Final

RAMONA GRASSLANDS, SANTA YSABEL, AND BOULDER OAKS PRESERVES

Grazing Management Plan

Prepared for
County of San Diego
Department of Parks and Recreation

October 15, 2019

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CHAPTER 1
Introduction

The purpose of this Grazing Management Plan is to provide guidance to the County of San Diego (County) Department of Parks and Recreation (DPR) for the management of natural resources through grazing on Ramona Grasslands, Santa Ysabel, and Boulder Oaks Preserves. These Preserves are managed for multiple goals and objectives, including recreational opportunities, biodiversity and sensitive species conservation, and wildfire risk management.

Historically, these Preserves have been grazed by domestic livestock. DPR continues to oversee cattle grazing of these Preserves in order to meet specific management goals and objectives recommended in Preserve Resource Management Plans. ESA has reviewed current grazing management and resources for these properties. Specific goals and objectives relating to grazing management and grazing management prescriptions have been developed that would facilitate progress towards achieving these goals and objectives for each of the Preserves. In addition, performance standards and a monitoring plan were developed to determine compliance with the Grazing Management Plan. A discussion of the effectiveness of the management prescriptions in achieving the goals and objectives is presented.

This analysis was completed using historical Residual Dry Matter (RDM) monitoring data and GIS layers provided by DPR (specifically for the Ramona Grasslands and Santa Ysabel Preserves), Resource Management Plans prepared for these Preserves as referenced throughout this document, and field observations from a site visit conducted for each Preserve by ESA biologist and Certified Rangeland Manager Philip Brownsey in September 2018. Additionally, the Natural Resources Conservation Service (NRCS) soils survey data (NRCS 2015) was queried for each of the three Preserves.

CHAPTER 2
Existing Conditions

2.1 Project Setting

This Plan focuses on three Preserves in the Peninsular Ranges within central San Diego County, each owned and managed by County DPR. The three Preserves include Ramona Grasslands Preserve, Santa Ysabel Preserve, and Boulder Oaks Preserve (**Figure 1**). The total project area consists of approximately 11,092 acres between all three Preserves, with up to 8,002 acres potentially available for livestock grazing. Elevations for the sites range from 1,350 to 4,292 feet above mean sea level.

This section describes the general environmental setting for each of the three Preserves with respect to designated grazing Management Units as identified in the respective Resource Management Plans for each Preserve (as referenced below).

2.1.1 Ramona Grasslands Preserve

Preserve Location

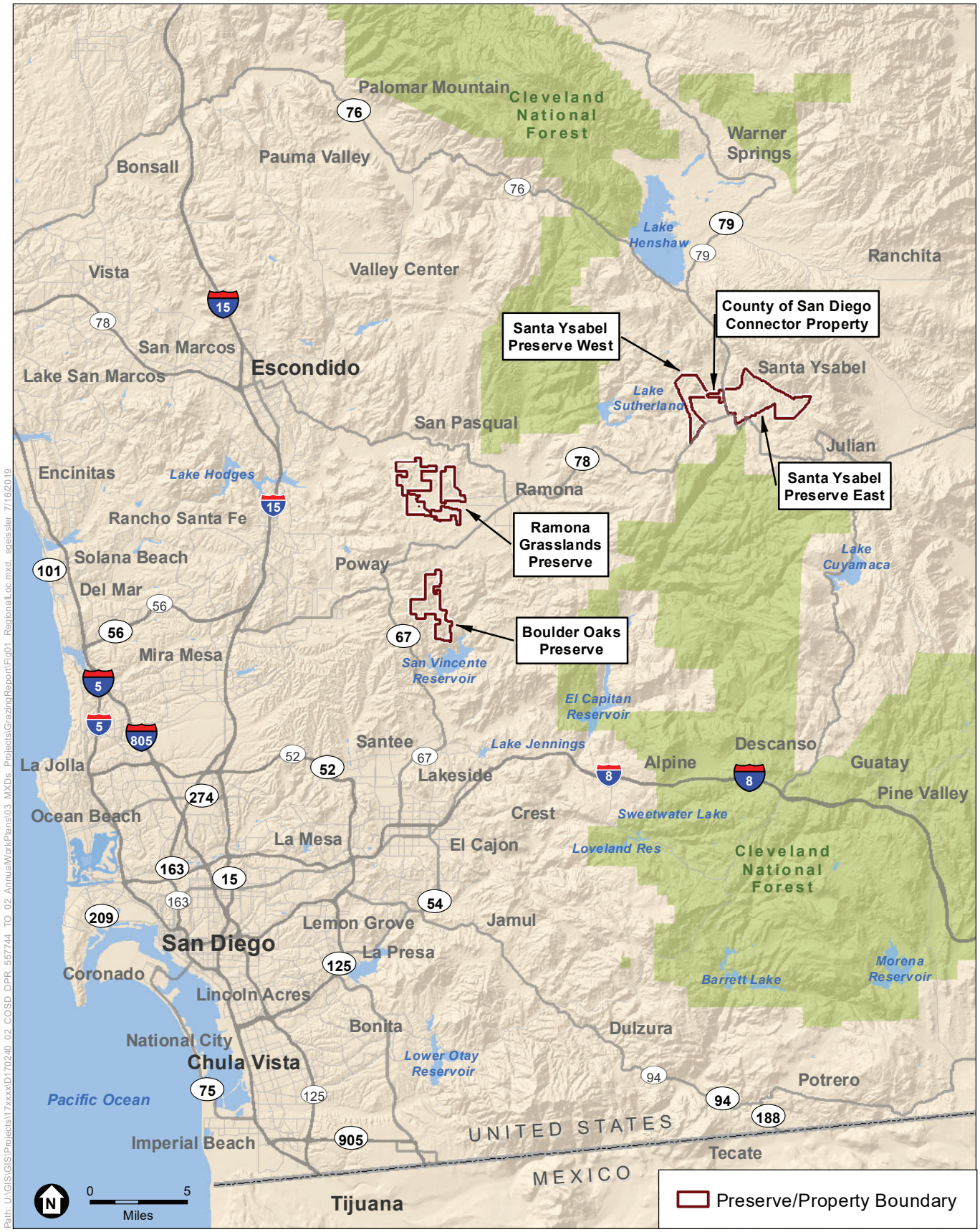
The Ramona Grasslands Preserve consists of approximately 3,490 acres in San Diego County[1], of which approximately 2,361 acres are available to grazing. Ramona Grasslands Preserve is primarily in the northwestern portion of the unincorporated community of Ramona in the Santa Maria Valley, adjacent to the Ramona Airport (**Figure 2**).

Physical Conditions

Climate

Average annual precipitation in the area of Ramona, California averages about 16 inches per year, primarily falling from November to April. Annual precipitation can fluctuate greatly from year to year, as is typical of Mediterranean climates, and the timing and amount of precipitation received has a large effect on forage production each year.

[1] In 2018 a 123-acre property was acquired that is located directly to the north of the northwest portion of the Preserve. As of October 2019, a biological resources inventory has not been performed for the property and an analysis of the property for grazing has not been performed. This Plan does not currently propose grazing for this property. When biological resources inventory surveys are completed this Plan will be updated.



SOURCE: ESRI

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Figure 1
Regional Location

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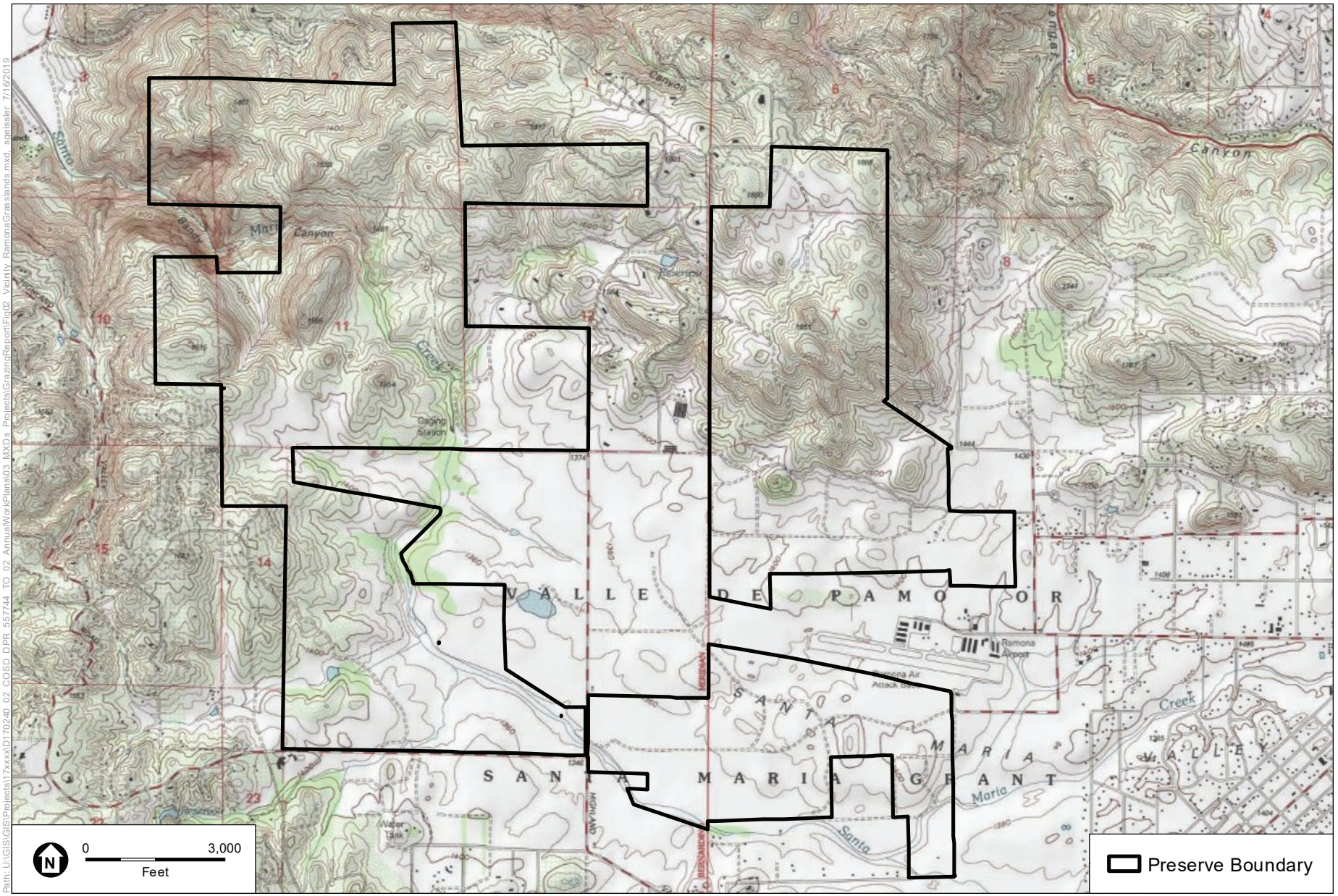

SOURCE: USGS 7.5' Topo Quad San Pasqual 1980, 1984

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Figure 2

Vicinity Map

Santa Ysabel Preserve East, West, and Connector Property

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Geology

The Ramona Grasslands Preserve is within the Santa Maria Valley, which consists of a broad basin surrounded by gentle hills and rocky rises ranging in elevation from approximately 410 meters (m) (1,350 feet [ft]) above mean sea level (AMSL) along the valley floor to over 518 m (1,700 ft) AMSL in the rocky hills of the northern sections of the Ramona Grasslands Preserve. The Ramona Grasslands Preserve comprises four properties referred to as: northwest area, southwest area, northeast area and southeast area of the Ramona Grasslands Preserve (Figure 2). The northwestern area of the Ramona Grasslands Preserve is west of Rangeland Road and is generally north of the Ramona Municipal Water District property. It is characterized by rocky hills bisected by Bandy Canyon, through which the Santa Maria Creek flows. The southwest area of the Ramona Grasslands Preserve is generally south and west of the Ramona Water District property and consists of rolling hills with rocky outcrops and areas of oak woodlands that transition into the lower topography grasslands to the south. The southern boundary is Highland Valley Road and Santa Maria Creek also flows through this area. The northeast area of the Ramona Grasslands Preserve is located east of Rangeland Road and north of the Ramona Airport. It is characterized by rocky chaparral-covered hillsides in the north and lower topography grasslands in the south. The southeast area of the Ramona Grasslands Preserve is east of Rangeland Road and south of the Ramona Airport. This area consists of low, rolling hills supporting grasslands and rocky outcrops. The Santa Maria Creek channel follows the southern boundary.

Soils

The Santa Maria Valley is located within the western zone of the Peninsular Ranges Batholith. Granodiorite outcrops from this uplifted structure occur across the grasslands of the Santa Maria Valley and dominate the hilltops, where relatively deep, well-drained soils of decomposed granodiorites slope away from them. Lower-lying areas tend to support heavier clay soils, with shallow or surface expression of clay hardpans, and these soils sometimes develop characteristic vernal pool/mima mound topography. Gabbro outcrops can also be found scattered throughout the grasslands and influence plant associations. Several general soil associations are represented within the Ramona Grasslands Preserve: acid igneous, Bonsall, Bonsall-Fallbrook, Bonsanko, Cieneba, Cieneba-Fallbrook, Fallbrook, Las Posas, Placentia, Ramona, Tujunga, Visalia, and Vista (**Figure 3**; USDA 1973). The characteristic features of these associations are described below.

Acid igneous rock land (AcG) is rough broken terrain. The topography ranges from low hills to very steep mountains. Large boulders and rock outcrops cover 50 to 90% of the total area. The soil material is loam to loamy coarse sand in texture and is very shallow over decomposed granite or basic igneous rock. This soil type is mapped primarily on a large hill near the central portion of the northwest area. Forage production on this soil map unit is assumed to be 0 pounds (lbs) per acre.

The ***Bonsall*** soil series (BIC2, BmC) is characterized by moderately well-drained, shallow to moderately deep sandy loams that have a heavy clay loam subsoil with slopes from 2 to 15%. These soils are mapped in the lower elevation areas of the southern areas. Forage production on this soil map unit is assumed to be 500 to 750 lbs per acre in low to normal productivity years.

The ***Bonsall-Fallbrook*** soil series (BnB) is characterized as a complex of sandy loams with slopes from 2 to 50%. This series is a mixture of soils with about 50% Bonsall sandy loam and 45% Fallbrook sandy loam. These soils appear in undulating uplands, where the Bonsall soils occupy the swales and Fallbrook soils occupy the low mounds and ridges. This soil series is mapped in the southeastern corner of the southwest area, the southern portion of the northeast area, and in the northern portion of southeast area. Forage production on this soil map unit is assumed to be 500 to 750 lbs per acre in low to normal productivity years.

