

Conservation ecology of rare plants within complex local habitat networks

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SUPPLEMENTARY TABLE 1 Rare plants in Napa County documented by the California Natural Diversity Database (CNDDDB, 2006; n = 55). According to the California Department of Fish and Game and NatureServe's element ranking system (CNDDDB, 2013a,b), each of these plants is considered to be at risk of extinction at the global or state level.

No.	Species	Status
1	<i>Amorpha californica</i> var. <i>napensis</i>	Imperilled
2	<i>Amsinckia lunaris</i>	Imperilled
3	<i>Arctostaphylos manzanita</i> ssp. <i>elegans</i>	Imperilled
4	<i>Astragalus claranus</i>	Critically imperilled
5	<i>Astragalus rattanii</i> var. <i>jepsonianus</i>	Vulnerable
6	<i>Astragalus tener</i> var. <i>tener</i>	Imperilled
7	<i>Atriplex joaquinana</i>	Imperilled
8	<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>	Imperilled
9	<i>Brodiaea leptandra</i>	Imperilled
10	<i>California macrophylla</i>	Imperilled
11	<i>Castilleja affinis</i> ssp. <i>neglecta</i>	Critically imperilled
12	<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i>	Imperilled
13	<i>Ceanothus confusus</i>	Imperilled
14	<i>Ceanothus divergens</i>	Imperilled
15	<i>Ceanothus purpureus</i>	Imperilled
16	<i>Ceanothus sonomensis</i>	Imperilled
17	<i>Centromadia parryi</i> ssp. <i>parryi</i>	Critically imperilled
18	<i>Chloropyron molle</i> ssp. <i>molle</i>	Critically imperilled
19	<i>Cryptantha dissita</i>	Imperilled
20	<i>Downingia pusilla</i>	Imperilled
21	<i>Erigeron greenii</i>	Imperilled
22	<i>Eriogonum nervulosum</i>	Imperilled
23	<i>Fritillaria pluriflora</i>	Vulnerable
24	<i>Harmonia hallii</i>	Imperilled
25	<i>Hesperolinon bicarpellatum</i>	Imperilled
26	<i>Hesperolinon breweri</i>	Imperilled
27	<i>Hesperolinon drymarioides</i>	Imperilled
28	<i>Hesperolinon serpentinum</i>	Imperilled
29	<i>Juglans hindsii</i>	Critically imperilled
30	<i>Lasthenia conjugens</i>	Critically imperilled
31	<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	Imperilled
32	<i>Layia septentrionalis</i>	Imperilled
33	<i>Legenere limosa</i>	Imperilled
34	<i>Leptosiphon jepsonii</i>	Imperilled

35	<i>Lilaeopsis masonii</i>	Imperilled
36	<i>Limnanthes vinculans</i>	Critically imperilled
37	<i>Lupinus sericatus</i>	Imperilled
38	<i>Monardella villosa</i> ssp. <i>globosa</i>	Imperilled
39	<i>Navarretia leucocephala</i> ssp. <i>bakeri</i>	Imperilled
40	<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i>	Critically imperilled
41	<i>Navarretia rosulata</i>	Imperilled
42	<i>Penstemon newberryi</i> var. <i>sonomensis</i>	Imperilled
43	<i>Plagiobothrys strictus</i>	Critically imperilled
44	<i>Poa napensis</i>	Critically imperilled
45	<i>Polygonum marinense</i>	Critically imperilled
46	<i>Rhynchospora californica</i>	Critically imperilled
47	<i>Sidalcea hickmanii</i> ssp. <i>viridis</i>	Imperilled
48	<i>Sidalcea oregana</i> ssp. <i>hydrophila</i>	Imperilled
49	<i>Streptanthus brachiatus</i> ssp. <i>brachiatus</i>	Critically imperilled
50	<i>Streptanthus hesperidis</i>	Imperilled
51	<i>Streptanthus morrisonii</i>	Imperilled
52	<i>Symphyotrichum lentum</i>	Imperilled
53	<i>Trifolium amoenum</i>	Critically imperilled
54	<i>Trifolium hydrophilum</i>	Imperilled
55	<i>Viburnum ellipticum</i>	Imperilled

