## RECON

Heritage Brodiaea Preserve 2022 Summary Monitoring Report (Year 6) San Diego, California

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2: Wildlife Species Observed

## 1.0 Introduction

This monitoring report presents the results of activities conducted within the Heritage Brodiaea Preserve (HBP) during the period of January 1 to December 31, 2022. Activities discussed in this report include site maintenance activities, thread-leaved brodiaea (*Brodiaea filifolia*) 2022 population (vegetative) counts and flowering data, and native grassland mitigation progress.

The HBP is an approximately 14-acre biological open space area that was dedicated as part of the Heritage Bluffs II development project. The HBP is located in the northern part of San Diego (Figure 1) and it occurs to the south of Carmel Valley Road and to the east of the Black Mountain Open Space Preserve (Figure 2). The City of San Diego has now included the HBP area into its Multiple Species Conservation Program Subarea Plan's Multi-Habitat Planning Area.

The goal of the HBP is to facilitate the conservation, preservation, and enhancement of biological resources as part of mitigation for impacts associated with development of the Heritage Bluffs II and East Clusters development project sites. The HBP has preserved a regionally significant population of thread-leaved brodiaea in a Conservation Easement dedicated for that purpose.

## 2.0 HBP Translocation History

The translocation of salvaged thread-leaved brodiaea occurred as part of the East Clusters Unit 3 and Heritage Bluffs II development projects and the locations of these translocations are shown on Figure 3. These translocation efforts established the baseline numbers of thread-leaved brodiaea plants for the mitigation monitoring effort. The 2022 monitoring year represents the sixth year after translocation for the Heritage Bluffs II thread-leaved brodiaea and the seventh year after translocation for the East Clusters Unit 3 effort.

#### 3.0 HBP 2022 Maintenance Activities

Maintenance activities conducted within the HBP area during 2022 focused on the control of perennial weeds and non-native grasses. General control of perennial weeds occurred in January, February, March, April, May, and June. During the fall months, hand weeding was conducted around thread-leaved brodiaea locations to remove excess grasses.

# 4.0 HBP 2022 Thread-leaved Brodiaea Vegetative Counts

A census of the number of thread-leaved brodiaea expressing vegetative growth in the HBP was conducted during the months of January through March of 2022. The census involved the mapping of expressed natural thread-leaved brodiaea plants not previously located, and all translocated thread-leaved brodiaea plant locations (i.e., corm and cut/block) now within the HBP. A census of the natural thread-leaved brodiaea plants expressing vegetatively in the HBP was not conducted this year.



🔆 Project Location



FIGURE 1 Regional Location



HBP Boundary



FIGURE 2 HBP Location on Aerial Photograph

0

300

Feet











East Clusters Unit 3 Transplant

Heritage Bluffs II Cut/Block Transplant 

Heritage Bluffs II Corm Transplant

Native Grassland Mitigation Area

FIGURE 3

Distribution of Natural and Translocated Thread-leaved Brodiaea in the HBP



Each thread-leaved brodiaea translocation location was visited, and a direct count of the vegetative individuals expressed at the location was done. The last vegetative count data for the HBP natural population conducted in 2021 is given in Table 1. The 2022 vegetative counts for all translocated/transplanted thread-leaved brodiaea are presented in Table 2 (Heritage Bluffs II translocated), and Table 3 (East Clusters Unit 3 translocated and transplanted) along with vegetated count data from previous years and the baseline reference counts.

Table 1 HBP Thread-leaved Brodiaea Vegetative Counts for Natural Population								
	2017 2018 2019 2010 2021							
	Vegetative	Vegetative	Vegetative	Vegetative	Vegetative			
	Count*	Count*	Count*	Count*	Count*			
TOTAL	10,211	15,263	13,811	13,848	13,161			
*Based on count of individuals that expressed vegetatively.								

