



May 18, 2021

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Technical Memorandum – Vegetation Management Zone Classification of Three Separate Marin County Open Space Preserves; Marin County, California

Dear Mr. Campo:

The purpose of this letter is to provide results of Vegetation Management Zone (VMZ) designations for three recently acquired open space preserves located in the Bowman Canyon, San Geronimo Ridgeland, and San Pablo Bayfront Land Conservation Areas. These Preserves include Bowman Canyon (443 acres¹), Heron Hill (15 acres), and Sky Ranch (16 acres) (Attachment A). In order to determine VMZ categories for these Preserves the following tasks were conducted: a background review of sensitive and special status biological resources, a reconnaissance-level habitat assessment, review and development of relevant GIS layers, and classification of vegetation management zones using an attribute matrix based on specific criteria for each of these three open space Preserves. Appendix B includes the definitions and rationale developed for the attribute matrix criteria that were used to develop zone classifications for each Preserve. An Excel spreadsheet that includes and evaluation of the matrix criteria for each Preserve was also included as a deliverable for this effort.

This memorandum provides methods used for vegetation management zone classification, a brief overview of existing conditions of the preserves, limitations identified for any of the parcels' zone classification, a summary narrative describing the rationale for each zone classification (by Preserve), and maps depicting vegetation management zones.

INTRODUCTION

The Marin County Open Space District's (District) Vegetation and Biodiversity Management Plan (VBMP; 2015) requires that open space preserves be classified into four vegetation management zones based on ecological and/or cultural importance of their vegetation types, the condition of their resources, and their proximity to urban or suburban areas. These four zones are: The *Legacy Zone*, *Sustainable Natural Systems Zone*, *Natural Landscape Zone*, and *Highly Disturbed Zone*. The purpose of classifying open space preserves into these categories is to help prioritize land management actions, land use, and resource management planning. The goal of this effort was to assign vegetation management zones for three open space Preserves: Bowman Canyon, Heron Hill, and Sky Ranch.

¹ This acreage includes two parcels, one comprising 276 acres and the other 167 acres. The 167-acre parcel was the subject of protocol-level botanical surveys. Reconnaissance-level surveys were conducted on the 443 acres.

VEGETATION MANAGEMENT ZONE DEFINITIONS

The following vegetation management zone definitions were applied to vegetation types within the three subject preserves.

- **Legacy Zone:** The legacy zone includes lands that support unique or irreplaceable remnants of natural biological diversity, along with other vegetation types with high biological value. The habitats for plants that have been identified as threatened, endangered, or rare in the world, the nation, the state of California, or Marin County are included in this zone, along with wetlands and selected upland vegetation types, including redwood forest, serpentine grasslands, and chaparral. Also included are habitats and vegetation types that are at the boundaries of their geographic distributions and that may be important to detecting, and managing for adaptation to, the effects of climate change.

Native vegetation in this zone remains largely intact and free of invasion by nonnative plants. Because of their rarity and ecological importance, many species and vegetation types within this zone are protected by federal and state laws and regulations, or by other initiatives, such as the Upland Habitat Goals Project. The legacy zone will serve as a sanctuary for natural resources that otherwise could be permanently lost from Marin, California, and the world.

- **Sustainable Natural Systems Zone:** The sustainable natural systems zone includes lands that are valuable for ensuring the ecological resiliency of natural systems and the associated character of Marin County. Lands in this zone, which generally form a natural buffer around lands in the legacy zone, include corridors supporting wildlife movements and potentially the movements of species adapting to climate change, areas of refuge for species living within or migrating through Marin County, and vegetation types that are not considered as biologically valuable as those included in the legacy zone, but that are still considered “hot spots” in terms of relatively high species diversity. Lands in this zone contain only minimal infrastructure, and the vegetation types are relatively free of invasive species.
- **Natural Landscape Zone:** The natural landscape zone includes lands that support native plants and natural vegetation types that are typical of Marin County landscapes. These common vegetation types, while not legally protected or recognized as rare, provide valuable habitat for a diversity of local native species. They contribute to the beauty of Marin County landscapes and add to the ecologically rich natural communities and scenic vistas that define the District preserves. Vegetation within the natural landscape zone often provides important buffers between the wildland-urban interface and other zones and contains large tracts of grasslands, common oak and other woodland vegetation types, and coastal scrub. While this zone is more infested with invasive plants than the legacy and sustainable natural systems zones, it still provides valuable connectivity and important habitat for common wildlife and plants.
- **Highly Disturbed Zone:** The Highly Disturbed Zone includes lands that provide essential services, such as fire protection, access to the District open space lands, and in many cases is within the state defined Wildland Urban Interface. While these lands are also important to the enjoyment and protection of the natural diversity of Marin County, their management is influenced by their role in preventing the movement of fire between residences and open space lands, transmitting utilities (e.g., power and water lines) to nearby communities, and facilitating visitor access. Due to high human use and disturbance, this zone is prone to invasive plant infestations; plant diseases and pathogen outbreaks; and neighboring land influences, such as trespass, predation by domestic pets, green waste dumping, and the introduction of garden plant escapees.

METHODOLOGY

Classifying each of these Preserves into vegetation management zones followed a modified version of the six-step process outlined in Appendix D of the VBMP. This process was modified for classifying these three Preserves because the steps outlined in Appendix D were used to create the vegetation management zones themselves and not for classifying parcels of land into these zones. Of the six steps identified in the VBMP (2015), classification for this effort utilized modified versions of these steps (Steps 1, 2, 5, and 6), but were further refined into the three steps below. This modified process relied on the evaluation of various criteria for vegetation management zone classification. These criteria were put into an attribute matrix

spreadsheet for the purpose of evaluating each vegetation type, by Preserve. Data sets that informed criteria evaluation and assisted in mapping vegetation management zones are included on pages D-2 through D-8 of the VBMP, which are summarized above. The steps and sources for criteria to be followed and included as a part of this analysis are:

- **Step 1: Identify High-Value Resources and Associated Threats.**
 - High-value resources are defined to be a limited suite of species, vegetation or habitat types, and ecological systems selected to represent and encompass the biodiversity found within the District's preserves.
 - High-value resources are bulleted on page 4-24 of the VBMP.
 - Threats to these resources were considered actions or factors that would directly or indirectly degrade the resources and that must be mitigated or managed where feasible to avoid or lessen that effect.
 - The VBMP identifies invasive weed threats by lifeform on pages 4-44 through 4-50 of the VBMP. It also includes sudden oak death as a threat (page 4-74).
 - Although not specifically stated in the VBMP, potential threats from certain invasive wildlife species will also be evaluated such as bullfrogs and wild pigs.
 - Habitat fragmentation and edge effects are not identified as threats in the VBMP but will also be included as evaluation criteria.
- **Step 2: Assess and Augment Existing Vegetation Data**
 - Existing vegetation data sets will be identified, assessed, and augmented as possible and practicable. Data sets may include monitoring reports, GIS data, maps, and other available information.
 - Though vegetation data may exist for the three Preserves it is likely to be too coarse to be adequate for classification of vegetation management zones. Therefore, a GIS vegetation layer will be created for each Preserve. This vegetation layer will be used to determine if high-value or sensitive natural communities are present within each Preserve.
- **Step 3: Apply Criteria, Create Zone Maps, and Provide Rational and Limitations**
 - Zone classification for each Preserve will be determined by the criteria sources identified in Step 1 above. Maps of vegetation management zones will be created for each of the three Preserves along with a discussion of the rational and limitations associated with the classification.
 - An attribute matrix spreadsheet will be created for the criteria evaluation of Steps 1 and 2. Once vegetation management zones for each of the three Preserves have been classified, based on the criteria evaluation, a brief narrative describing the rational for each zone classification (by Preserve) will be provided. Limitations identified for any of the Preserves' zone classification will be included in the narratives.

Data Resources and Guidance Documents

The data resources and guidance documents utilized for vegetation management zone classification for the three Preserves are provided below.

U.S. Fish and Wildlife Service (USFWS):

- List of Threatened and Endangered Species that may occur in the Bowman Canyon, Heron Hill, and Sky Ranch Preserves study areas. Retrieved from the USFWS Information for Planning and Consultation (IPaC) online system (USFWS 2020a)
- National Wetland Inventory (USFWS 2020b)

California Department of Fish and Wildlife (CDFW):

- State and Federally Listed Endangered, Threatened and Rare Plants of California (CDFW 2020a)
- Special Vascular Plants, Bryophytes, Lichens List (CDFW 2020b)
- State and Federally Listed Endangered and Threatened Animals of California (CDFW 2020c)
- Special Animal List (CDFW 2020d)
- California Natural Diversity Database (CNDDB 2020)

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- Vegetation and Biodiversity Mnagement Plan (2015)

Other Sources:

- Calflora (2020)
- The California Native Plant *Society's Inventory of Rare and Endangered Plants of California* (CNPS 2020)
- Consortium of California Herbaria One (CCH1) (CCH 2020)
- Consortium of California Herbaria Two (CCH2) (CCH 2020)
- eBird: An online database of bird distribution and abundance (2017)
- Marin County Breeding Bird Atlas (1993)
- Marin County Flora (2007)
- Marin Flora (Howell 1970)
- Rare Natives Locally (Smith 2019)
- The Jepson eFlora (JFP 2020)
- The Jepson Manual: Vascular Plants of California (Baldwin et al. 2012)

Scientific names of vegetation types and plant and animal species that appear in the attribute matrix and the vegetation management zone classification and adhere to the following the sources. Botanical taxonomy and nomenclature conforms to *The Jepson Manual* (Baldwin et al. 2012) with the exception of updates posted on the Jepson eFlora (JFP 2020) website. Common names of plant species are derived from The Calflora Database (Calflora 2020). Vegetation communities described herein conform to the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and/or *A Manual of California Vegetation* (Sawyer et al. 2009); *Conservation Lands Network 2.0* (Bay Area Open Space Council 2019), or *California Vegetation* (Holland and Keil 1995).

Taxonomy and nomenclature for special status plant species conform to the *Inventory of Rare and Endangered Plants of California* (CNPS 2020) and *Special Vascular Plants, Bryophytes and Lichens List* (CDFW 2020d). Nomenclature for common and special status wildlife conforms to the *Complete List of Amphibian, Reptile, Bird and Mammal Species in California* (CDFW 2016) with taxonomic nomenclature updates conforming to the *Special Animals List* (CDFW 2020d).

Field Investigation

In support of Step 1 (Identify High-Value Resources and Associated Threats), Nomad Ecology senior botanist Heath Bartosh and senior wildlife biologist Meghan Bishop conducted a reconnaissance level site visits to assess habitat within the Sky Ranch Preserve on May 8, Bowman Canyon Preserve on May 15, and Heron Hill Preserve on May 15, 2020. The purpose of these site visits was to determine the potential of each property to support special status species and other important biological resources. A representative set of all vegetation communities within the study area were visited and evaluated for their potential to support sensitive wildlife and botanical resources. During the assessment, an inventory of plant and wildlife species observed was recorded.

In addition, previous protocol-level botanical surveys and vegetation mapping were conducted on the 167-acre portion of the Bowman Canyon Preserve on March 12, April 10, May 10, June 20, and September 10, 2019. These botanical surveys were conducted in accordance with the CNPS *Botanical Survey Guidelines* (CNPS 2001), CDFW *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018), and USFWS *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000).

GIS Mapping

Identifying High-Value Resources and Associated Threats (Step 1) and Assessing and Augmenting Existing Vegetation Data (Step 2) were facilitated by GIS mapping. Field data including the locations of vegetation communities, potential wetland locations, and special status plant species occurrences were collected using a handheld Global Positioning System (GPS) during both the reconnaissance-level site visits of all three properties and the protocol-level survey of the 167-acre portion of Bowman Canyon. Any data points collected were transferred to a desktop computer Geographic Information System (GIS) platform operating ESRI ArcGIS 10 for creating polygons and populating attribute tables. Vegetation communities, potential wetlands, and the locations of roads were also drawn by hand on hardcopy maps in the field which were heads-up digitized in-house. Attribute data associated with this shapefile includes vegetation community types or land cover (if anthropogenic), conservation status and acreage.

Wetlands observed on site or that appear in the National Wetlands Inventory (2020), including ponds, were also included in the mapping efforts. Watercourses were assigned a buffer of 230 feet, which assumes a 30-foot average channel and 100 feet from the top of each bank. A building footprint shapefile from Marin County was also utilized to assess edge and habitat fragmentation effects on the Preserves. These footprints were buffered 100 feet to account for these indirect effects.

