Final Performance Report
California Department of Fish and Game

1. **State**: California

   Grant number: E-2-P-23

   Grant name: 2003 Threatened and Endangered Plants

   Project number and name: EP03-7: Development of Howell's spineflower (*Chorizanthe howellii*) habitat restoration and recovery strategy involving iceplant removal, MacKerricher State Park, Mendocino County, CA

2. **Report Period**: July 1, 2006 to March 31, 2007

   Report due date: May 17, 2007 **Report received by USFWS date**_____

3. **Location of work** (Include the county; if statewide don't list districts and counties; coordination activities can be listed as the office location): MacKerricher State Park, Mendocino County, CA

4. **Costs:** Please identify sources of federal and no-federal match and indicate amounts budgeted and spend for each. Indicate if match is in-kind. Indicate in the table whether costs are "Actual" or "Estimated".

Fund source	Budgeted	Actual Amount Spent
Federal: USFWS	29,000	
State: California		
Other:_____		
Other:_____		
Total Federal:	29,000	
Total Match:	9,667	
Total Project:	33,773	

5. **Objectives**: (list project objectives from grant proposal or grant agreement):

   - Conduct historical research on iceplant distribution and growth rate within the park.

   - Map current distribution of iceplant; enter into GIS layer and overlay on spineflower distribution; select 20 or more potential iceplant removal sites representing varying distances from spineflower colonies and environmental conditions.

   - Complete Section 106 NHPA clearance for removal sites.

   - Establish permanent monitoring plots and conduct initial photodocumentation and monitoring, to include characterization of soils, physical factors, species composition and structure both within and surrounding the removal areas.

   - Conduct manual removal of iceplant.

- Conduct post removal annual monitoring for 3 field seasons to document reoccupation of removal areas.

- Summarize results in report, and make recommendations regarding utilization of iceplant removal in long term management of spineflower.

6. **If the work in this grant was part of a larger undertaking with other components and funding, present a brief overview of the larger activity and the role of this project.**

   n/a

7. **Describe how the objectives were met. See attachment 1 for additional requirements**.

   Please see attached report

8. **Discuss differences between work anticipated in grant proposal and grant agreement, and that actually carried out with Federal Aid grant funds; include differences between expected and actual costs.**

   n/a

9. **List any publications or in-house reports resulting from this work.** Provide citations, including status (indicate if not completed), note any that are included with this report, and note where reports or publications may be obtained.

   None completed to date.

Name, title, phone number, and e-mail address of person compiling this report:

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Development of a Restoration Strategy for Howell's Spineflower

MacKerricher State Park

Progress Report
May 2007

by
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California State Parks
Mendocino District

Project Update (May 2007)

Since the 2006 report, the only project activity has involved plot maintenance (removal of scattered iceplant seedlings) and the production and presentation of the project and pertinent data to a State Parks resources training in January 2007.

Introduction

This report summarizes the results of a study intended to provide data in support of the development of a strategy for the recolonization of suitable habitat by Howell's spineflower (*Chorizanthe howellii* - ST/FE), an annual plant that grows almost entirely within MacKerricher State Park, north of Ft. Bragg, California. The study was funded by the U. S. Fish & Wildlife Service under Section 6 Grant E-2-P-23, and administered by the California Dept. of Fish & Game under Contract number P0330013. The project has been implemented by the Calif. Dept. of Parks & Recreation, Mendocino District. As of October 2005, all grant funds had been expended. State Parks has continued funding the project for maintenance and data collection activities, and intends to continue doing so indefinitely.

The report provides a methods section, study results, and a discussion section that interprets the data and provides an interim analysis of their significance. This section also includes a brief summary of strategic issues and management options. A project description, including discussions of the ecosystem, the plant community, Howell's spineflower, and other details, developed prior to project implementation, provides introductory information and is appended to this report.

Methods

To address the potential for recolonization by Howell's spineflower following a manual iceplant removal regimen, State Parks staff established twenty-five $50m^2$ plots, each within spineflower habitat and each with at least 50% iceplant cover, between Lake Cleone and the south end of the Ten Mile Dunes at MacKerricher State Park in winter 2004-05. We did not purposefully incorporate slope aspect or pitch as variables, although plot topography ranges from concave swale bottoms to convex dune tops, with most aspects either S- to SW- or N-facing. On each plot, we established five $1m^2$ quadrats, representing 10% of the total area of each plot, in a regular array (i.e., quadrats were not randomly situated, instead consistently located on all plots). Data collected prior to iceplant removal and once during each of the two following spring seasons included cover by plant species and other types of surface material (e.g., bare sand,

litter). Data were recorded in one of six categories for estimating cover on entire plots: Category 1 = 0-1; Cat. 2 = 1-5; Cat. 3 = 5-25; Cat. 4 = 25-50; Cat. 5 = 50-75; and Cat. 6 = 75-100%. We also estimated cover by plant species or other ground cover to the nearest 1% on each of the five quadrats on each plot. We estimated both cover category values on plots and percentage cover values on quadrats visually; on quadrats we used a $1m^2$ frame sectioned into $1/100m^2$ squares to assist in estimating cover to the nearest 1%. In addition, we counted the numbers of spineflower plants on quadrats, and estimated spineflower numbers on each $50m^2$ plot. Following the compilation of pre-treatment data, State Parks staff removed all iceplant by hand in January 2005. On even-numbered plots (n=12), we removed bulk organic litter in February 2005. This treatment was essentially a litter layer reduction; most plots retained a shallow (<1cm depth) litter layer after bulk removal. We left all plant litter (minus the just-removed iceplant remains) on odd-numbered plots (n=13). During data collection visits in May 2005 and June 2006, and during plot maintenance in January 2006, we removed all observed iceplant that had germinated or otherwise regrown onto plots.

Photo-documentation

We photographed all plots 1) prior to iceplant removal, 2) following the litter removal process, and during data compilation in 3) May 2005 and 4) June 2006. Each plot was photographed from just outside each plot corner looking diagonally across the plot, and labeled corresponding to the nearest cardinal direction for that corner and by month-year photographed. These photographs are available upon request.

Statistical Compilation

I compiled all data collected into an Excel spreadsheet, arranged by plots, quadrats, species, other ground cover types, and physical data (slope, exposure, etc.). Each observed plant species has been designated native or non-native; any taxon not identified to a level sufficient to determine native status were left out of computations. To date, I've attempted no statistical analyses other than computing simple means and proportions among species, and between groups, litter treatments, and years. Thus, all results shown below are based on raw data and basic spreadsheet computations.

Cover category values are not quantitatively accurate, and are used generally to assess relative cover over multiple samples over a relatively broad area. These values were only employed on the $50m^2$ plots, not on the $1m^2$ quadrats. I've used computations derived from cover category values here mostly to illustrate general patterns of relative cover and species dominance; these data will not be used at this time for determining statistical significance of any treatments.

Preliminary Results

Iceplant cover dropped precipitously following initial removal: from an average cover category of 5.8 (out of maximum value of 6) and a mean cover on quadrats of 81.6%, prior to removal to an average cover category value of 0.9 on plots and 0.24% on quadrats in May 2005 (Photos 1, 2, and 3). In June of 2006, the average cover category value of iceplant cover was 0.84, and the cover on quadrats was 0.03%.

Prior to iceplant removal (January 2005), we observed at least one spineflower plant on 7 of the 25 plots, with the spineflower cover on each of those 7 plots in category 1 (0-1%). By May 2005, this count had increased to 12 plots with spineflower (an estimated 369 plants in total), with

spineflower cover in category 2 (between 1 and 5%) on 3 plots (Photos 4, 5, and 6). In early June 2006, 21 plots had at least one spineflower plant; on 3 plots spineflower cover had increased to category 4 (over 25%); spineflower plants on many $50m^2$ plots had grown too numerous to count individually. On the 125 quadrats within those 25 plots, spineflower cover averaged virtually zero (less than 0.1%) prior to iceplant removal; the total number of plants was 54. By May 2005, spineflower cover on quadrats had increased to a mean of 0.24% with 108 plants accounting for that cover. In June 2006, spineflower cover had reached an average of 2.7% on quadrats by virtue of 758 plants counted.

In May 2005, as measured on quadrats (n=60), spineflower cover on litter-removal plots averaged 0.4%, whereas on littered quadrats (n=65), the mean for this measure was 0.3%. As of June 2006, spineflower cover on litter-removal quadrats averaged about 3.2%, and on littered quadrats the mean was 2.2%.