SUPPLEMENTARY TABLE 2 Habitat/land-use types documented in Napa County by Thorne et al. (2004) and the total area (km²) occupied by each type. Associations between habitat types and rare plants are outlined in terms of the total number of rare plant taxa that occur within each habitat, the proportion of each habitat occupied by rare plants, the total area (km²) and proportion of each habitat occupied by rare plant hotspots, and the specificity-weighted richness index (SWRI) for each habitat. The numbers preceding each habitat type are used throughout the article, with abbreviated habitat names, and for identification purposes in figures.

No.	Habitat type	Area (km ²)	No. of rare spp. present	% area occupied by rare spp.	Area occupied by hotspots (km ²)	% area occupied by hotspots	SWRI
1	Agriculture*	260.95					
2	Blue Oak Alliance	178.44	27	5.73	2.27	1.27	1.51
3	California Annual Grasslands Alliance	158.82	40	7.55	3.39	2.14	5.24
4	Chamise Alliance	124.90	27	7.75	1.90	1.52	1.92
5	Water*	116.61					
6	Mixed Oak Alliance	116.41	30	14.31	2.32	1.99	1.97
7	Leather Oak–White Leaf Manzanita–Chamise Xeric Serpentine NFD Super Alliance	109.16	21	9.51	2.84	2.60	1.25
8	Urban or Built-up*	107.11					
9	Coast Live Oak–Blue Oak–(Foothill Pine) NFD Association	106.76	23	14.45	1.02	0.95	1.33
10	California Bay–Madrone– Coast Live Oak–(Black Oak Big- Leaf Maple) NFD Super Alliance	74.01	23	12.29	1.73	2.33	1.93
11	Interior Live Oak–Blue Oak–(Foothill Pine) NFD Association	73.17	11	3.23	0.68	0.93	0.46
12	Douglas-fir Alliance	70.23	21	23.00	3.06	4.36	1.32
13	Coast Live Oak Alliance	53.34	25	9.12	0.43	0.82	2.06
14	Upland Annual Grasslands & Forbs Formation	49.16	33	21.31	2.10	4.28	3.72
15	Scrub Interior Live Oak–Scrub Oak–(California Bay– Flowering Ash–Birch Leaf Mountain Mahogany–Toyon– California Buckeye) Mesic East County NFD Super Alliance	44.69	14	3.73	0.17	0.40	0.56
16	Douglas-fir–Ponderosa Pine Alliance	37.21	17	45.46	3.99	10.74	0.72
17	Mixed Manzanita–(Interior Live Oak–California Bay– Chamise) West County NFD Alliance	35.14	25	28.43	3.04	8.66	1.68
18	White Leaf Manzanita–Leather Oak–(Chamise– <i>Ceanothus</i>	32.39	24	13.02	1.54	4.75	1.47

