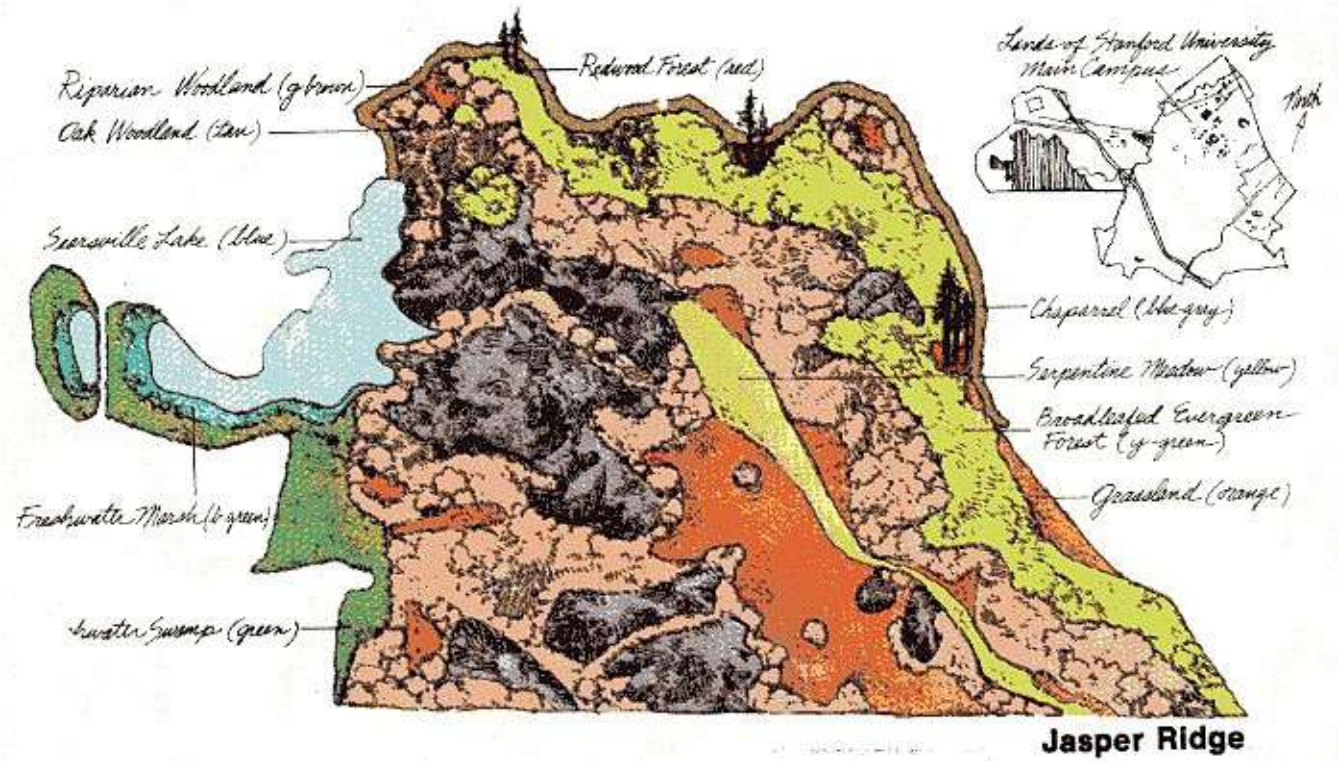
Jasper Ridge Biological Preserve, San Mateo County, CA

Status of Vascular Plants

A report produced as part of the State of the Preserve assessment



Stanford Magazine, Spring/Summer 1975. "Jasper Ridge: Stanford's Biological Preserve"

Compiled by

Toni Corelli, Paul Heiple, Ann Lambrecht, Ruth Porter, John Rawlings, Elizabeth Schwerer, and Carol Zabel

This report is dedicated to the late Ruth Porter

June, 2008

Abstract

This report emphasizes the need for ongoing field observation, recording of data, and the importance of vouchers conserved in the Jasper Ridge herbarium. While the rate of invasion by exotics has leveled in recent years, new species capable of moderate to severe impacts continue to arrive. These include over the past three decades *Brachypodium distachyon* (purple falsebrome), *Brachypodium sylvaticum* (slender false brome), *Briza maxima* (big quaking grass), *Cynosurus echinatus* (hedgehog dogtail grass), *Dittrichia graveolens* (stinkwort), *Ehrharta erecta* (panic veldt grass), and *Parentucellia viscosa* (yellow glandweed). *Lolium multiflorum* (Italian ryegrass), long present on the preserve and recorded in each flora beginning with Springer (1935), invaded the serpentine prairie during the 1980s becoming a dominant plant of that habitat. There is anecdotal and observational evidence from reliable sources that *Carduus pycnocephalus* has increased, though it is normally excluded from serpentine. Similarly, *Genista monspessulana* (French broom) is clearly observed to be spreading.

Information on the state of other important invasive exotics such as *Centaurea solstitialis* (yellow star-thistle) might be gleaned from Herb Dengler's field notes, John Thomas's field notes, and voucher labels. Reconstructing an invasion historical timeline from these sources would be particularly valuable both for the most serious weeds and the most threatened habitats, for example, riparian areas which are essential to the local survival of many native plants. The herbarium team is not currently prepared to undertake this type of systematic historical research in addition to their other duties, though detailed information from Thomas's notes and voucher labels could be readily compiled for others to analyze. The team is also not prepared to provide quantitative assessments of changes in native plant populations much beyond identifying those taxa with small populations and/or few locations, and vouchered taxa that are no longer known to be present.

Although a significant number of vouchered plants have not recently been seen in the field, this is not so much a matter of alarm as a wake-up call to design more systematic field surveys. Working hypotheses accounting for many of these "missing plants" are that:

- The majority of these plants may still be present and have been overlooked for a combination of reasons, the primary factor being that the team is not looking in the right place at the right time to find them blooming.
- Some plants have diminished and perhaps disappeared due to habitat change, which includes the construction of the dam and subsequent succession of the lakes to meadows, and the ongoing maturation of the chaparral.
- Some plants, particularly herbaceous annuals, have been lost to what may be called, for lack of a better term, normal turnover. Typically these are plants with small local populations that are eliminated due to climatic shifts, disturbance, competitive factors, or human impact.

Contents

Jasper Ridge Biological Preserve, San Mateo County, CA

Status of Vascular Plants

Names conformed to The Jepson Manual 1993 (TJM)

Introduction

This report emphasizes the need for ongoing field observation, recording of data, and the fundamental role of vouchers conserved in the Jasper Ridge Biological Preserve (JRBP) Herbarium, housed in the Oakmead Herbarium and Collection Rooms at the Leslie Shao-ming Sun Field Station at the preserve. The core of the herbarium collection was given to Jasper Ridge in 1992 by Professor John Thomas, the most assiduous collector of the preserve's flora and Stanford's most recent plant taxonomist. He referred to it as the JRBP Teaching and Reference Collection of Vascular Plants (Thomas, 1993).

Documenting the preserve's vascular plants in a scientific manner had long been a goal of Dr. Thomas, who was acutely aware of the difficulties arising from the lack of voucher specimens preserved by the authors of major floristic studies/plant lists: Springer 1932; Moeur 1947; D. Porter 1962; Dengler 1975. To this end, Thomas made, by his own account, almost 2000 collections at Jasper Ridge from 1955-1998 (Thomas, 1993).

The earliest plant collections from JRBP were made by 1867 by Volney Rattan (1840-1915). His specimen sheets conserved in the JRBP Herbarium give the location information as "Searsville." Over the intervening 141 years, numerous workers of varying botanical expertise have reported 880 different plants. Documentation varies from meticulously prepared vouchers to the simplest lists of plants encountered, photographs, and word-of-mouth reports. As a result of both the establishment of the JRBP Herbarium in the Sun Field Station, and thousands of hours of observation in the field and work in the herbarium by volunteers, JRBP is now better able to document its vascular plants in accordance with standards of modern floras. Another major step yet to be taken by the herbarium team is the identification and review of the some thousand vouchers for plants collected in the Jasper Ridge vicinity that were part of the Dudley Herbarium of Stanford University transferred to the California Academy of Sciences (Thomas, 1993). Since the Dudley Herbarium was integrated into the California Academy Herbarium (Timby, 1998), and because the California Academy has no short-term plan for Internet searching and access of its California vouchers, this second undertaking may prove formidable.

The herbarium relies on two databases for the information presented in this report, both created by Ruth Porter. The JRBP Plant List Database made possible all editions of the *Vascular Plant List* by Ruth Porter and Toni Corelli, just as it laid the groundwork and guided the process resulting in this report. The second database, called the Herbarium Database, was essential to the ultimate formation of the herbarium.

The JRBP Plant List Database, now maintained by Toni Corelli, represents all taxa included in the 2002 *Vascular Plant List*, plus new plants collected and information recorded since 2002. This database contains information about the 880 vascular plants reported for Jasper Ridge. It will be used to update the JRBP vascular plant Web page, and to compile a new edition of the *Vascular Plant List* incorporating the taxonomic revisions and name changes from the second edition of The Jepson Manual, scheduled for publication in 2009. The database will generally be available to staff, volunteers, and researchers.

The Herbarium Database, maintained by Ann Lambrecht, captures the information contained on the herbarium sheets, which includes label, map, herbarium numbers, and any other notes or annotations. Currently all sheets (more than 5,000) have been entered.

These two databases document the routine work carried out by the herbarium team that currently includes Toni Corelli, Paul Heiple, Ann Lambrecht, John Rawlings, Elizabeth Schwerer, and Carol Zabel. After the distribution of the first plant database in 1998, Carol Zabel began walking the trails in the preserve to find and record plant locations. Ann Lambrecht joined her in 1999. Ruth Porter was the original volunteer responsible for the organization of the JRBP Herbarium and creation of the databases. Toni Corelli joined Porter in 1996, and the other members of the team joined in later years.