In addition to investigating the recovery of Howell's spineflower, we are also interested in the recovery of other native species, or conversely, in the colonization by non-native species, where iceplant has been removed. While native species diversity (number of species) was greater than that of non-native species in both years following iceplant removal, average cover by the non-natives far exceeded that of native plants. In 2005, for all 25 plots, a total of 27 non-native species averaged a cover category value of 0.36, whereas 48 native species averaged a value of 0.26. The top six species in cover category average were *Bromus diandrus* (1.72), *Rumex acetosella* (1.08), *Geranium molle* (0.96), *Lupinus littoralis* (0.96), *Carpobrotus edulis* (0.92), and *Polygonum paronychia* (0.92); *Lupinus* and *Polygonum* are native species. At that time, the average cover value for litter was 5.16, and for sand, 2.56. In 2006, 38 non-native plant species averaged about the same cover category value, 0.36, while a total of 52 native species increased the average cover category value to 0.30. The top six cover values were for *Bromus diandrus* (2.72), *Rumex acetosella* (1.84), *Chorizanthe* (1.56), *Briza maxima* (1.32), *Daucus pusillus* (1.08), and *Lupinus littoralis* (1.08); *Chorizanthe*, *Daucus*, and *Lupinus* are native species. Also in 2006, litter cover averaged a value of 4.16, and sand a value of 3.08, on the 25 plots.

Grouping the individual cover proportions by native and non-native species allows a cursory estimation of the relative recovery of these two suites of plants. On quadrats, the total of plant cover and that of other types of groundcover (e.g., litter, sand, soil, rock) varies due to overlap of plant species with one another, i.e., the total is not necessarily 100%, but can vary from 100% upwards based upon the amount of overlap (layering) among plant species. In 2005, across the 125 quadrats, native species averaged 3.0% of all cover, non-native plants averaged 6.5%, while the mean relative cover for sand was 11.3% and that for litter was 79.2%. As of June 2006, native species averaged 9.4% cover on quadrats, non-native species 23.5%, sand 23.0%, and litter 44.2%. Thus, while total plant cover increased from about 9.5% in 2005 to almost 33% in 2006, the proportional increase in non-native plant cover was greater than that for native plants.

In 2006, *Briza maxima*, *Bromus diandrus*, *Geranium molle*, *Rumex acetosella*, and *Vulpia myuros* accounted for most of the non-native species cover. In contrast, among native species, only *Chorizanthe howellii* consistently accounted for a relatively large proportion of cover on plots and quadrats, with many others, such as *Ambrosia chamissonis*, *Bromus carinatus*, *Daucus*

pusillus, *Grindelia stricta*, *Leymus pacificus*, *Lupinus littoralis*, *Poa douglasii*, and *Polygonum paronychia*, dominant on some plots or portions thereof.

Labor Statistics

The total treatment area of 25 50-m^2 plots equals 0.125 hectare, or about 0.3 acre. To accomplish initial iceplant and litter removal, and plot maintenance (1 year), we worked an estimated 332 hours. At an estimated $15/hour pay rate, the cost-value of this iceplant-removal trial was about $5000* (= $16,000+/acre), and did not include expenses incurred for data compilation, equipment, or most importantly, removal of plant debris (left on-site adjacent to plots) – a step that would be necessary for more extensive site restoration.
(* Actual costs were higher, based on differential pay rates, travel costs, etc.)

Discussion

The decrease in iceplant cover from pre-treatment through spring 2006 was expected in light of long-term, repeated observations of the efficacy of manual removal, and demonstrated that this method can indeed reduce iceplant cover provided the resources are available in proportion to the size of the targeted treatment area. More importantly, the increase in cover of Howell's spineflower appears to be correlated with iceplant removal, sand disturbance, or both (acknowledging a lack of statistical corroboration for this observation), suggesting that spineflower can re-colonize habitat through the removal of one of its chief competitors for space and other vital resources. While the limited data preclude drawing firm conclusions, the removal of bulk litter, several centimeters thick on most plots, appears to hasten the recovery of spineflower on plots thus treated. Also worth noting is the sharp decrease in litter cover on litter-removal plots between 2005 and 2006, suggesting that the organic material is being incorporated into sub-surface soil horizons, or blown off-site by the wind.

The data also suggest other effects and trends. Most notably, the removal of iceplant, while apparently beneficial to Howell's spineflower, does not necessarily result in a similar recovery of other native components of dune mat vegetation, including several other rare annuals (e.g., *Collinsia corymbosa*, *Gilia millefoliata*, *Phacelia insularis* ssp. *continentis*). While we did observe increases in cover by these and other native plant species, the proportional increase in cover (2005 to 2006) by non-native species was considerably greater, although one year's data should not be considered conclusive. Yet the dramatic increase in non-native species such as sheep sorrel, ripgut brome, and quaking grass suggests that recovery of native plant habitat, including that of Howell's spineflower, may continue to be constrained by competition with these and other non-native species, even in the absence of a suffocating layer of iceplant. As such, management goals aimed at sustaining the recovery of the spineflower may need to include measures designed to curb other invasive species while promoting habitat improvement for native plants. Since less disturbance on plots for iceplant removal will be necessary over the next several years, observing the dynamics of species cover and composition over a sustained period of time will likely provide valuable information to benefit further strategic planning.

One of the more important caveats about the use of the data, as presented, is its compilation over such a brief time. As suggested, data collection over several years will provide a more accurate assessment of longer term trends, provided funding is available to continue to gather and analyze data. This study was limited in its scope due to funding constraints and other considerations; the

greater proportion of funding was allocated to labor, leaving little for incorporating additional treatments or sustaining the study over a longer time period. In particular, the failure to implement other treatments (in addition to manual removal) was a lost opportunity from a landscape management perspective. Other trials could include the use of mechanical equipment (excavators, tractors with rippers) or chemical treatments. Mechanical treatment is obviously destructive, and would result in even greater surface disturbance than does manual iceplant removal; native seed banks could very well be buried beyond any potential for germination as a result of the level of sand disturbance that this treatment would incur. Native vegetation would likely require considerably more time in which to recover, and might need to be augmented through human-assisted plant propagation and restoration.

Other than simple manual iceplant and litter removal treatments, we also did not implement any additional disturbance regimes, although at least 2 plots included foot trails – however, we did not attempt to quantify either trail impacts or potential effects on those plots. The graphical data compiled, including hand drawings of the general distribution of spineflower plants on plots in May 2005 and June 2006, may lend themselves to spatial analysis, however, this work has not been attempted yet. In addition, "disturbance" treatments could be implemented at any time on these plots, or a sampling thereof, to investigate the efficacy of disturbance on increasing or maintaining Howell's spineflower numbers.

Manual removal of iceplant, while apparently effective for the stated purpose of recovering spineflower habitat, is clearly not the most efficient method for eliminating the competition, especially in light of rapidly expanding iceplant cover and limited management resources. In the 1990's, glyphosate treatment of iceplant patches at the Bodega Marine Reserve resulted in excellent recovery of those sites by native plant species, albeit in coastal bluff and prairie habitats already dominated by native taxa (P.G. Connors, personal communication). Treatment of iceplant with glyphosate can be seasonally timed to limit damage to non-target plants, including the annual spineflower, individuals of which have produced seed and died by late summer, being essentially dormant through early winter when seeds germinate in the dunes. The slow, post-treatment decay of iceplant biomass allows for soil or sand retention while other species gradually re-occupy iceplant patches. Spineflower and other species might take longer to recover on iceplant patches treated chemically, but this treatment might also slow down the invasion rate of non-native plants, as well. An additional benefit is that glyphosate treatments could cover many times the area that could be treated manually for equivalent commitments of resources. Any serious attempt to reduce or eliminate the large areas of iceplant currently dominating coastal bluffs, dunes, and prairie must necessarily optimize the expenditures of limited resources for such work. If goals for dune restoration and recovery of rare plants have any chance for success, a sudden financial windfall or unexpected epidemic of volunteerism notwithstanding, the tasks at hand cannot be left solely to the work of hands. I believe that the greater benefit would accrue through the use of all habitat management and restoration tools available, not just those that are considered the most politically palatable.

Photo 1. Spineflower Plot 14SW, May 2005.

Photo 2. Spineflower Plot 14SW, May 2005.

