

ESTERO AMERICANO PRESERVE HERBARIUM BOOK



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Sonoma Land Trust

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And with support from:

Gold Ridge Resource Conservation District
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SUMMARY

This herbarium book contains plant specimens collected from the Estero Americano Preserve, located near Bodega, California, from May through June 2009. This project arose out of a coastal prairie plant identification training and subsequent grassland monitoring project that was designed to evaluate the effectiveness of cattle grazing for coastal grassland enhancement. Specimens collected were pressed, verified for identification, labeled and scanned, so that future participants working on the monitoring project will have a helpful aid for noting species present at the Preserve.

ACKNOWLEDGEMENTS

Many individuals contributed to the success of the grassland monitoring project and herbarium book effort. In particular: Noelle Johnson and Brittany Heck (Gold Ridge RCD) located and marked the sampling plots and collected numerous plant specimens; Rebecca Crowe (Environmental Consultant), Liz Parsons and Michael Hogan (CNPS Milo Baker Chapter) supported the monitoring project and helped locate and identify many of the more obscure species; Bob Neale, Tony Nelson, Shanti Wright and Brook Edwards (SLT staff) participated in the training and monitoring; Dr. Caroline Christian (SSU) orchestrated the entire project, and Karissa Westphal spent countless hours preparing the samples for this book.

ESTERO AMERICANO PRESERVE

The Sonoma Land Trust's Estero Americano Preserve is a scenic and biologically diverse 127-acre property located near the town of Bodega along the Estero Americano, tidal estuary that extends from Valley Ford to the Pacific Ocean. The Preserve was acquired in 1997 and 2001 in partnership with California State Coastal Conservancy and the Sonoma County Agricultural Preservation and Open Space District. The Preserve was purchased with the goal of protecting the coastal estuary, upland environments and other sensitive resources; allowing for restoration of habitat areas; and providing limited public access.



Sisyrrinchium bellum (photo: Noelle Johnson)

COASTAL GRASSLAND ASSESSMENT

A 2007 coastal grassland assessment by local consulting botanists identified much of the grassland area of the Preserve as coastal prairie. Coastal prairie is a perennial-grass dominated community with at least 10-15% relative cover of native grasses and forbs. Some of the native plant species found on the Preserve include: California oatgrass, purple needlegrass, tufted hairgrass, junegrass, lupine, harlequin lotus, early blue violet, Douglas's iris, and California blackberry. These plant species persist among non-native annual and perennial grasses and forbs that arrived in the area some years ago.

CATTLE GRAZING FOR COASTAL PRAIRIE ENHANCEMENT

Coastal grassland systems are threatened by shrub and tree encroachment, invasion and dominance by non-native annual and perennial grasses, and habitat loss due to housing development. Management activities such as mowing, grazing and prescribed burning can mimic altered disturbance regimes, control brush encroachment and the negative impacts of non-native species as well as promote native species. Grazing is often the most economical, practical and reliable method for managing grasslands at a large scale.



Cirsium quercetorum (photo: Shanti Wright)

Drawing on previous research across California grassland ecosystems, SLT is working under the assumption that livestock grazing will provide benefits to native flora found in the Estero grasslands by reducing the biomass and cover of exotic grasses, such as wild oats (*Avena* spp.) and brome grasses (*Bromus* spp.). Central to this management assumption is that native species are limited by competition with exotic grasses, and that properly-timed grazing would decrease exotic grass cover and biomass and increase the abundance of native species.

PARTNERSHIPS

To better understand the role of livestock grazing and other management activities at the Estero, SLT is working with multiple partners to assess the coastal grasslands, improve grazing infrastructure, and develop plans for grazing management and ecological monitoring for the coastal prairie grassland found on the property. The State Coastal Conservancy (SCC), Gold Ridge Resource Conservation District (RCD) the Natural Resources Conservation Service (NRCS), and the U.S. Fish and Wildlife Service (USFWS) have provided funding and technical assistance for coastal grassland management and water quality enhancement projects.



