents shrubs and trees from invading surrounding areas and converting prairies to shrubland, woodland, or forest.

With substantial changes in these disturbance patterns - including the displacement of Coast Miwok and Southern Pomo land stewards and the removal of fire from the landscape; changes in natural herbivory patterns of grizzly bear and native ungulates such as elk and deer; the overgrazing of non-native domesticated ungulates such as sheep and cattle; agriculture and urban development; and the introduction of non-native plants and the devastating brown-algae sudden oak death or SOD (*Phytophthora ramorum*) – the long-established balance of the ecosystem had been severely threatened.

Thus emerged the land ethic of OAEC, striving towards the idea of “regenerative disturbance,” where

humans once again are reassuming an integral role as a beneficial and integral part of nature, responsible for stewarding and tending the diversity of life that surrounds us through carefully managing small-scale disturbances.

In the early 21<sup>st</sup> century, we find ourselves in an unprecedented time. Humans have drastically altered the California landscape in the past 200 years by genocide of native peoples, extinction and near extinction of wildlife, logging, mining, tillage agriculture, grazing, draining the wetlands, damming the rivers, and urbanization. Climate change creates new challenges, the scale of which is unparalleled. Our generation is faced with the challenge of healing a damaged ecosystem, as well as a people disconnected from place, in a time of rapid ecological change.

Human communities have a choice to either view ourselves as a part of or apart from the fabric of biodiversity. As the current caregivers of this land, OAEC is challenged to interact with this dynamic living process of evolution in a manner that enhances the presence of biodiversity.

The over-arching goal of the Wildlands Program at the Occidental Arts & Ecology Center is to support communities to restore a regenerative disturbance relationship to wildness, and help the land restore itself to exhibit the healthy, self-willed and “wild-tended” ecological processes it had before European settlement brought clear cuts, extinctions and invasive exotic plants just 150 years ago.

Through intelligent land use decisions and ethno-ecologically proven practices, OAEC is committed to choosing to participate in the process of re-building soil, re-charging groundwater and re-creating wildlife habitat towards re-‘story’ing our relationship with the land as an inextricable part of the in the process.

#### **4. *Landowner Goals***

The following land management goals have been crafted as a pattern for regenerative land management that, while specific to OAEC, can be generally applied to California landscapes and ecosystems. While the details of the techniques and strategies will be as diverse as the people who employ them, we believe these broad management goals are overarching and yet specific enough to guide land managers who seek to build resilience and preserve diversity in a time of great change. Through the utilization of regenerative disturbance regimes, OAEC’s overarching goal is to restore keystone processes towards resilience-based regeneration.

These overarching goals will provide the foundation for the management directives in each vegetation community and its associated management units.

##### **1. SOIL. Create a soil-resilient landscape** by building living soil structure that sequesters carbon and water.

Logging, the removal of old-growth trees, overgrazing, and the introduction of invasive plants have taken a toll on the health and robustness of soils at OAEC and throughout the world. As the foundation for life, both micro and macro, soil is where the mineral cycle and carbon cycle begins. Carbon, minerals, and nutrients are cycled through the soil primarily via the natural processes of fire, grazing, diverse soil micro-biota, rainfall and infiltration, plant growth and decomposition. A primary goal in the management of the land at OAEC is to assist the regeneration of healthy, robust soils that sequester carbon and contain healthy soil biology and enhances the land’s capacity to offer ecosystem services.

- 2. WATER. Create a water-resilient landscape** by improving water quantity and quality through reducing erosion and encouraging groundwater recharge.

OAEC has pioneered the concept of Conservation Hydrology, and has been modeling watershed evaluation, restoration and monitoring techniques to the public for the past 20 years. The focus has included affordable, restorative practices that are applicable to most private landowners — those who retain the majority of land holdings in Sonoma and several other Northern California coastal counties.

The most effective place to store water is in the soil, and thus emerges the guiding principle: slow it, spread it, and sink it. A primary goal is to rehydrate the landscape, as that which infiltrates seeps forth. Slowing the flow is intrinsically connected to soils and a means of erosion control and sediment mitigation affecting the water quality of our creeks and rivers.

- 3. FIRE. Create a fire-resilient landscape** that reduces the threat of catastrophic fire, and allows for fire to function as a regenerative disturbance process in the landscape.

Native Californians managed much of California's diverse ecology with anthropogenic fire – that is, fire intentionally lit, controlled, and used by humans as a land management tool. In fact, anthropogenic fire was probably the single most powerful land management tool responsible for creating and maintaining the tremendous diversity of California's flora and fauna. Controlled burning with low-intensity fires benefits the land in myriad ways: cycling nutrients; germinating native plants with fire-obligate seed; arresting succession and maintaining open meadows and forests by clearing understory plants and removing encroaching seedlings; maintaining alkalinity of the soil; and reducing the threat of catastrophic, stand-replacing forest fires.

OAEC land managers have utilized small scale prescribed fire on various grassland stands a number of times over the past 20 years; luckily the land has not been impacted by a catastrophic forest fire since the Bodega Fire several decades ago. Our goal is to conduct restoration activities that will allow intentional, prescribed fire to benefit the land without threatening the local ecology, including human settlement.

- 4. LIFE. Create a life-resilient landscape** that enhances conditions conducive for native biodiversity and the human community.

The term "biodiversity" describes the exuberant expression of life in all its forms and ecological relations. From individual species to populations of interconnected co-evolved symbiotic life forms, biodiversity is the very tapestry upon which life depends for its own continuance.

Conservation International designated 35 regions on the planet as "Biodiversity Hotspots". These biodiversity hotspots "cover only 1.4 % of the earth, but are home to 44% of all vascular plant species and 35% of all vertebrate animal species." Coastal California is listed as one of the world's 35 biodiversity hotspots. However, coastal California has lost to human development over 95% of its old growth coniferous forests, freshwater wetlands, saltwater estuaries, bunch grass prairies and riparian gallery forests. According to studies by the Nature Conservancy, the Bay Area, including Sonoma County, ranks nationally as one of the areas with the highest number of federally listed endangered species. This same area is, coincidentally, leading the nation in rate of growth and median home prices, and is over 95% privately owned. It is imperative that private landowners and residents take on active roles as stewards of biodiversity and engage in the political process to ensure that public land use decisions are made that do not reduce the ecological carrying capacity of the



land that supports biodiversity.

We seek to enhance biodiversity of flora, fauna, fungi, the micro-biome and create habitat for native species of vertebrates and invertebrates. While we include *Homo sapiens* as a species for which we are managing, we strive to not place human needs above and beyond the needs of other species.

As part of the web of life, OAEC's human goals focus on utilizing the land for recreation, forestry products such as building materials, round poles, wild food and medicinal herbs, craft and basketry materials, and forage and fodder for grazing animals, in a way that enhances rather than reduces biodiversity. Recreation, access, and aesthetics are also crucial components to the human goals on the land.

Since the founding of OAEC in 1994, staff biologists have been compiling a species list of wildlife sightings and native plants. As ecological preserve managers, a critical component of the strategy to enhance biodiversity is an accurate list of species utilizing the site. A summary of the species level biodiversity of native plants and vertebrate animals observed on site to date is as follows: Native plants are represented by 185 species. We have documented 165 native vertebrate species at OAEC's preserve represented by 8 species of amphibians, 12 species of reptiles, 120 species of birds and 25 species of mammals. Federally and or state threatened and endangered species which have been documented at the Wildlands Preserve include Sonoma tree vole (*Arborimus pomo*), and spotted owl (*Strix occidentalis occidentalis*); the Dutchbill Creek watershed that OAEC drains into is the spawning ground of federally and state listed coho salmon (*Oncorhynchus kisutch*) and threatened steelhead trout (*Onchorhynchus mykiss*). A Species of Special Concern includes the Western pond turtles (*Emys marmorata*), which inhabit the big pond. A number of other Species of Special Concern utilize the land – see species lists Tables 3.1, 3.2 and 4 for details.

## **5. EDUCATION. Conduct education, participatory research and demonstration.**

An additional component of our human-centric goal includes education, demonstration and outreach, conducting participatory research and sharing the results of our experience with others.

OAEC's Wildlands Program provides education about effective restoration theory and methods and traditional ecological knowledge, as well as collaborates with the Federated Indians of Graton Rancheria, Sonoma State University and the Coastal Prairie Working Group, various youth service-learning programs, our local West County Fire Safe Council and the numerous students who attend workshops and tours. The Wildlands-Program has also been studying the presence of sudden oak death (SOD) and making efforts to protect both infected and uninfected trees.

## **6. ECONOMICS. Support the organization with economic stability.**

In order to ensure the ongoing health of OAEC, these goals must be met with sound economic strategies that sustain the cost of staffing and materials, and support the organization as a whole. A combination of government and foundation grant-funding, cost-share programs, student and volunteer labor, private donations will all contribute to a well-balanced plan.

## **5. Natural Resources**

### **5.1. Watersheds**



OAEC's 10 distinct sub-tributaries are located in the headwaters of the Dutch Bill Watershed, an 11 square mile tributary nested within its larger watershed, the 1480 square mile Russian River basin. Dutch Bill watershed originates on the slopes above the Occidental area, flows north west through Camp Meeker and finds its confluence with the lower Russian River at Monte Rio, which then wends its way to its rivermouth with the Pacific Ocean at Jenner.

At its most basic level, a watershed encompasses all of the land surface that collects and drains water down to a single exit point. A watershed is generally outlined by ridges with all rainfall within the ridge lines flowing to a common creek or drainage.

At the OAEC, we call our philosophical and practical responses to managing watershed challenges and opportunities before us "Conservation Hydrology." Conservation Hydrology utilizes the disciplines of ecology, population biology, biogeography, economics, anthropology, philosophy, planning and history to guide community-based watershed literacy, planning and action. It advocates that human development decisions must move from a "dehydration model" to a "rehydration model".