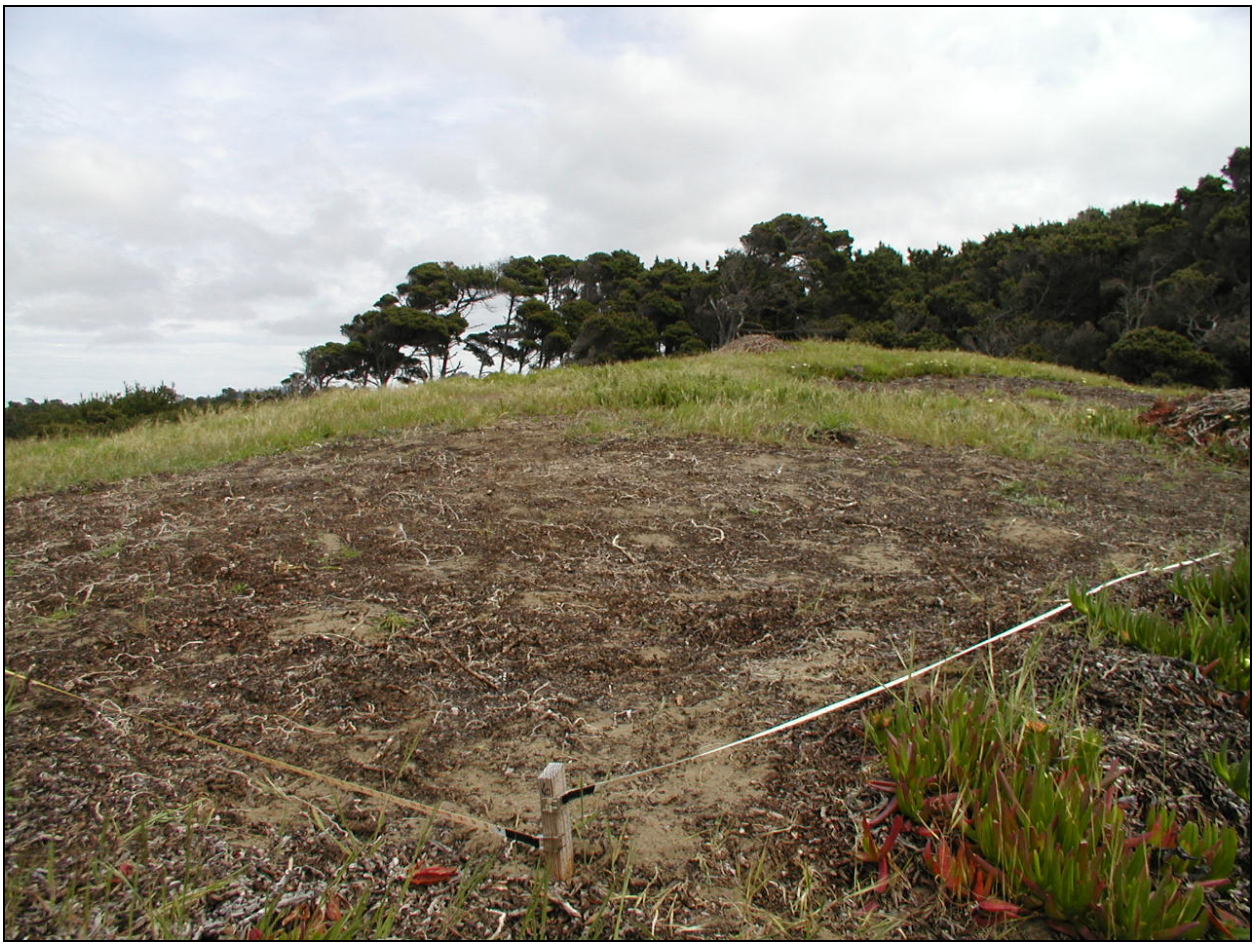

Photo 3. Spineflower Plot 6SW, May 2005.

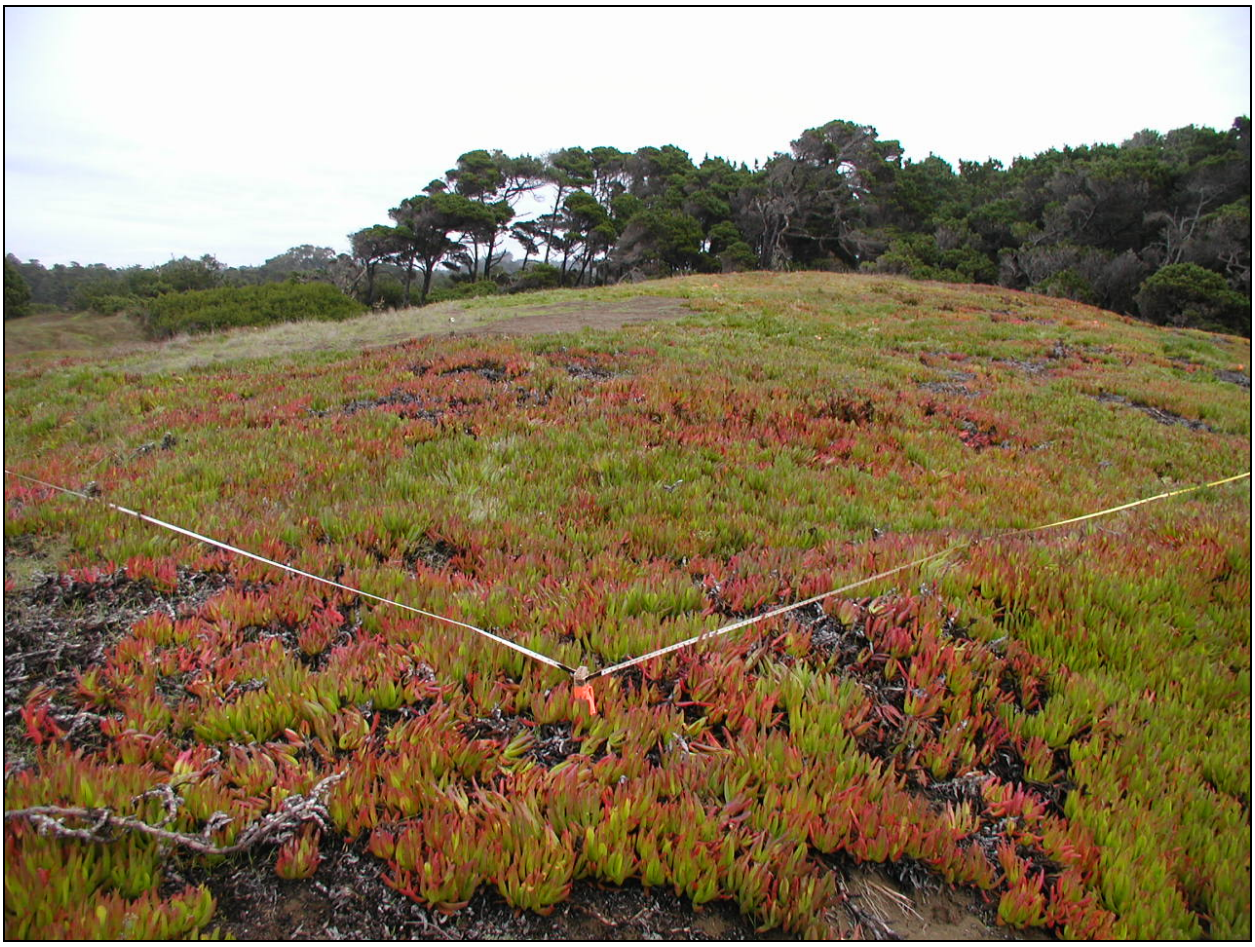

Photo 4. Spineflower Plot 6SW, January 2005.