Calochortus tolmiei
(photo: Shanti Wright)

GRAZING PLAN AND GRASSLAND MONITORING PLAN

Gold Ridge RCD has generously supported SLT with the development of both a grazing management plan and a grassland monitoring plan to guide and track livestock management activities at the Estero Americano Preserve for years to come. Certified Rangeland Manager Lisa Bush is part of a team assessing the Preserve and determining grassland production values and appropriate stocking levels for the Preserve. Dr. Caroline Christian is taking a lead role in developing the grassland monitoring plan to evaluate the effectiveness of cattle grazing in achieving SLT's conservation goals for the Preserve. Livestock are managed by local operator Joe Pozzi, recently honored with the Farm Bureau's first Luther Burbank Conservation Award for his efforts to protect the county's natural resources.

These plans set clear management goals and provide an opportunity to manage the property adaptively based on information from the monitoring program. The grazing management and monitoring plans are aimed at highlighting conservation values, such as the preservation of native species, healthy soils, and water quality, while at the same time supporting a working landscape that promotes historical uses of the land.

GRASSLAND MONITORING PROJECT

During this past fall (2008) and spring, SLT worked with several partner organizations to collect data for the first year of the monitoring study. Members of the California Native Plant Society (CNPS), Gold Ridge RCD staff, and Sonoma State University interns and faculty worked together to measure various aspects of the grassland vegetation at 28 1m² permanent locations throughout the preserve. Examples of the variables monitored include: percent cover and frequency and richness (number) of all native and exotic plant species. Measurement of these variables will help to provide a more complete picture about the health of the grasslands through time and help SLT staff determine if invasive plant species like velvet grass are increasing or decreasing in abundance.



Viola adunca (photo: Shanti Wright)



Triteleia laxa

(photo: Noelle Johnson)

BASELINE DATA

The 2009 data shows that the Estero has a phenomenal amount of native perennial grass, rush and sedge species which together comprise on average over 20% of the vegetation cover in the grasslands. During the spring, tall stands of California hairgrass (*Despachampsia californica*), purple needlegrass (*Nassella pulchra*), and California brome (*Bromus carinatus*) undulate across the hillsides as coastal breezes sweep in from the Estero. Some notable native wildflowers also found in the spring monitoring this year include bulbs, such as ground brodiaea (*Brodiaea terrestris*), blue-eyed grass (*Sisyrinchium bellum*), and pussy ears (*Calochortus tolmiei*), and forbs, such as California acaena (*Acaena pinnatifida*), lupine (*Lupinus variicolor*), and a multitude of clovers (*Trifolium* sp.).

Although the native grasses, sedges and rushes are abundant, native annual and perennial forbs – i.e. broad-leaved plants – were virtually absent at most of the sites sampled. Instead, exotic species, such as English plantain and rough cat’s ears, were most abundant in the plots. These results suggest that management efforts on the property should be aimed at preserving and enhancing the native perennial grasses, rushes and sedges.

EXOTIC SPECIES

As with all grasslands found throughout California, exotic grasses – both perennial and exotic dominate the Estero grasslands. Overall, 80% of the grassland is covered by exotic species, mostly annual grasses. Although this number may seem high to those unfamiliar with grasslands, grassland ecosystems have been hit hard by invasive species, leaving little room for native plant species to thrive. Of particular concern are exotic perennial grasses, especially velvet grass, which spreads rapidly in coastal grasslands. Velvet grass is a growing concern along the coast and forms dense stands in portions of the preserve. The monitoring program is designed to look at several noxious grassland weeds and to detect the arrival of new exotic species.

EDUCATIONAL TOURS

The activities described above are the foundation for educational “science outings” and other botanizing tours aimed to highlight the significance of coastal grasslands and the native species contained within them. This spring (2009) SLT collaborated with Milo Baker CNPS to provide a coastal grassland hike, which was oversubscribed and wildly popular – a testament to the public’s interest and enthusiasm for California’s grasslands.

This summary was prepared by Dr. Caroline Christian, faculty with the Environmental Studies and Planning Department at Sonoma State University, in collaboration with Shanti Wright, Stewardship Project Manager for the Sonoma Land Trust, August 2009. The herbarium book is a work in progress that will expand over time. For updates to this document, or for additional information about vegetation management activities occurring at the Estero Americano Preserve, please contact Sonoma Land Trust, at: (707) 526-6930.



