

Lichens of the Presidio of San Francisco

Shelly Benson¹, Tom Carlberg² and Janet Doell³

¹PO Box 104, Inverness, CA 94937 - shelly.benson@yahoo.com

²1959 Peninsula Drive, Arcata, CA 95521 - tcarlberg7@yahoo.com

³1200 Brickyard Way #302, Point Richmond, CA 94801 - jkdoell@gmail.com

Four independent surveys for lichens have taken place at the Presidio of San Francisco since 1997. Our recent inventory (2010-2011) captured 109 species, 78 of which are new additions to the park's list. There are now 138 species known from the Presidio. Several of our collections are new reports for California and others are range extensions within the state.

Introduction

The Presidio of San Francisco (the Presidio) is a former army post that is currently part of the Golden Gate National Recreation Area and is managed by the National Park Service (NPS) and the Presidio Trust. The US Army had control of the land from 1846 until 1994 when it was passed over to the NPS. The Presidio is an expanse of urban parkland located at the northern tip of San Francisco near the southern end of the Golden Gate Bridge. The park houses numerous historical structures from the US Army's 148-year presence at the site. Other developed features in the park include a national cemetery, residential areas, and a golf course. The Presidio's 300-acre forest of eucalyptus (*Eucalyptus globulus*), Monterey cypress (*Cupressus macrocarpa*), and Monterey pine (*Pinus radiata*) is the result of a large-scale landscape architecture plan implemented by the US Army in the 1880s. The forest

was planted to block strong coastal winds and distinguish the post from the city that was growing up around it, with the additional benefit of making the post seem more imposing (Presidio Trust 2012). Natural areas within the park consist of riparian areas, serpentine grasslands, coastal bluffs, beaches, and restored coastal dune communities.

The lichen flora of the Presidio has been explored in several studies (Table 1). In 1997, California Lichen Society (CALS) members Doris Baltzo and Janet Doell reported 34 species for the park (Baltzo & Doell 1997). In 2009, Michael Rotter, an intern at the Presidio Native Plant Nursery, conducted an inventory that added 19 species to the park's list (Rotter 2010). In January 2010, CALS led a field trip to the Presidio and identified seven more species for the park. In total, 60 species were reported for the Presidio as of January 2010. Based on the types of habitats present in the park and the sparse representation of crustose species in the studies, it was estimated that the inventory was approximately 50% complete. Tania Pollak, natural resource planner in 2010 for the Presidio Trust, attended the January 2010 field trip and expressed an interest in having CALS continue the inventory effort. That field trip sparked our interest and we initiated this inventory in May 2010.

The main contributions resulting from

the current inventory include: 1) providing park managers and interpretive staff with a more complete list of the lichen species present in the Presidio, thus enabling more effective management of their lichen resources; 2) establishing a baseline dataset, which will prove useful for future surveys conducted in the park; and 3) documenting lichen occurrences in California, which will help hone our knowledge of species' ranges and distributions throughout the state.

Methods

The inventory effort focused on areas where high lichen diversity was expected. This included areas with remnant stands of native vegetation, coastal bluffs, rock outcrops, riparian areas and seeps. Additionally, we spent a portion of our time searching for lichens in developed areas in order to capture those species that thrive in urban habitats and to sample the different types of substrates found there. Two reconnaissance and four collecting trips were made to the Presidio between May and July 2010, with the goal of visiting as many lichen-rich habitats as time allowed. We visited eight different locations in the park (Baker Beach, Battery Godfrey, an alkaline seep, Pershing Square, Lobos Creek, Fort Scott, San Francisco National Cemetery, and Marshall Beach) and collected specimens at one to three sites in each location (Figure 1).

