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**Technical Memorandum: Distribution and Habitat  
Characteristics of Braunton's Milk vetch on SSFL, the  
Likelihood of Undiscovered Occurrences on SSFL,  
and the Importance of the SSFL Population**

**December 8, 2017**

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# Technical Memorandum: Distribution and Habitat Characteristics of Braunton's Milk-vetch on SSFL, the Likelihood of Undiscovered Occurrences on SSFL, and the Importance of the SSFL Population

The potential for Braunton's milk-vetch to occur in other areas of SSFL is mentioned in the *Draft Santa Susana Field Laboratory Remediation Biological Assessment* (BA) in Section 5.1.1.1 under *Potential for Occurrence*. Additional discussions of Braunton's milk-vetch are included in Section 7.6.1.5, Table 7-11, and the analysis of impacts for Braunton's milk-vetch in Chapter 7. Clarification is needed in regards to the quotation NASA (2014) in the BA and in the November 30, letter, which should be amended to indicate that habitat possibly suitable for Braunton's milk-vetch could occur "in the northeastern portion of NASA Area II and in the southern portion of Area I (LOX Plant Area)" based on soil conditions. This clearly refers to the southern portion of NASA's property located in the northern part of Boeing's Area I, rather than the southern portion of Boeing's Area I. This distinction is made in Appendix M of NASA's FEIS. A summary of field surveys that resulted in no additional observations of Braunton's milk-vetch is provided in a separate attachment. Provided below is additional information on habitat characteristics for Braunton's milk-vetch in Area IV and the potential for it to occur in other areas of SSFL.

Although there have been no systematic site-wide surveys to determine if Braunton's milk-vetch occurs outside the western part of Area IV and the southeastern corner of the Southern Buffer Zone (Padre 2014; NASA 2014) (Figure 1), there have been numerous biological surveys and monitoring activities conducted for various activities at SSFL, especially in Areas I, II, III, IV, and the Southern Buffer Zone. These surveys have resulted in no observations of Braunton's milk-vetch within the Study Area outside of the two known areas, except for individuals noted at two previously disturbed locations in Area IV whose presence may be linked to topsoil imported from a borrow area in Braunton's milk-vetch habitat for use in restoration prior to designation of the Critical Habitat.

Braunton's milk-vetch on SSFL Area IV has been noted mostly in chaparral, and coast live oak or walnut woodlands. Common associated species include chamise (*Adenostoma fasciculatum*), sugar bush (*Rhus ovata*), manzanita (*Arctostaphylos* spp.), Malibu baccharis (*Baccharis malibuensis*), chaparral yucca (*Hesperoyucca whipplei*) and black sage (*Salvia mellifera*). Malibu baccharis, a CRPR 1B.1 species, is a fairly abundant associate of Braunton's milk-vetch in Area IV (both within the designated critical habitat and in the area to the northwest of the critical habitat). On SSFL, Malibu baccharis has been found only in association with Braunton's milk-vetch. This co-occurrence suggests specialized soils where Braunton's milk-vetch has been found. Other species noted wholly or primarily in association with Braunton's milk-vetch habitat on Area IV include Indian warrior (*Pedicularis densiflora*) and woolly blue curls (*Trichostema lanatum*). The occurrence of these two comparatively widespread chaparral species in association with Braunton's milk-vetch on SSFL may be related to the openness of the chaparral where Braunton's milk-vetch occurs. Chaparral and coast live oak and walnut woodland occur elsewhere onsite but vegetation alone is not a reliable predictor of the potential for Braunton's milk-vetch occurrence. If soils and underlying bedrock conditions are suitable, it is possible that Braunton's milk-vetch could occur elsewhere on SSFL, particularly within the Southern Buffer Zone

Further investigation of soil characteristics associated with Braunton's milk-vetch in Area IV shows that Braunton's milk-vetch plants primarily occur in soils classified as Gaviota rocky sandy loam (GrF [15 to 50 percent slopes]), with some individuals also present in the Los Osos clay loam (LoE2[15 to 30 percent slopes]) (Figure 2). These soils overlie sandstone, claystone, and siltstone of the Paleocene Santa Susana Formation (Figure 3). Variations in soil types across the Santa Susana Formation are partly reflective of variation in slope gradients in addition to differences in the underlying bedrock within the Santa Susana