Reliability Codes used in this report.

Taxa count is for California native and naturalized plants. Does *not* include waifs (planted specimens not fully naturalized at JRBP (List 5), hybrids (List 11), and rejected taxa (List 13) (should we have LINKS to these here as well?)

code	no. taxa	% all taxa	definition -- reliability
PV	593	75.2%	Plant Vouchered. Plant present and vouchered, herbarium team has observed within the last 10 or so years
P	034	04.3%	Present. Plant present, herbarium team has observed and verified recently; plant not vouchered
LRV	072	09.2%	Last Reported Vouchered. Plant vouchered, but herbarium team has not observed it in past 10 or so years
LRRS	089	11.3%	Last Reported by a Reliable Source. Plant reported by reliable source, herbarium team has not observed
Total	788	100.0%	

I. Status of the Flora

Floristic Summary

The California native and naturalized flora of JRBP is comprised of 788 species, subspecies, and varieties as of June 2008, (how do we make the link smaller?) http://spreadsheets.google.com/ccc?key=pTmNxXEfn25ZotxGhzNMnAg&hl=en. Each taxon is assigned one of four reliability codes as defined in the Introduction. Although we consider a few vouchered taxa likely to be locally extirpated, we have not yet assigned this status to any plant. Of the 788 plants, 566 (72%) are native and 222 (28%) are naturalized aliens (three of these are California native plants not indigenous to our region). The 788 taxa are 10.8% of the California flora (7266 terminal taxa) in TJM (Rosatti, 2005). A subset of 627 (P and PV) plants comprised of all plants observed recently by the herbarium team is 8.6% of TJM terminal taxa. As is the case for California as a whole and the Santa Cruz Mountain region in particular, Asteraceae is represented by the most taxa (107) followed by Poaceae (94). The largest genera are *Trifolium* (22), *Bromus* (12), and *Carex* (10).

Hybrids, waifs, and rejected taxa are not included in the 788 count. TJM does not give full treatment to most hybrids (13 taxa); hybrids are included on List 11. Waifs (53 taxa) are not fully naturalized at JRBP and include ornamental plants planted at JRBP, or other taxa seen once or twice but that do not reproduce or persist for more than a few generations (List 5). Rejected taxa and taxa erroneously included (26 taxa) are plants that were originally misidentifed or have had nomenclature and taxonomic changes (List 13). These taxa (92) are recorded in the Plant List Database but are not included in our 788 count.

Table 1. California Native & Naturalized Taxa Breakdown by Group and Reliability Code n=788

	no. taxa native P-PV / LRV / LRRS = TOTAL	**no. taxa alien**[1] P-PV / LRV / LRRS = TOTAL	**total all plants**	**% native / alien**	**% of total JRBP taxa** n=787
I. Ferns & Allies	015 / 002 / 001 / **018**	000 / 000 / 000 / 000	**18**	100.0% / 0%	02.3%
II. Gymnosperms	002 / 000 / 000 / **002**	001 / 000 / 000 / **001**	**3**	66.6% / 33.3%	00.3%
III. Angiosperms	417 / 062 / 067 / **546**	192 / 008 / 021 / **221**	**767**	71.3% / 28.7%	97.4%
Dicots	325 / 050 / 044 / 419	139 / 007 / 018 / 164	[583]	72% / 28%	[74.1%]
Monocots	092 / 012 / 023 / 127	053 / 001 / 003 / 057	[184]	69% / 31%%	[23.3%]
Totals I+II+III	434 / 064 / 068 / **566**	193 / 008 / 021 / **222**	**788**	72% / 28%	100%

[1]Including 3 California native plants not indigenous to our region

Figure 1. California Native & Naturalized Taxa – Breakdown by Group and Reliability Code n=788

Area of each box is proportional to the number of taxa in the corresponding category

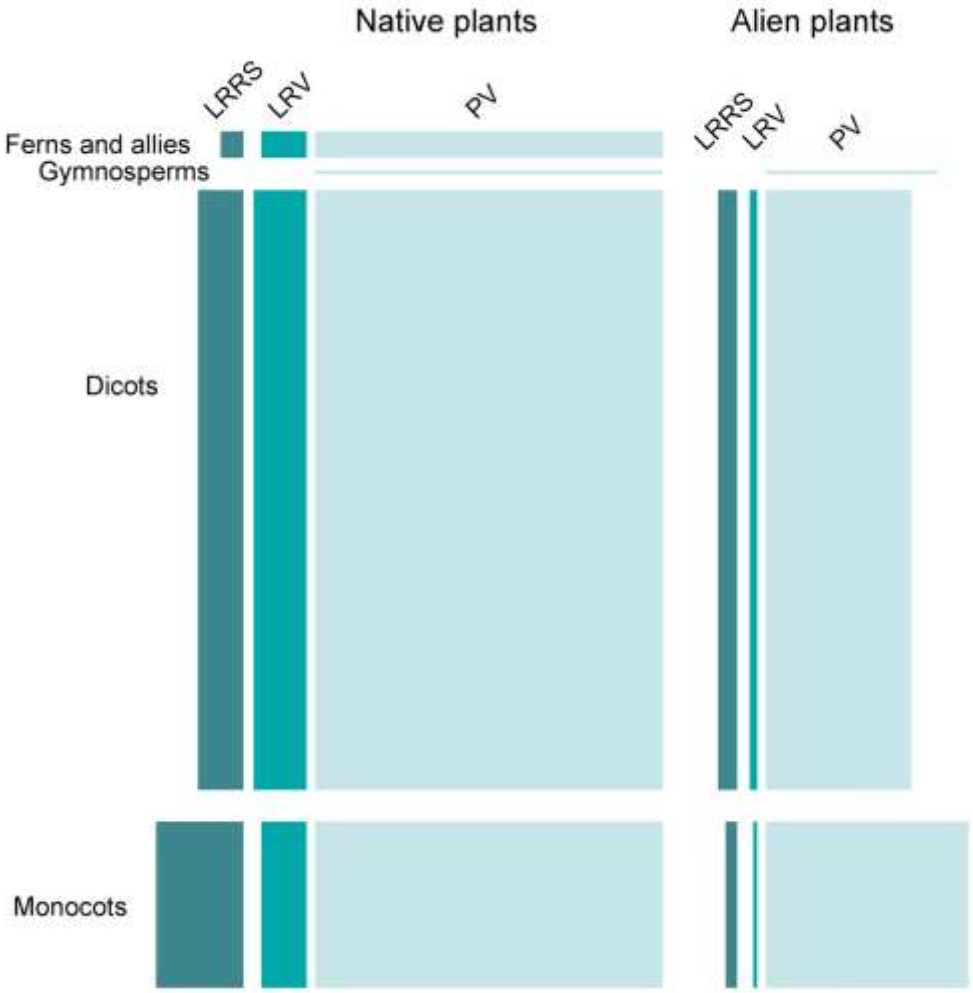


Table 2. Native & Naturalized Plants -- All Vouchered Plants (P, PV, LRV) n=699

	no. taxa (P+PV+LRV)
Ferns and fern allies	17
Gymnosperms	3
Angiosperms	679
Dicots	[521]
Monocots	[158]
Total	699

Table 3. Native & Naturalized Plants -- Comparison of Jasper Ridge Flora to TJM (1993) and Thomas (1961)

	California TJM, 1993	**Santa Cruz Mtn**[1] Thomas, 1961	**Jasper Ridge**
acres	100,000,000	887,039	1,189
taxa	7266	1796	788
genera	1222	650	395
families	173	167	98

[1]Numbers do not reflect TJM name changes

Herbarium workers have added 40 taxa since publication of the 2002 plant list: 15 native (List 6) and 25 non-native (List 8) of which at least 4 are potentially serious invasives.

Seventy-two of the almost 700 vouchered plants have not been seen by the herbarium team in recent years (List 2 LRV), and another 89 (List 3 LRRS) plants reported by reliable sources, primarily Herb Dengler, have not been observed by the herbarium team nor vouchered. These figures are puzzling, because we would not have thought that so many plants, 20% of the documented/reported vascular flora, would go unnoticed by the herbarium team. We are nevertheless as yet unwilling to designate any of the vouchered plants extirpated, nor discount wholesale the unvouchered reports from sources such as Dengler. We expect to find in the coming years both plants that have been reported by various workers but not yet observed by the herbarium team, and new plants not previously reported either because they are recent arrivals or have been hitherto overlooked.

Suppositions can be made, each probably accounting for some of the missing plants:

- Some plants listed in the unvouchered group (LRRS) were undoubtedly erroneously reported either because of misidentification or having been found outside the boundaries of the present-day preserve. We expect this number would at least be as large and likely significantly larger than those rejected for the same reasons from among the vouchered specimens, that is, about 4%.
- Some plants may be present in areas/habitats less-thoroughly botanized by the herbarium team: Middle Lake region; aquatic plants generally; off-trail areas, especially serpentine and riparian corridors. The same consideration applies for blooming period.
- Many of these plants are tiny or otherwise inconspicuous, and may have in fact been overlooked.
- Plants from difficult genera may be ascribed in the field to more common species, e.g., *Chenopodium, Cryptantha*, *Erodium, Lupinus,* and *Plagiobothrys*.
- Some plants have probably been extirpated, e.g., *Hierochloe occidentalis, Scoliopus bigelovii*.
- Some of the plants on the LRV and LRRS lists should probably be assigned to Waifs and Planted Specimens Not Fully Naturalized, e.g., *Petunia parviflora*.