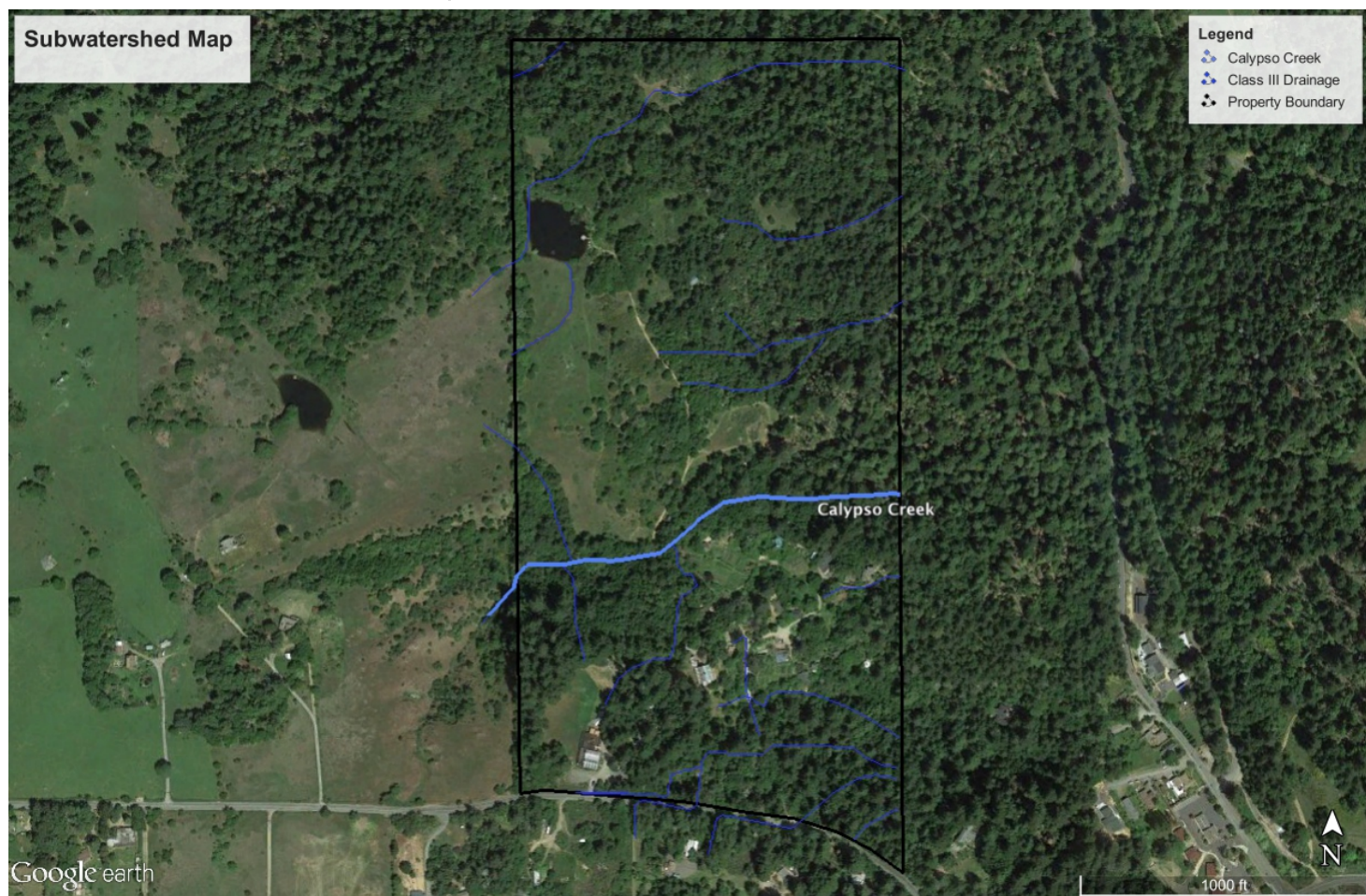
California is divided into watershed management areas which are given hydrologic unit identification numbers (see Table 1). The Forest Practice Watershed Mapper program allows users to identify the status of a specific planning watershed in accordance with the Anadromous Salmonid Protection (ASP) Rules, which require that every timber operation contribute to salmonid habitat restoration – see [http://egis.fire.ca.gov/watershed\\_mapper/](http://egis.fire.ca.gov/watershed_mapper/) .

**Subwatersheds** within the OAEC property are shown on Figure 3. All streams within the OAEC property are classified under the California Forest Practice Rules (FPRs) as Class II and III.

With the exception of Calypso Creek, marked in Figure 3, all waterways at OAEC are classified as Class III. Calypso Creek is unique as it contains the presence of aquatic insects and seasonal amphibians; a yellow-legged frog (*Rana boylei*) was spotted on the western end of the creek. In addition, there is a year-round pool below the culverted road crossing that maintains water throughout the dry season, and is a favorite drinking hole for wildlife.



Figure 3. Sub-Watershed Map



## 5.2 Geology

See Full Version of Plan to view this section.

### 5.2. Soils

See Full Version of Plan to view this section.

### 5.3. Plant and Animal Species

OAEC staff biologists have been documenting the flora, fauna, and funghi of OAEC for the last 20 years, and a comprehensive listing can be found in Table 3.1.

OAEC staff biologists have observed the following species on the property: Sonoma tree vole nest and babies seen nesting in Monterey pine (*Pinus radiata*) and Douglas fir (*Psuedotsuga menziesii*); Northern spotted owl seen in late summer, not nesting but foraging/feeding/roosting, and pellets have been observed; foothill yellow-legged frog in Calypso Creek; porcupine (*Erethizon dorsatum*) in Douglas fir along the Pond Road; a possible ringtail (*Bassariscus astutus*) sighting near the Core Area; and Western pond turtle in the pond.

In addition, merlin (*Falco columbarius*) and peregrine falcons (*Falco peregrinus*) used the land for hunting, and OAEC manages for neotropical migrant breeding birds such as pacific-slope (*Empidonax difficilis*) and ash-throated flycatcher (*Myiarchus cinerascens*), tree (*Tachycineta bicolor*), violet-green (*Tachycineta thalassina*) and barn swallows (*Hirundo rustica*), warbling vireo (*Vireo gilvus*), orange-crowned (*Vermivora celata*) and Wilson's warbler (*Wilsonia pusilla*), Western tanager (*Piranga ludoviciana*), and black-headed grosbeak (*Pheucticus melanocephalus*). None of these species are listed but are considered important species to manage.

#### Figure 6. CNDDDB Map

See Full Version of Plan to view this section.

#### Table 3. 1. Native Plants Observed at OAEC

See Full Version of Plan to view this section.

#### Table 3. 2. Non-Native Plants Observed at OAEC

See Full Version of Plan to view this section.

#### Table 4. Vertebrate Species of OAEC

See Full Version of Plan to view this section.

## 5.4. Wildlife Habitat Relationship System Classifications

See Full Version of Plan to view this section.

## Wildlife Habitat Elements

Habitat elements are mentioned in the above sections, but their importance is great enough to merit a section of its own. Snags, hardwoods with acorns, berries, riparian vegetation, downed logs, rock piles, springs, and pools of water in the dryer creeks are examples of only a few wildlife habitat elements critical to animals. Obviously, year-round sources of fresh water, such as the pond and portions of the creeks, are important for many wildlife species. Not so obvious is that many California streams and forests are lacking in important habitat elements that have routinely been removed in the past. Dead standing trees or snags were once targeted for removal as a fire hazards because lightning or other ignition sources could easily ignite the entire tree. In some snags a smoldering fire could persist in the rotting internal wood for days or weeks, releasing embers into surrounding vegetation during drier periods that can support wildfire. It may be justifiable to remove snags from ridges if the snag represents a safety threat and does not have active wildlife in it. However, whenever possible, snags should be left for wildlife nesting, perching, and as a substrate for foods such as insects and acorns. A rule of thumb is to leave one to three snags per acre. Rotten logs and slash on the forest floor can provide habitat for insects and wildlife as well. When clearing the forest to reduce fuel loads for fire protection, one should leave rotting logs and branches lying on the forest floor in a discontinuous pattern. To protect or restore suitable habitat for specific species of concern, one should perform a reference search to determine which habitat elements are beneficial to that particular wildlife species. Habitats for listed species found in the OAEC California Natural Diversity Database (CNDDDB) search are described in the individual species reports found in the appendix.

### 5.5. Archaeology/Cultural Resources

*See Full Version of Plan to view this section.*

## 6. Resource Management

Resource management involves first knowing what resources are on the property, then deciding how to utilize, restore, and/or protect them. Previous sections addressed plant and wildlife species, watershed, soil, and other resources. What resources contribute to the community at large? Which are part of the public trust? What resources need to be protected or enhanced? What are the threats to the resources? What resources can be utilized to help sustain the ownership, providing goods or services? What is the cumulative impact of our actions within a watershed? Again, some of these issues were addressed in previous sections.

This section deals with short and long-term overall land management issues, and Table 13 lists a number of specific projects with budgets.

The overall guidance for resource management is provided in the owner's goals and objectives including maintaining a healthy matrix of plant communities or habitats. The following sub-sections outline a description, history, and specific management opportunities to achieve these goals.

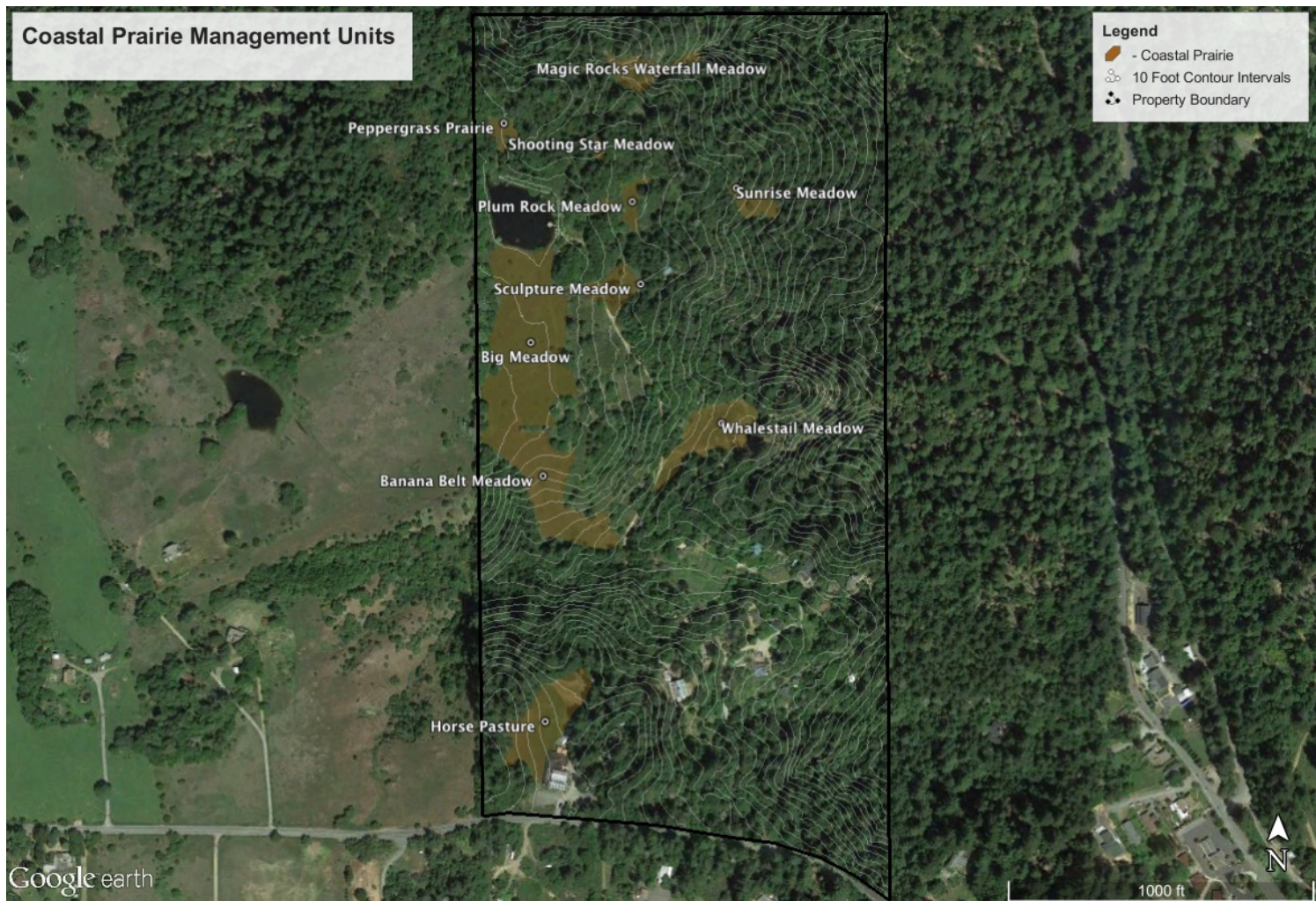


## 6.1. Management Units

The landowner goals outlined in section 3 apply to each vegetation community and management unit within. The following section describes the land at OAEC, organized by vegetation communities (coastal prairie, mixed hardwood, mixed conifer, wetland and riparian) with general descriptions of the vegetation type; and then individual management units within each vegetation community, along with management goals, strategies, and projects specific to each unit. See Figures 7.1, 7.2, 7.3, and 7.4 for management units and Figure 8 for roads and other landmarks.