Table 2 Heritage Bluffs II Thread-leaved Brodiaea Translocation Summary:								
	Latital.		017 through 2		2020	2021	2022	
	Initial	2017	2018	2019	2020	2021	2022	
Translocation	Translocation	Vegetative	Vegetative	Vegetative	Vegetative	Vegetative	Vegetative	
Method	Estimate	Count*	Count*	Count*	Count*	Count*	Count*	
Corm Translocation	2,690	2,556	2,727	3,192	3,840	4,859	4,934	
Corm Translocation <sup>+</sup>	1,166	1,161	1.262	1,389	1,413	1,774	1,435	
Cut-Block Salvage <sup>‡</sup>	1,850	2,414	2,477	3,816	3,789	3,496	3,574	
TOTAL	5,706**	6,131	6,556	8,397	9,013	10,129	9,943	
*Based on count of in	dividuals that exp	pressed vegeta	atively.					
<sup>+</sup> Salvaged from East Clusters.								
*Salvaged and planted March 2017.								
**Total planted individ	luals to be used	as baseline for	<sup>-</sup> subsequent s	ite assessmen	ts.			

Table 3 East Clusters Unit 3 Thread-leaved Brodiaea Translocation Summary: 2017 through 2022							
	2016 2017 2018 2019 2020 2021 2022						
Translocation	Vegetative	Vegetative	Vegetative	Vegetative	Vegetative	Vegetative	Vegetative
Method	Count*	Count*	Count*	Count*	Count*	Count*	Count*
Corm Translocation	3,175	3,281	3,569	5,311	5,306	7,358	8,471
TOTAL	3,175	3,281	3,569	5,311	5,306	7,358	8,471
*Based on count of individuals that expressed vegetatively.							

There was only minor herbivory to the natural thread-leaved brodiaea locations during 2022. The primary cause of herbivory was from animals grazing on the vegetative shoots (Photographs 1 and 2). The digging up of underground plant parts was less this year and generally more common during previous dry years as herbivores looked to supplemental food sources as the aboveground vegetative forage was scarcer in these years.



PHOTOGRAPH 1 View of Thread-leaved Brodiaea Location that was Grazed by Herbivores (Photo Date: January 2022)



PHOTOGRAPH 2 View of Thread-leaved Brodiaea Location that was Grazed by Herbivores (Photo Date: January 2022)



Precipitation amounts for this portion of San Diego County were below normal during the 2021-2022 rainfall season. Despite the low precipitation amounts, the vegetative growth of the thread-leaved brodiaea population within the HBP remained stable compared to the previous year counts based on the results of the vegetative counts for previous springs. Representative photographs of vegetative growth observed during the 2022 counts are provided (Photographs 3 through 8).

## 5.0 HBP 2022 Thread-leaved Brodiaea Flowering Individuals Count

A count of the number of thread-leaved brodiaea individuals that produced a flower stalk during the spring of 2022 was conducted within the HBP. The flower stalk count included all the translocated locations and a sampling of a number of naturally occurring thread-leaved brodiaea locations (199 total). The data on flowering individuals are given in Table 4. Representative photographs of thread-leaved brodiaea individuals in flower are shown in Photographs 9 through 11.

Table 4 HBP Thread-leaved Brodiaea Flowering Individuals (2022)						
	Flowering	Percent Vegetative				
Brodiaea Type	Individuals	Individuals Flowering				
Heritage Bluffs II Corm Translocation	2701	5.5				
Heritage Bluffs II Corm Translocation	36	2.5				
Heritage Bluffs II Cut-Block Translocation	14	0.4				
East Clusters Unit 3 Corm Translocation	387	4.6				
Natural Population Sample (199 locations)	391	9.2				

The percent of those thread-leaved brodiaea that expressed vegetatively and then flowered ranged between less than 1 percent to 9 percent during the spring of 2022. Factors that may have contributed to the flowering rates were the distribution of the rainfall events (i.e., a wetter first part of the season and a couple of late spring showers). Vegetative expression was good and it would appear that the corms were able to store energy for the next growing season. The thread-leaved brodiaea plants dried more gradually this year, which likely allowed for an increase in flower production.