- Updating nomenclature has introduced a small number of errors. This has been found for vouchered material and undoubtedly also applies to the LRRS category.
- Some plants, particularly herbaceous annuals, have been lost to what may be called, for lack of a better term, normal turnover. Typically these are plants with small local populations that are eliminated due to climatic shifts, disturbance, competitive factors, or human impact.

Invasives

Most introduced plants are relatively benign individually; however, the impacts of a few particularly invasive plants have been dramatic, altering or eliminating native vegetation. Furthermore, while the invasion index (V) shows a leveling in the rate of new arrivals, potentially serious invasives continue to arrive. The cumulative effects of all non-native plants on the preserve appear to us to be profound. Twenty-five aliens (List 8) have been added since the 2002 plant list; the majority of these plants are likely not new to the preserve but rather heretofore overlooked.

Records show that the invasion rates are approximately one to two new introduced vascular plant species per year in recent decades. Averaged over the period since the beginning of the Spanish colonization in 1769 (when introductions to California are thought to have begun), the rate of introduction has been 0.78 species per annum (Macdonald et al., 1988, after Mooney). In that examination of JRBP flora, the angiosperms, as one would expect, are the groups most severely invaded. While most introduced angiosperms are dicotyledons, the Macdonald study shows that monocotyledons show a slightly higher invasion proportion than dicotyledons relative to natives, reflecting the large number of non-native grasses (see List 8).

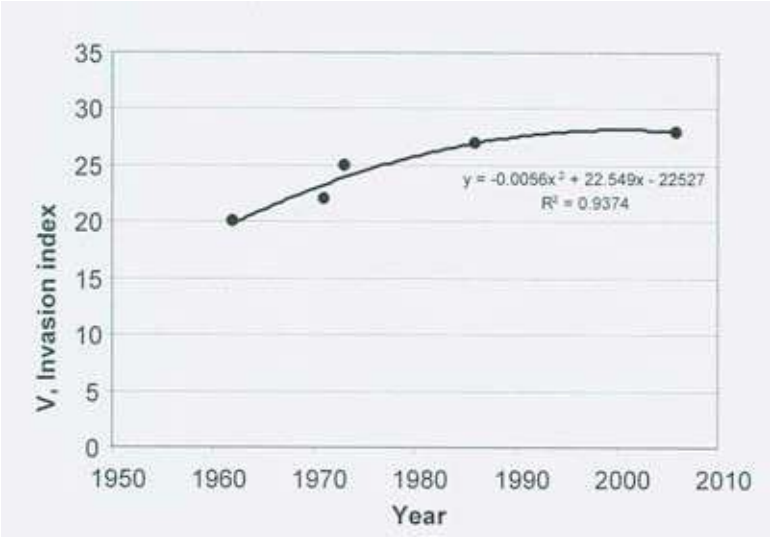
Table 4. Introduced Angiosperms

V = 100 I/S%, where I is the total of introduced taxa, and
S is the total number of native and introduced species

	1962	1971	1973	1986	2006
Angiosperms	(I=89 & V=20%)	(I=108 & V=22%)	(I=161 & V=25%)	(I=175 & V=27%)	(I=222 & V=28%)

1962-1986 figures from Macdonald, 1988 .

Figure 2. Invasion Index - ASK NONA for original and comments



The majority of all JRBP invasive exotics (222 taxa) are herbaceous (200 taxa). Only 22 taxa are trees, shrubs or woody vines. Eleven of these currently pose serious threats (List 15); woody plants other than those on List 15 have not become major problems. Some bird-dispersed shrubs and trees are scattered throughout the preserve: *Cotoneaster pannosa* (cotoneaster), *Crataegus monogyna* (hawthorn), *Olea europea* (olive tree), *Pistacia atlantica* (pistachio), *Pyracantha* sp. (pyracantha). Others such as *Rhus integrifolia* (lemonadeberry) are largely localized. For an overview of the woody flora of JRBP see Corelli, 2005.

In the aforementioned Macdonald study the habitats invaded by introduced species were determined from two annotated checklists (D. Porter, 1962; Thomas, 1971). Of the 108 species identified, 38 were restricted to disturbed areas (e.g., road verges), 11 were found in these areas as well as in areas of "natural" vegetation, 18 were restricted to sites of artificially high moisture availability (e.g., the verge of Searsville Lake and base of the dam) and 14 were found only in the riparian habitat. Of the species that were recorded in "natural" vegetation, 36 were in grassland, 18 were in open oak woodland, 3 were in closed oak woodland/oak-madrone forest and only 1 species, *Galium murale*, was recorded from chaparral. Certainly there are other aliens than this tiny, sausage-shape-fruited bedstraw that range into the chaparral including *Vulpia* spp., which were widely observed during our spring vegetation surveys, but not yet blooming so that species could be determined. Results from those surveys may eventually provide useful data on native/non-native plants present in different habitats. Comparing the Macdonald data for open oak woodland with Griffin's two blue oak woodland plots, we believe Griffin is better representative of the number of native and exotic taxa expected in this particular habitat:

Table 5. Natives/Non-Natives in Blue Oak Woodland and Serpentine Grassland (Griffin, unpublished)

	3 year averages 1000 m2 1979-81	total taxa	total exotics / %
SD-15 sandstone	63	76	30 / 39.5%
SD-16 sandstone	61	74	25 / 33.8%
serpentine grassland (1 yr only)	39	39	3 / 7.7%

The communities with more complete woody canopies, excepting riparian areas, continue to be less susceptible to invasion by introduced plant species. However, the recent invader *Ehrharta erecta* (panic veldt grass) and *Brachypodium sylvaticum* (slender false brome) could dramatically alter the herbaceous layer of the preserve's mesic woodlands and riparian corridors. The riparian zones have already been severely impacted by herbaceous and woody aliens *Genista monspessulana* (French broom), and to a lesser extent *Acacia dealbata* (silver wattle) and *Ailanthus altissima* (tree of heaven). However, the riparian areas continue to provide habitat for numerous native plants from *Polystichum dudleyi* (Dudley's shield fern) to *Lilium pardalinum* ssp. *pardalinum* (leopard lily), and their canopies are still dominated by native trees and the shrub understory by natives where not replaced by French broom infestations. Furthermore, the creek corridor below the dam has not been invaded by *Hedera helix (*English ivy*), Senecio mikanioides* (Cape-ivy, German-ivy*), Arundo donax (*giant reed), or *Rubus discolor (*Himalayan blackberry*)* as have many local drainages downstream from urban development. This same characterization is true for the preserve's riparian woodland west of Portola Road in the Alambique Creek watershed. *Vinca major (*greater periwinkle*)* is persistent in riparian areas but seldom forms extensive mats, and *Eucalyptus globulus* (blue gum) is not established in San Francisquito or Bear Creeks and does not behave as a weed anywhere on the preserve. Conspicuous plants in the major creek beds include the native *Carex nudata* (torrent sedge) and the exotic invasive *Agrostis viridis* (water bentgrass), along with a suite of other aliens. There is at least one large, seed-producing *Cortaderia selloana* (pampas grass) about a hundred yards west of San Francisquito Creek at the end of Trail 2 that should be removed, and another in the unfenced area west of Portola Road. For other locations consult the herbarium team.

The habitat most severely invaded by introduced plants is grassland occurring on soils other than those derived from serpentine. Annual herbs, mostly grasses of Mediterranean origin, made up an average of 89% (range 73-99%) of the above-ground phytomass in this grassland in 1966. By contrast, introduced plant species made up 28% on average of the phytomass of grassland on serpentine soils (range 10-53%) (McNaughton, 1968). At that time introduced grasses, other than *Bromus hordeaceus* (soft chess), were largely excluded from serpentine soils. Today, and for at least twenty years, *Lolium multiflorum* (Italian ryegrass) has attained both significant coverage and frequency in serpentine. New invasions continue in the annual grassland, with *Dittrichia graveolens* (stinkwort) a potentially potent new member along with *Centaurea solstitialis* (yellow star-thistle) of the grassland aestival flora.

A suite of annual grass invasions appear to have occurred in the 1970s-1980s. These included *Brachypodium distachyon* (purple falsebrome), first recorded July 4, 1977 by Herb Dengler west of the lake, where it still thrives, *Briza maxima* (big quaking grass*)* (first recorded by Dengler in June, 1976 in disturbed ground around a house-site), and *Cynosurus echinatus* (hedgehog dogtail grass) which was not recorded until after 1983 or so and which thrives on shady slopes and along most of the preserve's trails through woodland and chaparral. All are now widespread in wildlands. These grass introductions/expansions appear mild compared to the invasion of *Lolium multiflorum* (Italian ryegrass) into serpentine during this same period. In 1966 McNaughton did not report *Lolium* from his serpentine plots. In 1974, Dengler evidently had not observed *Lolium* as a significant presence on serpentine (as reported by Grundmann, 1983). By 1986, however, *Lolium multiflorum* was one of 3 annual grasses that was recorded growing in both greenstone and serpentine in Armstrong and Huenneke's transect during 1985-1990, and it had also become one of the most abundant plants on serpentine (Armstrong and Huenneke, 1993, fig. 5). Today, as emphasized by Weiss (1999; 2002), *Lolium multiflorum*, along with *Aegilops triuncialis* (barbed goat grass) in some other locations in the region, is degrading the unique floristic assemblage of local serpentine prairies.

In spite of the continuing alien immigration, no plant species are definitively known to have become extinct in the preserve as a result of invasions, although the first wave of wild oats, bromes, and barleys occurred prior to any botanical collecting. There is also observational evidence of native declines attributed to mostly exotics detailed in the following section.