The following vegetation types, based on descriptions by Holland (1986) or Holland and Keil (1995), are associated with the various criteria utilized in the matrix spreadsheet: Ruderal, Urban Mix, Non-Native Grassland, Native Grassland, Serpentine Grassland, Chamise Chaparral, Northern Coyote Brush Scrub / Sage Scrub, California Bay Forest, Coast Live Oak Forest, Black Oak Forest, Valley Oak Woodland, Mixed Evergreen Forest, Seasonal Wetland, and Pond.

Matrix Development

In order to Apply Criteria, Create Zone Maps, and Provide Rational and Limitations (Step 3), an attribute matrix spreadsheet was created for the criteria evaluation of Steps 1 (Identify High-Value Resources and Associated Threats) and 2 (Assess and Augment Existing Vegetation Data) of the Methodology. (Appendix B).

After vegetation in each Preserve was mapped with the GIS methodology discussed above, the GIS shapefiles of vegetation types were classified by zone using the specific attribute matrix criteria of data specific to each Preserve.

The following 19 attribute matrix criteria were identified, in part from the VBMP (2015) defined and a rationale for their use was provided within the Definitions and Rationale tab of the attribute matrix spreadsheet.

Attribute Matrix Criteria Definitions

- **Biodiversity Hotspots:** Areas of relatively high native biodiversity based on observations on site or known based on available literature.
- **Special Status Plants (Threatened & Endangered; T&E):** Plant species that have been listed as Threatened or Endangered (including candidates) under CESA and/or FESA.
- **Special Status Plants (CRPR):** Plant Species that have been listed by CNPS in the Rare Plant Inventory and given a California Rare Plant Rank of 1, 2, 3, or 4.
- **Locally Rare Plants / Plants of Limited Distribution:** Plant species that have been noted as locally rare by Marin County CNPS (Doreen Smith).
- **Plants of Limited Distribution:** No definition provided in VBMP, combined with Locally Rare.
- **Special Status Animals (T&E):** Animal species that have been listed as Threatened or Endangered (including candidates) under CESA and/or FESA.
- **Special Status Animals (Species of Special Concern; SSC):** A Species of Special Concern is a species, subspecies, or distinct population of an animal² native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria³:
 - is extirpated from the State or, in the case of birds, is extirpated in its primary season or breeding role;
 - is listed as Federally-, but not State-, threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed;
 - is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status;
 - has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.
- **Special Status Animals (Fully Protected; FP):** Animal (fish, amphibian, reptile, bird and mammal) species that are provided with additional protections to those animals that were rare or faced possible extinction; most fully protected species have also been listed as Threatened or Endangered under CESA and/or FESA.
- **Locally Rare Animals (Point Reyes Bird Observatory Conservation Science, Bird Species of Special Concern; PRBO):** Species that are considered by resource agencies or local experts as sensitive, declining, locally rare, locally endemic, or as having limited or restricted distribution.
- **Wildlife Corridors:** Derived from Conservation Lands Networks Critical Linkages (Penrod et al. 2013) or finer scale evaluations / observations of site.
- **Invasive Plants:** Invasive plant species that are identified in the VBMP (Pg. 4-44 through 4-50) as threats.
- **SOD:** Host trees with known infestations based on data from Sudden Oak Death mapper or observed on site.
- **Sensitive Natural Communities:** Natural Communities with ranks of G1, G2, and G3 (found in CDFW's Natural Communities List) are considered Sensitive Natural Communities based on the VBMP and are to be addressed in the environmental review processes of CEQA and its equivalents..
- **Upland Habitat Goal Sensitive:** Vegetation types based on the Conservation Lands Network Upland Habitat Goals effort. Vegetation types with a Rank of 1 or 2 are included here. Designations found in Table B.1 of the VBMP.

² For the purposes of this discussion, "animal" means fish, amphibian, reptile, bird and mammal

³ Criteria for fishes are similar except that Federally listed taxa are not defined as SSCs

- **Locally Rare Vegetation:** These are vegetation types that are known from 3 or fewer of the 34 MROSD preserves and vegetation at the edge of their range.
- **Wetlands:** Wetlands observed on site or appear in the National Wetlands Inventory, this includes stock ponds.
- **Streams:** Watercourses based on Marin County's stream centerline and buffered 230 feet, which assumes a 30-foot average channel and 100 feet from the top of each bank.
- **Land Birds:** Tree-dwelling, perching, songbirds, raptors, and ground-feeding birds that spend the majority of their lives in terrestrial environments.
- **Habitat Fragmentation, Edge Effects, and Vegetation Management:** Based on 100-foot buffer from adjacent residential boundaries (using county building footprints layer), vegetation management activities, fuel breaks, linear infrastructure (e.g. powerlines).

Each Preserve was analyzed individually based on the vegetation types and associated ecological assets or liabilities found within that Preserve. Under each vegetation type, the attribute matrix criteria defined above were identified as being present or absent within that vegetation type based on background research, field surveys, and other available data. All special status plants and invasive plant species that were observed during protocol-level plant surveys were identified under each of the associated vegetation types. All wildlife species (T&E, SSC, FP, PRBO, and Land Birds) were assigned a Presence rank of “Possible” within each vegetation type, based on CNDDDB occurrences in the area and accounted for their movement patterns. If a special status species was known to occur in land parcels adjacent to the Preserve in question, or similarly, if a land bird species was recorded in the vicinity of that Preserve, it was considered to be possibly present within that Preserve (CNDDDB 2020; eBird 2017; Nomad Ecology 2019a, 2019b, 2019c; Shuford 1993). Additionally, wildlife corridors, incidents of Sudden Oak Death (SOD), sensitive natural communities, wetlands, streams, and negative ecological impacts observed, or present based on available data within that Preserve were identified within the appropriate vegetation type in the matrix spreadsheet.

Upon completion of data compilation within the matrix spreadsheet, each vegetation type was classified into one of the four vegetation management zones outlined by the VBMP (2015).

Limitations

General

Reconnaissance-level survey coverage was limited by, size of the Preserves, density of some of the vegetation, and steep terrain, and amount of time budgeted. Based on the timing of the assessment, and the sampling intensity, it was not possible to rule out the presence of certain potentially occurring special status plant, fish, or wildlife species. However, inferences on presence or absence were possible for specific special status plant species with blooming periods corresponding to the May 2020 site visits. Negative findings during the site visits or focused surveys may not indicate absence unless field surveys conform to agency approved protocols. Moreover, for many species it is virtually impossible to prove absence even if surveys conform to approved protocols.