### 6.1.1. VEGETATION COMMUNITY - COASTAL PRAIRIE

**Figure 7.1 Coastal Prairie Management Units**



#### General Description:

California coastal prairie is a grass and forb plant community that stretches from the coast of southern California to southern Oregon. Often these ecosystems are referred to as grasslands, but prairies are increasingly becoming recognized for their floristic diversity beyond grasses; thus, they are often referred to as prairies rather than grasslands.

Coastal prairie is a distinct prairie type that is unique in the influence it receives from the maritime

climate, which brings frequent moisture in the form of fog and heavy rains. This allows for a more moderate climate; while inland California prairie ecosystems experience hot dry summers and cold wet winters, coastal prairies are more buffered by the moderating impact of the ocean.

Containing twice as many species as any other North American prairie, Coastal prairie is the most biodiverse prairie of North America.<sup>2</sup> Given California's prime coastal real estate, coastal prairie is also the single most urbanized major vegetation type in the U.S.; 24% of coastal prairie has been lost to pavement, and more to agriculture.<sup>3</sup> These facts place coastal prairie among the most diverse, as well as most endangered, ecosystems in California.

The roughly seven acres (in total) of coastal prairie at OAEC are comprised of a mix of nonnative grasses and forbs, as well as native perennial bunchgrasses such as blue wildrye (*Elymus glaucus*), California oatgrass (*Danthonia californica*), and purple needlegrass (*Stipa pulchra*), and wildflowers including indigenous food sources such as multiple species of yampah (*Perideridia spp.*), bluedicks (*Dichelostemma spp.*), and yellow mariposa lily (*Calochortus luteus*). Also providing wildlife habitat for a plethora of birds, insects, mammals and reptiles, the swaths of prairie dotting OAEC hum with life.

Coastal prairie is known to be "disturbance dependent," adapted to a variety of disturbances such as drought, fire, grazing, and burrowing. In many prairies, disturbance prevents shrubs and trees from invading surrounding areas and converting prairies to shrubland, woodland, or forest.

With substantial changes in these disturbance patterns - including the displacement of Coast Miwok and Southern Pomo land stewards and the removal of fire from the landscape; changes in natural herbivory patterns of native ungulates such as elk and deer; the overgrazing of non-native domesticated ungulates such as sheep and cattle; agriculture and urban development; and the introduction of non-native plants – the precious balance of coastal prairie has been severely threatened.

Due to the removal of keystone disturbance regimes such as regular, low-intensity fire and changes in grazing patterns, the encroachment of conifers and chaparral, marching inwards from meadow edges, steadily reduces the remaining area of prairie. Historical aerial photographs of OAEC dating back to 1953 show a steady shrinking of the total surface area of coastal prairie, as surrounding Douglas fir and coyote brush drop their seed and multiply deeper and deeper into the prairies. Aerial photos show that as recently as 65 years ago, the meadows on average were 20 – 50% larger than their current surface area. Based on this analysis, we adopt an additional goal unique to coastal prairie of no net-loss.

Non-native grasses and forbes have also established themselves, proving effective as outcompeting

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<sup>2</sup> Stromberg et al. 2002

<sup>3</sup> (Loveland, 1995)

many of the natives, and difficult to eradicate. Particularly aggressive is purple velvet grass (*Holcus lanatus*), an invasive nonnative perennial grass introduced from Northern Europe that threatens to wipe out the diversity of Sonoma County coastal prairies, where it is well-adapted to the cool moist climate. Other invasive grasses include: ripgut brome (*Bromus diandrus*), wild oats (*Avena fatua*), dominant forbs include plantain (*Plantago spp.*) and false dandelion *Hypochaeris radicata*.

Without a regenerative disturbance regime in place, the prairies are quickly being encroached upon along the edges by Douglas fir, and from the middle by coyotebrush. In order to maintain the mosaic of vegetation types which creates maximum edge and habitat for biodiversity, it is essential to actively manage the encroachment of OAEC's coastal prairies – which, without human management, would completely disappear in a manner of decades.

### Coastal Prairie Management History:

The history of the land greatly informs our management strategies, as we employ the a combination of regenerative disturbance regimes including mowing, grazing of goats, mechanical forest thinning, and prescribed burning to mimic the historical disturbances that maintained the meadow mosaic and its associated biodiversity. Consistent efforts to push back on encroaching trees and shrubs have successfully helped to maintain the meadow edges, often an effort of hundreds of hours of student and volunteer participation.

Use of low-intensity controlled burning has shown mixed results thus far. While it has beaten back certain invasives and benefited the native bunchgrasses, the low-lying non-native forbs – particularly plantain and false Dandelion – have thrived under the burning strategy. The consumption of thatch via burning opened up space between the bunchgrasses, releasing native bunchgrasses and also opening up space for forbs.

Mowing has proven to be a successful strategy in mimicking historical grazing patterns, enhancing native grasses and forbs, and reducing the population of invasives – particularly, ripgut brome. Beginning in May of 2003, the various units of OAEC's coastal prairie have been mowed annually in springtime, typically in May - once the grasses have reached a mowable height, but before the flowers form seeds. By mowing ripgut brome for multiple years, we reduced their presence dramatically which appears to be a successful strategy for short-lived annual exotics that have short-lived seed. Timing has proven to be the key element in successful mowing; in 2004 the mowing was a bit late, and the purple velvet grass seeds had already dried, resulting in successfully removing thatch but also dispersing seeds of unwanted invasives. If there was still soil moisture and we mowed too early, the plants were able to produce a second round of seed heads, lower to the ground and more difficult to mow. Therefore, the prescription is to mow as late as possible before the seed becomes viable. Typically mowing is followed by a weedwhipping treatment to catch velvet grass that flowers later in the season. Another crucial component of the mowing strategy is to leave large stands of blue wildrye (*Elymus glaucus*) intact for habitat and seed, which is then collected in summer.



Another factor that influences mowing timing is the seasonality of nesting birds; OAEC staff generally coordinates the mowing so as not to disrupt any ground-nesting birds that might be utilizing the tall grasses as habitat. Each year, patches of grass are left as unmowed islands of habitat for.

By 2010, the velvet grass proved itself as the most aggressively invasive nonnative taking hold in the coastal prairie ecosystem of Sonoma County. For purple velvet grass, the mowing may have slowed down seed production, but the perennial crowns are not killed by mowing, and the crowns simply widen after a mowing. Weed-whipping and hand-pulling velvet grass has also supplemented mowing in areas where the tractor can not access, or for sporadic grasses that flower later in the year. Hand pulling of crowns towards the end of the dry season in September / October has proven more successful in eradicating velvet grass, but is also a more difficult strategy to scale up. Timing on this strategy is crucial, due to the fact that as soon as any significant moisture arrives, the velvet grass kicks into a more active growth period and individual plants are more difficult to remove.

Despite its mixed results in reducing the population of invasives, we continue mowing to mitigate non-native seed production, minimize plant invasions of shrubs including broom and coyotebrush, maintain trails, remove thatch, create accessible camping areas, and reduce fire hazard.

In order to monitor the efficacy of mowing, in May of 2003 OAEC staff set up various 2- meter plots in Sunrise Meadow, Whales Tail Meadow, Plum Rock Meadow, and the Big Meadow, with one mowed plot and one control plot for each area. Data was collected for four years, and results showed after the third year a drastic decline in annual invasive grasses like *Bromus diandrus* with mowing. Mowing appears to have also promoted the successional state of low-growing exotics such as *Aira caryophylla* and *Vulpes spp.* It appears that the *Hemizonia sp.* population in the draw of Big Pond Meadow has drastically been reduced, perhaps as a result of mowing, although the cause is unclear. Overall, the presence of healthy, robust native bunchgrasses seems to have increased. While our goal has never been to eradicate the non-natives, we hope to mitigate their invasiveness and contain the spread in order to maintain native biodiversity while learning to co-exist with these newer arrivals. Due to limited resources, we tend to protect the best of what's left and control the spread of the worst.

To complement the mowing and burning, seed has been collected annually from different native perennial grasses and forbes to be sown via "shuck-n-huck" after burning and mowing, just before the first fall rains. Again, the timing is crucial: seed collection occurs as soon as they are mature, and then sown late in the season so that harvester ants don't decimate the seed before it germinates. In order to maintain seed contact with the ground, freshly dug gopher mounds offer loose bare soil in which to create a seed bed.

OAEC is a partner in the Coastal Prairie Working Group, which published the 2010-2011 Coastal Prairie Enhancement Feasibility Study, defining over 34 coastal prairie dominant vegetation types and experimenting with different management strategies. As part of the Coastal Prairie Working Group, OAEC has participated in research efforts, mapping, education and quantitative monitoring.

For more info visit [www.sonoma.edu/preserves/prairie/](http://www.sonoma.edu/preserves/prairie/).

In order to monitor shifts in species composition of coastal prairie units, in spring of 2014 OAEC staff set up various CNPS relevee plots in several meadows to continue monitoring species count and distribution; those plots are monitored annually each spring to track changes over time.

#### Management Objectives for Coastal Prairie Units:

- 1) No net coastal prairie loss: maintain the current surface area of all coastal prairie units.
- 2) Reduce the population of non-native grasses and forbs such as ripgut brome, purple velvetgrass, plantain, false dandelion, etc.
- 3) Increase the population of native grasses and forbs – such as *Wyethia spp.*, *Perideridia spp.*, *Stipa pulchra*, etc; we prioritize native bunchgrasses and forbs because of their capacity to build soil, sequester carbon and water, and support a diversity of vertebrate and invertebrate organisms that have co-evolved together
- 4) Enhance the functional carrying-capacity of our prairies to support prairie-dependent wildlife populations for species such as American badger, American kestrel, white-tailed kite, gopher snake, Western bluebird, and neo-tropical cavity-nesting species
- 5) Maintain access for the dominant camping area for OAEC guests and students
- 6) Maintain trails and roads for access and recreation
- 7) Provide forage for high intensity, short duration livestock

#### Strategies:

In order to effectively achieve these directives and manage OAEC's coastal prairie holistically over time, we need to be active participants in a regenerative disturbance regime. We will employ a host of disturbance strategies including: the removal of encroaching conifers, chaparral, and hardwoods along meadow edges with mechanical thinning, burning, grazing, mowing; physical weed removal of woody species through hand-pulling, digging and use of weed-wrenches; seed collection and dispersal; the construction of bird boxes and lizard castles. Developing an intensively managed grazing program seems to offer the most long-term scalable strategy for coastal prairie management, and the program at OAEC needs additional infrastructure and support to develop. Each management strategy is selected and utilized based on seasonal conditions based on the discretion of the land managers.

