Appendix C

Photographs

Disked ruderal grassland in the southwest part of the site, looking northeast; 04/07/21.

Disked ruderal grassland in the southeast part of the site, looking northwest; 04/27/21.

Pond P-14, looking northwest; 04/07/21. This former golf course pond receives storm water and nuisance water from the adjacent subdivison and holds water almost year-round.

Pond P-13, looking southwest; 04/07/21. This former golf course pond receives storm water and nuisance water from the adjacent subdivision and supports emergent wetland vegetation and trees.

Pond P-5, looking west; 04/19/21. This pond receives substantial landscape irrigation runoff from the community center to the west and holds water year-round during most years.

Horse Creek, which is adjacent to the north edge of the site, looking west; 04/07/21. Treated storm water from the north part of the Greentree Project will discharge to Horse Creek via an existing outfall.

Ulatis Creek, which is adjacent to the south edge of the site, looking southwest; 04/27/21.

Storm drain outfall in Ulatis Creek adjacent to the southwest corner of the site, looking southeast; 04/27/21. Treated storm water from the southwest part of the Greentree Project will be discharged through this outfall.

Constructed Ditch D-9, looking southwest; 04/27/21. This ditch carries storm water from the adjacent neighborhood to Pond P-2. Water from this ditch passes through the network of ponds and ditches and discharges to Old Ulatis Creek.

Constructed Ditch D-7, looking north along Leisure Town Road from adjacent to the City's sewer station; 04/27/21.

Pond P-2, looking east; 04/07/21. This pond is dry throughout much of the summer during most years.

Seasonal Wetland SW-6, looking southwest; 04/07/21. The central part of this wetland appears to pond water to only a few inches deep for a few days after heavy rain events.

Swainson's hawk nest tree just northwest of the intersection of Sequoia Avenue and Leisure Town Road, looking east; 04/27/21.

Swainson's hawk incubating eggs in the nest on April 27, 2021.

Pair of burrowing owls perched adjacent to a burrow on the north side of Gilley Way, looking southwest; 03/12/21.

Burrow south of Gilley Way that the pair shown above chose for nesting; 05/13/21. The northern burrow appears to be a "satellite" burrow used by this pair.

Burrowing owl (circled) perched in the west natal burrow, looking west; 03/25/21. The owl was turning its head erratically and appeared irritated by vehicle off-loading and weed-eaters across the street.

Dung, animal parts, and garbage "decorating" the burrow entrance; 05/13/21. Chirping owlets were heard in the burrow after an adult burrowing owl was observed taking a mouse in to the burrow.

Blue elderberry shrub No. 15, looking southwest; 04/07/21. No valley elderberry longhorn beetles or shrubs with evidence of occupancy were observed.

Blue elderberry shrub No. 16, looking southwest; 04/07/21. The shrub is on the interior bank of the Old Ulatis Creek channel.

Appendix D

Plants and Wildlife Observed

Table D-1
Plants Observed During March and April 2021

Gymnosperms

Cupressaceae - Cypress Family	
Cupressus sempervirens	Italian cypress
Pinaceae - Pine Family	
Cedrus deodara	Deodar cedar
Pinus sp.	Ornamental Pine

Angiosperms - Dicots

Adoxaceae - Muskroot Family	
Sambucus nigra	Elderberry
Amaranthaceae	
Amaranthus albus	Tumbleweed
Apiaceae - Carrot Family	
Conium maculatum	Poison hemlock
Foeniculum vulgare	Sweet fennel
Apocynaceae - Dogbane/Milkweed Family	
Nerium oleander	Oleander
Vinca major	Periwinkle
Asclepias fascicularis	whorled milkweed
Araliaceae - Ginseng Family	
Hedera helix	English ivy
Asteraceae (Compositae) - Sunflower Family	
Achyrachaena mollis	Blow-wives
Artemisia douglasiana	California mugwort
Baccharis pilularis	Coyote brush
Carduus pycnocephalus	Italian thistle
Centaurea solstitialis	Yellow starthistle
Centromadia fitchii	Fitch's spikeweed
Cichorium intybus	Chicory
Cirsium vulgare	Bull thistle
Cotula coronopifolia	Common brass-buttons
Dittrichia graveolens	Stinkwort
Erigeron canadensis	Canadian horseweed
Grindelia camporum	Great Valley gumplant
Helminthotheca echioides	Bristly ox-tongue
Heterotheca grandiflora	Telegraph weed
Lactuca serriola	Prickly lettuce
Leontodon saxatilis	Long-beaked hawkbit