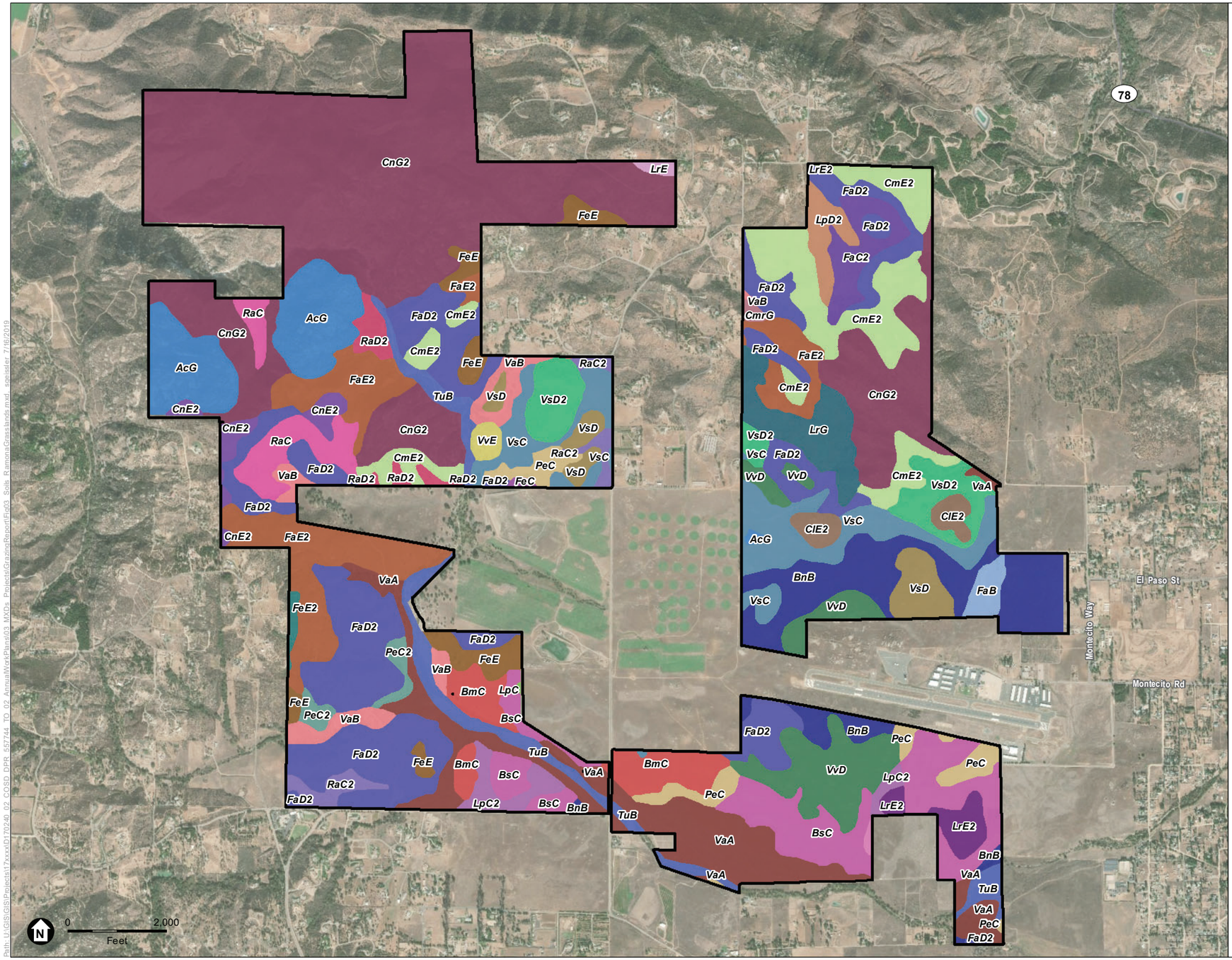
The ***Bosanko*** soil series (BsC) is characterized as well-drained, moderately deep clays from materials derived from acid igneous rock with slopes from 2 to 30%. These soils are found on uplands that are undulating to hilly. This series is mapped on the southeast area as well as in the southeastern portion of the southwest area. Forage production on this soil map unit is assumed to be 680 to 1,190 lbs per acre in low to normal productivity years.

The ***Cieneba*** soil series (ClE2, CmE2, CmrG) is characterized as coarse sandy and rocky sandy loams with slopes from 5 to 75%. They are typically described as excessively drained shallow soils that are weathered in place from granite outcrops found in the adjacent uplands. These soils are mapped primarily in the northern sections of the northern areas. Forage production on this soil map unit is assumed to be 540 to 1,521 lbs per acre in low to normal productivity years.

The ***Cieneba-Fallbrook*** soil series (CnE2, CnG2) is characterized as a soil complex with about 55% Cieneba coarse sandy loam and 40% Fallbrook sandy loam, with slopes of 9 to 65%. This soil is mapped on the northern areas. Forage production on this soil map unit is assumed to be 1,075 to 1,560 lbs per acre in low to normal productivity years.

The ***Fallbrook*** soil series (FaB, FaC2, FaD2, FaE2, FeC, FeE2, FeE) is characterized as sandy to rocky sandy loams with slopes from 2 to 30%. These soils are typically moderately deep and well drained and are weathered in place from granodiorite. This soil is mapped in scattered patches throughout the Ramona Grasslands Preserve. Forage production on this soil map unit is assumed to be 1,000 to 1,870 lbs per acre in low to normal productivity years.

The ***Las Posas*** soil series (LpC2, LpC, LpD2, LrE2, LrE, LrG) is characterized as fine sandy loams and stony fine sandy loams with clay subsoil with 2 to 65% slopes. These soils are well-drained, moderately deep, and are formed from materials weathered from basic igneous rocks. This soil is mapped in scattered patches throughout the Ramona Grasslands Preserve. Las Posas soils are considered mafic and are known to support sensitive plants population within the County of San Diego. However, within the Ramona Grasslands Preserve no special status plant populations were observed on these soils. Forage production on this soil map unit is assumed to be 510 to 1,400 lbs per acre in low to normal productivity years.



Preserve Boundary

- AcG: Acid igneous rock land
- BlC2: Bonsall sandy loam, 2 to 9 percent slopes, eroded
- BmC: Bonsall sandy loam, thick surface, 2 to 9 percent slope s
- BnB: Bonsall-Fallbrook sandy loams, 2 to 5 percent slopes
- BsC: Bosanko clay, 2 to 9 percent slopes
- ClE2: Cieneba coarse sandy loam, 15 to 30 percent slopes, ero ded
- CmE2: Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded
- CmrG: Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes
- CnE2: Cieneba-Fallbrook rocky sandy loams, 9 to 30 percent sl opes, eroded
- CnG2: Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent s lopes, eroded
- FaB: Fallbrook sandy loam, 2 to 5 percent slopes
- FaC2: Fallbrook sandy loam, 5 to 9 percent slopes, eroded
- FaD2: Fallbrook sandy loam, 9 to 15 percent slopes, eroded
- FaE2: Fallbrook sandy loam, 15 to 30 percent slopes, eroded
- FeC: Fallbrook rocky sandy loam, 5 to 9 percent slopes
- FeE2: Fallbrook rocky sandy loam, 9 to 30 percent slopes, ero ded
- FeE: Fallbrook rocky sandy loam, 9 to 30 percent slopes
- LpC2: Las Posas fine sandy loam, 5 to 9 percent slopes, erode d
- LpC: Las Posas fine sandy loam, 5 to 9 percent slopes
- LpD2: Las Posas fine sandy loam, 9 to 15 percent slopes, erod ed
- LrE2: Las Posas stony fine sandy loam, 9 to 30 percent slopes , eroded
- LrE: Las Posas stony fine sandy loam, 9 to 30 percent slopes
- LrG: Las Posas stony fine sandy loam, 30 to 65 percent slope s
- PeC2: Placentia sandy loam, 5 to 9 percent slopes, eroded
- PeC: Placentia sandy loam, 2 to 9 percent slopes
- RaC2: Ramona sandy loam, 5 to 9 percent slopes, eroded
- RaC: Ramona sandy loam, 5 to 9 percent slopes
- RaD2: Ramona sandy loam, 9 to 15 percent slopes, eroded
- TuB: Tujunga sand, 0 to 5 percent slopes
- VaA: Visalia sandy loam, 0 to 2 percent slopes
- VaB: Visalia sandy loam, 2 to 5 percent slopes
- VsC: Vista coarse sandy loam, 5 to 9 percent slopes
- VsD2: Vista coarse sandy loam, 9 to 15 percent slopes, eroded
- VsD: Vista coarse sandy loam, 9 to 15 percent slopes
- VvD: Vista rocky coarse sandy loam, 5 to 15 percent slopes
- VvE: Vista rocky coarse sandy loam, 15 to 30 percent slopes

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SOURCE: SSURGO; SanGIS 2018

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Figure 3
Soil Map – Ramona Grasslands Preserve

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The ***Placentia*** soil series (PeC2, PeC) is characterized as moderately well-drained sandy loams that have sandy clay subsoil, with 0 to 9% slopes. They are moderately well-drained soils made from granitic alluvium and are found on old alluvial fans. This soil is mapped in scattered patches throughout the Ramona Grasslands Preserve. Forage production on this soil map unit is assumed to be 1,020 to 1,275 lbs per acre in low to normal productivity years.

The ***Ramona*** soil series (RaC2, RaC, RaD2) is characterized as well-drained, very deep sandy loams that have a sandy clay loam subsoil with slopes of 0 to 30%. They are formed from granitic alluvium and are found on terraces and alluvial fans. This soil is mapped in patches on the northern areas. Forage production on this soil map unit is assumed to be 1,020 to 2,125 lbs per acre in low to normal productivity years.

The ***Tujunga*** soil series (TuB) is characterized as deep, excessively drained sands derived from granitic alluvium with slopes of 0 to 5%. This soil is mapped along the Santa Maria Creek on the southern and northwest areas. Forage production on this soil map unit is assumed to be 765 to 1,105 lbs per acre in low to normal productivity years.

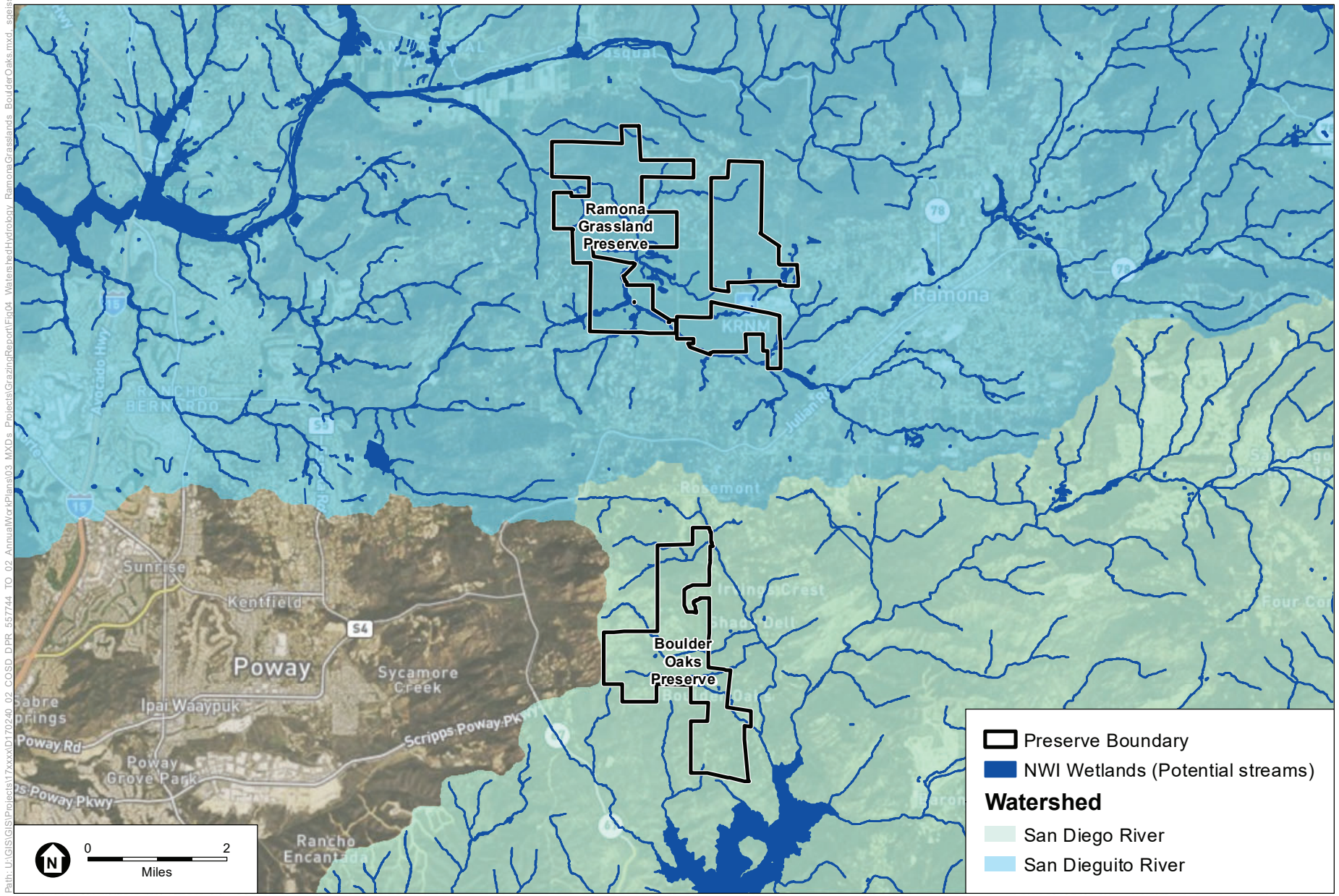
The ***Visalia*** soil series (VaA, VaB) is characterized as sandy or coarse sandy loams with slopes from 0 to 15%. These are moderately well-drained soils derived from granitic alluvium and are typically found in alluvial flood plains and fans. This soil is mapped in areas of lower topography throughout the Ramona Grasslands Preserve. Forage production on this soil map unit is assumed to be 500 to 750 lbs per acre in low to normal productivity years.

The ***Vista*** soil series (VsC, VsD2, VsD, VvD, VvE) is characterized as rocky coarse sandy loams with slopes of 5 to 65%. These are well-drained, moderately deep to deep soils derived from granodiorite or quartz diorites. Patches of this soil are mapped throughout the Ramona Grasslands Preserve. Forage production on this soil map unit is assumed to be 650 to 1,275 lbs per acre in low to normal productivity years.

Soils in Ramona Grasslands Preserve pastures are primarily sandy loams, with clay soils supporting vernal pool habitat in portions of Management Units 2A-2B and 3A-3D (Figure 3). Generally, the soils are well drained with low risk of compaction except for the Bosanko clay soils that have developed a clay hardpan supporting vernal pool features.

Hydrology

The Preserve occupies a significant portion of the Santa Maria Creek subbasin of the San Dieguito River watershed (**Figure 4**). The Santa Maria Creek and its tributaries drain from the mountains east of Ramona, across the Preserve, and through Bandy Canyon to its confluence with Santa Ysabel Creek. Below this confluence, the San Dieguito River flows into Lake Hodges. The Santa Maria Creek exhibits intermittent flow in response to winter rainfall, although surface flow in the creek may persist late in the summer during heavy rainfall years. Water is also perennial at the far western end of the valley. Most of the other drainages shown in Figure 5 have been previously identified as potential stream courses (blue line) by the U.S. Geological Survey (USGS) on the San Pasqual quadrangle topographic map (USGS 1983). All of the drainages mapped with the exception of Santa Maria Creek are ephemeral, have a defined bed and bank and may be considered jurisdictional by federal, state, and/or local agencies.