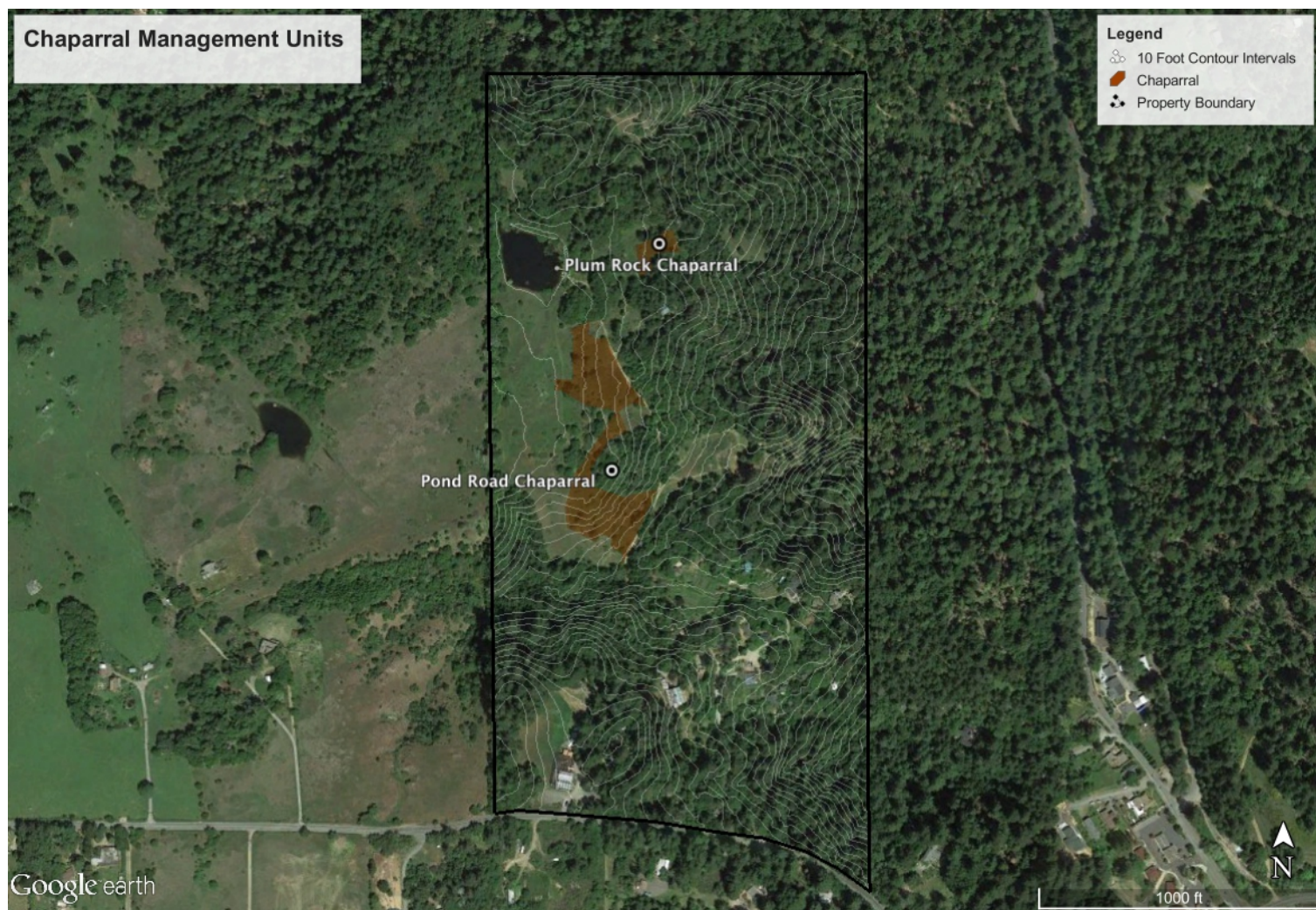
#### COASTAL PRAIRIE MANAGEMENT UNITS:

See Full Version of Plan to view this section.

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### 6.1.2. VEGETATION COMMUNITY – CHAPARRAL

Figure 7.2 Chaparral Management Units



#### Description:

Chaparral is a shrubland ecosystem dominated by woody, drought-hardy plants. The chaparral of OAEC is primarily comprised of coyotebrush, poison oak, California blackberry and coffeeberry with an herbaceous understory. Invasion by Scotch and French broom, two woody non-native and invasive shrubs from Europe, have proven to be incredibly successful at occupying the chaparral niche and competing with native counterparts. A few rare patches of hardwood chaparral comprised of manzanita are scattered along the edges of various chaparral and prairie units.

Chaparral serves many important ecological functions, primarily as habitat. It provides forage for birds and insects during seasons when forage is not in abundance – coyotebrush flowering in the winter and offering nectar and pollen for dozens of native insects, and poison oak fruiting in the late fall and offering berries for birds in a time of scarcity. In addition to forage, the dense stands of

brush provide cover and nesting habitat for chaparral specialists such as the wrentit, as well as islands of cover for many species of mammals, birds and reptiles.

Grazing and fire have historically provided disturbances that arrested or reversed succession and limited the expansion of chaparral. With the removal of those disturbances, the few stands of chaparral at OAEC have steadily expanded over the last several decades. While coastal prairie has diminished due to the expanding footprint of the chaparral, true to the general pattern of ecological succession, the oak woodlands appear to be benefiting from this expansion. The chaparral community provides a “nursery habitat” for young Douglas fir and mixed hardwood seedlings including coast live oak, California bay, toyon, and madrone, which establish amidst the dense thicket of chaparral. This protects them from deer browse pressure and thus allows them to grow above the height of deer browse and evolve into mature trees. As older oaks die of sudden oak death and young oaks germinating out in the open rarely survive the constant pressure of deer grazing, the habitat and protection provided by chaparral is crucial to the future of mixed hardwood recruitment.

### Chaparral Management History:

Much of the management of the chaparral at OAEC has involved keeping the chaparral in balance with surrounding plant communities – preserving its qualities as beneficial habitat for native flora and fauna, while limiting encroachment on coastal prairie. Land managers have experimented with reintroducing a regenerative disturbance regime in a number of ways – tractor mowing, hand-pulling, burning, and grazing chaparral – to attempt to achieve this dynamic balance. Several lessons have been gleaned from this experimentation.

Broom removal has been an ongoing endeavor for the last 20 years. In the core of the chaparral management units, where broom is solid and mature and drops thousands of seeds that are viable for decades<sup>4</sup>, it has proven impractical to entirely eradicate the broom. The strategy has been to: 1) “hold the line” on the expansion of the edges of the chaparral stands 2) allow the broom to act as nurse plants for young hardwood seedlings, who will eventually mature and shade out the broom, pushing the chaparral more towards an mixed hardwood plant community, and 3) systematically eradicate isolated populations that appear in other plant communities.

The treatment of coyotebrush requires a more subtle strategy. In places where there is a small cluster of mature coyotebrush within coastal prairie, at times land managers have allowed them to persist. Where coyotebrush is actively seeding out and encroaching upon prairie, however, we have actively worked to eliminate encroachment by removing all young seedlings.

Managing the woody shrub invasion has proven successful manually with weed wrenches, root jacks, and strong hands; mowing has also proved a useful tool, as well as prescribed fire, which both

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<sup>4</sup> Getting a Handle on Broom, John LeBlanc UC Agriculture and Natural Resources

eliminate young brush seedlings in coastal prairie. Hand pulling is successful for removing small plants with immature root systems, and the tools are effective in pulling larger plants that have developed a woody stem that the tools can grip. Timing is important, as pulling broom is easier in moist soil that is still soft.

In soil conditions where either the soil is too dry to manually pull, or the slope is steep and soil disturbance creates a potential for erosion and stimulate the latent broom seed bank, and a “lop and torch” strategy has shown to be effective. This strategy involves first lopping the chaparral at the base in early fall at the height of the dry season, stressing the plants and causing some mortality. We found that lopping in the spring was not as successful, as plant roots still had access to sufficient moisture to survive the year. The next steps involves returning the following year once the plant has resprouted, and torching or flaming the crownsprout during the burn season utilizing a propane tank with a hand torch attachment.

Torching has also been an effective method for killing young broom seedlings after removing mature chaparral from an expanding edge. Again, timing is an important element of this strategy; as soon as the first flush of seeds germinates with the first fall rains, running a propane torch quickly along the carpet of seedlings in the early cotyledon stage can eliminate the entire population. In a normal rainfall year, the second flush of seeds then germinates with later rains, offering the season’s second opportunity for removing yet another germination event. This has proven successful along the roads to hold back broom expansion; then other plants such as California blackberry, coyotebrush and mixed hardwood seedlings are given a competitive edge.

The many tons of brooms that have been pulled from OAEC have served as a crucial material for headcut mitigation, as the long and fairly straight woody branches offer organic matter to weave into eroding streambanks (see Drainages & Ponds section for more details).

### **Management Goals for Chaparral:**

- 1) Enhance the carrying capacity of chaparral for native flora and fauna (such as wrentit, towhees, quail, sparrows, small mammals, and reptiles etc.) ]
- 2) Enhance the few remaining stands of manzanita (by hermitage, Shooting Star Meadow, above the nursery, and in Peppergrass Prairie)
- 3) Maintain trails and roads for access and recreation

### **Strategies**

- 1) Limit the spread of brooms by “holding the line” on the edges of core populations and eradicating outlier broom from other plant communities
- 2) Encourage coast live oak and madrone regeneration amidst the chaparral, while limiting Douglas fir and California bay recruitment
- 3) Strengthen the goat grazing program as a chaparral management strategy