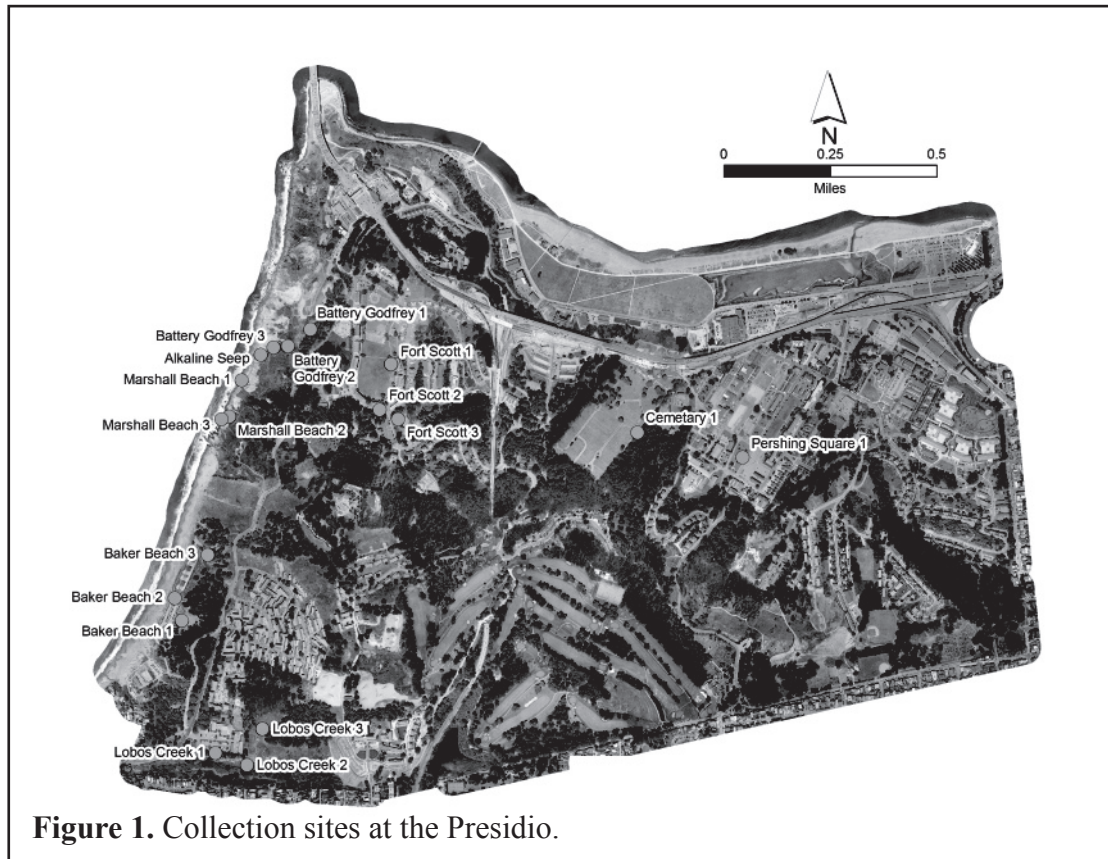
Due to limited resources, we did not consistently collect duplicate specimens of species already collected during this project. This kept the workload for the project manageable; however, it limited our ability to detect trends in rarity and

distribution of species. We did not attempt to identify pycnidial crusts because the technical material available for working with these specimens is very limited. The collections are the property of the NPS and were deposited at the California Academy of Science (CAS) herbarium in San Francisco, CA.

Sampling Locations

Baker Beach - Three sites were surveyed in the general Baker Beach area. The first was at the picnic area, where we collected from Monterey pine, pittosporum (*Pittosporum tobira*), and eucalyptus within a Monterey pine stand less than 100 meters from the beach. Most species collected here were found on pittosporum bark and were fairly typical for the region: *Chrysothrix xanthina*, *Flavoparmelia caperata*, *Flavopunctelia flaventior*, *Lepraria pacifica*, *Niebla cephalota*, *Opegrapha atra*, *Opegrapha herbarum*, *Parmotrema perlatum*, *Physcia adscendens*, *Pyrrhospora quernea*, *Ramalina farinacea*, *Ramalina subleptocarpha*, *Sigridea californica* (Figure 2), and *Xanthoria parietina*. In addition to the ordinary flora, this site also yielded the only collection of *Thelenella modesta*, a pyrenolichen infrequently reported from California, and the beautiful and easily identified *Gyalecta herrei* (Figures 3 & 4).

The second site was at the corner of the fence leading into Battery Chamberlin, where both natural and artificial substrates were sampled. Collections were made on ornamental shrubs at the edge of a Monterey pine stand and on the concrete bunker itself. *Caloplaca luteominia* var. *luteominia* is an abundant saxicolous



species throughout the coastal edge of the Presidio; this was the first place we found it. The third collection site was a Monterey cypress stand upslope from Battery Chamberlin.

Battery Godfrey - In the area around Battery Godfrey, we collected from toyon (*Heteromeles arbutifolia*) at the trailhead leading to Marshall Beach and Baker Beach, and from serpentine rock outcrops surrounded by coastal scrub on the bluff above the beach. The serpentine rocks had a moderately high diversity of species; although, due to the easily-fragmented nature of this rock, most specimens were small and found growing in the minute crevices and corners formed by the fracture planes of the substrate (Figure 5). The most interesting species found here was *Lecania pacifica*, a slight range

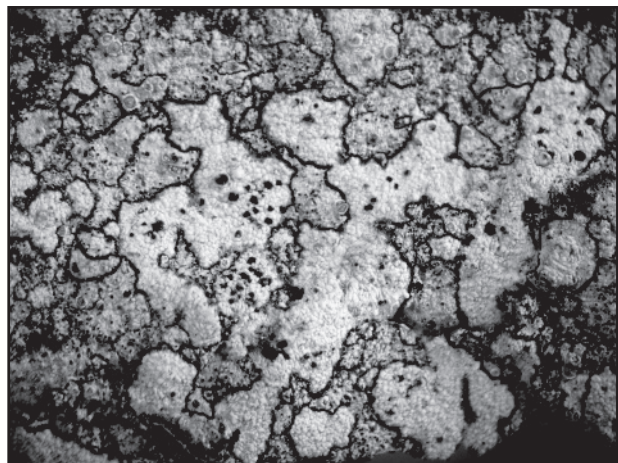


Figure 2. *Sigridea californica* was one of the most common lichens collected in the inventory. Note the “battle lines” even though it is all the same species. Photo by Tom Carlberg.