Formation. The Santa Susana Formation has been divided into several different geologic units and Braunton's milk-vetch is present in the portion where the formation consists of gray, micaceous claystone and siltstone, with a few minor thin sandstone beds (Figure 3). Although GrF soils are present across much of SSFL (Figure 2), Braunton's milk-vetch is present only in areas underlain by the Santa Susana Formation, which is located on the western portion of the site (in Area IV and extending into the Southern Buffer Zone). In Area IV, Braunton's milk-vetch occurs mostly on fairly steep north-facing slopes, with fewer plants present on southeast-facing slopes. In Area IV, Braunton's milk-vetch predominantly occurs in areas with a soil pH that ranges from 7.39 to 9.2 (Figure 4). Soil pH data was not available for the Southern Buffer Zone so comparisons were not possible.

Based on the distribution of soils and underlying bedrock there is some potential that Braunton's milk-vetch could occur elsewhere on the site, particularly on the western side of the Southern Buffer Zone (south of Area IV). The Southern Buffer Zone has not been systematically surveyed for Braunton's milk-vetch but the species has not been observed during site visits conducted in this area by biologists familiar with the species and its habitat on Area IV. Since formal surveys for Braunton's milk-vetch and its habitat have not been conducted outside of Area IV and soils and bedrock potentially suitable for Braunton's milk vetch appear to exist in the Southern Buffer Zone south of Area IV, there remains a possibility that the plant (or its seedbank) occurs in the Southern Buffer Zone south of Area IV.

Lands adjoining the western boundary of Area IV and the Southern Buffer Zone are in protected or open space status. The Upper Las Virgenes Canyon Open Space Preserve adjoins the western boundary of the Southern Buffer Zone and lands designated as natural open space within the Runkle Canyon specific plan area (City of Simi Valley) adjoin the western boundary of Area IV and the Northern Buffer Zone. Survey data for Braunton's milk-vetch have not been identified for these adjoining areas, however a report of a 2006 survey for the Braunton's milk-vetch population in Critical Habitat Unit 1D (MWH Global 2009) noted that "Braunton's milk-vetch was observed on private lands within Unit 1D adjacent to the SSFL boundary; however, this portion of the population was not surveyed or assessed." Additionally, there is a fairly high likelihood that the population located on a hill northwest of the Unit 1D boundary (see Figure 1) may continue westward into the open space portion of the Runkle Canyon specific plan area for an unknown distance. The habitat and soils adjacent to this population seem to be similar to those onsite and are underlain by the Santa Susana Formation, which continues westward across the Area IV boundary (Figure 3). Mature chaparral, unburned in the 2005 Topanga Fire, is present on the Santa Susana Formation west of the Area IV boundary. Within Area IV mature chaparral was removed to facilitate the radiological survey conducted in 2011, causing emergence of Braunton's milk-vetch plants within the newly opened habitat. The mature unburned chaparral in the adjoining portion of the Runkle Canyon open space area is where Braunton's milk-vetch, if present, would most likely exist as dormant seed bank.

Of the six designated critical habitat units described in USFWS 2006, Unit 1d in Area IV, has by far the largest population size (based on estimates made in 2006 and 2009) documented. The SSFL population clearly has the highest number of individuals reported (over 30,000), as the next highest occurrence is in Black Star Canyon, Orange County, where 5,092 individuals were recorded in 2003. The fact that adjacent habitat on SSFL has a recently (2011 to present) documented extant population, which was unknown at the time of critical habitat designation in 2006, emphasizes the importance of the area. Of the 20 known occurrences in southern California, five have been noted as being extirpated and the status of Braunton's milk-vetch at many of the other sites remain unknown (CDFW 2016). The portions of the critical habitat Unit 1d outside the SSFL boundary are on protected land, which increases the importance of the SSFL Area IV plants. Protecting both areas will help keep the population and habitat intact. Moreover, given the future protected status of Area IV based on Boeing's recently executed conservation easement, the Braunton's milk-vetch population on Area IV has the potential to be the most secure from future land-use changes, increasing its importance to the survival and likelihood for recovery of the species.