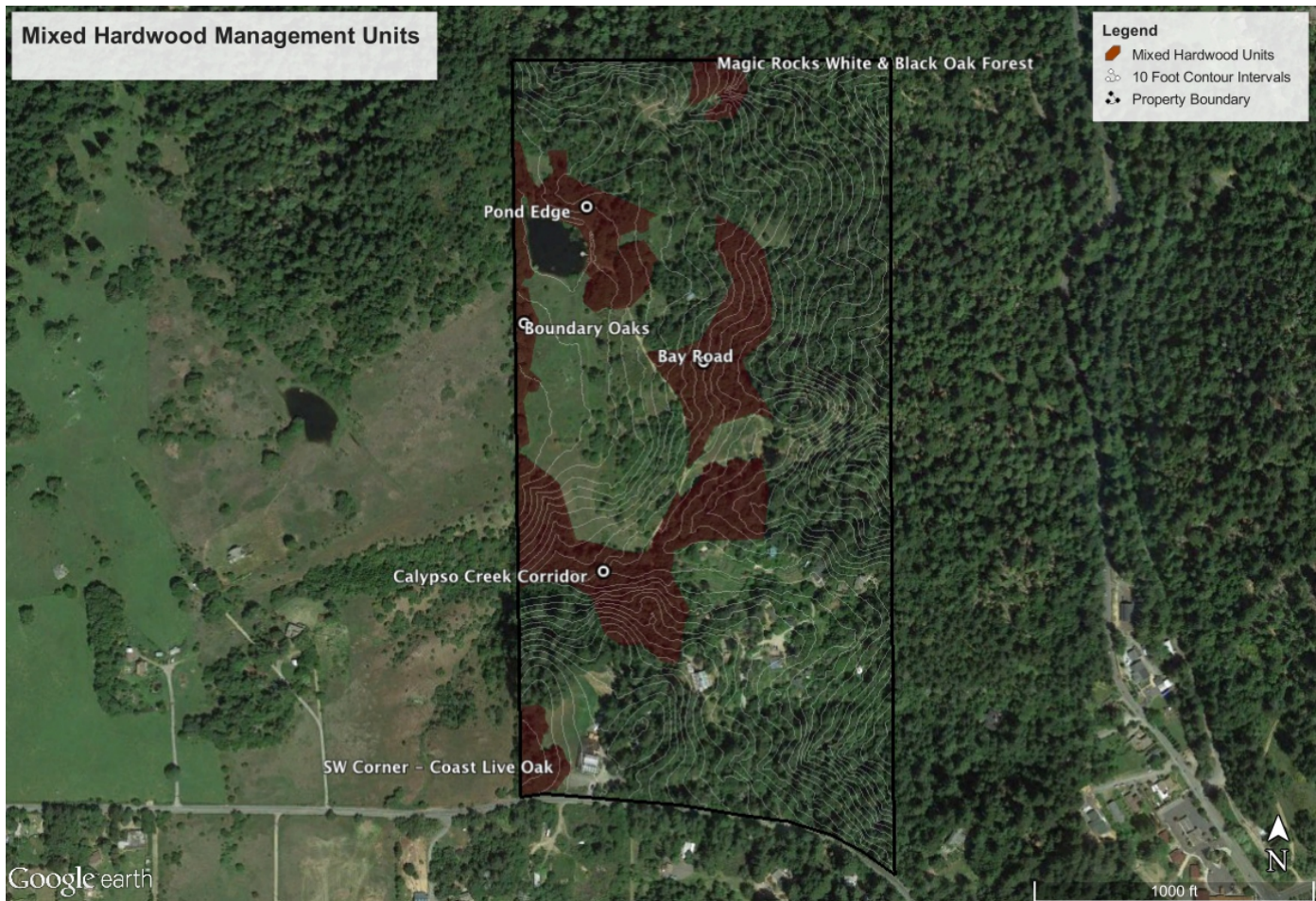
### **CHAPARRAL MANAGEMENT UNITS:**

*See Full Version of Plan to view this section.*



### 6.1.3. VEGETATION COMMUNITY - MIXED HARDWOOD

Figure 7.3 Mixed Hardwood Management Units



#### General Description:

Interspersed with the mosaic of coastal prairie, chaparral, and mixed conifer, pockets of mixed hardwood dot the hillsides of OAEC. This vegetation community is primarily dominated by the pungent California bay, with an intermingling of coast live oak, madrone, an occasional white or black oak, California hazelnut, and very often the ever-encroaching Douglas fir. The understory contains California blackberry, yerba buena, yerba de selva (*Whipplea modesta*), California honeysuckle (*Lonicera hispidula*), and more. In areas dominated by California bay, the understory tends to be fairly barren.

This plant community provides a bucolic visual and appealing aesthetic, enjoyed by all. The iconic oaks of OAEC have become a favorite subject of artwork and are central to the imagery that has become associated with OAEC.

The mixed hardwood plant community is where the food tends to be found, for humans and non-humans alike. Acorns, bay nuts, hazel nuts, and madrone berries are all edible, delicious, and nutritious, and have been highly prized as a food source by the native people of this area for many thousands of years. Foragers among the OAEC community value the mixed hardwood zones as the primary source of wild fruits, nuts and mushrooms.

Many birds and mammals rely upon these wild foods as well, which provide an abundant and nutritious fall forage source. In addition to their forage value, oaks in particular provide crucial habitat for nesting birds as perching sites, and as they slowly decay, their structure provides opportunities for cavity nesting as well. In fact, oak trees are the most important tree for wildlife on the North American continent due to the many ecosystem services they provide.

The oaks at OAEC have suffered due to the combined threats of fire suppression and changes in herbivory patterns by native ungulates, who overbrowse young oak seedlings. Walking along the trails at OAEC one will find the constant reminder of Sudden Oak Death (SOD), a forest disease which has killed nearly all of the mature tanoaks on the property as well as many of the heritage coast live and black oaks; their fallen trunks scatter the hillsides and open up niches that California bay and Douglas fir seem to have great success in filling.

### **Mixed Hardwood Management History:**

The first signs of SOD appeared in the early 2000s, as staff biologists started to notice a mysterious decline in the health and massive die-off of tanoaks. Science soon revealed that many of the oaks (live oaks, black oaks, and tanoaks) were being infected by a pathogen, *Phytophthora ramorum*, that caused a slough of symptoms that eventually lead to the death of the infected oak.

OAEC has been involved in experimenting with multiple strategies to slow the spread of SOD and attempt to save the remaining oaks.

Because California bays are both hosts and vectors of the pathogen, actively spreading it to neighboring oak trees, land managers have prioritized the removal of California bay branches and trees within the canopy of neighboring oaks – where practical. Often the bay is so dense that entirely removing bays within a 15-foot radius around oaks proves impossible due to resource constraints. Nevertheless, hundreds of bay trees have been removed, especially around heritage oaks. Thinning and limbing around oaks has also improved airflow and circulation, which seems to benefit neighboring oaks. Agrophos was applied to several heritage oaks in Solar Suburbia behind Sowing Circle homes.

In 2005, OAEC collaborated with Sonoma Mountain Institute and Dr. Elaine Ingham to conduct an experiment testing the efficacy of actively aerated compost tea as a foliar treatment on dozens of trees, which were already infected with SOD and far along in the infection process; results were mixed and did not offer conclusive direction around Sudden Oak Death treatment or prevention. Utilizing a microscope to examine microbiology on the leaves showed an increase in microbiology, but not a decrease in the symptoms of SOD, likely because it was so late in the game.

There has been a targeted individual effort to save the Bell Oak by the kitchen, which stands at the heart of the Core Area and offers shade to the picnic tables below. Treatments included foliar and subsoil compost tea application, and application of compost and mulch underneath the canopy. More recently in 2014 during a workshop the trunk of the tree was flamed as a “fire mimicry” experimental treatment, with unknown results. The tree is still alive and does not show signs of advanced SOD.

In addition to attempting to slow the spread of SOD, OAEC staff was strategic about increasing the diversity and presence of oak species that are not susceptible to SOD, namely white oak, by collecting and planting acorns throughout the property.

Recent samples taken in the spring of also in 2005 2015 confirm that California bays at OAEC are still indeed active carriers of *Phytophthora ramorum*, and that SOD is still present throughout the site.

The California bay, compared to the oaks, are thriving. Cut by the early European homesteaders and coppiced for firewood, most stands of bay have stump-sprouted and are multi-stemmed; many of the bays have been thinned and limbed as part of fuel load reduction efforts.

Unrelated to SOD, in 2001, OAEC received a grant from Partners With Wildlife and the U.S. Fish & Wildlife Service to improve mixed hardwood habitat for neo-tropical migrant breeding birds. The grant supplied a cost-share to the organization to conduct thinning and limbing to release oaks, remove broom, and save and sow of native forbs and grasses.

As part of an effort to move towards a more focused nutrient-cycling, closed-loop system, slash from these thinning efforts has been utilized in the following order of priority: 1) as biomass strategically place in gullies to mitigate headcuts in class III drainages; 2) as material for building wildlife habitat piles; and 3) as round pole building material (in the case of Douglas fir). Only when these options have been exhausted does slash become part of a burn pile.

#### Management Objectives for Mixed Hardwood Units:

- 1) Enhance the functional carrying-capacity of our mixed hardwood forests to support forest-dependent wildlife populations, and diversity of fungal and plant communities.
- 2) Select for madrone, oaks and hazel over California bay where possible
- 3) Experiment with treatment for sudden oak death
- 4) Preserve genetics of oak species through acorn collection and propagation, and protection of young oaks from deer browse
- 5) Maintain trails and roads for access and recreation

#### Strategies:

In order to effectively achieve these directives and manage OAEC's woodlands holistically over time, and in keeping with the theme of regenerative disturbance, we will employ a host of strategies including: the removal of encroaching conifers, prescribed fire, thinning and limbing, seed-saving and sowing, building wildlife habitat piles, and erosion control for headcut mitigation. Each management strategy is selected and utilized based on seasonal conditions and the discretion of the land managers.

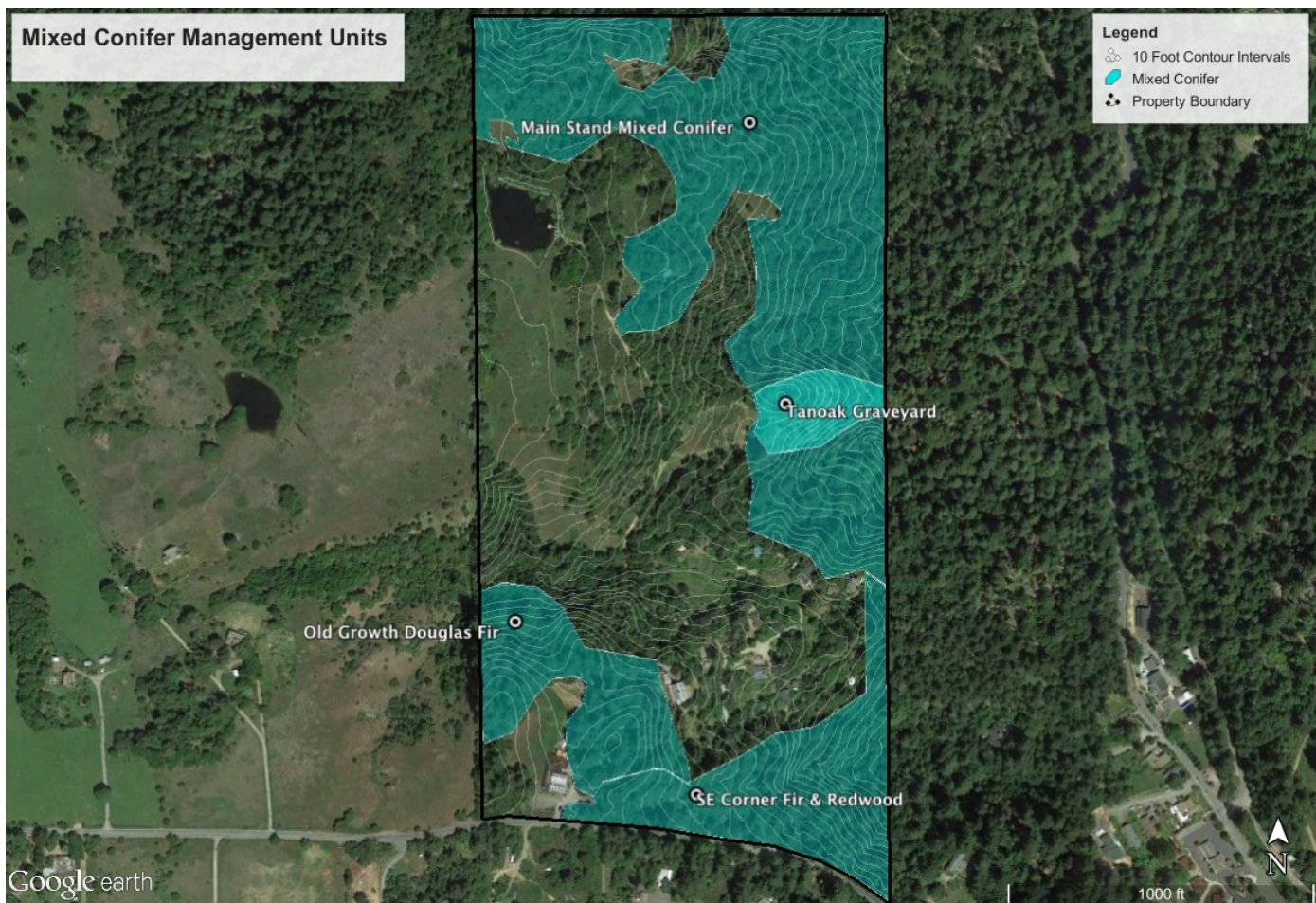
#### MIXED HARDWOOD MANAGEMENT UNITS:

*See Full Version of Plan to view this section.*

### **6.1.4. VEGETATION COMMUNITY – MIXED CONIFER**

**Figure 7.4 Mixed Conifer Management Units**





### General Description:

A dense canopy of second and third growth Douglas fir and redwood, interspersed with California bay, coast live oak, and tanoak, dominate approximately 42 acres of OAEC. The understory of this vegetation community tends to be fairly minimal, especially in the deep shade, while the edges that receive more sunlight contain yerba de selva, Douglas iris, yerba buena, and some native grasses.

Since the arrival of Europeans, the mixed conifer plant community has experienced two extreme ends of the disturbance scale. Several rounds of intensive logging impacted the forests of OAEC. The first round began with clearcutting of redwoods in the late 1800s, initiating the destructive process of soil disturbance, erosion, and loss of old-growth forest characteristics. Based on age-dating of third growth trees at OAEC, the second logging wave came in the 1920s and 30s, along with the associated road building, exacerbating the high level of disturbance that had already overtaxed the system. Based on stories from locals in the area, there was also significant removal of Douglas fir throughout the region post World War II to build houses for the returning veterans.

From the 1950s onwards, with a change in ownership away from homesteaders making a living off of the land, towards more environmentally-minded landowners with a "let nature restore" approach, the next 40 years or so saw the opposite end of the disturbance spectrum, with very little disturbance of any kind. The end result is an overstocked third growth forest. The regrowth of redwood has not been actively managed, and has stump-sprouted in a manner that has not selected for health and vigor. Within the original conifer stands where it has been cut, Douglas fir has reseeded to create dense "dog hair thickets" of young saplings stocked at a rate of hundreds of stems per acre. In addition, as the nation-wide fire suppression policy came into effect in the

1920s, Douglas fir dramatically expanded its distribution by reseeding into the neighboring vegetation communities of coastal prairie, chaparral, and mixed hardwood. The combination of the legacy of logging which has favored Douglas fir regeneration; a reduction in intensive grazing that would have limited the success of Douglas fir seedling expansion; and fire suppression, has created an unprecedented situation of overstocked conifer forests and conifers encroaching upon neighboring plant communities. These factors together have resulted in the expansion and overstocking of the coniferous forests to the detriment of wildlife, fire resilience, plant diversity and overall forest health.

Despite the compromised state of the mixed conifer stands, rare arboreal mammals such as Sonoma tree vole, porcupine, as well as Douglas squirrel, and redwood chipmunk, have all been observed in various locations throughout these vegetation communities. Spotted owl has also been observed, as well as a probable pair of nesting white-tailed kite. Other species of owls on the property are often found in this community, including great-horned, Western screech, Northern pygmy and sawwhet owls. It appears that the documented breeding of pileated woodpecker occurred in an SOD tanoak snags.

### **Mixed Conifer Management History:**

Under OAEC's stewardship, an attempt to restore a healthy balance through human-scale regenerative disturbance has led to a site-wide goal of removing encroaching conifers from neighboring plant communities. In addition, ongoing thinning and limbing of Douglas fir has helped move towards the goals of fuel load reduction, enhancing biodiversity, and increasing accessibility for wildlife and people along roads, trails, and in the forest. As outlined in the Mixed Hardwood Management Section, slash generated from thinning and limbing activities has ongoingly been utilized to brushpack gullies and mitigate headcuts, especially at road crossings. Round poles have also been selected for onsite construction projects, and where appropriate, slash was also utilized to create wildlife habitat piles. Land managers have also collected and distributed native grass seed (*Bromus laevipes*, *Melica californica*, *Festuca californica*, and *Elymus glaucus*), Douglas iris and yerba buena in encroachment areas after thinning, due to the fact that these heavily shaded encroached areas have little understory.

A guiding principle of mixed conifer management has included the mantra "less trees and more forest," implying the importance of reducing overall basal area and stem density in favor of improving the forest structure, function and composition and move towards its original pre-logging characteristics of a late seral stand condition.

### **Management Objectives for Mixed Conifer Units:**

- 1) Enhance the functional carrying-capacity of our forests to support forest-dependent wildlife populations for species such as spotted owl and Sonoma tree vole
- 2) Manage for a fire resilient forest
- 3) Manage towards late seral stage (old growth) characteristics
- 4) Enhance diversity of understory
- 5) Manage for small-scale onsite timber production – primarily round poles with the potential of a portable mill
- 6) Maintain trails and roads for access and recreation
- 7) Strive to manage forests for carbon sequestration in soils and vegetation
- 8) Manage to improve water quality and quantity

**Strategies:**

In order to effectively achieve these directives and manage OAEC's coniferous forests holistically over time, OAEC is committed to being active participants in a regenerative disturbance regime. Land managers employ a host of disturbance strategies including: thinning and limbing for fuel load reduction and wildlife habitat enhancement; the removal of encroaching conifers along neighboring plant communities with mechanical thinning, burning, grazing, mowing; seed collection and dispersal; construction of wildlife habitat piles; and brushpacking gullies for headcut mitigation. Each management strategy is selected and utilized based on seasonal conditions and the discretion of the land managers.

**MIXED CONIFER MANAGEMENT UNITS:**

*See Full Version of Plan to view this section.*



### 6.1.5. Management Unit - Core Area



#### Description & History:

The ten acres within the deer fence at OAEC is known as the Core Area, and contains the residential and organizational infrastructure including houses and outbuildings, gardens, power lines, plumbing, animal structures, and parking lots. It is bordered on the southern edge by the Southeast Corner mixed conifer management unit, and the eastern edge is demarcated by the property boundary; the northern and western boundaries are marked by the deer fence.

The Core Area is heavily vegetated, landscaped with mostly edible and some ornamental landscaping, and the edges of the Core Area are thick with a densely stocked mixed conifer and hardwood forest. Because of the presence of residential structures, a densely stocked forest, as well as its adjacency to fire vectors such as Coleman Valley Road and the town of Occidental, which is about ¼ of a mile downhill, the Core Area is the highest priority for fuel load reduction and fire safety. The way the topography works, the Core Area sits on a finger-ridge of a peninsula with southeast facing slopes that are part of a canyon that runs to the north end of Occidental; the northeast facing slopes are part of Calypso Creek canyon moving towards Camp Meeker. Both of

these canyons can help to funnel uncontrolled fire up to the Core Area.

Due to the significant amount of impervious surfaces (rooftops and roads) there is a substantial amount of runoff which is managed with swales and rain gardens to encourage infiltration and decrease runoff.

The gardens within the Core Area are protected within the organic agriculture conservation easement held by Sonoma Land Trust (see Appendix).

The wildlife biodiversity of the Core Area is significantly enhanced by the ample presence of water and food and cover resources throughout the gardens. The bird and insect biodiversity are particularly notable in the Core Area. Because of the deer fence which excludes all deer browse pressure, the plants are not browsed at all, which has a unique impact on the native plant life which receives a great amount of deer pressure outside of the deer fence.

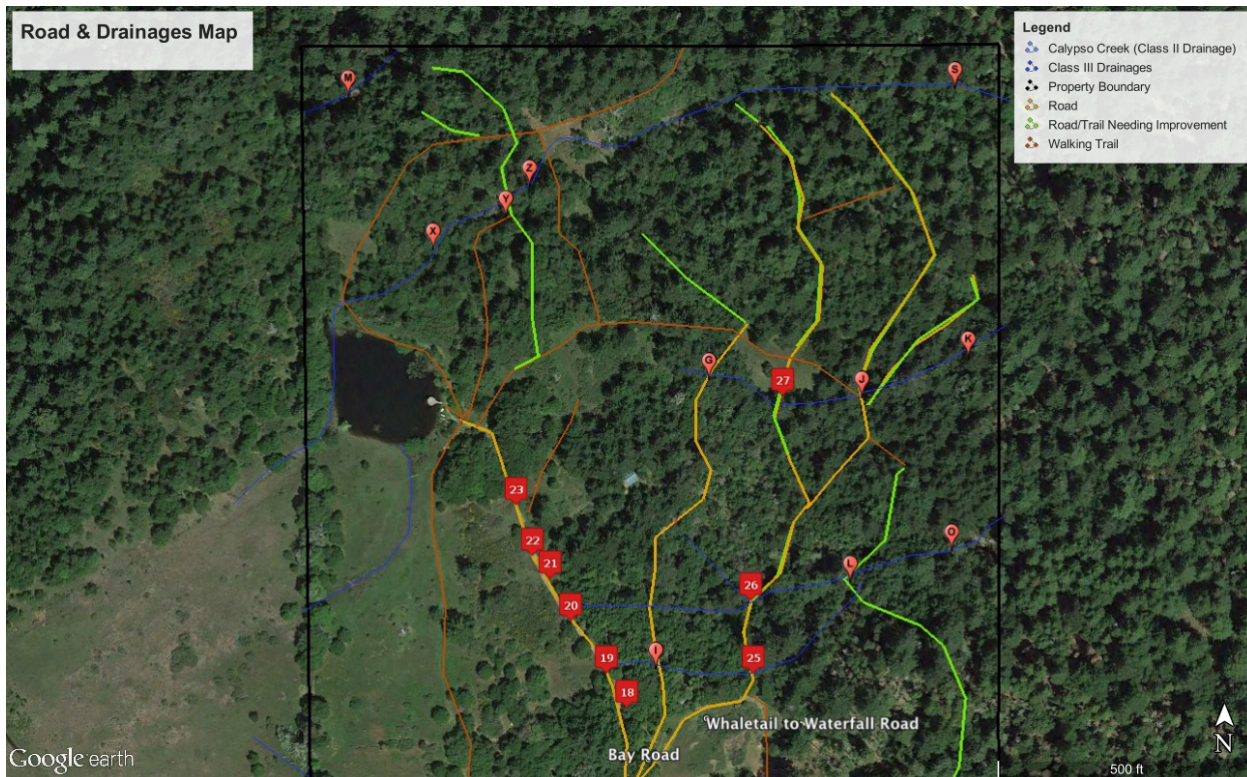
There is a zone between the Woods Yurt and Adam & Katy's that contains false lupine (*Thermomopsis* sp???) a rhizomatous native that looks like lupine, which is being crowded out and needs tending