Matricaria discoidea	Pineapple-weed
Microseris douglasii subsp. douglasii	Douglas' silverpuffs
Senecio vulgaris	Common groundsel
Silybum marianum	Milk thistle
Sonchus asper subsp. asper	Prickly sow-thistle
Sonchus oleraceus	Common sow-thistle
Taraxacum officinale	Common dandelion
Tragopogon porrifolius	Common salsify
Xanthium spinosum	Spiny cocklebur
Xanthium strumarium	Cocklebur
Berberidaceae	
Nandina domestica	Sacred bamboo
Boraginaceae - Borage Family	
Amsinckia menziesii	Rancher's fireweed
Plagiobothrys stipitatus	Stalked popcorn-flower
Brassicaceae (Cruciferae) - Mustard Family	
Brassica nigra	Black mustard
Brassica rapa	Field mustard
Capsella bursa-pastoris	Shepherd's purse
Hirschfeldia incana	Short-podded mustard
Lepidium latifolium	Broadleaf pepperweed
Lepidium latipes	Dwarf peppergrass
Lepidium nitidum	Shining peppergrass
Raphanus sativus	Wild radish
Sinapis arvensis	Charlock mustard
Sisymbrium irio	London rocket
Cactaceae - Cactus Family	
Opuntia sp.	Opuntia
Caprifoliaceae - Honeysuckle Family	
Lonicera japonica	Japanese honeysuckle
Caryophyllaceae - Pink Family	
Cerastium glomeratum	Sticky mouse-ear chickweed
Spergularia rubra	Ruby sand-spurrey
Stellaria media	Common chickweed
Chenopodiaceae - Goosefoot Family	
Chenopodium album	White pigweed
Salsola tragus	Russian-thistle
Convolvulaceae - Morning-Glory Family	
Convolvulus arvensis	Bindweed
Cucurbitaceae - Gourd Family	
Marah fabacea	California manroot
Euphorbiaceae - Spurge Family	

Croton setiger	Turkey mullein
Euphorbia oblongata	Eggleaf spurge
Triadica sebifera	Chinese tallow tree
Fabaceae (Leguminosae) - Legume Family	
Acmispon americanus	Spanish lotus
Lotus corniculatus	Bird's-foot trefoil
Lupinus bicolor	Miniature lupine
Medicago polymorpha	California burclover
Melilotus albus	White sweetcover
Melilotus indicus	Annual yellow sweetclover
Trifolium depauperatum	Dwarf sack clover
Trifolium hirtum	Rose clover
Trifolium microcephalum	Hairy clover
**Trifolium repens*	White clover
**Vicia sativa*	Common vetch
Vicia villosa	Winter vetch
Fagaceae - Oak Family	
Quercus lobata	Valley oak
Geraniaceae - Geranium Family	
Erodium botrys	Broad-leaf filaree
Erodium cicutarium	Red-stem filaree
Geranium dissectum	Cut-leaf geranium
Juglandaceae - Walnut Family	
Juglans hindsii	Northern California black walnut
Juncaceae	
Juncus balticus	Baltic rush
Juncus bufonius	Common toad rush
Lamiaceae (Labiatae) - Mint Family	
Lamium amplexicaule	Giraffe head
Marrubium vulgare	White horehound
Rosmarinus officinalis	Rosemary
Lythraceae - Loosestrife Family	
Lythrum hyssopifolia	Hyssop loosestrife
Malvaceae - Mallow Family	
Malva parviflora	Cheeseweed
Malvella leprosa	Alkali mallow
Martyniaceae	
Proboscidea louisianica	Ram's horn
Montiaceae - Miner's Lettuce Family	
Calandrinia menziesii	Red maids
Moraceae - Mulberry Family	
Ficus carica	Common fig
Morus alba	White mulberry

Myrsinaceae - Myrsine Family	
Lysimachia arvensis	Scarlet pimpernel
Myrtaceae - Myrtle Family	
Eucalyptus camaldulensis	Red gum
Eucalyptus globulus	Blue gum
Oleaceae - Olive Family	
Fraxinus sp.	Ash
Ligustrum sp.	Privet
Olea europaea	Olive
Onagraceae - Evening Primrose Family	
Epilobium brachycarpum	Summer cottonweed
Epilobium ciliatum	Hairy willow-herb
Orobanchaceae	
Castilleja attenuate	Narrow leaved owl's clover
Triphysaria eriantha	Butter 'n' eggs
Papaveraceae - Poppy Family	
Eschscholzia californica	California poppy
Phrymaceae	
Erythranthe guttata	Seep monkey flower
Plantaginaceae - Plantain Family	
Plantago erecta	California plantain
Plantago lanceolata	English plantain
Plantago major	Common plantain
Polygonaceae - Buckwheat Family	
Persicaria hydropiperoides	False waterpepper
Polygonum aviculare	Common knotweed
Rumex acetosella	sheep sorrel
Rumex crispus	Curly dock
Rumex pulcher	Fiddle dock
Rumex salicifolius	Willow dock
Ranunculaceae	
Ranunculus californicus	California buttercup
Rosaceae - Rose Family	
Cotoneaster sp.	Cotoneaster
Prunus spp..	Prunus
Rosa californica	California rose
Rosa sp.	Rose
Rubus armeniacus	Himalayan blackberry
Rubiaceae - Madder Family	
Galium aparine	Goose grass
Salicaceae - Willow Family	
Populus alba	White poplar
Populus fremontii	Fremont cottonwood