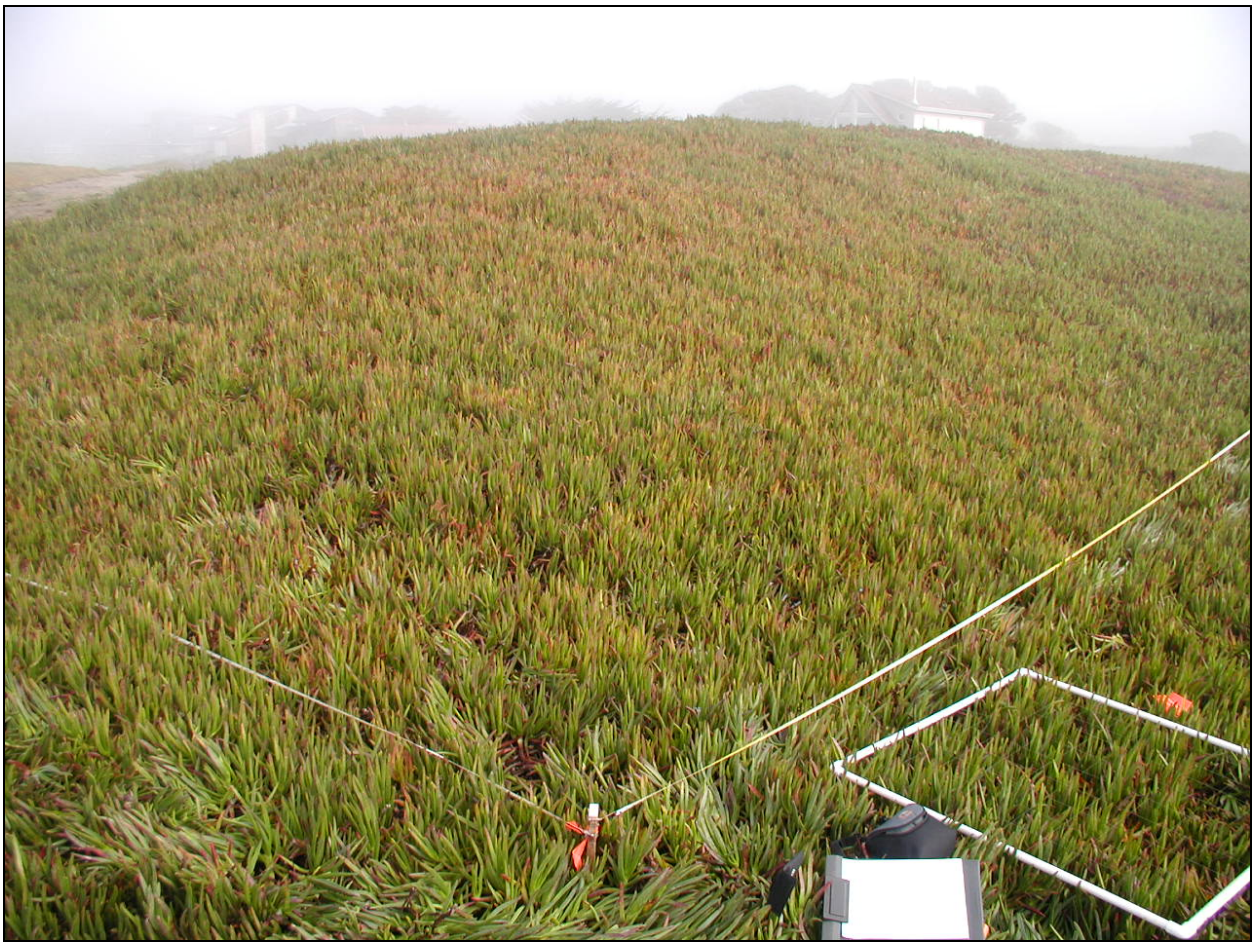

Photo 5. Spineflower Plot 14SW, January 2005.

Photo 6. Spineflower Plot 24NW, January 2005.

Appendix A: Project Description

The Development of a Habitat Restoration Strategy for Howell's Spineflower at MacKerricher State Park, Mendocino County, CA

Introduction

This project will conduct field trials and monitoring that will provide information about appropriate management strategies for the federally endangered Howell's spineflower (*Chorizanthe howellii* [Polygonaceae]). We will conduct this study beginning in summer 2004, and will complete data collection in spring 2007. The sites for this study all lie within MacKerricher State Park, in stabilized dunes east of the haul road, from just north of the Lake Cleone parking lot to approximately ¼ mile north of the Ward Avenue parking lot.

Funding for this project has been provided through the U. S. Dept. of Fish and Wildlife's Endangered Species Act, Section 6 program. The contract sum of $20,698 will provide labor, materials, and data collection, analysis, and storage. In-kind support, services, and materials, at a value of $8,300, will be provided by the California Department of Parks and Recreation; the latter sum will cover a final year of monitoring.

Ecology of Howell's Spineflower

Howell's spineflower is a low-growing annual, completing its life cycle within one year. Vegetative growth begins in winter, with flowering at its peak in May and June. Dispersal of its seeds is facilitated by the spiny tips of the involucre (perianth), allowing the mature involucres and fruits (achenes), containing seeds, to cling to animal fur (or humans, human clothing, etc.).

Howell's spineflower appears to prosper in relatively open areas of stabilized sand dunes and adjacent headlands, from just above sea level to about 100 feet elevation. While seldom persisting in areas of shifting sand or dense vegetative cover, the species does rely on adjacent vegetative cover and perhaps, minor to moderate accumulations of organic matter, as substrate-stabilizing influences. In open dunes and on coastal bluffs, the spineflower is associated with sand verbena (*Abronia latifolia*) and Menzies's wallflower (*Erysimum menziesii* ssp. *menziesii*). In hind-dune areas, dune scrub, and transitional coastal prairie vegetation, common associates include non-native grasses, such as sweet vernalgrass (*Anthoxanthum odoratum*) and purple velvet grass (*Holcus lanatus*), and native perennials and annuals that include dune knotweed (*Polygonum paronychia*), Brewer's rush (*Juncus breweri*), Mendocino coast paintbrush (*Castilleja mendocinensis*), coast buckwheat (*Eriogonum latifolium*), northcoast phacelia (*Phacelia insularis* var. *continentis*), ripgut brome (*Bromus diandrus*), and large quaking grass (*Briza maxima*).

Study System

Virtually the entire known distribution of Howell's spineflower lies within the boundaries of MacKerricher State Park,on the Mendocino County coast just north of Fort Bragg. Most occurrences of *C. howellii* have been documented for the coastal bluffs and dunes between Laguna Point and the mouth of Ten Mile River, in sand or sandy coastal prairie soils. This area has historically been subjected to diverse human-caused disturbances, including foot traffic, horse traffic, trail and road maintenance, and non-native plant invasions. In some areas,

spineflower has been eliminated due to residential development. Remnants of a coastal logging haul road persist across much of the spineflower's habitat; a proposal to re-construct this coastal road has been abandoned. However, ongoing and persistent impacts threaten the species throughout its limited geographical range.

About half the patches of Howell's spineflower grow in areas of regular human disturbance, while the remaining stands are infrequently disturbed by humans This range of disturbance regimes provides an opportunity to study the influence of human activities on spineflower colonization, with implications for long-term spineflower management and conservation. Along with trampling, trail maintenance, and other direct human impacts, spineflower colonies are also threatened, to varying degrees, by encroaching patches of the non-native invasive groundcover Hottentot-fig (aka iceplant; *Carpobrotus edulis*). Iceplant, native to South Africa, is well established in the park's fore- and hind-dunes and coastal bluff habitats. Its ecological requirements appear to overlap substantially with those of *Chorizanthe howellii*. Iceplant may be a significant factor in the exclusion of spineflower from otherwise suitable habitat, although this is an unsubstantiated hypothesis. *Carpobrotus* forms a dense mat that competes vigorously for water, nutrients, and light at the soil surface; the species also significantly reduces soil pH. Other than *Chorizanthe*, iceplant also threatens the federally endangered Menzies's wallflower (*Erysimum menziesii* ssp. *menziesii*) and several other species considered rare or endangered throughout their ranges, including round-headed Chinese houses (*Collinsia corymbosa*), North Coast phacelia (*Phacelia insularis* var. *continentis*), seaside gilia (*Gilia millefoliata*), and pink sand-verbena (*Abronia umbellata* ssp. *breviflora*).

In 1998, State Parks personnel removed iceplant intending to improve habitat for rare plants at several locations within MacKerricher State Park. They observed that Howell's spineflower responded to iceplant removal, under otherwise unspecified conditions, with increases in population size, especially where a thin layer of organic litter remained. Given the harsh dune environment, the survival rate of some species (particularly annuals with relatively shallow root systems) may increase as a result of enhanced soil moisture and temperatures moderated by a temporary or shallow litter layer. However, successful spineflower establishment is likely affected by an array of factors not yet documented or understood. As is the case for many early successional species, the optimal disturbance regime for *Chorizanthe* reproductive success is likely complex. Controlled environmental manipulations and monitoring will be necessary in order to determine the relative influences of a variety of ecological factors on spineflower colonization. Among the factors that appear to be influential on spineflower success are the distance to existing sources of spineflower seed and the depth of litter.

Goals

In order to increase knowledge about the roles of soil disturbance, iceplant cover, organic litter, and distance to propagule source on spineflower success, we propose the following strategic approach:

1. Determine the past and current distribution of ice plant and its encroachment rate within the state park;
2. Remove iceplant experimentally under varying disturbance regimes across a range of physical proximities to spineflower colonies;

3. Conduct a three-year monitoring program to determine the relationship between iceplant removal and spineflower colonization.
4. Produce a report on the concepts and goals of this project, a discussion of the results, and recommendations for the management of iceplant and spineflower.

Methods

As a condition of implementing this project, and prior to iceplant removal, this project will be reviewed for compliance under Section 106 National Historic Preservation Act. During the marking of plots, an archaeologist will work with District resources staff, in order to avoid impacts to sensitive cultural resources.

Goal #1: The history of encroachment by iceplant (i.e., its introduction and subsequent expansion rate) and its current distribution in the park are not documented. Aerial photographs, covering the known range of *Chorizanthe* at MacKerricher State Park, will be used to estimate past iceplant distribution, and its current distribution will be mapped using GPS and GIS technology. A comparison of the past and current distributional data will provide an estimate of the rate of change in iceplant cover in the park. The area preliminarily identified for this analysis is from Laguna Point north to Inglenook Creek, in dune, dune scrub, and coastal prairie habitats.

Goal #2: The spatial data on iceplant will be juxtaposed with existing spineflower GIS data in order to select potential iceplant removal sites at variable distances from spineflower colonies. A minimum of 25 trial removal sites will be established, covering a reasonable range in distances and directions from iceplant patches to the nearest spineflower colonies. Currently, the proposed study sites are concentrated in four areas in the hind dunes at MacKerricher State Park, between the day-use parking lot at Lake Cleone, north to the end of the paved haul road section just north of the Ward Avenue parking area; all potential plot locations are east of the haul road, and within 75 meters of it.

