OPEN SPACE
RESOURCE MANAGEMENT PLAN

TOWN OF TIBURON, MARIN COUNTY, CALIFORNIA

Adopted by Tiburon Town Council
November 17, 2010

LSA

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TOWN OF TIBURON, MARIN COUNTY, CALIFORNIA

Submitted to:

Town of Tiburon
1505 Tiburon Boulevard
Tiburon, California 94920
(415) 435-7392

Prepared by:

LSA Associates, Inc.
157 Park Place
Point Richmond, California 94801
(510) 236-6810

LSA Project No. TOT0801

November 2010

LSA

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PROJECT PURPOSE

The Town of Tiburon (Town) owns and manages approximately 250 acres of open space distributed among 21 parcels (Table A). These open space areas vary considerably in size, vegetation, occurrence of special-status species, and proximity to residences. Nearly all of the parcels were either purchased outright by the Town for preservation purposes or were acquired as a result of open space dedications required by the Town for new development projects.

The primary emphasis of this open space resource management plan is management of vegetation. The overwhelming abundance of French broom (*Genista monspessulana*) and to a lesser extent other invasive, non-native species becomes readily apparent after visiting all of Tiburon's open space parcels. These non-native species can increase the fire hazard and threaten sensitive resources. The fire-related condition of the Town's open space lands is generally typical of open space lands in the region, and removal of fire-prone vegetation is an ongoing management issue for virtually all agencies owning substantial open space lands. Managing non-native species largely responds to three of the Town's primary concerns: 1) fire hazards and fuel loading; 2) invasive, non-native species; and 3) protection of sensitive resources. Other topic areas such as erosion and passive recreation are treated in this management plan, but with more emphasis on how these issues relate to the primary vegetation management goals of the Town. An overriding element of this plan is prioritizing the tasks because the vegetation management needs on the 250 acres of open space are much greater than the Town's limited resources to address them.

KEY ISSUES

The RMP addresses several key issues including maintaining the biological resource values, reducing invasive and non-native species, reducing fire prone vegetation, addressing passive recreational use, and repairing areas experiencing erosion.

The larger open space parcels are regularly used by the residents of Tiburon and adjacent communities for passive recreation. These parcels are grassy areas on ridge tops or slopes of hills with expansive views of the areas surrounding San Francisco Bay and as such are desirable destinations.

Some of these parcels support special-status species, two of which, the Tiburon jewelflower (*Streptanthus niger*) and the Tiburon microblind harvestman (*Microcina tiburona*), a spider-like animal, do not occur beyond the Tiburon Peninsula. The habitat of these species is threatened by non-native invasive species, principally French broom, but also others such as Pampas grass (*Cortaderia* spp.), and pride of Madeira (*Echium candicans*).

These same non-native species are either in the process of, or have already overgrown, significant portions of the open space parcels. These non-native species destroy native habitat, render the habitat

unsuitable for the unique species of the Tiburon Peninsula, and increase the fire hazard to adjacent homes.

MANAGEMENT PRIORITIES

The primary emphasis of this RMP is the strategic reduction or removal of invasive species from open space lands. This reduction or removal would reduce fire-prone vegetation and maintain the biological values within the open space parcels.

The goals of the Town of Tiburon are in concert with those of the Marin County Open Space District with regard to management of vegetation (MCOSD 2009):

- Reduce fire hazard on open space;
- Reduce risk of wildfire;
- Preserve native species, including special-status species, and sensitive habitats;
- Control/reduce non-native species and weeds.

The control of non-native species will, to a great extent, accomplish the goals mentioned above because they are increasing fire hazard and threatening special-status species and habitat. The major emphasis of this plan is therefore the control or removal of non-native species. These non-native species occur in virtually all of the open space parcels. The approximately 250 acres of open space land is a much greater area than the Town has resources to manage. This plan includes recommendations that will allow the Town to better and more efficiently manage the open space with its limited resources.

VEGETATION AND SENSITIVE NATURAL RESOURCES

Vegetation

Twelve categories of vegetation are mapped on the open space parcels. The most common types are: grassland vegetation, including native grassland, non-native grassland, and serpentine grassland, oak woodland, coyote brush scrub, and French broom scrub.

Non-Native Species

Non-native species are a major management issue on the open space parcels. The management plan addresses 18 non-native species.

Sensitive Resources

Sensitive resources include those resources that provide especially valuable plant and wildlife habitat or represent a plant community that is declining in abundance. Sensitive resources include watercourses and wetlands that are important to wildlife. Sensitive plant communities include oak woodland, native grassland, and serpentine grassland. Rock outcrops are considered sensitive because of their importance to wildlife for cover, denning, and use as look-out vantages, and, on the Tiburon Peninsula, as habitat for state and federally protected plant species. This management plan addresses

seven special-status species documented to occur on or adjacent to one or more of the open space parcels.

RECOMMENDED MANAGEMENT ACTIVITIES

Recommended management activities primarily address the methods available for management of vegetation and non-native species and to a lesser extent the management of trails, prevention of erosion, and protection of special-status species.

Management activities include prescriptions for compliance with the Tiburon Fire Protection District recommendations for management of vegetation. These recommendations entail maintaining a defensible space 100 feet from homes. This would entail clearing or trimming shrubs within 100 feet of homes and limbing trees a certain distance from the ground.

The vegetation treatment methods that are discussed in this management plan include hand labor using hand tools, mechanical treatment using different types of equipment to cut the vegetation, herbicides, and prescribed burning.

Recommended management of grasslands includes removing invasive non-native species. The most common species are French broom, Pampas grass, pines, and fennel. French broom is the most abundant and its removal would greatly increase the fire safety of the parcels. Coyote brush scrub should be periodically thinned where possible. Oak woodland should remain intact with a complete canopy closure to lessen the colonization of the woodland openings by French broom. Non-native species should be removed from wetlands and watercourses.

The application of these treatments to the non-native species listed above is discussed in this management plan. The most common and most effective treatments include hand or mechanical cutting of the vegetation with a follow–up of herbicidal application to the cut stumps. This limits the amount of herbicide used and ensures that only the targeted species receives the herbicide.

The priority for a particular management activity may be altered for a particular open space preserve based on changing vegetation over time or based on the interest of nearby residents and their ability to acquire funding for a particular management activity. Nothing in the plan prevents residents from carrying out specific aspects of the plan on a separate priority, but coordination with the Town is necessary to prevent unforeseen impacts, such as to special-status species or sensitive communities, such as seasonal wetlands. Priorities of maintenance activities are based on various factors and not solely on public safety. Determining the priorities is based on the ability of the Town to complete a management activity that provides the greatest public benefit with a minimum of resources.

OPEN SPACE PARCEL DESCRIPTIONS

The management plan describes each of the open space parcels including physical attributes (size, access, aspect, and steepness), vegetation and natural features (special-status species and sensitive plant communities habitats), recreational use and access, and management recommendations.

APPENDIX A DISCUSSION

Appendix A describes each of the open space parcels and presents recommended management activities in a table format. Appendix A lists the size in acres, sensitive resources, suggested vegetation management goal, management recommendations, the priority of the management activity, the estimated cost, and considerations/comments and guidelines for each of the open space parcels. The table below summarizes the number of management activites for each priority and the total cost of each priority's activities. The approximate cost to implement all of the tasks in Appendix A is roughly estimated to be between $450,000 and $500,000. These costs will be revised once management activities are begun and true costs are known and could be substantially higher. These costs are for one-time activities only. Necessary follow-up activities should be conducted three times with each follow-up activity conducted one to three years after the prior activity. The costs of the follow-up activities is estimated at between 20 and 50 percent of the initial cost of the activity.

Priority	1	2	3	4	5	6	7	8	9
Number	16	12	10	18	12	12	13	16	16
Cost	$21,000	$60,000	$115,000	$13,000	$25,000	$110,000	$53,000	$21,000	$34,000

1.0 INTRODUCTION

1.1 PROJECT PURPOSE

The Town of Tiburon (Town) owns and manages approximately 250 acres of open space distributed among 21 parcels (Table A). These open space areas vary considerably in size, vegetation, occurrence of special-status species, and proximity to residences. Nearly all of the parcels were either purchased outright by the Town for preservation purposes or were acquired as a result of open space dedications required by the Town for new development projects.

In the past, the Town implemented several vegetation management activities to remove fire-prone vegetation and protect the Tiburon jewelflower (*Streptanthus niger*), a species that occurs in two main areas of the Tiburon Peninsula. Prior to conducting additional management activities, the Town determined that it needed a systematic approach to responsible stewardship of its open space parcels and hired LSA Associates, Inc. (LSA) to develop a resource management plan (RMP). The goal is to prioritize recommendations to assist in allocating limited funding and/or staffing resources toward efficient and effective resource management.

The primary emphasis of this open space resource management plan is management of vegetation. The overwhelming abundance of French broom (*Genista monspessulana*) and to a lesser extent other invasive, non-native species becomes readily apparent after visiting all of Tiburon's open space parcels. These non-native species can increase the fire hazard and threaten sensitive resources. The fire-related condition of the Town's open space lands is generally typical of open space lands in the region, and removal of fire-prone vegetation is an ongoing management issue for virtually all agencies owning substantial open space lands. Managing non-native species largely responds to three of the Town's primary concerns: 1) fire hazards and fuel loading; 2) invasive, non-native species; and 3) protection of sensitive resources. Other topic areas such as erosion and passive recreation are treated in this management plan, but with more emphasis on how these issues relate to the primary vegetation management goals of the Town. An overriding element of this plan is prioritizing the tasks because the vegetation management needs on the 250 acres of open space are much greater than the Town's monetary resources.

1.2 PROJECT AREA

Tiburon, an incorporated town in Marin County, California, occupies most of the Tiburon Peninsula, reaching south into the San Francisco Bay (Bay) approximately seven miles north of the City of San Francisco. The Town is bordered by Corte Madera to the north, the unincorporated Strawberry and Eagle Rock areas to the west, and Belvedere to the south, but is otherwise surrounded by the Bay. Primary access to Tiburon is from U.S. Highway 101, connecting to San Francisco to the south and San Rafael and Sonoma County to the north. Tiburon Boulevard, the primary arterial, provides access to the downtown area, civic facilities, and the majority of the homes and businesses located within the Town limits. Paradise Drive, an alternative access route, extends along the eastern boundary of the peninsula through largely unincorporated areas within the Town's planning area.

The Town has a substantial network of open space within its planning area with over 800 acres of protected open space owned by the Town, the County of Marin, or homeowner's associations or other private organizations. This private open space is protected from development by easements or other instruments. Angel Island State Park is also located within the Town's planning area but is under the jurisdiction of the California Department of Parks and Recreation and is not a part of this plan.

This open space resource management plan (RMP) focuses on the approximately 250 acres of open space that is owned and managed by the Town (Table A, Figure 1). Although the open space parcels differ widely in regards to size, vegetation, and use, many of the parcels are located on the Tiburon Ridge, which bisects the length of the peninsula. The Town created the Tiburon Ridge Trail through the acquisition of open space parcels, land dedications, public streets, and public pedestrian easements to provide a unique community resource that can be enjoyed by both residents and visitors.

Table A: Open Space Parcels Owned and Managed by the Town of Tiburon

Open Space Parcel I.D.	Open Space Parcel	Acreage
2	La Cresta Open Space Dedication	65.6
3	Cibrian Subdivision Open Space Area	3.8
4	Hexan Subdivision Open Space Area	0.7
8	Mateo Drive Subdivision Open Space Dedication Areas	3.2
9	La Cresta Subdivision Open Space Path Dedication	0.1
15	Atkinson Open Space Bond Purchase	59.7
21	Miraflores Subdivision Open Space Area and Pathway	17.3
23	Del Madera Subdivision Open Space Area	18.7
24	Reed School District Open Space Bond Purchase Area	12.7
25	Hamon (Rock and Tree) Bond Purchase Open Space Area	10.7
26	Del Madera Subdivision Dedicated Open Space	10.7
27	Agins Subdivision Dedicated Open Space Area	0.5
28	Eavey Bond Purchase Open Space Area	20.7
29	Mount Tiburon Subdivision Dedicated Open Space Area	12.5
30	El Marinero Subdivision Dedicated Open Space Area	9.3
31	Hilarita Project Dedicated Open Space Area	2.8
33	"Reed Park" Town-owned Open Space Lots	1.5
37	Marinero Circle Park Area	0.7
48	Stevens Court Open Space Area Dedication	0.6
57	Meadowhill Subdivision Open Space Area Dedication	0.7
58	Straits View Drive to Spanish Trail Road Strip	0.1

1.3 KEY ISSUES

The RMP addresses several key issues including maintaining the biological resource values, reducing invasive and non-native species, reducing fire prone vegetation, addressing passive recreational use, and repairing areas experiencing erosion.

1.3.1 Biological Resource Values

The Town of Tiburon is located in a wonderful geographic setting with views of the San Francisco Bay and Bay shoreline. As such, a variety of natural areas including salt marshes, oak woodland, scrub, and grasslands occur within the Town's limits. Some of the grassland areas support a large number of wildflowers, some of which are rare. The Tiburon jewelflower is one of the rarest species, occurring only on the Tiburon Peninsula and nowhere else in the world. Another rare species that only occurs on the Tiburon Peninsula is the Tiburon microblind harvestman (*Microcina tiburona*), which is a red, miniature spider-like species. In addition to these species, a number of rare plant species and a number of sensitive plant communities and habitats (notably native grasslands and wetlands) occur in the Town's open space parcels. Maintaining the biological values represented by these special-status species and sensitive habitats is a major issue addressed by the RMP.

1.3.2 Invasive Species

Invasive species are those species that have the ability to colonize areas and rapidly spread such that they become a dominant plant in an area. The term "invasive species" is used synonymously with "non-native species" in the RMP because it is these non-native species that rapidly invade and become dominant in areas of native vegetation. Managing invasive species is important because these species: 1) increase fire hazard, 2) spread rapidly, 3) reduce available habitat for native species, and 4) threaten the enjoyment of passive recreational users. The most prevalent invasive species is French broom, occurring on virtually every parcel and having the propensity, if not managed, to become the dominant species on these open space parcels.

1.3.3 Fire Prone Vegetation

Dense vegetation, including the non-native and aggressive French broom, occurs in the open space parcels. Efforts to reduce fire hazard in large part begins with managing the French broom and other invasive species. French broom has colonized residential properties adjacent to Tiburon's open space and nearby private open space providing an un-checked pathway for fire to move from a private residence to open space and hence to other residences. Coyote brush (*Baccharis pilularis*), a native species, has the ability to colonize grassland and thereby increase the fire hazard. Although, it does not appear to colonize these areas as rapidly as French broom, its occurrence with respect to fire hazard is addressed in this plan.

Sudden oak death, caused by the pathogen *Phytophthora ramorum*, has affected some oak trees within and adjacent to a few of the Tiburon open space parcels. Fire danger may be higher in areas with a large number of dead trees and where a dense understory of shrubs (often called ladder fuels) occurs that can convey a ground fire into the branches of dead trees. Areas without a shrubby understory are not as great a concern. In any event, areas within 100 feet of homes consisting of dead trees and shrubby understory were not observed during the field survey for this management plan.

1.3.4 Passive Recreation

Passive recreation, such as walking, running, and walking dogs is an important use for some of the Town's open space parcels. Those parcels that abut the Ring Mountain Open Space Preserve, areas

managed by the Marin County Open Space District, and the Town's open space parcels of the Middle Ridge are the primary areas where passive recreational use occurs.

1.3.5 Erosion

Erosion occurs on a few trails and along a few watercourses but does not appear to be a major issue. Some of the open space parcels are mapped in the Town's General Plan as being prone to landslides, which may have been one of the reasons for their remaining undeveloped and eventually preserved.

1.3.6 Coordination with Other Jurisdictions

The Town's open space parcels are located adjacent to private open space, private residences on large lots, and the Ring Mountain Open Space Preserve and Old St. Hillary's Open Space Preserve managed by the County of Marin. Many of the same issues discussed above occur on these adjacent parcels and management should occur in a coordinated fashion. For example, management efforts increase if seeds from weeds growing on adjacent parcels are landing on the Town's open space parcels. Coordination among the different land owners, including the owners of the private residential properties, should occur to address these issues in a uniform manner.

1.3.7 Public Education

Public education is needed with regard to fire safety and the rich natural heritage present in the Town's open space parcels. The TFPD and SMFPD both have information on their web sites regarding fire safety in and around the home. A greater out-reach program, in coordination with the Town, may improve the dissemination of information. The Town could also sponsor some open space walks highlighting the importance of the special-status species and the need to address the non-native species that threaten the biological values of the preserves and reduce fire safety.

1.4 MANAGEMENT PRIORITIES

The primary emphasis of this RMP is the strategic reduction or removal of invasive species from open space lands. This reduction or removal would reduce fire-prone vegetation and maintain the biological values within the open space parcels.

The goals of the Town of Tiburon are in concert with those of the Marin County Open Space District with regard to management of vegetation (MCOSD 2009):

- Reduce fire hazard on open space;
- Reduce risk of wildfire;
- Preserve native species, including special-status species, and sensitive habitats; and
- Control/reduce non-native species and weeds.

The control of non-native species will, to a great extent accomplish the goals mentioned above; because they are the species that increase fire hazard and threaten special-status species and habitat.

The major emphasis of this plan is the control or removal of non-native species. These non-native species occur in virtually all of the open space parcels and the 250 acres of open space is a much greater area than the Town has resources to manage. This plan will make recommendations that will allow the Town to better manage the open space within its limited resources.

Secondary emphases of the plan are passive recreation and erosion, because these occur on some of Tiburon's open space parcels. Passive recreation is a major activity along existing trails. Some of the trails consist of fire roads whereas others have been created informally by users leaving existing trail routes. Unauthorized trails tend to increase over time and reduce the vegetative cover. These trails are often perpendicular to the contour with a resulting increase in erosion. Erosion also occurs as minor slumping and gullying, or as eroding banks of watercourses in a few areas. Some of this erosion occurs on the trails. Management priorities are addressed in greater detail in Section 3.0 and in Appendix A.

2.0 VEGETATION AND SENSITIVE NATURAL RESOURCES

This section briefly describes vegetation types and sensitive habitats along with the special-status species that potentially occur on these parcels (Figures 2 to 12). The vegetation types are mapped for each parcel and form the baseline for determining management actions to address maintenance of biodiversity and fire safety. Aerial Information Systems, a consulting firm that mapped the vegetation of the Marin County open space preserves, mapped the vegetation on some of Tiburon's adjacent open space parcels using aerial photography and sophisticated software. LSA mapped the remaining open space parcels using aerial photography followed by visits to each of the sites. The vegetation types identified by Aerial Information Systems were verified during LSA's field work. Surveys occurred from February through April 2009.

Each open space parcel was visited at least one time to provide an overview of the issues associated with the parcel. During these visits the vegetation was described and the location of invasive species and eroding areas were mapped. Due to the size of the open space parcels, not all areas were visited although the maps provide a general idea of the presence of invasive species. LSA mapped most areas with the use of a Global Positioning System (GPS) device of sub-meter accuracy.

2.1 VEGETATION

The vegetation of the open space parcels is diverse and ranges from various types of woodland to various types of grassland.

2.1.1 Oak Woodland

Oak woodland is dominated by coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*) or a mixture of these two species. These trees grow to 30 feet tall and 1 to 2 feet in diameter but are mostly shorter and smaller in diameter. The small diameter indicates that they have recently colonized areas of scrub or grassland. The canopy can be completely closed or fairly open.

The understory consists of mostly native shrubby herbaceous species. Where the canopy is dense, the understory is often sparse, consisting of widely separated shrubs and a small amount of herbaceous plants. The understory can consist solely of leaf litter in some areas where the canopy is closed.

Understory shrubs include toyon (*Heteromeles arbutifolia*), poison oak (*Toxicodendron diversilobum*), coyote brush, California blackberry (*Rubus ursinus*), and Himalayan blackberry (*Rubus discolor*). In many areas, the non-native French broom is colonizing the understory of the oak woodland. Herbaceous species include hedge nettle (*Stachys* sp.), yerba buena (*Saturjea douglasii*) and various ferns (*Athyrium felix-femina, Dryopteris arguta, Pityrogramma triangularis*).

Effects of sudden oak death (SOD) were observed in oak woodlands both on the open space parcels and adjacent properties. The sudden oak death pathogen (*Phytophthora ramorum*) is rampant within

woodlands on Mount Tamalpais and in other areas of Marin County and has caused great die-offs of trees, especially tanbark oak (*Lithocarpus densiflorus*) and coast live oak. The carrier for this pathogen appears to include madrone (*Arbutus menziesii*), California bay, and redwood (*Sequoia sempervirens*).

2.1.2 Willow Scrub

Arroyo willow (*Salix lasiolepis*), a native tree up to 25 feet in height, is associated with wetland features and grows along ephemeral streams and within wetlands. It can grow in dense, impenetrable thickets, or is sparsely distributed along watercourses. Himalayan blackberry often occurs within the lower canopy of the arroyo willow.

2.1.3 Coyote Brush Scrub

Coyote brush scrub is a common native scrub consisting of coyote brush, poison oak, and toyon, all native species. It occurs as open or closed stands, usually 4 to 8 feet tall. French broom and cotoneaster (*Cotoneaster* sp.) often colonize areas of coyote brush scrub. Some stands of coyote brush have also recently colonized areas of native grassland based on the open canopy of the coyote brush scrub and the occurrence of native grass in the understory.

2.1.4 California Sagebrush Scrub

California sagebrush (*Artemesia californica*) is the dominant species in the California sagebrush scrub community. This scrub is well-developed on a rock outcropping of the Atkinson Open Space Bond Purchase parcel. A small stand of this scrub is present on the Middle Ridge and other small stands may occur elsewhere. California sagebrush scrub is unusual in the Town of Tiburon.

2.1.5 French Broom Scrub

French broom is the most common non-native shrub on the entire Tiburon Peninsula and occurs on almost every open space parcel owned by the Town. This species occurs in large impenetrable stands, in sparse stands that are the result of recent colonization of grassland areas, in coyote brush scrub, at the edge of oak woodland, and within the understory of oak woodland. It is quickly spreading on the Town's open space parcels, threatening native habitat and increasing fire hazard.

2.1.6 Wetland Vegetation

Wetlands are sensitive habitats and are regulated by the U.S. Army Corps of Engineers and San Francisco Regional Water Quality Control Board. Wetland vegetation consists of those species that can grow in saturated soils for a prolonged amount of time. Wetlands are mapped based on the occurrence of plants that have a wetland designation per *National List of Plant Species* (Reed 1988). Species such as sedges (*Carex* spp.), spreading rush (*Juncus patens*), iris-leaved rush (*Juncus xiphioides*), brown-headed rush (*Juncus phaeocephalus*), nut sedge (*Cyperus eragrostis*), and various species of spike rush (*Eleocharis* spp.) occur on the Town's open space parcels. Marsh monkey flower (*Mimulus guttatus*) is common in watercourses and wetlands on the Middle Ridge. Non-native

species in wetlands, that should be controlled are Harding grass (*Phalaris aquatica*), tall fescue (*Festuca arundinacea*), and Pampas grass (*Cortaderia* spp.).

2.1.7 Grassland (Mosaic of Native and Non-native Grasslands)

Several grassland types are mapped within the Tiburon open space parcels because of a difference in precision of the mapping. Some areas were mapped precisely by LSA, whereas other areas (usually large in extent) were mapped as a general "grassland" category. This general grassland category consists of a mosaic of native and non-native grasses. Both native and non-native grasses vary in density in this grassland. In places where native grass species are dense, non-native species are sparse and where non-native species are dense, native species are sparse. Often there is a gradual change in the density from the native to non-native grassland, further complicating the accuracy of delimiting the boundary between the two types. Therefore as a practical matter, native and non-native grasslands were often mapped as a general grassland consisting of both types.

Mapping by Aerial Information Systems occurred on a few of the open space parcels and included this general grassland category. The mapping performed by Aerial Information Systems was often verified during field work by LSA, but it does not cover all areas of the Tiburon open space.

The grassland types mapped are: 1) grassland (mosaic of native and non-native grasses), 2) native grassland, 3) non-native grassland, and 4) serpentine grassland (a special type of native grassland).

2.1.8 Native Grassland

Native grassland was mapped separately from the general grassland category in instances where boundaries between native and non-native grassland are easily discernible. Nevertheless, not all native grassland areas were mapped because of the large amount of time required. The native grasslands are dominated by purple needlegrass (*Nassella pulchra*), and include stands of blue wildrye (*Elymus glaucus*), California brome (*Bromus carinatus*), and creeping ryegrass (*Leymus triticoides*). Native forbs occur with the native grasses, including milkmaids (*Cardamine integrifolia*), narrow-leaf mule's-ear (*Wyethia angustifolia*), Johnny-jump-up (*Viola pedunculata*), purple sanicle (*Sanicula bipinnatifida*), soap root (*Chlorogalum pomeridianum*), and blue-eyed grass (*Sisyrinchium bellum*).

Native grasslands are considered sensitive communities due to a reduction in their extent and distribution since the arrival of Europeans and are, therefore, tracked by the California Natural Diversity Data Base (CNDDB).

2.1.9 Serpentine Grassland

Serpentine soils support a diverse assemblage of native grasses and forbs. As a result of the unusual chemical composition of this soil type (high in magnesium, nickel, cobalt, iron; low in calcium, nitrogen), some species become so specialized that they can no longer survive on non-serpentine soils. These "endemic" species are restricted to serpentine soils and are one of the reasons serpentine areas are floristically unique and biologically valuable. In general, non-native species are not adapted

to the harsh conditions provided by serpentine soils; however, some non-native species are developing adaptations to these substrates (eco-types).