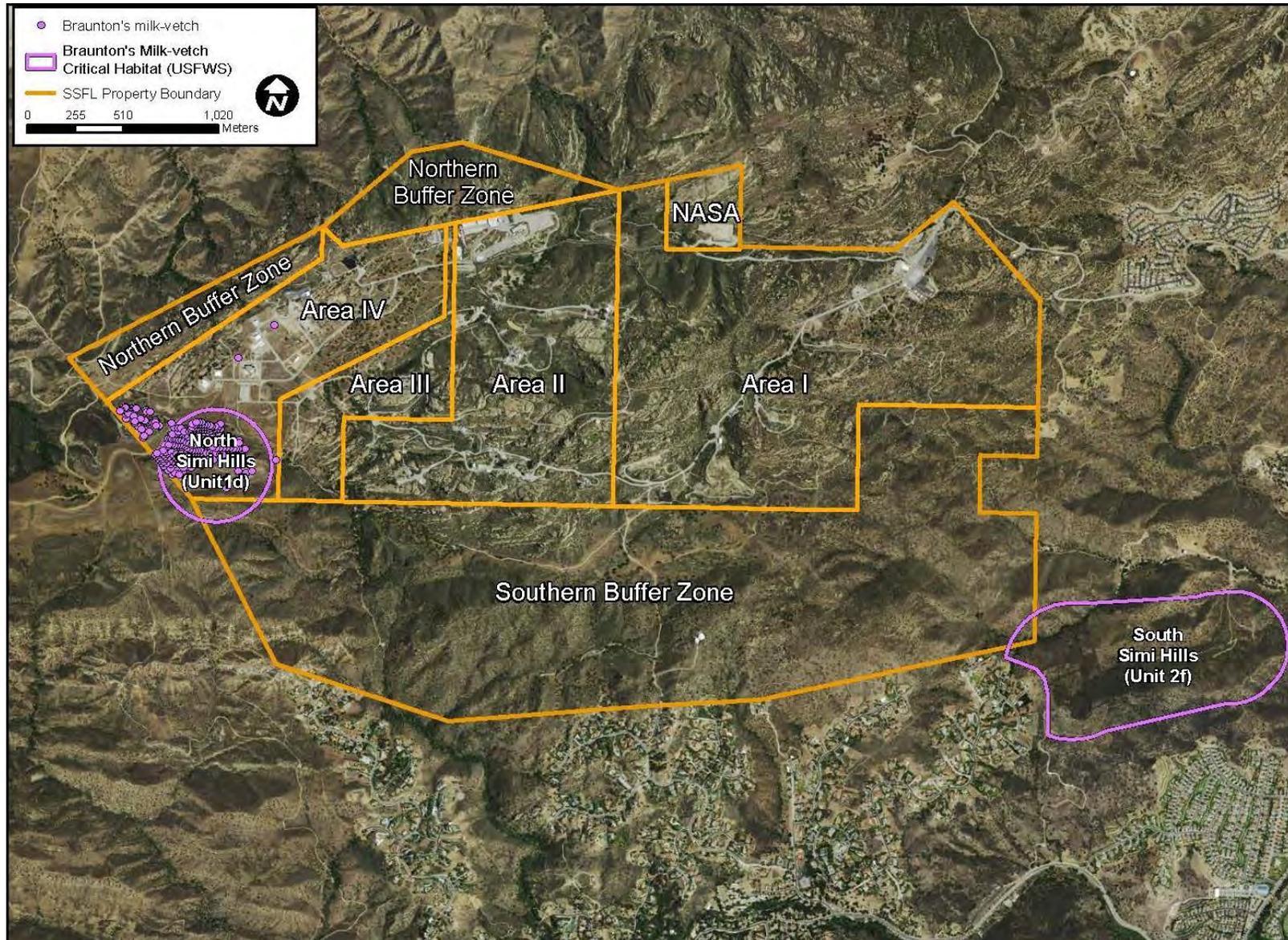


Figure 1. Braunton's Milk-vetch (*Astragalus brauntonii*) Observations and Critical Habitat near Santa Susana Field Laboratory

