

## ATTACHMENT A

### Evaluation of Petition: Request of Dr. Grey Hayes to List Scotts Valley Polygonum (*Polygonum hickmanii*) as Endangered

April 16, 2003

#### Introduction

On January 9, 2003, the Fish and Game Commission received a petition from Dr. Grey Hayes to list Scotts Valley polygonum (*Polygonum hickmanii*) as Endangered under the California Endangered Species Act (CESA). Scotts Valley polygonum is a small, erect, taprooted annual plant in the buckwheat family (Polygonaceae), growing 1-2 inches (2-5 cm) tall, with white flowers that bloom from late May to August. The species is endemic to Scotts Valley, Santa Cruz County; it is found nowhere else in the world. It is known from only two occurrences, less than one mile apart and occupying a total area of less than one acre. The populations are threatened by development activities, human use of the habitat, and invasion of non-native plants. Due to the limited size of the populations and small number of plants, the species is highly vulnerable to any modification or destruction of habitat, other human related activities, and chance natural events. The Department of Fish and Game (Department) reviewed the petition, interviewed knowledgeable individuals, and conducted a site visit. Based on this information, the Department finds that there is sufficient information to indicate that the petitioned action may be warranted, and recommends that the petition be accepted and considered.

#### Life History

Scotts Valley polygonum, also known as Hickman's knotweed and Hickman's smartweed, is a small annual plant in the buckwheat family (Polygonaceae). The petition provides information on the life history of the species, including sections on taxonomic history, species description, phenology, similar taxa, and pollination.

Mr. Randall Morgan, a Santa Cruz area ecologist and local expert, first noticed the uniqueness of Scotts Valley polygonum in 1990, and collected it to verify its identification in 1993. Further review and investigation confirmed that it was a distinct species that had never before been collected or described. In 1995, it was officially described as a species new to science (Hinds and Morgan 1995). The small, erect, taprooted annual grows 1-2 inches (2-5 cm) tall and can be either single stemmed or branched near the base (Figure 1). The linear leaves are 0.04-0.06 inch (1-1.5 mm) wide, 0.2-1.4 inch (0.5-3.5 cm) long and sharply pointed at the tip. The single white flowers, with bright orange or pink anthers, bloom from late May to August (Hinds and Morgan 1995).

Information on reproductive biology is lacking. Many species closely related to Scotts Valley polygonum are self-pollinating, and the small size and lack of showiness of the Scotts Valley polygonum plants and their flowers are indicative of a self-pollinating plant species (Morgan, pers. comm. 2003). However, a small, unidentified sphecid wasp was observed visiting a Scotts Valley polygonum individual, although its role as a pollinator is unknown. Observations indicate that seed production in healthy Scotts Valley polygonum plants ranges from several dozen to up to 200 seeds per plant, while depauperate plants may produce few or no seeds (Morgan, pers.

comm. 2003).

### **Kind of Habitat Necessary for Survival**

The petition includes information on the kind of habitat necessary for survival, including sections on habitat and associated species.

Scotts Valley polygonum occurs in Scotts Valley, Santa Cruz County, California, approximately seven miles (12 km) from the coast, at an elevation of 700-800 feet (215-246 m). It is found in grassland habitat of gently sloping to nearly level, fine-textured, shallow sandy loam soils, underlain by outcrops of Santa Cruz mudstone and Purisima sandstone (Figure 2). Pockets of these shallow, well-draining soils, often referred to as “rock outcrops”, are scattered within an area generally composed of deeper soils with greater water-holding capacity. Because of their greater water-holding capacity, and due to current management, the deeper soils tend to support an annual grassland composed primarily of non-native species. Within this more extensive annual grassland, the rock outcrops form small patches of winter-saturated/summer-dry habitat in which the non-native grasses are unable to survive (Figures 3 & 4). These outcrops support an array of specially-adapted native plants, including several rare endemics, and have hence been nicknamed the “wildflower fields”. Scotts Valley polygonum only occurs within these relatively bare microhabitats with little or no competition from other plants.

### **Range & Distribution**

Scotts Valley polygonum is endemic to Scotts Valley, Santa Cruz County; it is found nowhere else in the world (Figure 5). It is known from only two occurrences, less than one mile apart and occupying a total area of less than one acre (Figure 6). The petition includes information on the range and distribution of the species, including sections on distribution, known occurrences, attempts to locate additional populations, as well as maps.