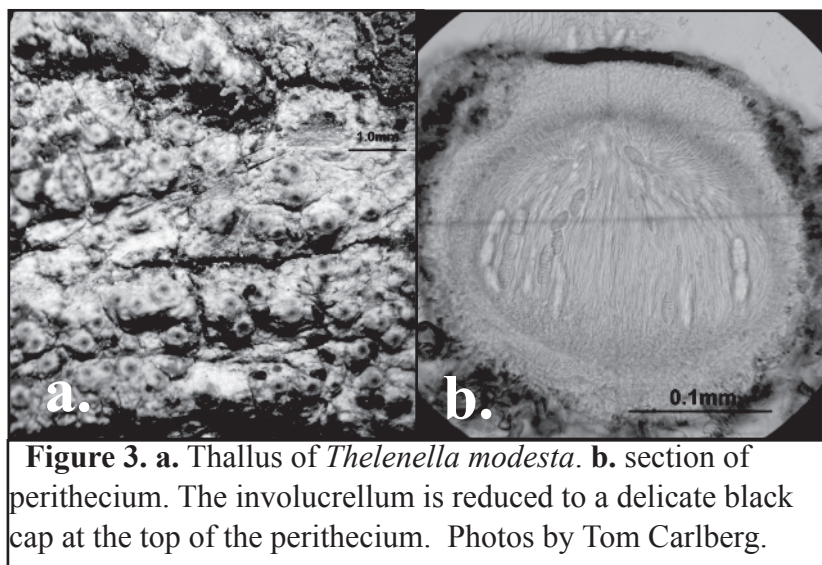


Figure 3. a. Thallus of *Thelenella modesta*. **b.** section of perithecium. The involucrellum is reduced to a delicate black cap at the top of the perithecium. Photos by Tom Carlberg.

extension from Monterey County.

Alkaline Seep - We discovered an alkaline seep on the coastal bluff between Marshall Beach and Baker Beach. The alkali salts in the water had precipitated into a very soft rock with a basic pH. This chemically distinctive substrate was uncommon within the Presidio as were the lichen species we documented here. We collected *Verrucaria calciseda*, an endolithic lichen that creates small pits in the rock where the fruiting structures (perithecia) develop (Figure 6). *Thelidium minutulum*, a new report for California, was also found on the alkali accretions (Figure 7).

Pershing Square - At Pershing Square, a heavily-landscaped part of the Presidio, we collected from the north end of the square, on palms and other exotic trees. All of the trees showed obvious nitrogen enrichment from fertilizer, based on the line of *Xanthoria* spp. growing within the fertilizer spray zone. The lichens collected here show a certain degree of “urbanization” and species of *Phycia*, *Phaeophycia* and *Xanthoria* predominate.

Lobos Creek - At Lobos Creek, we surveyed three general areas: an open stand of Monterey pine adjacent to the parking lot at the Lobos Dunes restoration site, and two very similar locations several

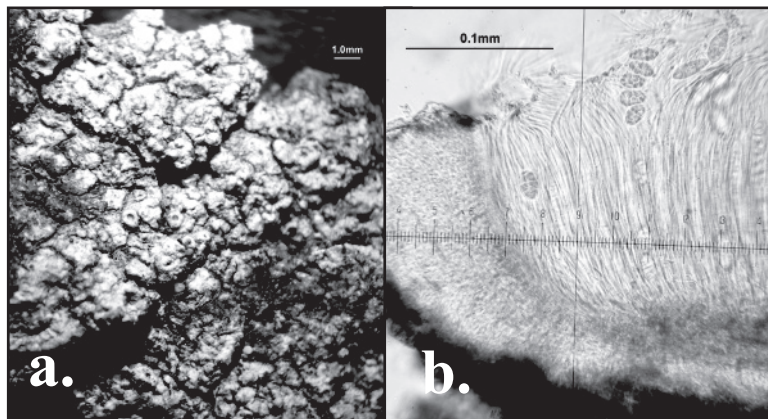


Figure 4. a. Habit of *Gyalecta herrei*. **b.** Section through apothecium. Photos by Tom Carlberg.

hundred meters to the east, both within the Lobos Dunes restoration site. Lobos Creek had high species diversity due to a combination of natural and man-made substrates including coyote bush (*Baccharis pilularis*), a boardwalk made of recycled plastic, and weathered interpretive signboards. The only occurrence of the non-lichenized fungus *Sarea resinae* came from the resin of a Monterey pine in this area.

Fort Scott - At Fort Scott, an area dominated by older buildings and mature landscaping, we sampled urban parkland habitats: a small group of Bishop pine (*Pinus muricata*) and ornamental shrubs in landscaped areas near old military buildings, palm trees, yucca (*Yucca filamentosa*), Monterey cypress trees in a landscaped area lining the roadway, a gravel path bordered by small cobbles, and painted concrete porches and rock walls. Many of the “usual suspects” were collected here: *Chrysothrix xanthina*, *Cliostomum griffithii*, *Flavoparmelia caperata*, *Lecanora expallens*, *Lecanora polytropa*, *Micarea prasina*, *Niebla cephalota*, *Opegrapha atra*, *Parmotrema perlatum*, *Physcia dimidiata*, *Physcia tribacia*, *Punctelia jeckeri*, *Pyrrhospora quernea*, *Ramalina farinacea*, *Ramalina menziesii*, *Ramalina subleptocarpha*, *Sigridea californica*, *Usnea cornuta*, and *Xanthoria parietina*. Some distinctive species were also found here: *Lecanora crenulata* and a lichen identified as *Arthonia* cf. *fuliginosa*, which if verified would represent a new record for California. *Xanthoria candelaria* is an attractive, brightly-colored, minute lichen with strongly ascending lobes that was found growing on the thickly layered paint