The dominant grass on serpentine soil on the Tiburon Peninsula (including the Middle Ridge) is purple needlegrass, a native bunchgrass that was prevalent in California before the disturbance to grasslands from heavy cattle-grazing. In places where the soil is relatively shallow, it supports various densities of melic grass (*Melica californica*), a species almost always associated with serpentine substrates. Other grass species that are abundant in serpentine grassland are Torrey's melic (*Melica torreyana*), June grass (*Koeleria macrantha*), and Idaho fescue (*Festuca idahoensis*). Native forbs such as California poppy (*Eschscholzia californica*), lomatium (*Lomatium utriculatum*), cream-cups (*Platystemon californicus*), tidy-tips (*Layia platyglossa*), and hog-fennel (*Lomatium dasycarpum*) also grow intermixed in the grassland providing a colorful display in the spring. Weedy exotic wildflowers are typically not present in serpentine grasslands in great amounts.

In areas with a very thin soil cover, wildflowers such as California goldfields (*Lasthenia gracilis*) provide patches of yellow in early spring. Later in the season, the unusual pitted onion (*Allium lacunosum*), which reaches its northernmost distribution on the Tiburon Peninsula, dwarf plantain (*Plantago erecta*), and hayfield tarweed (*Hemizonia congesta*) occur in the same areas.

2.1.10 Serpentine Outcrops

Outcrops of serpentine bedrock with gravelly to fine-grained soils are present on some of the open space parcels (Atkinson and most of the parcels of the Middle Ridge, and a few others). Depending on the soil depth and disturbance to these outcrops, they support species adapted to this substrate, including some that are endemic to serpentine soils. Species observed in outcrops include rock lettuce (*Dudleya farinosa* and *Dudleya cymosa*), naked-stemmed buckwheat (*Eriogonum nudum*), lizardtail (*Eriophyllum confertiflorum*), and Gambel's milkvetch (*Astragalus gambelianus*). Serpentine outcrops also support some of the rare and endangered species on the Tiburon Peninsula (see Section 2.4 *Special-status Species*).

2.1.11 Non-Native Grassland

The non-native grassland is variable and difficult to characterize accurately as exposure, past history, and proximity to development influence the species composition. Sandstone soils and areas of fill are dominated by introduced, annual grasses. These grasslands formerly supported native perennial bunchgrasses, but due to continual grazing, the native grasses have been replaced by non-native species, including wild oats (*Avena* spp.), Italian wildrye (*Lolium multiflorum*), soft chess (*Bromus hordeaceus*), annual fescue (*Vulpia* spp.), hare barley (*Hordeum murinum* ssp. *leporinum*), ripgut brome (*Bromus diandrus*), and rattlesnake grass (*Briza maxima*). Perennial non-native grass species include Harding grass, velvet grass (*Holcus lanatus*), and tall fescue.

Native and non-native forbs are present in various amounts; common native species are yarrow (*Achillea millefolium*), false lupine (*Thermopsis californica*), checkerbloom (*Sidalcea malvaeflora*), and soap root. Non-native species include bur-clover (*Medicago polymorpha*), filarees (*Erodium* spp.), and thistles (*Cirsium vulgare; Carduus pycnocephalus*).

2.1.12 Backyard/Ornamental

The "backyard" designation on the maps indicates areas where the property owners have landscaped the open space parcel adjacent to their property. Ornamental shrubs and grasses are the most common plants installed in these areas. In a few instances, ornamental species have colonized the open space parcels and these areas are also mapped as backyard/ornamental.

2.2 INVASIVE SPECIES AND NOXIOUS WEEDS

The following species are not native to the Tiburon Peninsula and are either considered invasive species or noxious weeds by the California Department of Food and Agriculture. These species are spreading into native habitats to the detriment of native plants and plant communities.

2.2.1 Acacia

Black acacia (*Acacia melanoxylon*) and green wattle (*A. decurrens*), both species native to Australia, occur in small to relatively dense stands or singly on some parcels, where they have spread from residential properties.

2.2.2 Bamboo

Bamboo (*Bambusa* spp.) is a large grass that spreads by rhizomes (underground stems) displacing native species. It occurs at a few sites on the Middle Ridge. (Most of one stand was removed in 2008 by the Town.)

2.2.3 Blue-Gum Eucalyptus

Blue-gum (*Eucalyptus globulus*) is an invasive tree species originally from Australia. It grows in small stands or singly within the open space parcels. The well-known "Hippie Tree" of the Middle Ridge is a large specimen of this species.

2.2.4 French Broom/Scotch Broom

French broom (*Genista monspessulana*) has invaded grassland, coyote brush scrub, and transitional zones between woodland and grassland. It occurs on virtually all of the open space parcels and is particularly dense at the Del Madera and Eavey properties. It occurs near sensitive habitat on Del Madera, Miraflores, and Hamon parcels. (Some French broom was removed along the fire road on the latter three parcels by the Town in 2008.) Scotch broom (*Cytisus scoparius*) (not pictured) occurs on Ring Mountain (La Cresta parcel) but has not been observed on the open space parcels south of Trestle Glen. It is, however, likely to colonize other parcels in the future.

2.2.5 Himalayan Blackberry

Himalayan blackberry (*Rubus discolor*) is a non-native shrub that forms large impenetrable thickets in riparian or wetland areas. It often grows in the understory of willow trees.

2.2.6 Myoporum

Myoporum (*Myororum* sp) is a commonly planted ornamental species. It occurs occasionally in the open space parcels.

2.2.7 Pampas Grass

Pampas grass (*Cortaderia jubata* and *Cortaderia selloana*) grows to 9 to 12 feet in height and can attain a diameter of up to 10 feet. It is invading watercourses and wet substrates within shrubby areas and grasslands on many of the open space parcels.

2.2.8 Pine

The most common pine tree on the Tiburon open space parcels is Monterey pine (*Pinus radiata*). Italian stone pine (*Pinus pinea*) occurs on one parcel (Marinero Circle) and at least one unidentified species of pine grows on the Middle Ridge. The pines range from saplings to 18 inches or greater in diameter. Mature pines produce seeds that result in a gradual increase of pine trees in an area. The heaviest infestations are on the Middle Ridge.

2.2.9 Pittosporum

Pittosporum (*Pittosporum* sp.) is a commonly planted ornamental tree that has spread to a few of the open space parcels.

2.2.10 Plum

Plum trees (*Prunus* spp.) occur singly or as small stands on many of the open space parcels, including the Middle Ridge and the La Cresta parcel. Seeds from ornamental plum trees spread to the wildlands by birds that eat the fruits.

2.2.11 Pride of Madeira

Pride of Madeira (*Echium candicans*), a native of Madeira and the Canary Islands, is extremely fast-growing and is becoming very invasive in many parts of the Tiburon Peninsula (and other places in Marin County). It likely spread to the open space parcels from residential garden plantings. This plant occurs in great numbers on the west road bank of Gilmartin Drive on the Del Madera parcel and is also present near the backyards of residences along Hacienda Drive, on the Miraflores parcel, and in the grassland below the "Hippie Tree." It also appears planted at the entrance to open space at Avenida Miraflores.

2.2.12 Star-Thistles

Purple star-thistle (*Centaurea calcytrapa*) and yellow star-thistle (*Centaurea solstitialis*) are not abundant on the open space parcels, but both species have the potential to invade several plant communities. (Some purple star-thistle was removed from the Hamon and Miraflores parcels in 2008 and 2009 by E. Buxton.)

2.2.13 Sweet Fennel

Sweet fennel (*Foeniculum vulgare*), a perennial species with large root systems, occurs in large, dense stands in relatively wet areas in grasslands. It is especially invasive on the Atkinson parcel and in the southern portion of the Del Madera site.

2.2.14 Thistles

Italian thistle (*Carduus pycnocephalus*), artichoke thistle (cardoon) (*Cynara cardunculus*), and bull-thistle (*Cirsium vulgare*) are mapped under the general category of "thistles" on the vegetation maps; however, not all occurrences are mapped. Thistles grow mostly in grassland areas and/or where there has been prior disturbance. Italian thistle occurs in large and small patches on many of the parcels, especially under trees. Artichoke thistle also grows in patches but is less widespread (large stand on Miraflores parcel). Bull thistle occurs throughout the grasslands on many of the parcels, as well as in disturbed areas on the Middle Ridge.

2.3 SENSITIVE RESOURCES

Sensitive resources include those resources that provide especially valuable plant and wildlife habitat or represent a plant community that is declining in abundance. Sensitive resources include watercourses and wetlands that are important to wildlife with impacts regulated by the U.S. Army Corps of Engineers and the Regional Water Quality Control Board. The State Department of Fish and Game regulates the bed and bank of streams and lakes. Sensitive plant communities include oak woodland, native grassland, and serpentine grassland. Rock outcrops are considered sensitive because of their importance to wildlife for cover, denning, and use as look-out vantages, and, on the Tiburon Peninsula, as habitat for state and federally protected plant species.

2.4 SPECIAL-STATUS SPECIES

2.4.1 Tiburon Jewelflower (*Streptanthus niger*)

Status. Tiburon jewelflower is federally-listed as endangered (USFWS 1995); is State-listed as endangered; and is also on CNPS' List 1B, indicating that it is rare and endangered throughout its range.

Morphology. Tiburon jewelflower is an annual herb in the mustard family (Brassicaceae). It reaches 30-60 cm (1-2 feet) in height. The lower leaves are toothed, the upper ones with a few teeth or none at all. The relatively large sepals are dark purple (hence the name purple jewelflower), whereas the small petals are white with purple mid-veins and a dark purple claw. The fruits (capsules) are straight and erect, 4-7 cm (1.5-2.75 in) long (Hickman 1993). This species is self-pollinated (Kruckeberg 1957).

Habitat and Distribution. Tiburon jewelflower is endemic (restricted) to serpentine substrates on the Tiburon Peninsula. No historic occurrences from other locations are known. The jewelflower occurs in two main areas - at the south end, near Old St. Hilary's church, and on the Middle Ridge, north of Gilmartin Drive (E. Buxton, pers. obs.). Although serpentine substrate exists on Ring Mountain, Tiburon jewelflower does not occur on the mountain (E. Buxton, pers. obs.).

Occurrence on Tiburon Open Space. Tiburon jewelflower is likely restricted to two serpentine outcrop areas of the Middle Ridge: 1) *on the face of the large escarpment* (east corner of parcel 25; north corner of parcel 26; southwest edges of parcel 24), and 2) *on the east side of the fire road between Hacienda Drive and the "Hippie Tree"* (west edge of parcel 24; east edge of parcel 21) (Eva Buxton, pers. obs.). Tiburon jewelflower is potentially present on the Marinero Circle Park site (parcel 37) where no known surveys for this species have been conducted.

2.4.2 Tiburon (Indian) Paintbrush (*Castilleja affinis* ssp. *neglecta*)

Status. Tiburon paintbrush is federally-listed as an endangered species (USFWS 1995) and State-listed as a threatened species (January 1990) (CDFG 2007). This paintbrush is on CNPS' List 1B, indicting that it is rare and endangered throughout its range.

The type specimen of *Castilleja affinis* ssp. *neglecta* was collected on the Tiburon Peninsula by Katherine Brandegee, Curator of Botany at the San Francisco Academy of Sciences, in the early 1900's.

Morphology. Tiburon paintbrush is a semi-woody perennial in the snapdragon family (Scrophulariaceae). Its 30-60 cm (1-2 ft) tall stems are erect and sparsely covered with soft, spreading hairs. The leaves have one or two pairs of narrow lobes. The conspicuous floral bracts are tipped with yellow (sometimes red-tipped but not on Ring Mountain). The flowers are yellow, 8-20 mm (0.7-0.8 in) long. This species is distinguished from chaparral paintbrush (*C. foliolosa*) on the Tiburon Peninsula by its sparse pubescence and its unbranched hairs (Howell 2007). On Ring Mountain this species blooms from April to mid-May (E. Buxton, pers. obs.) [not through June as noted in CNPS (2001)].

Habitat and Distribution. Tiburon paintbrush occurs on serpentine soil on open slopes and in serpentine bunchgrass communities. This paintbrush was once known only from the Tiburon Peninsula (Ring Mountain and Middle Ridge) as well as Nicasio Ridge, but it has now also been found in Napa and Santa Clara counties (USFWS 1995; Howell 2007).

Occurrence on Tiburon Open Space. Tiburon paintbrush is presently known from four areas on the Middle Ridge: 1) on the north-facing side of the north-to-south-trending ridge (east corner of parcel 21; 2) north-central portion of parcel 25; 3) along the banks of a drainage (north-central portion of parcel 26); and, 4) in rocky serpentine grassland (northwest portion of parcel 23) (E. Buxton, pers. obs.). It may occur on serpentine substrates on other open space parcels

2.4.3 Marin Dwarf Flax (*Hesperolinon congestum*)

Status. Marin dwarf flax is federally-listed as threatened (USFWS 1995) and State-listed as threatened (June 1992) (CDFG 2007). The flax is on CNPS's List 1B, indicating that it is rare and endangered throughout its range.

Morphology. Marin dwarf flax is an annual member of the flax family (Linaceae). The threadlike stems are 5 to 30 cm (2-12 in) tall (E. Buxton, pers. obs.) bearing linear leaves. The flowers are borne in open to congested clusters along the branches. The sepals are hairy and the five 3-8 mm (0.1-0.3 in) long petals are white to bluish-pink. The anthers are a deep pink to purple color. It blooms from April through July. Marin dwarf flax is the only member of the *Hesperolinon* genus occurring on the Tiburon peninsula.

Habitat and Distribution. Marin dwarf flax occurs in serpentine soils in grassland or chaparral communities in Marin, San Francisco, and San Mateo counties. In Marin County, besides Ring Mountain, this species is also found on Carson Ridge, Big Rock Ridge, near Nicasio, and on Mount Burdell (Howell 2007).

Occurrence on Tiburon Open Space. Marin dwarf flax occurs in shallow serpentine soil on the Middle Ridge (E. Buxton, pers. obs.) and may occur in similar habitat on other open space parcels. Although this species appears to respond well to some disturbance on Ring Mountain, few plants have been observed on the Middle Ridge in recent years (E. Buxton, pers. obs.).

2.4.4 Tiburon Buckwheat (*Eriogonum luteolum* var. *caninum*)

Status. Tiburon buckwheat was upgraded in 2007 from CNPS List 3 to List 1B (see designation above) and has no federal or State protective status.

Morphology. Tiburon buckwheat is an annual member of the buckwheat family (Polygonaceae). This species is prostrate to ascending, 5-30 cm (2-12 in) in height, evenly branched with many "round" bright pink involucres (flowers) distributed along the branches. The basal leaves are generally round, wavy-margined, and densely tomentose (hairy) on the underside. This species blooms from June to August.

Habitat and Distribution. Tiburon buckwheat is a serpentine endemic, *i.e.*, restricted to serpentine soils, where it grows on open, sparsely vegetated sites. This species is listed as known from Alameda, Colusa, Lake, Marin, Napa, Santa Clara, and San Mateo counties and is extirpated in Sonoma County (CNPS 2001). However, during communications with Dr. J. Reveal (authority on the *Eriogonum* genus) in 1999, he suggested that Tiburon buckwheat (*E. luteolum* var. *caninum*) is narrowly restricted to the Tiburon area only (E. Buxton, pers. comm.).

Occurrence on Tiburon Open Space. Tiburon buckwheat grows in barren serpentine soils on the Middle Ridge, especially on the steep escarpment (southwest edge of parcel 24) and on the south-facing side of the south-to-north-trending ridge (north-central portion of parcel 25) (E. Buxton, pers. obs.).

2.4.5 Marsh Zigadene (*Zigadenus micranthus* var. *fontanus*)

Status. Marsh zigadene was recently included on CNPS' List 4, a watch list, and has no federal or State protective status.

Morphology. Marsh zigadene is a bulbous perennial in the Liliaceae (lily family). The plant is up to 40 cm (16 in) in height with 1 cm (0.4 in) wide leaves that usually exceed the stem. The inflorescence consists of a panicle with white to yellowish flowers. The perianth parts (petals and sepals) have a

yellow gland at the base. The three-chambered fruits are erect (Hickman 1993).

Habitat and Distribution. Marsh zigadene occurs in vernally mesic (wet in the spring) sites in chaparral, woodland, and grassland communities, often on serpentine soils.

Occurrence on Tiburon Open Space. Marsh zigadene occurs in a small seep in the northern portion of parcel 26 (E. Buxton, pers. obs.). It may be present in similar habitats in other areas on the Tiburon peninsula.

2.4.6 Tiburon Microblind Harvestman (*Microcina tiburona*)

Status. Tiburon microblind harvestman, a spider-like species, was identified as a federal species of concern. Today the federal government is no longer maintaining the list of species of concern, those species that were formerly on the list are either declining or in need of conservation. Tiburon microblind harvestman is on the State's List of Special Animals.

Morphology. Tiburon microblind harvestman is approximately 1 mm long and is reddish in color. The males are differentiated from the females by larger eye tubercles (Briggs and Ubick 1989).

Habitat and Distribution. Tiburon microblind harvestman occurs only on the Tiburon Peninsula. It is known from three locations: the County's Ring Mountain Open Space Preserve and Old St Hillary's Open Space Preserve and the Town's Middle Ridge.

Tiburon microblind harvestman occurs solely in serpentine areas, at the interface of soil and rocks. This species is observed during the time of year when the soil is moist. During the summer, the habitat dries and the harvestman goes deeper into the soil.

Occurrence on the Tiburon Open Space. Unofficial records indicate that Tiburon microblind harvestman occurs in the serpentine areas at the interface of rocks and soil on Town open space.

2.4.7 Opler's Longhorn Moth (*Adela oplerella*)

Status. Opler's longhorn moth was also identified as a federal species of concern. Although the federal government is no longer maintaining the list of species of concern, those species that were formerly on the list are either declining or in need of conservation. Opler's longhorn moth is on the State's List of Special Animals.

Morphology. Opler's longhorn moth is a small, dark-colored moth with relatively long antenna.

Habitat and Distribution. Opler's longhorn moth is known from mostly serpentine areas in the San Francisco Bay Area including the Ring Mountain Open Space Preserve. It occurs in areas where cream cups are relatively dense. Opler's longhorn moth is usually observed resting on cream cups. Female moths lay their eggs on the flowers and the larvae feed on the ovaries and developing seeds.

Occurrence on the Tiburon Open Space. Habitat for Opler's longhorn moth occurs within the serpentine areas of the Town's open space although it has not yet been observed there.

3.0 RECOMMENDED MANAGEMENT ACTIVITIES

Recommended management activities primarily address the methods available for management of vegetation and non-native species and to a lesser extent the management of trails, prevention of erosion, and protection of special-status species. Management priorities and the related costs are also addressed in this section.

3.1 FUEL LOADING AND FIRE MANAGEMENT

The Mediterranean climate of the Bay Area—which is characterized by wet, mild winters and dry, hot summers—is conducive to producing an abundance of fuel because of the long growing season. Fire suppression, heavy rains, and seasonal or prolonged drought can all yield an excessive amount of fuel due to the accumulation of plant material. Excessive fuel loads have the potential to result in wildfires that pose a threat to surrounding homes and communities and even the native vegetation itself.

Major wildfires can adversely impact native habitat in several ways. A very hot fire, due to high fuel loads, can sometimes completely destroy plants that would otherwise recover from a cooler and less intense fire. The increased chance of post-fire erosion and subsequent invasion of exotic plant species can also have detrimental effects on natural communities. Finally, firefighting activities, such as creating fire breaks (linear swath where the vegetation is removed by a bulldozer) and fuel breaks (wide linear swaths where the vegetation is cut to a few inches of the ground, but remains present) can permanently damage native vegetation and foster colonization by non-native species. While native plant communities are well-adapted to natural fires, the human perturbations of the natural cycles adversely affect these plant communities.

The proximity of residential development to the Town's open space parcels creates the need to consider wildfire safety within the Town and in surrounding communities. Fire management can be an important tool in maintaining and restoring native vegetation and control of invasive exotic plant species.

3.1.1 Fire Protection

The fire protection districts that service the Town are the Tiburon Fire Protection District (TFPD) and the Southern Marin Fire Protection District (SMFPD). Most of the Town of Tiburon and the unincorporated areas along Paradise Drive are served by the TFPD. The TFPD, which averages 20 career safety employees, 18 volunteer firefighters, and six reserve firefighters, provides a number of community services, including:

- Fire Prevention (code enforcement, plan reviews, and summer defensible space programs for homeowners);
- Public Education (fire and burn prevention programs in schools; CPR, First Aid, and Community Disaster Preparedness classes);

- Emergency Medical Services; and
- Fire Protection, Hazardous Materials Response, and Fire Investigation.

The SMFPD is an independent special district established by the Marin County Board of Supervisors on July 1, 1999. The district was formed by the consolidation of the Alto-Richardson Bay Fire Protection District and the Tamalpais Fire Protection District. In February of 2004, a Joint Powers Agreement was enacted, adding the Sausalito Fire Department as part of the District. The District has 56 fulltime employees including a Chief, Deputy Chief, Administrative Services Manager, Administrative Aide, 3 Battalion Chiefs, 9 Captains, 3 Lieutenants, 15 Paramedic/Firefighters and 20 Firefighter/Engineers.

The District serves the areas of Sausalito, Tamalpais Valley, Almonte, Homestead Valley, Alto Bowl, Strawberry Peninsula and the portion of Tiburon generally west of the Belveron neighborhood. The District operates 3 fire stations, including downtown Sausalito, Tamalpais Valley and Strawberry. The District responds to over 4,000 incidents per year. Appendix B shows the service areas of the TFPD and SMFPD.

3.1.2 Fire Hazards

Large parts of the Tiburon Peninsula are either permanently protected as open space or are privately owned and are currently undeveloped. These areas are susceptible to wildfires and are of particular concern because they are at the wildland-urban interface. Wildfires often occur on grassy areas and can spread to nearby dwellings. If the fires are unattended or exposed to winds, some forested areas, such as those of eucalyptus or pine, may be particularly prone to fire.

The greatest problem posed by wildfires is the difficult access for fire fighting equipment and personnel to areas susceptible to such fires. Ideally, such access should be provided over all-weather (maintained or paved) roads and over grades no steeper than 15 percent. Urban fires can be a serious problem in older areas of the Tiburon Planning Area, such as Downtown Tiburon or the hilly areas with narrow streets. Such situations limit access by fire fighting equipment and escape by residents.

The wildland-urban interface is the area where development and structures meet undeveloped wildland with vegetative fuels. Based on factors including existing vegetation types, probability of fire, and wildland-urban interface settings, the California Department of Forestry and Fire Protection has identified communities which are at risk for wildfire. Tiburon is on the list and scores in the highest threat category.

3.1.3 Suggested Vegetation Treatment Protocols

A number of agencies have developed vegetation management protocols to reduce the potential for fire damage to structures. Most of these recommendations entail creating a defensible space of a 100-foot radius from the home. This recommendation is applicable to very few of the open space parcels, because the boundaries of most of the open space parcels are greater than 100 feet from homes.

Vegetation management practices would benefit those residences that have created defensible space and would be of marginal benefit for the Town if the adjacent residential vegetation, located between the open space and the home, remained unmanaged. The following recommendations were developed after examining vegetation management protocols developed by various agencies throughout California, especially the Tiburon Fire Protection District, Southern Marin Fire Protection District, and the California Department of Forestry and Fire Protection:

1. Grassland areas should be maintained and should not be allowed to become dominated by French broom, other non-native plants, coyote brush, or oak woodland.
2. Fuel breaks should be established, maintained, and expanded in areas dominated by coyote brush scrub, French broom, and other non-native species of woody vegetation. Most of these fuel breaks would be created in French broom because of its abundance in the open space parcels. These fuel breaks can be established at the boundary of the open space parcels and within the open space parcels to create patches of shrubs instead of one continuous area supporting shrubs. Such fuel breaks should be maintained to promote the growth of grasses. The number and size of such fuel breaks would depend on the Town's financial resources.
3. Once such fuel breaks are created, a schedule should be developed and implemented to remove the patches of French broom that occur between the fuel breaks and to re-establish the former grassland.
4. For open space areas that are within 100 feet of residential structures, the distance between the understory shrubs and the lower crown of the overstory trees should vary between 4 and 10 feet depending on the species and slope steepness.
5. For open space areas that are within 100 feet of residential structures and where an understory is absent, limbs that are 3 inches or less in diameter should be trimmed within 6 feet from the ground on trees that exceed 18 feet in height.
6. For open space areas that are within 100 feet of residential structures, native shrubs should be trimmed such that they are no closer together than 2 times their height. Non-native shrubs, including French broom, should be completely removed from areas within 100 feet of structures.

3.2 VEGETATION MANAGEMENT METHODS

Several methods are available to manage vegetation and remove invasive species. These methods are often dependent on the size of the management area, type of vegetation, and quantity and type of weeds. The use of some treatments may be limited to a particular season because 1) of the occurrence of special-status species, 2) of potential harm to sensitive vegetation, or 3) effectiveness is greater in one season as compared to the other seasons.

These vegetation management methods are summarized to describe the range of management techniques that are available to the Town. Once a management activity is initiated, follow-up work during succeeding years will be necessary. Weed removal will need to occur on a continual basis until the weed seeds in the soil no longer germinate. These follow-up activities will need to be recognized when planning the implementation of the management activities. An evaluation of the benefits and drawbacks of the methods described below is presented at the end of this section.