	spp. (Foothill Pine)) Xeric Serpentine NFD Super Alliance						
19	California Bay- Leather Oak–(<i>Rhamnus</i> spp.) Mesic Serpentine NFD Super Alliance	29.04	22	17.89	1.42	4.89	1.29
20	Chamise–Wedgeleaf Ceanothus Alliance	28.63	12	2.73	0.27	0.95	0.51
21	Knobcone Pine Alliance	23.92	20	31.47	1.70	7.14	1.18
22	Valley Oak–(California Bay–Coast Live Oak–Walnut–Ash) Riparian Forest NFD Association	23.15	26	15.36	0.63	2.76	2.04
23	Interior Live Oak Alliance	21.43	9	3.65	0.22	1.07	0.33
24	Leather Oak–California Bay– <i>Rhamnus</i> spp. Mesic Serpentine NFD Alliance	17.79	22	9.71	0.14	0.82	1.28
25	Saltgrass–Pickleweed NFD Super Alliance	14.45	9	33.24	1.29	8.92	1.78
26	Sclerophyllous Shrubland Formation	13.26	7	4.86	0.06	0.49	0.52
27	Valley Oak Alliance	11.72	20	7.79	0.09	0.81	1.08
28	Coast Redwood–Douglas-fir/California Bay NFD Association	11.65	15	26.35	0.36	3.09	0.69
29	Black Oak Alliance	10.39	16	25.46	1.36	13.17	0.92
30	McNab Cypress Alliance	9.64	13	9.33	0.26	2.74	0.83
31	Serpentine Grasslands NFD Super Alliance	8.56	19	12.13	0.19	2.29	1.08
32	Sargent Cypress Alliance	8.27	9	4.52	0.16	2.03	0.46
33	Foothill Pine Alliance	7.58	17	29.64	0.67	8.94	0.90
34	Vacant*	7.22					
35	Rock Outcrop	6.84	20	18.43	0.22	3.26	1.13
36	Unknown	4.70	16	16.62	0.26	5.67	0.85
37	Oregon White Oak Alliance	4.58	12	13.33	0.14	3.13	0.57
38	White Alder (Mixed Willow–California Bay–Big-Leaf Maple) Riparian Forest NFD Association	3.91	15	25.22	0.23	5.98	0.88
39	Foothill Pine/Mesic Non-serpentine Chaparral NFD Association	3.80	6	5.35	0.02	0.72	0.26
40	Canyon Live Oak Alliance	2.67	14	38.78	0.38	14.33	0.91
41	Winter-Rain Sclerophyll Forests & Woodlands Formation	2.50	5	4.87	0.008	0.34	0.45
42	Mixed Willow Super Alliance	2.19	14	16.38	0.19	9.09	0.68
43	Valley Oak–Fremont Cottonwood–(Coast Live Oak) Riparian Forest NFD Association	2.13	7	9.58	0.03	1.73	1.09

44	Sparse California Juniper–Canyon Live Oak–California Bay–California Buckeye/Steep Rock Outcrop NFD Alliance	1.94	0	0.00	0.00	0.00	0.00
45	Eucalyptus Alliance	1.65	9	6.90	0.03	2.24	1.08
46	Riverine, Lacustrine, and Tidal Mudflats	1.57	4	26.83	0.001	0.11	0.25
47	Coast Redwood Alliance	1.31	3	14.62	0.00	0.00	0.14
48	(<i>Carex</i> spp.– <i>Juncus</i> spp.–Wet Meadow Grasses) NFD Super Alliance	1.14	14	30.38	0.04	3.79	1.07
49	(Bulrush–Cattail) Fresh Water Marsh NFD Super Alliance	1.09	11	18.23	0.02	2.67	2.24
50	Perennial Bunchgrass Restoration Sites	1.03	5	13.93	0.08	7.77	0.27
51	Tanbark Oak Alliance	0.99	8	34.62	0.24	24.75	0.29
52	Brewer’s Willow Alliance	0.96	11	23.63	0.08	8.35	0.47
53	Ponderosa Pine Alliance	0.68	7	47.97	0.19	28.03	0.26
54	Serpentine Barrens	0.20	3	32.46	0.05	27.41	0.21
55	Coyote Brush–California Sagebrush–(Lupine spp.) NFD Super Alliance	0.17	0	0.00	0.00	0.00	0.00
56	<i>Lotus scoparius</i> Alliance (post-burn)	0.12	0	0.00	0.00	0.00	0.00
57	Sparse Bush Lupine/Annual Grasses/Rock Outcrop NFD Alliance	0.02	0	0.00	0.00	0.00	0.00
58	Sugar Pine–Canyon Oak NFD Association	0.01	1	100.00	0.00	0.00	0.02
59	California Juniper Alliance	0.01	0	0.00	0.00	0.00	0.00

*Human-related land uses were excluded from the analysis.

References

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