To the extent possible, a range of other physiographic factors that might influence spineflower colonization will also be incorporated into the selection of the trial sites. These factors include slope aspect and pitch, microrelief, and vegetation types. At each site, one or more plots will be established; these will remain marked for the 3-year duration of the study.

Plots will be 50-square-meter squares, marked at corners with wooden stakes and flags, with up to a one-meter buffer zone around each plot. Each plot will be photographed from a minimum of 2 standard perspectives and distances. On each plot, we will record initial data, including quantification or description of the following variables: distance to the ocean, soil type, slope aspect, microrelief, species composition and cover, distance and direction to nearest spineflower colony, estimated population size of spineflower colony, and a quantitative and qualitative description of the site's disturbance regime.

State Parks personnel will remove the iceplant solely by manual methods – small hand tools may be used to extract roots or stems. Once all initial data on all plots has been recorded, removal will be scheduled for the months of October, November, and December 2004. All removal work should be accomplished over as short a period of time as possible, and should be completed prior to the first substantial rainfalls in autumn 2004. All visible living iceplant will be removed from

all plots, with an additional buffer of at least one foot on all sides of each plot. All living iceplant debris will be removed manually (no raking) from all plots to locations a minimum distance of 25 meters away, and debris piles will be monitored for regrowth for the duration of these trials. On about half the plots, all dry (dead) iceplant litter will be raked lightly off plots. This material will be used to supplement existing dry litter on the remaining plots, in effect creating 2 treatments: one set of plots with litter, and an approximately equal number without litter. On each litter plot, litter depth will be recorded at random from 20 points. These data will produce an average litter depth for each plot. All plots will be photographed from 2 standard perspectives and distances.

Goal #3
In spring 2005, 2006, and 2007, we will collect plant cover and composition data from all plots. This will include quantifying or describing any variables that may have changed, including plant composition and cover, litter depth, and proximity and direction to spineflower colonies. In addition, qualitative changes in disturbance regimes or other pertinent information should be noted. All plots will be photographed from the standardized locations. To the extent possible, plots should be undisturbed by data collection activities.

In fall 2005 and 2006, within 20 calendar-days of the anniversary of initial iceplant removal on each plot, iceplant regrowth will be removed in the same manner as that of the original work. Litter depths will be measured at the same number of randomly selected locations as for the original measurements. Data for any autumn-peak-phenology species observed will be recorded. All plots will be photographed from the standardized locations. Observations of any other circumstances or impacts that could influence the results of these trials should be noted.

Please refer to attached images.

Goal #4: A final report will be prepared summarizing the historical and more current distributions of iceplant within spineflower habitat in the park. The report will also discuss the relationships between spineflower colonization and the various physical and biotic factors, and will include appropriate management recommendations suggested by the results of this study. The nature of further studies that might augment management strategies will also be discussed.

Major Tasks and Deliverables

1. Conduct historical research on iceplant distribution and growth rate within the park.
2. Map historical and current distribution of iceplant using airphotos and GPS; create iceplant map. Juxtapose spineflower distribution with that of iceplant patches.
3. Select 20 or more potential iceplant removal sites; field verify these sites.
4. Deliverable: map of iceplant and spineflower habitats for coastal area of MacKerricher State Park, Laguna Point to Inglenook Creek.
    - Complete Section 106 NHPA clearance for removal sites.
5. Deliverable: completed NHPA documents
    - Establish plots for iceplant removal and subsequent monitoring of identified data sets.
6. Deliverable: updated map showing plot locations
    - Conduct initial photodocumentation and data collection.

7. Deliverable: first year photos and raw data
    - Manually remove iceplant; photodocument.
8. Deliverable: post-removal photos
9. Repeat data collection for all appropriate variables and photodocument in spring of each year 2005-2007.
10. Deliverable: updated raw data and statistical compilation
    - Remove iceplant regrowth from plots; photodocument.
11. Deliverable: updated plot photos.
    - Write report, including recommendations for iceplant removal and its implications for management of spineflower.
12. Deliverable: final data compilation, photographs, report, & management recommendations

Partners: Partners include the U.S. Fish and Wildlife Service and the California Department of Parks and Recreation [DPR]. The information from this study will enable these agencies to refine recovery efforts and management direction aimed at long term management of Howell's spineflower. Funding will be administered through the California Department of Fish and Game.

Howell's Spineflower Recolonization Study

Plot Data - May 2005

Plot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/10/2005	5/10/2005	5/10/2005	5/10/2005	5/10/2005	5/10/2005	5/10/2005
Observer	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner
Recorder	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman
Photos?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Slope (degrees)	2	1	8	11	12	6	6	5	12	7/7	2	14	2	8	8
Aspect (degrees)	220	299	268	4	20	276	350	240	201	242/62	58	240	295	244	212
Azimuth (degrees)	37	29	359	10	20	48	342	351	36	76	23	23	28	20	19
Distance to Ch ho (m)	1.3	>5	on plot		0.3	on plot		0.1	on plot	0.03	on plot	0.3	on plot	on plot	> 5 m
Estimated Ch ho on 50 m^2 plot	0	0	6	0	0	20	0	0	55	0	1	0	3	3	0
Trail on plot?	yes	yes	no	no	no	no	no	no	no	no	no	no	no	no	no
Mean litter depth (cm)	4.826	9.906	7.62	8.382	5.334	9.144	4.445	7.874	2.54	8.636	6.35	9.652	6.858	7.62	9.144
Bulk litter removed?	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
1/06: Carpobrotus #seedlings/resprouts	5	6	0	5	20	64	0	29	6	3	101	175	300	750	50

Notes: 50 m^2 plot data: Cover categories: 0 = 0%, 1 = 0-1%, 2 = 1-5%, 3 = 5-25%, 4 = 25-50%, 5 = 50-75%, 6 = 75-100%.

1 m^2 plot data is estimated actual cover, to nearest 1%.

50 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Species	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.
Abronia latifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Aira caryophyllea	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Ambrosia chamissonis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Amsinckia spectabilis	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1
Anagallis arvensis	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0
Aphanes occidentalis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Asteraceae unknown sp.	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Brassicaceae unknown sp.	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0
Briza maxima	0	1	2	0	1	1	4	0	3	2	0	0	1	0	0
Bromus carinatus	3	2	2	2	2	1	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	1	3	3	3	3	4	2	4	2	2	1	1	1	1
Camissonia cheiranthifolia	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0
Cardamine oligosperma	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1
Carpobrotus edulis	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
Castilleja ambigua ssp. *ambigua*	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Cerastium fontanum ssp. *vulgare*	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Chorizanthe howellii	0	0	1	0	0	1	0	0	2	1	1	0	1	1	0
Cirsium vulgare	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Howell's Spineflower Recolonization Study

Plot Data - May 2005

Plot #	16	17	18	19	20	21	22	23	24	25
Date	5/10/2005	5/10/2005	5/10/2005	5/10/2005	5/10/2005	5/11/2005	5/11/2005	5/11/2005	5/11/2005	5/11/2005
Observer	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner	Warner
Recorder	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman	Edleman
Photos?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Slope (degrees)	10	8	4	2	4/6	13	6	6	8	7
Aspect (degrees)	190	270	308	128	120/256	272	201	160	244	233
Azimuth (degrees)	33	54	30	44	32	80	81	66	66	47
Distance to Ch ho (m)	on plot	on plot	0.5	> 5 m	2.0	1.4	> 5 m	1.1	on plot	on plot
Estimated Ch ho on 50 m^2 plot	10	11	0	0	0	0	0	0	200+	60+
Trail on plot?	no	no	no	no	no	no	no	no	yes	yes
Mean litter depth (cm)	4.826	8.89	9.144	8.89	9.652	10.414	3.81	5.08	5.588	5.334
Bulk litter removed?	yes	no	yes	no	yes	no	yes	no	yes	no
1/06: Carpobrotus #seedlings/resprouts	180	90	200	8	142	20	143	189	106	3

Notes: 50 m^2 plot data: Cover categories: 0 = 0%, 1 = 0-1%, 2 = 1-5%, 3 = 5-25%, 4 = 25-50%, 5 = 50-75%, 6 = 75-100%.

1 m^2 plot data is estimated actual cover, to nearest 1%.