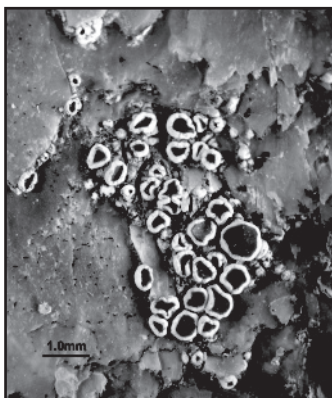


Figure 5. *Lecanora dispersa* growing on serpentine rock. Photo by Tom Carlberg.

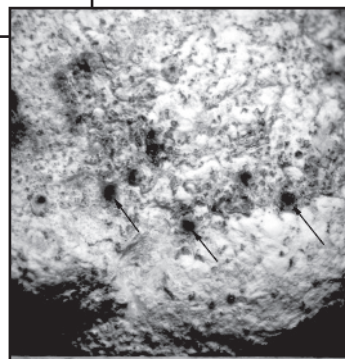


Figure 6. Perithecia of *Verrucaria calciseda* (arrows) immersed in soft alkali substrate. Scale = 1.0mm. Photo by Tom Carlberg.

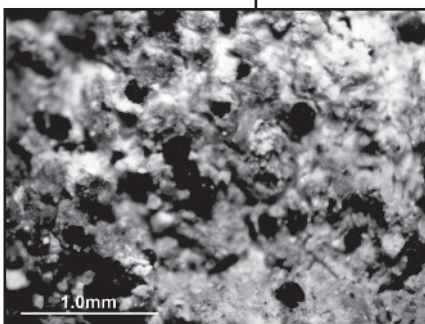


Figure 7. Perithecia of *Thelidium minutulum* superficial on loosely-aggregated alkali substrate. Photo by Tom Carlberg.

on the concrete porches of some of the buildings at Fort Scott (Figure 8). *Amandinea punctata* and *Opegrapha atra* were growing as epiphylls on the leaves of an unidentified palm tree (Figure 9).

San Francisco National Cemetery - We expected to find interesting lichens on the old marble and granite headstones of the San Francisco National Cemetery; however, due to the immaculate care and maintenance of the grounds, we found nothing growing on these substrates. It is common practice in well-maintained cemeteries to apply chemical compounds to the headstones to prevent lichen growth. Our only collections came from the sandstone wall separating the cemetery grounds from the adjacent parklands.

Marshall Beach - We collected from three sites in the Marshall Beach area. All of the sites were within the supralittoral zone or lower, areas strongly influenced by marine elements. The geology at Marshall Beach was highly variable with a number of different rock types found next to each other, all within a relatively small area. At the first collection site we sampled from serpentine outcrops and an



Figure 8. Lobes of *Xanthoria candelaria*. Photo by Tom Carlberg.

adjacent rock outcrop composed of a darker material. Both substrates were within the splash zone and received nitrogen input from bird droppings. We collected *Caloplaca coralloides* from the tops of the rocks, at the upper limit of the intertidal zone, and *Wahlenbergiella mucosa* on rocks near the water's edge.

Continuing a short distance south along Marshall beach, there was a ridge of Franciscan chert protruding into the ocean. Collections at this second site were made from both protected and exposed

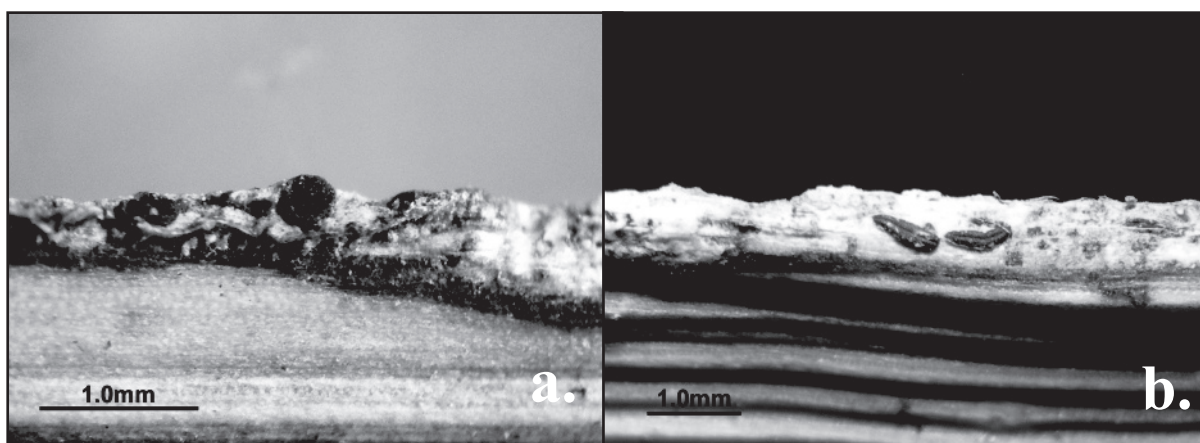


Figure 9. a. Apothecia of *Amandinea punctata*. b. Lirellae of *Opegrapha atra*. Both lichens are growing on palm leaves. Photos by Tom Carlberg.