Because the species was first discovered in 1990, little is known about its historical range and distribution. The petition states that construction of Highway 17 and the development of the City of Scotts Valley may have removed habitat supporting the species. In addition, non-native plants have invaded and now dominate habitat areas that once may have supported Scotts Valley polygonum. However, the petition also states that the species has likely always been limited in distribution, because the habitat in which it occurs is very restricted, no historical records of the species have been located, and thorough surveys of potentially suitable habitat throughout Scotts Valley and surrounding areas have not located any additional populations.

### **Occurrences**

The two occurrences of Scotts Valley polygonum are located on three privately-owned parcels. At each occurrence the Scotts Valley polygonum plants are grouped in one or more discrete patches located within distinct areas of thin-soiled habitat. Each patch of plants ranges in size from 5 ft by 5 ft (1.5 m by 1.5 m) to 50 ft by 30 ft (15m by 9 m).

#### **EO1 – Polo Ranch**

The first occurrence, referred to in the petition as Polo Ranch (EO1<sup>1</sup>), is located entirely

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<sup>1</sup> EO = Element Occurrence: a population/occurrence of the species as defined by the Department's California Natural Diversity Database (CNDDDB)

on the Polo Ranch property. This population is located just east of Highway 17 and north of Navarra Road, in northern Scotts Valley, on private land owned by Lennar Communities/Greystone Homes. A housing development is currently being planned for this site. The most recent surveys of this location, conducted in 1998, found seven patches of Scotts Valley polygonum plants, all located within approximately 500 feet of each other.

### EO2 – Glenwood Hills

The second occurrence, Glenwood Hills (EO2) is located north of Casa Way and west of Glenwood Drive in northern Scotts Valley, less than one mile northwest of Polo Ranch (EO1). It is made up of five patches of plants located on two adjacent parcels, one owned by the Scotts Valley School District, and one owned by the Salvation Army. Because this occurrence is located on two adjacent parcels, which are owned and managed by two separate landowners, the petition distinguishes between the two portions of the occurrence by referring to them as Scotts Valley School District (EO2a) and Salvation Army (EO2b).

#### EO2a – Scotts Valley School District

This portion of the occurrence consists of one patch of plants occurring on land owned by Scotts Valley School District, in a 9-acre “preserve area”<sup>2</sup> adjacent to Scotts Valley High School. The plants are located approximately 60 feet (18 m) from the edge of the high school playing fields.

#### EO2b – Salvation Army

This portion of the occurrence consists of four patches of plants occurring on land owned by Salvation Army, approximately 690 feet (210 m) west of the plants on Scotts Valley School District Land (EO2a). A 4.4 acre conservation easement to protect this habitat area in perpetuity was drafted in 1999, but it has not yet been finalized.

### **Abundance and Population trend**

The petition includes information on abundance and population trend, and presents the survey data of the occurrences in a table format. This information includes both exact counts of numbers of plants as reported to the CNDDDB or elsewhere, as well as general estimates of population numbers based on local botanists’ recollections of their observations. Because Scotts Valley polygonum was discovered so recently, information on its abundance prior to 1990 is not available. The petition states that it may have been more abundant in the past, before the construction of Highway 17 and the City of Scotts Valley, which may have removed habitat supporting the species. Since its discovery in 1990, the total number of plants observed in any given year has ranged from 200-400 plants to almost 3500 plants (Table 1). The only year for which exact counts of plants at all populations is available is 1998, when a total of 3412 plants were counted<sup>3</sup>.

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<sup>2</sup> The “preserve area” provides habitat for several rare species, including the Federally-listed endangered Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*), the State-listed endangered San Francisco popcorn flower (*Plagiobothrys diffusus*), the Federally-listed endangered Ohlone tiger beetle (*Cicindela ohlone*), as well as Scotts Valley polygonum. However, the long-term legal protection of this habitat area has not been secured.