SOURCE: SanGIS; NWI; Open Street Map, 2019.

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Figure 4

Watershed and Hydrology – Ramona Grasslands and Boulder Oaks Preserves

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Vegetation Communities

The grazed portions of the Ramona Grasslands Preserve consist mostly of non-native annual grassland communities, in addition to some oak woodlands and riparian vegetation associated with Santa Maria Creek (**Figure 5**). Vegetation types on Ramona Grasslands Preserve are discussed in detail in the Vegetation Management Plan (ICF 2012). **Table 1** shows the vegetation communities within the Ramona Grasslands Preserve that are considered to support suitable vegetation for grazing, totaling approximately 1,497 acres. Non-native grassland occurs throughout Ramona Grasslands Preserve, with large continuous patches primarily occurring in the southern portion of the preserve. The northern and western portions of the preserve (Management Units 4B, 4C and 5, as well as the western edge of Unit 3B), have more limited forage resources due to the prevalence of southern mixed chaparral, Diegan coastal sage scrub and coastal sage-chaparral scrub communities.

TABLE 1
VEGETATION COMMUNITIES IN RAMONA GRASSLANDS PRESERVE SUITABLE FOR GRAZING

Vegetation Community[1]	Acres
Disturbed Wetland	1
Disturbed Habitat	25
Valley Needlegrass Grassland	14
Saltgrass Grassland	16
Non-native Grassland	1,387
Alkali Marsh	17
Open Coast Live Oak Woodland	20
Eucalyptus Woodland	16
Non-native Woodland	1
Total	**1,497**

[1] This does not include vegetation communities and other land cover classifications judged to be not suitable for grazing, including developed lands, non-vegetated channel, agriculture, coastal sage scrub and chaparral variants, emergent wetland, riparian forest, southern willow scrub, mulefat scrub, open water, and dense coast live oak woodland.

Flora

Notable flora on the Ramona Grasslands Preserve include a small population of Engelmann oak (*Quercus engelmannii*) as well as species associated with vernal pools and chamise and sage scrub habitats. Delicate clarkia (*Clarkia delicata*) is known to occur in the oak woodlands. Southern tarplant (*Centromadia parryi* ssp. *australis*) and graceful tarplant (*Holocarpha virgata* ssp. *elongata*) are both summer annuals with populations in the upland annual grasslands (ICF 2012).

Fauna

Santa Maria Creek, running through the Ramona Grasslands Preserve supports breeding populations of arroyo toad (*Anaxyrus californicus*). In addition, the extensive grasslands of Ramona Grasslands Preserve provide habitat for small mammals, including Stephens' kangaroo rat (*Dipodomys stephensi*) and grassland songbirds and foraging habitat for an array of raptors, including golden eagle (*Aquila chrysaetos*). Vernal pools in the southern portion of the Ramona Grasslands Preserve support populations of San Diego fairy shrimp (*Branchinecta sandiegonensis*) (ICF 2012).

Grazing Infrastructure

Fence Locations

Ramona Grasslands Preserve currently has the essential infrastructure necessary for livestock grazing (**Figure 6**). Perimeter and interior fences on Management Unit boundaries are generally adequate for containing cattle and should be expected to require normal maintenance to remain functional.

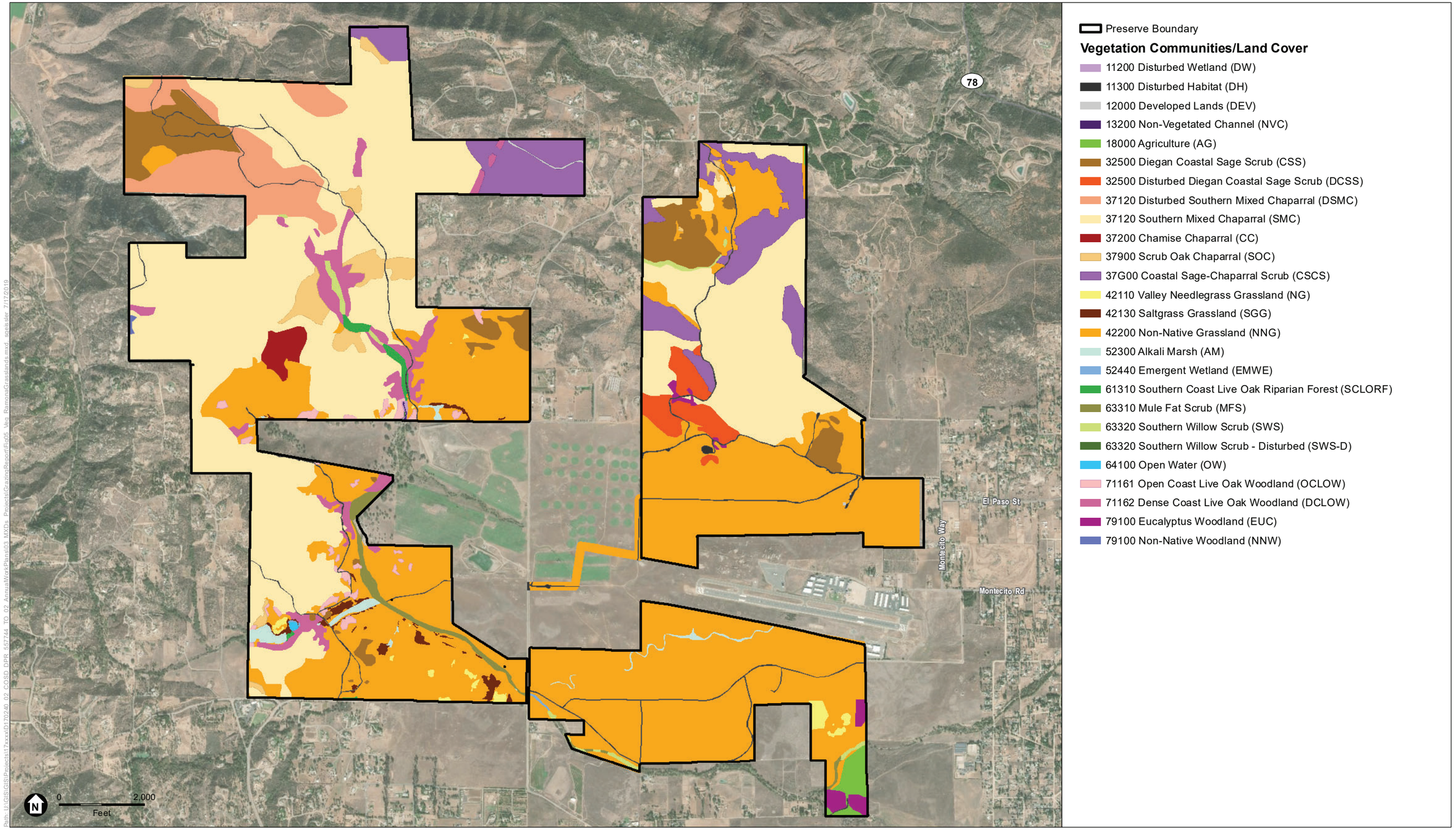
Water Sources

Currently Management Units 1A, 2A, 2B (northeast portion), 3B, 3D, and 4A have water sources available and provide adequate supply for the number of cattle that would be appropriate for each pasture (Figure 6). This infrastructure has generally been constructed and maintained by DPR staff or contractors and is generally considered high quality. A water trough is planned to be added to Management Unit 3D so cows will be able to stay longer to graze. The existing well in Management Unit 3E is planned to be repaired in 2019 to provide a water source.

Grazing History

Ramona Grasslands Preserve has been grazed by domestic livestock generally for more than a century. The majority of the core grasslands area has been used for cattle grazing for many years, with limited improvements such as perimeter fencing and wells installed over the years. The entire Ramona Grasslands Preserve is currently under lease to a cattle rancher. Bulls are added to the range around the first week of December to begin siring calves, with calving starting in mid-September of the following year. Calves are removed the following summer when the forage begins losing nutritional value. Nutritional supplement is provided during summer (molasses supplement for increased protein and improved digestion of the dry forage), when the pregnant cows are on the range, which is otherwise low in nutrition once the vegetation dries out.

The current DPR grazing lessee manages livestock grazing on Ramona Grasslands Preserve in addition to a grazing lease they have on the adjacent Ramona Municipal Water District (RMWD) property. In 2017, records were not kept separating grazing use on the Ramona Grasslands Preserve versus the RMWD property. Actual use in 2017 was 1,210.6 Animal Unit Months (AUMs).



SOURCE: SanGIS 2018

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Figure 5
Vegetation Map – Ramona Grasslands Preserve

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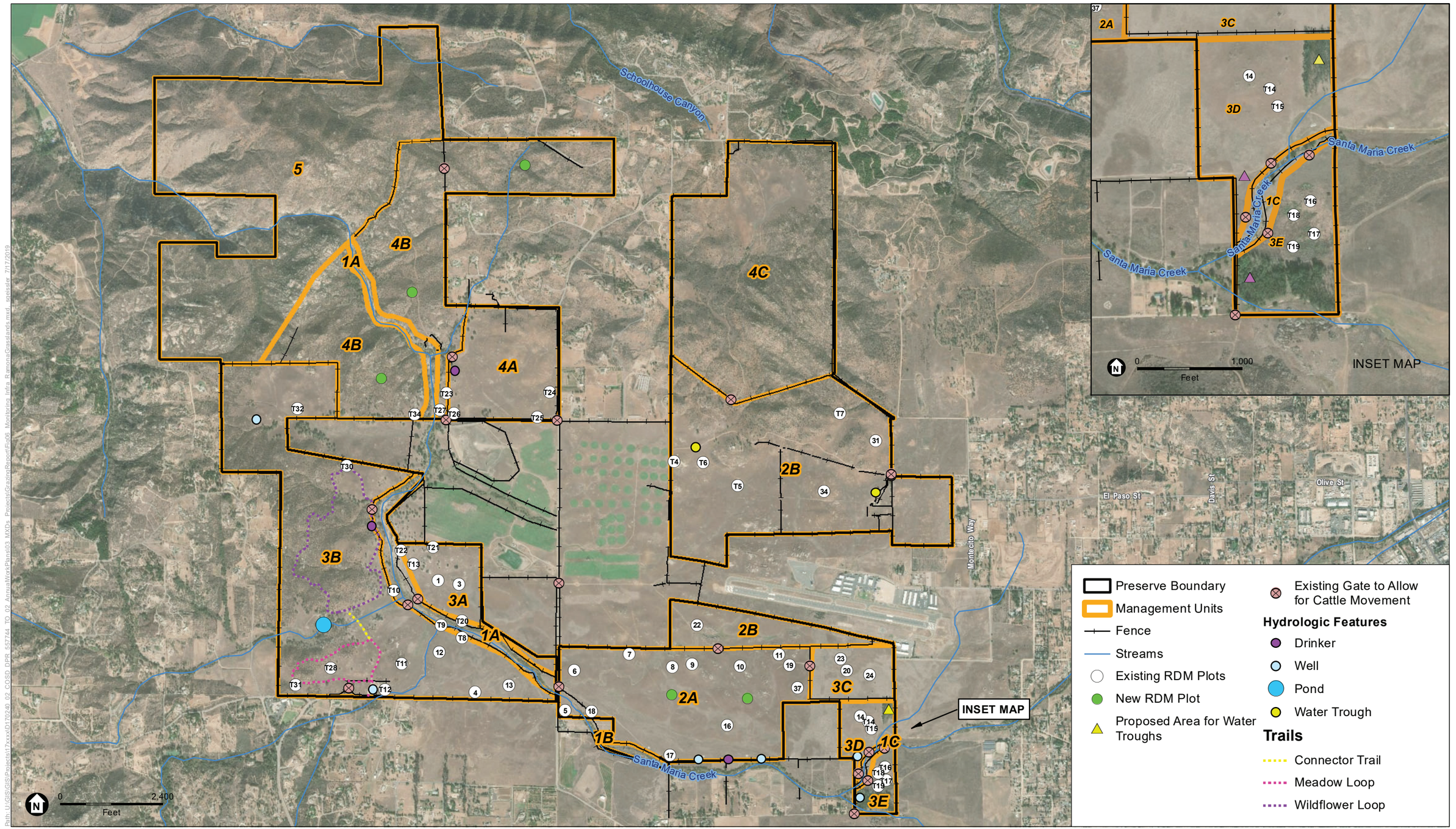

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SOURCE: ESRI, AECOM 2018

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Figure 6
Monitoring and Infrastructure – Ramona Grasslands Preserve

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2.1.2 Santa Ysabel Preserve

Project Location

The Santa Ysabel Preserve consists of approximately 5,584 acres in San Diego County. The Santa Ysabel Preserve is in northeastern San Diego County just north, east and west of the unincorporated community of Santa Ysabel, 0.25 mile north of the unincorporated community of Wynola and 2.25 miles northwest of the unincorporated community of Julian. It is situated in the Santa Ysabel Valley which is located within the future East County MSCP area. SR-79 provides the western boundary of Preserve East (including the Nature Center Property) and the eastern boundary of the Connector Property. SR-78 provides the southern and western boundaries of the Nature Center Property as well as the southern boundary of Preserve West (**Figure 7**).

Physical Conditions

Climate

Most of the annual precipitation in the Santa Ysabel area falls between November and March and averages 22 inches per year. Annual precipitation can fluctuate greatly from year to year, as is typical of Mediterranean climates, and the timing and amount of precipitation received has a large effect on forage production each year.