3.2.1 Hand Labor

Hand labor is best utilized where access is difficult, spot treatments are required, and sensitive resources occur adjacent to the plants slated for removal. Hand labor methods involve pruning, cutting or removal of trees, shrubs, and grasses by hand or using hand-held tools. Hand labor techniques allow for selective removal of targeted species and have little impact beyond the removal of these targeted plants, leaving native species or other desirable vegetation in place. Hand labor is often used in conjunction with other fuel reduction techniques. Hand labor is most commonly used by residents to reduce fuel volume on private lands and by publicly-funded crews to reduce hazards on public lands. Advantages of hand labor are the ability to remove specific non-native plants without damaging adjacent native plants. Drawbacks are that hand labor is slow.

3.2.1.1 Removal by Hand. Pulling weeds by hand, including the use of a weed wrench, offers the greatest amount of control among hand labor techniques, but is also very time-intensive. Hand-pulling weeds generally results in few impacts with the exception of erosion while walking over steep areas. To limit the spread of seeds, care should be taken to bag weeds securely if viable seeds are present.

3.2.1.2 Weed Whipping. Weed whipping is using a hand-held tool (normally gas-powered) that cuts grass and very small shrubs with a plastic line or cutting blade. Weed whipping is typically used annually after grasses have dried so that the grass does not grow back. This technique reduces the height of the fuel, but does not create areas of bare soil, as the vegetation is not completely removed. Weed whipping is often the only type of "mowing" treatment possible in steep wooded areas or landscaped slopes. Heavier weed-whipping machines can be fitted with plastic or steel knives or serrated saw blades, such as brush cutters or brush saws. Utilizing a cutting blade allows treatment of woody stems, but this option is limited to stems under 1 inch in diameter. Weed whipping can treat approximately 750 square feet per hour; using a cutting blade reduces treatment productivity to approximately 400 square feet per hour.

3.2.2 Mechanical Treatment

Mechanical treatment involves cutting grasses and removing weeds, shrubs, and trees up to 24 inches in diameter through the use of a tractor or other machinery and performing operations such as grading, mowing, disking, and crushing. Heavy machinery is often used where terrain and the presence of trees do not prohibit travel. Generally, using heavy machinery for treatment is relatively inexpensive and faster than hand labor. There is, however, limited control over which plants are cut during mowing or disking operations, but machines can be guided around isolated areas of concern. Disking is discouraged because of the propensity to create infestations of weeds in the disked areas. Additionally, inadvertent impacts to short vegetation can occur when machinery operates on top of these plants. Heavy machinery can also create excessive disturbances to surface soils when the ground is soft, leaving ruts and bare soil.

Mechanical treatments can be used almost any time of the year when the top soil is dry but are faster when done in the summer or fall, when the brush is brittle and grass has dried. Because mechanical treatment methods almost always utilize equipment with metal blades, combustion engines, and corollary fuels, they should be used with special precautions during high fire-danger periods, as the

machines themselves (and metal blades striking rocks) can inadvertently start fires. Also, vehicles and equipment undercarriages should be cleaned prior to moving or removing them from a work site to reduce the risk of transferring unwanted material, disease (such as sudden oak death), or seeds to other areas. Steepness is a constraint for mechanical equipment.

3.2.2.1 Mowing. Mowing, using a tractor or similar equipment with a mower attachment such as a rotary or flail-mower, reduces fuel height which in turn reduces flame length and possibly the rate of spread in a grassfire. Under ideal conditions, approximately 5 acres per day can be mowed; however, the size of the area treated depends on surface topography and slope of the site. The timing of mowing has an impact on the type of grasses that are promoted; late mowing, after annual grasses have cured, enhances growing conditions for perennial native grasses, provided mowing does not occur during seed production. Mowing at the appropriate time to a height of approximately 4 inches minimizes weed and brush encroachment and reduces the amount of manual work needed to maintain the site, but it should be avoided when birds are known to actively ground-nest. The mowing of weeds is typically required annually.

3.2.2.2 Mechanical Cutting or Crushing. A tractor or similar equipment can be used to cut or crush brush. Attachments include rollers (*e.g.*, brush hog), a horizontal cutting blade (which operates similar to a large mower), or a set of chains to flail the material being treated. The blade cuts or breaks off the brush, knocks down the larger shrubs, and compacts the material. The cut material should be gathered and transported from the site.

Brush that is old or dead is more brittle and breaks off more easily than thin, young stems which are easily bent. The soil surface can be slightly disturbed by the tractor; however, the surface is usually not scraped. Mowers typically consist of tractors with affixed or towed mowing heads. These heads cut or flail small-diameter material, especially grasses. Many mowers have an articulated arm or boom that can reach 10-15 feet from the vehicle. This type of machinery is often "road-based." (Trials using a "Tiger" mower in Oakland have removed shrubs from one acre every 12 hours.)

Other attachments to tractors and equipment have been developed that use a gravity roller to crush and chop vegetation into mulch. The gravity roller, which is held by cables, can be rolled down a slope, then winched back up the slope. By shortening one of the cables, some degree of directional movement can be attained, *i.e.*, the roller can be aimed at specific areas. The gravity roller is filled with water to provide the weight necessary to cut the brush. Cutting surfaces arranged on the roller resemble tire tread. The "Brontosaurus" is a type of grinding machine with an articulated arm that grinds woody material and, in some cases, shatters roots of shrubs instead of cutting them.

3.2.3 Herbicides

Health, safety, and environmental concerns have limited the widespread use of herbicides over the past 20 years. Use of herbicides is one of the most effective methods and one of the most controversial methods of managing vegetation and controlling weeds. Herbicides can be used in conjunction with other treatment methods such as cutting, increasing the effectiveness of both treatments and reducing the quantity of herbicide used. Application to individual weeds can also reduce amounts used.

Application of herbicides and other chemicals is typically performed by hand and can include sponging, spraying, or dusting chemicals onto unwanted plants. Hand-application provides flexibility and is ideally suited for small treatment areas. Roadside application of herbicides may employ a boom affixed to or towed behind a vehicle.

Herbicide application requires training and licensing to ensure proper and safe use, handling and storage of materials. Only personnel with the appropriate license are allowed to use chemicals to treat vegetation. Personal protection equipment is essential to limit exposure to chemicals and includes long pants and long-sleeved shirts, gloves, safety goggles, hard hats, sturdy boots, face masks and, in some instances, respirators. Use of herbicides in surface waters or in wetlands that drain to surface waters is regulated by the Regional Water Quality Control Board. Prior to use in such situations, a permit from the Regional Water Quality Control Board would be needed.

3.2.4 Prescribed Burning

Prescribed burning is one of the more controversial options for use in managing vegetation on open space but is presented here because of its effectiveness in control of invasive species. It also provides fire personnel with training in preparation for wildland fires. Much planning and a great number of approvals would be required prior to conducting a prescribed burn. Prescribed burning requires the development and approval of a prescription or burn plan, which is typically developed by the local fire protection district in consideration of fuel reduction requirements, suitable local weather conditions, and available resources for fire management. Prescribed burns must be conducted by trained fire protection personnel only. Utilizing personnel and equipment from neighboring fire districts provides the added benefit of joint training under controlled rather than emergency conditions. Timing is critical because of variation in weather conditions, as well as wildlife (nesting birds) and botanical (rare plant) considerations. Periods of increased wildlife and botanical activity need to be avoided to limit potential negative impacts to these resources. In addition, fuel moisture content must be determined to assess whether the targeted area is safe to burn. More suitable burn days are normally available in the spring and early summer, when atmospheric conditions are more conducive to smoke dilution and dispersion.

In Tiburon, approvals would be needed from the Town Council, board of directors of the Tiburon Fire Protection District and/or Southern Marin Fire Protection District and the Bay Area Air Quality Management District, at a minimum. The time-frame for conducting a prescribed burn is likely to be on the order of 5 to 10 years (to obtain permits), according to the Fire Protection Specialist of the Tiburon Fire Protection District.

Prescribed burning reintroduces fire into the ecosystem as a more naturally-occurring treatment and can closely approximate the forces that shaped the natural vegetation. It is often used in conjunction with hand labor and mechanical treatment methods as a means of removing excess debris. Prescribed fire is generally used in larger areas, where a maximum amount of fuel reduction can take place. Treatment boundaries are often road and trail crossings, which reduce the number of fire breaks that need to be created, thereby reducing labor costs and time needed to prepare for the burn, as well as minimizing the amount of surface soil disturbance and potential for soil erosion. The burns are most effective in vegetation types such as grasslands, eucalyptus groves, pine stands, chaparral, or oak

woodland where it can simulate natural fires but are also effective at reducing French broom (Klein, pers. comm.).

3.2.5 Grazing

Grazing involves using animals to consume vegetation in order to reduce the amount or density of vegetation and is most effective in grasslands (cattle or sheep) or shrublands (goats). This method is naturally most effective where the plants are palatable to the animals selected. Grazing does not need to be conducted each year, if the intent is to control shrubs. Yearly grazing is necessary to reduce grassland fuels in highly ignitable locations.

Grazing can be a relatively inexpensive treatment method and can even generate revenue when cattle grazing is contracted for large areas (100 acres or greater). Goat grazing typically requires a subsidy to be cost-effective, and sheep grazing is typically a cost-neutral treatment technique. Control of livestock movements and prevention of the impacts of overgrazing, including increased erosion from plant loss, is critical for successful use of this treatment method. Using professional herders or portable fences may be an alternative to fixed fencing where the treatment is ephemeral. Additional controls are also needed for protection of selected plant materials and riparian zones, and to prevent erosion or other undesirable environmental impacts.

The benefits of grazing include reducing herbaceous vegetation and reducing the shrub and tree growth in grasslands. For some grasslands that are dominated by non-native grasses or a mixture of native and non-native grasses, grazing can maintain the presence of the native grass and wildflowers. If these grasslands are not grazed, a layer of thatch builds up and inhibits the native grass and wildflowers. Appropriately-timed grazing can also be used to promote increases in native grass and to reduce the proportion of nonnative annual grasses. Without grazing, or another shrub management technique, these grasslands will become dominated by coyote brush or French broom, and eventually become oak woodland.

The detriments of grazing include introduction of weeds into pristine grasslands. The Town's open space parcels support grasslands, particularly the serpentine grasslands, which are nearly pristine. Introduction of livestock into these areas may also result in the introduction of weed seeds that are present in the fur or dung. The disturbance that results from the grazing (reduced vegetation density, hoof prints) could allow the non-natives to gain a foot hold in these pristine grasslands. Although grazing is not recommended for these grasslands, without some shrub removal, shrub and tree density will increase.

Although the concept of grazing is the same regardless of which type of animal is used, how each animal conducts its grazing varies significantly. As a result, not all animals will be ideally suited for grazing treatments in all areas.

3.2.5.1 Cattle. Using cattle for grazing treatments is appropriate in large grassy areas (typically with a minimum of 100 acres) with a less than 35 percent slope. The cost effectiveness for use on large areas precludes their use on the Town's open space parcels, unless the Town contracts with the rancher for the grazing. In addition, cattle do not usually eat shrubby material, and so cannot be used

to completely treat coyote brush and French broom. They will, however, easily maintain a grassland area if coyote brush sprouts are controlled by another means.

A site-specific grazing management plan and a grazing monitoring program should be developed to identify resource and fuel management goals, and to ensure that livestock are removed when management goals are met. The grazing management plan should specify management goals, stocking rate and use levels, grazing seasons, monitoring techniques and performance criteria. Stocking rates are determined by a range analysis which calculates the number of cattle required for a given period to attain the desired use level, typically measured in pounds per acre of residual dry matter (RDM).

The availability of alternative pastures on public open space or private property in the vicinity of treatment areas where livestock can be moved following attainment of target use levels is critical to reducing potential adverse impacts. Fencing must be used to prohibit grazing animals from venturing into areas outside the treatment area. However, fencing is typically the major expense in utilizing livestock for vegetation management. As a result, livestock tenants and others supplying grazing animals are typically asked to provide and repair fencing during treatment. Additionally, water sources are required for animals and need to be provided at the treatment site. Exclusion fencing to prevent livestock from gaining access to riparian zones and wetlands may be necessary to prevent degradation of water quality and habitat.

3.2.5.2 Horses. Grazing by horses is another effective way to reduce herbaceous vegetation. (Horses do not prefer shrubby material and so cannot be used to clear areas as firebreaks.) Horses can be grazed on slopes over 35 percent, making them an ideal complement to cattle grazing, but erosion can be a problem in small acreages where bare dirt becomes exposed as a result of high hoof- traffic..

3.2.5.3 Sheep. Sheep will graze both forbs and grasses, will graze steep slopes, and are more likely to eat shrubs than horses or cattle. Their herding instinct can allow grazing without the installation and maintenance of fences, but requires that a shepherd and dogs be present. A combination of sheep and goats can be a viable option when a mixture of grass and shrubs are present in the area to be treated.

3.2.5.4 Goats. Goats prefer to "browse" on woody vegetation (e.g., tree leaves, twigs, vines, and shrubs) and will eat materials up to 6 feet above the ground. This grazing pattern creates a desirable vertical separation between the canopy and ground cover, but is best used in areas with low numbers of plants intended for retention, since goats will indiscriminately damage most plants. Unfortunately, goats do not like to eat French broom. Portable electric fences are commonly used to help control the herd and the outcome of their grazing. Measures must also be taken to prevent girdling of trees that can result from the goats browsing on tree bark. A herd of 200-300 goats can graze up to 1 acre per day. Herd movement has the advantage of breaking off dead material in a stand as well as punching a humus layer into the soil (if the ground is somewhat moist) thereby removing or thinning shrubs.

A site-specific grazing management plan should be prepared and implemented for goat grazing treatments. This plan should include goals and implementation actions to ensure that timing of

grazing treatment is optimal to prevent the spread of seeds from invasive plants and other targeted species and to maximize the reduction of shrubs. The plan should also provide a justification for the stocking rate and duration. Monitoring should be conducted by qualified personnel to determine when the objectives are attained so that grazing animals are removed in a timely manner.

3.2.6 Evaluation of Vegetation Treatment Methods

The following evaluates each available vegetation management technique.

3.2.6.1 Hand Labor. Hand labor is an effective manner to remove many species of invasive plants and is best utilized in inaccessible areas and areas where sensitive resources should be protected. Hand labor is not cost effective for large stands of invasive species or for invasive species with perennial roots because of the amount of time needed to remove the root.

3.2.6.2 Mechanical Treatments. Mechanical treatments are effective for treating large stands of weeds in accessible and flat areas where the vegetation can be mowed or cut. Mechanical treatments need to occur every year or every other year and, unless the weeds are entirely removed by using an additional treatment such as herbicides, they do not facilitate the restoration of grassland.

3.2.6.3 Chemical Treatments. Chemical treatments, when used in conjunction with other methods such as cutting, are an effective means of removing non-native species, especially species with perennial roots and species that resprout after cutting. Follow-up treatments are reduced because the mortality is higher with herbicides. The drawback of the use of chemicals is the perception of deleterious effects of herbicides on humans and the environment from indiscriminate use.

3.2.6.4 Prescribed Burning. Prescribed fire is effective for reducing shrub density in grasslands and provides the local fire protection districts with the opportunity of practice controlling fires in brushy vegetation. Drawbacks include the need for repeated treatments, views of burned landscapes, generation of smoke, the possibility of the fire escaping the burn area, and the amount of administrative work needed to acquire approval and to plan and carryout the prescribed burn.

3.2.6.5 Grazing. Grazing goats can reduce the density of shrubs in scrub vegetation. Cattle, horses, and sheep can play a major role in maintaining native species in grasslands by reducing thatch, forbs, and annual grasses. Drawbacks are the need for fencing and water, repeated treatments yearly or every other year, and the effort to transport and manage the animals on the open space parcels. Grazing animals may also import new species of weeds to an open space parcel. Grazing in areas open to the public may also generate conflicts.

3.3 TREATMENT OF VEGETATION TYPES ON TIBURON OPEN SPACE

In Tiburon, vegetation management is often hampered by access, steeply sloping terrain, impenetrable vegetation, and proximity of residences. This section presents recommended management activities that respond to the challenges of managing vegetation on small, steep, and inaccessible parcels in the most cost-efficient and effective manner. LSA referred to a number of previous reports in developing these vegetation management prescriptions, including the East Bay Regional Park District's *Wildfire Hazard Reduction and Resource Management Plan* (LSA 2008) and *Marin Municipal Water District Vegetation Management Plan Update - Background Report No. 6 - Fire Hazard Management* (Leonard Charles and Associates 2008).

Appendix A presents the recommended management activities for each of Tiburon's open space parcels. This appendix references these recommended management activities and prioritizes treatments for each of the open space parcels. Sensitive resources are listed and any special considerations are discussed.

3.3.1 Grassland

Grassland management primarily entails removing species of woody plants and other non-native plants. Large tracts of non-native grassland could be grazed or burned to reduce fuel load and to promote establishment of native grasses. Native grasslands should not be grazed because of the likelihood of livestock bringing in weeds from other areas, but burning can be an acceptable management activity in a few instances. Prior to burning, excess thatch should be removed, by raking or other means, to reduce mortality of native grasses. Yearly follow-up treatments to remove woody vegetation such as French broom, which has seeds that germinate in response to fire, may be necessary after burning.

3.3.2 Scrub

Coyote brush scrub should be periodically thinned where possible. Such thinning could occur by mechanical means, grazing with goats, or fire. Follow-up treatments would be needed for each of the proposed methods. California sagebrush scrub only occurs in two locations (Atkinson parcel and near the "Hippie Tree" on the Middle Ridge) and does not require any special management other than removal of occasional invading shrubs such as coyote brush or French broom.

3.3.3 Oak Woodland

Oak woodland should remain intact with a complete canopy cover. Woodland supporting a sparse tree canopy or woodland whose canopy has been trimmed provides sufficient light for the colonization of the understory by shrubs. A dense canopy reduces the amount of light reaching the understory which in turn reduces the amount of shrubs in the understory. In general, woodland with an open canopy cover should be allowed to form a complete cover over time. Pruning to keep the canopy open should be avoided.

3.3.4 Wetlands and Watercourses

A variety of wetland types occur on the open space parcels including springs, seeps, and swales. These habitats should be maintained by ensuring that coyote brush and non-native species are removed from these areas. Non-native species that commonly colonize wetlands include fennel, French broom, Pampas grass, and bull thistle. In addition, other species of non-native species may colonize wetland areas.

Watercourses should be regularly monitored to ensure that banks are not eroding. Rubbish including garbage, furniture, and yard clippings should be removed.

3.4 TREATMENT OF INVASIVE SPECIES ON TIBURON OPEN SPACE

Recommendations for the treatment of invasive species are based on the information compiled by the California Invasive Pest Council (Cal-IPC), the particular conditions within the open space parcels, experience of the Marin Municipal Water District, experience of the Marin County Open Space District, and conditions observed in the field.

The steepness of the topography and lack of access limits the advisability of using mechanical equipment. In addition, mechanical treatment is often not the most effective method of treatment and creates disturbance that further allows re-colonization of areas by the long-lived seeds of invasive weeds. In these instances, crews on foot with hand tools or with a back-pack herbicide spray apparatus should be used.

Once treated, the invasive species should be removed and not left on the site. In a few instances, viable seed can be produced by cut plants that remain in place. Dead weeds that remain are detrimental to native grassland and the habitat of special-status species because they create shade, increase the thickness of the thatch and add nutrients, thereby promoting the growth of weeds and non-native grasses.

3.4.1 Acacia

Acacia should be treated by cutting the tree and applying an appropriate herbicide to the cut stump to prevent resprouting. The stumps should be brushed free of sawdust prior to application of the herbicide to allow the herbicide to go directly into the cut stump and not be absorbed by the sawdust.

3.4.2 Bamboo

Some bamboo on the Middle Ridge has been removed but currently needs follow-up treatments. Such treatments could include removing with the use of hand tools or by cutting the canes and applying an appropriate herbicide to the stump to prevent re-growth.

3.4.3 Blue Gum Eucalyptus

The recommendation for the removal of blue gum entails cutting the tree and applying an appropriate herbicide to the cut stump to prevent resprouting. The stumps should be brushed free of sawdust prior

to the application of the herbicide to allow the herbicide to go directly into the cut stump and not be absorbed by the sawdust. Most recommendations entail leaving the large, stately blue-gum trees and removing small trees and saplings to prevent the formation of a dense stand of this flammable species.

3.4.4 French Broom

French broom is the most abundant invasive species within the open space parcels. Management of French broom provides a challenge because of its abundance, its ability to spread, and the need for follow-up treatments.

The most successful treatment of French broom, based on the experience of the Marin Municipal Water District (Klein pers. comm), is repeated burning every other year for approximately 10 years or the use of a mechanical mower with follow-up spraying of herbicide on the cut stems. A non-selective herbicide would be applied in non-sensitive areas, whereas an herbicide specific to broad-leaved plants would be applied where sensitive monocotyledonous plants such as the native grasses occur. If possible, the herbicide should be applied late enough in the season after the herbaceous species have dried out for the year. Hand tools including a weed wrench or other types of tools are appropriate in areas where there are few French broom plants or where the areas are inaccessible to mechanized equipment. Scotch broom should receive a similar treatment.

3.4.5 Himalayan Blackberry

The canes of Himalayan blackberry should be cut in the spring around the time of flowering. The root crowns will resprout and should be treated with an appropriate herbicide. Repeated treatments would be necessary.

3.4.6 Myoporum

Myoporum should be treated by cutting the tree and applying an appropriate herbicide to the cut stump to prevent resprouting. The stumps should be brushed free of sawdust prior to application of the herbicide to allow the herbicide to go directly into the cut stump and not be absorbed by the sawdust.

3.4.7 Pampas Grass

Pampas grass can be removed by hand by removing all of the leaves and cutting it back to its base before excavating the plant. This process is time-consuming if done by hand. If done by a back-hoe, it can create disturbance to the soil and may not be desirable in wetland areas. Other methods entail cutting the plant down to its base and then applying an appropriate herbicide.

3.4.8 Pine

Monterey pine, Italian stone pine, and at least one other species of pine tree are best removed by cutting with a chain saw or by mechanized equipment where sites are accessible. All debris should be removed.

3.4.9 Pittosporum

Pittosporum should be treated by cutting the tree and applying an appropriate herbicide to the cut stump to prevent resprouting. The stumps should be brushed free of sawdust prior to application of the herbicide to allow the herbicide to go directly into the cut stump and not be absorbed by the sawdust.

3.4.10 Plum

Ornamental plum trees should be treated by cutting the tree and applying an appropriate herbicide to the cut stump to prevent resprouting. The stumps should be brushed free of sawdust prior to application of the herbicide to allow the herbicide to go directly into the cut stump and not be absorbed by the sawdust.

3.4.11 Pride of Madeira

Little is known of the control methods for pride of Madeira. Since it is a biennial or short-lived perennial, it should be cut at its base after flowering. Repeated treatments may be necessary. Seedlings should be removed the following year in the vicinity of the removed parent plant. An approach of cutting the trunk at the base may provide good results. Herbicide may need to be applied to the cut trunk to reduce follow up treatments.

3.4.12 Star-Thistle

Purple Star-thistle. Small infestations of purple star-thistle can be controlled by manually cutting below the root crown, although follow-up treatments may be necessary. Chemical control can be effected by using suitable herbicides on seedlings or small rosettes in late winter or spring.

Yellow Star-thistle. Yellow star-thistle is one of the worst range weeds in California (Cal-IPC 2009), but it is not common in the open space parcels. Physical or chemical control methods are recommended. Hand pulling would be best in areas supporting sensitive resources and follow-up should occur the same year. Using an appropriate herbicide is also an effective option for control of yellow star-thistle.

3.4.13 Sweet Fennel

Sweet fennel can be removed by hand, a time-consuming process, or by the use of appropriate herbicides in the spring while the plant is sprouting from the underground perennial root.

3.4.14 Thistles

Artichoke Thistle. Artichoke thistles are difficult to control manually as most of the 8-foot long root needs to be removed. The most effective method is by cutting the foliage from the root crown and applying a suitable herbicide.

Bull Thistle. Most bull thistle plants remain in the rosette stage for one year, then bolt, flower, and set seed in the second growing season, although some individuals may bolt and flower in the first year and others may not bolt until their third, fourth, or fifth year. Cutting bull thistle at the root crown during the flowering stage effects good control. In addition, a variety of herbicides also control bull thistle (Cal-IPC 2009).

Italian Thistle. Italian thistle occurs in mostly small stands in many of the open space parcels. As such, the best control methods are by either physical or chemical means. Hand pulling or grubbing is effective if the top four inches of root are removed. A variety of herbicides have resulted in control of Italian thistle (Cal-IPC 2009).

3.5 MANAGEMENT OF SPECIAL-STATUS SPECIES

Some of the Town open space parcels support documented populations of Tiburon jewelflower, Tiburon paintbrush, Marin dwarf-flax, Tiburon microblind harvestman, Tiburon buckwheat, marsh zigadene, and Oakland star tulip. (No special-status species surveys were conducted specifically for this RMP, but LSA has knowledge of some of the plant occurrences as reported by E. Buxton.) Tiburon jewelflower and Tiburon buckwheat habitat is especially threatened by non-native grasses and a grove of pine trees in the Middle Ridge Area. (Several pines in this grove were removed by the Town in 2008.)