Disappearances and Declines

Carol Zabel writes:


Serpentine outcrop carpeted with flowers

The population size of some native annual forbs has declined over the past 25 years. Some declines may be due to normal population fluctuations. Others seem related to competition from exotic species, human activity such as trail maintenance, or to habitat change from natural causes. For example, the slope above Road F and its intersection with Trail 16 was sometimes completely covered with both *Lupinus nanus* (Douglas' annual lupine) and *L. bicolor* (miniature lupine), as was the slope on Trail 10 above its intersection with Trail 12, and other locations. These slopes are now dominated by *Carduus pycnocephalus* (Italian thistle), annual grasses, and later in the summer by *Centaurea solstitialis* (yellow star-thistle).

Serpentine areas such as Area C no longer have as much *Castilleja densiflora* ssp. *densiflora* (owl's clover), *Lasthenia californica* (goldfields), *Linanthus* spp., and other annual forbs. A new suite of annual grasses, particularly *Lolium multiflorum* and *Brachypodium distachyon* (purple falsebrome), has moved in. Compare today's serpentine flower display to the aerial photograph printed in The Stanford Magazine, Spring/Summer 1975 (image on right).

While there are probably various and often complex causes, competition from *Centaurea solstitialis*, *Carduus pycnocephalus*, and non-native grasses are major

factors in these declines. Mowing along roads and trails and widening and maintenance of roads and trails are vectors of introduction, and create and maintain invasion corridors. For example, the annual *Salvia columbariae* (chia) in its only known site near the end of Trail b grows intermingled with *Centaurea solstitialis*, *Carduus pycnocephalus*, and *Anagallis arvensis* (scarlet pimpernel). There were still a few dozen *Salvia columbariae* flowering there in 2008.

Platystemon californicus (cream cups) have not appeared the past two years. Twenty years ago large displays were seen in serpentine grassland on the slope below upper Trail 5.

The annual *Phacelia distans* (common phacelia) grows at the switchback on Trail 11 (one of two known sites), a location with so much *Carduus pycnocephalus* that it is regularly mowed to keep the trail open. In 2001 and 2002 there were 15-20 plants, in 2003 there were 8-9 plants. In March 2004 there were about 10 very small plants. The area is still mowed to try to prevent the spread of *Carduus pycnocephalus*.

The El Nino rains of the early 1980s caused a portion of the hillside on Trail 1, adjacent to serpentine, to slide onto the trail, wiping out many plants, including almost all of the *Collomia heterophylla* (varied-leaved collomia). The hillside was colonized by *Toxicodendron diversilobum* (western poison oak) and the native *Rubus ursinus* (California blackberry). The El Nino rains of 1998 caused a section of this hill to collapse again.

An example of trail work as a factor in declines is the portion of Trail 8 that was widened and leveled in the 1990s, wiping out about 60 linear feet of *Scutellaria tuberosa* (Dannie's skullcap), which grows from tubers. In May 1998 there were 25 plants left in the area, and none in succeeding years.

In places the winter's rains bring in seeds that grow on creek banks: below the Dennis Martin site, Bear Creek crossing near Whiskey Hill gate, the low-flow crossing of San Francisquito Creek at the end of Road C, Corte Madera Creek at Leonard's Bridge, and the Causeway Bridge on Trail 13. The plants may last one season, die off and not appear again in succeeding years. These sites have given several new names to our plant list: *Acer palmatum* (Japanese maple), *Borago officinalis* (common borage), *Dichondra* sp. (dichondra), *Lobelia erinus* (edging lobelia), *Polycarpon depressum* (polycarp), and *Xanthium spinosum* (spiny cocklebur). Sometimes the water brings in very undesirable plants, such as *Erechtites minima* (toothed coast fireweed), *Ehrharta erecta* (panic veldt grass), and *Senecio mikanioides*. Volunteers pulled and bagged every *Erechtites minima* they could find under the Causeway Bridge, but a few plants still show up. *Ehrharta erecta* is here to stay, as will also likely be the case for *Senecio mikanioides*.

Typha spp. (cattails) have multiplied in Searsville Lake as the reservoir silts in and succession speeds on. In summer 2000, the herbarium team went into the dry lake bed near Searsville Lab and were able to walk almost to the Causeway Bridge. Later that summer they again walked in the dry lake bed directly across to the shallow inlet. In October 2003 they walked across to the deep inlet, the shallow inlet by then being closed off by *Typha* spp. In November 2003 they walked the dry bed of Middle Lake. There were *Typha* spp. only around the edge, the water inflow to Middle Lake having been blocked off by the *Typha* spp. At the Searsville Lab boat landing, in addition to nearby *Typha* spp. and *Salix exigua* (narrow-leaved willow), *Myriophyllum aquaticum* (parrot's feather) blocks the movement of water bringing seeds to the shore. In past years the herbarium team had seen many *Cyperus erythrorhizos* (red-rooted cyperus), *Alisma plantago-aquatica* (common water plantain), and the non-native *Polygonum persicaria* (lady's thumb) and *Artemisia biennis* (biennial sagewort). These plants are now declining as *Typha* continues to colonize this area.

Goals and Desiderata

- Recommend that JRBP staff and herbarium volunteers establish protocols for vouchering plant material observed and/or reported in research projects.
- Recommend that JRBP establish a budgeted weed-control program. This should be structured as a long-term conservation research project, e.g., *Lolium multiflorum* reduction on serpentine grassland, or habitat restoration in riparian areas. Currently many weed removal efforts are carried out by volunteers, not a fully effective or sustainable approach.

- Recommend that JRBP staff and herbarium volunteers develop a seminar on preserve plant communities and invasives. This might be a half-day single session, offered to docents and Stanford staff and students. Part of the session should be spent on weed removal, for example, in the *Pleuropogon californicus* (semaphore grass) vernally wet area. The vegetation in this area has been mapped by a rapid vegetation assessment protocol; there is a significant native plant presence, threatened by *Genista monspessulana* and *Lolium multiflorum*.
- Incorporate location and flowering-time information already documented into the plant list database.
- Field observation, visit more locations, voucher plants known to be present (P), focus on LRV and LRRS plants.
- Georeferencing of plants using GPS, GIS and JRBP Sector Map Book, including information technology infrastructure for storing and retrieving data and images.
- Photo collection - add to this collection and correct existing inaccuracies which appear on the JRBP Web site; consider adding links to CalPhotos website.
- Publish a new vascular plant booklet conforming to the next edition of TJM, on the lines of Ertter's 1997 checklist.
- Join the Consortium of California Herbaria thus making our database available to them.

II. Status of the Herbarium

History of the Herbarium
EK Jewett (2005) Documenting Plant Diversity: Jasper Ridge's Herbarium. Views Online.

Statistical Summary

- Number of sheets with Dudley Herbarium numbers: n=3,873 (source Herbarium Database).
- Number of sheets without Dudley Herbarium numbers: n=1,108 (source Herbarium Database).
- Specimens to be mounted: more than 300.
- List of collectors and annotators: 102 collectors (C); 48 annotators (A), of whom some have also been collectors(source: Herbarium Database).
  http://spreadsheets.google.com/ccc?key=pTmNxXEfn25YHzIwlpmQ_PA&hl=en

Some notable collectors prior to 1950 (source: Herbarium Database).

Some notable collectors prior to 1950	Voucher dates	Number of vouchers in herbarium
Abrams, L.R.	1898-1934	51
Applegate, Elmer I.	1895	8
Benson, Lyman	1930	2
Davis, D.D.	1903	25
Dudley, W.R.	1839-1910	53
Keck, David D.	1932-1939	2
Mason, H.L.	1921-1922	14
McMurphy, J.I.	1906-1911	12
Rattan, Volney	1867	3
Stinchfield-Ferris, Roxana	1913-1924	7
Vestal, A.G.	1923-1937	4

Goals and desiderata

For volunteers:

- Mount and accession backlog.
- Combine teaching and research sections of herbarium.
- Enhance herbarium in support of teaching and research--especially for common annual grassland grasses and forbs.
- Identify the thousand or so vouchers for plants collected on the preserve that were part of the Dudley Herbarium transferred to the California Academy of Sciences. Review these data for understanding of JRBP flora.
- Update to new nomenclature TJM (2nd Edition, estimated release date late 2009).

For JRBP staff:

- Agree on procedure for verification of difficult material by experts.
- Purchase relevant new floras.
- Photograph vouchers, and agree on storage and retrieval protocol for digital images.
- Upgrade equipment, especially microscopes and lights.

III. Plant Lists

A. California Native and Naturalized Vascular Plants n=788

http://spreadsheets.google.com/ccc?key=pTmNxXEfn25ZotxGhzNMnAg&hl=en

List 1. Vouchered and Present, observed recently by herbarium team (PV, P) n=627
http://spreadsheets.google.com/ccc?key=pTmNxXEfn25aSef6LHwdPYg&hl=en
These are plants vouchered in the herbarium and observed recently (PV), as well as 35 other plants known to be present which are not yet vouchered (P). Lists 1, 2, and 3 do not include hybrids, waifs, or rejected taxa. Family names are presented without suffix "aceae."