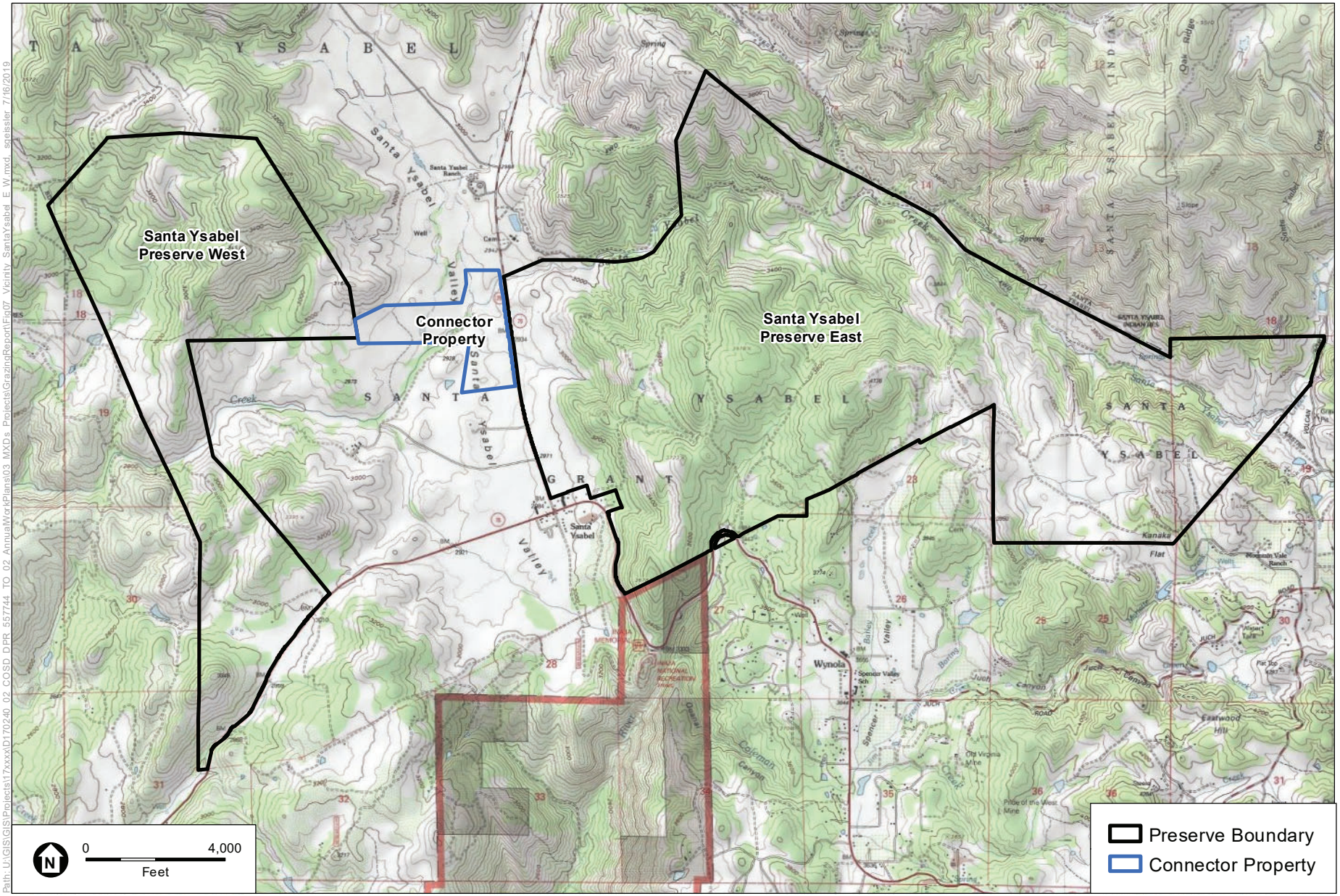
Geology

The Santa Ysabel Preserve is situated within the geomorphic province - which is characterized by a series of north-to-south trending mountain ranges that gradually slope west to the coastal plain and sharply slope east to the Salton Trough (Norris and Webb 1990). These ranges are primarily composed of uplifted granite, granodiorite, and quartz diorite. The valleys located between these ranges typically contain Quaternary alluvium (California Geological Survey 2010) and are underlain primarily by Mesozoic granitic rocks. As a result, the soils mapped within the Santa Ysabel Preserve are primarily derived from weathered granitic rock.

Soils

A total of 13 general soil associations are represented within the Santa Ysabel Preserve: acid igneous rock land, Calpine coarse sandy loam, Crouch coarse sandy loam, Crouch rocky coarse sandy loam, Holland fine sandy loam, Holland stony fine sandy loam - deep, Holland stony fine sandy loam, Loamy alluvial land, Reiff fine sandy loam, Sheephead rocky fine sandy loam, Tollhouse rocky coarse sandy loam, Tujunga sand, and Riverwash (**Figure 8**; USDA 1973). A brief description of each soil series and the associated soil type that occurs in the Santa Ysabel Preserve is presented below.

Acid igneous rock land series (AcG) is rough, broken terrain; topography ranges from low hills to steep mountains. Large boulders and rock outcrops of granite, granodiorite, tonalite, quartz diorite, gabbro, basalt, or gabbro diorite that cover 50 -90 percent of the total area. The soil type is loam to loamy coarse sand in texture is very shallow over decomposed granite or basic igneous rock. In a few places there may be pockets of deep soils between the rocks. This soil series is mapped on the southwestern portion of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 0 lbs per acre.



SOURCE: USGS 7.5' Topo Quad Warners Ranch 1962; Santa Ysabel 1980, 1985; Ranchita 1962; Julian 1980, 1985

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Figure 7

Vicinity Map

Santa Ysabel Preserve

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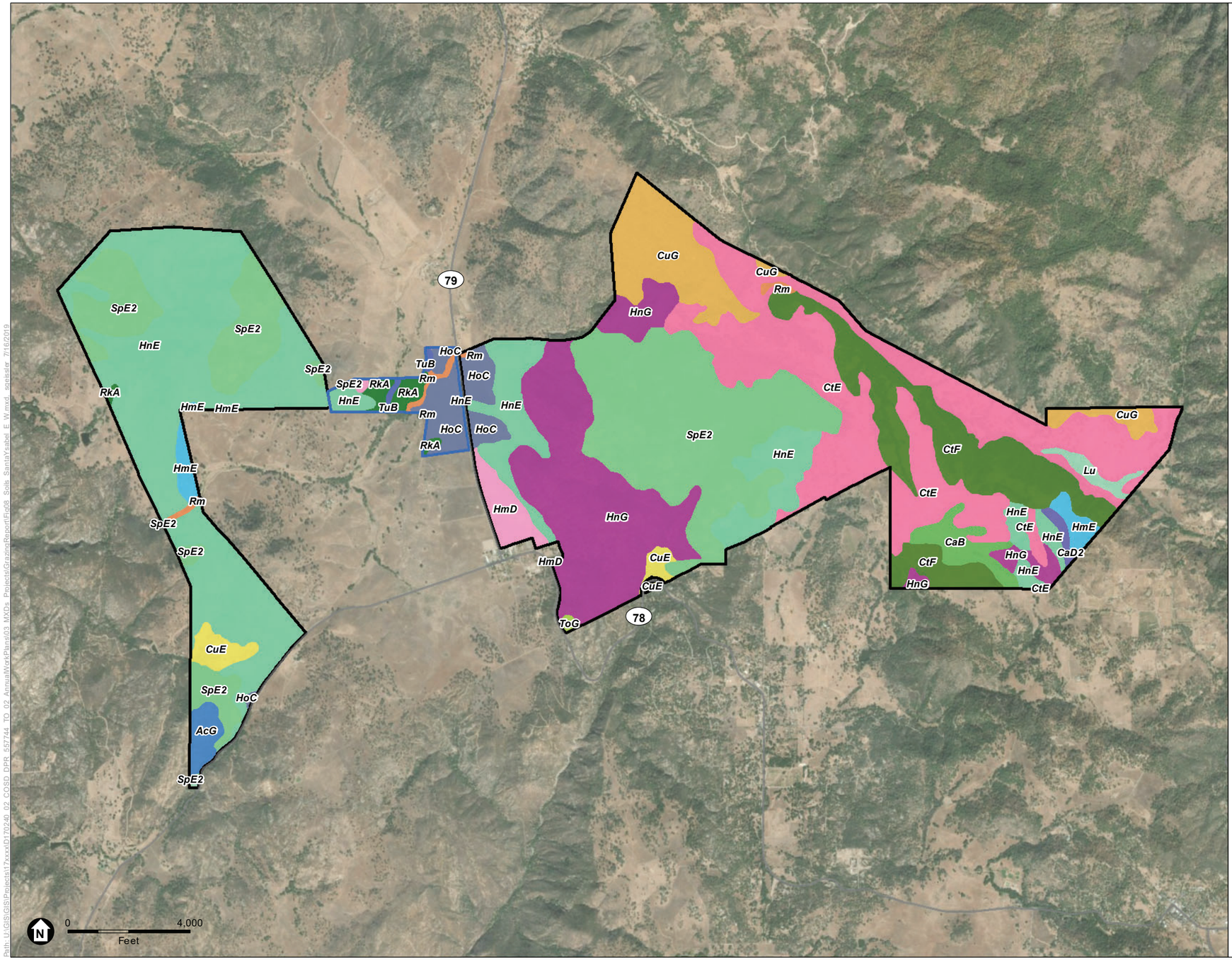

Preserve Boundary
Connector Property
AcG: Acid igneous rock
CaB: Calpine coarse sandy loam, 2 to 5 percent slopes
CaD2: Calpine coarse sandy loam, 9 to 15 percent slopes, erod ed
CtE: Crouch coarse sandy loam, 5 to 30 percent slopes
CtF: Crouch coarse sandy loam, 30 to 50 percent slopes
CuE: Crouch rocky coarse sandy loam, 5 to 30 percent slopes
CuG: Crouch rocky coarse sandy loam, 30 to 70 percent slopes
HmD: Holland fine sandy loam, 5 to 15 percent slopes
HmE: Holland fine sandy loam, 15 to 30 percent slopes
HnE: Holland stony fine sandy loam, 5 to 30 percent slopes
HnG: Holland stony fine sandy loam, 30 to 60 percent slopes
HoC: Holland fine sandy loam, deep, 2 to 9 percent slopes
Lu: Loamy alluvial land
RkA: Reiff fine sandy loam, 0 to 2 percent slopes
RkB: Reiff fine sandy loam, 2 to 5 percent slopes
Rm: Riverwash
SpE2: Sheephead rocky fine sandy loam, 9 to 30 percent slopes , eroded
ToG: Tollhouse rocky coarse sandy loam, 30 to 65 percent slo pes
TuB: Tujunga sand, 0 to 5 percent slopes

SOURCE: SSURGO; SanGIS 2018

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Figure 8
Soil Map – Santa Ysabel Preserve

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The ***Calpine*** soil series (CaB, CaD2) consists of very deep, well drained soils that formed in alluvium derived from granitic rocks. Calpine soils are within alluvial fans, fan remnants, and stream terraces with slopes from 0 to 15 percent. This soil is mapped on the southeastern portion of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 400 to 680 lbs per acre in low to normal productivity years.

The ***Crouch*** soil series (CtE, CtF, CuE, CuG) consists of deep, well drained soils that formed in material weathered from granitic rock. Crouch soils are on mountainous uplands and have slopes of 8 and 75 percent. This soil is mapped on the eastern portion of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 2,550 to 3,400 lbs per acre in low to normal productivity years.

The ***Holland*** soil series (HmD, HmE, HnE, HnG, HoC) is characterized as a fine sandy loam or stony fine sandy loam with slopes from 2 to 30 percent. These soils are typically described as very deep, well drained soils that formed in material weathered from granitic rock. The soil is mapped in small patches on the eastern portion of the Santa Ysabel Preserve and in large areas on the middle and western portions of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 750 to 1,200 lbs per acre in low to normal productivity years.

The ***loamy alluvial land series*** (Lu) consists of somewhat poorly drained, very deep, dark brown to black silt loams and sandy loams. It occurs in mountainous areas and has slopes of 0 to 5 percent. Areas containing this soil type were formerly wet meadow that were drained by head-cutting of gullies, which eventually formed drainage ditches and lowered the water table. This land is seldom saturate except in winter, when overflow may occur, and most of the water-tolerant vegetation has disappeared. This soil is mapped in a small patch on the eastern portion of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 750 to 1,250 lbs per acre in low to normal productivity years.

The ***Reiff*** soil series (RkA, RkB) consists of very deep, well drained soils formed in coarse- to medium-textured alluvium weathered from mixed sources. Reiff soils are on flood plains and alluvial fans with slopes from 0 to 9 percent. This soil is mapped in a small patch on the middle portion of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 1,020 to 2,125 lbs per acre in low to normal productivity years.

The ***Riverwash*** soil series (RM) is characterized as sandy, gravelly, or cobbly alluvium derived from mixed sources. These soils are typically well drained and are found along drainages. This soil is mapped in small patches along Santa Ysabel Creek and drainages on the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 750 to 1,250 lbs per acre in low to normal productivity years.

The ***Sheephead*** soil series (SpE2) consists of shallow, somewhat excessively drained soils that formed in material weathered from mica, schist, gneiss, or granite. Sheephead soils are on mountainous uplands and have slopes of 9 to 75 percent. This soil is mapped in patches on the middle and western portions of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 425 to 850 lbs per acre in low to normal productivity years.

The ***Tollhouse*** soil series (ToG) consists of shallow, somewhat excessively or excessively drained soils that formed in material weathered from granitic rocks. Tollhouse soils are on

strongly sloping to very steep mountain slopes. This soil is mapped in a very small patch along the south boundary of the middle of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 325 to 455 lbs per acre in low to normal productivity years.

The ***Tujunga*** soil series (TuB) is characterized as very deep, somewhat excessively drained soils that formed in alluvium from granitic sources. Tujunga soils are on alluvial fans and floodplains with slopes ranging from 0 to 9 percent. This soil is mapped in a very small patch along one of the drainages in the middle of the Santa Ysabel Preserve. Forage production on this soil map unit is assumed to be 765 to 1,105 lbs per acre in low to normal productivity years.

Hydrology

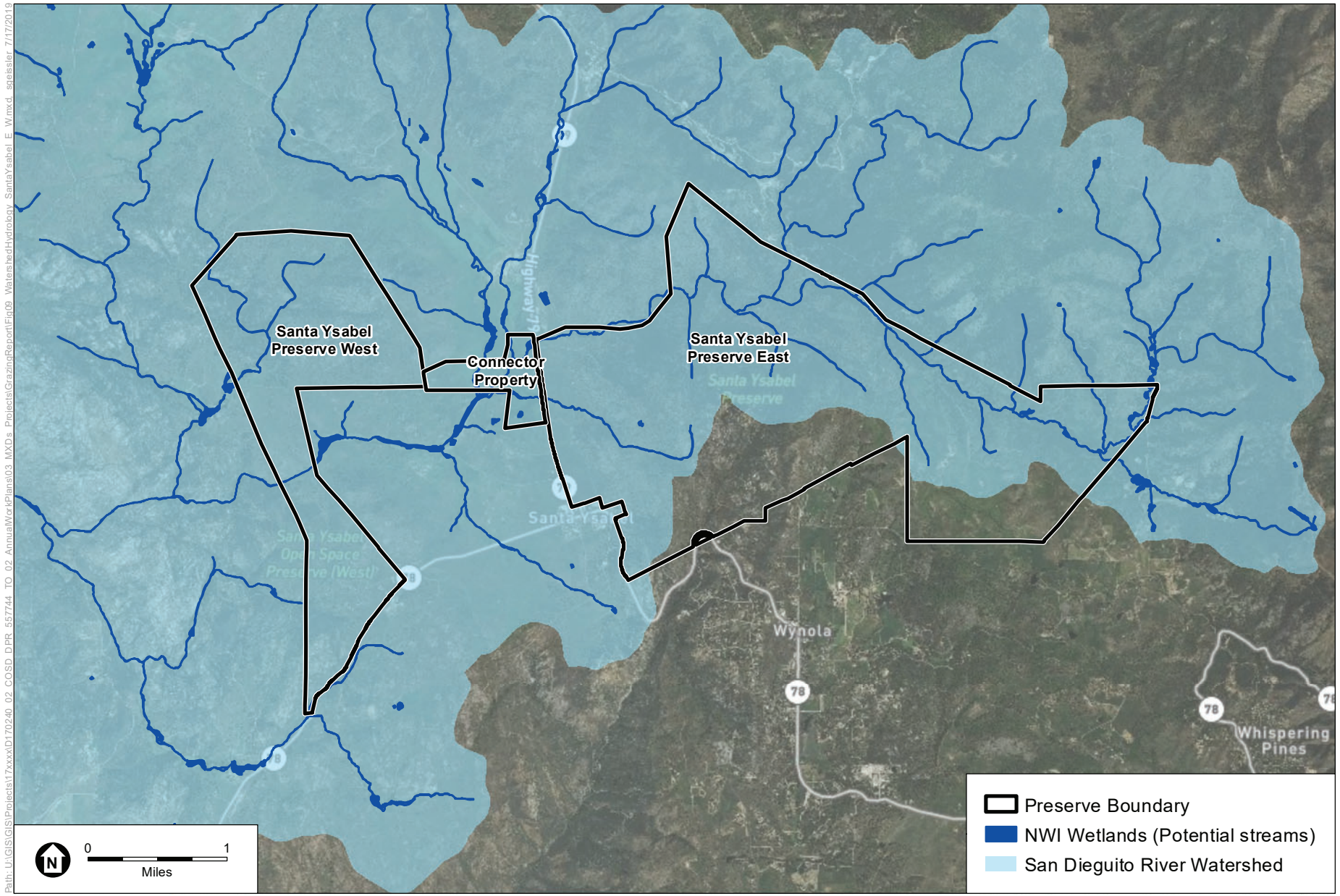
The Santa Ysabel Preserve is in the Santa Ysabel Hydrologic Area of the San Dieguito River Watershed (**Figure 9**). Two major drainage systems have their headwaters within or immediately adjacent to the Santa Ysabel Preserve: the San Dieguito River headwaters and the San Diego River headwaters. Santa Ysabel Creek, the primary tributary to the San Dieguito River, flows westward along the northern boundary of the eastern portion of the Santa Ysabel Preserve, through the connector property, and bisects the western portion of the Santa Ysabel Preserve. Approximately 3 miles of the Santa Ysabel Creek corridor occurs on the Santa Ysabel Preserve. The headwaters of the San Dieguito River extend to the immediate east and north of the Santa Ysabel Preserve on the western slopes of Volcan Mountain and it serves as the primary drainage for the Santa Ysabel Preserve. The eastern portion of the Santa Ysabel Preserve also contains the headwaters of the San Diego River, which flows southwest and drains into the Pacific Ocean.