The CNDDDB tracks user-submitted occurrences of all special status species in California and is used extensively as a reference for regulatory and planning purposes (CNDDDB 2020). This database may substantially under-represent actual densities of species, particularly for species that are difficult to detect and for areas that are in private land ownership and have not been surveyed. It is also likely to under-represent densities of species that are not prominent in regulatory permitting or environmental planning settings.

Plants

Based on the timing of the site visits, all plant species growing in each of the study areas may not have been observed due to varying flowering phenologies and life forms, such as bulbs, biennials, and annuals. Other potentially dominant species within vegetation communities on site may be present during other times of the year. Therefore, the present study is not floristic in nature, except for the 167-acre portion of the Bowman Canyon Preserve. A floristic study not only requires every plant observed to be identified to a level necessary to determine their regulatory status, it also necessitates a sufficient number of site visits spaced throughout the growing season within the blooming periods of all plant species, including common taxa, to ensure a complete inventory is obtained (CDFW 2018). Some of the plant species identified in this report are tentative due to the absence of morphological characters, resulting from immature reproductive structures or seasonal desiccation, which is required to make species-level determinations. In these cases *cf* (compares to) is used to indicate provisional species identification based on gestalt, vegetative morphology and/or a species' known range.

Since vegetation types are based on samples from selected seasonal vegetation descriptions, and their associate species may be subject to change if additional data are collected, annual species dominance may change depending on the sample season or year. Other potentially dominant species within vegetation communities on site may be present during other times of the year.

Animals

Several factors constrained the ability to identify all of the wildlife species that occur within each of the Preserves. Songbirds are most easily detected in the early morning or late evening, rather than during other times of the day. Due to the scope of work, not all habitat types could be surveyed during the optimal time for bird detection. Similarly, owls and bats are most easily detected at night. The activity pattern or presence of some species can be highly variable and unpredictable. Although the timing of the surveys inhibited the detection of birds, it likely facilitated the detection of other taxa. Finally, one reconnaissance visit is not sufficient for identifying all wildlife that may winter, breed, forage, or migrate through the project area.

Determinations were made for these species due to the presence of suitable habitat, known occurrences in the area, and/or the property being within the species' range. There is potential for the study area to support other listed species besides those discussed in the results below, and this should not be considered a comprehensive list since there are many bird and bat species that could potentially migrate through or occasionally utilize the study area. Additionally, the study area has the potential to support many other non-listed nesting bird species, roosting bat species, and a variety of other wildlife species. The area is also important for movement corridors and for habitat connectivity for all wildlife, including large mammals.

EXISTING CONDITIONS

Bowman Canyon Preserve

The 443-acre Bowman Canyon Preserve is located in unincorporated northeastern Marin County, California, within the Petaluma River (34852) and Novato (32627) 7.5-minute USGS topographic quadrangles. Bowman Canyon Preserve is located west of the City of Novato and east of Stafford Lake and is accessed from Bowman Canyon Road. Bowman Canyon Preserve contains ranch roads and trails that do not currently connect with Mount Burdell's designated roads and trails. Elevation at the site ranges from approximately 160 feet (49 meters) to 967 feet (295 meters).

The topography of Bowman Canyon Preserve is comprised of a central ridge with its summit near the northern end of the property. The slope north of the summit is north facing Serpentine Grassland with rock outcrops. The slopes on either side of the ridge are steep Non-Native Grasslands and Purple Needlegrass Grasslands becoming Oak Woodland and California Bay Forest at lower elevations. The slope east of the

ridge descends into a canyon that carries a stream with seasonally wet pools and then back up into Chamise Chaparral at the far eastern boundary. Other drainages within Bowman Canyon Preserve include an unnamed creek in the southwest, and another unnamed creek on the eastern edge of the study area. Both creeks carry flow during the wet season, into the spring months, and are dry towards the end of summer. There is also a spring-fed seasonal pond on the west side of the property.

The vegetation communities found within Bowman Canyon Preserve include: Ruderal, Non-Native Grassland, Native Grassland (Purple Needlegrass Grassland, Idaho Fescue Grassland), Serpentine Grassland, Chamise Chaparral, Northern Coyote Brush Scrub / Sage Scrub, California Bay Forest, Coast Live Oak Forest / Woodland, Black Oak Forest, Valley Oak Woodland, Mixed Evergreen Forest and Seasonal Wetland.

Table 1. Vegetation Types in the Bowman Canyon Preserve

VEGETATION TYPE	ACREAGE
<u>Upland Herbaceous Dominated Vegetation Types</u>	
Non-Native Grassland	150.78
Purple Needlegrass Grassland	13.30
Serpentine Grassland	45.28
<u>Shrub Dominated Vegetation Types</u>	
Chamise Chaparral	4.89
Northern Coyote Brush Scrub / Sage Scrub	4.00
<u>Woodland and Forest Vegetation Types</u>	
California Bay Forest	63.09
Coast Live Oak Forest / Woodland	48.23
Black Oak Forest	1.35
Mixed Evergreen Forest	66.18
Valley Oak Woodland	9.91
<u>Wetland Herbaceous Dominated Vegetation Types</u>	
Seasonal Wetland	0.05
<u>Other</u>	
<i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i> Stand	0.55
Ruderal	8.00
Road	6.50
Total:	422.11

Heron Hill Preserve

The 15-acre Heron Hill Preserve is located just northeast of the unincorporated community of Cerro in Marin County, California, within the Novato (32627) 7.5-minute USGS topographic quadrangle. Heron

Hill Preserve is west of China Camp State Park, south of Buck's Landing at the mouth of Gallinas Creek and just north of the District's San Pedro Mountain Open Space Preserve. Heron Hill is accessed from North San Pedro Road. This Preserve consists of land that is on the edge of a suburban area and contains trails running from the parking area up to the top of the hill. Elevation at the site ranges from approximately 78 feet (24 meters) to 440 feet (134 meters).