List 2. Vouchered but not observed by herbarium team in past 10 or so years (LRV) n=72. These are plants historically present, but whose status is unknown.
http://docs.google.com/Doc?id=dgmw255r_40mvb4dcc3&hl=en

List 3. Plants reported by reliable sources other than herbarium team (LRRS) n=89
http://docs.google.com/Doc?docid=dgmw255r_418ghchgcf&hl=en

B. Special Lists

List 4. Aquatic Plants n=30 http://docs.google.com/Doc?docid=dgmw255r_42g4j3qdgp&hl=en

List 5. Waifs and Planted Specimens Not Fully Naturalized at JRBP n=53
(not included in total taxa count)

Waif = alien (non-native) and either not reproducing without human intervention or not persisting for more than a few generations and therefore incompletely naturalized

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	Comments
Gymnosperms	Cupress.	Cupressus sp.	cypress	PV	Collected by J. Thomas in 1979, one tree planted in Searsville Town vicinity; persistent
Gymnosperms	Pin.	Pinus sylvestris	Scotch pine	PV	Collected by J. Rawlings

					in 2005 between Road C and Sand Hill Road, two mature plants; persistent
Dicots	Acer.	Acer palmatum	Japanese maple	PV	Collected in 2002 by C. Zabel and A. Lambrecht in Corte Madera floodplain; not seen since
Dicots	Apocyn.	Nerium oleander	oleander	P	Planted at caretaker's house; persistent
Dicots	Aster.	Coreopsis tinctoria	calliopsis	LRV	Collected by R. Porter in 1997 at low flow crossing; not seen since
Dicots	Aster.	Cotula coronopifolia	brass-buttons	LRV	Collected by J. Thomas in 1981 on dam; last voucher 1982
Dicots	Aster.	Erigeron karvinskianus	Mexican daisy	LRV	Collected by H. Dengler in 1965 below Dennis Martin mill site, seen in 1988 at same location; not seen since
Dicots	Aster.	Santolina chamaecyparisus	lavender-cotton	PV	Collected by J. Thomas in 1977, planted at caretaker's house; persistent
Dicots	Boragin.	Borago officinalis	common borage	P	Reported by A. Lambrecht and C. Zabel in 2003, one plant found in the Corte Madera floodplain; not seen since
Dicots	Brassic.	Iberis umbellata	candytuft	LRRS	Reported by H. Dengler; not seen since
Dicots	Brassic.	Lepidium campestre	cow-cress	LRV	Collected by V. Parannal in 1976 in the Searsville Lake delta; not seen since
Dicots	Brassic.	Lepidium pinnatifidum	Eurasian cress	LRV	Collected by H. Dengler in 1972 at low flow crossing; not seen since
Dicots	Brassic.	Lobularia maritima	sweet alyssum	PV	Collected by J. Thomas in 1983 from an unspecified location, one plant found in 1998 in Corte Madera floodplain south of Leonard's bridge; not seen since
Dicots	Buddlej.	Buddleja davidii	butterfly bush	LRRS	Reported by H. Dengler; not seen since
Dicots	Campanul.	Lobelia erinus	edging lobelia	P	Reported by C. Zabel and A. Lambrecht in 2000 below causeway bridge, Trail 13, one

					plant found in 2003 near low-flow crossing; not seen since
Dicots	Cannab.	Cannabis sativa	marijuana	PV	Collected by R. Porter in 1982; found occasionally by JRBP staff
Dicots	Cist.	Cistus creticus	rock-rose	LRV	Collected by D. Breedlove in 1971 from an unspecified location; not seen since
Dicots	Convolvul.	Ipomoea purpurea	common morning-glory	P	Reported by H. Dengler, reported by C. Zabel in 1998 from causeway; not seen since
Dicots	Eric.	Arctostaphylos sp.	manzanita	PV	Collected by T. Corelli in 2005 at Hermit Cabin site; persistent
Dicots	Euphorbi.	Euphorbia lathyris	caper spurge	PV	Collected by C. Zabel and R. Porter in 1999 on the north side of Trail 12 in intermittent stream bed; not seen since
Dicots	Fab.	Medicago sativa	alfalfa	P	Reported by D. Porter, found in 2000 near the west end of the dam bridge; not seen since 2001
Dicots	Fab.	Pisum sativum	garden pea	LRV	Collected by J. Thomas in 1967 from Road D; not seen since
Dicots	Fab.	Trifolium hybridum	alsike clover	LRV	Collected by J. Thomas in 1983 near the low-flow crossing; not seen since
Dicots	Fab.	Trifolium repens	white clover	PV	Collected by J. Thomas in 1974 in drainage channel at Corte Madera Creek, several plants seen in the early 2000s on Road C near dam bridge; not seen since
Dicots	Lami.	Marrubium vulgare	horehound	P	Reported by H. Dengler, one plant found in 2001 below Dennis Martin site; not seen since 2004
Dicots	Malv.	Abutilon theophrasti	velvet-leaf	PV	Collected by C. Zabel in 2006 in old dumping site above ranger's house, removed; not seen since
Dicots	Ole.	Ligustrum lucidum	glossy privet	PV	Collected by J. Thomas in 1978 at caretaker's house; persistent
Dicots	Ole.	Ligustrum	California	P	Reported by H. Dengler,

		ovalifolium	privet		one plant found in 2001 on Trail 13; not seen since
Dicots	Ros.	Prunus sp.	ornamental plum	PV	Collected by T. Corelli in 2007 at Douglas' iris site; persistent
Dicots	Ros.	Crataegus laevigata	English hawthorn	PV	Collected by C. Zabel and I. Brown in 2003, planted at Hermit Cabin site; persistent
Dicots	Ros.	Rosa banksiae	Lady Banks' rose	P	Reported by I. Brown, one large plant at Hermit Cabin site; persistent
Dicots	Ros.	Rosa laevigata	Cherokee climbing rose	PV	Collected in 1967 and 2004, planted along the Sand Hill Road fence; persistent
Dicots	Ros.	Sanguisorba minor ssp. muricata	garden burnet	LRRS	Reported by H. Dengler; not seen since
Dicots	Scrophulari.	Digitalis purpurea	purple foxglove	P	Reported by C. Zabel in 2001 at west end of Leonard's bridge, mowed; not seen since
Dicots	Scrophulari.	Verbascum thapsus	woolly mullein	PV	Collected by J. Thomas in 1981 and 1982; not seen since
Dicots	Solan.	Datura stramonium	jimson weed	PV	Collected by J. Thomas in 1976 in Searsville Lake delta; not seen since
Dicots	Solan.	Lycopersicon esculentum	tomato	PV	Collected in 1981 by J. Thomas, and in 2002 by T. Corelli between Road C and Sand Hill Road; not seen since
Dicots	Solan.	Physalis philadelphica	tomatillo	LRRS	Reported by H. Dengler; planted at ranger's house
Dicots	Verben.	Phyla nodiflora var. nodiflora	garden lippia	PV	Collected by C. Zabel in 2001 below Searsville Lab; not seen since
Dicots	Vit.	Vitis sp.	grape	P	Reported by C. Zabel and A. Lambrecht, planted at Hermit Cabin site; persistent
Monocots	Arac.	Zantedeschia aethiopica	calla lily	P	Reported by H. Dengler, found in 2004 at east end of Trail 13; not seen since
Monocots	Lili.	Agapanthus orientalis	lily-of-the-Nile	LRRS	Reported by R. Porter at Douglas' iris site; not

					seen since
Monocots	Lili.	Amaryllis belladonna	belladonna lily	PV	Reported by C. Zabel in 1998, collected in 2007 on Road A between creek and road; persistent
Monocots	Lili.	Asparagus officinalis ssp. officinalis	garden asparagus	LRV	Collected in 1991 at low-flow crossing; not seen since
Monocots	Lili.	Hyacinthoides hispanica	Spanish bluebell	P	Reported by R. Porter at Douglas' iris site; persistent
Monocots	Lili.	Kniphofia sp.	red-hot poker	P	Reported by C. Zabel and A. Lambrecht in 2003 between Road C and Sand Hill Road; persistent
Monocots	Lili.	Narcissus sp.	daffodil	P	Reported in 2002 near Douglas' iris site; persistent
Monocots	Lili.	Narcissus sp.	narcissus	P	Reported in 2002 at English elm grove; persistent
Monocots	Po.	Agrostis avenacea	hairy-flowered bent grass	LRV	Reported in 1979 at edge of Searsville Lake near old bathing beach area; not seen since
Monocots	Po.	Bromus tectorum	cheat grass	LRV	Collected by J. Thomas in 1981 below Searsville Lab; not seen since
Monocots	Po.	Crypsis vaginiflora	prickle grass	LRV	Collected by J. Thomas in 1976 in Searsville Lake delta; not seen since
Monocots	Po.	Hordeum vulgare	common barley	LRRS	Reported by H. Dengler; not seen since
Monocots	Po.	Panicum miliaceum	broom corn millet	PV	Collected by A. Lambrecht in 2000 in dry bed of Corte Madera Creek; not seen since

List 6. Native additions since the *Vascular Plant List* (2002) n=15

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	Comments
Dicots	Api.	Bowlesia incana	bowlesia	PV	Trail 9
Dicots	Aster.	Microseris douglasii ssp. tenella	delicate Douglas microseris	PV	Road F
Dicots	Convolvul.	Calystegia purpurata ssp. purpurata	morning-glory	PV	Serpentine and non-serpentine chaparral, oak

					woodland
Dicots	Fag.	Lithocarpus densiflorus var. densiflorus	tanbark oak	P	Near Douglas' iris site
Dicots	Lami.	Prunella vulgaris var. lanceolata	narrowleaf self-heal	PV	Road C at low-flow crossing
Dicots	Orobanch.	Orobanche vallicola	broom-rape	PV	Trail 2
Monocots	Cyper.	Carex bolanderi	Bolander's sedge	PV	Corte Madera floodplain, Trail 13, old Trail 13
Monocots	Cyper.	Scirpus maritimus	alkali bulrush	PV	In water at Searsville Lab boat landing
Monocots	Lili.	Allium peninsulare var. franciscanum#	peninsular onion#	PV	Serpentine soils
Monocots	Orchid.	Piperia michaelii#	Michael's piperia#	PV	Off Road F
Monocots	Orchid.	Piperia transversa	transverse piperia	P	Road E, Trail 4, bird path behind Hillside Lab
Monocots	Po.	Festuca rubra	red fescue	PV	Below Searsville Lab near old boat ramp
Monocots	Po.	Glyceria occidentalis	water manna grass	PV	Downstream from Bear Creek and San Francisquito Creek junction
Monocots	Po.	Melica subulata	Alaska oniongrass	PV	Trail 2 near Zoology Cabin foundation
Monocots	Po.	Panicum capillare	witchgrass	P	Dry streambed below Dennis Martin site

#Indicates rare, threatened, and/or endangered

List 7. Naturalized Alien Plants n=222
http://spreadsheets.google.com/ccc?key=pTmNxXEfn25bKIeY_n7mHRQ&hl=en

List 8. Naturalized Alien Additions since the *Vascular Plant List* (2002) n=25
Cal-IPC (California Invasive Plant Council) http://www.cal-ipc.org/

Taxa in boldface are additions to the *Vascular Plant List* (2002); **+ = potentially serious** new invasives. The majority of these plants were likely already present on the preserve before 2002.