The Santa Ysabel Preserve supports a variety of wetland and drainage areas. Wetland and drainage types found within the Santa Ysabel Preserve site included ephemeral drainages, intermittent creeks, seeps, disturbed depressional wetlands, and agricultural ponds.

Management Unit E4 has spring fed grasslands along the slopes to the south of Santa Ysabel Creek. Creek access on the western portion of the Santa Ysabel Preserve is restricted by riparian pasture fencing and on the eastern portion of the Santa Ysabel Preserve by steeper slopes and thicker riparian vegetation, with little upland forage adjacent to the creek.

Vegetation Communities

Santa Ysabel Preserve is a mosaic of extensive non-native annual grasslands, oak woodlands consisting primarily of Engelmann oaks, and chaparral in a rolling to steep landscape (**Figure 10**). **Table 2** shows the vegetation communities within Santa Ysabel Preserve that are considered to support suitable vegetation for grazing, which total approximately 4,487 acres. The western portion of the Santa Ysabel Preserve supports dense areas of Engelmann oaks, while the eastern portion of the Santa Ysabel Preserve is contains a mix of deciduous trees and conifers, including Engelmann oak, black oak (*Juglans californica*), coast live oak (*Quercus agrifolia* ssp. *agrifolia*), canyon live oak (*Quercus chrysolepis*), white alders (*Alnus rhombifolia*), western sycamore (*Platanus racemosa*), and big cone Douglas fir (*Pseudotsuga macrocarpa*). Non-native grassland also occurs throughout the Santa Ysabel Preserve, with patches of native perennial grasses and vegetation associated with a spring-fed seep vegetation present on the open hillslope in Management Unit E4. Chaparral communities also occur interspersed throughout Santa Ysabel Preserve, primarily on low productivity Sheephead rocky fine sandy loam soils.



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SOURCE: SanGIS; NWI; Open Street Map, 2019.

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Figure 9

Watershed and Hydrology – Santa Ysabel Preserve

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TABLE 2
VEGETATION COMMUNITIES IN SANTA YSABEL PRESERVE SUITABLE FOR GRAZING

Vegetation Community[1]	Acres
Field/Pasture	<1
Valley and Foothill Grassland	27
Non-Native Grassland	1,673
Foothill/Mountain Perennial Grassland	4
Meadows and Seeps	261
Montane Meadow	1
Coast Live Oak Woodland	590
Open Coast Live Oak Woodland	<1
Engelmann Oak Woodland	1,320
Open Engelmann Oak Woodland	11
Mixed Oak Woodland	541
Undifferentiated Open Woodland	<1
Mixed Oak / Coniferous / Bigcone / Coulter Forest	58
Total	**4,487**

[1] This does not include vegetation communities and other land cover classifications judged to be not suitable for grazing, including urban/developed, variants of coastal sage scrub,chaparral, and riparian, freshwater, and dense coast live oak woodland.

Flora

Notable flora in Santa Ysabel Preserve relevant to grazing management is primarily Engelmann oak, which occurs in stands throughout the Santa Ysabel Preserve (County of San Diego 2008a). Other rare and sensitive flora occurring on the Santa Ysabel Preserve occur in areas less likely to be affected by grazing management. The on-site grasslands have the potential to support a rich and healthy suite of native perennial species like purple needlegrass, johnny jump-ups, checkerbloom, bluedicks, California aster and blue-eyed grass with appropriate management.

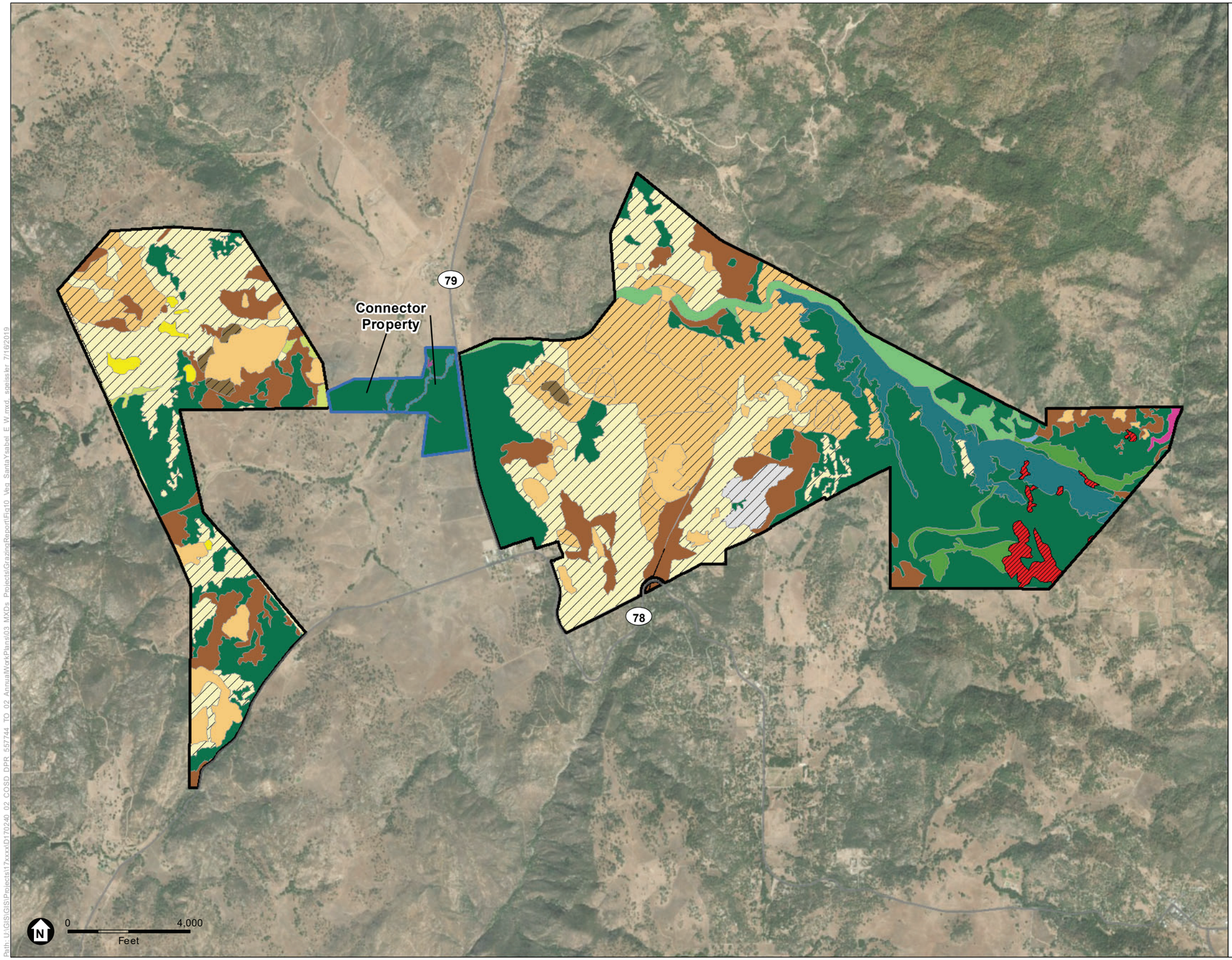
Fauna

Arroyo toad is known to occur in the western portion of the Santa Ysabel Preserve in Santa Ysabel creek, which runs through the Santa Ysabel Preserve from east to west. Potential habitat for Stephens' kangaroo rat occurs in portions of Management Units E1, E2, E5, and W1. The Santa Ysabel Preserve supports an array of raptors, providing nesting, roosting, and foraging habitat for golden eagle, Cooper's hawk (*Accipter cooperii*), and California spotted owl (*Strix occidentalis occidentalis*) (County of San Diego 2008a).

Grazing Infrastructure

Fence Locations

The Santa Ysabel Preserve has the essential infrastructure on necessary for livestock grazing (**Figure 11**). Perimeter fences are generally adequate for containing cattle. Some of the interior fences are in poor repair, requiring maintenance if Management Unit stocking and period of use are expected to be managed closely.



Preserve Boundary
Connector Property

Vegetation Communities/Land Cover

- 12000 Urban/Developed
- 18310 Field/Pasture
- 32500 Diegan Coastal Sage Scrub
- 32520 Diegan Coastal Sage Scrub: Inland form
- 37130 Northern Mixed Chaparral
- 37200 Chamise Chaparral
- 37510 Mixed Montane Chaparral
- 37900 Scrub Oak Chaparral
- 42000 Valley and Foothill Grassland
- 42200 Non-native Grassland
- 42400 Foothill/Mountain Perennial Grassland
- 45000 Meadows and Seeps
- 45100 Montane Meadow
- 52420 Transmontane Freshwater Marsh
- 61300 Southern Riparian Forest
- 61310 Southern Coast Live Oak Riparian Forest
- 61320 Southern Arroyo Willow Riparian Forest
- 62000 Riparian Woodlands
- 63300 Southern Riparian Scrub
- 64140 Freshwater
- 71160 Coast Live Oak Woodland
- 71161 Open Coast Live Oak Woodland
- 71162 Dense Coast Live Oak Woodland
- 71180 Engelmann Oak Woodland
- 71181 Open Engelmann Oak Woodland
- 71182 Dense Engelmann Oak Woodland
- 77000 Mixed Oak Woodland
- 78000 Undifferentiated Open Woodland
- 84500 Mixed Oak/Coniferous/Bigcone/Coulter Forest

SOURCE: SanGIS 2018

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Figure 10
Santa Ysabel Preserve East and West Vegetation Communities

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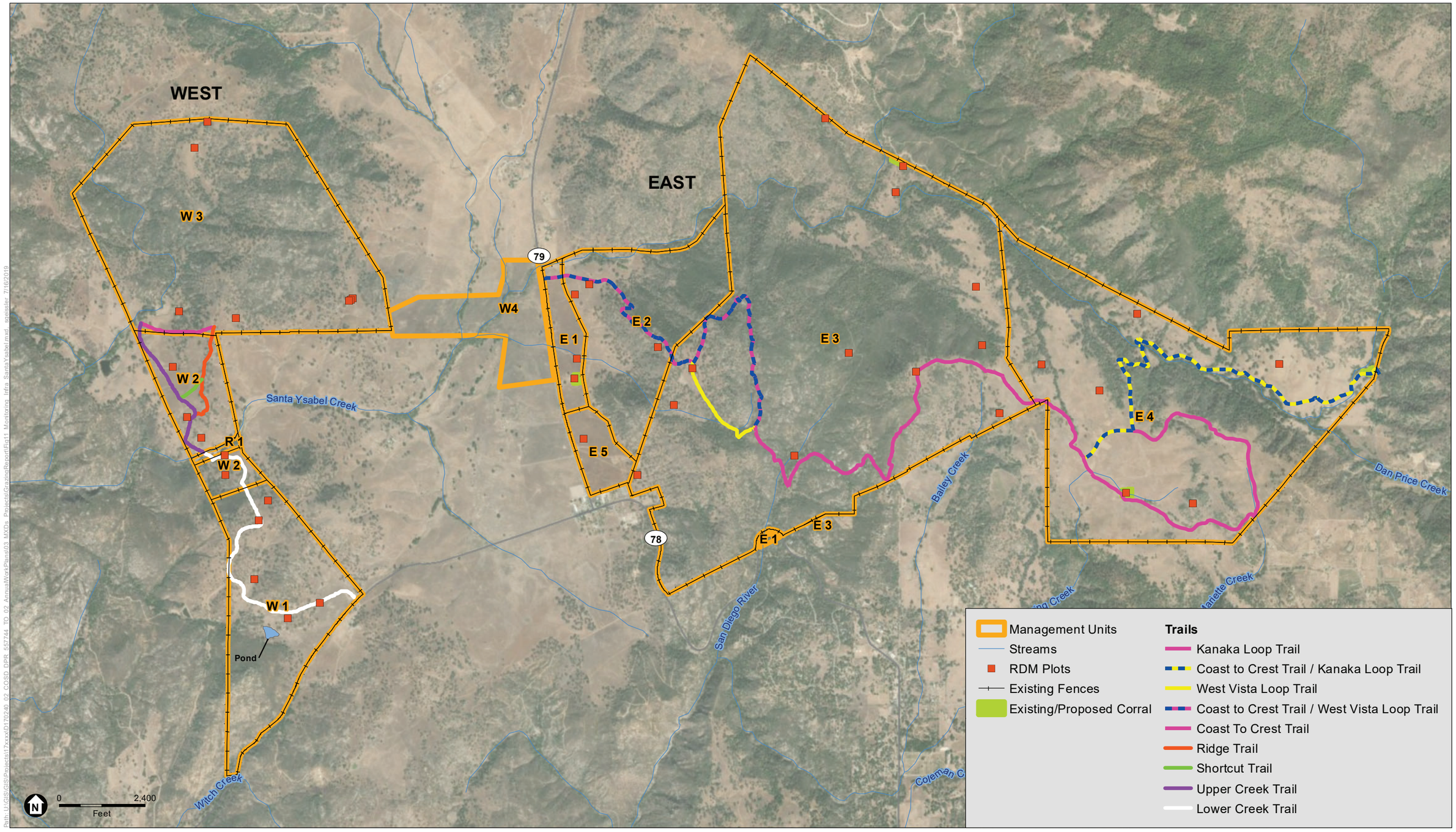

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SOURCE: ESRI, AECOM 2018

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Figure 11
Monitoring and Infrastructure – Santa Ysabel Preserve

ESA

Water Sources

Water developments are minimally adequate, particularly on the west side of the Santa Ysabel Preserve to ensure proper distribution of livestock (Figure 11). This infrastructure has generally been constructed and maintained by the grazing lessees and is functional. Spring fed troughs in general could be better maintained or improved to provide reliable water through more of the grazing season.