microhabitats. The inland portion of the ridge was highly degraded with crumbling rock fragments and areas of soil accumulation that supported *Dudleya* (*Dudleya farinosa*) and lizard tail (*Eriophyllum stoechadifolium*). Patches of exposed soil in sheltered locations hosted a prolific growth of soil crusts. Interesting collections from this area included *Lepraria pacifica*, recently distinguished in western North America from the European species *L. incana*; *Leptogium intermedium*; and *Porina chlorotica*. The nose of the ridge at the water's edge was composed of more solid Franciscan chert and was exposed to the wind and spray of the ocean. This portion of the ridge was not vegetated. Here we found the tiny, fruticose *Lecania fructigena*, and from within the splash zone we collected *Hydropunctaria maura* (Figure 10). This is the first time *H. maura* and *L. intermedium* have been documented in California.

Just south of the ridge of Franciscan chert was a ridge of sandstone, essentially the last barrier between Marshall Beach and Baker Beach to the south. This third collection site clearly receives salt spray

input from the ocean based on the honeycomb weathering patterns observed on the rocks. Collections here were similar to the previous location; *Lecania fructigena* was particularly abundant.

Results

This inventory captured 109 lichen species, 78 of which are new additions to the park's list. Four species are new to California (*Caloplaca approximata*, *Hydropunctaria maura*, *Leptogium intermedium*, and *Thelidium minutulum*) and the range for two species has been extended by 100 miles or more (*Lecania pacifica* and *Usnea mutabilis*). The new total for lichens reported from the Presidio is 138 species. There were 29 species documented in the previous three inventories that we did not detect, representing 21% of the current Presidio lichen flora. The majority of these species are regionally common and we expect they are present in the park. The purpose of this inventory was to detect unreported species and it is likely that we overlooked several species already known for the park. Species reported as occurring in the

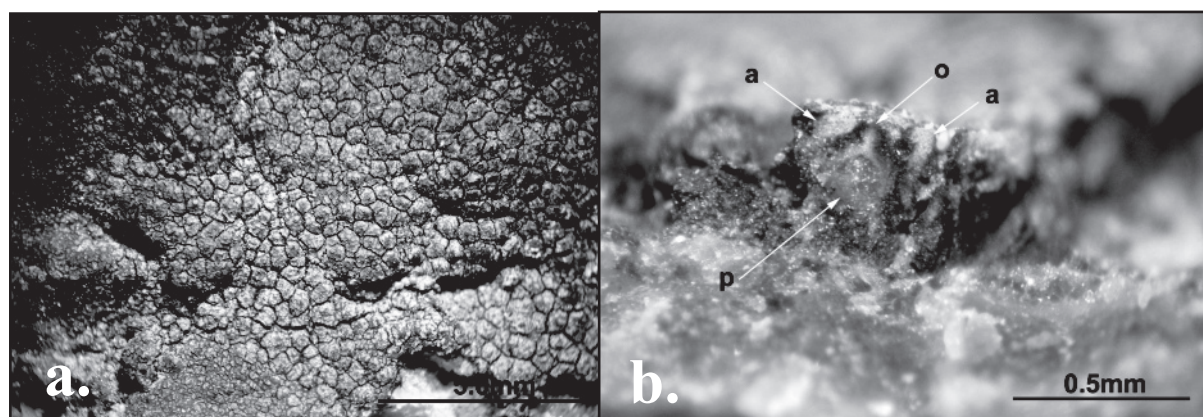


Figure 10. a. Habit of *Hydropunctaria maura*. b. Thallus section showing perithecium (p) with ostiole (o) and pockets of algae (a), separated by black bands of medulla. Photos by Tom Carlberg.

Table 1. Summary of lichen species reported for the Presidio of San Francisco. **Bold** type indicates a species represented by an accessioned voucher. Species listed under Rotter 2010 include determinations made by Benson and Carlberg in December 2011.