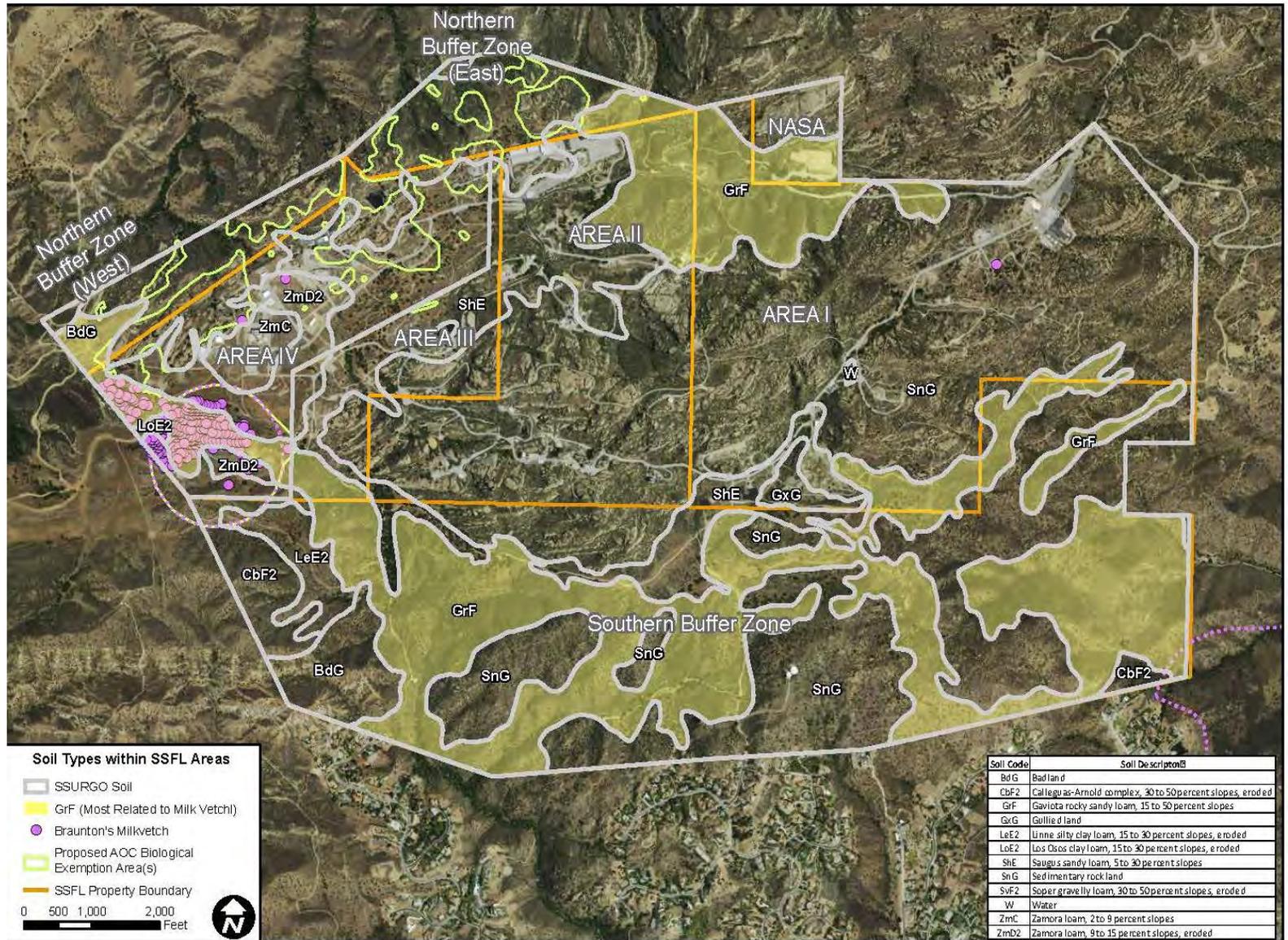


Figure 2. Soils Types within Santa Susana Field Laboratory and Occurrence of Braunton's milk-vetch