PHOTOGRAPH 4 Vegetative Growth at a Thread-leaved Brodiaea Translocation Plot (Photo Date: January 2022)



PHOTOGRAPH 3 Vegetative Growth at a Thread-leaved Brodiaea Translocation Plot (Photo Date: January 2022)



PHOTOGRAPH 5 Vegetative Growth at a Thread-leaved Brodiaea Translocation Plot (Photo Date: January 2022)



PHOTOGRAPH 6 Vegetative Growth at a Natural Thread-leaved Brodiaea Location (Photo Date: January 2022)



PHOTOGRAPH 7 Vegetative Growth at a Natural Thread-leaved Brodiaea Location (Photo Date: January 2022)



PHOTOGRAPH 8 Vegetative Growth at a Natural Thread-leaved Brodiaea Location (Photo Date: February 2022)



PHOTOGRAPH 9 Thread-leaved Brodiaea Flower (Photo Date: April 2022)



PHOTOGRAPH 10 Thread-leaved Brodiaea Flower (Photo Date: May 2022)





PHOTOGRAPH 11 Thread-leaved Brodiaea Flower (Photo Date: May 2022)



## 6.0 Plant and Wildlife Observations

Native cover estimates were conducted visually. Native plant cover in the HBP is primarily comprised of native bunchgrasses along with scattered individuals of native perennial plants, for example, gumplant (*Grindelia camporum*), lemonadeberry (*Rhus integrifolia*), redberry (*Rhamnus crocea*), and California buckwheat (*Eriogonum fasciculatum*). The estimated native plant cover for the HBP is approximately 35 percent.

A list of plant species observed within the HBP, compiled during monitoring visits, is provided as Attachment 1. A total of 51 plants species were documented. Examples of native species observed in the preserve areas include blue-eyed grass (*Sisyrinchium bellum*) (Photograph 12), goldenstar (*Bloomeria crocea*) (Photograph 13), death camas (*Toxicoscordion venenosum*) (Photograph 14), blue dicks (*Dipterostemon capitatus*) (Photograph 15), and onion (*Allium praecox*) (Photograph 16). A few individuals of Johnny-jump-up (*Viola pedunculata*) (Photograph 17), American vetch (*Vicia americana*) (Photograph 18), and succulent lupine (*Lupinus succulentus*) (Photograph 19) were observed this year within the preserve.

A list of general wildlife species observed within the HBP was compiled during monitoring visits and is provided as Attachment 2. Observed wildlife included 6 species of insect, 1 snail species, 4 reptile species, 19 bird species, and 4 mammal species. Funnel spiders are common in the grassland habitat. Other notable wildlife species observed on the site this past year were southern Pacific rattlesnake (*Crotalus oreganus helleri*), greater roadrunner (*Geococcyx californianus*), coyote (*Canis latrans*), and California quail (*Callipepla californica*) (Photograph 20). The presence of the rattlesnake species and the coyote are beneficial as they may help to control the gophers. An owl box was installed in the large preserve area in the fall of 2021 to attract barn owls; however, no owls have occupied the box to date.

#### 7.0 Native Grassland Mitigation (Year 2)

The Heritage Bluffs II project conditions of approval required the implementation of a native grassland mitigation element. A mitigation plan was approved that outlined the mitigation requirement that included the establishment of a minimum 0.15 acre of native grassland and the enhancement of a 0.30-acre buffer within a 0.45-acre restoration area. The restoration area was located on two old dirt roads that were included in the HBP (see Figure 3).

Implementation of the native grassland mitigation within the preserve began with the planting of the native bunch grasses during the first week of December 2020. Weed control was the primary maintenance activity conducted in the native grassland mitigation area during the 2021 and 2022 monitoring years.



PHOTOGRAPH 12 Blue-eyed Grass Observed in the Heritage Preserve (Photo Date: March 2022)



PHOTOGRAPH 13 Goldenstar Observed in the Heritage Preserve (Photo Date: April 2022)





PHOTOGRAPH 14 Death Camas Observed in the Heritage Preserve (Photo Date: January 2022)



PHOTOGRAPH 15 Blue Dicks Observed in the Heritage Preserve (Photo Date: March 2022)





PHOTOGRAPH 16 Early Onion in the Heritage Preserve (Photo Date: March 2022)



PHOTOGRAPH 17 Johnny-jump up in the Heritage Preserve (Photo Date: March 2022)