<sup>3</sup> The petition originally stated that the total number of plants seen in 1998 was 5410. On January 30,

	1990	1991	1992	1993-1996	1997	1998	1999	2000	2001	2002
<b>Polo Ranch (EO1)</b>	300	n/a*	n/a*	n/a*	2140	1259	n/a*	n/a*	n/a*	n/a*
<b>School District (EO2a)</b>	n/a*	50	n/a*	n/a*	n/a*	153	n/a*	120	150	140
<b>Salvation Army (EO2b)</b>	50	n/a	79	n/a*	n/a*	2000	n/a*	200	225	200

**Table 1.** Number of Scotts Valley polygonum plants observed at each site since 1990.  
n/a\*: no survey information available for that year

At Polo Ranch (EO1) surveys conducted in 1990, 1997, and 1998 found between three and seven patches of plants, with a total of between 300 and 2140 plants in all patches. The difference in the number of patches and plants observed at this site in different years may be due to variations in survey methodology; natural fluctuations in the population; or changes in land use affecting the species, such as cessation of grazing or increased off-road vehicle use. No survey information has been available for this occurrence since 1998.

At the School District site (EO2a), surveys since 1991 have found between 50 and 153 plants in one patch. At the Salvation Army site (EO2b), surveys since 1990 have found between 50 and 2000 plants in four patches. The reason for the marked increase and then subsequent decrease in the number of plants at the Salvation Army site is unknown. The Scotts Valley Water District Recycled Water Distribution System was constructed at this site in 1999; however, it is not known whether construction activities were related to the decrease in the number of plants between 1998 and 2000.

Because the species is a small annual plant, population numbers or changes in these numbers do not necessarily reflect the health of the population. For example, fluctuation of population numbers by an order of magnitude or more from year to year, as has been observed at both the Polo Ranch (EO1) and Salvation Army (EO2b) sites, is not unusual for annual plants, and could be due to environmental factors such as rainfall or temperature. The Department concurs with the petition statement that because the population numbers vary greatly from year to year, habitat quality and quantity, and the degree and nature of the threats to the habitat, is a more useful and accurate indicator for the status of the species.

### **Factors Affecting the Ability to Survive and Reproduce**

The petition describes factors affecting the ability of Scotts Valley polygonum to survive and reproduce, including sections on habitat modification and destruction, overexploitation, predation, competition, disease, and other natural events or human-related activities.

#### Habitat Modification or Destruction

The petition states that Scotts Valley polygonum is threatened by direct and indirect impacts due to development at all occurrences, including the destruction of plants and/or their habitat; changes in surface hydrology; changes in water quality due to application of herbicides, pesticides and dust-reducing substances applied to adjacent areas; and soil siltation. In addition, proximity to developed areas can increase the risk of other

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2003, the Commission received a letter from the petitioner stating that this value was erroneous, and that the correct number is 3412.

related impacts, such as human use of the habitat or invasion of non-native species; these threats are discussed separately below.

A housing development is currently in the planning stages for the Polo Ranch site (EO1). A draft EIR was first circulated for this project in 1990. The property was subsequently sold to Lennar Communities/Greystone Homes (Greystone), and a second draft EIR was circulated in 2000. The project proposal is currently being reconfigured, and Greystone is preparing formal development applications for the project, which will consist of approximately 40-50 dwelling units (Morrison, pers. comm. 2002). An updated project map provided to Department biologists during a site visit in March 2003, shows that the reconfigured project would result in the elimination of one patch of Scotts Valley polygonum plants. The remaining patches would be set aside in an open space area, with setbacks of generally 100 ft. or more between the Scotts Valley polygonum plants and the development. This new project configuration has not yet been finalized. The petition states that regardless of possible reconfiguration, the project will still result in significant fragmentation of habitat and secondary impacts to Scotts Valley polygonum, including encroachment of non-native plants; changes in hydrologic conditions; soil compaction and disturbance; inadvertent or intentional application of herbicides, fertilizers, or pesticides near the Scotts Valley polygonum plants; and dumping of yard waste.