Iris douglasiana
(photo: Shanti Wright)

GROUP	FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	PAGE #
FERNS AND ALLIES					
	Blechnaceae	<i>Woodwardia fimbriata</i>	giant chain fern	yes	
	Dennstaedtiaceae	<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern	yes	33
	Dryopteridaceae	<i>Polystichum munitum</i>	western sword fern	yes	34
GYMNOSPERMS					
	Cupressaceae	<i>Cupressus macrocarpa</i>	Monterey cypress	no	
	Pinaceae	<i>Pinus muricata</i>	Monterey pine	no	
ANGIOSPERMS/DICOTS					
	Anacardiaceae	<i>Toxicodendron diversilobum</i>	western poison oak	yes	
	Apiaceae	<i>Conium maculatum</i>	poison hemlock	no	11
		<i>Daucus pusillus</i>	rattlesnake weed	yes	12
		<i>Heracleum lanatum</i>	cow parsnip	yes	
		<i>Ligusticum apiifolium</i>	celeryleaf licorice-root	yes	
		<i>Lomatium</i> sp.	lomatium	yes	
		<i>Sanicula crassicaulis</i>	Pacific sanicle	yes	13
		<i>Torilis nodosa</i>	knotted hedge-parsely	no	
	Asteraceae	<i>Achillea millefolium</i>	yarrow	yes	14
		<i>Anaphalis margaritacea</i>	pearly everlasting	yes	
		<i>Artemisia douglasiana</i>	mugwort	yes	15
		<i>Aster chilensis</i>	creeping aster	yes	
		<i>Baccharis pilularis</i>	coyote brush	yes	16
		<i>Bellis perennis</i>	English daisy	no	17
		<i>Carduus pycnocephalus</i>	Italian thistle	no	18
		<i>Chamomilla suaveolens</i>	pineapple weed	no	19
		<i>Cirsium quercetorum</i>	brownie thistle	yes	20
		<i>Cirsium vulgare</i>	bull thistle	no	21
		<i>Filago gallica</i>	narrowleaf cottonrose	no	22
		<i>Gnaphalium purpureum</i>	cudweed	yes	23
		<i>Hemizonia congesta</i> ssp. <i>congesta</i>	hayfield tarweed	yes	
		<i>Hypochaeris glabra</i>	smooth cat's-ear	no	
		<i>Hypochaeris radicata</i>	rough cat's-ear	no	24
		<i>Madia gracilis</i>	slender tarweed	yes	
		<i>Microseris acuminata</i>	silverpuffs	yes	25
		<i>Psilocarphus tenellus</i> var. <i>tenellus</i>	woolly marbles	yes	
		<i>Sonchus asper</i> ssp. <i>asper</i>	prickly sow thistle	no	
		<i>Wyethia</i> sp.	mules ears	yes	
	Boraginaceae	<i>Myosotis discolor</i>	changing forget-me-not	no	26
	Caprifoliaceae	<i>Lonicera involucrata</i> var. <i>ledebourii</i>	twinberry	yes	27
	Caryophyllaceae	<i>Cerastium glomeratum</i>	mouse-ear chickweed	no	28
		<i>Silene gallica</i>	windmill pink	no	31
		<i>Spergularia rubra</i>	red sandspurry	no	
	Convolvulaceae	<i>Calystegia collina</i> ssp. <i>collina</i>	coast range false bindweed	yes	29
		<i>Convolvulus arvensis</i>	bindweed	no	30
	Crassulaceae	<i>Dudleya farinosa</i>	powdery liveforever	yes	
	Cucurbitaceae	<i>Marah oreganus</i>	coast man-root	yes	32
	Fabaceae	<i>Lotus angustissimus</i>	slender lotus	no	
		<i>Lotus corniculatus</i>	birdfoot trefoil	no	35
		<i>Lotus formosissimus</i>	harlequin lotus	yes	
		<i>Lotus micranthus</i>	lotus	yes	36
		<i>Lotus purshianus</i> var. <i>purshianus</i>	Spanish clover	yes	
	Fabaceae	<i>Lotus wrangelianus</i>	calf lotus	yes	
		<i>Lupinus bicolor</i>	miniature lupine	yes	37