Grazing History

Historically, grazing on Santa Ysabel Preserve pastures was year-round and has been a land use and land management practice for more than a century. The Santa Ysabel Preserve itself is a collection of once-separate properties that have a history of livestock grazing. Currently, the eastern and western portions of the Santa Ysabel Preserve are leased to different livestock producers for grazing with cow-calf pairs year-round. On the western portion of the Santa Ysabel Preserve, recent years have seen about 30 cow-calf pair grazing with winter and spring use on Management Unit W2 and most summer and fall use with the herd split between Management Units W1 and W3. Grazing with 30 cow-calf pair marks a steady decline in stocking rates for this portion of the Santa Ysabel Preserve over the past several years of drought. The current lessee started grazing with about 60 cow-calf pair on the western portion of the Santa Ysabel Preserve 10 years ago. The primary limitation on the western portion of the Santa Ysabel Preserve seems to be water availability rather than forage. Grazing on the eastern portion of the Santa Ysabel Preserve has been more typically year-round in each Management Unit with cow-calf pair, with smaller herds split between each pasture based on available forage in relatively constant numbers in each Management Unit through the year, ranging from about 115 to 160 pair from 2013 to 2017, with grazing overall decreasing over these years.

2.1.3 Boulder Oaks Preserve

Project Location

The Boulder Oaks Preserve is 2,016 acres in central San Diego County. The area available for grazing consists of two small pastures together comprising approximately 57 acres sitting in a narrow valley and bisected by the Foster Truck Trail off the Mussey Grade Road (**Figure 12**).

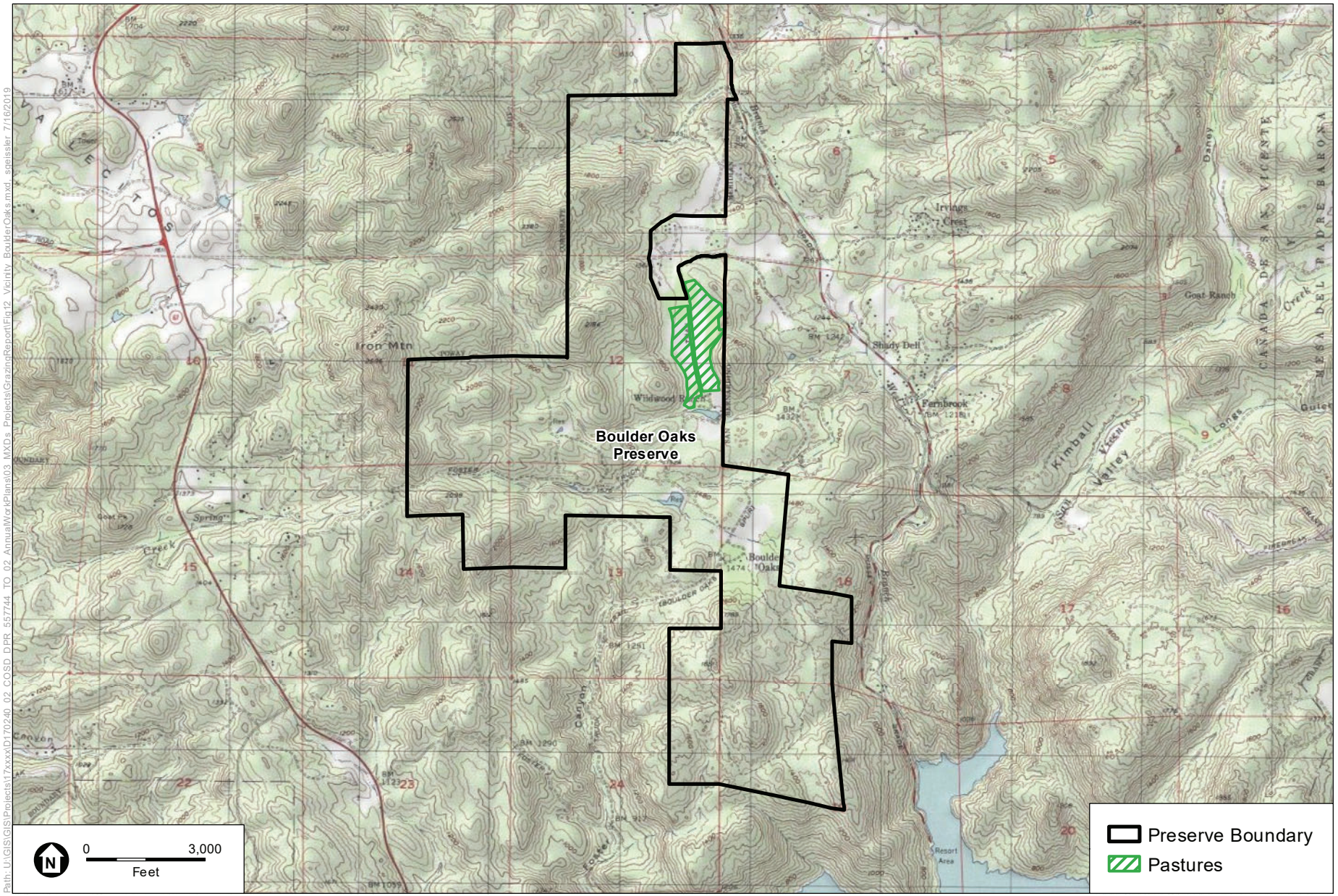
Physical Conditions

Climate

Average annual precipitation in the area of Ramona, California averages about 16 inches per year, primarily falling from November to April. Annual precipitation can fluctuate greatly from year to year, as is typical of Mediterranean climates, and the timing and amount of precipitation received has a large effect on forage production each year.

Geology

The Management Units for grazing in the Boulder Oaks Preserve sits in a small valley with a gently sloping alluvial plain in the Peninsula Ranges Batholith. Hilltops and hillsides are dominated by rocky outcrops and boulders.



SOURCE: USGS 7.5' Topo Quad San Vicente Reservoir 1971, 1973

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Figure 12
Vicinity Map
Boulder Oaks Preserve

ESA

Soils

A total of 3 general soil associations are represented within the Management Units of Boulder Oaks Preserve: Arlington, Cienaba, and Visalia (**Figure 13**; USDA 1973). The Management Units contain primarily moderately productive Arlington coarse sandy loams with moderate productivity and smaller portions of Cieneba rocky coarse sandy loam and Visalia sandy loam. These soils tend to have moderate forage productivity, ranging from 680 to 1,700 lbs per acre in low to high productivity years, respectively. The course sandy loam soils are also relatively resilient to compaction.

The ***Arlington*** soil series (AvC) is characterized as sandy or coarse sandy loams with slopes from 2 to 9%. They are described as well drained loamy soils occurring on alluvial fans. This soil is the predominant soil series within both pastures of the Boulder Oaks Preserve. Forage production on this soil map unit is assumed to be 680 to 1,275 lbs per acre in low to normal productivity years.

The ***Cieneba*** soil series (CmE2, CmrG) is characterized as coarse sandy and rocky sandy loams with slopes from 9 to 75%. They are typically described as excessively drained shallow soils that are weathered in place from granite outcrops found in the adjacent uplands. These soils are mapped primarily on the margins of the pastures in the Boulder Oaks Preserve and don't make up much of the area. Forage production on this soil map unit is assumed to be 540 to 1,020 lbs per acre in low to normal productivity years.

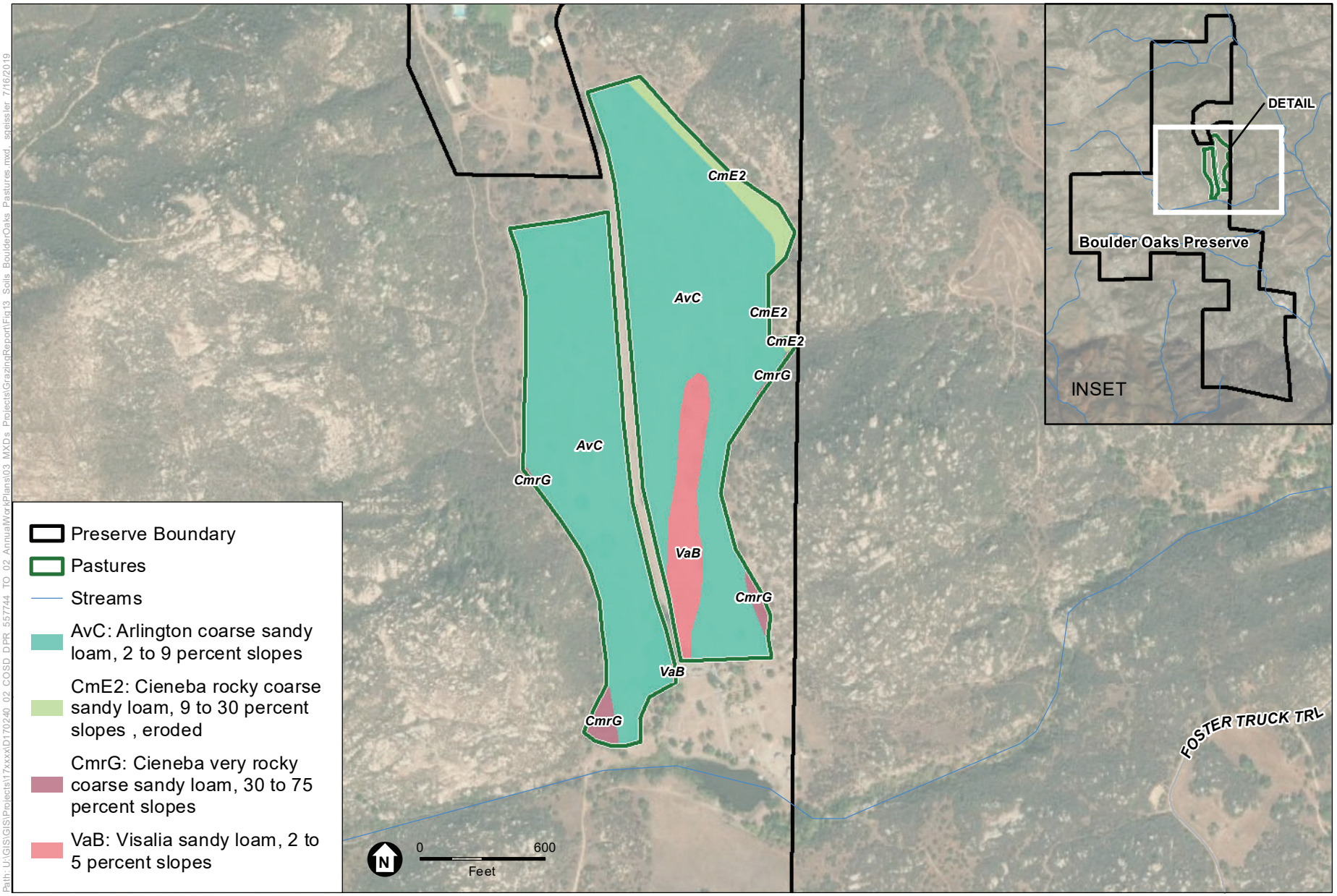
The ***Visalia*** soil series (VaB) is characterized as sandy or coarse sandy loams with slopes from 0 to 15%. These are moderately well-drained soils derived from granitic alluvium and are typically found in alluvial flood plains and fans. This soil is mapped in a portion of the east pasture of the Boulder Oaks Preserve. Forage production on this soil map unit is assumed to be 500 to 750 lbs per acre in low to normal productivity years.

Hydrology

Boulder Oaks Preserve occurs within the San Diego River watershed (Figure 4). The Management Units drain to the south into a tributary that flows east to the west branch of San Vicente Creek, outside of the Boulder Oaks Preserve. There is no creek access from the Management Units.

Vegetation Communities

The Management Units within Boulder Oaks Preserve are comprised of two vegetation communities: valley and foothill grassland and open Engelmann Oak woodland (**Figure 14**). Both vegetation communities are considered to contain suitable vegetation for grazing, and total 53 acres combined (**Table 3)**. Roughly half of each Management Unit supports Engelmann Oak savanna with an understory dominated by filaree (*Erodium botrys*) and rat-tail fescue (*Vulpia myorus*).



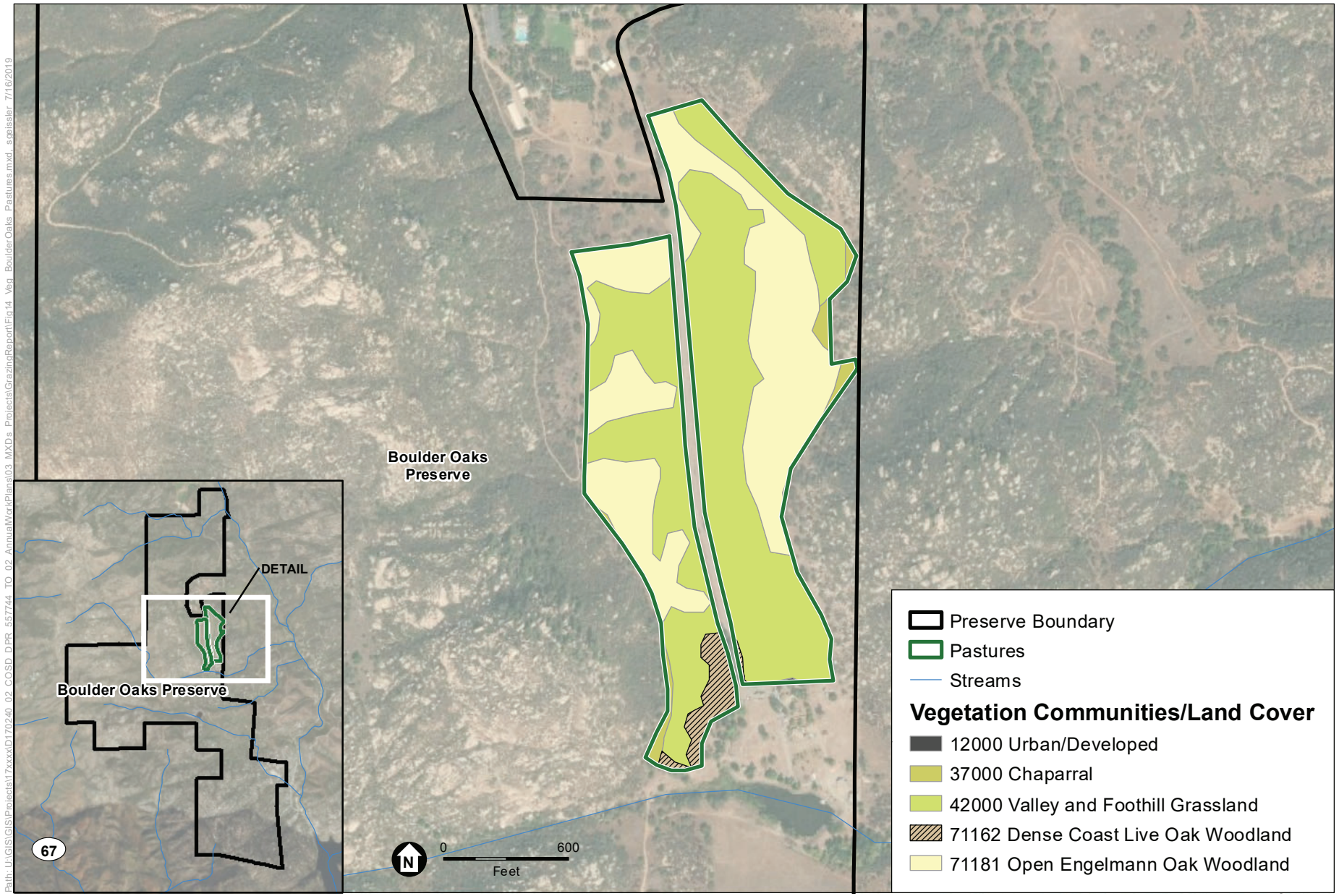
SOURCE: ESRI; SanGIS; AECOM 2018

COSD DPR 557744 TO 02 San Diego Grazing Plan

Figure 13

Soil Map – Boulder Oaks Preserve

ESA



SOURCE: ESRI; SanGIS; AECOM 2018

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Figure 14

Vegetation Map – Boulder Oaks Preserve

ESA

TABLE 3
VEGETATION COMMUNITIES IN BOULDER OAKS PRESERVE PASTURES SUITABLE FOR GRAZING

Vegetation Community[1]	Acres
Valley and Foothill Grassland	32
Open Engelmann Oak Woodland	21
Total	**53**

[1] This does not include vegetation communities and other land cover classifications judged to be not suitable for grazing, including urban/developed lands, chaparral, and dense oak woodland.

