

level shallow soils over outcrops of Santa Cruz mudstone and Purisima sandstone (Hinds and Morgan 1995). It frequently, though not always, occurs with the endangered *Chorizanthe robusta* var. *hartwegii* (Scotts Valley spineflower) (59 FR 5499) and other small annual herbs in patches within a more extensive annual grassland habitat. These small patches, scattered in a mosaic throughout the grassland plant community, have been referred to as "wildflower fields" because they support a large number of native herbs, in contrast to the adjacent annual grasslands that support a greater number of nonnative grasses and herbs. While the wildflower fields are underlain by shallow, well-draining soils, the surrounding annual grasslands are underlain by deeper soils with a greater water-holding capacity, and therefore more easily support the growth of nonnative grasses and herbs.

Although the patches of wildflower field habitat stand out in contrast to the surrounding grasslands, a closer look at the wildflower field patches reveals slight microhabitat differences within the patch itself. The outer edge, or "ring" of the patch supports the greatest diversity of the native herbs, which are found on the deepest soils within the patch. Moving toward the center of the patch, the soil layer is shallower, and another ring supporting primarily the endangered *Chorizanthe robusta* var. *hartwegii* occurs here. In the very center of the patch where the soils are shallowest, the greatest concentration of *Polygonum hickmanii* is found, and other species are sparse. The surface soil texture in the center of the wildflower fields tends to be consolidated and crusty rather than loose and sandy (Biotic Resources Group (BRG) 1998). Flowering in *P. hickmanii* lags behind that of the endangered *Chorizanthe robusta* var. *hartwegii* and the other herbs by 4 to 8 weeks, and the consolidated soil surface may play a role in supplying late spring moisture to the species (R. Morgan, pers. Comm. 2003).

Elevation of the sites is from 215 to 246 meters (m) (700 to 800 feet (ft)) (Hinds and Morgan 1995). In the Scotts Valley area, the grasslands tend to be located on the middle to lower slopes within the subwatersheds, while the slopes above the grasslands tend to support redwood and mixed forest plant communities. On the Polo parcel, the slopes become increasingly steep from west to east; slopes nearest to Carbonero Creek on the western edge of the parcel are less than 20 percent, the slopes in the middle of the parcel range from 20 to 40 percent, and the slopes along the

eastern edge of the parcel up to the ridgeline reach over 40 percent. Geologic reports discuss several hazards that contribute to the geologic instability of the site. First, the site is within a seismically active region that experiences groundshaking. Second, the site has been subject to landslide activity, and evidences of past debris flows have been observed on the site. Third, due to the impermeable nature of the Purisima Formation bedrock, seasonal perched groundwater conditions are common in areas where the bedrock is overlain by alluvium (material deposited by flowing water) and colluvium (loose deposit of rock debris accumulated at the base of a cliff or slope), which contributes to slope instability (Impact Sciences 2000).

The geology of the Glenwood parcel has some similarities to the Polo parcel. Santa Cruz mudstone underlays the lower slopes and alluvial deposits, and the Purisima Formation underlays the upper slopes and ridges. The lowest elevations are along Carbonero Creek, which runs through the middle of the parcel from north to south. Similar to the Polo parcel, the mildest slopes are adjacent to the creek, while the slopes generally increase with increased distance from the creek, and slopes along the ridges to the east and west reach over 30 percent (Impact Sciences 1997, 1998). Geologic hazards on the site that contribute to slope instability include seismic hazards, landslide activity, high erosion, and sedimentation potential due to the presence of springs and drainages and the impermeable nature of the Purisima Formation on the upper slopes. Although soil erosion and sedimentation are natural processes, human activities can increase the rates above their natural levels (Global Change Research Information Office (GCRIC) 2002). Processes such as soil erosion on upper slopes, the accumulation of sedimentation on lower slopes, and soil compaction can alter the physical and chemical properties of those soils sufficiently to change their ability to store and supply nutrients and moisture needed by plants (GCRIC 2002). The persistence of plants with specific microhabitat requirements depends on maintaining the appropriate edaphic or soil conditions. Maintaining the stability of the higher slopes within a subwatershed are therefore important for maintaining the stability of the edaphic conditions directly downslope.

*Polygonum hickmanii* is associated with a number of native herbs including *Chorizanthe robusta* var. *hartwegii*, *Lasthenia californica* (goldfields), *Minuartia douglasii* (sandwort),

*Minuartia californica* (California sandwort), *Gilia clivorum* (gilia), *Castilleja densiflora* (owl's clover), *Lupinus nanus* (sky lupine), *Brodiaea terrestris* (brodiaea), *Stylocline amphibola* (Mount Diablo cottonweed), *Trifolium grayii* (Gray's clover), and *Hemizonia corymbosa* (coast tarplant). Nonnative species present at the two sites include *Filago gallica* (filago) and *Vulpia myuros* (rattail) (California Natural Diversity Data Base (CNDDB) 1998; R. Morgan, pers. comm., 1998). In many cases, the habitat also supports a crust of mosses and lichens (BRG 1998).

For purposes of this rule, a concentration of individuals of *Polygonum hickmanii* will be referred to as a "colony." Because of the close proximity of many of the colonies to each other (less than 0.4 km (0.2 mi) apart), it is unknown whether they function as genetically separate units or not. The approximate area occupied by any one colony ranges from the smallest at 1.5 m by 1.5 m (5 ft by 5 ft) to the largest at 15 m by 9 m (50 ft by 30 ft). Currently, there are approximately 11 colonies of *P. hickmanii* in total; the area covered by observable plants is less than 0.4 hectare (ha) (1 acre (ac)).

The *Polygonum hickmanii* colonies are split between two sites—the Glenwood site and the Polo Ranch site. The Glenwood site is located north of Casa Way and west of Glenwood Drive in northern Scotts Valley; it contains five colonies on two parcels of land. One of these colonies is situated within a 3.6 ha (9 ac) preserve on a 19.4 ha (48 ac) parcel that is owned by the Scotts Valley Unified School District and is referred to as the "School District" colony (Denise Duffy and Associates 1998). The other four colonies at the Glenwood site are located approximately 0.21 km (0.13 mi) to the west of the School District colony, on a parcel of land owned by the Salvation Army (CNDDB 1998). These four colonies are referred to as the "Salvation Army" colonies. Additional suitable but unoccupied habitat is found on the east side of Glenwood Drive on a parcel owned by Glenwood/American Dream. This parcel was recently approved for a housing development; a large portion of the parcel will be designated as "open space," and a management plan will be developed to take into consideration the conservation of sensitive resources (Wetlands Research Associates 2002). This open space area supports numerous colonies of *Chorizanthe robusta* var. *hartwegii*, which is frequently found in the same wildflower field patches as *Polygonum hickmanii*, as well as the endangered Ohlone tiger