The following represent management activities that would benefit these special-status species:

- Remove wild oats from the serpentine outcrop habitat of Tiburon jewelflower and Tiburon buckwheat in the North Middle Ridge Management Area. This task is necessary for these species to survive and should be performed by a botanist or other person familiar with the appearance of these species from their seedling to fruiting stages.
- Maintain the existing grassland free of coyote brush, trees, and non-native species to the extent possible. This task would benefit Tiburon jewelflower, Marin dwarf flax, Tiburon paintbrush, Oakland star tulip, and Tiburon microblind harvestman, all grassland species;
- Provide interpretive signage that discusses the biology and distribution of the special-status species that occur on Town open space and the need to remain on trails;
- Monitor recreational use of the open space parcels, especially on the Middle Ridge in order to protect rare plant habitat;
- Provide and maintain signs in appropriate locations informing visitors of the Tiburon Municipal Code which prohibits dogs from running at large; and
- Install post and cable fencing along trails in sensitive areas to encourage visitors to remain on the trails.

3.6 COSTS FOR VEGETATION TREATMENTS

This section presents the cost for the various types of vegetation treatments. Unit costs for different treatment methods can vary dramatically, not only across categories but within them as well. Similarly, unit costs for some treatment methods will vary greatly according to:

- Height, density, species composition, and arrangement (eg. sparse, clumped) of existing vegetation;
- Desired vegetation conversion and management objectives;
- Size, accessibility, slope, soil stability, and vegetation types;
- Weather;
- Governing regulations and resource restrictions; and
- Planning and monitoring to develop follow-up treatment prescriptions.

Selecting the most appropriate treatment method depends on the conditions listed above, the timing of treatments, and cost of the various treatment methods available. Selecting a treatment method that is overly expensive may reduce the Town's budget for other needed management efforts and could inhibit the Town's ability to address additional areas. Selecting a treatment method based solely on its perceived "lower" financial cost, however, can result in additional negative impacts to the treatment area such as invasion of non-native species, or can result in the selection of a less effective treatment method. The costs in Table B were derived from recent experience of the East Bay Regional Park District and the Marin Municipal Water District in implementing vegetation management activities.

Table B: Unit Costs for Vegetation Treatment Methods

Treatment Method	Estimated Unit Cost ($ per Acre)
Hand Labor Treatments	
Weed Whipping	$1,500
Brush Removal (dense)	$2,140 [a]
Brush Removal (sparse)	$1,000
Hand-Pulling – initial clearing	$2,000-2,500
Hand-Pulling – follow-up	$600-$1,500
Mechanical Treatment	
Mowing	$500-$634 [b,c]
Chemical Treatment	
Stump Application (dense)	$1,500 [d]
Stump Application (sparse)	$750 [d]
Foliar Application	$500
Spot application	$160-$260
Prescribed Burning	$60-$1,500 [b,c]
Grazing	
Sheep	$200 [b]
Goats	$300-$1,197

[a] The Sea Ranch Association Fuels Management Implementation, 2002.
[b] Applegate, Oregon Fire Plan. http://www.wildfireprograms.com/search.html?displayId=237
[c] Fire Plan, http://www.wildfireprograms.com/search.html?displayId=237 Source: Wildland Resource Management, Inc., 2008
[d] The rate for weed whipping was used for stump application based on the type of hand work involved.

The Treatment Areas and Treatment Recommendations table (Appendix A) presents approximate costs of the treatment activities. These costs were approximated in two ways: 1) by estimating the

number of hours it would take to perform an activity and then multiplying by the hourly worker cost (estimated at $45/hour which is slightly more than the wage of a group 6 category of laborer as determined by the California Department of Industrial Relations) or 2) by multiplying the estimated unit cost in Table B by the size of the area to be treated. For estimating the cost of the proposed treatments in Appendix A, the $2,140/acre cost for brush removal was most commonly used for dense brush and $750/acre was used for sparse brush that had colonized grassland areas. (This $750/acre estimate was used because the time commitment would be approximately half that of weed whipping at $1,500/acre.). The cost of a biological consultant conducting surveys for special-status plants was estimated at $100/hour. Estimating these costs are useful for planning purposes and the Town can determine costs more accurately after several activities have been implemented. For instance the town recently removed broom from a 1.3-acre area at a cost of $18,000. This is quite a bit more costly than the estimated costs developed in Table B and more experience with vegetation management will allow the Town to more accurately budget for these activities.

The costs presented in Appendix A are for one time treatments only. Follow-up treatments will need to be repeated every 1 to 3 years (depending on the non-native species) until the non-native species have been significantly reduced. The costs of these follow-up treatments are expected to be half to a quarter of the initial treatment costs. Once an area is proposed for treatment, follow-up treatments would be necessary and associated costs of the follow-up treatments should be allocated, otherwise the initial treatment would be for naught.

3.7 EROSION

Erosion, the process by which soil particles are displaced and transported by wind or water, occurs naturally from weather or runoff. Human land use practices such as construction, agriculture, removal of vegetation or mulch, paving, or heavy repeated trampling can cause accelerated erosion beyond natural levels. Erosion reduces soil quality and water-holding capacity by removing the nutrient-rich upper layers of the soil. Erosion can result in increased sedimentation in wetlands and streams (including riparian habitats), degradation of water quality, reduction of water storage capacity, and loss of native habitat. The extent of erosion depends on a combination of factors, including the amount and intensity of rainfall, soil type, slope length and steepness, and ground cover (vegetation, litter/mulch, rocks). Soil erodibility is a function of texture, organic matter content, structure, and permeability. In general, areas with erosive soils on long steep slopes with little or no cover will be most susceptible to erosion.

Wind, water, and human land use practices have resulted in erosion in parts of the Town's open space parcels. Roads, trails, and unvegetated areas along steep slopes are the most susceptible to erosion. Natural slumping occurs in some areas. Erosion control is critical for maintaining natural drainage patterns, water and soil quality, healthy aquatic ecosystems, and safe trail conditions. The Town should carefully consider different strategies and techniques available to remedy a particular problem and use those that will have a minimal environmental impact.

Due to the variety of site and soil conditions encountered within the Town's open space parcels, these guidelines should be adjusted based on specific on-site conditions.

- Use Best Management Practices (BMPs) to address eroding areas. Ensure that sediment-trapping devices and erosion control measures are accessible for maintenance and removal. The following BMPs should be considered, designed, and implemented on a site-specific basis:
    - Interceptor berms or wattles at the top of slope to divert and dissipate runoff away from unstable or denuded areas;
    - Properly designed culverts and drains that avoid concentration of runoff;
    - Vegetation (preserved and/or planted);
    - Mulch (straw, wood chips, hydromulch, erosion control blankets etc.);
    - Contour wattles, rolling dips or water bars to slow down and divert runoff on steep slopes, trails, and roads;
    - Gravel filters, sand bags, permeable dams, etc. for filtering sediment out of runoff; and
    - Sediment traps/basins at base of slope to allow soil particles to settle out and to attenuate runoff peaks.
- Develop a regular maintenance program. Maintenance of all BMPs is essential for them to function properly. They should be inspected regularly and after each rainfall event. When a problem is identified, initiate immediate repairs.
- Control surface water runoff. Divert and disperse surface water runoff originating upgrade of exposed areas to reduce erosion and sediment loss. This is especially important on trails and fire roads where waterbars and/or rolling dips should be installed on sloping areas.
- Use erosion control blankets or fabric to repair eroding slopes or banks of watercourses.
- Restrict or prohibit trail users from areas where erosion has created a public hazard.
- Check erosion control measures on a yearly basis, once installed, to ensure that they are functioning properly.

3.8 TRAILS

The Town's larger open space parcels support a network of trails and fire roads that are heavily used for passive recreation, including the Tiburon Ridge Trail. The main trails are located on the La Cresta and Atkinson parcels, adjacent to the Ring Mountain Open Space Preserve managed by the Marin County Open Space District, and in the North Middle Ridge Management Area. Some of these trails originated from former ranch roads now serving as fire roads. Other trails have developed from visitors walking cross-country in grassland areas.

3.8.1 Dog Walking

Dog walking is a popular passive recreation activity in the open space parcels (*e.g.*, the Middle Ridge and Ring Mountain areas). The Town's existing practice is to allow dog walking, provided that dogs remain under control of the owner/guardian and that owner/guardians clean up after their dogs (Municipal Code, Title VI, Chapter 20). However, it is not uncommon for dogs to run freely in open space parcels, disturbing or presenting safety risks to other users and/or leashed dogs, trampling

sensitive habitat, and contributing to the creation of unauthorized trails. Professional dog walkers bring as many as 10 off-leash dogs at a time. Off-leash dogs can harass or kill wildlife.

The Town should consider periodic monitoring of popular dog walking trails by law enforcement officials to enforce the Town's ordinance. Warnings or citations should be issued to violators. Interpretive signage should be established in sensitive habitat areas (e.g., serpentine habitat on the Middle Ridge) to discourage dogs from running off-leash and to foster a sense of personal responsibility for the stewardship of the Town's natural resources. Fencing can also be considered to restrict access to sensitive habitat areas.

3.8.2 Road and Trail Maintenance

In the future, the Town may evaluate the potential for new trail routes, but the primary focus at present will be on improving the current network of trails (e.g., those associated with the Tiburon Ridge Trail) and implementing management actions to minimize road and trail impacts. This section describes best management practices (BMPs), design standards, maintenance, and management strategies that the Town should implement for roads and trails within Town open space parcels. Due to the variety of trail and resource conditions encountered, these guidelines should be adjusted based on specific on-site conditions. Before deciding when and where to reconstruct or upgrade a portion of a road or trail, the Town should carefully consider different strategies and techniques available to remedy a particular problem and identify those that will have the least environmental impact. Planning department staff should monitor trails while public works staff should maintain trails.

Trail work should be planned and implemented with the objective of providing for visitor safety, resource protection, and public access. The fire road between the north end of the Hacienda fire road and the junction of the fire road and Gilmartin Drive passes through a serpentine outcrop, where Tiburon jewelflower grows at the edge of the road. A rare-plant monitor should be present when the fire road needs maintenance in order to ensure that disturbance to individuals of Tiburon jewelflower does not occur.

The trail maintenance program outlined below, while operating within budgetary and staffing constraints, should assist the Town in addressing its trails on open space parcels:

- Regular inspection and monitoring of each trail/fire road to see if any repair or maintenance is needed and if so:
- Trail work aimed toward preventing serious damage during the rainy months after each rainfall;
- Emergency repair work and/or signing to eliminate or to identify a possible safety hazard.

3.8.2.1 General Trail Maintenance Guidelines. The guidelines listed below address general trail maintenance.

- Practice environmentally sound maintenance and use techniques appropriate for the type of trail. For example, use mechanical or other means to treat vegetation along the edge of trails thereby avoiding the use of chemicals in the vicinity of people.
- Prepare an annual Trail Maintenance Schedule with an approach to addressing current concerns.

- Repair heavily used fire roads or trails in the spring and maintain them throughout the season on an as-needed basis.
- Prioritize trail maintenance tasks to: 1) correct unsafe trail conditions, 2) repair environmental damage, and 3) restore the fire road or trail to the desired conditions.

3.8.2.2 Annual Spring and Early Summer Tasks. The following list consists of general tasks to be accomplished after the cessation of the winter rains.

- Clear windfalls and plant debris from the trail bed for safety and to prevent detouring.
- Repair trail wash-outs.
- Level the trail tread as necessary and restore the tread grade to the original slopes. Use local material to fill ruts, holes, low spots, or muddy areas.
- Repair erosion-damaged facilities promptly to prevent further damage. Check for erosion effects after spring runoff. Check and repair water bars, drainage ditches, culverts, and drainage dips. Add water bars, drainage dips and additional drainage structures if needed. Corrective work for drainage or erosion problems should be performed within a reasonable period of time. Where necessary, barriers to prevent further erosion should be erected until problems are corrected.
- Check and repair all structures after spring runoff.
- Clear rainwater runoff diverters of silt and brush.

3.8.2.3 Seasonal Closure. The following list provides guidance on procedures for seasonally closing trails. Some jurisdictions close trails or parks for a few days after rain to protect the trails or during the summer because of fire danger.

- Minimizing heavy traffic loads, especially during the rainy season, is one of the simplest ways to maintain an unpaved road or trail.
- Close roads and trails susceptible to erosion whenever possible provided that they do not allow access to critical public water supply facilities or utilities.
- All entry points onto a seasonally-closed trail should be signed appropriately. Some consideration may be given to including on the sign reference, the estimated reopening date. Care should be exercised to promptly remove all closure signs when conditions have changed.

3.8.2.4 Trail Maintenance Costs. The U.S. Forest Service has developed costs for trail maintenance for the Middle Fork (Cimmaron) Trail. These costs are for linear foot, square foot, or per structure. They are presented here as a guideline for any expected costs of trail maintenance.

Rolling dips $32.00 to $80.00 each
Water bar (treated timber) $75.00 each
Trail restoration $0.72 per linear foot
Retaining wall (treated wood) $65.00 per square foot

3.9 PRIORITIZATION OF MANAGEMENT ACTIVITIES

The following discussion provides a basic rationale to prioritize the recommended management activities. Justification is addressed for many of the management activities and based on this discussion, the reader can ascertain reasons for the level of priority of the other management activities that are not mentioned in this discussion. Determining the priorities is based on the ability of the Town to complete a management activity that provides the greatest public benefit with a minimum of resources. Public benefit is defined primarily by the greatest amount of area cleared of French broom or other species with the least amount of effort thereby providing the greatest protection from fire or protection to sensitive biological resources. As the perceived public benefit declines and/or the amount of effort greatly increases, the priority declines. The highest priority is level 1, medium priorities are levels 4 through 6, and the lowest priority is level 9 as shown in the table that is Appendix A.

Priority 1 management activities address fire safety activities, other safety activities, habitat restoration, and protection of special-status species. Priority 1 fire safety activities entail the removal of woody vegetation within 100 feet of residential homes for those homes that have already cleared vegetation from their lots. Priority 1 activities address other imminent public safety needs such as a hazardous tree. The Tiburon and Southern Marin Fire Protection Districts recommend that defensible space be created within 100 feet of residential structures. Many of the residential yards abutting the open space parcels are much greater than 100-feet long and the vegetation therefore should be treated by the owners. Priority 1 activities also include removal of non-native species, including Pampas grass, that pose an immediate threat to the habitat of special-status species or the special serpentine grassland. This is especially true for those open space parcels of the Middle Ridge and those near Ring Mountain.

Priority 2 management activities entail the removal of non-native woody vegetation that is colonizing grassland of the Middle Ridge open space parcels. These Middle Ridge open space parcels are biologically valuable because they support special-status species and sensitive plant communities. Priority 2 also entails removal of artichoke thistles and other non-native woody plants that are colonizing the grasslands of the Middle Ridge. These species produce a large amount of seed and can spread and become a fire hazard. Maintaining grassland areas reduces fire hazard and supports the rare species and wildflowers that grow in Tiburon's grasslands.

The emphasis of the RMP is to reduce French broom, Pampas grass, and other invasive species. French broom is already dominant throughout and if untreated, it will become the dominant species in all of the open space areas. The best allocation of effort therefore appears to be to prevent the increase of French broom and other non-native species. The highest priority is given to the removal of French broom and other non-native species from the existing grassland and woodland areas of the most biologically valuable parcels (Atkinson and the North Middle Ridge Management Area). Another high priority activity is monitoring the results of the control efforts to prevent the regrowth of non-natives in areas previously treated.

The Tiburon jewelflower, which only grows on two main areas on the Middle Ridge, is threatened by non-native species. Allocation of a little effort to remove wild oats and adjacent non-native woody vegetation (such as French broom) will result in the survival of this species and its management is therefore a high priority.

Priority 3 management activities entail reduction of fire hazard and habitat restoration activities. These habitat restoration activities entail removal of non-native woody plant species that are colonizing the grasslands of the other open space parcels that are not part of the Middle Ridge. As stated above, it is important to remove these invasive species for fire protection purposes and habitat preservation purposes prior to these areas becoming a scrub dominated by woody vegetation. Priority 3 management activities differ from Priority 1 with respect to clearing vegetation from open space areas within 100 feet of homes. Priority 3 is recommended where the adjacent homeowners have not cleared their vegetation within their yards and open space is within 100 feet of the house but beyond their shrubby yards. In a very few instances Priority 3 is recommended for areas with a large cleared area between home and open space because the lower amount of fuel close to the home.

Priority 4 management activities entail installing signage on the Middle Ridge open space parcels, monitoring the effects of dogs on special-status species and sensitive vegetation, and surveying for and mapping the location of special-status species on these parcels.

Some of the open space parcels provide habitat for and are known to support special-status species, therefore management prescriptions are designed to assume presence of these species. The special-status species could be better managed and protected if their occurrences are known and mapped. For parcels supporting sensitive habitat, surveys for special-status species is designated as priority 4. For parcels supporting low quality habitat, surveys for special-status species is designated a low priority.

Replacing signs that have been removed and installing new signs educating trail users about trail etiquette, maintaining dogs on leash, and cleaning up after the dogs is also a priority 4 management activity. This will allow the Town to better manage the sensitive resources of the open space parcels and reduce conflicts between users.

Priority 5 through 9 management activities consist of removing selected stands of non-native invasive species, individual non-native woody plants that have colonized grassland areas where sensitive biological resources are presumed absent, and installing trail signs on parcels adjacent to the Ring Mountain Open Space Preserve. The level of priority depends on the sensitivity of the open space area and the benefit of the activity to fire safety and habitat protection or habitat restoration.

Some residential owners have planted lawns, hedges, and/or other types of ornamental vegetation on open space for their own private use. Priority 5 management activities also entail investigating these situations.

Creating fuel breaks through dense French broom is accorded priority 7 in areas distant from homes; as such an effort would be of lesser benefit than the creation of defensible space within 100 feet of residential structures. Nevertheless, the creation/maintenance of fuel breaks is less of an effort than the removal of an entire stand of French broom. The latter is therefore designated as a low priority.

Although a prescribed burn in French broom would have the same effect as removing the entire stand, it is accorded priority 7 because of the benefit of having the fire protection agencies develop experience with fires in that type of vegetation. Prescribed burns will necessitate follow-up treatments to remove seedlings and resprouting French broom plants for several years.

The priority for a particular management activity may be altered for a particular open space preserve based on changing vegetation over time or based on the interest of nearby residents and their ability to acquire funding for a particular management activity. Nothing in the plan prevents residents from carrying out specific aspects of the plan on a separate priority, but coordination with the Town is necessary to prevent unforeseen impacts, such as to special-status species or sensitive communities, such as seasonal wetlands. . Priorities of maintenance activities are based on various factors and not solely on public safety. Determining the priorities is based on the ability of the Town to complete a management activity that provides the greatest public benefit with a minimum of resources.

4.0 OPEN SPACE PARCEL DESCRIPTIONS AND MANAGEMENT RECOMMENDATIONS

This section describes the open space parcels and lists management recommendations. For more specific recommendations, please see Appendix A. and section 3.1.3 *Suggested Vegetation Treatment Protocols* for fire protection.

4.1 LA CRESTA OPEN SPACE MANAGEMENT AREA (PARCELS 2 AND 9)

4.1.1 Size, Access, Aspect, Steepness

La Cresta Open Space Dedication (Parcel 2). The La Cresta Open Space Dedication (La Cresta) Parcel (65.6 acres) is located in the north portion of the Tiburon Planning Area just outside of Town Limits. The Ring Mountain Preserve, managed by the Marin County Open Space District (MCOSD), is located immediately east of the parcel. The parcel is accessed from Via Los Altos through Blackfield Drive. Due to the parcel's location at the northernmost end of the Tiburon Ridge, the site slopes steeply to the north, south, and west. The northwestern terminus of the Ring Mountain Fire Road/Tiburon Ridge Trail bisects the parcel. The La Cresta Subdivision Open Space Path Easement (Parcel 9, *described below*) provides access to this parcel for neighborhood residents.

La Cresta Subdivision Open Space (Parcel 9). The La Cresta Subdivision Open Space Path Dedication (0.1 acre) is located in the north portion of the Tiburon planning area just outside of Town Limits. The easement is accessed from Via Los Altos through Blackfield Drive. The easement contains an approximately 270-foot long linear path that provides a connection to the Ring Mountain Fire Road/Tiburon Ridge Trail through the La Cresta Open Space Dedication (Parcel 2, *described above*). The path consists of steps that climb the steep south-facing slope before transitioning to a decomposed granite and dirt trail.

4.1.2 Vegetation and Natural Features

La Cresta supports a mosaic of dense to relatively open scrub, dense forest, and open grasslands (Figure 2). Many of the species within the scrub and grassland are non-native, weedy species. Although serpentine substrates are common on Ring Mountain to the east of La Cresta, no serpentine substrate was observed on this parcel. A narrow path bordered by ornamental plants connects the street with the open space parcel.

Grassland. The grassland is a mosaic of native and non-native grasses.

Woody Vegetation. About one third of the parcel, especially in a deep canyon on the north-facing slope, is covered by a dense forest. Several trees in the forest are dead or dying and may be affected by Sudden Oak Death Syndrome (SOD). Coyote brush scrub intermixed with mostly French broom is

common. The only occurrence of Scotch broom on Tiburon open space was observed on this parcel. Stands of black acacia, pine, and blue-gum eucalyptus also occur on this site.

4.1.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. No special-status species were observed during the early spring surveys.

Native Grassland. Small areas adjacent to the oak-woodland support many native species including purple needlegrass, blue wildrye, milkmaids, narrow-leaf mule's-ear, and Johnny-jump-up.

4.1.4 Recreational Use and Access

La Cresta Open Space Dedication (Parcel 2). The Ring Mountain Fire Road bisects the La Cresta Open Space Dedication parcel and connects the Tiburon Ridge Open Space Preserve to the west with the Ring Mountain Open Space Preserve to the east. The Tiburon Ridge Open Space Preserve and the Ring Mountain Open Space Preserve are managed by the MCOSD. The approximately 6- to 8-foot wide dirt fire road is used by hikers, bicyclists, and equestrians. Dog-walkers are also common. The eastern segment of the fire road, which connects with the La Cresta Subdivision Open Space (Parcel 9, *described below*), constitutes the northwestern terminus of the Tiburon Ridge Trail. The fire road is rutted, moderately-sloped, and/or rocky in some locations. During the wet season, water pools in small depressions along the road. A couple of narrow secondary trails have been established as short-cuts or to provide a means of unofficial access to the parcel.

Depending on the location of the viewer in the parcel, views to the east and/or north are limited by the dense coast live oak and California bay trees. In other locations, however, unobstructed vistas of the Tiburon, Marin, and San Francisco peninsulas are provided. An existing wooden bench, located adjacent to the fire road at the northeastern edge of the parcel, faces the eastern expanse of the Town with Angel Island and the City of San Francisco beyond. Marin County Open Space District signage, along with a cattle gate with horse step-over, indicates the entrance to the Ring Mountain Preserve at the eastern boundary of the La Cresta Open Space Dedication Area.

La Cresta Subdivision Open Space (Parcel 9). At the western end of Via Los Altos, within the La Cresta residential neighborhood, the easement and path is marked with Town signage indicating access to the Tiburon Ridge Trail. Temporary "*No Parking*" signs that appear to be posted by the local residents are located along the street immediately west of the easement. The beginning of the path consists of steps that climb up the steep slope toward the water tank located at the top of the hill. A wooden fence and ornamental shrubs such as ceanothus (*Ceanothus* sp.) and jasmine (*Jasminum* sp.) separate the easement from the adjacent residence to the east. At the top of the hill, the path transitions into an approximately 3-foot wide decomposed granite and dirt trail that connects with the Tiburon Ridge Trail/Ring Mountain Fire Road (Parcel 2, *described above*).

4.1.5 Management Recommendations

Recommended management activities include:

- Remove or reduce the density of French broom;
- Remove individual Scotch broom plants before this species spreads;
- Survey for and map the locations of potentially-occurring special-status species;
- Track and record signs of Sudden Oak Death (SOD); remove dead trees affected by the SOD;
- Monitor the path (parcel 9) to ensure that ornamentals do not spread into wildlands;
- Maintain the trails and fire roads to ensure that they are clear of debris and erosion is minimized;
- Install signage at open space access points requiring users to stay on existing authorized fire roads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats; and
- Monitor trail use and enforce Town of Tiburon regulation of "dogs on leash" and "clean after your dog" as posted on Town signage at conspicuous entrances to open space parcels.

4.2 CIBRIAN SUBDIVISION OPEN SPACE AREA (PARCEL 3)

4.2.1 Size, Access, Aspect, Steepness

The Cibrian Subdivision Open Space (Cibrian) Area (3.8 acres) is a linear parcel located at the rear of residences accessed by Cibrian Drive and Park Place via Taylor Road and Paradise Drive in the northern-most portion of Town Limits. The parcel is located on a steep, densely vegetated, east-facing slope. The Ring Mountain Open Space Preserve is located to the south and west of the property. Access to the open space area is provided by a dirt trail located upslope from the parcel's western boundary. The trail extends in a north-south direction from the terminus of Robin Drive to the Taylor Fire Road in the Ring Mountain Open Space Preserve.

4.2.2 Vegetation and Natural Features

The vegetation consists mostly of woody vegetation and a few small areas of native grasses. Some areas were formerly native grassland and have now succeeded to coyote brush scrub (Figure 3).

Grassland. The grassland is a mosaic of native and non-native grasses.