Recent construction of Scotts Valley High School at the Scotts Valley School District site (EO2a) eliminated approximately 0.33 acre of rock outcrop areas that may have provided suitable habitat for Scotts Valley polygonum (BRG 1999b). The patch of Scotts Valley polygonum plants occurs approximately 60 feet (18 m) from the edge of the high school playing fields. Although it is located in the high school "preserve area", which is currently managed to protect the rare species that occur there, including the federally-listed endangered Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*), the State-listed endangered San Francisco popcorn flower (*Plagiobothrys diffusus*), the federally-listed endangered Ohlone tiger beetle (*Cicindela ohlone*), and Scotts Valley polygonum, the long-term conservation of this habitat area is not guaranteed. In addition, the petition states that the proximity of these Scotts Valley polygonum plants to developed areas subjects them to indirect impacts, such as changes in surface hydrology and water quality, invasion of non-native plants, soil disturbance and compaction, and possible vandalism. The most recent monitoring report for the preserve area states that construction of the high school recreational fields has resulted in increased runoff entering the drainage swale on the grassland preserve, and that erosion was noted along the edge of the preserve (BRG 2002).

At the Salvation Army site (EO2b), habitat destruction occurred during the construction of the Scotts Valley Water District Recycled Water Distribution System project in July, 1999. This project eliminated eight rock outcrop areas that may have provided suitable habitat for Scotts Valley polygonum (BRG 1999a). Grading was authorized by the Environmental Impact Report (EIR) to come within 75 feet (23 m) of the Scotts Valley polygonum population. Actual grading was out of compliance with the EIR, coming within 10 feet (3 m) of the Scotts Valley polygonum plants. As a result of this unauthorized activity, the Scotts Valley Water District and the Department entered into negotiations in an attempt to address the unauthorized grading. The Salvation Army, on behalf of the Scotts Valley Water District, offered the Department a conservation easement over 4.4 acres of the Salvation Army site. However, that conservation easement contained terms which were unacceptable to the Department. There is

currently no long-term protection of this habitat area. The Scotts Valley polygonum plants are now located directly downslope from the road, which could result in a number of indirect impacts to the plants, including changes in surface hydrology and water quality, increase in soil siltation, soil compaction and disturbance, and invasion of non-native plants.

### Competition

The petition states that Scotts Valley polygonum, which requires relatively bare microhabitats with little or no competition from other plants in order to survive and reproduce, is threatened by invasion of non-native grasses from surrounding areas. Although the rock outcrop areas where Scotts Valley polygonum occurs generally do not support abundant non-native species, the tall grasses found in nearby areas can negatively impact Scotts Valley polygonum by causing shading that would not normally be present, as well as contributing to the accumulation of thatch. In addition, disturbance factors that have been identified at all sites, including foot traffic, and bicycle and off-road vehicle use, may facilitate an increase in non-native species within and around Scotts Valley polygonum habitat through soil disturbance and compaction, and transport and spread of non-native seed. Cessation of grazing can also result in increased abundance of non-native species. The petition notes that cessation of grazing at the Polo Ranch site approximately ten years ago may have led to the disappearance of the State-listed endangered San Francisco popcornflower at that site, and may pose a similar threat to Scotts Valley polygonum. Although impacts of competition on Scotts Valley polygonum currently appear to be minimal, the level of threat could increase over time.

### Other Natural Events or Human-related Activities

The petition describes natural events or human-related activities that could affect the ability of Scotts Valley polygonum to survive and reproduce, including impacts related to habitat fragmentation and inadequate design of preserve areas; disturbance and soil compaction due to human, bicycle, and pet traffic; off-road vehicle use; as well as chance natural events that could lead to extinction.

According to the petition, habitat fragmentation and inadequate design of preserve areas threaten the continued existence of the species. Habitat fragmentation can result in the disruption of ecological functions, leading to hydrologic changes, non-native plant invasions, and disruption of fire regimes, soil integrity, seed dispersal mechanisms, nutrient cycling, and plant-pollinator interactions. According to the petition, development at Polo Ranch (EO1) will further fragment habitat at that site, and inadequate buffers or preserve areas would jeopardize the species at that location. In addition, the petition also states that the small preserve at the School District site (EO2a) is not adequate to protect the species, and grading for the water district project (EO2b) has further fragmented habitat.

Off-road vehicle use, which can result in the damage or death of plants when they are run over, as well as cause soil disturbance and compaction, is an ongoing problem. According to the petition, heavy off-road vehicle use is occurring at the Polo Ranch site (EO1). Although a "no trespassing" sign is posted at the location, the off-road vehicle activities continue to occur because of an inability to lock a main access gate due to a private property right of way, the isolated nature of the property, and infrequent law

enforcement patrol. The 2000 Polo Ranch EIR stated that the reduction in the number of plants between 1997 and 1998 may have resulted in part from effects of off-road vehicle use at the site (Impact Sciences, 2000). During a site visit in 2003, Department biologists observed a number of off-road vehicle and bicycle trails at the site. Although the activity appeared to be concentrated outside of the known occupied Scotts Valley polygonum habitat areas, there was some evidence of off-road activity within the occupied habitat areas.