Flora

Notable flora in the Management Units include Engelmann oak and possibly Orcutt's brodiaea (*Brodiaea orcuttii*), which normally occurs on clay soils and near vernal pools (County of San Diego 2008b). It is possible that recent management of over grazing may have affected Engelmann oak recruitment and potential Orcutt's brodiaea populations in the southern half of the eastern Management Unit.

Fauna

The Management Units on Boulder Oaks Preserve have the potential to support grassland birds and small mammals and may provide foraging habitat for raptors. There is potential foraging and nesting habitat for Cooper's hawk in the Management Units. (County of San Diego 2008b).

Grazing Infrastructure

Fence Locations

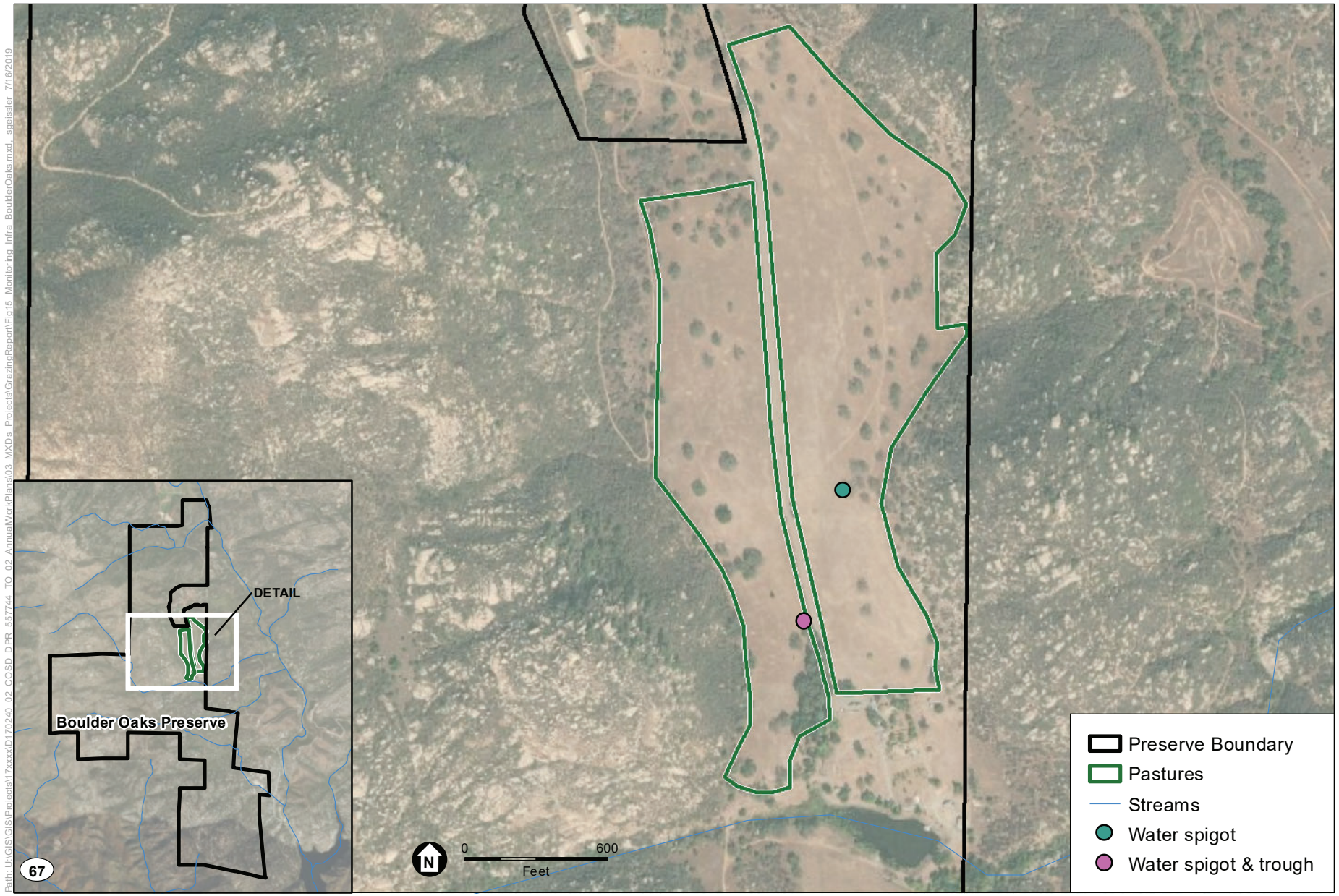
The Management Units have minimal infrastructure on site necessary for livestock grazing (**Figure 15**). Perimeter fences are generally adequate for containing cattle within the western Management Unit completely fenced and the eastern Management Unit fenced mostly on three sides and relying on the boulder slope to the east to contain cattle. No permanent corrals or loading facilities are located within the Management Units.

Water Sources

Water sources are available in each Management Unit that would provide an adequate supply for the number of cattle that would be appropriate for each pasture (Figure 15). Water sources include a water spigot and trough in the western Management Unit and a water spigot in the eastern Management Unit.

Grazing History

Historically, grazing on these Management Units was year-round and has been a land use and land management practice for more than a century. In the summer of 2018, the grazing lease was terminated. In the recent past, the Management Units were leased allowing for up to 20 animal units at any one time. The previous tenant had used supplemental hay to feed cattle when stocking exceeded forage production capacity.



SOURCE: ESRI; SanGIS; AECOM 2018

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Figure 15

Monitoring and Infrastructure – Boulder Oaks Preserve

ESA

CHAPTER 3
Management Goals and Objectives

Through a review of resources present in and around each of the three (3) Preserves, discussions with DPR staff and current Preserve lessees (ranchers), as well as reviews of monitoring documents and vegetation and grazing management plans for these Preserves, several management goals and objectives have been identified that are relevant to a livestock grazing program. These include natural resource management goals that could be affected by livestock grazing both positively or negatively, depending on how grazing is managed. For all three (3) Preserves, the goals for improving and maintaining biodiversity, reduction in wildfire hazard, and maintenance of soil health were identified, with specific objectives for each Preserve identified to reach these goals.

3.1 Goals and Objectives Common to All Three Preserves

Goal 1. Maintain and Improve Biodiversity

Objective 1.1 Reduce abundance of nonnative annual grasses.

Objective 1.2 Maintain and improve habitat for raptors.

Objective 1.3 Protect and promote regeneration of Engelmann oaks.

Goal 2. Reduce Wildfire Hazard

Objective 2.1: Reduce thatch build up and continuity of fine fuels.

Objective 2.2: Reduce the abundance of nonnative annual grasses.

Goal 3. Maintain Soil Health

Objective 3.1: Maintain minimum RDM standards to protect soil structure.

3.2 Additional Goals and Objectives for Ramona Grasslands Preserve

Goal 1. Maintain and Improve Biodiversity

Objective 1.4 Maintain and improve habitat for arroyo toad.

Objective 1.5 Maintain and improve habitat for Stephens' kangaroo rat.

Objective 1.6 Maintain and improve alkali playa plant species and vernal pool habitat for San Diego fairy shrimp and vernal pool specific plant species.

3.3 Additional Goals and Objectives for Santa Ysabel Preserve

Goal 1. Maintain and Improve Biodiversity

Objective 1.7 Maintain and improve habitat for arroyo toad.

Objective 1.8 Maintain and improve habitat for Stephens' kangaroo rat.

3.4 Grazing and Related Management Prescriptions

Generally, grazing management would be done with cow-calf pair and associated bulls and yearlings necessary for cattle operations and meeting management objectives. This would be consistent with past management and achieves management objectives in a more practical manner than other options (such as mowing), due to the extensive nature of the three (3) Preserves. Cattle are also less likely to encounter problems with predators compared to other livestock, reducing the likelihood of conflict.

In general, the primary target for grazing prescriptions is the achievement of RDM targets. RDM is the remaining, dry, herbaceous forage before the onset of fall germinating rains (Bartolome et al 2002). The amount of RDM remaining is weighed and expressed as pounds per acre. This material acts as soil protection from the compacting and erosive effects of rains and can help conserve initial fall soil moisture to facilitate germination of the next season annual plants. However, excessive levels of RDM may prevent moisture from reaching the ground, also hindering germination. The target RDM is adjusted based on factors such as average annual rainfall, slope, special habitat requirements of sensitive species in the area, as well as other management objectives (such as roadside Management Units susceptible to wildfire ignitions). RDM standards should be viewed as targets that are achieved in most years. However, in dry years, it should not be expected that RDM would be above the upper end of the standard while in wet years it should not be expected that RDM would be below the lower end of the standard. Also, RDM standards should not be expected to be missed multiple years in a row.

To achieve RDM standards across Management Units, water and nutrient supplements should be used to encourage cattle distribution. Nutrient supplements should not be placed near water sources (e.g., troughs, drinkers, or surface water) or low relative to hills. Generally, nutrient supplements should be placed at least one quarter mile from watering locations. In addition, supplemental feed (e.g., hay) should be avoided on the Preserves. The need for supplemental feed indicates that RDM targets have been exceeded and cattle should be moved, and the feed could contain invasive non-native plant seed. Several specific grazing management prescriptions were developed to address identified objectives. These include RDM standards as well as season of use limitations to ensure achievement of these objectives. In general, grazing management not prescribed may be adaptable and developed in conjunction to with the lessee to achieve both livestock production needs and other situations that may arise from management of the Preserves.

Additional recommendations related to infrastructure (e.g., water sources) and lease terms and provided in **Appendix A**.

3.4.1 Special Management Prescriptions

Stephens' Kangaroo Rat (*Dipodomys stephensi*)

Stephens' kangaroo rat (SKR) is a federally listed endangered species. This species occupies habitat on loamy grassland soils with high forb cover and low overall above ground biomass. SKR occurs on Ramona Grasslands Preserve and has potential to occur on Santa Ysabel Preserve. Grazing management that reduces above ground biomass and shifts species composition to higher forb cover can improve habitat for this species. For this reason, soils suitable for habitat for SKR will have lower RDM standards than other soils, with a target range of 400 to 800 lbs. per acre, following previous guidelines for these Preserves and used by other agencies (USFWS 2014).

Arroyo Toad (*Anaxyrus californicus*)/Riparian Pasture

Arroyo toad is a federally listed endangered species. This species has been observed within Santa Maria Creek on Ramona Grasslands Preserve and Santa Ysabel Creek within the western portion of Santa Ysabel Preserve. Arroyo toad breeding season extends from February 1 to July 31. In addition, mid-seral riparian vegetation states provide better habitat conditions for arroyo toad. Targeted grazing within riparian pastures between August and January can be utilized to maintain mid-seral riparian vegetation states, particularly when this vegetation is relatively more palatable to livestock than upland vegetation in the late summer and fall. An RDM standard of 800 to 2,000 lbs per acre in riparian pasture will be sufficient to achieve vegetation management objectives while providing soil and stream bank protection from erosion. This RDM standard is based on professional judgement to be a moderate amount of grazing that will be sufficient to reduce exotic annual grass cover while also leaving mulch for soil protection (Bartolome et al 2002, Brownsey et al 2017).

San Diego Fairy Shrimp (*Branchinecta sandiegonensis*)/Vernal Pools

San Diego fairy shrimp is a federally listed endangered species that occupies vernal pool wetland habitat. Vernal pool habitat for this species occurs primarily on Management Unit 3C and to a lesser extent Management Units 2A, 2B, 3A, 3B, and 3D on Ramona Grasslands Preserve. Habitat quality for this species is dependent on vernal pools remaining inundated for a sufficient period of time for the organism to complete its lifecycle in the winter and spring. This inundation period can be affected by the quantity of annual grasses on site that tend to increase evapotranspiration and decrease inundation period (Marty 2015, Marty 2005, Pyke and Marty 2005).

Spring grazing can more effectively cause a shift in species composition towards native annual forbs, relative to other seasons, helping to reduce the abundance of invasive non-native grasses and thus reducing evapotranspiration. This can help promote longer vernal pool inundation periods, increasing the likelihood of San Diego fairy shrimp being able to complete their lifecycle within the pool, particularly in years with marginal rainfall. Winter grazing, before pools have become inundated, is unlikely to result in a meaningful shift towards native annual forbs and

reduced invasive non-native annual grasses. Summer grazing can have some effect by reducing RDM, but is not targeted at reducing seed production of invasive non-native annual grasses. To ensure cattle grazing does not result in harm to vernal pool invertebrates, such as the San Diego fairy shrimp, and/or alter the vernal pool topography, grazing is only recommended while the pools are dry.

For these reasons, grazing in spring very soon after vernal pools have dried is recommended to achieve the RDM targets within a 2 to 6 week grazing period. Timing will be dependent upon seasonal rainfall and climatic conditions; however, is anticipated for late spring (April to June). Grazing during the summer can also be an alternative, but will be less effective at reducing non-native seed production and improving vernal pool inundation over the long-term.

To manage invasive non-native annual grasses in this habitat, RDM standards (800 to 1,500 lbs per acre) are appropriate to be met in most years. In drought years, grazing may be unnecessary as invasive non-native annual grasses tend to respond poorly following drought. This RDM standard is based on professional judgement to be a moderate amount of grazing that will be sufficient to reduce invasive non-native annual grass cover while also leaving mulch for soil protection (Bartolome et al 2002, Brownsey et al 2017).