Populus nigra	Lombardy poplar
Salix exigua	Narrow-leaved willow
Salix gooddingii	Goodding's black willow
Salix laevigata	Red willow
Salix lasiolepis	Arroyo willow
Scrophulariaceae	
Verbascum blattaria	Moth mullein
Simaroubaceae - Quassia Family	
Ailanthus altissima	Tree of heaven
Verbenaceae - Vervain Family	
Phyla nodiflora	Common frog-fruit
Viscaceae - Mistletoe Family	
Phoradendron leucarpum subsp. tomentosum	Oak mistletoe

Angiosperms -Monocots

Alismataceae - Water-Plantain Family	
Alisma triviale	California water plantain
Amaryllidaceae - Amaryllis Family	
Agapanthus orientalis	Lilly-of-the-Nile
Arecaceae (Palmae) - Palm Family	
Washingtonia filifera	California fan palm
Cyperaceae - Sedge Family	
Cyperus eragrostis	Tall flatsedge
Poaceae (Gramineae) - Grass Family	
Avena fatua	Wild oat
Briza minor	Small quaking grass
Bromus diandrus	Ripgut grass
Bromus hordeaceus	Soft chess
Bromus rubens	Red brome
Crypsis schoenoides	Swamp grass
Cynodon dactylon	Bermudagrass
Dactylis glomerata	Orchard grass
Echinochloa crus-galli	Barnyard grass
Elymus caput-medusae	Medusahead
Elymus triticoides	Beardless wildrye
Festuca arundinacea	Tall fescue
Festuca myuros	Rattail sixweeks grass
Festuca perennis	Italian ryegrass
Hordeum marinum subsp. gussoneanum	Mediterranean barley
Hordeum murinum subsp. leporinum	Hare barley
Paspalum dilatatum	Dallis grass
Phalaris aquatica	Harding grass

Phalaris paradoxa	Paradox canary-grass
Poa annua	Annual bluegrass
Polypogon monspeliensis	Annual beard grass
Setaria verticillate	Hooked bristlegrass
Sorghum halepense	Johnsongrass
Themidaceae	
Brodiaea elegans	Harvest brodiaea
Triteleia hyacinthina	Wild hyacinth
Typhaceae - Cattail Family	
Typha angustifolia	Narrow-leaved cattail
Typha latifolia	Broad-leaved cattail

TABLE D-2

WILDLIFE SPECIES DOCUMENTED IN THE SITE

Birds

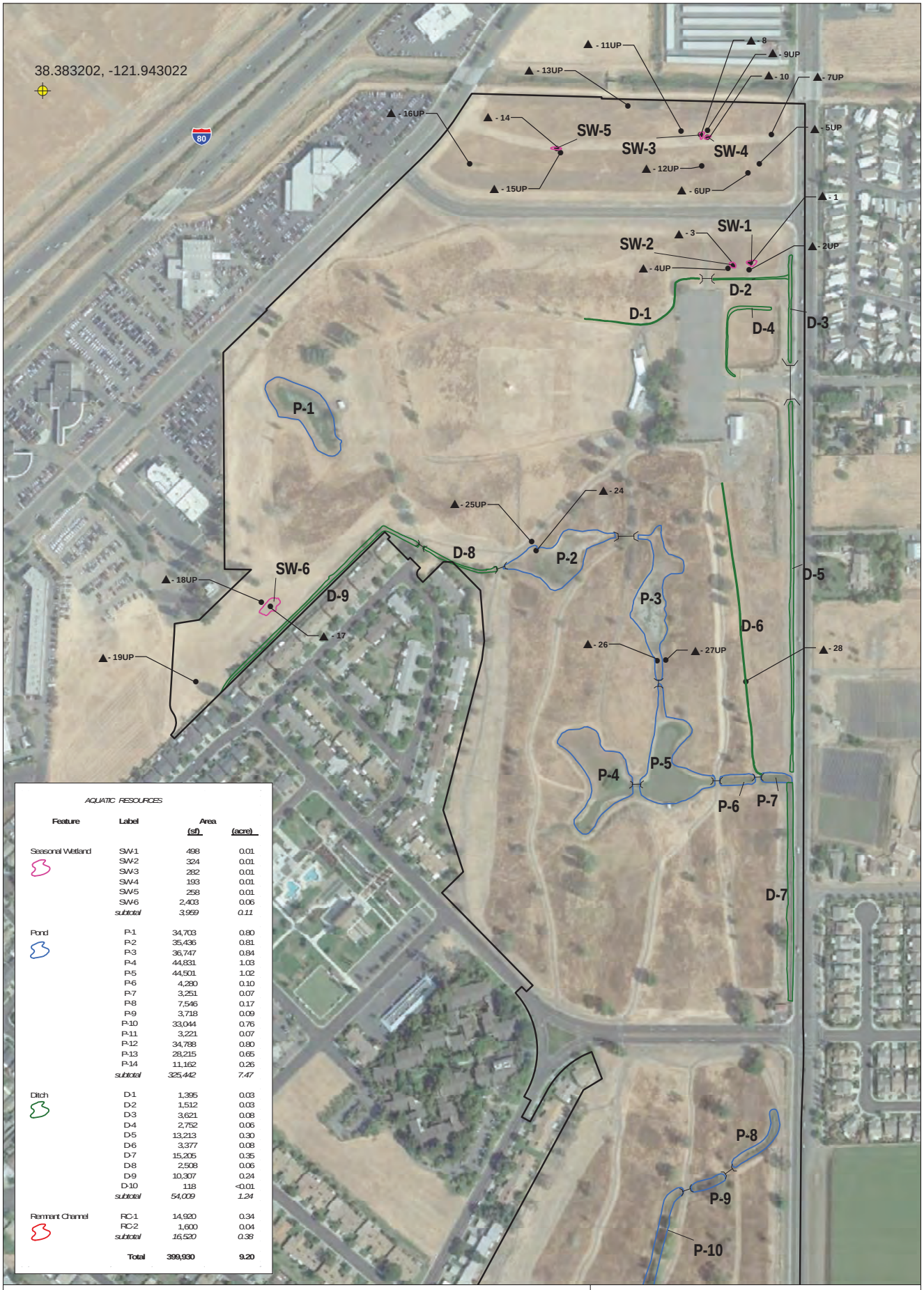
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Canada goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Hooded merganser	*Lophodytes cucullatus*
Turkey vulture	*Cathartes aura*
Wild turkey	*Meleagris gallopavo*
White-tailed kite	*Elanus leucurus*
Swainson's hawk	*Buteo swainsoni*
Cooper's hawk	*Accipiter cooperii*
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
California quail	*Callipepla californica*
Turkey	*Meleagris gallopavo*
Killdeer	*Charadrius vociferous*
California gull	*Larus californicus*
Common snipe	*Gallinago gallinago*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Great-horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Anna's hummingbird	*Calypte anna*
Belted kingfisher	*Megaceryle alcyon*
Northern flicker	*Colaptes auratus*
Western kingbird	*Tyrannus verticalis*
Violet-green swallow	*Tachycineta thalassina*
Green-backed heron	*Butorides virescens*
Tree swallow	*Tachycineta bicolor*
Black phoebe	*Sayornis nigricans*