PHOTOGRAPH 18 American Vetch Observed in the Heritage Preserve (Photo Date: April 2022)



PHOTOGRAPH 19 Succulent Lupine Observed in the Heritage Preserve (Photo Date: May 2022)





PHOTOGRAPH 20 California Quail Observed in the Heritage Preserve (Photo Date: May 2022)



The success criteria for the native grassland mitigation include the assessment of species richness/recruitment, native vegetation cover, non-native vegetation cover, and target invasive species. The assessment of these criteria for Year 2 of the five-year monitoring period as follows:

- Species Richness and Recruitment: Evaluation of the number of native species observed in the native grassland mitigation found five native plant species: purple needlegrass (*Stipa pulchra*), foothill needlegrass (*Stipa lepida*), California encelia (*Encelia* californica; Photograph 21), willow herb (*Epilobium brachycarpum*), and long-stemmed golden-yarrow (*Eriophyllum confertiflorum*) (Photograph 22). The presence of five native species exceeds the Year 2 success criteria milestone which required three native species be present. Recruitment of needlegrasses and willow herb was observed this year.
- Native Vegetation Cover: Native vegetation cover was estimated to be 30 percent and was comprised primarily of the two native grass species planted (Photographs 23 and 24). The Year 2 success criteria milestone is 25 percent.
- Non-native Vegetation Cover: Cover of non-native vegetation was less than 1 percent due to the regular control of non-native species. The Year 1 success goal for this criterion was a maximum of 20 percent cover of non-native species.
- **Target Invasive Species**: There were no target invasive species (e.g., artichoke thistle [*Cynara cardunculus*], fennel [*Foeniculum vulgare*], Australian saltbush [*Atriplex semibaccata*], black mustard [*Brassica nigra*], bristly ox-tongue [*Helminthotheca echioides*], Russian thistle [*Salsola tragus*]) within the native grassland mitigation area due to regular control of these species during maintenance visits. The success goal for this criterion for Year 1 was no target invasive species present.

The native grassland mitigation area is progressing well at the end of the first year after installation. Regular control of non-native plant species and the introduction of native plant seed to the area will be conducted during the second year of monitoring.

#### 8.0 Supplemental Planting

Supplemental planting within the HBP occurred during the winter and fall of 2022. Seed was broadcast by hand in the smaller preserve area in early January and included purple needlegrass, common goldfields (*Lasthenia gracilis*) (Photograph 25), and miniature lupine (*Lupinus bicolor*) (Photograph 26). In addition, seed of purple needlegrass was hand broadcast in both preserve areas in mid-November.



PHOTOGRAPH 21 California Encelia Observed in the Native Grassland Mitigation Area at the Heritage Preserve (Photo Date: May 2022)



Long-stemmed Golden-yarrow Observed in the Native Grassland Mitigation Area at the Heritage Preserve (Photo Date: May 2022)





PHOTOGRAPH 23 View of the Native Grassland Mitigation Area in the Heritage Preserved Looking North (Photo Date: May 2022)



PHOTOGRAPH 24 View of the Native Grassland Mitigation Area in the Heritage Preserved Looking South (Photo Date: May 2022)





PHOTOGRAPH 25 Common Goldfields Observed in the Heritage Preserve (Photo Date: April 2022)



PHOTOGRAPH 26 Small-flowered Lupine Observed in the Heritage Preserve (Photo Date: April 2022)



### 9.0 Management Activities for 2023

Management activities to be conducted during 2023 will focus on the continued control of non-native grasses and perennial non-native plant species (e.g., artichoke thistle re-sprouts, fennel re-sprouts, Russian thistle, prickly lettuce [*Lactuca serriola*], and other weed species). Although significant progress was made in the control of perennial non-native plant species in 2022, control efforts will continue as re-sprouts and new seedlings of these noxious weeds begin to appear.

Additional seeding of native bunch grasses will occur in the fall of 2023 to augment areas seeded this year and to begin to fill in other bare areas within the HBP. Other native annual species may be added to the seed mix if weed control progresses well.

The maintenance of the native grassland mitigation area will concentrate on the control of invasive plant species during the third year. If weed control progresses well, other native plants may be added to the native grassland mitigation area this year to increase species richness.