Scientific Name	Benson, Carlberg, Doell 2010-2011	Previous Inventories		
		CALS 2010	Rotter 2010	Baltzo & Doell 1997
<i>Acarospora socialis</i> H. Magn.	X			
<i>Amandinea punctata</i> (Hoffm.) Coppins & Scheid.	X			
<i>Anisomeridium biforme</i> (Borrer) R.C. Harris	X			
<i>Arthonia</i> cf. <i>fuliginosa</i> (Schaerer) Flotow	X			
<i>Arthonia pruinata</i> (Pers.) Steud. ex A. L. Sm.	X			
<i>Bacidia circumscripta</i> (Nyl. ex Vain.) Malme	X			
<i>Bacidia heterochroa</i> (Müll. Arg.) Zahlbr.	X			
<i>Bacidina ramea</i> S. Ekman	X			
<i>Biatora globulosa</i> (Flörke) Fr.	X			
<i>Bilimbia</i> cf. <i>sabuletorum</i> (Schreb.)	X			
<i>Buellia badia</i> (Fr.) A. Massal.	X			
<i>Buellia dispersa</i> A. Massal.	X			
<i>Buellia oidalea</i> (Nyl.) Tuck.	X			
<i>Buellia sequax</i> (Nyl.) Zahlbr.	X			
<i>Buellia stellulata</i> (Taylor) Mudd.	X			
<i>Buellia tessellata</i> Körber	X			
<i>Caloplaca approximata</i> (Lynge) H. Magn.	X			
<i>Caloplaca bolacina</i> (Tuck.) Herre	X			X
<i>Caloplaca citrina</i> (Hoffm.) Th. Fr.	X			
<i>Caloplaca coralloides</i> (Tuck.) Hulting	X			
<i>Caloplaca inconspicua</i> Arup	X			
<i>Caloplaca ludificans</i> Arup	X			
<i>Caloplaca luteominia</i> var. <i>luteominia</i> (Tuck.) Zahlbr.	X			
<i>Caloplaca phlogina</i> (Ach.) Flagey	X			
<i>Caloplaca pyracea</i> (Ach.) Th. Fr.	X			
<i>Caloplaca saxicola</i> (Hoffm.) Nordin				X
<i>Catillaria</i> cf. <i>nigroclavata</i> (Nyl.) Schuler	X			
<i>Chrysothrix xanthina</i> (Vain.) Kalb	X	X	X	X
<i>Cladonia</i> cf. <i>asahinae</i> J. W. Thomson			X	
<i>Cladonia</i> cf. <i>fimbriata</i> (L.) Fr.				X
<i>Cladonia chlorophaea</i> (Flörke ex Sommerf.) Sprengel	X			X
<i>Cladonia furcata</i> (Hudson) Schrader			X	X
<i>Cladonia macilenta</i> Hoffm.	X		X	
<i>Cladonia pyxidata</i> (L.) Hoffm.	X		X	
<i>Cladonia subulata</i> (L.) F. H. Wigg.	X		X	
<i>Cladonia transcendens</i> (Vainio) Vainio			X	
<i>Cliostomum griffithii</i> (Sm.) Coppins	X			
<i>Dimelaena radiata</i> (Tuck.) Müll. Arg.				X
<i>Diploschistes scruposus</i> (Schreber) Norman				X
<i>Diplozomma albostratum</i> (Hoffm.) Flotow	X			
<i>Evernia prunastri</i> (L.) Ach.	X	X	X	X
<i>Flavoparmelia caperata</i> (L.) Hale	X	X	X	X
<i>Flavopunctelia flaventior</i> (Stirton) Hale	X		X	X
<i>Graphis scripta</i> (L.) Ach.		X		
<i>Gyalecta herrei</i> Vězda	X			

Table 1. (Continued)

Scientific Name	Benson, Carlberg, Doell 2010-2011	Previous Inventories		
		CALS 2010	Rotter 2010	Baltzo & Doell 1997
<i>Heterodermia leucomela</i> (L.) Poelt	X			X
<i>Hydropunctaria maura</i> (Wahlenb.) Keller, Gueidan & Thüs	X			
<i>Hyperphyscia adglutinata</i> (Flörke) H. Mayrhofer & Poelt	X			
<i>Hypogymnia inactiva</i> (Krog) Ohlsson			X	
<i>Hypogymnia enteromorpha</i> (Ach.) Nyl.		X		X
<i>Hypogymnia imshaugii</i> Krog	X	X		
<i>Hypotrachyna revoluta</i> (Flörke) Hale	X			
<i>Kaernefeltia californica</i> (Tuck.) Thell & Goward	X			
<i>Lecanactis californica</i> Tuck.	X			
<i>Lecania fructigena</i> Zahlbr.	X			
<i>Lecania inundata</i> (Hepp ex Körber) M. Mayrhofer	X			
<i>Lecania pacifica</i> Zahlbr. ex B. D. Ryan & van den Boom	X			
<i>Lecanora caesiorubella</i> Ach.	X			X
<i>Lecanora</i> cf. <i>conizaeoides</i> Nyl. ex Crombie				X
<i>Lecanora confusa</i> Almb.	X			
<i>Lecanora crenulata</i> Hooker	X			
<i>Lecanora dispersa</i> (Pers.) Sommerf.	X	X		
<i>Lecanora expallens</i> Ach.	X			
<i>Lecanora gangaleoides</i> Nyl.	X			
<i>Lecanora hagenii</i> (Ach.) Ach.	X			
<i>Lecanora polytropa</i> (Hoffm.) Rabenh.	X			
<i>Lecanora symmicta</i> (Ach.) Ach.	X			
<i>Lecidea atrobrunnea</i> (Lam. & DC.) Schaerer	X			
<i>Lecidea erythrophaea</i> Flörke ex Sommerf.	X			
<i>Lepraria lobificans</i> Nyl.		X		
<i>Lepraria membranacea</i> (Dickson) Vainio		X		X
<i>Lepraria pacifica</i> Lendemer	X			
<i>Lepraria xerophila</i> Tønsberg	X			
<i>Leptogium intermedium</i> (Arnold) Arnold	X			
<i>Megalania columbiana</i> (G. Merr.) Ekman	X			
<i>Melanelixia fuliginosa</i> (Fr. ex Duby) O. Blanco et al.			X	
<i>Micarea prasina</i> Fr.	X			
<i>Niebla cephalota</i> (Tuck.) Rundel & Bowler	X	X	X	X
<i>Ochrolechia arborea</i> (Kreyer) Almb.	X			
<i>Opegrapha atra</i> Pers.	X			
<i>Opegrapha herbarum</i> Mont.	X			
<i>Parmelia hygrophila</i> Goward & Ahti	X			
<i>Parmelia sulcata</i> Taylor	X	X	X	
<i>Parmotrema arnoldii</i> (Du Rietz) Hale				X
<i>Parmotrema perlatum</i> (Hudson) M. Choisy	X	X	X	
<i>Parmotrema stuppeum</i> (Taylor) Hale	X		X	X
<i>Pertusaria amara</i> (Ach.) Nyl.	X			X
<i>Phaeophyscia hirsuta</i> (Mereschk.) Essl.	X			
<i>Physcia adscendens</i> (Fr.) H. Olivier	X		X	X
<i>Physcia caesia</i> (Hoffm.) Fűrnr.			X	
<i>Physcia dimidiata</i> (Arnold) Nyl.	X			
<i>Physcia tribacia</i> (Ach.) Nyl.	X			X