TABLE 2 (Continued)
WIDLIFE SPECIES DOCUMENTED IN THE SITE

Say's phoebe	*Sayornis saya*
California scrub jay	*Aphelocoma coerulescens*
Yellow-billed magpie	*Pica nuttalli*
American crow	*Corvus brachyrhynchos*
American bushtit	*Psaltriparus minimus*
Ruby-crowned kinglet	*Regulus calendula*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
Yellow-rumped warbler	*Setophaga coronata*
California towhee	*Pipilo crissalis*
White-crowned sparrow	*Zonotrichia leucophrys*
Red-winged blackbird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Brewer's blackbird	*Euphagus cyanocephalus*
Lesser goldfinch	*Spinus psaltria*
American goldfinch	*Carduelis tristis*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
Mammals	
Coyote	*Canis latran*
Black-tailed hare	*Lepus californicus*
Raccoon	*Procyon lotor*
Western gray squirrel	*Sciurus griseus*
California ground squirrel	*Spermophilus beecheyi*
Bottae's pocket gopher	*Thomomys bottae*
Reptiles and Amphibians	
Western fence lizard	*Sceloporus occidentalis*
Pacific chorus frog	Pseudacris regilla

Appendix E

Aquatic Resources Map



AQUATIC RESOURCES

Feature	Label	Area (sf)	Area (acre)
Seasonal Wetland	SW-1	498	0.01
	SW-2	324	0.01
	SW-3	282	0.01
	SW-4	193	0.01
	SW-5	258	0.01
	SW-6	2,403	0.06
	subtotal	*3,959*	*0.11*
Pond	P-1	34,703	0.80
	P-2	35,436	0.81
	P-3	36,747	0.84
	P-4	44,831	1.03
	P-5	44,501	1.02
	P-6	4,280	0.10
	P-7	3,251	0.07
	P-8	7,546	0.17
	P-9	3,718	0.09
	P-10	33,044	0.76
	P-11	3,221	0.07
	P-12	34,788	0.80
	P-13	28,215	0.65
	P-14	11,162	0.26
	subtotal	*325,442*	*7.47*
Ditch	D-1	1,395	0.03
	D-2	1,512	0.03
	D-3	3,621	0.08
	D-4	2,752	0.06
	D-5	13,213	0.30
	D-6	3,377	0.08
	D-7	15,205	0.35
	D-8	2,508	0.06
	D-9	10,307	0.24
	D-10	118	<0.01
	subtotal	*54,009*	*1.24*
Remnant Channel	RC-1	14,920	0.34
	RC-2	1,600	0.04
	subtotal	*16,520*	*0.38*
	Total	**399,930**	**9.20**

Data Disclaimer:
The delineation has been done in accordance with the 1987 Wetlands Delineation Manual, US Army Corps of Engineers and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. The boundaries and jurisdictional status of all waters shown on this map are preliminary and subject to verification by the U.S. Army Corps of Engineers.

Project Area (±189.37 ac.)

Culvert

▲ - 1 3-Parameter Data Point

N

0 250 500

Moore Biological Consultants

Aquatic Resources

Greentree Development Project

City of Vacaville, Solano County, CA

Map Date: 05/21/2021

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	P-10	33,044	0.76
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Project Area (±189.37 ac.)