The topography of Heron Hill Preserve is comprised of a north to south running ridgeline on the eastern edge of the property with its summit near the southern end just outside of the property. Most of Heron Hill Preserve is comprised of Mixed Evergreen Forest; however, the western portion of the preserve is classified as Urban Mix, the former residence on site and the presence of large stands of eucalyptus trees. The north eastern portion of Heron Hill is comprised of Non-native Grassland and Northern Coyote Brush Scrub. A small ephemeral drainage flows north through the central portion of the preserve and empties into a small pond along the northern boundary of the property. This pond is completely shaded by eucalyptus trees and did not appear to provide suitable habitat for special status species during the site visit due to the surrounding disturbed habitat and lack of connectivity to suitable habitat.

The vegetation communities found within Heron Hill Preserve include: Non-Native Grassland, Northern Coyote Brush Scrub, Mixed Evergreen Forest, Pond, and Urban Mix / Developed.

Table 2. Vegetation Types in the Heron Hill Preserve

VEGETATION TYPE	ACREAGE
<u>Upland Herbaceous Dominated Vegetation Types</u>	
Non-Native Grassland	1.03
<u>Shrub Dominated Vegetation Types</u>	
Northern Coyote Brush Scrub	0.31
<u>Woodland and Forest Vegetation Types</u>	
Mixed Evergreen Forest	11.25
<u>Wetland Herbaceous Dominated Vegetation Types</u>	
Pond	0.04
<u>Other</u>	
Urban Mix / Developed	3.95
Total:	16.58

Sky Ranch Preserve

The 16-acre Sky Ranch Preserve area is a U-shaped property located south of Fairfax and east of San Anselmo, in Marin County, California. Sky Ranch Preserve is located within the San Rafael (37122) 7.5-minute USGS topographic quadrangle and is accessed from Crest Road in Fairfax. Sky Ranch Preserve shares its southwestern border with the Mount Tamalpais Watershed area of the Marin Municipal Water District and its southeastern border with the Marin County Park, Bald Hill Open Space Preserve. The elevation at Sky Ranch ranges from approximately 400 feet (121 meters) to 600 feet (182 meters).

The northeastern portion of Sky Ranch Preserve is near the crest of the hill with sloping valleys to the south and western sides. Crest Road runs up through the northwestern portion of the preserve and then turns into

a dirt access road surrounded by a disturbed Ruderal landscape at the heart of the property. Non-native Grassland, Native Grassland, and Northern Coyote Brush Scrub surround the Ruderal access road area, which are in turn surrounded by the California Bay Forest and Coast Live Oak Forest that make up the rest of Sky Ranch Preserve. Small ephemeral drainages run off the edges of the property. The VBMP (2015) reports that the Bald Mountain Open Space Preserve does not have any maintained trails, however the Deer Park Trailhead of the Mount Tamalpais / Marin Municipal Water District is located just southwest of Sky Ranch Preserve. Areas with rural residences are located closely adjacent to the western and eastern boundaries of the Preserve. This Preserve used to include several building pads according to Marin County data of building footprints.

The vegetation communities found within Sky Ranch Preserve include: Ruderal, Non-Native Grassland, Native Grassland (Purple Needlegrass Grassland, Blue Wildrye Grassland), Northern Coyote Brush Scrub, California Bay Forest, and Coast Live Oak Forest / Woodland.

Table 3. Vegetation Types in the Sky Ranch Preserve

VEGETATION TYPE	ACREAGE
<u>Upland Herbaceous Dominated Vegetation Types</u>	
Non-Native Grassland	2.29
Purple Needlegrass Grassland Blue Wildrye Grassland	0.22
<u>Shrub Dominated Vegetation Types</u>	
Northern Coyote Brush Scrub	0.38
<u>Woodland and Forest Vegetation Types</u>	
California Bay Forest	7.72
Coast Live Oak Forest / Woodland	2.96
<u>Other</u>	
<i>Genista monspessulana</i>	1.37
<i>Phalaris aquatica</i> / <i>Carduus pycnocephalus</i> subsp. <i>pycnocephalus</i> Stands	0.12
Ruderal	0.66
Road	0.46
Total:	16.23

VEGETATION MANAGEMENT ZONE CLASSIFICATION RESULTS

Bowman Canyon Preserve

The Bowman Canyon Preserve is the largest of the three Preserves studied in this scope and was determined to contain areas that fit into all four of the Vegetation Management Zones. Based on a review of available databases and literature, familiarity with local flora and fauna, the presence of specific vegetation types, and reconnaissance site assessments, nine special status plant species were observed and eleven special status animal species could potentially occur within the Bowman Canyon Preserve. A list of these plant and animal species is included in the attribute matrix excel spreadsheet. Table 4 provides all the vegetation

types present in Bowman Canyon Preserve and their associated Vegetation Management Zone determinations. Zone determinations for each vegetation type were made based on the potential presence of special status plant and animal species (according to their life history traits), the value that is contributed to habitat connectivity and wildlife corridors, the amount of invasive plants it supports, the presence of biodiversity hot spots, and the amount of habitat fragmentation and edge effects that were observed during site visits.

Overall, the majority of vegetation types are ecologically intact except for minor fragmentation by fire / access roads along the ridgetops and near the northern boundary. However, adjacent land-uses practices have greatly degraded the quality of vegetation types, particularly in the valley bottoms on the south side of the preserve along Novato Boulevard. The valley bottom grasslands are mowed routinely and the nearby dairy operations use these areas to dispose of cattle manure. Novato Boulevard also acts as an invasive plant vector from weeds establishing in the road shoulder and colonizing the edge of the preserve.

It should be noted that California Bay Forest, which was assigned to the Sustainable Natural Systems Zone, may qualify for Legacy Zone status. The California Bay Forest within the Bowman preserve appeared to have an age, structure, and composition that is not typical of this vegetation type in the region. Many of the individual California Bay trees (*Umbellularia californica*) within this preserve were large in both diameter at breast height (DBH) and height. Several of these individual trees appeared to have gone through many fire events, given the size of their burls⁴, which also lends to an inference about their age. Due to the age of these trees, their large stature also creates a canopy structure that is unique to other, younger and wind sculpted bay forests in the region. The canopy is taller, and density of trees is lower in the California Bay Forest on Bowman. The understory composition of this vegetation type on Bowman comprises greater diversity than the typical California Bay Forest, which are most often void of understory vegetative cover. The understory of this forest type on Bowman comprised mature ferns, perennial herbs, and scattered shrubs.