Table 1. (Continued)

Scientific Name	Benson, Carlberg, Doell 2010-2011	Previous Inventories		
		CALS 2010	Rotter 2010	Baltzo & Doell 1997
<i>Platismatia glauca</i> (L.) W. L. Culb. & C. F. Culb.				X
<i>Porina chlorotica</i> (Ach.) Müll. Arg.	X			
<i>Punctelia perreticulata</i> (Räsänen) G. Wilh. & Ladd	X			
<i>Pyrrhospora quernea</i> (Dickson) Körber	X			X
<i>Ramalina canariensis</i> J. Steiner	X		X	
<i>Ramalina farinacea</i> (L.) Ach.	X	X	X	X
<i>Ramalina leptocarpa</i> Tuck.			X	
<i>Ramalina menziesii</i> Taylor	X	X	X	X
<i>Ramalina pollinaria</i> (Westr.) Ach.	X			
<i>Ramalina roesleri</i> (Hochst. ex Schaerer) Hue		X		
<i>Ramalina subleptocarpa</i> Rundel & Bowler	X	X	X	X
<i>Rinodina bolanderi</i> H. Magn.	X			
<i>Rinodina herrei</i> H. Magn.	X			
<i>Sarea resinae</i> (Fr.:Fr.) Kuntz	X			
<i>Schismatomma decolorans</i> (Turner & Borrer ex Sm.) Clauz. & Vězda		X		X
<i>Sigridea californica</i> (Tuck.) Tehler	X			
<i>Staurothele polygonia</i> B. de Lesd.	X			
<i>Teloschistes flavicans</i> (Sw.) Norman	X			
<i>Thelenella modesta</i> (Nyl.) Nyl.	X			
<i>Thelidium minutulum</i> Körber	X			
<i>Toninia cinereovirens</i> (Schaerer) A. Massal.	X			
<i>Toninia ruginosa</i> ssp. <i>pacifica</i> Timdal	X			
<i>Toninia tristis</i> (Th. Fr.) Th. Fr.	X			
<i>Trapeliopsis flexuosa</i> (Fr.) Coppins & P. James		X		
<i>Tuckermannopsis orbata</i> (Nyl.) M. J. Lai	X			
<i>Tuckermannopsis chlorophylla</i> (Willd.) Hale		X	X	
<i>Usnea californica</i> Herre				X
<i>Usnea</i> cf. <i>fragilescens</i> Hav. ex Lynge			X	X
<i>Usnea</i> cf. <i>lapponica</i> Vainio			X	
<i>Usnea</i> cf. <i>subfloridana</i> Stirton			X	
<i>Usnea cornuta</i> Körber	X		X	
<i>Usnea flavocardia</i> Räsänen	X	X		X
<i>Usnea mutabilis</i> Stirton	X			
<i>Usnea rubicunda</i> Stirton	X	X	X	X
<i>Verrucaria americana</i> (B. de Lesd.) Breuss	X			
<i>Verrucaria calciseda</i> DC.	X			
<i>Verrucaria</i> cf. <i>nigrescens</i> Pers.				X
<i>Verrucaria mimicrans</i> Servit	X			
<i>Wahlenbergiella mucosa</i> (Wahlenb.) Gueidan & Thüs	X			
<i>Xanthomendoza fulva</i> (Hoffm.) Søchting, Kärnefelt & S. Kondr.	X		X	
<i>Xanthomendoza hasseana</i> (Räsänen) Søchting, Kärnefelt & S. Kondr.			X	
<i>Xanthoparmelia novomexicana</i> (Gyelnik) Hale	X			
<i>Xanthoparmelia verruculifera</i> (Nyl.) Crespo, O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch		X		
<i>Xanthoria candelaria</i> (L.) Th. Fr.	X			
<i>Xanthoria parietina</i> (L.) Th. Fr.	X		X	X
<i>Xanthoria polycarpa</i> (Hoffm.) Th. Fr.	X		X	

Presidio are summarized in Table 1. This table includes all species published in previous reports, including those with no voucher specimens. Lichens that were not identified beyond the level of genus were excluded from this list.

Noteworthy Species

Several species encountered in the course of this project are unusual for the area or are unique and deserve some additional comment:

Caloplaca approximata (Lynge) H. Magn.