Woody Vegetation. Woody vegetation consists of oak woodland, coyote brush scrub, and a scrub dominated by dense French broom.

4.2.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. Oakland star tulip (*Calochortus umbellatus*) (see *Special-status Species*) occurs within the coyote brush scrub. No other special-status species were observed during the early spring surveys.

4.2.4 Recreational Use and Access

No existing recreational use is associated with this parcel. Recreational use is not recommended due to the existing dense vegetation and slope.

4.2.5 Management Recommendations

Management issues include reducing the density of French broom and coyote brush and maintaining the grassland. SOD is also present on the parcel and/or the adjacent woodland. Recommended management activities include:

- Remove French broom and cotoneaster;
- Remove Monterey pine;
- Reduce the density of coyote brush;
- Monitor SOD and remove any dead trees;
- Maintain native grassland and Oakland star tulip areas free of woody vegetation; and
- Survey for and map Oakland star tulip and other potential special-status species in grassland areas.

4.3 HEXAN SUBDIVISION OPEN SPACE AREA (PARCEL 4)

4.3.1 Size, Access, Aspect, Steepness

The Hexan Subdivision Open Space (Hexan) Area (0.7 acre) is located directly adjacent to Cibrian Drive in the northern-most portion of Town Limits. Access to Cibrian Drive is provided by Taylor Road and Paradise Drive. From the roadway, the parcel slopes downward to the west. A narrow trail is located along the northern boundary of the parcel and travels down the slope toward Robin Drive and Paradise Drive.

4.3.2 Vegetation and Natural Features

The vegetation consists of grassland and woody vegetation (Figure 3).

Woody Vegetation. Woody vegetation consists of scrub dominated by French broom and oak woodland.

4.3.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. Oakland star tulip occurs in the grassland.

Native Grassland. The native grassland is dominated by purple needlegrass and a variety of native forbs, including soap root and false lupine.

4.3.4 Recreational Use and Access

A narrow user-created dirt trail is located along the northern boundary of the parcel. The trail travels down the slope toward Robin Drive and Paradise Drive behind the residences located along Cibrian Drive. The size of the parcel and its lack of connection with other open space parcels limit recreational opportunities.

4.3.5 Management Recommendations

Recommended management activities include:

- Remove French broom and Italian thistle;
- Maintain native grassland and Oakland star tulip areas free of woody vegetation;
- Maintain mulched area free of weeds; and
- Prevent the placement of additional mulch that destroys native grassland.

4.4 MATEO DRIVE SUBDIVISION OPEN SPACE DEDICATION AREAS (PARCEL 8)

4.4.1 Size, Access, Aspect, Steepness

The Mateo Drive Subdivision Open Space Dedication (Mateo) Areas (3.2 acres) are located along Paradise Drive in the northeastern portion of the Town Limits. From the roadway, the parcels slope upward toward the rear of single-family homes located along Mateo Drive. The parcels are linear, with most of the open space parcel located immediately adjacent to the approximately 0.3-mile stretch of Paradise Drive. Portions of these areas have been approved (In 2008) by the Town as off-site replanting mitigation sites for coast live oak trees.

4.4.2 Vegetation and Natural Features

The vegetation consists of a mosaic of grassland and woody vegetation (Figure 4). Ornamental species have been extensively planted on this site.

Grassland. The grassland consists of a mosaic of native and non-native grasses.

Woody Vegetation. Woody vegetation consists of a scrub dominated by French broom, oak woodland along a watercourse, and individual ornamental plants. The area currently dominated by woody vegetation was formerly grassland judging from the predominance of grass in the understory.

4.4.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. Although known to occur in the general areas of the Mateo parcel, Oakland star tulip was not observed during the spring survey and is unlikely to occur.

Native Grassland. Small patches of native grassland dominated by purple needlegrass are present.

Watercourse. A watercourse with steep banks, cobble bottom, and an oak woodland overstory is present on the site. Slumping is occurring on the slope above the bank of this watercourse.

4.4.4 Recreational Use and Access

No existing recreational use is associated with this parcel. The small size of the parcel, steep slopes, and its lack of connection with other open space parcels limit recreational opportunities.

4.4.5 Management Recommendations

Specific management recommendations include:

- Remove French broom, cotoneaster, ornamental juniper, pride of Madeira and other ornamental plants that are fire-prone;
- Maintain grassland areas free of woody vegetation; and
- Repair eroding area above watercourse.

4.5 ATKINSON OPEN SPACE BOND PURCHASE (PARCEL 15)

4.5.1 Size, Access, Aspect, Steepness

The Atkinson Open Space Bond Purchase (Atkinson) is a large (59.7 acres) parcel located in the northern portion of Town Limits directly south of the Ring Mountain Open Space Preserve. The parcel is accessed on the west by a fire road extending from Reed Ranch Road and on the east by the Shepherd Way Fire Road extending from Shepherd Way. The parcel is crescent-shaped with a steep south-facing slope. The two fire roads generally follow the northern ridge of the parcel and join at its northernmost boundary. Single-family residential homes are located along the southern and western base of the open space parcel.

4.5.2 Vegetation and Natural Features

The vegetation consists of a variety of grassland types, woody vegetation, and wetland vegetation (Figure 5).

Grassland. Grassland consisting of a mosaic of both native and non-native annual grasses occurs on this site, in addition to serpentine grassland, native grassland.

Woody Vegetation. Woody vegetation consists of oak woodland, California sagebrush scrub, coyote brush scrub, and a scrub dominated by dense French broom.

4.5.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. The grasslands are likely to support special-status species associated with serpentine soils.

Native Grassland. Patches of native grasses such as purple needlegrass, blue wild rye, and creeping ryegrass are present on the site.

Serpentine Grassland. Serpentine grassland, dominated by purple needlegrass and other native grassland species is present on the large areas of serpentine substrate.

Wetland. Wetlands dominated by sedge are present in several areas on this parcel. Most Pampas grass has been removed from wetland seeps by the County of Marin in 2007.

Watercourse. A watercourse flows through coast live oak woodland and willow riparian vegetation before entering a culvert beneath Reed Ranch Road.

4.5.4 Recreational Use and Access

Atkinson provides access to the Tiburon Ridge Trail and the Ring Mountain Open Space Preserve. The Shepherd Way Fire Road, which is part of the Tiburon Ridge Trail, follows the northeastern boundary of the parcel toward the Ring Mountain Open Space Preserve. This fire road is accessed from Shepherd Way via Trestle Glen Boulevard. The gated entrance is located adjacent to the parking lot for the Shepherd of the Hills Lutheran Church and is marked with signage indicating access to the Tiburon Ridge Trail. Hikers, bicyclists, and equestrians are permitted on the fire road, which climbs steeply up the ridge from its access point. The San Pablo Bay and the Richmond–San Rafael Bridge are visible to the east. Minor erosion and rutting is evident in certain areas along the approximately 8-foot wide dirt fire road. A few narrow short-cut trails have been created west of the fire road and extend down the slope toward the residences at Turtle Rock Court. At the northern boundary of Atkinson, the Shepherd Way Fire Road joins with another fire road that veers toward the east. The Shepherd Way Fire Road continues north to the Ring Mountain Open Space Preserve.

The other fire road follows the ridgeline to the west and south through rocky serpentine grassland habitat. Spectacular views of the Town, Angel Island, the City of San Francisco, and Mount Tamalpais are available on clear days. The fire road is wide in some areas, approximately 15-feet, and narrows to approximately 8 feet wide in other areas. The northern segment of the fire road is rocky and rutted. A few narrow short-cut trails have been created west of the fire road and extend upslope toward Ring Mountain. As the road descends downslope it passes dense stands of coyote brush. The road becomes grassier and wet (during the rainy season). At the southwestern boundary of Atkinson, the fire road continues out of the public open space parcel through private open space and connects with a paved driveway accessed from Reed Ranch Road. A short-cut trail alternatively continues to Indian Rock Court. Single-family residences exist along both streets.

4.5.5 Management Recommendations

Recommended management activities include:

- Remove French broom, myoporum, plum, pine, Pampas grass, sweet fennel, Italian thistle, and Harding grass;
- Maintain the area of California sagebrush scrub;

- Survey for and map special-status species;
- Maintain grassland and eliminate colonization of grassland by coyote brush;
- Conduct general maintenance of the trails and fire roads to ensure that they are clear of debris and erosion is minimized;
- Install signage at open space access points requiring users to stay on existing authorized fire roads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats; and
- Monitor trail use and enforce Town of Tiburon regulation of "dogs on leash" and "clean after your dog."

4.6 NORTH MIDDLE RIDGE MANAGEMENT AREA (NMRMA)

Seven of the Tiburon open space parcels are located on the Middle Ridge, a relatively undeveloped area in the central portion of the peninsula. The Middle Ridge parcels are divided into two groups based on geography, vegetation, and visitation. The North Middle Ridge Management Area (NMRMA) consists of the following five parcels:

1. Miraflores Subdivision Open Space Area and Pathway (Parcel 21, 17.3 acres)
2. Del Madera Subdivision Homeowners Open Space Area (Parcel 23, 18.7 acres)
3. Reed School District Open Space Bond Purchase Area (Parcel 24, 12.7 acres)
4. Hamon (Rock and Tree) Bond Purchase Open Space Area (Parcel 25, 10.7 acres)
5. Del Madera Subdivision Dedicated Open Space (northwestern portion of Parcel 26 west of Gilmartin, 8.8 acres)

4.6.1 Size, Access, Aspect, Steepness

The five open space parcels located in the NMRMA are located in the central portion of Town Limits. The NMRMA includes approximately 68.2 acres and includes the top of the Tiburon Ridge. Access to the various parcels is via the following main roads: Avenida Miraflores, Miraflores Lane, and Rock Hill Drive to the northwest (Parcel 21); Via Paraiso West to the south (Parcels 25 and 26); Gilmartin Drive to the southeast (Parcels 23, 24, and 26); and the Hacienda Drive Fire Road to the north (Parcels 23 and 24). The parcels are bounded by private residences and undeveloped land. All parcels are contiguous with the exception of an isolated small portion of Parcel 21, the Miraflores Subdivision Open Space Area and Pathway (MSOSAP), which is located between the Avenida Miraflores and Miraflores Lane.

Most of the parcels within the NMRMA are located on the southwest-facing slope of the Tiburon Ridge (Parcels 21, 25, and 26), with topography varying from gentle slopes to relatively steep grades. A large escarpment with a very steep face is present at the common boundaries of parcels 24, 25, and 26. The top of the ridge is flat along the Hacienda Drive fire road (Parcels 23 and 24).

4.6.2 Vegetation and Natural Features

The vegetation in the NMRMA is a mosaic of woody and herbaceous vegetation, mainly grassland (Figures 6 and 7). Several serpentine rock outcrops, including a large escarpment, are present in the eastern portion. Areas of very shallow serpentine soil (barrens) are found throughout the grassland on flat portions. Wetlands, as well as a few seeps and drainages are present within the grassland and near the outcrops. Some parcels support vegetation dominated by noxious weeds.

Woody Vegetation. Woody vegetation consists of oak woodland, willows, native coyote brush scrub, non-native French broom scrub, and stands of non-native trees such as pines, black acacia, blue-gum eucalyptus, and fruit trees. The non-native trees mostly occur in mixed stands. A narrow strip along the eastern portion the NMRMA consists of dense oak woodland. A few native willows are associated with wetlands and ephemeral watercourses.

Grassland. Large grassland areas are composed of a mixture of native and non-native grasses.

Non-Native Grassland. Non-native grassland occurs mostly on sandstone soils on the lower portions of the Ridge but is also present along the edges of the Hacienda fire road, where previous and ongoing impacts from vehicles and foot traffic have disturbed the native substrate.

Noxious Weeds. Noxious weeds are treated here (under the NMRMA) because of the sensitive nature of the Middle Ridge, where introduced species are spreading into native habitats to the detriment of special-status species and sensitive plant communities. Only the "worst offenders" present in the NRMRA are included below:

Herbaceous species

Pampas grass is invading wet substrates within shrubby areas or grasslands on most parcels on the Ridge. It is especially prevalent on parcel 26 (approximately 35 individuals counted), where it has invaded the drainage and adjacent areas. A stand of approximately 10 individuals grow in a serpentine seep above the retaining wall along Gilmartin Drive in the northern portion of parcel 26. Pampas grass is also present on parcel 21 along a watercourse and near residences, both in the eastern portion and in the western portion between Avenida Miraflores and Geldert Drive. (Pampas grass was removed in the north corner of parcel 26 and along the fire road on this and the adjacent parcel 25 in 2008 by the Town of Tiburon.)

Bull thistle, an opportunistic, invasive thistle, occurs singly or in small colonies in grasslands, especially on parcels 21 and 24, near the north end of the Hacienda fire road. It is also invading the areas on parcels 25 and 26 that were cleared of French broom and Pampas grass in 2008. (Some of the thistles were removed in the spring of 2009 by Eva Buxton/Alison Pence; Town of Tiburon).

Italian thistle is less common than bull thistle and occurs in large patches rather than in small stands like bull thistle. It is present under the stand of pines near the north end of the Hacienda fire road and near the "Hippie Tree." (Some of the thistles were removed in 2009 by the Town of Tiburon.)

Artichoke thistle (cardoon), a very spiny and extremely invasive plant has potentially spread from a garden where it was used as an ornamental plant. A colony consisting of about 45 individuals is present between residences in the narrow portion of parcel 21.

Sweet fennel, an invasive perennial species, occurs in large, dense stands in relatively wet soils in grasslands. It is a dominant plant in certain areas on parcels 25 and 26.

Pride-of-Madeira, a fast-growing species, is rapidly becoming a very invasive plant in many parts of the Tiburon Peninsula. This species occurs in great numbers on the west road bank of Gilmartin Drive on parcel 26 and is also present near the backyards of residences along Hacienda Drive on parcel 21.

Annual grasses, especially wild oats, pose a great threat to Tiburon jewelflower and other protected species in the NRMRA. Wild oats are quickly colonizing the serpentine grasslands and serpentine outcrop areas on parcels 21, 24, 25, and 24 and 26, where they are out-competing the rare plants (E. Buxton, pers. obs.) (Some of the grasses were removed by E. Buxton in 2007 and 2008 on parcels 21/24.)

Purple star-thistle, a species with a tendency to become a noxious weed, is becoming established near the "Hippie Tree" on parcel 25. (Some purple star-thistle was removed in 2009 by E. Buxton).

Woody species

French broom has invaded grasslands and ecotones (transitional zones between woodland and grassland) on all parcels of the Middle Ridge. The most severe infestations are found on parcels 21, 25, and 26, where it is spreading into sensitive serpentine habitat. (Some broom was removed along the fire road on these parcels in 2008 by the Town.)

Pines, including Monterey pine, are present below the escarpment on parcels 25 and 26, in the border region between parcels 25 and 26, to the south of the "Hippie Tree," and near the north end of Hacienda fire road. (Seeds for some of these trees may have spread from a property off Paradise Drive, where a former resident supposedly planted non-native conifers collected on trips to foreign countries.) The pines are spreading and many saplings/small trees grow in the grassland. (Some of the pines on parcel 26 were removed in 2008 by the Town of Tiburon.)

Black acacia provides an impenetrable thicket adjacent to some private properties on Hacienda Drive (last house), where it appears to have spread into Tiburon open space.

Blue-gum eucalyptus trees are present in small groves or singly on parcels 21 and 25.

Fruit trees (wild plum) are present in small amounts, especially on parcel 21.

4.6.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. Tiburon paint brush, Tiburon jewelflower, and Marin dwarf flax, all federally and State-listed species under the federal and State Endangered Species Act and the

California Endangered Species Act, as well as on California Native Plant Society's (CNPS) List 1B (rare and endangered throughout its range) are known to occur on serpentine substrates in the NMRMA (CNDDB 2009, E. Buxton, pers. obs.). Tiburon buckwheat, which is on CNPS's List 1B occurs in the same habitat. As no rare-plant surveys were conducted for the RMP, occurrences of these species are not mapped. In addition, a small stand of marsh zigadene, a species on the California Native Plant Society's watch list (List 4), is present in this area (Eva Buxton, pers. obs.). (This species became noticeable when Pampas grass and broom were removed on parcel 26.)
Serpentine Outcrops. Outcrops of serpentine bedrock and gravelly to fine-grained soils are present on all parcels in the NMRMA. Depending on the soil depth and disturbance to these outcrops, they support various species adapted to this soil type, including endemic, rare plants (see above and *Special-status Species,* Sect. 2.4). Wild oats, a non-native grass, is invading these outcrops.

Serpentine Grassland. This type of grassland occurs on serpentine substrates or on sandstone soils that are at least overlain by serpentine soils and is prevalent on parcels on top of the Middle Ridge. The dominant grass in this grassland is purple needlegrass; however, areas with some non-native grasses occur throughout. In places where the soil is relatively shallow, it supports various densities of melic grass, a species almost always associated with serpentine. Many native forbs grow interspersed among the grasses. These wildflowers are especially attractive in shallow-soiled barrens dispersed throughout the grassland.

Wetland/Watercourse. Wetlands, some of which appear to be seeps, are dominated by species associated with prolonged soil saturation. Some wetlands were mapped using a GPS-unit, others were mapped more generally without such a unit. (The "wetland" category refers only to wetland vegetation.)

A relatively large area supports wetland vegetation on parcel 26, where drainage from the slope to the northeast appears to flow from a seep some distance from the fire road at the toe of the slope in the northern portion of parcel 26. The stream channel splits into two channels for a short distance. The drainage ends abruptly in a 3-6-foot deep hole near the junction of Gilmartin Drive and Via Paraiso West. About eight (8) large arroyo willows, a species that is always associated with a high water table, grow along the channel(s). The invasive perennial Harding grass provides a nearly 100 percent cover adjacent to the channels/wetland vegetation. An area with a 100 percent cover of sedges is also present on parcel 21 near the watercourse, which also emanates from an apparent seep.

Marsh monkey-flower, sedges, and various rushes are also found in wet seeps and watercourse (drainage channels) lacking a woody canopy on the steep slope above the fire road on parcel 26 and in the stream channel on parcel 21. Two cement ditches convey water from the steepest portion at the south end of the escarpment to a culvert by the fire road on parcel 26. An ephemeral watercourse along the fire road, starting on parcel 25, supports a few arroyo willows. It also drains into the culvert by the fire road. The water flow appears to be piped under Gilmartin Road, eventually draining into Richardson Bay. A cement ditch is also present on parcel 21, near the residences on Rock Hill Drive.

4.6.4 Recreational Use and Access

The NMRMA contains a heavily-used network of trails that generally interconnect and permit access between all parcels. These trails include the Hacienda Drive fire road, a number of small trails that

connect it to areas down slope on the Reed School parcel, and a few trails that cross the other parcels including Hamon and Del Madera Sub Division Dedicated Open Space.

To the north, the Hacienda Drive fire road, an approximately 10 to 12 feet wide compacted dirt trail, follows the flat portion of the Tiburon Ridge. The fire road is accessed by Gilmartin Drive to the east and Hacienda Drive to the west. Dog walking is popular along the fire road due to the flat terrain and easy access. Limited parking is located adjacent to Gilmartin Road. Town open space signage located adjacent to Gilmartin Road states: *Keep on leash and clean after your pets; no dumping and littering; open between one hour before sunrise and one hour after sunset*. The signage also indicates that public access over Hacienda Drive from the Town's open space is temporarily prohibited by order of Marin Superior Court. The Hacienda Drive fire road generally extends in a west/east direction on the Del Madera Subdivision Open Space Area parcel (DMSOSA, Parcel 23). The Reed School District Open Space Bond Purchase parcel (RSDOSBP, Parcel 24) is located just southwest of the fire road. The fire road is occasionally rutted and prone to areas of ponded water in some locations during the rainy season. Views of the Richmond-San Rafael Bridge and the San Pablo Bay are provided to the north, and the City of San Francisco, Golden Gate Bridge, City of Sausalito and Mount Tamalpais are visible to the south. Multiple offshoot trails extend downslope in both directions from the fire road over the DMSOSA and RSDOSBP parcels. A wooden post fence separates the DMSOSA parcel from private property located north of Hacienda Drive. A sign located at the terminus of the fire road at Hacienda Drive prohibits access over Hacienda Drive beyond the access gate.

South of the Hacienda Drive Fire Road, the Reed School parcel (Parcel 24) consists primarily of narrow trails that extend downslope. Residential homes border the parcel to the northeast. The trails within the Reed School parcel provide direct access to the Del Madera SOSA (Parcel 23) and the Miraflores Subdivision Open Space Area and Pathway (Miraflores, Parcel 21). Access to the Del Madera Subdivision Dedicated Open Space (Del Madera SDOS, Parcel 26) and the Hamon (Rock and Tree) Bond Purchase Open Space Area (Hamon, Parcel 25), located downslope, is generally prohibited by rock outcrops and a steep drop-off in slope. The DMSDOS (Parcel 26) is accessed by an approximately 8-foot wide fire road midway up Gilmartin Drive. The approximately 200-foot long segment of the fire road extends to the northwest toward Hamon (Parcel 25). Other recreational use on the Del Madera SDOS appears to be limited, as is apparent in the lack of any user-created trails. The fire road continues through Hamon, and toward the center of the parcel it terminates with a narrow trail extending to the northeast and the southwest. To the southwest, the trail extends to a large eucalyptus tree (the "Hippie Tree") with a swing that is located adjacent to a large rock formation. Richardson Bay and the City of Sausalito are visible downslope from this location and to the southwest. The trail narrows significantly and extends down a steep slope toward private property adjacent to Rock Hill Drive. To the northeast, the trail travels up a moderately steep slope and connects with Miraflores (Parcel 21).

Recreational use in the eastern half of Miraflores is generally confined to two primary trails. One of these trails extends in a north/south direction and connects Hacienda Drive and Hamon. The other trail extends from a gate at Avenida Miraflores toward Hacienda Drive. Primary access to the parcel from adjacent residential neighborhoods is from Avenida Miraflores and Miraflores Lane. Easy access to the Hacienda Drive fire road is provided at the northeastern boundary of the parcel. Portions of the parcel that extend to the west, between residential development located along Avenida Miraflores and Hacienda Drive and between residential development located along Miraflores Lane

and Rock Hill Drive, are generally not utilized for recreational purposes. A small isolated portion of Miraflores (approximately 0.1 acre) is located to the rear of homes located along Avenida Miraflores and Miraflores Lane. This parcel is not utilized for public recreational use, as it only connects Avenida Miraflores with Miraflores Lane. The portion of the MSOSAP that is located north of Avenida Miraflores is characterized by a steep and moderately densely-vegetated ravine. Although this portion of the parcel may be accessed by residents along Avenida Miraflores or Geldert Drive, it does not appear to be utilized for general recreational use.

Due to its wide open space and/or relatively gentle slopes, portions of the NRMRA are heavily used by "professional" dog-walkers. It is not unusual to find these walkers with 5-10 dogs off-leash on any given day.

4.6.5 Management Recommendations

The following are recommended management activities in the NMRMA. In Appendix A, recommendations are provided for each individual parcel.

- Remove noxious/invasive weeds, including wild oats, in the vicinity of special-status species and sensitive habitats;
- Remove all Pampas grass;
- Alert residents with properties abutting open space parcels about the detrimental effect of ornamental plants spreading into wildlands;
- Investigate the encroachment onto publie open space by adjacent property owners;
- Prevent woody vegetation from colonizing the serpentine grassland;
- Prevent spread of black acacia into open space parcels;
- Maintain area of California sagebrush scrub;
- Survey for and map the distribution of special-status plant species;
- Conduct general maintenance of the trails and fire roads to ensure that they are clear of debris and erosion is minimized;
- Install signage at open space access points requiring users to stay on existing authorized fire roads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats by people and dogs;
- Monitor trail use and enforce Town of Tiburon regulation of "dogs on leash" and "clean after your dog" as posted on Town signage at main entrance points;
- Attach new signs regarding "dogs on leash" on posts where this signage has been removed; and
- Develop one or more interpretive signs discussing the special-status species and the importance to remain on trails.

4.7 SOUTH MIDDLE RIDGE MANAGEMENT AREA (SMRMA)

The South Middle Ridge Management Area (SMRMA) is treated separately from the North Middle Ridge Management Area (NMRMA) for several reasons; it is 1) geographically separated by Gilmartin Drive, 2) almost completely vegetated with French broom, and 3) unlikely to support special-status plant species. The SMRMA consists of the following contiguous parcels:

- Del Madera Subdivision Dedicated Open Space Area (southeastern portion of Parcel 26 that is located east of Gilmartin [Parcel 26], 1.9 acres)
- Eavey Bond Purchase Open Space Area (Parcel 28, 20.7 acres)
- Stevens Court Open Space Area Dedication (Parcel 48, 0.6 acre)

4.7.1 Size, Access, Aspect, Steepness

The three open space parcels within the SMRMA are located in the central portion of Town Limits. The SMRMA includes approximately 23.2 acres, and all three parcels are located to the south and east of Gilmartin Drive. Gilmartin Drive provides direct access to the two discontinuous parcels that are part of the Del Madera Subdivision Dedicated Open Space (Del Madera SDOS, Parcel 26) and the primary portion of the Eavey Bond Purchase Open Space Area (Eavey, Parcel 28). Via Paraiso East provides access to the large portion of the Eavey, located east of the road, and to the smaller discontinuous portion of the parcel located west of the road. The Stevens Court Open Space Area Dedication (Stevens, Parcel 48) is located adjacent to the eastern boundary of the Eavey. It is densely vegetated, and is probably best accessed via the rear of residential homes located along Stevens Court. The parcels are bounded by private residences and undeveloped land.