Coast Live Oak Woodland at Bowman may also qualify for Legacy zone status, at least on the southeastern boundary due to the presence of two CRPR species present; Franciscan onion (*Allium peninsulare* var. *franciscanum*; 1B.2) and Napa false indigo (*Amorpha californica* var. *napensis*; 1B.2). Although Napa false indigo is known from nearby Mount Burdell, the Franciscan onion at Bowman was a new Marin County record as it had never been recorded before in the county.

These aspects of California Bay Forest and Coast Live Oak Woodland on Bowman should be considered if the District looks to reevaluate the Sustainable Natural Systems Zone designation it has been assigned.

The summary below breaks down the vegetation types by Vegetation Management Zone.

- **Highly Disturbed Zone:** Only contains the Ruderal vegetation type due to its proximity to the road, the presence of transmission utilities, the amount of invasive plant species and lack of special status plants, the low quality of habitat for special status wildlife and wildlife corridors, and habitat degradation from the spread of manure by local dairy operations.
- **Natural Landscape Zone:** Includes Non-native Grasslands due to the high amount of invasive plants, the lack of special status plants, low quality of habitat for wildlife corridors, and some edge effects from the adjacent residential subdivision. Non-native Grassland also acts as a good buffer between the Highly Disturbed Zone and the other two higher level zones.
- Sustainable Natural Systems Zone includes Chamise Chaparral, Northern Coyote Brush Scrub / Sage Scrub, California Bay Forest, Coast Live Oak Forest, and Mixed Evergreen Forest vegetation

⁴ California bay is a fire adapted species by stump sprouting from a burl after fire.

types were all classified into the Sustainable Natural Systems Zone based on their lower amount of invasive plants, special status plants observed, presence of habitats that are supportive of special status animals, moderate quality habitat for wildlife corridors, and lack of evidence of edge effect or habitat fragmentation.

- Legacy Zone within the Bowman Canyon Preserve was determined to contain Native Grassland, Serpentine Grassland, Seasonal Wetland, Black Oak Forest, and Valley Oak Woodland vegetation types. These vegetation types were categorized into the highest-level zone based on their lack of invasive plants species, presence of special status plants and sensitive natural communities, high quality habitat for special status animals and wildlife corridors, and lack of edge effects and habitat fragmentation.

Table 4. Vegetation Types and Vegetation Management Zones for Bowman Canyon Preserve

VEGETATION TYPE	VEGETATION MANAGEMENT ZONE	RATIONALE
Ruderal	Highly Disturbed Zone	Area next to Novato Road contribute to Edge Effects Power lines present Area with high amount of invasive plants No special status plants observed Habitat least supportive of special status animals Low wildlife corridor value Manure spread in this area from local dairy operations
Non-Native Grassland	Natural Landscape Zone	Area with high amount of invasive plants No special status plants observed Habitat supportive of special status animals Low quality habitat for wildlife corridors Acts as buffer around more important zones Edge effects and habitat fragmentation present
Native Grassland Purple Needlegrass, Idahoe Fescue	Legacy Zone	Area with lower amount of invasive plants No special status plants observed Habitat supportive of special status animals Moderate quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
Serpentine Grassland	Legacy Zone	Area with lower amount of invasive plants Special status plants present Habitat supportive of special status animals High quality habitat for wildlife corridors Hot spot of biodiversity No evidence of edge effect or habitat fragmentation
Chamise Chaparral	Sustainable Natural Systems Zone	No invasive plant observed Special status plants present

VEGETATION TYPE	VEGETATION MANAGEMENT ZONE	RATIONALE
		Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
Northern Coyote Brush Scrub / Sage Scrub	Sustainable Natural Systems Zone	No invasive plant observed Special status plants present Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
California Bay Forest	Sustainable Natural Systems Zone	No invasive plants observed Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
Coast Live Oak Forest	Sustainable Natural Systems Zone	No invasive plant observed Special status plants present Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
Black Oak Forest	Sustainable Natural Systems Zone	No invasive plant observed Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
Valley Oak Woodland	Legacy zone	No invasive plant observed Special status plants present Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation

VEGETATION TYPE	VEGETATION MANAGEMENT ZONE	RATIONALE
Mixed Evergreen Forest	Sustainable Natural Systems Zone	No invasive plant observed Habitat supportive of special status animals High quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation
Seasonal Wetland	Legacy Zone	No invasive plant observed Special status plants present Habitat supportive of special status animals Moderate quality habitat for wildlife corridors No evidence of edge effect or habitat fragmentation

Heron Hill Preserve

The Heron Hill Preserve is the smallest of the three preserves studied in this scope and was determined to contain areas that fit into two of the Vegetation Management Zones. Based on a review of available databases and literature, familiarity with local flora and fauna, the presence of specific vegetation types, and reconnaissance site assessments, one special status plant species was observed and three special status animal species could potentially occur within the Heron Hill preserve. A list of these plant and animal species is included in the attribute matrix (Excel spreadsheet). Table 5 provides all the vegetation types present in Heron Hill Preserve and their associated Vegetation Management Zone determinations.

Overall, the condition of Heron Hill is a result of surrounding residential subdivision and ornamental plantings. Much of the understory of the woodlands on this preserve are dominated by invasive French broom (*Genista monspessulana*), although other less invasive non-native weeds are also present. A lack of fire, presumably due to fire suppression, has led to an overstocked condition. Despite these aspects of Heron Hill there are remnant patches of native grasses, not large enough to form vegetation communities, present on the eastern ridge that could be enhanced and expanded.

The summary below breaks down the vegetation types by Vegetation Management Zone.

- **Highly Disturbed Zone:** includes Urban Mix vegetation type, which the only type categorized into this zone for the Heron Hill Preserve due to its proximity to neighborhoods and the presence of transmission lines, the high amount of invasive plants, the lack of special status plants observed, the habitat is not supportive of special status animals or wildlife corridors, and presence of major edge effects and habitat fragmentation.
- **Natural Landscape Zone:** includes Non-Native Grassland, Northern Coyote Brush Scrub, Mixed Evergreen Forest, and Pond, which were classified into this Zone because there is a high presence of invasive plants, few special status plants are present, the habitat is least supportive of special status animals and provide low quality for wildlife corridors, and edge effects and habitat fragmentation are present throughout.