Culvert

▲- 1 3-Parameter Data Point

N

0 250 500

Moore Biological Consultants

Map Date: 05/21/2021

Aquatic Resources

Greentree Development Project

City of Vacaville, Solano County, CA

Appendix F

Special-Status Plant Survey Report

May 18, 2021

Diane S. Moore, M.S.
Moore Biological Consultants
10330 Twin Cities Road, Ste. 30
Galt, CA 95632

RE: Green Tree Golf Club Site Special-status Plant Survey

Dear Ms. Moore:

At your request, I have conducted a special-status plant survey to determine the presence/absence of special-status plant species on approximately 189.37 acres (the study area) that includes the former Green Tree Golf Club in Vacaville, Solano County, California. The former golf club comprises approximately 156 acres of the study area (Figure 1). The study area occurs between 80- and 95-feet elevation and is bordered to the north by Horse Creek, to the east by Leisure Town Road, to the west by the extension of the Leisure Town Retirement Community, and to the south by what was formerly known as Old Ulatis Creek (Figure 2).

The former golf course was active between 1961 and its closure in 2016. Most of the property has been disked annually since the closure. The study area is comprised of primarily ruderal annual vegetation. Golf course remnant features include abandon ponds and wetlands, ornamental trees, golf cart pathways, and other infrastructure.

The property is currently proposed for a mixed-use development. The survey was conducted to update work conducted by others in 2016 and 2019.

METHODS

Surveys

Field surveys were conducted on March 30-31 and April 16, 2021 by Jeff Glazner. The entire site was observed with emphasis on areas that were not ruderal grassland. The survey was floristic in nature with emphasis on habitats that could support any of the species listed in Table 1. Plant species observed were recorded and are presented in Appendix A.

Queries

The California Natural Diversity Data Base (CNDDB) (2021) was queried prior to conducting the rare pant survey. The six-quadrangle search area included the Elmira, Fairfield North, Mt. Vaca, Allendale, Dixon, and Dozier USGS quadrangles. Salix also queried the California Native Plant Society Inventory (CNPS 2021) for reported occurrences

of special-status plant species within the six-quad area, and the U.S. Fish and Wildlife Service Information for Planning and Consultation database for the region surrounding the study area. Figure 3 illustrates the 13 special-status plant species occurrences reported by the CNDDB within a 5-mile radius of the study area.

Of the 40 plant species identified in the CNDDB, CNPS, and IPaC queries (Appendix B), it was determined that 35 have no potential to occur due to the lack of any suitable habitat (such as vernal pools, coastal wetlands or marshes, wooded slopes, among others) or suitable substrates (such as saline or alkaline conditions, or sepentinite, among others). These plants with no likelihood to occur are summarized in Table 1 below. Ten (10) plants for which there are reported occurrences within a 5-mile radius of the site (Figure 3) are marked with an asterisk (*).

Table 1

Special-status Plant Species with No Potential to Occur within Green Tree Study Area

Common name	Taxon	Fed/State/CNPS status	Habitat/soil required
Western viburnum	*Viburnum ellipticum*	-/-/2B.3	Chaparral; cismontane woodland; lower montane coniferous forest. North-facing slopes
Bolander's waterhemlock	*Cicuta maculata bolanderi*	-/-/2B.1	Marshes and swamps (coastal, fresh, or brackish)
Mason's lilaeopsis	*Lilaeopsis masonii*	-/CR/1B.1	Marshes and swamps (brackish or freshwater); riparian scrub.
Alkali-sink goldfields	*Lasthenia chrysantha*	-/-/1B.1	Vernal pools, wet saline flats
Contra Costa goldfields*	*Lasthenia conjugens*	FE/-/1B.1	Valley and foothill grassland (mesic); vernal pools
Coulter goldfields	*Lasthenia glabrata coulteri*	-/-/1B.1	Marshes and swamps (coastal salt); playas; vernal pools.
Heckard's peppergrass	*Lepidium latipes heckardii*	-/-/1B.1	Valley and foothill grassland (alkaline flats)
Heartscale*	*Atriplex cordulata cordulata*	-/-/1B.2	Meadows and seeps (saline or alkaline); chenopod scrub; valley and foothill grassland (sandy)
Brittlescale	*Atriplex depressa*	-/-/1B.2	Chenopod scrub; playas; valley and foothill grassland; [alkaline or clay]
Vernal pool smallscale	*Atriplex persistens*	-/-/1B.2	Vernal pools (alkaline)
San Joaquin spearscale*	*Extriplex [Atriplex] joaqinana*	-/-/1B.2	Chenopod scrub; meadows; valley and foothill grassland; [alkaline]