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	Comments
Dicots	Aster.	**Dittrichia graveolens +**	stinkwort	PV	Along trails, disturbed areas, grassland, riparian corridors; spreading rapidly, impacts may become more important in

					future
Dicots	Aster.	Lactuca virosa	wild lettuce	PV	Along Trail 13
Dicots	Aster.	Urospermum picroides	prickly goldenfleece	PV	Along Road F
Dicots	Brassic.	Coronopus didymus	lesser wart cress	PV	Stream bank and fence at Bear Creek crossing, low-flow crossing
Dicots	Chenopodi.	Chenopodium vulvaria	pigweed	PV	Bear Creek
Dicots	Fab.	Acacia melanoxylon	blackwood acacia	PV	Streambank below Dennis Martin site
Dicots	Fab.	Trifolium arvense	rabbitfoot clover	PV	Douglas' iris road
Dicots	Gerani.	Geranium sp.	geranium	P	Bear Creek
Dicots	Lami.	Mentha suaveolens	apple mint	PV	Now-dry bed of Corte Madera Creek
Dicots	Lin.	Linum bienne	narrow-leaved flax	PV	Sand Hill Road fence and near field station
Dicots	Ros.	Duchesnea indica	mock-strawberry	PV	San Francisquito Creek bed
Dicots	Scrophulari.	**Parentucellia viscosa +**	yellow glandweed	PV	Burn site along Road B
Dicots	Urtic.	Soleirolia soleirolii	baby's tears	P	Old Trail 13, lake side of Leonard's Bridge
Dicots	Zygophyll.	Tribulus terrestris	puncture vine	PV	Road B, near Dennis Martin site
Monocots	Cyper.	Cyperus difformis	variable flatsedge	LRV[1]	Searsville Lake
Monocots	Po.	Agrostis stolonifera	creeping bent grass	PV	Leonard's Bridge
Monocots	Po.	Arrhenatherum elatius	tall oat grass	PV	Lakefront road near town of Searsville site
Monocots	Po.	**Brachypodium sylvaticum +**	slender false brome	P	Sand Hill Road fence south of Main Gate
Monocots	Po.	Bromus catharticus	rescue grass	PV	San Francisquito Creek bed near Dennis Martin site
Monocots	Po.	Bromus stamineus	Chilean brome	P	Caretaker's house
Monocots	Po.	Bromus sterilis	poverty brome	PV	Shady areas, including Road C crossing of San Francisquito Creek
Monocots	Po.	**Ehrharta erecta +**	panic veldt grass	PV	Scrub, grasslands, woodland, forest, dry creekbed; spreading rapidly, impacts may

					become more important in future
Monocots	Po.	Hainardia cylindrica	thintail	PV	Behind field station at edge of brick patio, Bike Bowl
Monocots	Po.	Phalaris brachystachys	shortspike canarygrass	PV	Near Escobar Gate in annual grassland
Monocots	Po.	Piptatherum miliaceum	smilo grass	PV	North and south side of Leonard's Bridge

[1]This plant was noted in 2005 mounted in error on specimen sheet No. DH719375/JHT20180, *Cyperus erythrorhizos*, collected in 1980.

List 9. Potentially Serious Aliens Not Yet Present n=2

Cal-IPC http://www.cal-ipc.org/

Group	Family	Species as in TJM, 1993	Common Name	Comments
Monocots	Po.	Aegilops triuncialis	barbed goat grass	Established at Coyote Ridge; grassland, oak woodland
Monocots	Po.	Arundo donax	giant reed	Established in neighboring communities; riparian corridors

List 10. Rare, Threatened and/or Endangered n=10

California Department of Fish and Game. Natural Diversity Database. Oct., 2006. Special Vascular Plants, Bryophytes, and Lichens List] California Native Plant Society Inventory of Rare and Endangered Plants http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	CNPS List	Comments
Gymnosperms	Pin.	Pinus radiata[1]	Monterey pine	PV	1B.1	Planted at JRBP and naturalizing
Dicots	Api.	Perideridia gairdneri ssp. gairdneri	Gairdner's yampah	LRRS	4.2	Reported by H. Dengler to docent class of 1975. Herbarium team has never seen this species
Dicots	Aster.	Lessingia hololeuca	woolly-headed lessingia	PV	3	Common in several areas of the preserve. Late summer blooming
Dicots	Boragin.	Plagiobothrys chorisianus var. hickmanii	Hickman's popcornflower	PV	4.2	Bike Bowl area
Dicots	Brassic.	Arabis blepharophylla	coast rock cress	LRV	4.3	Vouchered by J. Thomas in 1984, collected in serpentine near Westridge fence. Herbarium team has never seen this species
Dicots	Malv.	Malacothamnus fasciculatus	chaparral mallow	PV	1B.2	Three individuals on Trail 12. Winter to early

						spring bloom into early summer
Dicots	Polemoni.	Linanthus ambiguus	serpentine linanthus	LRRS	4.2	Reported by Moeur. Herbarium team has never seen this species
Dicots	Thymelae.	Dirca occidentalis	western leatherwood	PV	1B.2	Common in woodland, many locations, documentation available. Begins blooming in December
Monocots	Lili.	Allium peninsulare var. franciscanum	peninsular onion	PV	1B.2	Serpentine soils. Type locality. Spring blooming
Monocots	Orchid.	Piperia michaelii	Michael's piperia	PV	4.2	Live oak woodland west of Road F

[1]See note following List 15 for *Pinus radiata*

List 11. Hybrids n=13 (not included in total taxa count)

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	Comments
Dicots	Boragin.	Amsinckia menziesii var. m. x A. m. var. intermedia	hybrid fiddleneck	PV	Grassland at Whiskey Hill gate
Dicots	Corn.	Cornus sericea ssp. s. x C. glabrata	hybrid dogwood	P	Reported by H. Dengler; no voucher specimens
Dicots	Fab.	Lupinus microcarpus var. densiflorus x L. nanus	hybrid lupine	LRRS	Reported by H. Dengler; no voucher specimens
Dicots	Fag.	Quercus agrifolia var. a. x Q. kelloggii	hybrid live & black oak	LRRS	Reported by H. Dengler; no voucher specimens
Dicots	Fag.	Quercus agrifolia var. a. x Q. wislizeni var. frutescens	hybrid live & interior live oak	LRRS	Reported by H. Dengler; no voucher specimens
Dicots	Fag.	Quercus berberidifolia x Q. lobata	hybrid scrub & valley oak	LRV	Specific location information not on herbarium label
Dicots	Fag.	Quercus douglasii x Q. durata	hybrid blue & leather oak	PV	Trail 15
Dicots	Fag.	Quercus douglasii x Q. lobata	hybrid blue & valley oak	LRV	Upper Trail 9
Dicots	Fag.	Quercus kelloggii x Q. wislizeni	oracle oak (hybrid)	LRV	Specific location information not on herbarium label
Dicots	Scrophulari.	Castilleja densiflora x	hybrid	PV	North-south band across

		C. rubicundula ssp. lithospermoides	owl's-clover		the serpentine, Area C
Dicots	Scrophulari.	Castilleja exserta x C. attenuata	hybrid owl's-clover	LRRS	Reported by H. Dengler; no voucher specimens
Dicots	Scrophulari.	Castilleja exserta x C. rubicundula ssp. lithospermoides	hybrid owl's-clover	LRRS	Reported by H. Dengler; no voucher specimens
Monocots	Po.	Elymus glaucus x E. multisetus	squirreltail hybrid	PV	Trail 9 in serpentine, Trail 11 near Fire Road E

List 12. Type Locality
(the particular site where the first collection was made and described)

Group	Family	Name as in TJM, 1993	Common Name	Reliability Code	Comments
Monocot	Lili.	Allium peninsulare var. franciscanum#	Franciscan onion	PV	Serpentine soils; type locality; spring blooming

#Indicates rare, threatened, and/or endangered

List 13. Rejected Taxa (R) n=26 (*non-native)
(not included in total taxa count)