50 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Species	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.
Abronia latifolia	0	1	0	0	0	0	0	0	0	1
Aira caryophyllea	0	0	0	0	0	0	0	0	0	0
Ambrosia chamissonis	1	0	0	0	0	0	0	1	0	0
Amsinckia spectabilis	1	1	1	0	1	1	1	1	1	1
Anagallis arvensis	1	0	0	0	0	0	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	1	0	2	2
Asteraceae unknown sp.	0	0	0	0	0	0	0	0	0	0
Brassicaceae unknown sp.	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	0	0	1	0	0	0
Bromus carinatus	0	0	0	0	0	1	0	0	0	0
Bromus diandrus	2	0	1	0	1	1	1	2	2	2
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	1	0
Cardamine oligosperma	1	1	0	0	0	0	0	0	1	1
Carpobrotus edulis	1	1	1	1	1	0	1	1	1	1
Castilleja ambigua ssp. *ambigua*	0	0	0	0	0	0	0	0	0	0
Cerastium fontanum ssp. *vulgare*	0	0	0	0	0	0	0	0	0	0
Chorizanthe howellii	1	1	0	0	0	1	0	0	2	2
Cirsium vulgare	1	0	0	0	0	0	0	0	0	0

50 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Species	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.
Claytonia perfoliata	0	1	1	1	1	0	0	0	0	0	1	1	1	0	0
Collinsia corymbosa	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Cryptantha leiocarpa	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Daucus pusillus	1	1	0	1	1	0	1	1	1	1	1	0	1	0	0
Dicotyledones unknown sp.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Galium aparine	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1
Geranium dissectum	0	0	1	1	1	1	1	1	2	1	0	0	1	0	0
Geranium molle	0	1	0	1	2	1	1	1	2	2	1	1	1	0	1
Gilia millefoliata	0	1	0	0	0	0	0	0	0	1	0	1	1	1	1
Grindelia stricta	1	1	1	0	1	0	1	1	0	0	0	2	2	0	0
Hesperevax sparsiflora	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Holcus lanatus	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris glabra	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0
Hypochaeris radicata	1	1	1	1	0	1	0	1	1	1	0	0	0	0	0
Juncus breweri	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0
Lasthenia californica	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	1	0	1	2	1	0	0	1	1	0	0	0	0	0
Leymus pacificus	1	1	1	2	0	1	1	1	1	0	1	1	1	1	1
Lotus micranthus	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lotus purshianus	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus bicolor	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Lupinus littoralis	0	2	1	1	1	1	2	1	1	2	1	1	1	1	1
Madia sativa	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Marah oreganus	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Medicago polymorpha	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0
Oxalis corniculata	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Phacelia insularis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago erecta	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Platystemon californicus	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Poa annua	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	1	1	0	0	1	0	1	0	0	1	1	2	0	1
Poa unilateralis	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

50 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Species	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.
Claytonia perfoliata	0	0	0	0	0	1	0	0	1	1
Collinsia corymbosa	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	1	0	0	0	0	0	1	0	1	1
Daucus pusillus	0	0	1	0	0	1	0	0	1	1
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	2	1
Erodium cicutarium	0	0	0	1	0	0	0	0	0	0
Eschscholzia californica	2	0	0	0	0	0	0	1	0	0
Galium aparine	0	1	0	0	0	1	0	0	0	0
Geranium dissectum	0	0	0	0	0	0	0	0	2	2
Geranium molle	1	1	1	0	1	1	1	1	1	1
Gilia millefoliata	0	0	0	0	0	0	1	0	1	1
Grindelia stricta	0	0	1	1	0	0	1	1	2	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	1	0	0	0	0	0	1
Holcus lanatus	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	0	0	0	0	0	0	0	1	0
Hypochaeris glabra	0	0	0	0	0	0	0	0	1	1
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	1	1
Lasthenia californica	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	1	1	1	1	1	1	1	0	0
Lotus micranthus	0	0	0	0	0	0	0	0	0	0
Lotus purshianus	0	0	0	0	0	0	0	0	0	0
Lupinus bicolor	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	1	1	0	1	1	1	0	1	1
Madia sativa	0	0	0	0	0	0	0	0	0	0
Marah oreganus	1	0	0	0	0	0	0	0	0	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	1	1	1
Oxalis corniculata	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	0	0	1	2
Phacelia insularis	0	0	0	0	0	0	0	0	0	0
Plantago erecta	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0
Platystemon californicus	0	0	0	0	0	0	0	0	0	0
Poa annua	0	0	0	0	0	0	0	0	0	0
Poa douglasii	1	0	1	1	1	2	1	0	1	1
Poa unilateralis	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	0	0	0	0	0

50 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Species	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.
Polygonum paronychia	0	0	1	1	1	1	0	1	1	1	1	1	2	0	1
Rumex acetosella	1	1	2	3	3	1	1	0	0	0	1	1	1	1	1
Senecio vulgaris	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1
Soliva sessilis	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0
Sonchus oleraceus	0	1	0	1	1	0	0	0	0	0	1	0	0	1	0
Stellaria media	0	0	0	2	1	1	1	1	0	0	1	1	1	1	1
Trifolium barbigerum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium depauperatum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium dubium	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium glomeratum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium microcephalum	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium subterraneum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium variegatum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vicia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Yabea microcarpa	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
litter	5	5	6	4	6	6	4	5	4	5	6	5	6	5	6
moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sand	0	0	2	4	1	3	0	4	5	3	1	4	2	3	1
soil	2	3	0	0	0	0	1	0	0	0	0	0	0	0	0