Table 1 Special-status Plant Species with No Potential to Occur within Green Tree Study Area			
Common name	**Taxon**	**Fed/State/CNPS status**	**Habitat/soil required**
Ferris' milkvetch	*Astragalus tener ferrisiae*	-/-/1B.1	Meadows (vernally mesic); valley and foothill grassland (subalkaline flats)
Alkali milkvetch*	*Astragalus tener tener*	-/-/1B.2	Playas; valley and foothill grassland (adobe clay), vernal pools (alkaline)
Delta tule pea	*Lathyrus jepsonii jepsonii*	-/-/1B.2	Marshes and swamps (freshwater and brackish)
Showy Indian clover*	*Trifolium amoenum*	FE/-/1B.1	Coastal bluff scrub; Valley and foothill grassland (sometimes serpentinite)
Saline clover	*Trifolium hydrophilum*	-/-/1B.2	Marshes and swamps; valley and foothill grassland (mesic, alkaline); vernal pools
Mt. Diablo fairy lantern	*Calochortus pulchellus*	-/-/1B.2	Chaparral; cismontane woodland; valley and foothill grassland, wooded slopes
Fragrant fritillary	*Fritillaria liliacea*	-/-/1B.2	Coastal prairie; coastal scrub; valley and foothill grassland; [often serpentinite]
Adobe-lily*	*Fritillaria pluriflora*	-/-/1B.2	Chaparral; cismontane woodland; valley and foothill grassland; [often adobe, generally serpentine of interior foothills]
Brewer's dwarf flax*	*Hesperolinon breweri*	-/-/1B.2	Chaparral; cismontane woodland; valley and foothill grassland; [mostly serpentinite].
Wooly rose-mallow	*Hibiscus lasiocarpos occidentalis*	-/-/1B.2	Marshes and swamps (freshwater).
Keck's checkerbloom*	*Sidalcea keckii*	-/-/1B.1	Cismontane woodland; valley and foothill grassland; [serpentinite]
Hispid salty bird's-beak	*Chloropyron molle hispidum*	-/-/1B.1	Meadows; playas; [alkaline]
Bogg's Lake hedge-hyssop	*Gratiola heterosepala*	-/CE/1B.2	Vernal pools
Colusa grass	*Neostapfia colusana*	FT/CE/1B.1	Vernal pools

Table 1

Special-status Plant Species with No Potential to Occur within Green Tree Study Area

Common name	Taxon	Fed/State/CNPS status	Habitat/soil required
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	FT/CE/1B.1	Vernal pools
California alkali grass	*Puccinellia simplex*	-/-/1B.2	Alkaline, vernally mesic; sinks, flats, lake margins. Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools
Crampton's tuctoria	*Tuctoria mucronata*	FE/CE/1B	Vernal pools.
Woolly-headed gilia	*Gilia capitata tomentosa*	-/-/1B.1	Coastal bluff scrub (rocky, outcrops)
Baker's navarretia*	*Navarretia leucocephala bakeri*	-/-/1B.1	Cismontane woodland; lower montane coniferous forest; meadows (mesic); valley and foothill grassland; vernal pools
Slender-leaved pondweed	*Stuckenia filiformis alpina*	-/-/2B.2	foothill grassland; vernal pools. Marshes and swamps (assorted shallow freshwter)
Recurved larkspur*	*Delphinium recurvatum*	-/-/1B.2	Chenopod scrub; cismontane woodland; valley and foothill grassland; [alkaline]
Little mousetail	*Myosurus minimus apus*	-/-/3	Vernal pools (alkaline)
Delta mudwort	*Limosella australis*	-/-/2B.1	Vernal pools (alkaline). Usually mud banks; marshes and swamps (freshwater or brackish); riparian scrub

Status
FE - Federal Endangered
CE - California Endangered
CR - California Rare

CNPS (California Native Plant Society):
Rank 1B - Plants rare, threatened, or endangered in California and elsewhere
Rank 2B - Plants rare, threatened, or endangered in California, more common elsewhere
Rank 3 - Plants about which more information is needed, a review list
RED Code
1 - Seriously endangered (>80% of occurrences threatened)
2 - Fairly endangered (20 to 80% of occurrences threatened)

It was determined that five (5) of the 40 species identified in Appendix B have some potential, but are unlikely, to occur due to the presence of very limited or minimal suitable habitat on the site. These five species formed the target list for this special-status species

survey and include those listed in Table 2 below. Three (3) plants for which there are reported occurrences within a 5-mile radius of the site (Figure 3) are marked with an asterisk (*).

Table 2

Special-status Plant Species with SOME Potential to Occur within Green Tree Study Area

Common name	Taxon	Fed/State/CNPS status	Habitat/soil required	Likelihood to Occur
Pappose tarplant	*Centromadia parryi parryi*	-/-/1B.2	Coastal prairie; meadows and seeps; marshes and swamps; vernally wet grassland (sometimes alkaline).	Unlikely. Species requires alkaline conditions which are minimal on the site.
Carquinez goldenbush	*Isocoma arguta*	-/-/1B.1	Valley and foothill grassland (alkaline).	Unlikely. Species requires alkaline conditions which are minimal on the site.
Bearded-nut popcornflower*	*Plagiobothrys hystriculus*	-/-/1B.1	Valley and foothill grasslands (mesic); vernal pools.	Unlikely. Marginal habitat present in northern area grassland. No vernal pools.
Dwarf downingia*	*Downingia pusilla*	-/-/2B.2	Vernal pools and seasonal wetlands..	Unlikely. Marginal habitat present in seasonal wetland.
Legenere*	*Legenere limosa*	-/-/1B.1	Vernal pools and seasonal wetlands.	Unlikely. Marginal habitat present in seasonal wetland.