### **Management Objectives & Strategies:**

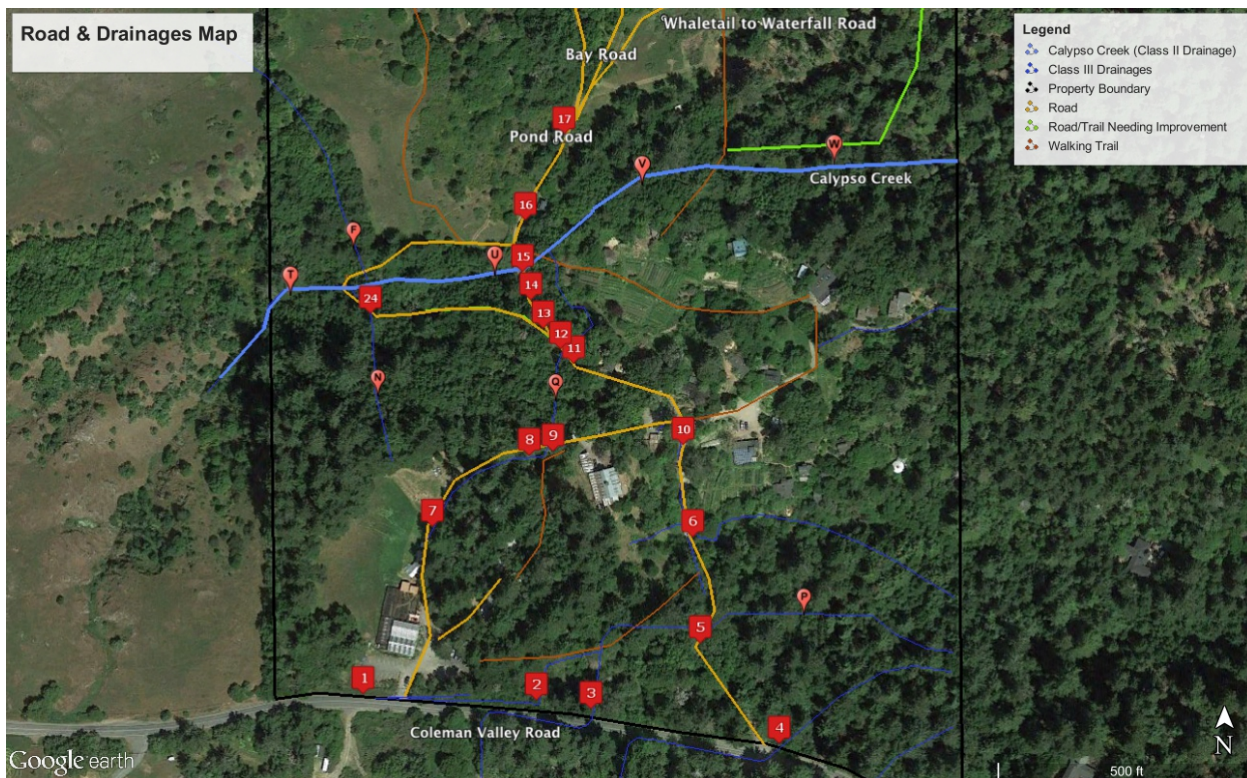
1. Prioritize fuel load reduction and defensible space surrounding core area and structures, and ingress / egress routes (see map)
2. Improve the fencing for containment of goats to maintain thinned understory
3. Continue organic gardening and facility maintenance

### 6.1.6. Drainages & Habitat Ponds

Figure 8. Road & Drainage Maps (northern and southern portions)







**Table 6. Habitat Erosion Table**

*See Full Version of Plan to view this section.*

### **I. Calypso Creek**

Calypso Creek (named by OAEC staff and not marked officially as such on maps) is OAEC's only Class II stream, due to the year-round presence of aquatic life. Calypso Creek runs from the west to the east, and feeds into Dutchbill Creek, a Coho salmon and steelhead trout bearing stream.

#### **Management Strategies & Objectives:**

- Continue planting riparian species along the creek (see Section IV of Management Units)

### **II. Class III Drainages**

All of the Class III drainages at OAEC run generally from the west to the east, draining into Dutchbill Creek. They have been managed over the last 20 years of OAEC's history for enhancing water quantity and quality through erosion control, groundwater recharge, and sediment reduction efforts.

Many of the Class III drainages require ongoing, small-scale brush-packing of gullies to mitigate headcutting and erosion; these are marked on the Drainage & Ponds map as Points F through R.

## **Management Strategies & Objectives:**

- Enhance water quality and quantity through continued erosion control, groundwater recharge, and sediment reduction

## **III. Pond**

The 6 acre-foot pond at OAEC located next to the Big Meadow near the top of the watershed was built in the days when the Farallones Institute managed the property. This fills with surface flow from the surrounding several acres of uplands.

Currently the pond edges contain several species of willow, a few younger coast live oaks, and along the lower water line you will find cattail and tule. The northern and western edges of the walkway around the pond are overtaken with watsonia, an invasive bulb from South Africa which is mowed annually before it sets seed. The invasive broom sedge (*Andropogon virginicus*) has established itself around the edge of the pond along the high water line; it is unlikely to be eradicated, as ongoing management has not reduced its population. It also does not seem to be expanding above the high water line and thus is not a high priority for management.

The pond provides crucial habitat for Western pond turtle (*Clemmys marmorata*), listed as a Species of Special Concern in California, as well as numerous other aquatic and amphibious species such as Pacific chorus frog. A barrier "fish fence" was built at the pond overflow to create a portion of the pond with water for Pacific chorus frogs to breed out of reach of the non-native bass which are very successful in the pond. An SOD oak has recently fallen on this barrier and the fish fence needs revamping. A potential option is to cut one branch of the oak in order to be able to restring the fence, and then leave the remainder of the oak in place as a deer browse barrier, and place cuttings of grey willow along the overflow. This will eventually provide a visual barrier for the fish fence as the big oak slowly decomposes over time.

The spillway is lined with concrete for the first bit, and then transitions to a deeply eroded streambed created by the spillway that abandoned the historic drainage flow. There is significant erosion in the lower portion of the spillway. To reduce headcutting, energy needs to be dissipated at the terminus of the spillway, and for the next 100 feet or so channel bed stabilization is required. There is an opportunity to reconnect and backwater the old channel to use it as a sediment retention recharge area. At Point X, there are a series of cross-channel brush "beaver analog dams" that were installed in 2004 by a crew from Marin Conservation Corps with slash from thinning and limbing. To mitigate the incision (the actual headcut is further upstream), the height of the streamflow was raised to encourage backflow to the historic stream channel, which created a backwatered infiltration area. These brush check dams need to be rebuilt and improved down to the old haul road crossing at Point Y.

The next reach from Point Y to the Magic Rocks Meadow there is a series of headcuts, marked by Point Z, which need to be treated with placement of rocks to mitigate headcut migration and preserve open water for wildlife pools for drinking later into the season, a project which



could potentially be supported with funding from EQIP and NRCS. There is a significant amount of slash to be generated by thinning and limbing below the pond which could contribute to gully packing efforts, and rock will need to be brought in for treating the lower portions of the drainage.

There is small-scale headcut mitigation needed for the two drainages that fill the pond where it hits the willows on the southwestern side of the fence. This can be accomplished with brush-packing from thinning the encroaching conifers along the western boundary.

#### Management Objectives & Strategies:

- Continue to maintain pond for agricultural water use and recreation
- Plant additional clusters of water-loving plants from high to low water, especially culturally significant plants such as elderberry, willow, dogwood, and tule, and manage these plants for cultural uses
- Improve Western pond turtle habitat in pond

### **6.1.7. Drainages & Habitat Ponds**

See Figure 8 for Map of Roads.

#### **Table 7. Summary of Road Projects**

*See Full Version of Plan to view this Table and the complete section; an abbreviated version is provided below.*

An extensive network of roads and trails provides access throughout OAEC for vehicle traffic foot travelers (see Figure 8). Additionally, the roads and trails are utilized by wildlife as corridors to movement around the property and adjacent lands. The majority of the roads are legacy ranch roads and logging haul roads and skid trails, in varying condition; Table 7 provides a summary of work that needs to be completed on the road system.

There are two access points to the property from Coleman Valley Road: the main driveway which leads to the core area, and the nursery parking lot entrance. There is parking at both locations, where staff, residents, and visitors park their vehicles during their stay. The additional ingress/egress offered by the second nursery entrance provides a continuous loop in the case of fire or other emergency, as it is connected to the core area parking via a driveway that passes by the barn.

The main access from the core area to the backcountry and the northern portion of the property is via the Pond Road, which is a well-maintained road, accessible for two wheel drive vehicles. It was improved as part of a Fish Friendly Roads demonstration project in 2006, with the installation of rolling dips and improved culverts to reduce erosion and sediment delivery to Dutchbill Creek. As part of a watershed-wide sediment reduction strategy for Coho salmon and steelhead trout, OAEC was one of seven properties in the Dutchbill Creek watershed to receive grant funding. A Gold Ridge Resource Conservation District grant proposal was funded by the California Dept. of Fish &

Wildlife, and inventory and implementation was completed by Gold Ridge RCD and Pacific Watershed Associates as per the Fish Friendly Roads protocol. The Pond Road is regularly used by tractor, truck, and foot to access the property for management work and recreation, and receives the most traffic.

Other than the Pond Road, all of the roads and trails at OAEC have suffered from fallen SOD trees that block the roads in varying degrees. There is continued and ongoing work to clear the roads, but there is much remaining work, and new trees fall and add to the challenge.

In addition, all of the Class III drainages are experiencing incision and headcutting, especially at the road crossings. Ongoing gully packing with slash has vastly improved the incisions, but all of the wet crossings need ongoing headcut mitigation work, especially in the lower reaches.

## **6.2. Property Boundaries, Trespass, Security**

*See Full Version of Plan to view this section.*

## **6.3. Invasive Species Control**

*See Full Version of Plan to view this section.*

## **6.4. Disease & SOD**

*See Full Version of Plan to view this section.*

## **6.5. Revegetation and Reforestation**

*See Full Version of Plan to view this section.*

## **6.6. Timber Stand Improvement**

*See Full Version of Plan to view this section.*

## **6.7. Biomass Utilization and Carbon Sequestration**

*See Full Version of Plan to view this section.*

## **6.8. Timber Harvesting, Conifer Stand Descriptions**

*See Full Version of Plan to view this section.*

## **Exemptions**

*See Full Version of Plan to view this section.*

## **General Harvest Plan Guidelines**

*See Full Version of Plan to view this section.*

## **Harvesting Goals, and Silvicultural Methods**

*See Full Version of Plan to view the complete version of this section; the following is a summary.*

The over-all goal for the structure of the OAEC conifer forests is to promote the development of mixed-age stands with a discontinuous, multi-level canopy. Ideally old growth elements would be

allowed to develop as well. Commercial harvesting is not a priority for the owners, however, periodic thinning of sizeable trees to be used for on-site projects may occur. Selection criteria should include not only what material is need for a project, but how the forest stand will fare with tree removal: regeneration, release, habitat, erosion, etc.