Most of the parcels within the SMRMA are located on the southwest-facing slope of the Tiburon Ridge (Parcels 26 and 28), with gentle slopes to relatively steep grades. The Stevens parcel is located in the middle of a steep and densely-vegetated ravine that extends in a generally north/south direction.

4.7.2 Vegetation and Natural Features

The vegetation of the SMRMA consists of grassland, scrub, and oak woodland/forest (Figure 8). Wetlands and a watercourse also occur in this area.

Grassland. The grassland is a mosaic of native and non-native grasses.

Woody Vegetation. Woody vegetation consists of oak woodland and a scrub dominated by dense French broom. The oak woodland/forest is mostly impenetrable with branches extending to near ground level. French broom is colonizing the edge of the woodland/forest.

The greatest invasion of French broom on Tiburon open space occurs on the Del Madera Subdivision Dedicated Open Space Area and Eavey Bond Purchase Open Space Area (Parcels 26 and 28). French broom was supposedly planted on these parcels to prevent erosion in association with the development along Gilmartin Drive.

4.7.3 Special-status Species and Sensitive Plant Communities/Habitats

Native Grassland. The native grassland is composed of purple needlegrass at a 5 to 75 percent cover and a relatively large patch of blue wildrye.

Wetland. A large wetland area, dominated by two species of sedge, occurs in the central portion of the small Eavey parcel and a smaller wetland is present in the northern portion of the large Eavey parcel. Both wetlands are being invaded by French broom and coyote brush.

Watercourse. A narrow, seasonal drainage extends through the wetland on the lower Eavey parcel. Sedges and chain fern grow along the channel.

4.7.4 Recreational Use and Access

Generally, no formal recreational use is associated with these parcels as a result of the existing steep slopes, dense vegetation, and lack of public access points. Eavey is a steep parcel that is primarily accessed through the rear of private residential properties along Via Paraiso East. At the parcel's connection with Gilmartin Drive, dense vegetation prohibits access and there are no areas for parking along the bend in the road. Stevens is located in the middle of a steep and densely vegetated ravine and is inaccessible due to impenetrable vegetation. A small portion of the Del Madera SDOS includes a short, approximately 100-foot long and 12-foot wide, fire road that connects Gilmartin Drive with Round Hill Road and the residences located along it. This area is too small for regular recreational use.

4.7.5 Management Recommendations

The following are recommended management activities in the SMRMA. The steepness of the site precludes access by heavy equipment; therefore, management activities should be accomplished by a crew on foot.

- Remove French broom at edge of present infestations to prevent further spread and within 100 feet of residences and oak woodland;
- Remove all Pampas grass;
- Maintain wetland and grassland areas as free of woody vegetation as possible;
- Create fuel breaks within French broom;
- Consider controlled burn of French broom; and
- Monitor for SOD.

4.8 MOUNT TIBURON/EL MARINO MANAGEMENT AREA (PARCELS 27, 29, AND 30)

The Mount Tiburon/El Marino Management Area (Mount Tiburon) includes the following contiguous parcels located just within the eastern boundary of Town Limits:

- Agins Subdivision Dedicated Open Space Area (Parcel 27, 0.5 acre)
- Mount Tiburon Subdivision Dedicated Open Space Area (Parcel 29, 12.5 acres)
- El Marinero Subdivision Dedicated Open Space Area (Parcel 30, 9.3 acres)

4.8.1 Size, Access, Aspect, Steepness

The Mount Tiburon/El Marino Management Area is located in the eastern portion of the Town Limits. The Mount Tiburon Subdivision Dedicated Open Space Area (MT) and the El Marinero Subdivision Dedicated Open Space Area (El Marinero) are large, contiguous, and densely vegetated parcels located behind the single-family residences along Place Moulin and Sugarloaf Drive, respectively. Both parcels have a steep downslope. Direct access to these parcels is difficult as a result of the dense vegetation (California bay and coast live oak), steep slope, and barrier of private property. The Agins Subdivision Dedicated Open Space Area (Agins) is contiguous with the northwestern boundary of MT. It is located downslope of residences located along Gilmartin Drive.

4.8.2 Vegetation and Natural Features

Oak woodland is the dominant vegetation of this area with relatively small areas of grassland (Figures 6 and 9).

Grassland. The grassland was not surveyed but presumably consists of a mosaic of native purple needlegrass and non-native annual grasses.

Woody Vegetation. Oak woodland occurs on an extremely steep slope with herbaceous species in the understory. French broom is present in the western portion of the El Marinero parcel and the western portion of the Agins parcel.

4.8.3 Special-status Species and Sensitive Plant Communities/Habitats

Watercourse. A small intermittent watercourse, less than 3 feet wide, flows through the Agins parcel.

4.8.4 Recreational Use and Access

No existing recreational use is associated with these parcels. Recreational use is not recommended due to the existing dense vegetation and steep slope.

4.8.5 Management Recommendations

The steepness of the site precludes access of heavy equipment; therefore, management activities should be accomplished by a crew on foot. Recommended management activities include:

- Remove non-native shrubs;

- Monitor for SOD;
- Monitor the edge of Sugarloaf Drive and culvert for erosion; and
- Monitor for and remove refuse dumped along road.

4.9 HILARITA/REED PARK MANAGEMENT AREA (PARCELS 31 AND 33)

The Hilarita Project Dedicated Open Space Area (2.8 acres) and "Reed Park" Town-owned Open Space Lots (1.5 acres) are contiguous parcels located in the southeastern portion of Town Limits below the Tiburon Ridge.

4.9.1 Size, Access, Aspect, Steepness

Hilarita Project Dedicated Open Space Area (Parcel 31). The Hilarita Project Dedicated Open Space Area (Hilarita) is accessed by Ned's Way via Tiburon Boulevard. Land uses surrounding the parcel include single-family residential to the north and east, and the Town's Public Works Department Corporation Yard and high density residential (i.e., condominium and/or apartment buildings) to the south. The parcel slopes to the southwest. The northeastern half of the parcel is accessed directly from the condominium/apartment complex parking lot located at the terminus of Ned's Way. A narrow path adjacent to the parking lot leads upslope through a small eucalyptus stand to the top of the hill overlooking the residential complex. This portion of the open space is primarily open and grassy with various shrubs and trees around the outer boundaries.

The southwestern half of the parcel is located to the west of the parking area at the end of Ned's Way. It consists primarily of a wide and open grassy area that slopes gently to the southwest with clear views of the City of Sausalito across Richardson Bay. Faint tire and foot paths are visible in the slope. The space is easily accessed by residents of the adjacent housing units. Fencing separates the rear yards of single-family homes, located to the north, from the open space parcel.

"Reed Park" Town-Owned Open Space Lots (Parcel 33). The "Reed Park" Town-owned Open Space Lots (Reed Park) are accessed via the rear of single-family residential homes located off of Round Hill to the north and the Town's Public Works Department Corporation Yard to the west (1175 Kleinert Way). For the most part, the parcel is heavily vegetated and slopes downward in a southerly direction.

4.9.2 Vegetation and Natural Features

The vegetation consists of grassland and woody vegetation (Figure 10).

Non-native Grassland. Non-native grassland, dominated by non-native species such as ripgut brome and vetch (*Vicia* sp.), occurs on both the Hilarita and the Reed Park parcels.

Woody Vegetation. Woody vegetation consists of oak woodland, French broom scrub, and acacia woodland, dominated by acacia (*Acacia* sp.). The acacia woodland occurs in the central portion of the Hilarita parcel. Oak woodland and French broom are present in patches on both sites. A few French broom plants also grow in the understory of the oak woodland and in the grassland.

4.9.3 Special-status Species and Sensitive Plant Communities/Habitats

Native Grassland. Native grassland, dominated by purple needlegrass and soap root, occurs on both parcels.
Wetland. A wetland seep, dominated by non-native Harding grass and tall fescue, is present on the Hilarita parcel.

4.9.4 Trails and Recreational Opportunities

No formal recreational use is associated with these parcels. Nevertheless, at Hilarita, a relatively wide area of gently-sloping, mowed grassland appears to be used by neighbors for general play, picnics, and/or dog-walking. The steep slope and dense vegetation associated with the Reed Park parcel limits recreational opportunities.

4.9.5 Management Recommendations

The steepness of the site precludes access of heavy equipment; therefore, management activities should be accomplished by a crew on foot. Recommended management activities include:

- Remove French broom, acacia, myoporum, pride of Madeira, cotoneaster, pine, and Pampas grass;
- Maintain as much of the area in native wetland and grassland as possible; and
- Remove non-native Harding grass, tall fescue, and Himalayan blackberry from seep.

4.10 MARINERO CIRCLE PARK (PARCEL 37)

4.10.1 Size, Access, Aspect, Steepness

The Marinero Circle Park Area (0.7 acre) is located directly adjacent to the north loop of Marinero Circle in the eastern portion of Town Limits. Marinero Circle, accessed by Lyford Drive and Tiburon Boulevard, is characterized by high density residential land uses (i.e., condominium and/or apartment buildings). The open space parcel consists of a very steep southwest-facing slope that is characterized by rock outcrops, grasses, and scattered trees and shrubs. At the top, Marinero Circle Park (Marinero) becomes flat and private open space forms the northern boundary. Single-family residential homes are located upslope (i.e., to the northeast) of the parcel off of Acela Drive. Access is via a narrow trail that originates at Marinero Circle.

4.10.2 Vegetation and Natural Features

The vegetation consists of patches of woody vegetation and grassland. A mostly unvegetated road cut of serpentine rock is present next to Marinero Circle. A seep/wetland is present in the southeast corner of the parcel (Figure 11).

Woody Vegetation. The steep portion of the parcel supports Italian stone pine measuring up to 14 inches in diameter and 30 feet in height. Monterey pine occurs in one area and French broom is present sparingly throughout the site.

Serpentine Outcrop. The rocky area, occupying approximately ¼ of the parcel, is a largely barren, serpentine road cut supporting some native plants and invasive weeds.

4.10.3 Special-status Species and Sensitive Plant Communities/Habitats

Special-Status Plant Species. The serpentine rock outcrop and the grassland potentially support special-status species;

Native Grassland. The native grassland is dominated by purple needlegrass.

Wetland. A small seep, 5-8 feet wide and dominated by plants associated with wetlands, is present on the steep southeast portion of the parcel. Because of its small size, this seep likely only flows in the spring or after heavy rains. The water drains downslope through the stand of Italian stone pine.

4.10.4 Trails and Recreational Opportunities

No existing recreational use is associated with this parcel. The small size of the parcel, steep slope, existing vegetation, and its lack of connection with other open space areas limit recreational opportunities.

4.10.5 Management Recommendations

The steepness of the site precludes access of heavy equipment; therefore, management activities should be accomplished by a crew on foot. Recommended management activities include:

- Remove non-native trees, shrubs, and all Pampas grass;
- Survey for and map special-status species in and near the serpentine outcrop and in the native grassland; and
- Thin the understory of Italian pines

4.11 MEADOWHILL SUBDIVISION OPEN SPACE DEDICATION (PARCEL 57)

4.11.1 Size, Aspect, Access, Steepness

The Meadowhill Subdivision Open Space Dedication (Meadowhill) is a linear parcel (0.7 acre) located in the eastern portion of the Town Limits. For the most part, the parcel is located in a heavily-wooded ravine that slopes down the Tiburon Ridge to the south. Single-family residential development is located upslope of the open space to the east and west. The parcel could be accessed via the rear of residential properties located off of Tara Hill Road, Roundhill Road, and Meadowhill Drive at the southern end and Venado Drive and Mount Tiburon Boulevard at the northern end.

Access is also from the private open space between Meadowhill and Marinero. The slope of this open space parcel faces southwest and west. Some portions of the Meadow Hill are steep.

4.11.2 Vegetation and Natural Features

A variety of vegetation types occur on the Meadowhill parcel, including native grassland, non-native grassland, French broom scrub, a mixture of Monterey pine and oak woodland, and pure stands of oak woodland (Figure 11). An adjacent property owner has planted ornamental vegetation in one portion of the parcel.

Non-native Grassland. Non-native grassland on the site is dominated by annual, non-native grasses.

Woody Vegetation. Woody vegetation consists of non-native shrubs, including myoporum and French broom, a mixture of Monterey pine and coast live oak, and oak woodland. French broom also occurs in the understory of the woodland.

Ornamental Vegetation. Ornamental vegetation is present behind a fence and includes ice plant (*Mesembryanthemum edule*) and a lemon tree (*Ruta* sp.).

4.11.3 Special-status Species and Sensitive Plant Communities/Habitats

Native Grassland. The native grassland consists of mostly purple needlegrass.

Wetland. A small seep, approximately 10 feet wide and dominated by nut sedge, occurs beneath Monterey pines. Water flows from the seep to an adjacent off-site watercourse. Judging from the size of the seep, water probably only flows in the spring.

4.11.4 Trails and Recreational Opportunities

No existing recreational use is associated with this parcel. The steep slope and existing dense vegetation limit recreational opportunities.

4.11.5 Management Recommendations

The steep slopes and high density of the shrubs precludes the use of mechanical equipment. Management activities should be initially accomplished by a crew on foot.

- Remove non-native trees and shrubs.

4.12 STRAITS VIEW DRIVE TO SPANISH TRAIL ROAD STRIP (PARCEL 58)

4.12.1 Size, Aspect, Access, Steepness

The Straits View Drive to Spanish Trail Road Strip (Straits View) is an approximately 550-foot long linear parcel (0.1 acre) that is located in the eastern portion of the Tiburon planning area just inside of the Town Limits. It is beneath transmission lines. The site is accessed by Straits View Drive and from the rear of single-family residential homes. The parcel is located in the center of a wooded ravine that slopes steeply to the southeast in the direction of Angel Island.

4.12.2 Vegetation and Natural Features

Woody Vegetation. Except for a few coast live oaks, the vegetation consists of mostly non-native species such as acacia, blue-gum eucalyptus, and French broom (Figure 12).

4.12.3 Special-status Species and Sensitive Plant Communities/Habitats

No sensitive resources are present.

4.12.4 Trails and Recreational Opportunities

No existing recreational use is associated with this parcel. The small size of the parcel, steep slope, existing vegetation, and its lack of connection with other open space areas limit recreational opportunities. The parcel is also surrounded by private land.

4.12.5 Management Recommendations

The Town's 2020 General Plan indicates that this parcel is located in an area susceptible to wildfire (Diagram 6.3-5). However, the small size of the parcel precludes effective management unless integrated with the management of adjacent lands.

- Remove French broom, pride of Madeira, and Pampas grass.

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5.1 REPORT CONTRIBUTORS

Clinton Kellner, Ph. D. Project Manager
Eva Buxton, Senior Botanist
Laura Lafler, Principal-in-Charge
Kristin Granback, Planner

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FIGURES

Parcel I.D.	Open Space Parcel	Acreage
2	La Cresta Open Space Dedication	65.6
3	Cibrian Subdivision Open Space Area	3.8
4	Hexan Subdivision Open Space Area	0.7
8	Mateo Drive Subdivision Open Space Dedication Areas	3.2
9	La Cresta Subdivision Open Space Path Dedication	0.1
15	Atkinson Open Space Bond Purchase	59.7
21	Miraflores Subdivision Open Space Area and Pathway	17.3
23	Del Madera Subdivision Open Space Area	18.7
24	Reed School District Open Space Bond Purchase Area	12.7
25	Hamon (Rock and Tree) Bond Purchase Open Space Area	10.7
26	Del Madera Subdivision Dedicated Open Space	10.7
27	Agins Subdivision Dedicated Open Space Area	0.5
28	Eavey Bond Purchase Open Space Area	20.7
29	Mount Tiburon Subdivision Dedicated Open Space Area	12.5
30	El Marinero Subdivision Dedicated Open Space Area	9.3
31	Hilarita Project Dedicated Open Space Area	2.8
33	"Reed Park" Town-owned Open Space Lots	1.5
37	Marinero Circle Park Area	0.7
48	Stevens Court Open Space Area Dedication	0.6
57	Meadowhill Subdivision Open Space Area Dedication	0.7
58	Straits View Drive to Spanish Trail Road Strip	0.1

LSA

FIGURE 1

Project Parcels

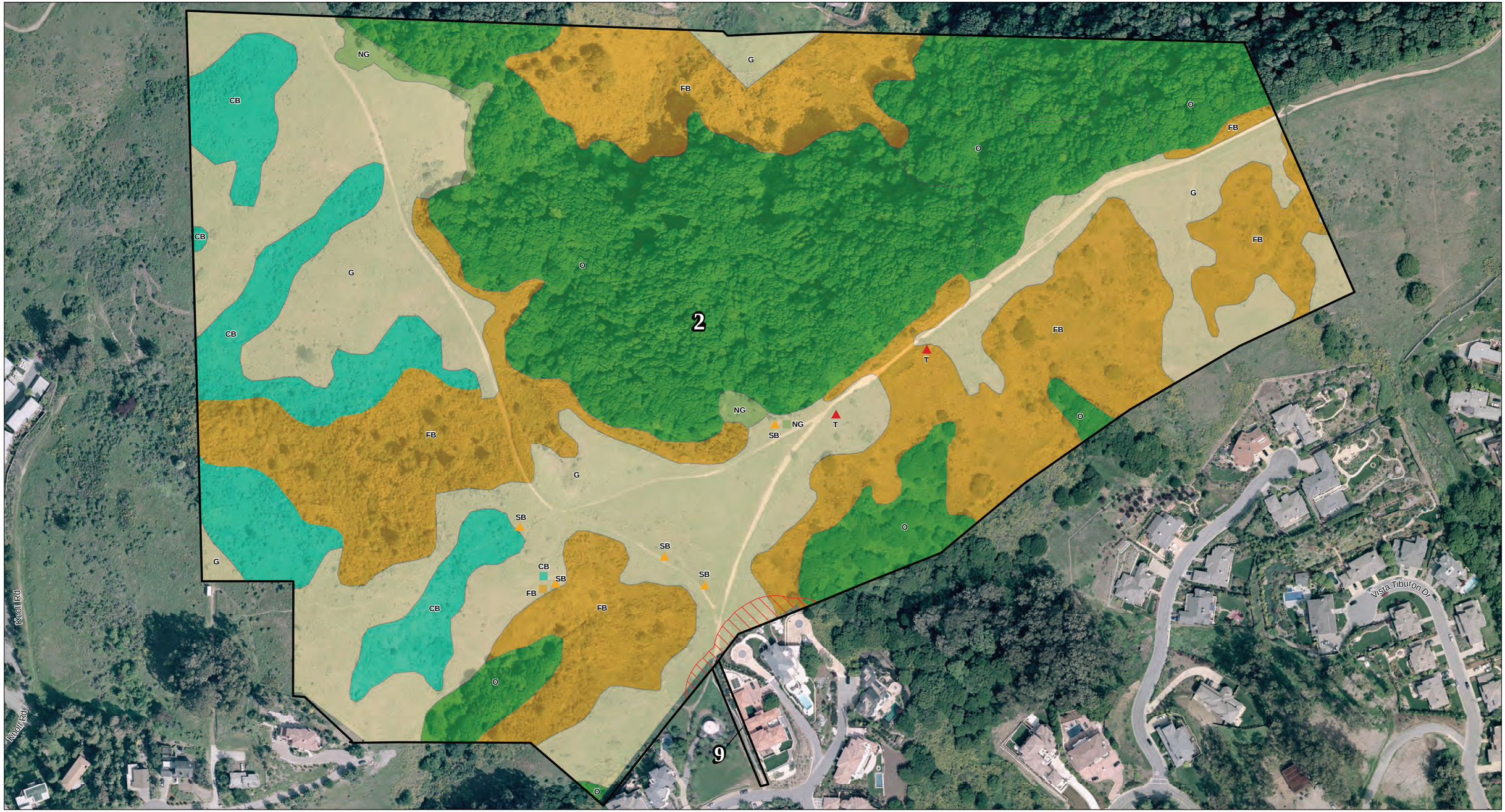
Tiburon Open Space Management Plan

0 0.25 0.5
MILES

Overview

SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\Figure1_Overview.mxd (11/23/2009)



LSA

N

0 100 200
FEET

Project Parcels
Fire Buffer
Large Areas
Individual or Small Areas

O Oak Woodland
CB Coyote Brush
G Grassland
NG Native Grassland
FB French Broom

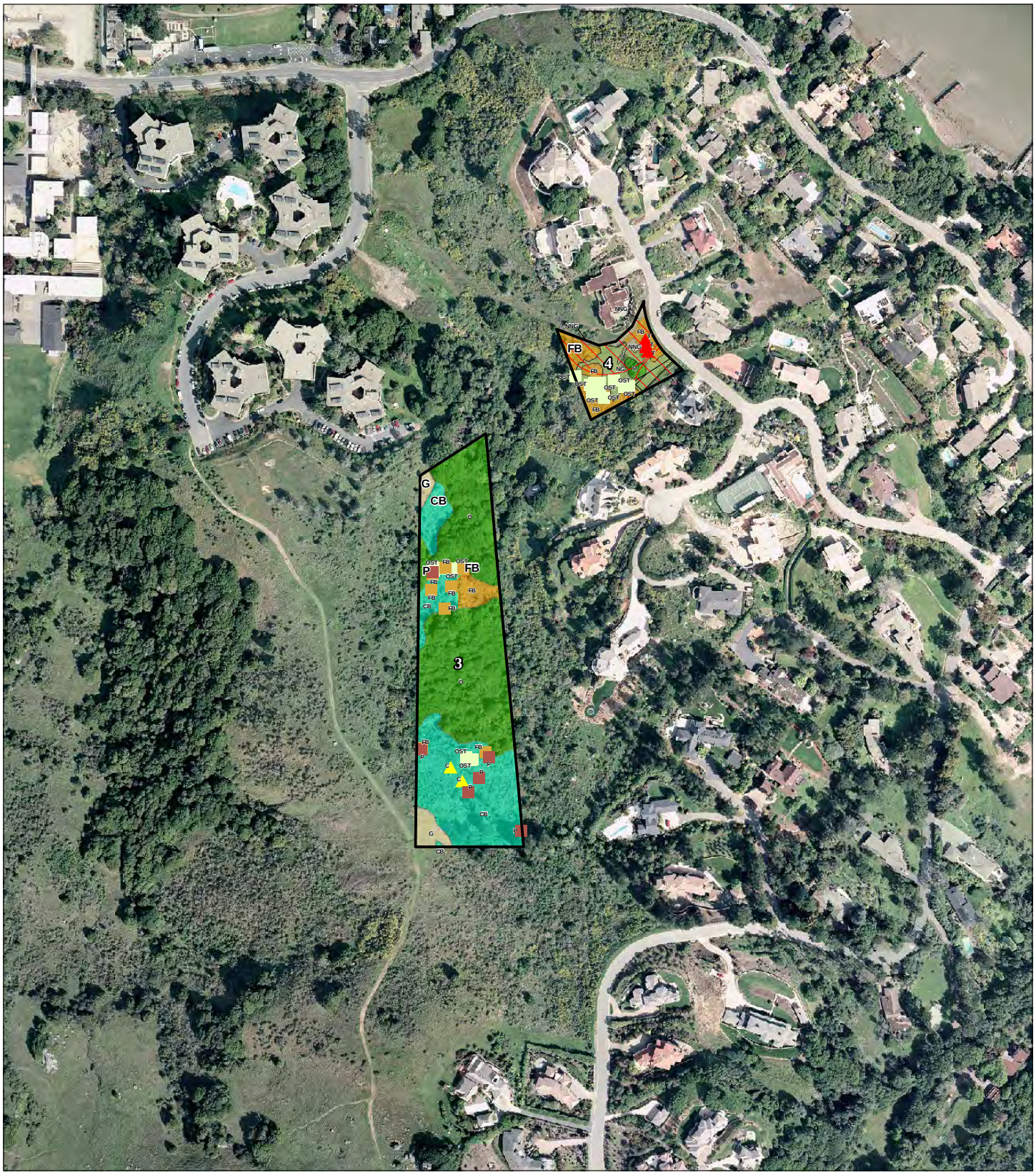
T Thistle
SB Scotch Broom

SOURCE: Aerial Imagery from the County of Marin
I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure2_LaCrestaParks_(2and9).mxd (11/12/2009)

FIGURE 2

Tiburon Open Space Management Plan

La Cresta Open Space Dedication (2) and
La Cresta Subdivision
Open Space Path Dedication (9)



LSA

Project Parcels
Fire Buffer
Large Areas
Individual or Small Areas
Mulch

O Oak Woodland
CB Coyote Brush
G Grassland
NG Native Grassland
NNG Non-native Grassland
FB French Broom