CNPS (California Native Plant Society):
Rank 1B - Plants rare, threatened, or endangered in California and elsewhere
Rank 2B - Plants rare, threatened, or endangered in California, more common elsewhere
RED Code
1 - Seriously endangered (>80% of occurrences threatened)
2 - Fairly endangered (20 to 80% of occurrences threatened)

FINDINGS

Soils

Five soil units have been mapped within the study area, as illustrated in Figure 4. The soil units include the following (*USDA Natural Resources Conservation Service Web Soil Survey for Solano County, NRCS 2021*).

Capay silty clay loam, 0 percent slopes

The Capay component makes up 85 percent of the map unit. Slopes are 0 to 0 percent. This component is on distal alluvial fans on valleys. The parent material consists of alluvium derived from igneous, metamorphic, and sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is rarely flooded. It is occasionally ponded. A seasonal zone of water saturation is at 79 inches during January, February, March. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 11 within 30 inches of the soil surface.

Capay clay, 0 percent slopes

The Capay component makes up 85 percent of the map unit. Slopes are 0 to 0 percent. This component is on basin floors on valleys. The parent material consists of flood basin silty and clayey alluvium derived from metamorphic and sedimentary rock over fan alluvium derived from metamorphic and sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is high. This soil is rarely flooded. It is frequently ponded. A seasonal zone of water saturation is at 60 inches during January, February. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 11 within 30 inches of the soil surface.

Clear Lake clay, 0 to 2 percent slopes

The Clear Lake component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on basin floors on valleys. The parent material consists of basin alluvium derived from igneous, metamorphic and sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is rarely flooded. It is frequently ponded. A seasonal zone of water saturation is at 12 inches during January, February. Organic matter content in the surface horizon is about 2 percent. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 9 within 30 inches of the soil surface.

Yolo loam, 0 to 4 percent slopes

The Yolo component makes up 85 percent of the map unit. Slopes are 0 to 4 percent. This component is on alluvial fans on valleys. The parent material consists of alluvium derived from metamorphic and sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is

high. Shrink-swell potential is low. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 1 within 30 inches of the soil surface.

Yolo loam, clay substratum

The Yolo component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on alluvial fans. The parent material consists of alluvium derived from sedimentary rock. Depth to a root restrictive layer, strongly contrasting textural stratification, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Habitat Types

Four landcover types (habitats) are identified within the study area and are summarized below in Table 3 and illustrated in Figure 5. Representative site photos are presented as aerial oblique photos in Figures 6a-d.

Table 3
Landcover Types within the Green Tree Study Area

Habitat	Approximate Acreage
Ruderal Grassland	153.48
Urban Woodland	10.83
Urban	17.21
Aquatic Resources	9.20
Total (Woodland/Aquatic Resources 1.35 acre overlap)	**189.37**

Ruderal

Approximately 153.48 acres of the study area are ruderal grassland – former golf course lands that are annually disked and/or mowed. All of the non-wetland grassland areas are occupied primarily by weedy grasses and forbs. The potential for special status plant species in the upland grasslands is very low due to the ongoing disturbance of regular disking, abundance of non-native Mediterranean species, and poor habitat quality. Dominant grasses are Italian wild oat (*Avena fatua*), soft chess (*Bromus hordeaceus),* ripgut brome (*Bromus diandrus*), hare barley (*Hordeum murinum*), Bermudagrass (*Cynodon dactylon*), ryegrass (*Festuca perennis*), filaree (*Erodium cicutarium*), Italian thistle (*Carduus pycnodephalus*), common groundsel (*Senecio vulgaris*), winter vetch (*Vicia villosa*), Spanish lotus (*Acmispon americanus*), bindweed (*Convolvulus arvensis*) and cut leaf geranium (*Geranium dissectum*).

Urban Woodland

The Urban Woodland habitat type is comprised of areas where there are clusters of trees large enough to create canopy coverage and sizable shaded areas. Four areas are identified within the study area as urban woodland. The urban woodland is a product of anthropogenic influences, primarily, the former golf course. Many Eucalyptus trees, ornamental pines and white poplar occur throughout the study area, along with many other non-native planted species. The largest of these woodlands occurs along the former Old Ulatis Creek corridor. There is a mix of native and non-native species along this mostly dry remnant channel.

Urban

Parking lots, buildings, cart paths and similar developed areas occur throughout the study area and are not habitat for special status species.

Aquatic Resources

Several constructed ponds and connecting drainages were embedded in the former golf course. These features have been abandoned and are not maintained anymore and are in an unmanaged condition. Most of the ponds appear to have a clay liner but most were dry or nearly dry during the spring surveys. A couple of features had standing water and a more aquatic flora. Common species observed in the former ponds include cocklebur (*Xanthium strumarium*), false waterpepper (*Persicaria hydropieroides*), curly dock (*Rumex crispus*), and swamp grass (*Crypsis schoenoides*).