According to the petition, dirt bike trespass is a problem on the Salvation Army property (EO2b) despite fencing in the area, and there appears to be no enforcement. A dirt bike trail runs through one of the Scotts Valley polygonum habitat areas at this site, and although current activity does not yet appear to have significantly impacted the species, it is likely that damage to this site will occur over time (Kathy Lyons, pers. comm. 2002). During a site visit in 2003, Department biologists observed a person riding a motorbike through the Scotts Valley polygonum habitat area.

The petition also states that soil disturbance and compaction by human, bicycle, and pet traffic are potential threats in the School District preserve area (EO2a). According to the most recent monitoring report for the preserve area, during 2001 and 2002, the preserve was subject to minor human disturbances, including students traversing the site and residents using the area for golf practice.

Due to the low population numbers and the small area of occupied habitat, the species is also at increased risk of extirpation or extinction due to chance natural events, such as disease outbreak or fire.

#### Overexploitation, Predation, and Disease

The Department concurs with the petition statement that overexploitation, predation, and disease are not known to be significant threats at this time.

#### **Degree and Immediacy of Threat**

The petition states that two development projects have resulted in habitat modification and destruction at one occurrence (EO2a and EO2b), and a third project is currently being planned at the other occurrence (EO1). According to a USFWS Recovery Plan, Scotts Valley polygonum will be jeopardized if all of these projects are completed without significant conservation measures for the plants (USFWS 1998). Impacts of these development activities, including direct destruction of plants and/or their habitat, habitat fragmentation, and disruption of ecological functions, may threaten the survival and reproduction of Scotts Valley polygonum.

In addition, activities identified at all sites, including bicycle, foot traffic, and off-road vehicle use, resulting in the soil disturbance and compaction, and invasion by non-native plants, may threaten the survival and reproduction of Scotts Valley polygonum over time. Chance natural events, such as fire or disease outbreak, could result in the extirpation of one or more patches of Scotts Valley polygonum.

Due to the limited size of the populations and small number of plants, the species is highly vulnerable to any modification or destruction of habitat, or other human-related activities or natural events.

## **Impact of Existing Management Efforts**

### Management of Known Populations

The Polo Ranch occurrence (EO1) is not currently managed to protect the species. A “no trespassing” sign is posted at this location; however, off-road vehicle use continues to be a problem.

The Scotts Valley High School occurrence (EO2a) is contained within a 9-acre “preserve area” with a management plan and 10-year monitoring program. Management actions outlined under this plan include the installation of boundary fencing, control of invasive species, and periodic mowing on portions of the site. The Department concurs with the petition statement that the future funding and management of this area is unclear due to a lack of legally-binding documents.

The Salvation Army occurrence (EO2b) is currently managed under the Recycled Water Distribution System, Salvation Army Site Revegetation and Management Plan. According to the petition, this plan includes the installation of boundary fencing, periodic mowing on portions of the site, revegetation, and erosion control measures. However, the petition also states that the plan is only partially being implemented because the specified 4.4 acre conservation easement has not yet been finalized. The Department agrees that finalization and implementation of the conservation easement is essential to the long-term protection and management of this site.

### Federal Status

On April 8, 2003, the USFWS published a final rule, listing Scotts Valley polygonum as Endangered under the Federal Endangered Species Act (FESA), and concurrently designating critical habitat for the species. This rule becomes effective on May 8, 2003. Listing under FESA does not provide Scotts Valley polygonum adequate protection, because all occurrences of the species are on private lands, where USFWS has limited jurisdiction. A federal nexus would be required in order for the species to receive any protection under the federal act.

### Other Status

Scotts Valley polygonum is classified by the California Native Plant Society (CNPS) as 1B, meaning it is Rare or Endangered in California and elsewhere (CNPS 2001). Its Global and state ranking as tracked by the California Natural Diversity Database (CNDDDB) are G1 (Less than 6 viable element occurrences OR less than 1000 individuals OR less than 2000 acres), and S1.1 (very threatened) (CNDDDB 2003). Although these rankings help show that the species is rare and may be in need of protection, they do not provide any official protection.