50 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Species	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.	Cover Cat.
Polygonum paronychia	1	0	1	1	1	2	1	1	1	2
Rumex acetosella	1	1	2	1	1	1	1	2	0	0
Senecio vulgaris	1	1	1	0	1	0	0	1	2	2
Soliva sessilis	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	1	0
Sonchus oleraceus	0	0	1	0	0	0	1	0	1	0
Stellaria media	1	1	1	0	1	1	1	2	1	1
Trifolium barbigerum	0	0	0	0	0	0	0	0	0	0
Trifolium depauperatum	0	0	0	0	0	0	0	0	0	0
Trifolium dubium	0	0	0	0	0	0	0	0	0	0
Trifolium glomeratum	0	0	0	0	0	0	0	0	0	0
Trifolium microcephalum	0	0	0	0	0	0	0	0	0	0
Trifolium subterraneum	0	0	0	0	0	0	0	0	0	0
Trifolium variegatum	0	0	0	0	0	0	0	0	0	0
Vicia sp.	0	0	0	0	0	0	0	1	0	0
Vulpia myuros	1	0	0	0	0	0	0	0	1	1
Yabea microcarpa	0	0	0	0	0	0	0	0	0	0
litter	5	5	5	6	5	6	4	6	4	5
moss	0	0	0	0	0	0	0	0	0	0
sand	4	3	4	2	4	1	5	2	3	3
soil	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot A	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Abronia latifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ambrosia chamissonis	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Amsinckia spectabilis	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
Anagallis arvensis	<1	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	1	0	0	0	25	0	5	1	0	0	0	0	0
Bromus carinatus	10	5	0	1	0	<1	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	0	0	3	5	<1	32	0	11	<1	5	0	0	0	0
Camissonia cheiranthifolia	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	0	0	0	0	0	0	0	0	<1	0	<1	0	0	1	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus pusillus	0	<1	0	0	<1	0	0	0	0	0	0	0	<1	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geranium dissectum	0	0	0	0	2	0	2	0	4	<1	0	0	<1	0	0
Geranium molle	0	2	0	<1	15	0	1	0	2	0	0	<1	<1	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Grindelia stricta	0	0	0	0	2	0	0	0	0	0	0	<1	5	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris glabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	0	0	0	<1	0	0	0	2	0	0	0	0	0	0
Leymus pacificus	0	<1	0	2	<1	0	2	0	<1	0	0	0	<1	0	0
Lotus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	4	<1	0	6	0	1	0	0	0	0	<1	<1	0	0
Medicago polymorpha	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot A	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Abronia latifolia	0	0	0	0	0	0	0	0	0	<1
Ambrosia chamissonis	<1	0	0	0	0	0	0	0	0	0
Amsinckia spectabilis	1	0	0	0	0	0	0	0	0	0
Anagallis arvensis	0	0	0	0	0	0	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	0	0	0	0	0	0
Bromus carinatus	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	0	0	0	0	<1	0	11	0	2
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	<1	0	<1	0	<1	0	<1	<1	0	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	2	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	0	<1
Daucus pusillus	0	0	0	0	0	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	2
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	5	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	<1	0	0	0	0
Geranium dissectum	0	0	0	0	0	0	0	0	1	0
Geranium molle	0	0	0	0	0	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	1	0
Grindelia stricta	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	0	0	0	0	0	0	0	0	0
Hypochaeris glabra	0	0	0	0	0	0	0	0	<1	0
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	0	0	0	<1	0	<1	0	0	0
Lotus sp.	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	<1	0	<1	0	0	0	0	0	<1	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	0	0	0	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot A	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Poaceae sp.	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0
Poa unilateralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	<1	0	0	0	<1	0	0	1	2	0	<1
Rumex acetosella	0	<1	0	8	15	0	0	0	0	0	<1	0	<1	0	0
Senecio vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Soliva sessilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Sonchus oleraceus	0	<1	0	0	<1	0	0	0	0	0	0	0	0	<1	0
Stellaria media	0	0	0	0	0	0	<1	0	0	0	<1	0	0	<1	0
Trifolium dubium	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium subterraneum	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
litter	90	78	97	78	54	91	35	94	76	87	93	79	85	85	99
moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sand	0	0	2	8	0	9	0	4	0	12	2	20	<1	5	<1
soil	<1	6	0	0	0	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot A	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Poaceae sp.	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	<1	0	<1	0
Poa unilateralis	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	2	0	0	3	3
Rumex acetosella	0	0	0	0	0	0	0	0	<1	0
Senecio vulgaris	<1	0	0	0	0	0	0	0	7	6
Soliva sessilis	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0
Stellaria media	<1	0	0	0	0	0	0	7	0	<1
Trifolium dubium	0	0	0	0	0	0	0	0	0	0
Trifolium subterraneum	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0
litter	88	99	87	100	55	98	78	82	85	84
moss	0	0	0	0	0	0	0	0	0	0
sand	7	<1	13	0	45	0	22	<1	<1	2
soil	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	5	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot B	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Abronia latifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aira caryophyllea	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Amsinckia spectabilis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Anagallis arvensis	<1	0	0	0	0	0	0	0	0	0	<1	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae unknown sp.	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	1	0	6	0	<1	0	0	0	0	0	0
Bromus carinatus	4	<1	0	0	1	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	0	0	0	1	<1	60	4	16	6	1	0	0	0	<1
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Carpobrotus edulis	0	0	0	0	0	0	0	0	0	0	<1	<1	<1	<1	<1
Chorizanthe howellii	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Clarkia davyi	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Geranium dissectum	0	0	0	<1	<1	0	0	0	3	<1	0	0	0	0	0
Geranium molle	0	0	0	0	0	0	<1	0	4	2	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Grindelia stricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	0	0	0	0	2	0	0	<1	0	0	0	0	0	0
Leymus pacificus	<1	0	0	1	0	0	2	0	<1	0	0	0	0	0	0
Lotus micranthus	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	0	0	0	1	0	0	0	<1	16	0	<1	0	<1	0
Marah oreganus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot B	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Abronia latifolia	0	0	0	0	0	0	0	0	0	<1
Aira caryophyllea	0	0	0	0	0	0	0	0	0	0
Amsinckia spectabilis	2	0	0	0	0	0	0	0	<1	0
Anagallis arvensis	0	0	0	0	0	0	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0
Asteraceae unknown sp.	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	0	0	0	0	0	0
Bromus carinatus	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	<1	0	0	0	0	3	<1	<1	<1	<1
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	<1	0	0	0	0	0	0	0	<1
Carpobrotus edulis	<1	0	<1	<1	<1	<1	<1	<1	<1	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	5	0
Clarkia davyi	0	0	0	0	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	<1	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	1	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	<1	0	0	0	0
Geranium dissectum	0	0	0	0	0	0	0	0	2	0
Geranium molle	0	0	0	0	0	0	0	0	<1	0
Gilia millefoliata	0	0	0	0	0	0	0	0	<1	0
Grindelia stricta	0	0	0	0	0	0	0	0	<1	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	4	<1
Lessingia filaginifolia	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	0	0	<1	0	<1	0	0	0	0
Lotus micranthus	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	<1	0	0	<1	0	0	0	<1	0
Marah oreganus	0	0	0	0	0	0	0	0	0	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	<1	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot B	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Phacelia distans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa unilateralis	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Rumex acetosella	0	<1	0	0	0	0	0	0	0	0	0	<1	<1	0	0
Senecio vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	0
Soliva sessilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0
Sonchus oleraceus	0	0	0	1	<1	0	0	0	0	0	0	0	0	0	0
Stellaria media	0	0	0	0	0	0	<1	0	0	0	0	0	<1	0	0
Trifolium dubium	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
litter	96	62	100	85	96	69	31	83	40	66	98	74	98	86	100
moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sand	0	0	0	13	0	29	0	4	33	10	<1	25	0	13	0
soil	<1	30	0	0	0	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot B	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Phacelia distans	0	0	0	0	0	0	0	0	0	<1
Phacelia insularis	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	0	0	0	0
Poa unilateralis	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	0	0	<1	0	7
Rumex acetosella	0	3	<1	0	0	0	0	0	<1	0
Senecio vulgaris	0	0	0	0	0	0	0	0	8	2
Soliva sessilis	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0
Stellaria media	0	1	0	0	0	0	0	3	2	0
Trifolium dubium	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0
		0								
litter	92	94	80	99	85	98	99	96	74	90
moss	0	0	0	0	0	0	0	0	0	0
sand	5	1	20	0	15	<1	0	1	2	0
soil	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	8	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot C	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Amsinckia spectabilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	5	0	6	0	8	0	0	<1	0	0	0	0	0
Bromus carinatus	<1	3	0	1	0	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	0	0	2	4	0	33	4	7	<1	2	0	0	0	0
Camissonia cheiranthifolia	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	0	0	0	0	0	0	0	0	<1	0	<1	<1	0	<1	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Daucus pusillus	0	0	0	0	0	0	<1	0	0	<1	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Geranium dissectum	0	0	0	0	5	0	0	0	<1	0	0	0	0	0	0
Geranium molle	0	0	0	0	10	0	0	0	<1	1	0	0	0	0	<1
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grindelia stricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Holcus lanatus	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	<1	0	0	3	0	0	1	0	0	0	<1	0	0	0	0
Lotus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	0	0	0	8	0	0	0	<1	0	0	0	0	0	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa unilateralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	2	0	0	0	0	0	0	0	<1	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot C	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Amsinckia spectabilis	0	0	0	0	0	0	0	0	<1	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	0	0	0	0	0	0
Bromus carinatus	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	12	0	0	0	0	0	0	0	<1	22
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	<1	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	1	<1	<1	0	<1	0	<1	<1	<1	0
Chorizanthe howellii	<1	0	0	0	0	0	0	0	0	2
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	2	<1
Daucus pusillus	0	0	0	0	0	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	<1
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	2	0	0	0	0	0	0	<1	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0
Geranium dissectum	0	0	0	0	0	0	0	0	10	<1
Geranium molle	0	<1	0	0	0	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0
Grindelia stricta	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	3
Holcus lanatus	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	0	0
Lessingia filaginifolia	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	0	0	0	<1	0	0	0	0	0
Lotus sp.	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	<1	0	0	1	0	<1	0	0	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	1	0	0
Phacelia distans	0	0	0	0	0	0	0	0	0	1
Phacelia insularis	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	6	0	0	0	0
Poa unilateralis	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	1	0	0	0	<1

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot C	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Senecio vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Soliva sessilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stellaria media	0	0	0	<1	0	0	<1	0	0	0	<1	0	0	0	0
Trifolium dubium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
litter	98	85	88	65	54	94	58	78	78	93	97	60	100	84	100
moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sand	0	0	7	19	<1	6	0	17	13	6	0	40	0	16	0
soil	1	10	0	0	0	0	<1	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot C	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Senecio vulgaris	0	0	0	0	0	0	0	0	8	0
Soliva sessilis	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0
Stellaria media	<1	<1	0	0	0	0	0	<1	0	0
Trifolium dubium	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	<1	0	0	0	0	0	0	0	0	0
litter	51	99	85	100	74	93	75	50	79	71
moss	0	0	0	0	0	0	0	0	0	0
sand	30	1	15	0	25	0	25	48	1	1
soil	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	1	0	0	0	0	0	0	0	0	8