Engelmann Oak (*Quercus engelmannii*)

Engelmann oak is an endemic oak to southern California and a management priority. Large stands of Engelmann oak are found on Santa Ysabel and Boulder Oaks Preserves, with more isolated populations at Ramona Grasslands Preserve. Oak recruitment is generally low across the state of California and livestock grazing can contribute to this to some degree, along with other factors including resource competition with seedlings from invasive non-native annual grasses and small mammal herbivory (McCreary 2009). Timing of grazing and avoiding higher intensity grazing can be more important than RDM standards for managing oaks. Avoiding high intensity grazing in Engelmann oak stands by moving cattle to other pastures during the summer and fall, when cattle are more likely to selectively graze oak leaves due to its higher protein content relative to other vegetation, can help to avoid this effect. Spring grazing is preferable (e.g. February to April), as herbaceous forage abundance and quality will be the greatest, minimizing the incentive of cattle to consume oak seedlings and saplings, which are less preferable relative to herbaceous vegetation at this time of year due to their tannin content. Additionally, an RDM standard of 800 to 1,500 lbs per acre in Engelmann oak savannah will be sufficient to reduce some competition for oak seedlings from exotic annual grasses while providing soil protection from erosion.

Flexible Use

Management Units designated as flexible use will be managed for specific management goals and objectives that can be achieved with greater flexibility in timing and intensity of grazing. Specifically, species diversity (Goal 1), fire hazard reduction (Goal 2), and soil conservation (Goal 3) are the guiding goals for Management Units designated as flexible use. These Management Units may also contain a mix of species-specific habitat management objectives, including Engelmann Oak savannah, grassland stands suitable for raptor foraging, and riparian

habitat that supports arroyo toad. These Management Units may be used for livestock grazing within the RDM prescriptions (800 to 1,500 lbs per acre) given to provide flexibility necessary to achieve specific management prescriptions on other Management Units while also providing year-round grazing capability on Ramona Grasslands and Santa Ysabel Preserves. This RDM standard is based on professional judgement to be a moderate amount of grazing that will be sufficient to reduce invasive non-native annual grass cover while also leaving mulch for soil protection (Bartolome et al 2002, Brownsey et al 2017).

Ramona Grasslands Preserve

The Ramona Grasslands Preserve is anticipated to have a total grazing capacity of 565.2 to 1,516.2 AUMs in low to normal years (**Table 4)**. The grazing capacity estimated from soil survey data is similar to recent actual use as reported by the lessee. Some changes from current grazing management have been identified to achieve the goals and objectives.

The season of grazing within vernal pool habitat in Management Units 2A, 2B, 3A, 3B, 3C, and 3D should be shifted to the spring, shortly after the pools have dried, to better achieve species composition shifts away from invasive non-native annual grasses by reducing seed production of invasive non-native annual grasses, consistent with recommendations in ICF (2012) and findings in the scientific literature (Marty 2005, Pyke and Marty 2005, Marty 2015). Timing will be dependent upon annual rainfall patterns and climatic conditions but is anticipated for a 2 to 6 week period between April and June depending upon the inundation period of the pools and the annual forage production.

There are also recommendations for restoration of Management Unit 3E. This unit needs fence repair due to flooding on Santa Maria Creek and lack of maintenance on the southern boundary. Additionally, the water source is not currently operational. Also, Management Unit 3E has not been grazed in several years and has been invaded by invasive non-native plants. An initial treatment with some combination of mowing, herbicide, or targeted grazing will assist to reduce invasive non-native plant populations.

TABLE 4
GRAZING PRESCRIPTIONS FOR RAMONA GRASSLANDS PRESERVE

Management Unit	Prescription Category/Management Targets	Season of Use[1]	Grazing Capacity, Low to Normal Year (AUMs)	RDM Standard (lbs per acre)
1A	Riparian pasture/arroyo toad	August to January	5 to 30	800 to 2,000
1B	Riparian pasture/arroyo toad	August to January	0 to 3	800 to 2,000
1C	Riparian pasture/arroyo toad	August to January	0 to 1	800 to 2,000
2A	Stephens' kangaroo rat	Year Round	65 to 174	400 to 800
2B	Stephens' kangaroo rat	Year Round	134 to 339	400 to 800
3A	Stephens' kangaroo rat	Year Round	36 to 64	400 to 800
3B	Flexible use	Year Round	165 to 443	800 to 1,500

Management Unit	Prescription Category/Management Targets	Season of Use[1]	Grazing Capacity, Low to Normal Year (AUMs)	RDM Standard (lbs per acre)
3C	Vernal pool	After pool inundation period is complete (anticipated April to June)	3 to 25	800 to 1,500
3D	Vernal pool	After pool inundation period is complete (anticipated April to June)	0 to 16	800 to 1,500
3E	Restoration[2]	Year Round	1 to 5	800 to 1,500
4A	Flexible use	Year Round	13 to 77	800 to 1,500
4B	Flexible use	Year Round	143 to 341	800 to 1,500
4C	Not proposed for managed grazing due to vegetation community	--	0	--
5	Not proposed for managed grazing due to topography	--	0	--

[1] Year-round season of use implies that the grazing could occur year-round, as needed to achieve more specific management prescriptions for other pastures.
[2] After restoration, this pasture should support 5 AUMs at an 800 lbs/ac RDM standard. Season of use may be flexible.

Santa Ysabel Preserve

Current grazing management at Santa Ysabel Preserve is currently adequate for meeting the identified goals and objectives. Within the eastern Management Units, total grazing capacity is anticipated to be 1,440 to 1,680 AUMs (**Table 5**). Within the western Management Units, total grazing capacity is anticipated to be 231 to 522 AUMs (Table 5). Grazing capacity is based on recent stocking numbers because soil survey estimates of grazing capacity seemed to both overstate the available forage in normal years and understate the available forage in drought years, based on actual use data provided by the current grazing lessees (which fell within the bounds of the estimates derived from soil survey data). For this reason, grazing capacity is based on actual recent grazing use records.

An approximately 30-acre portion of Management Unit E5 will be fenced off around the future Nature Center, currently under development. Management of this subunit would then be discrete from the remainder of Management Unit E5. This parcel could either be grazed with targeted grazing or mowed, to achieve RDM targets for the objectives identified.

TABLE 5
GRAZING PRESCRIPTIONS FOR SANTA YSABEL PRESERVE

Management Unit	Prescription Category/Management Targets	Season of Use[1]	Grazing Capacity, Low to Normal Year (AUMs)	RDM Standard (lbs per acre)
E1	Stephens' kangaroo rat	Year Round	90 to 115	400 to 800
E2	Stephens' kangaroo rat	Year Round	200 to 280	400 to 800 (SKR habitat in northwest portion) 800 to 2,000 (southeast portion)
E3	Flexible use	Year Round	350 to 420	800 to 1,500
E4	Flexible use	Year Round	740 to 780	800 to 1,500
E5[2]	Stephens' kangaroo rat	Year Round	48 to 57	400 to 800
E6[2]	Spring grazing	February to April	8 to 20	400 to 800
W1	Stephen's kangaroo rat	Year Round	75 to 175	400 to 800
W2	Flexible use	Year Round	25 to 70	800 to 1,500
W3	Flexible use	Year Round	120 to 270	800 to 1,500
W4 (Connector)	Flexible use	Year Round	8 to 86	800 to 1,500
R1	Arroyo toad/riparian pasture	August to January	3 to 7	800 to 2,000

[1] Year-round season of use implies that the grazing could occur year-round, as needed to achieve more specific management prescriptions for other pastures.
[2] 35 acres were removed from the current Management Unit E5 for the Nature Center footprint and a new Management Unit was created (E6) to allow for seasonal grazing in the grassland between the Nature Center and Highway 79. After final fence construction and landscaping, 25 acres are assumed to be available for grazing.

Boulder Oaks Preserve

The Boulder Oaks Preserve is anticipated to have a total grazing capacity of 9 to 41 AUMs in low to normal years (**Table 6**). Grazing with cattle will be used to achieve the goals and objectives identified. Given the small area available for grazing, goals and objectives will best be achieved by a shortened grazing season to provide a higher stocking rates for a shorter duration. The actual grazing period would be expected to occur over 2 to 6 weeks in the spring to achieve the targeted RDM standards, with some flexibility for when this period would occur over the prescribed season of use. The duration and time of grazing is expected to decrease the likelihood of soil compaction, reduce the likelihood of grazing below the minimum RDM standard, reduce the likelihood of seedling and sapling mortality of Engelmann oaks, and improve grazing lessee monitoring and management by focusing the grazing management over a shorter time period. In particular, this timing will focus grazing when grasses are abundant and of relatively high quality compared to oak seedlings and saplings, encouraging selection of grasses, while achieving a somewhat lower RDM standard to reduce fire hazard along a roadside with residences in the area. This timing will also help to reduce oak resource competition with invasive non-native annual grasses, further promoting oak regeneration.

TABLE 6
GRAZING PRESCRIPTIONS FOR BOULDER OAKS PRESERVE

Management Unit	Prescription Category/Management Targets	Season of Use	Grazing Capacity, Low to Normal Year (AUMs)	RDM Standard (lbs per acre)
West	Spring grazing	February to April	5 to 24	500 to 1,200
East	Spring grazing	February to April	4 to 17	500 to 1,200

CHAPTER 4
Performance Standards and Monitoring Plan

Performance standards and implementation of a monitoring plan are meant to determine whether the goals and objectives of the grazing program are being met. With this information, future management decisions can be revised if needed.

4.1 Residual Dry Matter Monitoring (Objectives 1.1, 1.4, 2.1, 2.2, 3.1)

RDM should be monitored in each Preserve Management Unit to determine whether RDM targets are being met, both on the upper and lower bounds. An adequate number of RDM monitoring plots should be established with clipped weights recorded at each, along with descriptive characterization of the grassland stand in the vicinity of the clipped plot, indicating whether the clipped plot is representative of the stand and whether the stand in general appears to be above, within, or below the RDM standards for the management prescription.

Guenther and Hayes (2008) provide a guide on utilizing monitoring points to extrapolate to RDM maps across a grassland stand and Management Unit. When weighing samples, consistent relative humidity is important. While samples should be weighed as "air-dried" weights, clear, dry weather conditions in the field should be adequate for consistent sampling. High relative humidity can alter the results, which can be compensated for by taking collected samples, air drying them, and re-weighing at a time of more typical relative humidity for field conditions. RDM monitoring should be done in the fall, in the month before typical fall germinating rains begin. As a rule of thumb, standing RDM in grasslands decreases by roughly 10 percent each month after grasses senesce in the spring in the absence of domestic livestock grazing or significant large ungulate grazing.

There are also remote sensing techniques using multispectral Landsat or MODIS imagery that can be utilized to classify RDM into classes consistent with the RDM standards identified in this Grazing Management Plan that allows for greater coverage of RDM mapping with reduced field time (Ford et al 2017, Guenther et al 2018, Tsalyuk et al 2015). These remote sensed data are available freely with extensive coverage of the project area on regular time intervals. By monitoring plots and measuring actual RDM, then visually classifying patches of spatially similar RDM levels by experienced field staff in to RDM classes, these data can then be used to train image recognition software to classify the remaining grassland vegetation of the Preserves into RDM classes relevant for determining whether management objectives are being achieved over a larger area than is possible with monitoring and clipping discrete plots.

The existing RDM monitoring plots used at Ramona Grasslands and Santa Ysabel Preserves are generally adequate for determining RDM compliance with management prescriptions if notes regarding grassland stands are also kept (Figures 5 and 9). However, additional monitoring plots are proposed on Ramona Grasslands Preserve within Management Units 2A and 4B to better understand RDM compliance within those respective areas (Figure 5). Additional points will need to be added to the "Connector Property" on the Santa Ysabel Preserve because this area will be open to grazing. In particular, monitoring plots should be established on the upland Holland soils east and west of Santa Ysabel Creek as well as on the Reiff soils north and east of Santa Ysabel Creek within the proposed Management Unit W4. One (1) monitoring plot should be established in Boulder Oaks Preserve within each of the two proposed Management Units. Unless there is poor distribution of livestock grazing within these relatively small Management Units, one plot in each along with descriptive notes on the RDM conditions on the Management Units as a whole to place the single data points in context.

4.2 Invasive Non-native Plant Detection Monitoring (Objective 1.1)

Invasive non-native plants will be surveyed during annual RDM monitoring events. Coordination between DPR staff and grazing lessees will be established so that introductions of new invasive non-native plants can be detected and eradicated before they become established.

4.3 Engelmann Oak Recruitment Monitoring (Objective 1.2)

Every 5 years monitoring of Engelmann oak populations on Ramona Grasslands, Santa Ysabel and Boulder Oaks Preserves will be implemented to determine the rate of recruitment to ensure long-term stability of tree populations. Monitoring methods will include macro plots with size class counts, including seedlings, saplings, and mature trees. This type of monitoring would assist with informing whether stocking rates, grazing periods, and cattle distribution being used within the Preserve Management Units are consistent with maintenance of oak populations.

4.4 Vernal Pool and Riparian Vegetation Monitoring (Objectives 1.3, 1.5)

Protocols for monitoring vegetation composition and structure in vernal pools and riparian areas within Ramona Grasslands Preserve have been established through DPR's Targeted Monitoring Plan to determine whether the specific management prescriptions for the Management Units with these features are meeting their objectives. Riparian vegetation within Santa Ysabel Preserve can be monitored every 3 to 5-years due to the more stable nature of this vegetation.

4.5 Monitor Actual Grazing Use (Objective 3.2)

As part of the grazing leases for each Preserve an annual report is required to be submitted to the County of San Diego Department of General Services and Parks and Recreation by the grazing lessee. The annual reports will include kind, class, numbers, and dates of use of each Management Unit used by grazing lessee's livestock. This data will be field verified by DPR staff and will integrate with observations made from other monitoring efforts to understand the extent to which grazing management may be related to changing conditions being observed.

CHAPTER 5
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Appendix A
Additional Recommendations

APPENDIX A
Additional Recommendations

Cattle Water Sources

Water is a key factor in improving livestock distribution and meeting forage utilization targets. Observations of reduced spring output as related by DPR staff and grazing lessees, particularly on Santa Ysabel Preserve suggest a need to improve existing water sources and explore the possibility of establishing new watering points. Existing water sources should be assessed to determine their reliability through the year and a determination made whether it is feasible to improve the reliability of these sources into the summer and fall dry season. This might involve water lines from existing water sources or developing new water sources on Santa Ysabel Preserve. In particular, a reliable, year-round, off-stream water source in the southwest corner of Management Unit W3 may help improve livestock distribution and forage utilization across the Management Unit, allowing for more effective achievement of management goals. With a long-term lease (5 or more years), the lessee may be eligible for NRCS cost-share funds to help facilitate the establishment of new water sources.

Lease Terms

Longer term leases provide greater stewardship incentives for livestock producers. A 5-year lease term that is renewable once can provide the certainty that a livestock producer may need for making investments in grazing infrastructure and greater efforts made to achieve the Grazing Management Plan goals of sustainably using the forage resources. A longer-term lease may also make opportunities for NRCS cost share funds to become available for infrastructure improvements that have both conservation and livestock production benefits. This kind of lease should still include clauses for lease termination for violations of lease terms.