GROUP	FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	PAGE #
		<i>Lupinus variicolor</i>	lupine	yes	38
		<i>Lupinus microcarpus</i> var. <i>microcarpus</i>	chick lupine	yes	
		<i>Trifolium albopurpureum</i> var. <i>dichotomum</i>	clover	yes	
		<i>Trifolium barbigerum</i> var. <i>barbigerum</i>	bearded clover	yes	
		<i>Trifolium campestre</i>	hop clover	no	
		<i>Trifolium dubium</i>	little hop clover	no	39
		<i>Trifolium glomeratum</i>	clustered clover	no	
		<i>Trifolium gracilentum</i>	pinpoint clover	yes	40
		<i>Trifolium subterraneum</i>	subterranean clover	no	41
		<i>Trifolium wormskioldii</i>	cows clover	yes	42
		<i>Vicia sativa</i>	vetch	no	43
	Geraniaceae	<i>Erodium cicutarium</i>	red-stemmed filaree	no	44
		<i>Erodium moschatum</i>	musky stork's bill	no	
		<i>Geranium dissectum</i>	cutleaf geranium	no	45
	Lamiaceae	<i>Mentha pulegium</i>	pennyroyal	no	46
		<i>Monardella</i> sp.	coyote mint	yes	47
		<i>Prunella vulgaris</i> var. <i>lanceolata</i>	self-heal	yes	
		<i>Stachys ajugoides</i> var. <i>rigida</i>	hedge-nettle	yes	48
	Linaceae	<i>Linum bienne</i>	pale flax	no	49
	Lythraceae	<i>Lythrum hyssopifolium</i>	loosestrife	no	
	Malvaceae	<i>Sidalcea malvaeflora</i> ssp. <i>malvaeflora</i>	checker mallow	yes	50
	Myricaceae	* <i>Myrica californica</i>	wax myrtle	yes	
	Onagraceae	<i>Camissonia ovata</i>	sun cup	yes	
	Papaveraceae	<i>Eschscholzia californica</i>	California poppy	yes	51
	Plantaginaceae	<i>Plantago erecta</i>	dotseed plantain	yes	52
		<i>Plantago lanceolata</i>	English plantain	no	53
	Polemoniaceae	<i>Navarretia squarrosa</i>	skunkweed	no	
	Polygonaceae	<i>Eriogonum latifolium</i>	coast buckwheat	yes	54
		<i>Rumex acetosella</i>	sheep sorrel	no	55
		<i>Rumex pulcher</i>	fiddle dock	no	56
	Portulacaceae	<i>Calandrinia ciliata</i>	red maid	yes	57
	Primulaceae	<i>Anagallis arvensis</i>	scarlet pimpernel	no	58
	Ranunculaceae	<i>Ranunculus californicus</i>	California buttercup	yes	
	Rosaceae	<i>Acaena pinnatifida</i> var. <i>californica</i>	California acaena	yes	59
		<i>Fragaria vesca</i>	wood strawberry	yes	
		<i>Physocarpus capitatus</i>	ninebark	yes	
		<i>Rosa eglanteria</i>	eglantine rose	no	60
		<i>Rubus ursinus</i>	California blackberry	yes	61
	Rubiaceae	<i>Sherardia arvensis</i>	field madder	no	62
	Scrophulariaceae	<i>Castilleja affinis</i> ssp. <i>litoralis</i>	coast Indian paintbrush	yes	
		<i>Mimulus aurantiacus</i>	bush monkeyflower	yes	63
		<i>Mimulus guttatus</i>	large monkeyflower	yes	
		<i>Parentucellia viscosa</i>	yellow glandweed	no	
		<i>Scrophularia californica</i>	bee plant	yes	64
	Violaceae	<i>Viola adunca</i>	early blue violet	yes	65
ANGIOSPERMS/MONOCOTS					
	Cyperaceae	<i>Carex barbarae</i>	Santa Barbara sedge	yes	92
		<i>Carex densa</i>	dense sedge	yes	93
		<i>Carex gynodynamis</i>	hairy sedge	yes	94
		<i>Carex harfordii</i>	Harford's sedge	yes	
		<i>Carex subbracteata</i>	smallbract sedge	yes	95
		<i>Carex tumulicola</i>	foothill sedge	yes	96
	Iridaceae	<i>Iris douglasiana</i>	Douglas's iris	yes	102