## ATTACHMENTS

## ATTACHMENT 1

Plant Species Observed

	Attachment 1 Plant Species Observed	
Family	Scientific Name / Common Name	Origin
Amaranthaceae / Amaranth Family	Amaranthus albus / tumbleweed	I I
Anacardiaceae / Sumac or Cashew Family	Rhus integrifolia / lemonade berry	Ν
Apiaceae (Umbelliferae) / Carrot Family	Foeniculum vulgare / fennel	I
	Ambrosia psilostachya / western ragweed	Ν
	Baccharis pilularis / chaparral broom, coyote brush	Ν
	Corethrogyne filaginifolia var. filaginifolia / California sand-aster	Ν
	Deinandra fasciculata [=Hemizonia fasciculata] / fascicled tarweed	Ν
	Encelia californica / California encelia	Ν
Astornagon / Cumflouring Formily	Eriophyllum confertiflorum var. confertiflorum / long-stem golden-yarrow	Ν
Asteraceae / Sunflower Family	Grindelia camporum [=Grindelia camporum var. bracteosa] / gumplant	Ν
	Isocoma menziesii var. menziesii / spreading goldenbush	Ν
	Lactuca serriola / prickly lettuce	
	Lasthenia gracilis [L. californica Lindley, misapplied in San Diego County] / common goldfields	Ν
	Pseudognaphalium beneolens [=Gnaphalium canescens ssp. beneolens] / fragrant everlasting	Ν
	Sonchus oleraceus / common sow thistle	I
Brassicaceae (Cruciferae) / Mustard Family	Brassica nigra / black mustard	I
Chananadiasaaa / Caasafaat Family	Atriplex semibaccata / Australian saltbush	I
Chenopodiaceae / Goosefoot Family	Salsola tragus / Russian thistle, tumbleweed	-
	Convolvulus arvensis / bindweed, orchard morning-glory	Ι
Convolvulaceae / Morning-Glory Family	Convolvulus simulans / small-flowered morning-glory	Ν
Cucurbitaceae / Gourd Family	Marah macrocarpa / wild cucumber	Ν
	Acmispon glaber [=Lotus scoparius] / deerweed, California broom	Ν
	Lupinus bicolor / miniature lupine	Ν
Fabaceae (Leguminosae) / Legume Family	Lupinus succulentus / arroyo lupine	Ν
rabaceae (Leguminosae) / Legume ramily	Medicago polymorpha / California burclover	I
	Melilotus officinalis / yellow sweetclover	
	Vicia americana ssp. americana / American vetch	Ν
Geraniaceae / Geranium Family	Erodium cicutarium / redstem filaree	I
Lamiaceae / Mint Family	Stachys rigida var. rigida [=Stachys ajugoides var. rigida] / hedge nettle	Ν
Malvaceae / Mallow Family	Sidalcea sparsifolia [=Sidalcea malviflora ssp. sparsifolia] / southern checkerbloom	Ν
Onagraceae / Evening-Primrose Family	<i>Epilobium brachycarpum /</i> willow herb, fireweed	Ν

	Attachment 1	
	Plant Species Observed	
Family	Scientific Name / Common Name	Origin
Palyaanacaaa ( Pushukaat Family	Eriogonum fasciculatum / California buckwheat	N
Polygonaceae / Buckwheat Family	Rumex crispus / curly dock	
Ranunculaceae / Buttercup Family	Ranunculus californicus / California buttercup	N
Rhamnaceae / Buckthorn Family	Rhamnus crocea / spiny redberry	N
Solanaceae / Nightshade Family	Datura wrightii / western Jimson weed	N
Violaceae / Violet Family	<i>Viola pedunculata /</i> johnny-jump-up	N
Alliaceae / Onion Family	Allium praecox / early onion	N
Iridaceae / Iris Family	Sisyrinchium bellum / western blue-eyed grass	N
Melanthiaceae / False-hellebore Family	Toxicoscordion fremontii [=Zigadenus fremontii] / Fremont's camas	N
	Avena barbata / slender wild oat	
	Brachypodium distachyon / purple falsebrome	I
	Bromus diandrus / ripgut grass	I
Deserve (Creminese) / Crees Forsily	Bromus hordeaceus / soft chess	I
Poaceae (Gramineae) / Grass Family	Bromus rubens [=Bromus madritensis ssp. rubens] / red brome	I
	Festuca perennis [=Lolium multiflorum and Lolium perenne] / rye grass	I
	Stipa lepida [=Nassella lepida] / foothill needle grass	N
	Stipa pulchra [=Nassella pulchra] / purple needle grass	N
	Bloomeria crocea / common goldenstar	N
Themidaceae / Brodiaea Family	Brodiaea filifolia / thread-leaved brodiaea	N
-	Dipterostemon capitatus [=Dichelostemma capitatum] / blue dicks	N
ORIGIN		
N =Native to locality.		
I = Introduced species from outside locality.		