Group	Family	Species as in TJM, 1993	Common Name	Comments
Dicots	Aster.	Lessingia filaginifolia	common corethrogyne	Voucher now identified as *L. hololeuca*
Dicots	Aster.	Lessingia tenuis	spring lessingia	Need an expert for these vouchers
Dicots	Brassic.	Barbarea vulgaris*	common winter cress*	Voucher now identified as *B. orthoceras*
Dicots	Brassic.	Descurainia sophia*	tansey mustard*	Collected outside JRBP
Dicots	Brassic.	Erucastrum gallicum*	erucastrum*	Voucher now identified as *Tropidocarpum gracile*
Dicots	Crassul.	Crassula aquatica	water pygmy-weed	Voucher now identified as *C. connata*
Dicots	Eric.	Arctostaphylos canescens var. canescens	hoary manzanita	Voucher material inadequate for identification
Dicots	Fab.	Acacia decurrens*	green wattle*	Vouchers now identified as *A. dealbata*
Dicots	Fag.	Quercus wislizeni var. wislizeni	interior live oak	Vouchers now identified as *Q. wislizeni* var. *frutescens* due to taxonomic changes
Dicots	Gentian.	Centaurium davyi	Davy's centaury	Vouchers now identified as *C. muehlenbergii*
Dicots	Hydrophyll.	Nemophila menziesii var.	baby blue-eyes	Vouchers now identified as *N. menziesii* var. *atomaria*

		menziesii		
Dicots	Orobanch.	Orobanche californica ssp. jepsonii	Jepson's broom-rape	Vouchers now identified as *O. vallicola* due to recent taxonomic changes
Dicots	Polemoni.	Gilia achilleifolia ssp. achilleifolia	California gilia	Vouchers now identified as *G. achilleifolia* ssp*. multicaulis*
Dicots	Portulac.	Claytonia parviflora ssp. viridis	claytonia	Vouchers now identified as *C. exigua* ssp*. exigua*
Dicots	Rhamn.	Rhamnus ilicifolia	holly-leaf redberry	Vouchers now identified as *R. crocea*
Dicots	Urtic.	Urtica urens*	dwarf nettle*	Voucher now identified as *Hesperocnide tenella*
Monocots	Junc.	Juncus mexicanus	Mexican rush	Voucher now identified as *J. patens*
Monocots	Lili.	Allium dichlamydeum	coastal onion	Vouchers now identified as *A. peninsulare* var*. franciscanum* due to recent taxonomic changes
Monocots	Po.	Agrostis capillaris*	colonial bent grass*	Vouchers now identified as *A. stolonifera*
Monocots	Po.	Eragrostis pilosa var. pilosa	pilose eragrostis	Voucher now identified as *E. pectinacea*
Monocots	Po.	Festuca pratensis*	meadow fescue*	Vouchers now identified as *F. arundinacea*
Monocots	Po.	Hordeum jubatum	foxtail barley	Voucher now identified as *Elymus multisetus*
Monocots	Po.	Leptochloa uninervia	Mexican sprangletop	Voucher now identified as *L. fascicularis*
Monocots	Po.	Melica geyeri	Geyer's onion grass	Voucher material inadequate for identification
Monocots	Po.	Phalaris lemmonii	Lemmon's canary grass	Voucher, now missing, evidently referred to another species
Monocots	Po.	Poa unilateralis	ocean-bluff bluegrass	Voucher now identified as *Koeleria macrantha*

List 14. Planted or Garden Escape Native Plants Not Indigenous to JRBP n=4

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	Comments
Gymnosperms	Pin.	Pinus radiata[1]	Monterey pine	PV	Planted and invasive
Dicots	Anacardi.	Rhus integrifolia	lemonadeberry	P	Planted just outside Goya Gate and has been seen invading near Trail 17 and Road F in recent years

Dicots	Eric.	Arctostaphylos sp.	manzanita	PV	One plant near Hermit Mine
Dicots	Scrophulari.	Keckiella antirrhinoides var. antirrhinoides	chaparral beardtongue	PV	Trail 12 near Mapache Gate

[1]See the following list for more information about this species

List 15. Invasive Exotic Trees and Shrubs n=11

These currently pose serious threats (*non-native ** native but not indigenous)

Cal-IPC http://www.cal-ipc.org/

Group	Family	Species as in TJM, 1993	Common Name	Reliability Code	Comments
Gymnosperms	Pin.	Pinus radiata**[1]	Monterey pine**	PV	Occasional in disturbed areas
Dicots	Anacardi.	Pistacia atlantica*	pistachio*	PV	West end of dam, Sand Hill Road fence, upper Trail 7
Dicots	Anacardi.	Rhus integrifolia**	lemonadeberry**	P	Near trail to Goya Gate; recent arrival
Dicots	Fab.	Acacia dealbata*	silver wattle*	PV	San Francisquito Creek banks, below Dennis Martin site, and along Sand Hill Road fence
Dicots	Fab.	Genista monspessulana*	French broom*	PV	Many locations and habitats
Dicots	Mor.	Ficus carica*	edible fig*	PV	Riparian, base of dam and Dennis Martin site
Dicots	Ole.	Olea europaea*	olive tree*	PV	Occasional in woodland and disturbed areas
Dicots	Ros.	Cotoneaster pannosa*	cotoneaster*	PV	Occasional in woodlands
Dicots	Ros.	Crataegus monogyna*	hawthorn*	PV	Occasional in woodlands
Dicots	Ros.	Pyracantha sp.*	pyracantha*	PV	Occasional in disturbed areas, Hermit Cabin site
Dicots	Simaroub.	Ailanthus altissima*	tree of heaven*	PV	Along Road B, Dennis Martin site

[1] Should *Pinus radiata* be managed as a pest or treated as "neo-native." Millar (1999) writes:

> If elements of the evolutionary model suggested here have validity, conservation and restoration approaches for *P. radiata* may well consider a different approach (Millar 1998b). That is, if *P. radiata* has long existed in small disjunct populations and these have repeatedly changed in location over the Californian coast in response to fluctuating Quaternary climates (i.e., a metapopulation model), then sites beyond *P. radiata*'s current distribution might be considered suitable habitat for conservation. These, I suggest, may be thought of as "neo-native". *Pinus radiata* has readily naturalized in many California coastal locations, including locations documented by the fossil record as recently occupied by the species and under similar climates. Many of these areas are within the present range of its long-time tree associates, *P. muricata* and cypresses (*Cupressus* spp.), as well as many shrubs and herbs. *Pinus radiata* thrives in many of these locations. Concern for *P. radiata* "displacing" other native species in these areas seems minor since these are historically native sites; they are plant communities within which *P. radiata* has existed in the recent past, and associated controlling factors (insects, pathogens) are likely still present. If the presence of *P. radiata* in these communities causes shifts in native plant diversities, these may reasonably be considered natural dynamics under conditions where *P. radiata* is present.

About the Herbarium Team

Toni Corelli has been a docent at JRBP since 1987. She has a BS degree in Botany from San Jose State University (SJSU), two years of graduate studies at SJSU, and is the curator of the Carl W. Sharsmith Herbarium at SJSU. She has written and/or collaborated on five books about the flora of the San Francisco Bay area. She has been active in the JRBP herbarium since 1996.

Paul Heiple joined the herbarium team in January of 2007. He is a geologist with a MS from the Colorado School of Mines. He has lived in New York, Colorado, Pennsylvania and California. He has been active in plant societies in those states. He enjoys restoration work at San Mateo County's Edgewood Park were he has volunteered for twelve years removing invasive plants.

Ann Lambrecht has been a docent at JRBP since 1975. She has a life-long interest in wildland plants, particularly those of the Bay Area, where she was born. She is retired after many years in the business world. She has been active in the herbarium since 2000.

John Rawlings was a member of the 2004 docent class. His class project was an identification guide to grasses expected to be encountered during the Spring wildflower walks from Escobar Gate. He as been active with the herbarium team since 2005.

Elizabeth Schwerer became a JRBP docent and joined the herbarium team in 2006. Her academic training is in applied probability and decision models, and she worked most recently at the U.S. Geological Survey's Center for Science Policy. Now she devotes most of her time to her young children.

Carol Zabel was a member of the 1981 docent class. She retired as a docent in 2004 and from the Herbarium team in 2008.

In addition to plants, plant specimens, and plant databases, the herbarium team routinely works on research and educational projects at JRBP:

- BIOSCI 96 Jasper Ridge Docent Training Class -- Cindy Wilber
- Comparative ecology and life history of chaparral shrub species -- David Ackerly
- Continuing Studies Classes:

  Bio 12 Wildflower Families of the Bay Area (Corelli/Mason)

  Bio 47 Native Shrubs, Trees, and Vines of the Santa Cruz Mountains (Corelli)

- Determination of the plant species composition of mammal exclosure plots -- Rodolfo Dirzo
- Determinants of the distribution and reproductive success of *Dirca occidentalis* -- William Graves
- Effects of fire on grassland species composition -- Jeffrey Dukes
- Feasibility study of serpentine habitat creation -- Tim Bonebrake
- Herbivory and competition between native and exotic plant species -- Rodolfo Dirzo, Eduardo Mendoza, Yolanda Cachú
- Jasper Ridge global change experiment (JRGCE) (vegetation determination) -- Nona Chiariello
- Camera-trap monitoring of large and medium-sized mammals -- Rodolfo Dirzo, Yolanda Cachú, Eduardo Mendoza, Luis Abdala
- Mapping and eradication of newly invasive plants and other invasive plants at JRBP -- *Dittrichia graveolens*, *Erechtites minima* and *Parentucellia viscosa* -- Herbarium Team
- Reference surveys for Stanford Foothills Restoration Project -- Sean Anderson, Paulo Oliveira
- Restoration, monitoring, student & public outreach in San Francisquito Creek Watershed -- Ryan Navratil
- Resource inventory of Boething Treeland Nursery after vacated by Boething -- Herbarium Team
- Resurvey of preinvasion serpentine vegetation plots -- Cristina Salvador
- Small mammal diversity and density across habitats -- Rachel Adams, Hillary Young
- Taxonomic study of the genus *Orobanche* of the U.S. -- Alison Colwell

Abbreviations and Symbols:

Angio – Angiosperms
Cal-IPC – California Invasive Plant Council
Dicots – Dicotyledons
GIS – Global information system
GPS – Global positioning system
JRBP – Jasper Ridge Biological Preserve
LRRS - Last Reported by a Reliable Source. Plant reported by reliable source, herbarium team has not observed
LRV - Last Reported Vouchered. Plant vouchered, herbarium sheet exists but herbarium team has not observed it in past 10 or so years
Monocots – Monocotyledons
P - Present. Plant present, herbarium team has observed and verified recently; plant not vouchered
PV - Plant Vouchered. Plant present and vouchered, herbarium team has observed within the last 10 or so years
spp. – more than one species
ssp. - subspecies
TJM – The Jepson Manual 1993
var. – variety

Symbols:
One star (*) designates a non-native plant, unless otherwise noted
Two stars (**) designates a California native plant not indigenous to JRBP
Pound sign (#) indicates a rare and/or endangered plant

Appendices

A. Aquatic Plants Archive various documents
B. Grasses Archive various documents LINK BROKEN
C. Oak Archive various documents
D. JRBP Plant List Database 2008 selected fields for all 880 entries
http://spreadsheets.google.com/ccc?key=pTmNxXEfn25YvBY11VV8YSQ&hl=en

Bibliography with links to online text

Armstrong, JK.; Huenneke, LF. 1993. Spatial and Temporal Variation in Species Composition in California Grasslands: The Interaction of Drought and Substratum. In The Vegetation of Ultramafic (Serpentine) Soils, Proceedings of the First Int. Conference on Serpentine Ecology. Andover, Hampshire: Intercept Ltd. PDF extract

Bocek, B.; Reese, E. 1992. Land Use History of Jasper Ridge Biological Preserve. Research Report No. 8.