## **Suggestions for Future Management**

The following recommendations were given in the petition. The Department concurs that implementation of these actions would help to ensure the long-term survival and reproduction of Scotts Valley polygonum.

- Preserve both occupied and unoccupied habitat, to help ensure the long-term survival of

the species. Preservation of a matrix of occupied and potentially suitable habitat will help allow the species to survive stochastic events and respond to varying changes in disturbance regimes.

- Ensure that current management and land-use plans are properly finalized and implemented. The 4.4 acre conservation easement on the Salvation Army site should be finalized, and efforts should be made to secure long-term legal protection of the Scotts Valley School District “preserve area”. Adaptive management plans should be developed and implemented at all sites.
- Conduct research on pollination biology, seed dispersal, seed herbivory, plant demographics, and soil requirements, as well as researching management methods to reduce competition with non-native plants. Conduct monitoring and research to determine buffering needs and adequate preserve size for current and future preserve areas.
- Monitor extant populations yearly and submit information to the CNDDDB, and continue to conduct surveys in potentially suitable habitat.

#### **Availability and Sources of Information**

The petition includes 1) A list of agencies and organizations that should be involved in efforts to manage and preserve the species, 2) Herbarium specimen label information, 3) A bibliography, and 4) A list of individuals consulted.

#### **A Detailed Distribution Map**

The petition includes detailed distribution maps for the two occurrences of the species.

## References

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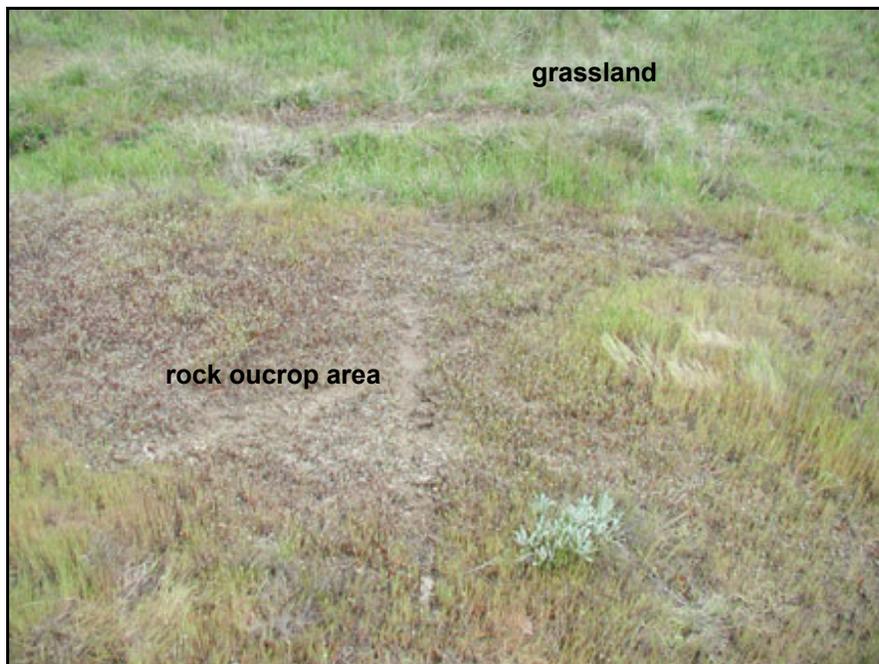
**Figure 1.** Scotts Valley polygonum (*Polygonum hickmanii*), close-up. *Photo by Randy Morgan*



**Figure 2.** Grassland containing Scotts Valley polygonum habitat areas. *Photo by Melanie Gogol-Prokurat*



**Figure 3.** Pocket of sparsely-vegetated, thin-soiled Scotts Valley poygonum habitat within grassland, overview. *Photo by Melanie Gogol-Prokurat*



**Figure 4:** Pocket of sparsely-vegetated, thin-soiled Scotts Valley poygonum habitat within grassland, close-up. *Photo by Melanie Gogol-Prokurat*

Figure 5  
The Distribution of Scotts Valley Polygonum (*Polygonum hickmanii*)



Figure 6  
Scotts Valley Polygonum (*Polygonum hickmanii*) Occurrences