## ATTACHMENT 2

Wildlife Species Observed

Attachment 2 Wildlife Species Observed		
Major Wildlife Group	Family	Scientific / Common Name
Invertebrates	Apidae / Honey Bees, Bumble Bees, and Allies	Apis mellifera / honey bee
	Papilionidae / Parnassians & Swallowtails	Papilio rutulus / western tiger swallowtail
	Pieridae / Whites & Sulphurs	Pontia protodice / checkered [=common] white
	Nymphalidae / Brush-footed Butterflies	Agraulis vanillae incarnata / gulf fritillary
		Junonia coenia grisea / common buckeye
		Vanessa cardui / painted lady
	Land Snails / Helminthoglyptidae	Heminthoglypta traskii coelata / Peninsular Range shoulderbrand snail
Reptiles	Phrynosomatidae / Spiny Lizards	Sceloporus occidentalis longipes / Great Basin fence lizard
		Uta stansburiana elegans / western side-blotched lizard
	Colubridae / Colubrid Snakes	Pituophis catenifer annectens / San Diego gophersnake
	Crotalidae / Rattlesnakes	Crotalus oreganus helleri / southern Pacific rattlesnake
	Odontophoridae / New World Quail	Callipepla californica/California quail
	Accipitridae / Hawks, Kites, & Eagles	Buteo jamaicensis / red-tailed hawk
	Falconidae / Falcons	Falco sparverius / American kestrel
	Charadriidae / Lapwings & Plovers	Charadrius vociferus / killdeer
	Columbidae / Pigeons & Doves	Zenaida macroura / mourning dove
	Cuculidae / Cuckoos & Roadrunners	Geococcyx californianus / greater roadrunner
	Tyrannidae / Tyrant Flycatchers	Sayornis nigricans / black phoebe
		Sayornis saya / Say's phoebe
		Tyrannus verticalis / western kingbird
Birds	Corvidae / Crows, Jays, & Magpies	Corvus brachyrhynchos / American crow
DILUS	Alaudidae / Larks	Eremophila alpestris actia / California horned lark
	Aegithalidae / Bushtit	Psaltriparus minimus / bushtit
	Troglodytidae / Wrens	Thryomanes bewickii / Bewick's wren
	Turdidae / Thrushes	Sialia mexicana / western bluebird
	Mimidae / Mockingbirds & Thrashers	Mimus polyglottos / northern mockingbird
	Parulidae / Wood Warblers	Setophaga [=Dendroica] coronata / yellow-rumped warbler
	Passerellidae / New World Passerines	Melospiza melodia / song sparrow
		Pipilo maculatus / spotted towhee
		Zonotrichia leucophrys / white-crowned sparrow
	Fringillidae / Finches	Haemorhous [=Carpodacus] mexicanus / house finch

Attachment 2 Wildlife Species Observed			
Major Wildlife Group	Family	Scientific / Common Name	
Mammals	Leporidae / Rabbits & Hares	Sylvilagus bachmani / brush rabbit	
	Sciuridae / Squirrels & Chipmunks	Otopermophilus [=Spermophilus] beecheyi / California ground squirrel	
	Geomyidae / Pocket Gophers	Thomomys bottae / Botta's pocket gopher	
	Canidae / Canids	Canis latrans / coyote	