OST Oakland Star Tulip
P Pine
C Cottoneaster
T Thistle

N

0 75 150
FEET

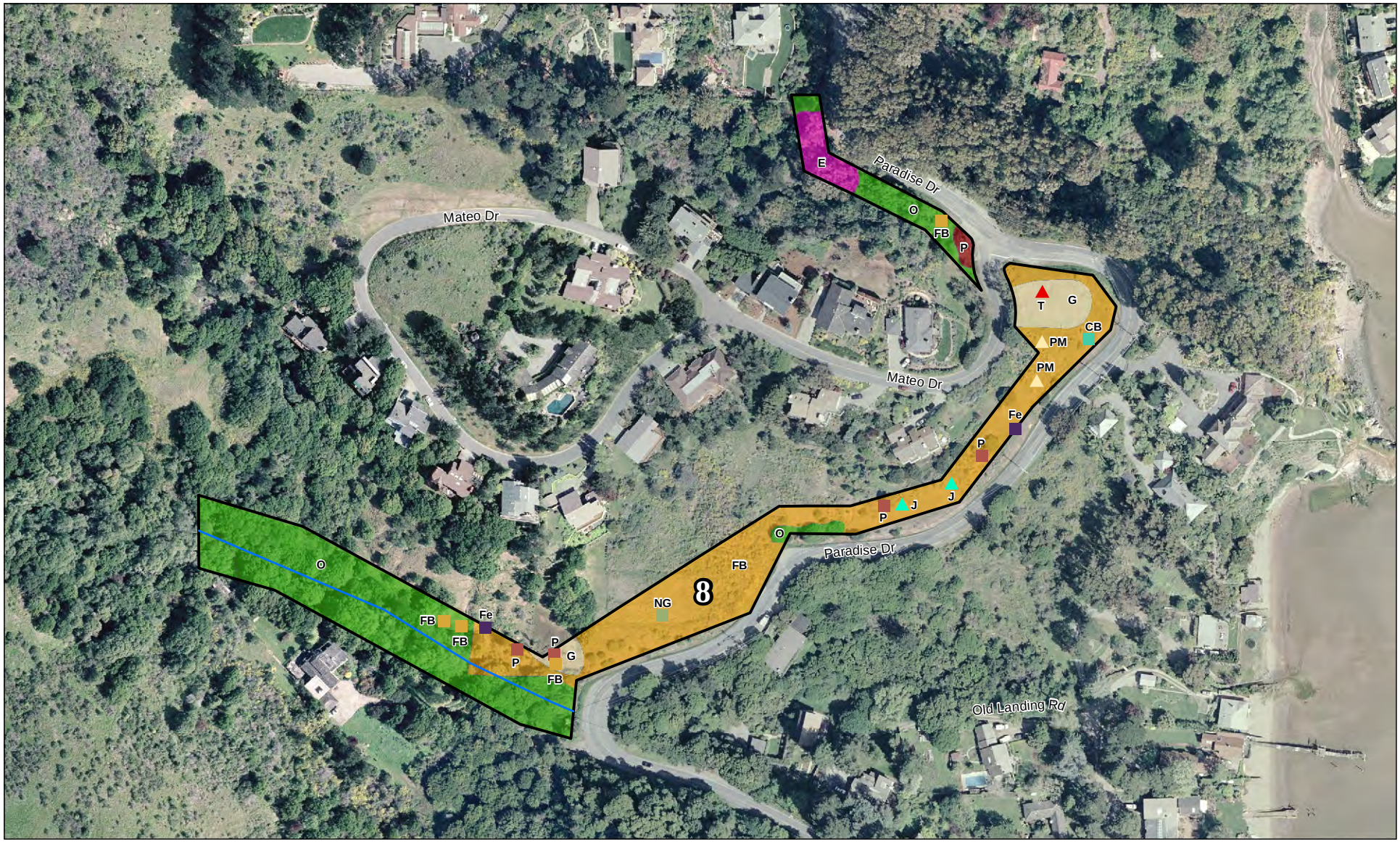
SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure3_Cibrian_HexanOS(3_4).mxd (10/15/2009)

FIGURE 3

Tiburon Open Space Management Plan

Cibrian Subdivision Open Space Area (3) and Hexan Subdivision Open Space Area (4)



LSA

Project Parcels
Watercourse
Large Areas
Individual or Small Areas

O Oak Woodland
G Grassland
E Eucalyptus
P Pine
FB French Broom

CB Coyote Brush
NG Native Grassland
Fe Sweet Fennel
J Juniper
T Thistle
PM Pride of Madeira

0 50 100 200
FEET

SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure4_MateoDriveOS_(8).mxd (09/29/2009)

FIGURE 4

Tiburon Open Space Management Plan

Mateo Drive Subdivision
Open Space Dedication Areas (8)

LSA

Project Parcel
Fire Buffer
Watercourse
Er Erosion
Large Areas
Individual or Small Areas

W Wetland
O Oak Woodland
Wi Willow
CB Coyote Brush
CS California Sagebrush

G Grassland
NG Native Grassland
SG Serpentine Grassland
E Eucalyptus
FB French Broom

PG Pampas Grass
Fe Sweet Fennel
W/Fe Wetland / Fennel

NNG Non-native Grassland
P Pine
HG Harding Grass
C Cotoneaster
T Thistle
My Myoporum
Pl Plum

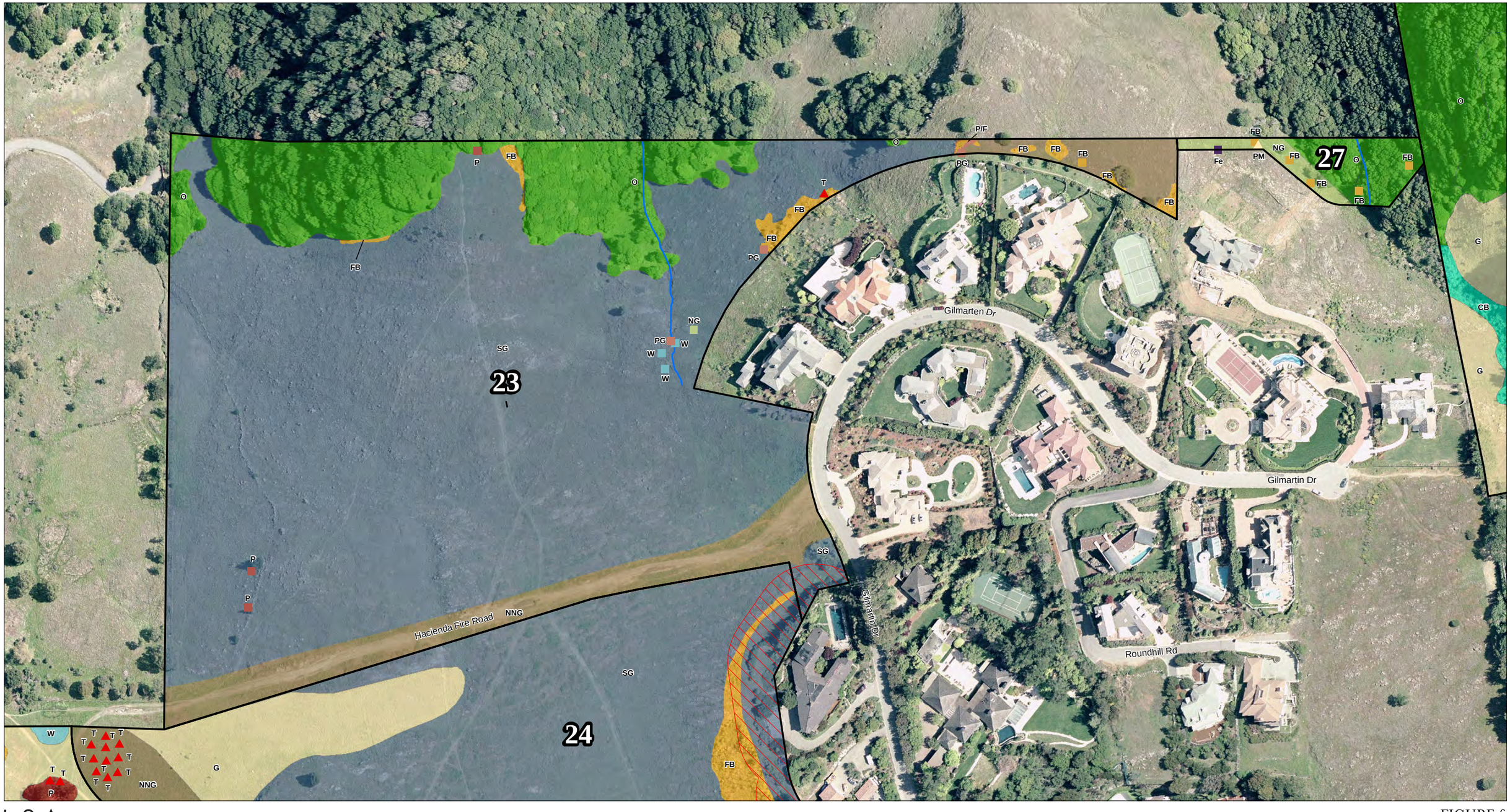
0 125 250
FEET

SOURCE: Aerial Imagery from the County of Marin
I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure5_AtkinsonOS_(15).mxd (10/15/2009)

FIGURE 5

Tiburon Open Space Management Plan

Atkinson Open Space Bond Purchase (15)
and Southern Portion of Mateo Drive Subdivision
Open Space Dedication Area



LSA

0 75 150
FEET

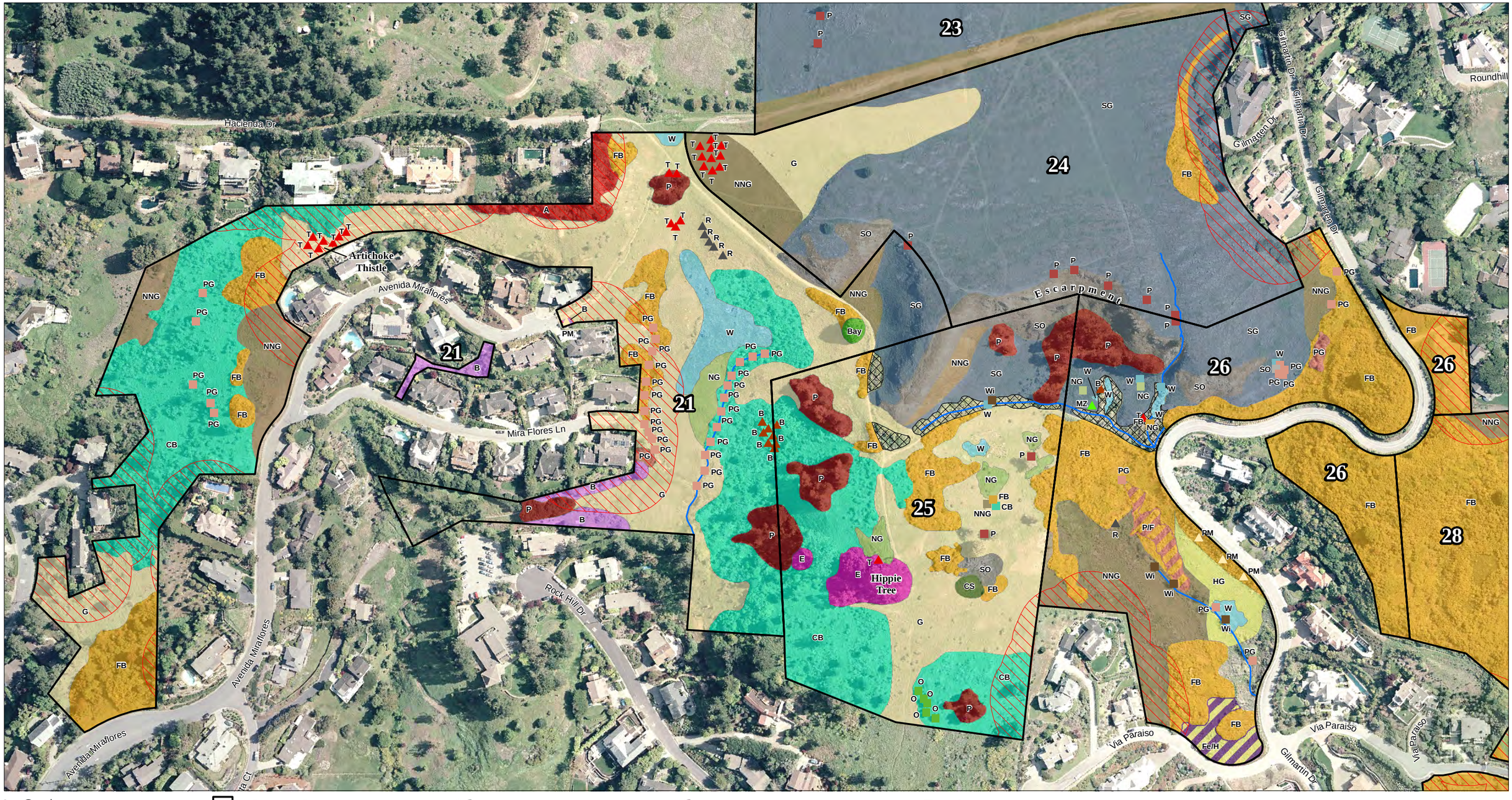
- Project Parcels
- Fire Buffer
- Watercourse
- Large Areas
- Individual or Small Areas
- W Wetland
- O Oak Woodland
- CB Coyote Brush
- G Grassland
- NG Native Grassland
- SG Serpentine Grassland
- NNG Non-native Grassland
- P Pine
- FB French Broom
- P/F Pampas Grass / French Broom
- PG Pampas Grass
- Fe Sweet Fennel
- T Thistle
- PM Pride of Madeira

SOURCE: Aerial Imagery from the County of Marin
I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure6_DelMadera_Agins(23_27).mxd (10/15/2009)

FIGURE 6

Tiburon Open Space Management Plan

Del Madera Subdivision Open Space Area (23),
Agins Subdivision Dedicated Open Space Area (27)
and Northern Portion of Reed School District
Open Space Bond Purchase Area (24)



LSA

Project Parcels
Fire Buffer
Watercourse
French Broom Removed in 2008
R Rocks
Large Areas
Individuals or Small Areas

W Wetland
CB Coyote Brush
CS California Sagebrush
G Grassland
NG Native Grassland
RF Serpentine Outcrop
NNG Non-native Grassland
B Backyard (Ornamental)

E Eucalyptus
P Pine
A Acacia
FB French Broom
P/F Pampas Grass/French Broom
PG Pampas Grass
HG Harding Grass
Fe/H Fennel/Harding Grass

O Oak
Wi Willow
SO Serpentine Outcrop
MZ Marsh Zigadene
T Thistle
B Bamboo
PM Pride of Madera

0 100 200
FEET

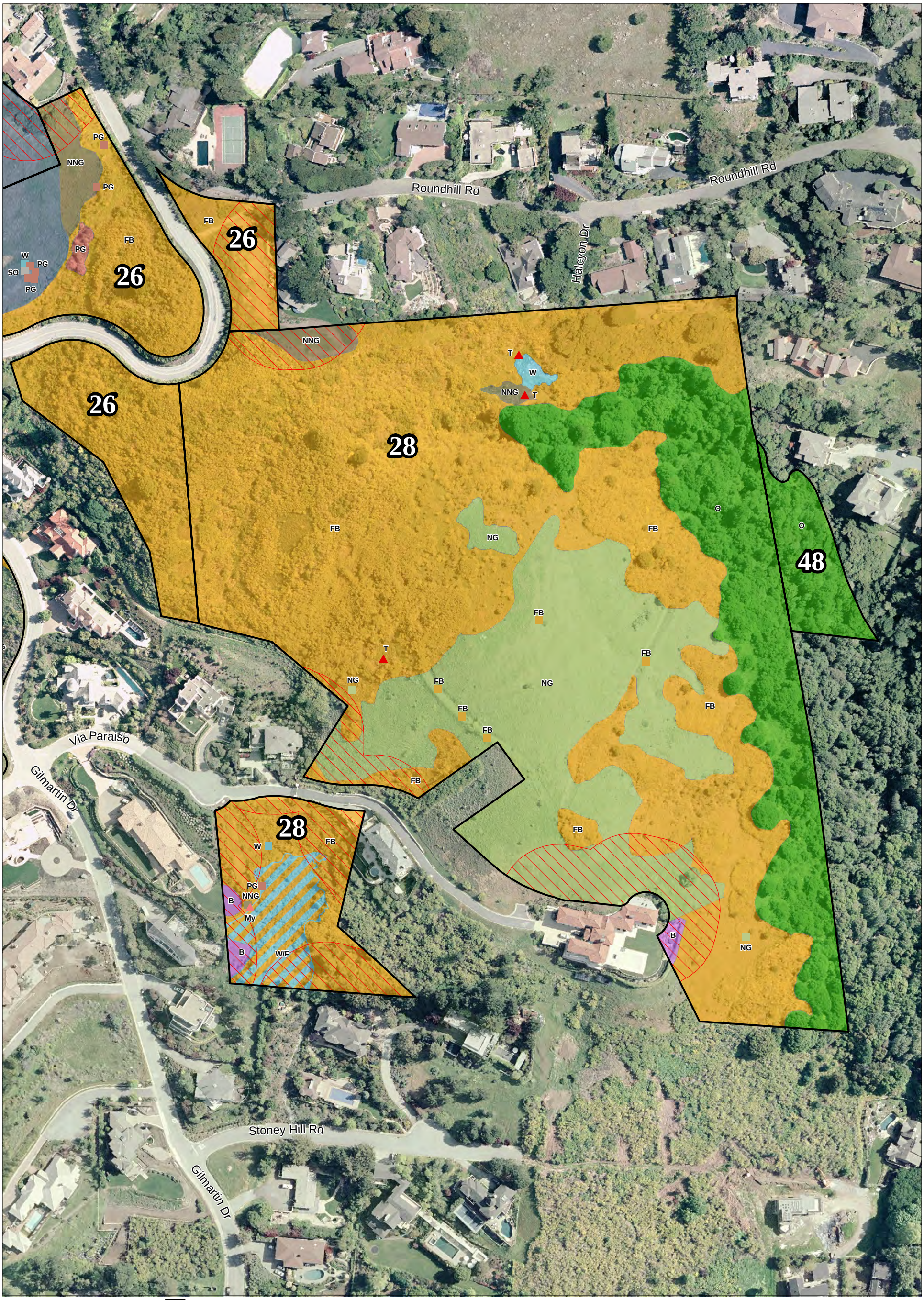
SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure7_MirafloresReedHamonDelMadera(21_24_25_26).mxd (10/15/2009)

FIGURE 7

Tiburon Open Space Management Plan

Miraflores Subdivision Open Space Area and Pathway (21),
Reed School District Open Space Bond Purchase Area (24),
Hamon (Rock and Tree) Bond Purchase Open Space Area (25),
Del Madera Subdivision Dedicated Open Space (26) and
Northern End of Eavey Bond Purchase Open Space Area (28)



LSA

- Project Parcels
- Fire Buffer
- Large Areas
- Individual or Small Areas

- W Wetland
- O Oak Woodland
- G Grasslands
- NG Native Grassland
- SG Serpentine Grassland
- NNG Non-native Grassland
- B Backyard
- FB French Broom
- W/F Wetland / French Broom
- PG Pampas Grass

- SO Serpentine Outcrop
- T Thistle
- My Myoporum

FIGURE 8

Tiburon Open Space Management Plan

South Middle Ridge Management Area
Del Madera Subdivision Dedicated Open Space (26)
Eavey Bond Purchase Open Space Area (28),
Stevens Court Open Space Area Dedication (48)

SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure8_SouthMiddleRidge(26_28_48).mxd (10/15/2009)

LSA

Project Parcels
Watercourse
Large Areas
Individual or Small Areas

O Oak Woodland
CB Coyote Brush
G Grassland
NG Native Grassland
B Ornamental
O/F Oak Woodland/French Broom
FB French Broom

0 75 150
FEET

SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure9_MountTiburonElMarinero(29_30).mxd (09/29/2009)

FIGURE 9

Tiburon Open Space Management Plan

Mount Tiburon Subdivision Dedicated Open Space Area (29) and
El Marinero Subdivision Dedicated Open Space Area (30)
and Eastern Portion of Agins Subdivision Dedicated Open Space Area (27)

LSA

- Project Parcels
- Fire Buffer
- Large Areas
- Individual or Small Areas

- O Oak Woodland
- NG Native Grassland
- NNG Non-native Grassland
- E Eucalyptus
- A Acacia
- FB French Broom
- W/H Wetland / Harding Grass

- P Pine
- PG Pampas Grass
- HG Harding Grass
- C Cottoneaster
- HB Himalayan Blackberry
- T Thistle
- My Myoporum
- PM Pride of Madeira

0 100 200
FEET

SOURCE: Aerial Imagery from the County of Marin
I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure10_HilaritaReedOS(31_33).mxd (10/15/2009)

FIGURE 10

Tiburon Open Space Management Plan

Hilarita Project Dedicated
Open Space Area (31)
"Reed Park" Town-owned
Open Space Lots (33)

LSA

Project Parcels
Large Areas
Individual or Small Areas

O Oak Woodland
NG Native Grassland
SO Serpentine Outcrop
NNG Non-native Grassland
B Backyard
P Pine
P/O Pine/Oak Woodland
FB French Broom
O/F Oak Woodland/French Broom
W Wetland
A Acacia
PG Pampas Grass
My Myoporum
PM Pride of Madera

0 75 150
FEET

SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure11_MarineroMeadowhill(37_57).mxd (03/31/2010)

FIGURE 11

Tiburon Open Space Management Plan

Marinero Circle Park Area (37) and
Meadowhill Subdivision Open Space Dedication (57)

LSA

FIGURE 12

Project Parcels
Large Areas
Individual or Small Areas

NNG Non-native Grassland
E Eucalyptus
A Acacia
FB French Broom

PM Pride of Madeira

Tiburon Open Space Management Plan

Straits View Drive to
Spanish Trail Road Strip (58)

0 50 100
FEET

SOURCE: Aerial Imagery from the County of Marin

I:\TOT0801\GIS\Maps\Vegetation Mapping\With Veg Labels\Figure12_StraitsView_(58).mxd (09/29/2009)

APPENDIX A

TREATMENT AREAS AND TREATMENT RECOMMENDATIONS

TREATMENT AREAS AND TREATMENT RECOMMENDATIONS**

General Open Space Management Considerations (All Parcels)								
Techniques. Use mechanized equipment in accessible areas and a crew on foot with hand tools on steep areas. **Special-Status Plant Species.** Avoid known locations of sensitive habitat or special status species. **Nesting Birds.** Avoid trees and dense brush from March through July to prevent disturbing nesting birds. **Native Grassland.** Use treatment techniques to avoid damage to native grassland. **Wetlands.** Careful use of treatment techniques to avoid damage to wetland vegetation. Any application of herbicides in wetlands may require a permit from the Regional Water Quality Control Board.								
Parcel Number	**Open Space Area**	**Acres**	**Sensitive Resources**	**Suggested Vegetation Management Goal**	**Management Recommentations**	**Priority***	**Cost*****	**Considerations/Comments and Guidelines**
2	**La Cresta Open Space Dedication**	65.6	Oak woodland; Potentially occurring special-status species; Native grassland	**Maintain** oak woodland; **Increase** native grassland	Remove the coyote brush and French Broom stands within 100 feet of residences (mechanically cut & apply herbicide to stumps)	1	910	Remove broom in fall-winter to avoid trampling native vegetation
					Remove French and Scotch broom that are colonizing grassland (hand cut & apply herbicide to stumps)	3	28,500	Remove broom in fall-winter to avoid trampling native vegetation
					Remove French broom along edge of oak woodland (hand or mechanically cut & apply herbicide to stumps)	3	7,280	Protect native grassland; Remove broom in fall-winter to avoid trampling native vegetation
					Remove dead trees and track sudden oak death	9	U	
					Survey for and map special-status species	4	1,600	Oakland star-tulip potentially present
					Remove thistles by hand	6	180	Few small stands
					Remove stands of French broom and the associated pine, eucalyptus, and plum (mechanically cut broom, hand cut trees, apply herbicide to stumps [except pine])	6	69,160	Large broom infestations should be checked to prevent spread
					Install signage at open space access points requiring users to stay on existing authorized fireroads or trails and dogs on leash	7	360	Consider enforcing Town's "dog on leash" ordinance through the use of 1) periodic monitoring of open space and issuance of citations to violators, and 2) a combination of interpretive signage and fencing to discourage unleashed dogs
					Maintain trails and fire roads	8	360	
3	**Cibrian Subdivision Open Space Area**	3.8	Oak woodland; Native grassland; Oakland star tulip and possibly other special-status species	**Maintain** oak woodland; **Increase** native grassland; **Reduce** coyote brush; **Maintain** Oakland star tulip habitat	Remove individual plants of French broom, Monterey pine, cotoneaster, from coyote brush stands and any oak trees killed by SOD (hand removal & apply herbicide to stumps)	6	2,625	When spraying herbicide, need to ensure that drift does not land on native grasses and other non-target native plants
					Remove stand of French broom (mechanically cut & apply herbicide to stumps)	9	400	
					Maintain purple needlegrass free of woody vegetation (coyote brush) and invasive species (hand cut & apply herbicide to stumps)	3	750	
					Reduce density of coyote brush by a minimum of 50% thereby expanding native grassland and Oakland star tulip habitat (mechanically cut, if not too steep & apply herbicide to cut stumps)	7	1,601	
					Survey for and map special-status species	4	400	
4	**Hexan Subdivision Open Space Area**	0.7	Large oak tree; Native grassland, Oakland star tulip	**Maintain** large oak, native grassland and habitat of Oakland star tulip.	Remove French broom within 100 feet of residence (mechanically cut & apply herbicide to stumps)	1	728	Mulch was probably installed by the adjacent landowners
					Remove remaining French broom and Italian thistle (mechanically cut & apply herbicide to stumps)	6	3,276	
					Maintain native grassland free of woody vegetation and invasive species (mechanically cut & apply herbicide to stumps)	3	867	
					Prevent placement of additional mulch	8	A	
					Maintain mulch free of weeds. (apply herbicide)	8	150	