This is the first report of this taxon for California.

Hydropunctaria maura (Wahlenb.) Keller, Gueidan & Thüs

This is the first report of this taxon for California. The anatomy of this maritime saxicolous lichen is extremely interesting. The fruiting structures are perithecia, the algae are arranged in vertical columns, and the “medulla” is a black basal layer which forms columns (“jugae” or “punctae”) to the upper surface and isolates the algae into pockets near the upper surface (Figure 10).

Lecania pacifica Zahlbr. ex B. D. Ryan & van den Boom

Reported from Monterey County and points further south, this species has somewhat dispersed brown minutely incised squamules, bearing a slight resemblance to *Lecania fructigena* Zahlbr. when that species is not well developed.

Lepraria pacifica Lendemer

Described by Lendemer in 2011, where he states that it is the dominant *Lepraria* species in the coastal redwood forests, it is also reported by Williams & Sillett in 2007

(as *L. incana*), occurring on all vertical strata of numerous *Sequoia sempervirens* trees. In the Presidio we found it growing on soil and on the bark of *Pinus radiata*.

Leptogium intermedium (Arnold) Arnold

This is the first report of this taxon for California. A small gelatinous cyanolichen growing on sand and soil, it is easily overlooked. Identification requires examination of the arrangement of the medulla in a thin section of the thallus.

Porina chlorotica (Ach.) Müll. Arg.

Recent revisions have placed this taxon in other genera (*Trichothelium*, *Pseudosagedia*), all of which report larger spore sizes than found in this specimen. The spore sizes in Brodo (2004) and Smith et al. (2009), where the name *P. chlorotica* is retained, match much more closely, as do the conidia; hence we are retaining this (possibly taxonomically mistaken) name. In any case, an interesting collection of a species seldom reported for California.

Thelenella modesta (Nyl.) Nyl. (Figure 3)

This specimen has generally smaller spores than the descriptions of European material, with a range of 17.8-31.7 x 10.1-14.1µm as opposed to 25-42 x 11-17. The reactions of microsections to K and I also differ; Smith et al. (2009) state that the hymenial gel and asci are K/I-, but this specimen is repeatedly K/I+ blue for both of these parts of the perithecium. Material from Oregon referred to *T. cf. modesta* by McCune (2010) has larger spores than European reports, a K/I+ blue hymenium (as does this specimen), and differs in several other characters.

Thelidium minutulum Körber (Figure 7)

This is the first report of this taxon for California. Characterized by the lack of an

involucrellum, the carbonized upper and non-carbonized lower wall of the perithecium, 2-celled ascospores, and a hymenial gelatin that is I+ red and K/I+ blue.

***Usnea mutabilis* Stirton**

This represents a new northern limit for the species within California, with the next nearest collection reported from Seal Point, approximately 35 miles south of Monterey, California.

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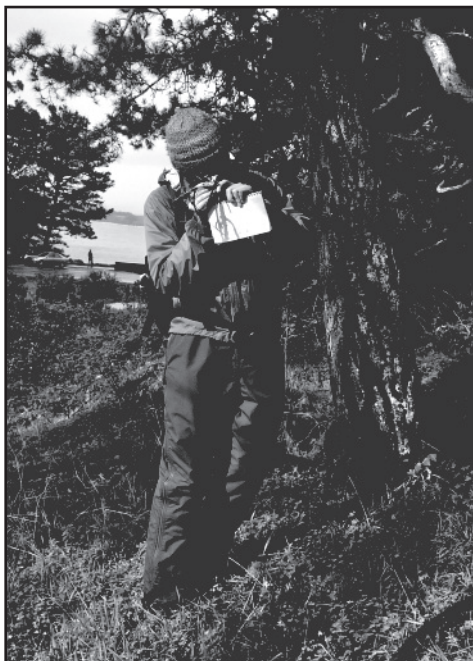
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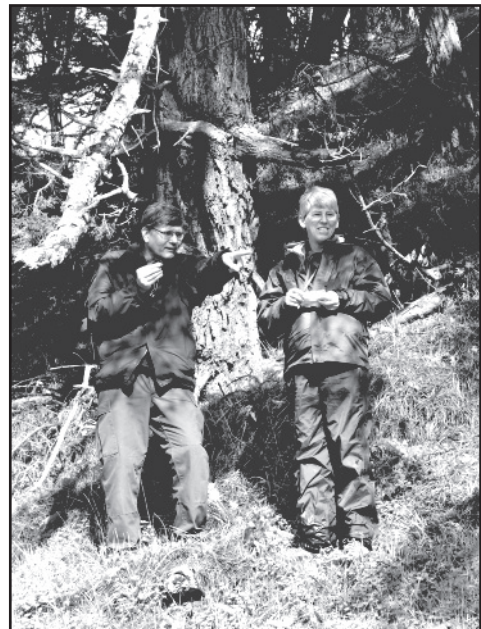
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Field trip to the Presidio during the CALS Annual meeting in 2010. Judy Robertson with several other CALS members. Photo by Erin P. Martin.



Shelly Benson at the Presidio. Photo by Erin P. Martin.



Tom Carlberg with Lee Gallagher at the Presidio. Photo by Erin P. Martin.