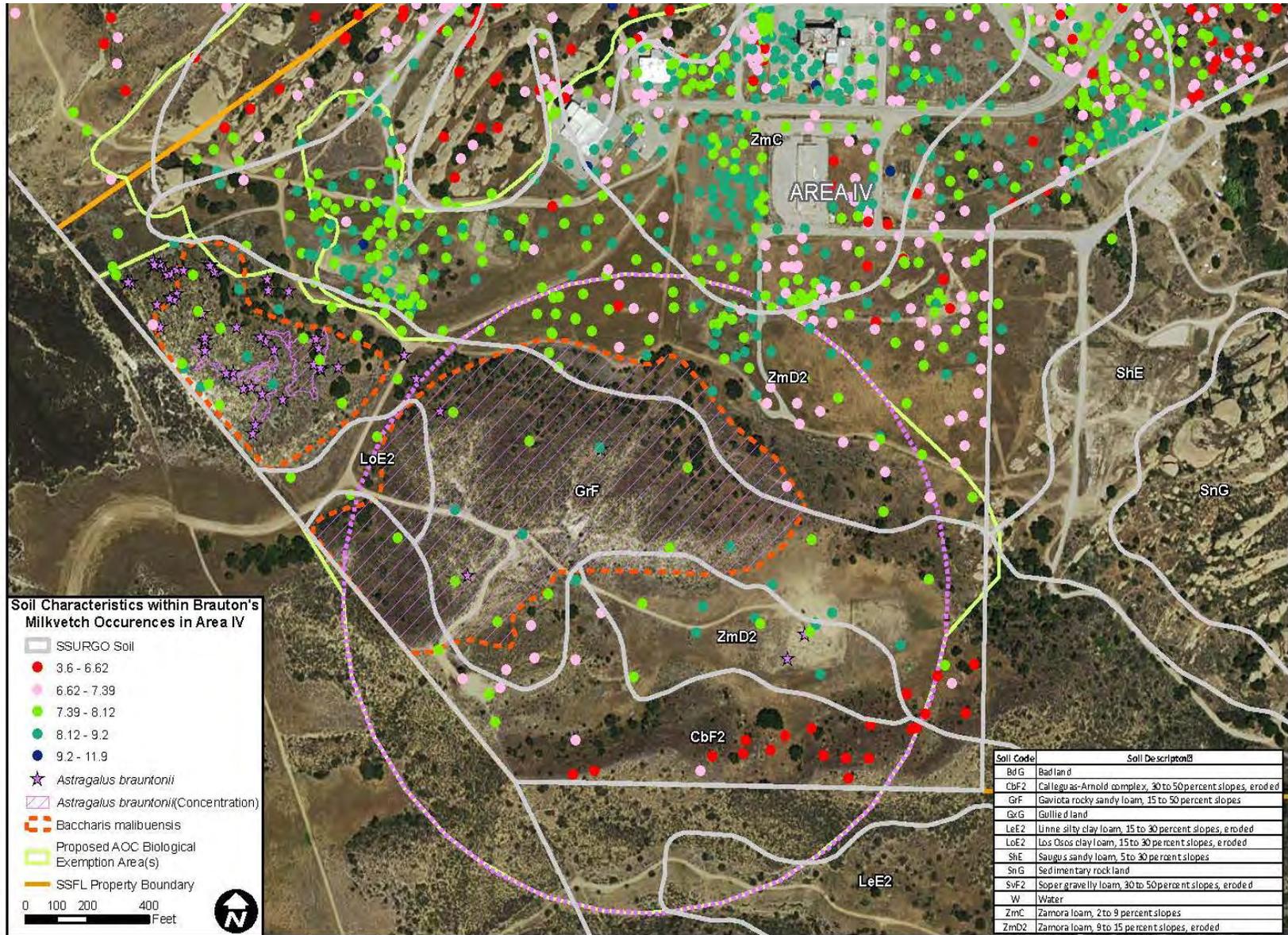


Figure 4. Soil pH characteristics and Braunton's milk- vetch (*Astragalus brauntonii*) in Area IV of Santa Susana Field Laboratory

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