* Priorities: 1 is the highest priority and 9 is the lowest priority

** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

Parcel Number	Open Space Area	Acres	Sensitive Resources	Suggested Vegetation Management Goal	Management Recommentations	Priority*	Cost***	Considerations/Comments and Guidelines
8	**Mateo Drive Subdivision Open Space Dedication**	3.2	Watercourse; Native grassland	**Prepare** site for oak woodland mitigation plantings by removing non-native species.	Remove French broom, cotoneaster, ornamental juniper, pride of Madeira and other ornamental plants (hand cut & apply herbicide to stumps)	6	5,460	Much of area is steep; Avoid native grasses for vegetation treatments
					Remove non-native shrubs, including French broom along a 10-foot wide band beside Paradise Drive (mechanically cut & apply herbicide to cut stumps)	9	360	
					Repair eroding area above watercourse	8	720	
9	**La Cresta Subdivision Open Space Path Easement**	0.1	None	**Contain** ornamentals to path area	Monitor to ensure that ornamentals do not spread into wildlands	9	45	
15	**Atkinson Open Space Bond Purchase**	59.7	Native grassland; Wetlands; Potential for Special-status species	**Maintain** grassland and wetland areas free of invasive species and coyote brush. **Maintain** existing California sagebrush scrub and wetland; **Increase** native grassland by removing non-native species; **Monitor** and **Repair** eroding banks of watercourses and head cuts as needed.	Remove Individuals of coyote brush and/or small areas of French broom, Monterey pine, sweet fennel, Harding grass, Italian thistle, Myoporum, plum, and Pampas grass from grassland or other areas (hand cut & apply herbicide to stumps)	3	72,000	
					Remove Pampas grass (hand or backhoe & herbicide)	1	4,368	
					Remove stands of French broom and sweet fennel (hand cut & apply herbicide to stumps)	5	7,280	
					Thin the coyote brush stands, especially those within 100 feet of the residences on Turtle Rock Court (hand cut & apply herbicide to stumps)	3	437	
					Remove any colonizing coyote brush, coast live oak, California bay and other species of trees from the California sagebrush scrub (hand cut & apply herbicide to stumps)	7	750	
					Survey for and map special-status species	4	3,200	
					Install signage at open space access points requiring users to stay on existing authorized fireroads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats	7	360	Consider enforcing Town's "dog on leash" ordinance through the use of 1) periodic monitoring of open space and issuance of citations to violators, and 2) a combination of interpretive signage and fencing to indicate sensitive habitat areas and discourage unleashed dogs
					Monitor trail use and enforce Town of Tiburon regulation of “dogs on leash” and “clean after your dog”	7	45	
					Repair erosion of watercourses and trails.	8	1,080	

* Priorities: 1 is the highest priority and 9 is the lowest priority

** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

Parcel Number	Open Space Area	Acres	Sensitive Resources	Suggested Vegetation Management Goal	Management Recommentations	Priority*	Cost***	Considerations/Comments and Guidelines
21	**Miraflores Subdivision Subdivision Open Space Area and Pathway (NMRMA)**	17.3	Serpentine outcrop along east edge supporting Tiburon jewelflower and Tiburon buckwheat; Potential for Marin microblind harvestman; Wetland; Watercourse; Native Grassland	**Maintain** habitat for rare plants; **Prevent** spread of some noxious weeds	Remove pride of Madeira (hand cut and apply herbicide to trunks)	5	360	Pride of Madeira occurs in south portion of parcel (between Avenida Miraflores and Geldert Drive) (not mapped) and along gully in southern portion.
					Remove Pampas grass (hand cut with metal blade on weed whip & herbicide or backhoe)	1	1,080	Pampas grass occurs in south portion of parcel (between Avenida Miraflores and Geldert Drive) (not mapped) and along gully in southern portion.
					Remove all individuals of artichoke thistle with follow-up for several years (hand removal)	2	360	An extremely invasive plant that is difficult to remove due to its sharp spines
					Weed serpentine outcrops of wild oats (hand removal)	2	360	
					Survey for and map special-status species	4	1,600	
					Remove black acacia, French broom, and other non-native species that are growing within 100 feet of homes on Hacienda Drive, Avenida Miraflores, Mira Flores Lane, and Rock Hill Drive (mechanically and hand cut & apply herbicide to stumps)	3	1,165	Alert property owners of spread of acacia into open space (last house on Hacienda Drive) and planted ornamental grasses and pride of Madeira (last house on Avenida Miraflores)
					Remove pines and bull thistles (hand cut pines and hand removal of thistles)	5	1,602	
					Remove non-native woody vegetation that is colonizing grassland (hand cut & apply herbicide)	2	32,760	
					Install signage at open space access points requiring users to stay on existing authorized fire roads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats	4	360	Consider enforcing Town's "dog on leash" ordinance through the use of 1) periodic monitoring of open space and issuance of citations to violators, and 2) a combination of interpretive signage and fencing to indicate sensitive habitat areas and discourage unleashed dogs; Existing signs are removed
					Monitor trail use and enforce Town of Tiburon regulation of “dogs on leash” and “clean after your dog”	4	45	
					Investigate "taking" of open space by adjacent property owner	7	A	Acacia and ornamental vegetation may have naturally colonized adjacent open space
					Remove French broom along east edge near fire road (mechanically cut & apply herbicide to stumps)	2	437	Stand of broom is directly across from population of Tiburon jewelflower
					Thin coyote brush stands to 25% cover or less to prevent grasslands from becoming scrub (mechanically cut & apply herbicide to stumps)	9	18,200	A few isolated and dense stands of coyote brush should remain for wildlife cover
					Remove rest of French broom (mechanically cut & apply herbicide to stumps)	6	6,188	
23	**Del Madera Subdivision Homeowners Open Space Area (NMRMA)**	18.7	Serpentine grassland; Wetland; Watercourse; Special-status species	**Maintain** oak woodland and serpentine grassland; **Protect** habitat for special-status species	Remove individuals or small colonies of Italian thistle (hand cut) and sweet fennel (hand or mechanical removal & apply herbicide to stumps)	6	800	Special-status plant species occur onsite and should be avoided.
					Remove French broom and Pampas grass (hand removal & apply herbicide to cut surfaces)	2	180	Coordinate with adjacent home owners for them to remove French broom and Pampas grass from their back yards
					Remove pines (hand cut)	1	720	
					Install signage at open space access points requiring users to stay on existing authorized fire roads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats	4	360	Consider enforcing Town's "dog on leash" ordinance through the use of 1) periodic monitoring of open space and issuance of citations to violators, and 2) a combination of interpretive signage and fencing to indicate sensitive habitat areas and discourage unleashed dogs
					Monitor trail use and enforce Town of Tiburon regulation of “dogs on leash” and “clean after your dog”	4	45	
					Survey for and map special-status species	4	2,000	
					Conduct general maintenance of the trails and fire roads to ensure that they are clear of debris and erosion is minimized	8	720	

* Priorities: 1 is the highest priority and 9 is the lowest priority

** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

Parcel Number	Open Space Area	Acres	Sensitive Resources	Suggested Vegetation Management Goal	Management Recommentations	Priority*	Cost***	Considerations/Comments and Guidelines
24	**Reed School District Open Space Bond Purchase Area (NMRMA)**	12.7	Serpentine grassland; Serpentine outcrops; Wetlands; Watercourses; Special-status plant species	**Maintain** serpentine grasslands; **Protect** habitat for special-status species	Remove all pine saplings/seedlings (hand cut)	1	1,440	Pine saplings along escarpment presently small
					Remove thistles (hand cut)	2	360	Some thistles removed in 2008; follow-up needed
					Remove French broom by back yards of homes on Gilmartin Drive (mechanically cut & apply herbicide to stumps)	1	1,238	Entire stand should be removed
					Survey for and remove Fr. broom and other woody species in grassland (hand cut & apply herbicide to stumps)	2	16,500	
					Weed serpentine outcrops of wild oats (by hand)	2	720	Annual grasses outcompeting endangered plants; weeding to be done by person(s) familiar with special-status plants in area
					Protect serpentine outcrops from trampling by people and dogs	4	A	Consider enforcing Town's "dog on leash" ordinance through the use of 1) periodic monitoring of open space and issuance of warnings or citations to violators, and 2) a combination of interpretive signage and fencing to indicate sensitive habitat areas and discourage unleashing dogs
					Install signage at open space access points requiring users to stay on existing authorized fire roads or trails to minimize the creation of short-cut trails and/or trampling of sensitive habitats	4	360	
					Monitor trail use and enforce Town of Tiburon regulation of “dogs on leash” and “clean after your dog”	4	45	
					Develop interpretive signs discussing the special-status species	4	320	
					Survey for and map special-status plant species	4	800	
					Conduct general maintenance of the trails and fire roads to ensure that they are clear of debris and erosion is minimized	8	720	Populations of rare plants monitored periodically by Eva Buxton for USFWS
25	**Hamon (Rock and Tree) Bond Purchase Open Space Area (NMRMA)**	10.7	Serpentine grassland; Serpentine outcrops; Wetlands; Watercourses; Special-status species;	**Maintain** and **preserve** serpentine grassland/native grassland; **protect** habitat for special-status plants; **enhance** wetland	Remove French broom in vicinity of serpentine outcrops, including follow-up in areas where broom was removed in 2008 (hand cut & apply herbicide to stumps)	1	728	Necessary to prevent spread into sensitive habitat
					Monitor trail use and enforce Town of Tiburon regulation of “dogs on leash” and “clean after your dog”	4	45	
					Remove/reduce density of other infestations of broom (mechanically cut & apply herbicide to stumps)	5	2,330	
					Weed portions of serpentine outcrops (escarpment) of wild oats (by hand)	2	360	Weeding needs to be done by person(s) familiar with special-status species in area
					Remove dead and live pines below escarpment and saplings near wetland (hand cut)	2	3,349	Pines are converting habitat from serpentine grassland to a non-native woodland
					Remove bull thistle, purple star-thistle, and Italian thistle (by hand)	6	360	Bull thistle especially invasive in denuded areas where broom/pampas grass removed in 2008; starthistle recent invasion of parcel, especially near Hippie tree
					Remove pride of Madeira on slope below "Hippie Tree" (hand cut)	5	180	Only a few plants present in 2009
					Remove woody vegetation that is colonizing grassland except California sagebrush (hand cut & apply herbicide to stumps)	5	7,500	
					Conduct general maintenance of the trails and fire roads to ensure that they are clear of debris (garbage) and erosion is minimized	8	720	
					Thin coyote brush stands to 25% cover or less to prevent grasslands from becoming scrub (mechanically cut & apply herbicide to stumps)	9	10,920	A few isolated and dense stands of coyote brush should remain for wildlife cover
					Remove Harding grass from wetland (by hand)	8	720	
					Survey for and map special-status species	4	800	Populations of rare plants monitored periodically by Eva Buxton for USFWS and CDFG

* Priorities: 1 is the highest priority and 9 is the lowest priority

** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

Parcel Number	Open Space Area	Acres	Sensitive Resources	Suggested Vegetation Management Goal	Management Recommentations	Priority*	Cost***	Considerations/Comments and Guidelines
26	**Del Madera Subdivision Dedicated Open Space Area (NMRMA and SRMRA)**	10.7	Serpentine grassland/native grassland; serpentine outcrops; wetlands; watercourses; special-status plant species;	**Maintain** and **preserve** serpentine grassland/native grassland; **protect** habitat for special-status plants; **enhance** wetland	Remove all pines/pine saplings near escarpment (hand cut)	1	2,160	Pines are converting habitat from serpentine grassland to a non-native woodland
					Remove all Pampas grass (mechanically cut & apply herbicide to base)	1	2,160	Stand in serpentine seep in eastern portion is especially detrimental to native plants; large plants in wetland below fireroad are "destroying" wetland and watercourse
					Remove French broom from areas within 100 feet of homes. (mechanically cut & apply herbicide to stumps)	1	364	
					Remove French broom from 10-foot wide boarder along Gilmartin Drive (mechanically cut & apply herbicide to stumps)	1	364	
					Remove French broom (mechanically cut & apply herbicide to stumps)	8	12,121	French broom must be monitored and seedlings removed for it not to spread to serpentine grassland
					Search for and remove individuals and small stands of French broom and other species of woody vegetation that are colonizing grassland. (hand cut & apply herbicide to stumps)	2	3,000	
					Monitor trail use and enforce Town of Tiburon regulation of “dogs on leash” and “clean after your dog”	4	45	
					Remove pride of Madeira on Gilmartin Drive embankment (hand cut trunk)	5	360	This species is highly invasive and fast-growing
					Monitor recurrence of and remove French broom in areas where removed in 2008 (hand cut & apply herbicide to stumps)	1	360	Follow-up for several years will be necessary
					Remove Harding grass from stream channel west of Gilmartin Drive (hand removal)	8	1,456	
					Remove sweet fennel (mechanically cut & apply herbicide to base) and Harding grass (hand removal) in southern portion	8	1,019	This portion entirely vegetated by non-native species
					Keep seeps/wetlands east of fireroad (near Gilmartin Drive) free of weeds, including bullthistle	3	473	One small seep supports marsh zigadene (CNPS List 4)
					Remove bamboo shoots (hand or mechanically cut & apply herbicide to stumps)	5	360	Bamboo removed in 2008 but underground stems are resprouting
					Survey for and map special-status species	4	400	Populations of rare plants monitored periodically by Eva Buxton for USFWS and CDFG
27	**Agins Subdivision Dedicated Open Space Area (Agins)**	0.5	Native grassland; Watercoruse	**Maintain** grassland and oak woodland.	Remove French broom, sweet fennel, and pride of Madeira (hand or mechanically cut & apply herbicide to stumps)	8	360	Coordinate with adjacent home owners for them to remove French broom and Pampas grass from their back yards
28	**Eavey Bond Purchase Open Space Area (Eavey) (SMRMA)**	20.7	Native grassland; Wetland; Potential for special-status species	**Maintain** wetland and woodland. **Increase** native grassland.	Remove Pampas grass (hand cut & apply herbicide to base)	2	180	Grassland separates the French broom from the backyards thereby reducing the priority for removal. Coordinate with adjacent home owners for them to remove invasive non-native species from their back yards that front the Town's open space.
					Maintain wetland and grassland areas free of French broom and other native and non-native shrubs (hand or mechanically cut & apply herbicide to stumps [uplands only])	6	18,928	
					Remove French broom from areas within 100 feet of homes (hand cut & apply herbicide to stumps)	1	3,640	
					Remove French broom from areas within 100 feet of oak woodland and from beneath canopy of oak woodland (hand cut & apply herbicide to stumps)	7	16,380	
					Create fuel breaks in the French broom (mechanically cut & apply herbicide to stumps)	7	10,920	
					Conduct controlled burn of French broom areas.	7	18,000	
					Investigate "taking" of open space by adjacent property owners	5	A	
					Monitor sudden oak death. If dead trees are greater than 5 percent cover of oak woodland, initiate removal of dead trees.	9	U	

* Priorities: 1 is the highest priority and 9 is the lowest priority

** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

Parcel Number	Open Space Area	Acres	Sensitive Resources	Suggested Vegetation Management Goal	Management Recommentations	Priority*	Cost***	Considerations/Comments and Guidelines
29	**Mt Tiburon Subdivision Dedicated Open Space Area (Mt Tiburon)**	12.5	Potential for purple needlegrass grassland;	**Maintain** grassland and oak woodland.	Maintain grassland free of woody species (hand cut & apply herbicide to stumps)	5	4,514	Isolated nature of site reduces the priority
					Monitor sudden oak death. If dead trees are greater than 5 percent cover of oak woodland, initiate removal of dead trees.	9	45	The site is extremely steep and only needs monitoring at this time.
30	**El Marinero Subdivision Dedicated Open Space Area (El Marinero)**	9.3	Potential for native grassland	**Maintain** grassland and oak woodland.	Monitor culvert and edge of road for erosion	8	45	The site is extremely steep and only needs monitoring at this time.
					Monitor for and remove refuse dumped along the road	8	90	
					Monitor sudden oak death. If dead trees are greater than 5 percent cover of oak woodland, initiate removal of dead trees.	9	U	
31	**Hilarita Project Dedicated Open Space Area (Hilarita)**	2.8	Wetland; Native grassland	**Maintain** oak woodland and non-native grassland. **Increase** native grassland.	Remove pride of Madeira (hand cut & apply herbicide to cut trunk) and Pampas grass (hand cut & apply herbicide to base or backhoe)	6	180	Grassland separates the French broom from the buildings thereby reducing the priority for removal. Portions of Hilarita are steep.
					Remove individual plants of French broom, myoporum, cotoneaster, Italian thistle, acacia, and other invasive species that are colonizing grassland and wetland. Remove seedling and sapling eucalyptus and pine; large trees may remain (hand or mechanically cut & apply herbicide to stumps)	3	3,000	
					Remove stands of French broom and non-native woody species within 100 feet of buildings (hand or mechanically cut & apply herbicide to stumps)	3	720	
					Remove stands of French broom and acacia (hand or mechanically cut & apply herbicide to stumps)	7	2,621	
					Remove non-native tall fescue and Harding grass from seep (by hand)	8	720	
					Monitor Himalayan blackberry and control if stands exceed 20 feet in diameter.	9	360	
33	**"Reed Park" Town-owned Open Space Lots (Reed Park)**	1.5	Wetland; Native grassland	**Maintain** native grassland and oak woodland. **Increase** native grassland.	Remove Individuals or small stands of French broom from grassland or areas beneath oak woodland canopy (hand cut & apply herbicide to stumps)	7	360	Portions of Reed Park are steep
					Remove stands of French broom (hand cut & apply herbicide to stumps)	7	2,002	
					Remove stands of French broom within or beside understory within 100 feet of homes	1	2,075	
					Monitor Himalayan blackberry and control if stands exceed 20 feet in diameter.	9	360	
37	**Marinero Circle Park (Marinero)**	0.7	Wetland; Native grassland; Potential for Special-status species	**Maintain** non-native grassland and **Increase** native grassland.	Thin understory beneath Italian stone pine trees; clear limbs less than 3 inches in diameter for 10 feet.	1	360	The majority of Marinero is steep and inaccessible
					Remove Pampas grass (hand cut & apply herbicide to base)	5	180	
					Remove Monterey pine, French broom, and sapling Italian stone pine and other non-native species that are colonizing the grassland (hand cut & apply herbicide to stumps [except pines])	6	874	
					Remove the large Italian stone pine (to 14 inches in dbh and 30 feet tall) that is growing on the road cut (hand cut)	1	720	
					Survey for and map special-status species	6	400	
48	**Stevens Court Open Space Dedication (Stevens)**	0.6	None	**Maintain** oak woodland.	Monitor sudden oak death, if dead trees are greater than 5 percent cover of oak woodland, initiate removal of dead trees.	9	U	Site is inaccessible because surrounded by dense oak woodland.

* Priorities: 1 is the highest priority and 9 is the lowest priority

** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

Parcel Number	Open Space Area	Acres	Sensitive Resources	Suggested Vegetation Management Goal	Management Recommentations	Priority*	Cost***	Considerations/Comments and Guidelines
57	**Meadowhill Subdivision Open Space Dedication (Meadowhill)**	0.7	Wetland; Native grassland	**Maintain** non-native grassland and oak woodland. **Increase** native grassland.	Remove French broom, Myoporum, Pride of Madeira, and other non-native shrubs from grassland (hand cut & apply herbicide to stumps)	9	473	Meadowhill is inaccessible except through adjacent residential property
					Remove the small Monterey pine trees. Removal of the larger Monterey pine trees should occur if such removal will not damage the shorter coast live oak trees. Remove stands of French broom (hand cut & apply herbicide to stumps [except pines])	9	2,160	
					Investigate "taking" of open space by adjacent property owner	5	A	
					Remove the lower limbs of the coast live oak trees	9	360	
58	**Straits View Drive to Spanish Trail Road Strip**	0.1	None	**Reduce** spread of non-native species.	Remove French broom, pride of Madeira, and Pampas grass (hand cut & apply herbicide to stumps)	9	360	This is a very narrow strip of land with limited access and is beneath a transmission line.
					Monitor for and remove seedling and sapling eucalyptus (hand cut & apply herbicide to stumps)	9	45	

* Priorities: 1 is the highest priority and 9 is the lowest priority

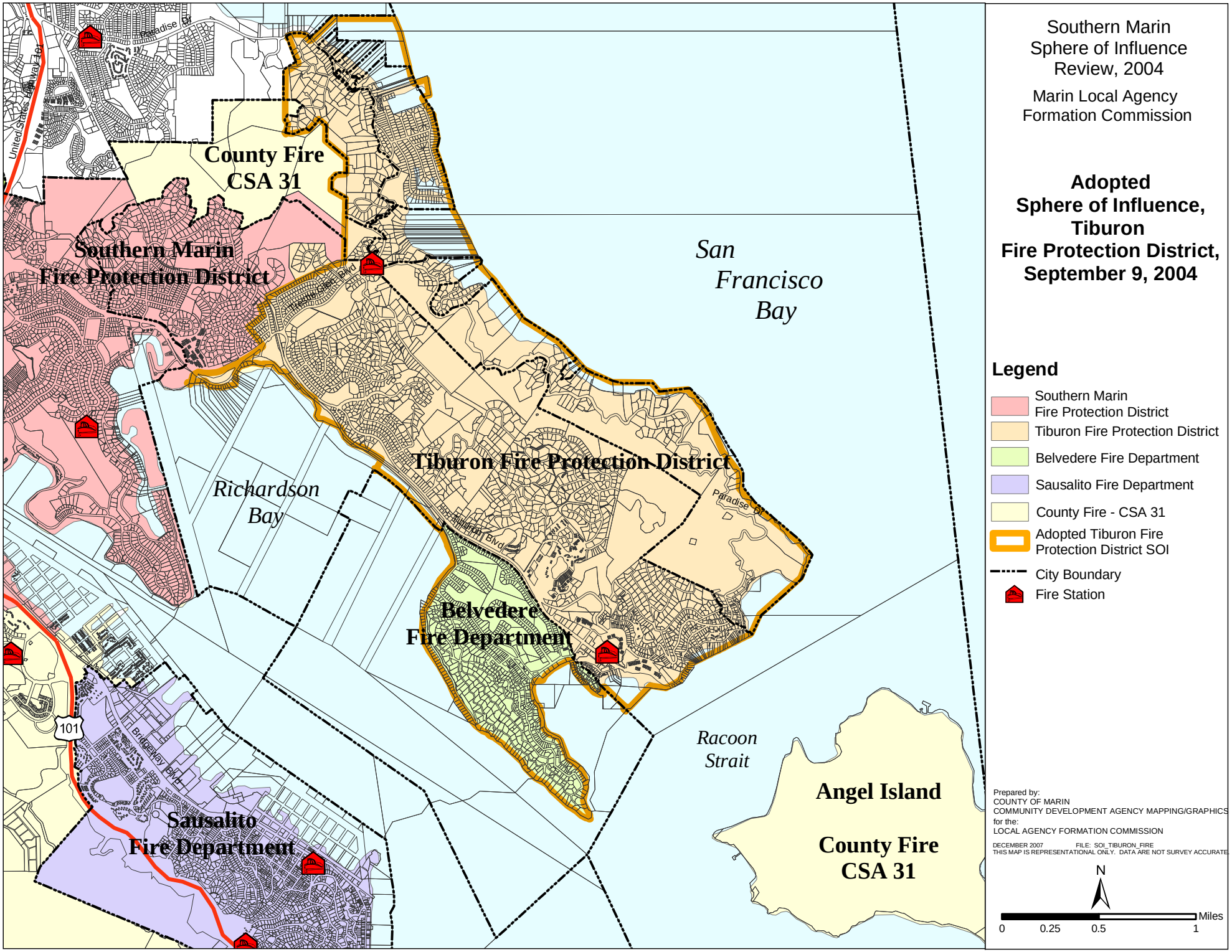
** See Section 4 of the RMP for a list of management recommendations and descriptions of the open space parcels. See Section 3.1.3 for vegetation treatment protocols for fire safety.

*** Cost is in dollars. See Section 3.6 of the RMP for explanation of the cost of the management activities. A = administrative cost of office staff; U = unknown cost.

451,181

APPENDIX B

SERVICE AREAS OF THE TIBURON FIRE PROTECTION DISTRICT AND THE SOUTHERN MARIN FIRE PROTECTION DISTRICT


County Fire
CSA 31
Southern Marin
Fire Protection District
San
Francisco
Bay
Tiburon Fire Protection District
Richardson
Bay
Belvedere
Fire Department
Racoon
Strait
Angel Island
County Fire
CSA 31
Sausalito
Fire Department
Paradise Dr
Tiburon Blvd
Trestle Glen Blvd
Bridgeway Blvd
101
Southern Marin
Sphere of Influence
Review, 2004
Marin Local Agency
Formation Commission
Adopted
Sphere of Influence,
Tiburon
Fire Protection District,
September 9, 2004
Legend
Southern Marin
Fire Protection District
Tiburon Fire Protection District
Belvedere Fire Department
Sausalito Fire Department
County Fire - CSA 31
Adopted Tiburon Fire
Protection District SOI
City Boundary
Fire Station
Prepared by:
COUNTY OF MARIN
COMMUNITY DEVELOPMENT AGENCY MAPPING/GRAPHICS
for the:
LOCAL AGENCY FORMATION COMMISSION
DECEMBER 2007
FILE: SOI_TIBURON_FIRE
THIS MAP IS REPRESENTATIONAL ONLY. DATA ARE NOT SURVEY ACCURATE
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0.5
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