Table 5. Vegetation Types and Vegetation Management Zones for Heron Hill Preserve

VEGETATION TYPE	VEGETATION MANAGEMENT ZONE	RATIONAL
Non-Native Grassland	Natural Landscape Zone	Invasive plants present Special status plants present Habitat least supportive of special status animals Low quality habitat for wildlife corridors Acts as buffer around more important zones Edge effects and habitat fragmentation present
Urban Mix	Highly Disturbed Zone	Area near neighborhoods Power lines present Area with high amount of invasive plants No special status plants observed Habitat not supportive of special status animals No wildlife corridor value Edge effects and habitat fragmentation present
Northern Coyote Brush Scrub	Natural Landscape Zone	No invasive plants observed No special status plants observed Habitat supportive of special status animals High quality habitat for wildlife corridors Acts as buffer around more important zones No evidence of edge effect or habitat fragmentation
Mixed Evergreen Forest	Natural Landscape Zone	Invasive plants present No special status plants observed Habitat supportive of special status animals Moderate quality habitat for wildlife corridors Acts as buffer around more important zones Edge effects and habitat fragmentation present
Pond	Natural Landscape Zone	No invasive plants observed No special status plants observed Habitat not supportive of special status animals Moderate quality habitat for wildlife corridors Edge effects and habitat fragmentation present

Sky Ranch Preserve

The Sky Ranch Preserve was determined to contain areas that fit into three of the Vegetation Management Zones. Based on a review of available databases and literature, familiarity with local flora and fauna, the presence of specific vegetation types, and reconnaissance site assessments, no special status plant species were observed and six special status animal species could potentially occur within the Heron Hill preserve. A list of these plant and animal species is included in the attribute matrix (Excel spreadsheet). Table 6

provides all the vegetation types present in Heron Hill Preserve and their associated Vegetation Management Zone determinations.

Overall, vegetation communities within Sky Ranch have been degraded by surrounding residential subdivision and its former use boarding horses and other livestock, which is visible on Google Earth aerial imagery prior to 2017. These land-uses have impacted the habitat directly from development and indirectly through the expansion on invasive plant species. It should be noted that although Native Grassland is present its quality is reduced due to the presence of invasive species and was therefor put into the Natural Landscape Zone.

The summary below breaks down the vegetation types by Vegetation Management Zone.

- **Highly Disturbed Zone:** includes Non-Native Grassland, which is based on a high amount of invasive plants, no special status plants observed, the habitat is least supportive of special status animals and provides a low quality habitat for wildlife corridors, and edge effects and habitat fragmentation are present due to access roads and recreational use areas.
- **Natural Landscape Zone** includes: Native Grassland and Northern Coyote Brush Scrub because invasive plants are present and no special status plants were observed, the habitat is supportive of special status animals and contributes a high quality of habitat for wildlife corridors, these areas acts as buffers around the more important zones, and edge effects and habitat fragmentation are present.
- **Sustainable Natural Systems Zone:** contains the California Bay Forest and Coast Live Oak Forest vegetation types. These forested areas are host to a lower amount of invasive plants species, no special status plants were observed, the habitat is supportive of special status animals and provides high quality habitat for wildlife corridors, and edge effects and habitat fragmentation are still present but in lower amounts.

Table 6. Vegetation Types and Vegetation Management Zones for Sky Ranch Preserve

VEGETATION TYPE	VEGETATION MANAGEMENT ZONE	RATIONAL
Ruderal	Highly Disturbed Zone	Area near access roads Area with high amount of invasive plants No special status plants observed Habitat least supportive of special status animals Low quality habitat for wildlife corridors Edge effects and habitat fragmentation present
Non-Native Grassland	Highly Disturbed Zone	Area with high amount of invasive plants No special status plants observed Habitat least supportive of special status animals Low quality habitat for wildlife corridors Edge effects and habitat fragmentation present
Native Grassland Purple Needlegrass, Blue Wildrye	Natural Landscape Zone	Invasive plants present No special status plants observed Habitat supportive of special status animals High quality habitat for wildlife corridors

VEGETATION TYPE	VEGETATION MANAGEMENT ZONE	RATIONAL
		Acts as buffer around more important zones Edge effects and habitat fragmentation present
Northern Coyote Brush Scrub	Natural Landscape Zone	Invasive plants present No special status plants observed Habitat supportive of special status animals High quality habitat for wildlife corridors Acts as buffer around more important zones Edge effects and habitat fragmentation present
California Bay Forest	Sustainable Natural Systems Zone	Invasive plants present No special status plants observed Habitat supportive of special status animals High quality habitat for wildlife corridors Edge effects and habitat fragmentation present
Coast Live Oak Forest	Sustainable Natural Systems Zone	Invasive plants present No special status plants observed Habitat supportive of special status animals High quality habitat for wildlife corridors Edge effects and habitat fragmentation present

DISCUSSION

Bowman Canyon Preserve

The Bowman Canyon Preserve has a rich assemblage of high-quality vegetation communities that support special status species. It is a large swath of land that nearly connects Little Mountain Preserve with Mount Burdell Preserve. With that connectivity it extends the border of contiguous wild spaces contributing to the conservation of biodiversity in the area and increases protected spaces for critical linkages and wildlife corridors. Vegetation management strategies that are already in place for Mount Burdell Preserve (VBMP 2015) would also serve well on the Bowman Canyon Preserve. These strategies include, removal of invasive plant species, protecting sensitive habitats and riparian areas from grazing and human recreational activities, planting native vegetation, and protecting and enhancing suitable habitat for special status animal species.

Heron Hill Preserve

The Heron Hill Preserve includes vegetation types that have been impacted by former development and invasive weed infestations, although some native integrity remains. Management strategies that we suggest for Heron Hill Preserve include removal of invasive species such as French broom (*Genista monspessulana*), protection of natural habitats from human recreational activities, and making efforts to protect the open space of Heron Hill preserves between China Camp State Park to the southeast and San Pedro Mountain Open Space Preserve to the southwest.

Sky Ranch Preserve

Similar to Heron Hill, the Sky Ranch Preserve has a land use history that includes former building pads however, the woodlands and some of the grasslands on site have intact native ecosystems and connect to larger preserves and watershed lands. As such, wildlife corridors and large areas of contiguous habitat should be protected and possibly enhanced on the Sky Ranch Preserve. Designated critical habitat for Northern Spotted Owl is also just south of the Sky Ranch Preserve. However, it also has wildland urban interface surrounding the northern half of the Preserve. Management strategies for this Preserve should include protocol level surveys for Northern Spotted Owl and efforts to increase suitable owl habitat. Control of invasive species and protections from human impacts would also be beneficial.