Brenzel, KN. 2001. Sunset Western Garden Book, 7th edition. Sunset Publishing Corporation, Menlo Park, California.

California Dept. of Fish and Game. Natural Diversity Database. Oct., 2006. Special Vascular Plants, Bryophytes, and Lichens List.

California Native Plant Society Inventory of Rare and Endangered Plants. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

CalPhotos: A database of photos of plants, animals, habitats and other natural history subjects. BSCIT, University of California, Berkeley. http://calphotos.berkeley.edu/

Consortium of California Herbaria. http://ucjeps.berkeley.edu/consortium/about.html

Cooper, W. 1922. The broad-sclerophyll vegetation of California: an ecological study of chaparral and its related communities. Washington, D.C.: Carnegie Institution of Washington.

Corelli, T.; Porter, R. 1999. Jasper Ridge Biological Preserve Vascular Plant List, Stanford University.

Corelli, T. 2004. Plants that like hosts. JRBP Field Notes June 2004:6-8. Includes location, habitat, flowering time for Orobanches, etc.

Corelli, T. 2004. Willows. JRBP Field Notes March 2004:6-8. Includes locations.

Corelli, T. 2005. Step up to the barberry. JRBP Field Notes February:6. LINK BROKEN

Corelli, T. 2005. Woody Plants at Jasper Ridge. JRBP Field Notes December:4-6. LINK BROKEN

Corelli, T. 2005. An unwanted plant: Parentucellia viscosa. JRBP Field Notes June:6. LINK BROKEN

Dengler, H. 1975. A List of Vascular Plants of Jasper Ridge Biological Preserve. 29 p.

Dengler, H. n.d. [Being an annotated copy of Thomas (1961) Flora of the Santa Cruz Mountains of California].

Dengler, H. 1983 (?) [Being an annotated copy of Thomas (1961) Flora of the Santa Cruz Mountains of California. Handwritten note on first blank page: "JR = read for Jasper Ridge according to Mr. Herb

Dengler, 1973-4." This book bears the plate "Stanford University Department of Biological Sciences, Teaching and Reference Herbarium," with John Hunter Thomas autograph].

Dengler, H. 1984. [Additions to the 1973-4 Plant List].

DiTomaso, J; Healy, E. 2006. Weeds of California and other Western States. University of California Department of Agriculture and Natural Resources.

Ertter, B. 1997. Annotated Checklist of the East Bay Flora: Native and Naturalized Plants of Alameda and Contra Costa Counties, CA.

Ertter, B. 2002. The Flowering Plants and Ferns Of Mount Diablo California. California Native Plant Society, Sacramento, California.

Griffin, J. 1981. [List of all species in sandstone plots in blue oak woodland at JRBP] .

Grundmann, A. 1983. Grasses found in the Jasper Ridge Biological Preserve . . . species identified ca. 1973 by H. G. Dengler. (sic)

Hickman, JC. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, California.

Hopkinson, P. et al. 2008. Italian ryegrass: A New Central California Dominant? Fremontia 36 (2008): 20-24.

Jasper Ridge Biological Preserve. 2000 to 2007. Annual Report.

Jasper Ridge Biological Preserve. 2005. Sector Map Book of Jasper Ridge Biological Preserve.

Jasper Ridge Biological Preserve. Herbarium Team. 2008. http://spreadsheets.google.com/ccc?key=pTmNxXEfn25YvBY11VV8YSQ&hl=en&pli=1 [Excel spreadsheet]. Selected fields for all 880 entries.

Jepson Flora Project. Jepson Online Interchange for California Floristics. http://ucjeps.berkeley.edu/interchange.html

Jewett, EK. 2005. Documenting Plant Diversity: Jasper Ridge's Herbarium. Views Online.

Macdonald, IAW. et al. 1988. Introduced Species in Nature Reserves in Mediterranean-type Climatic Regions of the World. Biological Conservation 44: 37-66.

Macklin, E. 1987. A Partial List of the Flora seen with Herb Dengler on May 14, 1987.

Macklin, E. 1988. A Partial List of Vascular Plants to be Expected Early in April on the Wildflower Loop from Escobar Gate.

McNaughton, SJ. 1968. Structure and Function in California Grasslands. Ecology 49:962-972. Methods and results. PDF extract http://trees.stanford.edu/PDF/mcnaughton1968.pdf

McNeal, DW. 1992. New taxa and combinations in western North American Liliaceae. Phytologia 73:

307-311.

McNeal, DW; Ownbey, M. 1977. Status of Allium-Serratum Liliaceae and Description of a New Species. Madrono 24: 24-29.

Millar, CI. 1999. Evolution and biogeography of Pinus radiata, with a proposed revision of its quaternary history. New Zealand Journal of Forestry Science 29:335-365.

Moeur, JC. 1947. An ecological and taxonomic survey of the spermatophytes of Jasper Ridge. Stanford University thesis.

Mooney, HA. 1978-1979. Jasper Ridge Plant Communities [Lecture Notes]. Reference to seven oaks at JR and specific reference to Q. dumosa.

Porter, D. 1962. The vascular plants of the Jasper Ridge Biological Experimental Area of Stanford University. Dept. Biol. Sciences. Research Report no. 2. Index.

Porter, R. 2000. John Thomas's loans from California Academy of Science. Memorandum to Philippe Cohen.

Porter, R.; Corelli, T. 1998. Jasper Ridge Biological Preserve Vascular Plant List.

Porter, R.; Corelli, T. 2002. Vascular Plant List Jasper Ridge Biological Preserve, Stanford University. 2nd ed.

Rawlings, J. 2006. Preliminary Outline of Grass floristics and grassland ecological studies at Jasper Ridge Biological Preserve, Stanford University, San Mateo County, CA.

Rawlings, J. 2005. Willow identification guide: leaf comparison and variation.

Rosatti, TJ. 2005. Jepson Manual Update: Attempting to Quantify the Changes Expected for TMJ2. The Jepson Globe 16, no. 2: 1.

Springer, M. 1932. A floristic and ecologic study of Jasper Ridge. Stanford University thesis.

Stanford Magazine, Spring/Summer 1975. Jasper Ridge: Stanford's Biological Preserve.

Thomas, JH. 1961. Flora of the Santa Cruz Mountains of California, A Manual of the Vascular Plants. Stanford University Press, Stanford, California.

Thomas, JH. 1961. The history of botanical collecting in the Santa Cruz Mountains of Central California. Contributions from the Dudley Herbarium 5:147-168.

Thomas, JH. 1971. Additions to the Flora of Jasper Ridge. Stanford University. Jasper Ridge Biological Experimental Area, Addendum to Research Report, No. 2. [last 3 pages of D. Porter's plant list].

Thomas, JH. 1974. Some Common Spring Plants of the Grasslands on Jasper Ridge.

Thomas, JH. 1975. List of Vascular Plants of a Serpentine Area at The Southern End of The San Francisco Watershed Reserve, San Mateo County.

Thomas, JH. 1993. The JRBP Teaching and Reference Collection of Vascular Plants. Views Winter:7.

Timby, S. 1998. The Dudley Herbarium: its origin, fate, and legacy at Stanford. Sandstone and Tile (22,4): 1-15.

Ward, Bob. n.d. All Plant List by Bob Ward. This is an extensive source of 719 names compiled from earlier lists and used by Ruth Porter in developing her list. Ward's list also includes *Q. dumosa* (cf. Mooney, 1979).

Weiss, SB. 1999. Cars, cows, and checkerspot butterflies: nitrogen deposition and management of nutrient-poor grasslands for a threatened species. Conservation Biology 13:1476-1486. JSTOR Stable URL: http://links.jstor.org/sici?sici=0888-8892(199912)13:6<1476:CCACBN>2.0.CO;2-L

Weiss, SB. 2002. National Fish and Wildlife Foundation Edgewood Final Report. http://www.eparks.net/vgn/images/portal/cit_609/14232736Edgewood-NFWFPart2.pdf

Zabel, C. 2001-2006. Trail Notes, excerpted from JRBP Field Notes.

Zabel, C. 1999. Plant regrowth in the controlled burn.

Zabel, C. 2002. Plant survey of Hermit's Cabin site and area bordered by Road F and trail to Goya Gate. Note *Crataegus monogyna* later identified as *C. laevigata* at this site.

Zabel, C. 2003. Index for the Duncan Porter Report, 1962, and Additions, JH Thomas, 1971.

Zabel, C. 2003. Plants found and identified in JRBP by Carol Zabel/Ann Lambrecht since my last list of 9/6/02. Note *Juncus bufonius* var. *occidentalis* later identified as *J. b*. var. *bufonius*.

Zabel, C. 2003. Plants growing on serpentine areas which need to be protected.