GROUP	FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	PAGE #
		<i>Sisyrinchium bellum</i>	blue-eyed grass	yes	101
	Juncaceae	<i>Juncus bolanderi</i>	Bolander's rush	yes	97
		<i>Juncus bufonius</i> var. <i>bufonius</i>	toad rush	yes	
		<i>Juncus capitatus</i>	leafybract dwarf rush	no	
		<i>Juncus effusus</i> var. <i>brunneus</i>	soft rush	yes	98
		<i>Juncus occidentalis</i>	western rush	yes	99
		<i>Juncus patens</i>	spreading rush	yes	
		<i>Juncus phaeocephalus</i>	brownhead rush	yes	
		<i>Luzula comosa</i>	wood rush	yes	100
	Liliaceae	<i>Brodiaea terrestris</i> ssp. <i>terrestris</i>	ground brodiaea	yes	91
		<i>Calochortus tolmiei</i>	pussy ears	yes	
		<i>Chlorogalum pomeridianum</i>	soap plant	yes	103
		<i>Triteleia laxa</i>	Ithuriel's spear	yes	
	Poaceae	<i>Agrostis</i> sp.	bentgrass	?	
		<i>Aira caryophyllea</i>	silver European hairgrass	no	67
		<i>Anthoxanthum odoratum</i>	sweet vernal grass	no	
		<i>Avena barbata</i>	slender wild oat	no	68
		<i>Brachypodium distachyon</i>	false brome	no	69
		<i>Briza maxima</i>	rattlesnake grass	no	70
		<i>Briza minor</i>	little quaking grass	no	71
		<i>Bromus carinatus</i> var. <i>carinatus</i>	California brome	yes	72
		<i>Bromus diandrus</i>	ripgut grass	no	73
		<i>Bromus hordeaceus</i>	soft chess	no	74
		<i>Bromus madritensis</i> ssp. <i>madritensis</i>	foxtail chess	no	
		<i>Cynosurus echinatus</i>	hedgehog dogtail	no	75
		<i>Dactylis glomerata</i>	orchard grass	no	76
		<i>Danthonia californica</i> var. <i>californica</i>	California oatgrass	yes	77
		<i>Danthonia pilosa</i>	hairy oatgrass	no	
		<i>Deschampsia cespitosa</i> ssp. <i>cespitosa</i>	tufted hairgrass	yes	78
		<i>Deschampsia cespitosa</i> ssp. <i>holciformis</i>	tufted hairgrass	yes	
		<i>Elymus glaucus</i> ssp. <i>glaucus</i>	blue wildrye	yes	79
		<i>Festuca arundinacea</i>	tall fescue	no	
		<i>Festuca idahoensis</i>	Idaho fescue	yes	
		<i>Holcus lanatus</i>	velvet grass	no	80
		<i>brachyantherum</i>	meadow barley	yes	81
		<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley	no	82
		<i>Hordeum murinum</i>	Mouse barley	no	83
		<i>Koeleria macrantha</i>	junegrass	yes	84
		<i>Lolium multiflorum</i>	Italian ryegrass	no	
		<i>Lolium perenne</i>	perennial ryegrass	no	85
		<i>Nassella lepida</i>	foothill needlegrass	yes	
		<i>Nassella pulchra</i>	purple needlegrass	yes	86
		<i>Poa annua</i>	annual bluegrass	no	
		<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky bluegrass	no	87
		<i>Poa unilateralis</i>	ocean-bluff bluegrass	yes	88
		<i>Polypogon monspeliensis</i>	annual beard grass	no	
		<i>Taeniatherum caput-medusae</i>	medusahead	no	
		<i>Vulpia bromoides</i>	six-week's fescue	no	89




Estero Americano Preserve



Parcels are approximate only.
Source: County of Sonoma
Enterprise GIS Database 05
AirPhoto USA 2004. Cal DFG
CNDDDB 04. Map: SLT 08/09

Vegetation Monitoring Plots

Legend

-  study points
-  fence
-  10 meter contours