CONCLUSION

The acquisition of Bowman, Heron Hill and Sky Ranch Preserves fulfill a number of the goals and strategies that are consistent with the District's guiding documents and make valuable connections to existing parks and open spaces currently owned by Marin County Open Space District as well as lands owned by other agencies. The purpose of this letter was to provide results of Vegetation Management Zone (VMZ) designations for these three recently acquired Preserves. Based on our assessment, these Preserves support suitable habitat for special status plants, special status animals, and a number of land bird species and provide important habitat for wildlife corridors. Many natural communities are represented in the Bowman, Heron Hill and Sky Ranch Preserves which overall contribute to the beauty and biodiversity of Marin County landscapes.

Please feel free to contact me at (925) 228-3027 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Heath Bartosh', with a stylized, cursive script.

Heath Bartosh
Senior Botanist
Rare Plant Specialist
Nomad Ecology, LLC

Attachment A – Figures

REFERENCES

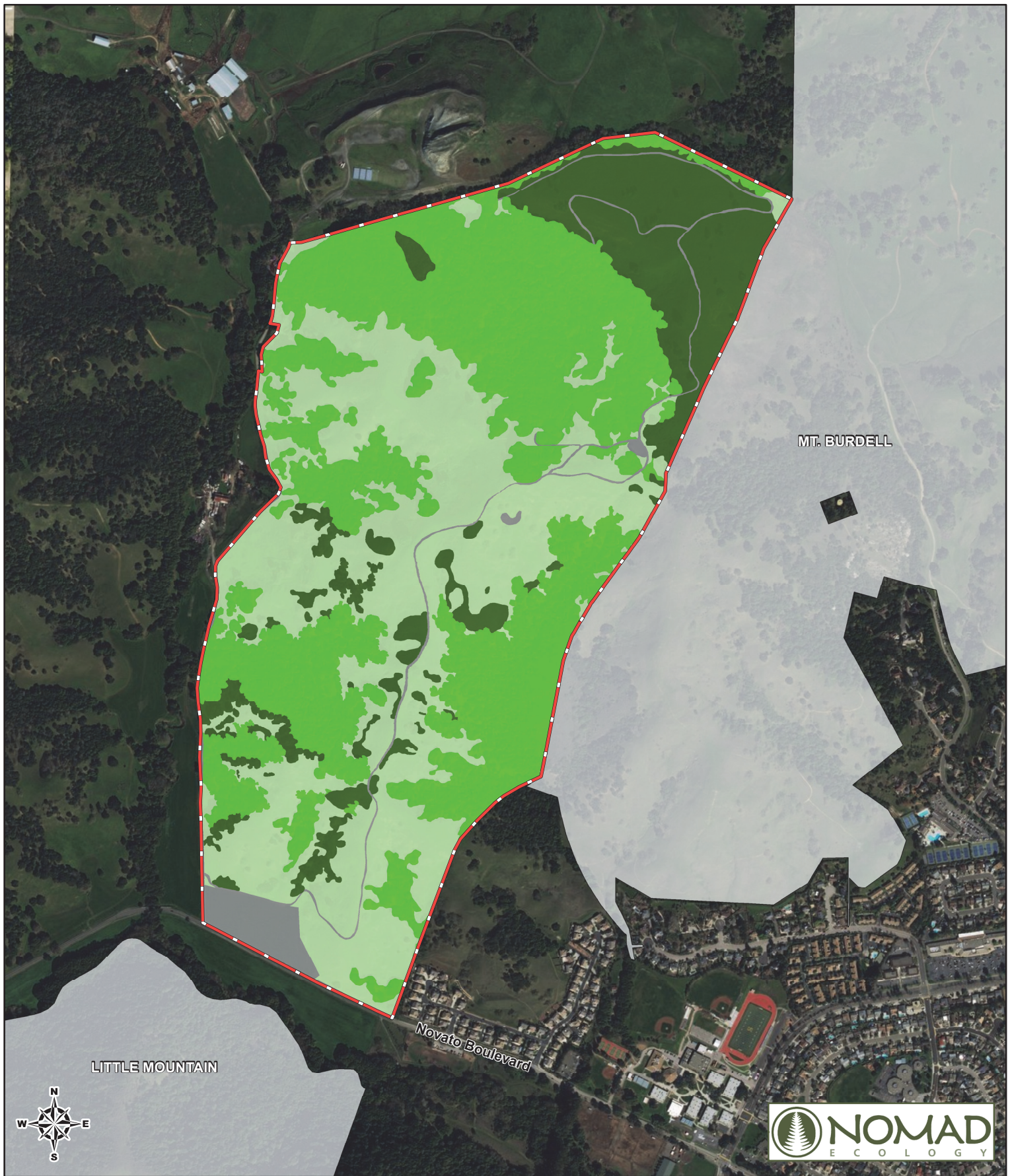
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Attachment A

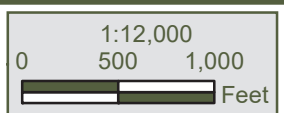


August 2020

Attachment A



Figure 2
Bowman Vegetation Zoning
 Vegetation Management Zone Classification
 Marin County Parks



Sources: ESRI, Marin County Parks

Marin County, California

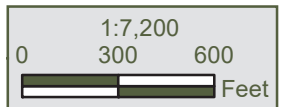


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Attachment A



Figure 3
Heron Hill Vegetation Zoning
 Vegetation Management Zone Classification
 Marin County Parks



Sources: USGS

Marin County, California



August 2020

Attachment A

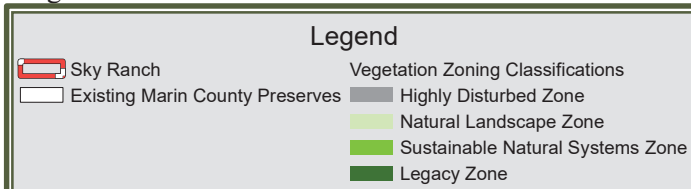
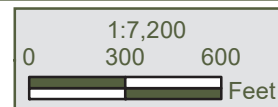


Figure 4
Sky Ranch Vegetation Zoning
 Vegetation Management Zone Classification
 Marin County Parks



Sources: USGS

Marin County, California