### Tree Stand Descriptions, Brief Recommendations

*See Full Version of Plan to view the complete version of this section; the following is a summary.*

#### **Table 9. Forest Units, WHR, & Basal Area**

*See Full Version of Plan to view this section.*



*Photo 1635. Example of Unit IV, 311 sq.ft. basal area Redwood overstory*





Photo 967. Example of SOD patch in Unit IV. Basal area 90 sq. ft. with numerous tan oak and bay saplings in the dead brush



Photo plot 2. Example of unit V, Douglas fir, 572 sq. ft. basal area

**Figure 9. Forest Units**  
*See full version of the Plan to view this section.*

**6.9. Erosion Control**

The most fertile portion of the soil profile is in the top few inches, and it takes years to develop. Erosion control measures are implemented to keep valuable soil in place where it can grow vegetation while keeping topsoil out of watercourses where it can reduce water quality to the detriment of aquatic life and human water users. Roads, skid trails, and log landings are the main causes for erosion on the property. Timber harvesting and other management activities should utilize existing trails and avoid construction of new trails. Some of the old skid trails have established stands of perennial grasses – avoid bulldozing these during management operations if possible.

**Water breaks**

*See Full Version of Plan to view this section.*

**Seed and Mulch**

*See Full Version of Plan to view the complete version of this section; the following is a summary.*

Once off the road, the first and foremost method of erosion control is to keep the soil in place using vegetation and/or mulch. Bare soil erodes at much higher rates than vegetated soil or soil with a thick layer of forest litter or duff.

**Table 11. Native Perennial Seed Mix Example**

<i>Bromus carinatus</i>	California brome	25%
<i>Elymus glaucus</i>	blue wildrye	25%
<i>Festuca rubra (Molate)</i>	Molate red fescue	25%
<i>Stipa pulchra</i>	purple needle grass	25%
Total	1.2 pounds per 1,000 sq.ft.	

**Gully Repair**

An inexpensive effective fix for small gullies is the brush check dam and brush packing in gullies, starting at the headcut and then working our way down. This can utilize thinnings and prunings from the forest as well as live willow stakes in areas where sun reaches the forest floor, and must be installed following details provided in the Typical Specifications section in **Appendix 1**. Brush checks can be used as energy dissipaters for small ditch relief culvert outlets. It is essential that these features be keyed into the banks properly and that there is a u-shaped weir opening large enough to accommodate flows.



## 7. Fuel Management

### 7.1. Fire Hazard Zones – Defensible Space

See Full Version of Plan to view the complete version of this section; the following is a summary.

Areas of highest risk or likelihood of ignition sources are near the cabins (wood stoves, electric fires) and downhill of the eastern property line (above Occidental and Bohemian Highway). Fire moves fastest upslope, and upslope of the road in Occidental is a dense stand of trees. A high fire hazard rating in these areas is based on a combination of risk (the likelihood of a fire starting) and fire severity (a function of fuels, slope, weather, and prevailing winds).

The following table lists the area between a building and wildlands where the vegetation must be modified to reduce flammability.<sup>5</sup>

**Table 12. Recommended Defensible Space**

	0 – 20% Slope	21 – 40% Slope	40% + Slope
Grass	30 feet	100 feet	100 feet
Shrubs	100 feet	200 feet	200 feet
Trees	30 feet	100 feet	200 feet

Vegetation modification may include mowing, watering, planting of low flammable plants, creating areas of discontinuity between vegetation. The following is from California Public Resource Code:

**4291.** Any person that owns, leases, controls, operates, or maintains any building or structure in, upon, or adjoining any mountainous area or forest-covered lands, brush-covered lands, or grass-covered lands, or any land which is covered with flammable material, shall at all times do all of the following:

(a) Maintain around and adjacent to such building or structure a firebreak made by removing and clearing away, for a distance of not less than **30 feet** on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This subdivision does not apply to single specimens of trees, ornamental shrubbery, or similar plants which are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

(b) Maintain around and adjacent to any such building or structure additional fire protection or firebreak made by removing all brush, flammable vegetation, or combustible growth which is located from 30 feet to **100 feet** from such building or structure or to the property line, whichever is nearer, as may be required by the director if he finds that, because of extra hazardous conditions, a firebreak of only **30 feet** around such building or structure is not sufficient to provide reasonable fire

<sup>5</sup> from University of Nevada Cooperative Extension *Living With Fire: A Guide for the Homeowner*  
[www.extension.unr.edu/FIRE/FrontPage.html](http://www.extension.unr.edu/FIRE/FrontPage.html)

safety. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(c) Remove that portion of any tree which extends within **10 feet** of the outlet of any chimney or stovepipe.

(d) Maintain any tree adjacent to or overhanging any building free of dead or dying wood.

(e) Maintain the roof of any structure free of leaves, needles, or other dead vegetative growth.

(f) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that is attached to any fireplace, stove, or other device that burns any solid or liquid fuel. The screen shall be constructed of nonflammable material with openings of not more than one-half inch in size.

(g) Except as provided in Section 18930 of the Health and Safety **Code**, the director may adopt regulations exempting structures with exteriors constructed entirely of nonflammable materials, or conditioned upon the contents and composition of same, he may vary the requirements respecting the removing or clearing away of flammable vegetation or other combustible growth with respect to the area surrounding said structures.

No such exemption or variance shall apply unless and until the occupant thereof, or if there be no occupant, then the owner thereof, files with the department, in such form as the director shall prescribe, a written consent to the inspection of the interior and contents of such structure to ascertain whether the provisions hereof and the regulations adopted hereunder are complied with at all times.

## 7.2. Firebreaks and Fuel Breaks

Firebreaks are areas of bare soil or pavement that do not burn. Fuel breaks are areas where vegetation is maintained in such a way as to slow the spread of fire, eliminate ladder fuels (dead branches and brush from ground level to the forest canopy), and allow access to fire fighters. The key firebreaks for the property are the main access road and trails. Creating additional bare soil firebreaks is not recommended for the following reasons: bare soil is an invitation for erosion and weed establishment (such as broom), and it is aesthetically unappealing. For a firebreak to be more effective, they should be augmented by creating adjacent fuel breaks 50 feet wide in the flattest areas and 200 feet wide in the steepest areas.

### Hardwood –Conifer Dominated Fuel Breaks

*See Full Version of Plan to view the complete version of this section.*

### Grass Dominated Fuel Break

*See Full Version of Plan to view the complete version of this section.*

### 7.3. Other Fire-Safety Considerations

- Maintain water storage and fire hydrants. This should be a top priority.
- Clean wood stove chimneys on a regular basis and maintain spark screens at the top of the stack.
- All internal combustion driven equipment used in forest, brush-covered lands must have functioning spark arrestors: chainsaws, lawnmowers, weed eaters, etc.
- Do not operate equipment in fire hazard areas when the Fire Department fire weather danger rating is high.
- When using equipment that could ignite vegetation – such as grinders, torches, or welding equipment – clear away flammable materials within a 10-foot wide area around the operation.
- Keep fire fighting tools (pointed shovel, McCleod, Pulaski, etc.) and extinguishers handy. There should be a fire tool cache in an obvious locations near the road and kitchen area. Vehicles traveling into the property should be equipped with a shovel and fire extinguishers.
- Visitors must park in designated areas that have been cleared.
- Keep escape routes open when burning.
- Burn slash piles only with a permit from CDF when conditions are safe: wind less than 10 mph, high humidity and fuel moisture mid-winter, early spring.
- Burning is prohibited from May 1 until the end of CDF's declared fire season.
- When burning in areas of continuous flammable vegetation or duff, clear a firebreak to mineral soil around burn piles.

## 8. Emergency Preparedness

Fire, earthquakes, medical emergencies are situations which can be moderated by advance planning. This includes knowing and maintaining escape routes and safe gathering places, emergency contact lists, a list of medical facilities and also having emergency supplies on hand.

Visit <http://sonomacounty.ca.gov/FES/Emergency-Management/Emergency-Preparedness/> for information on survival kits, disaster communications, and more.

<http://www.sonoma-county.org/eservice/FIRE.htm#top>

### Fire Response Plan

*See Full Version of Plan to view the complete version of this section.*

### Other Emergency Preparedness

*See Full Version of Plan to view the complete version of this section.*

#### 8.1. Infrastructure, Transport Network, Fire Hydrants, Water Storage & Tool Cache

*See Full Version of Plan to view the complete version of this section.*

## **Figure 10. Emergency Map - Roads & Infrastructure**

*See Full Version of Plan to view the complete version of this section.*

## **9. Visitor Information**

OAEC is open to the public through volunteer days, courses, special events, plant sales, and tours; it is not open for drop-in visitors. Garden volunteer days happen weekly on Wednesdays, from 10am – 5pm, every week except for the Wednesday before Thanksgiving week, Christmas, and New Year's. Dates for courses, special events, plant sales and tours are listed online; please visit [www.oaec.org](http://www.oaec.org) for the most updated event calendar and to find out more about visiting.

## **10. Project Descriptions, Schedule & Cost**

*See Full Version of Plan to view the complete version of this section.*

## **11. Sources of Assistance, Contacts, References**

### **11.1. Public Assistance**

- ❑ Occidental Volunteer Fire Dept. 3800 Bohemian Hwy, (707) 874-3800
- ❑ Cal Fire, California Department of Forestry and Fire Protection. Cost share programs: **Jill Butler**, 135 Ridgeway Ave., Santa Rosa, CA 95401. (707) 576-2360.
- ❑ NRCS, Natural Resource Conservation Service, 1301 Redwood Way, Suite 170, Petaluma, CA 94954. (707) 794-1242. Advice and cost share programs, soil information, erosion control and engineering advice.
- ❑ CDFW, California Department of Fish and Wildlife. Region 3 office: 7329 Silverado Trail, Napa, CA, 94558 (707) 944-5500. Fisheries and wildlife habitat enhancement, species protection.
- ❑ UCCE, University of California Cooperative Extension. 579 Low Gap Road, Ukiah, CA 95482. (707) 463-4495. Forestry and agriculture information, field workshops.
- ❑ Archaeology: Northwest Information Center, Dept. of Anthropology, Sonoma State University, Rohnert Park, CA 94928. (707) 664-2494. Records search.
- ❑ California Geological Survey (formerly CDMG), c/o CDF: Dave Longstreth 135 Ridgeway Ave., Santa Rosa, CA 95401. (707) 576-2987
- ❑ California Geological Survey (formerly CDMG), c/o George Saucedo, Senior Geologist, (415) 904-7726 [gsaucedo@consrv.ca.gov](mailto:gsaucedo@consrv.ca.gov)

### **11.2. Private Land Management Contacts**

- ❑ Appleton, Harold: Registered Professional Forester. Bodega Bay. (707) 875-3976  
[haroldappleton@comcast.net](mailto:haroldappleton@comcast.net)
- ❑ Erickson, Rolfe: Geology professor, Sonoma State. 664-2334

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## **APPENDIX**

See full version of the Plan for this section.