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot D	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Anagallis arvensis	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amsinckia spectabilis	0	0	0	0	0	0	0	0	0	0	0	<1	0	<1	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Asteraceae unknown sp.	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	1	0	9	0	4	0	0	0	0	0	0
Bromus carinatus	8	0	<1	0	2	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	0	<1	12	10	0	10	0	30	0	0	0	0	0	0
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	<1	0	0	0	0	<1	0	0	<1	0	<1	0	0	<1	<1
Cerastium fontanum ssp. *vulgare*	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0
Chorizanthe howellii	0	0	<1	0	0	0	0	0	1	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus pusillus	1	0	0	0	0	0	<1	0	3	0	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geranium dissectum	0	0	0	0	<1	0	<1	0	1	0	0	0	0	0	0
Geranium molle	0	0	0	0	1	0	<1	0	0	<1	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grindelia stricta	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	3	0	0	0	0	0	0	<1	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	2	0	<1	0	0	0	0	0
Leymus pacificus	<1	0	0	2	0	0	2	1	0	0	0	0	<1	0	0
Lotus micranthus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	0	0	<1	0	0	<1	<1	<1	0	0	<1	0	0	<1
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago erecta	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa annua	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae unknown sp.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot D	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Anagallis arvensis	0	0	0	0	0	0	0	0	0	0
Amsinckia spectabilis	0	0	0	0	0	0	0	<1	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	4	0
Asteraceae unknown sp.	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	0	0	0	0	0	0
Bromus carinatus	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	2	0	0	0	0	1	0	<1	4	2
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	<1	<1	<1	0	<1	0	0	<1	0	0
Cerastium fontanum ssp. *vulgare*	0	0	0	0	0	0	0	0	0	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	13	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	<1
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	2	0
Daucus pusillus	0	0	0	0	0	0	0	0	<1	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	7	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	3	0	0	0	0	0	0	0	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0
Geranium dissectum	0	0	0	0	0	0	0	0	1	4
Geranium molle	0	0	0	0	<1	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	<1	0
Grindelia stricta	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	0	<1	0	<1	0	0	0	0	0
Lotus micranthus	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	<1	0	0	0	0	<1	0	0	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	<1	0
Phacelia distans	0	0	0	0	0	0	0	0	2	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0
Plantago erecta	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0
Poa annua	0	0	0	0	0	0	0	0	0	0
Poaceae unknown sp.	0	0	0	0	0	0	0	0	0	0
Poa douglasii	1	0	0	0	0	0	0	0	0	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot D	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Poa unilateralis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	1	<1	0	0	0	0	0	0	0	0	0	0	0
Rumex acetosella	0	0	0	7	9	0	0	0	0	0	0	0	0	<1	0
Senecio vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Soliva sessilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	<1	0	<1	0	0	0	0	0
Sonchus oleraceus	0	0	0	<1	<1	0	0	0	0	0	0	0	0	0	0
Stellaria media	0	0	0	6	0	<1	0	0	0	0	0	0	0	0	<1
Trifolium dubium	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
litter	68	90	99	63	77	90	77	86	32	90	99	55	100	78	100
moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sand	0	0	0	10	<1	10	0	11	28	10	0	45	0	22	0
soil	3	10	0	0	0	0	2	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	1	0	0	0	0	0	7	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot D	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Poa unilateralis	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	0	0	0	0	0
Rumex acetosella	<1	<1	0	0	0	0	<1	1	0	0
Senecio vulgaris	0	<1	0	0	<1	0	0	0	<1	1
Soliva sessilis	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0
Stellaria media	<1	<1	0	0	0	0	0	1	0	<1
Trifolium dubium	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	<1	0
litter	67	73	25	100	66	99	97	93	8	93
moss	0	0	0	0	0	0	0	0	0	0
sand	27	26	75	0	33	0	3	5	59	0
soil	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	40	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot E	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Aira caryophyllea	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Anagallis arvensis	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ambrosia chamissonis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Amsinckia spectabilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Briza maxima	0	0	0	0	0	<1	4	0	<1	0	0	0	0	0	0
Bromus carinatus	4	10	<1	0	0	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	0	10	1	2	3	3	35	<1	<1	<1	0	0	0	0	<1
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Carpobrotus edulis	0	0	0	0	<1	0	0	0	0	0	0	<1	1	<1	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
Clarkia davyi	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daucus pusillus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Galium aparine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Geranium dissectum	0	0	0	<1	<1	0	<1	0	0	0	0	0	0	0	0
Geranium molle	0	0	0	0	<1	0	0	1	0	<1	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grindelia stricta	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris glabra	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Lessingia filiaginifolia	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	0	0	3	0	<1	3	0	0	0	<1	0	0	0	0
Lotus micranthus	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus bicolor	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	0	0	0	0	<1	2	0	0	0	0	<1	<1	0	<1
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacelia insularis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot E	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Aira caryophyllea	0	0	0	0	0	0	0	0	0	0
Anagallis arvensis	0	0	0	0	0	0	0	0	0	0
Ambrosia chamissonis	0	0	0	0	0	0	0	<1	0	0
Amsinckia spectabilis	0	0	0	0	0	0	0	0	0	0
Aphanes occidentalis	0	0	0	0	0	0	0	0	0	0
Armeria maritima	0	0	0	0	0	0	0	0	0	0
Artemisia pycnocephala	0	0	0	0	0	0	0	0	4	<1
Briza maxima	0	0	0	0	0	0	0	0	0	0
Bromus carinatus	0	0	0	0	0	0	0	0	0	0
Bromus diandrus	<1	0	0	0	0	<1	4	<1	3	2
Camissonia cheiranthifolia	0	0	0	0	0	0	0	0	0	0
Cardamine oligosperma	0	0	0	0	0	0	0	0	0	0
Carpobrotus edulis	0	0	<1	<1	<1	<1	<1	<1	0	0
Chorizanthe howellii	0	0	0	0	0	0	0	0	2	2
Clarkia davyi	0	0	0	0	0	0	0	0	0	0
Claytonia perfoliata	0	0	0	0	0	0	0	0	0	0
Cryptantha leiocarpa	0	0	0	0	0	0	0	0	1	<1
Daucus pusillus	0	0	0	0	0	0	0	0	0	0
Dicotyledones unknown sp.	0	0	0	0	0	0	0	0	0	0
Eriogonum latifolium	0	0	0	0	0	0	0	0	<1	0
Erodium cicutarium	0	0	0	0	0	0	0	0	0	0
Eschscholzia californica	<1	0	0	0	0	0	0	1	0	0
Galium aparine	0	0	0	0	0	0	0	0	0	0
Geranium dissectum	0	0	0	0	0	0	0	0	0	0
Geranium molle	0	0	<1	0	0	0	0	0	0	0
Gilia millefoliata	0	0	0	0	0	0	0	0	0	0
Grindelia stricta	0	0	0	0	0	0	0	0	0	0
Hesperevax sparsiflora	0	0	0	0	0	0	0	0	0	0
Heterotheca sessiliflora	0	0	0	<1	0	0	0	0	0	3
Hordeum brachyantherum	0	0	0	0	0	0	0	0	0	0
Hypochaeris glabra	0	0	0	0	0	0	0	0	0	0
Hypochaeris radicata	0	0	0	0	0	0	0	0	0	0
Juncus breweri	0	0	0	0	0	0	0	0	<1	0
Lessingia filiaginifolia	0	0	0	0	0	0	0	0	0	0
Leymus pacificus	0	0	<1	0	0	0	0	0	0	0
Lotus micranthus	0	0	0	0	0	0	0	0	0	0
Lupinus bicolor	0	0	0	0	0	0	0	0	0	0
Lupinus littoralis	0	0	0	0	<1	0	0	0	2	0
Medicago polymorpha	0	0	0	0	0	0	0	0	0	0
Nemophila menziesii	0	0	0	0	0	0	0	0	0	0
Phacelia distans	0	0	0	0	0	0	0	0	4	5
Phacelia insularis	0	0	0	0	0	0	0	0	0	0

1 m^2 plot data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Plot E	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa annua	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa unilateralis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	0
Rumex acetosella	0	<1	1	22	<1	0	0	0	0	0	0	0	1	0	2
Senecio vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0
Soliva sessilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	1	0	<1	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stellaria media	0	0	0	1	0	0	0	0	0	0	0	0	<1	0	0
Trifolium dubium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vicia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
litter	92	30	95	55	95	75	56	86	23	78	99	55	98	93	98
moss	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sand	0	0	3	18	4	22	0	11	70	21	0	45	0	7	<1
soil	4	36	0	0	0	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0

1 m^2 plot data	16	17	18	19	20	21	22	23	24	25
Plot E	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover	% Cover
Plantago lanceolata	0	0	0	0	0	0	0	0	0	0
Poa annua	0	0	0	0	0	0	0	0	0	0
Poaceae sp.	0	0	0	0	0	0	0	0	0	0
Poa douglasii	0	0	0	1	0	<1	0	0	0	<1
Poa unilateralis	0	0	0	0	0	0	0	0	0	0
Polygonum paronychia	0	0	0	0	0	0	0	0	0	2
Rumex acetosella	1	0	3	0	0	0	0	13	0	0
Senecio vulgaris	0	0	0	0	0	0	0	<1	<1	<1
Soliva sessilis	0	0	0	0	0	0	0	0	0	0
Sonchus asper ssp. *asper*	0	0	0	0	0	0	0	0	0	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0
Stellaria media	<1	<1	0	0	<1	0	0	2	0	0
Trifolium dubium	0	0	0	0	0	0	0	0	0	0
Vicia sp.	0	0	0	0	0	0	0	<1	0	0
Vulpia myuros	0	0	0	0	0	0	0	0	<1	4
litter	79	45	87	99	70	99	17	68	50	69
moss	0	0	0	0	0	0	0	0	0	0
sand	20	55	10	0	30	0	79	16	34	13
soil	0	0	0	0	0	0	0	0	0	0
# *Cho how* plants	0	0	0	0	0	0	0	0	13	19