Special-status Plants

Based on the 2021 queries described in the Methods section above, the disturbed condition of the habitat within the study area, and the results of the field surveys, it was determined that only the five species identified in Table 2 above had some potential, although unlikely, to occur within the study area due to the presence of marginal levels of suitable habitat. Three of those species had been reported to occur within a five-mile radius of the study area: bearded-nut popcornflower, dwarf downingia, and legenere, as illustrated in Figure 3. None of these, or any other special-status species were observed during the field surveys.

CONCLUSION

I conducted a rare plant survey of the 189.37-acre Green Tree study area in Vacaville, Solano County. Three field visits were conducted during March and April 2021, and no special-status species were detected on the property.

Please contact me if you would like to discuss these findings.

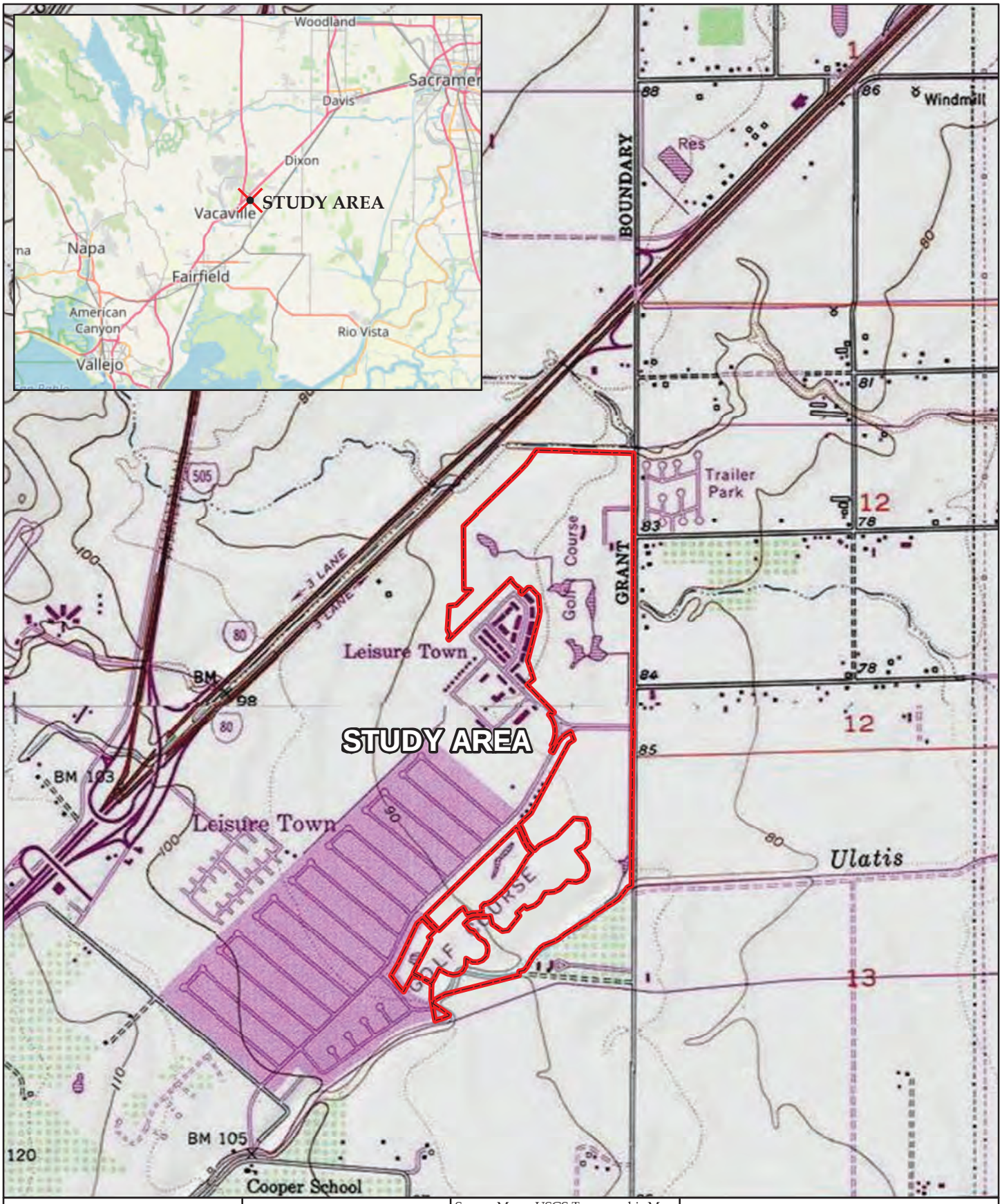
Sincerely,

Jeff Glazner
Principal Biologist/Botanist

Attachments:

Figure 1. USGS Site and Vicinity Map
Figure 2. Aerial Photo
Figure 3. CNDDB Occurrence Map
Figure 4. Soils Map
Figure 5. Habitat Map
Figures 6a-6d. Aerial Site Photos

Appendix A. List of Plants Observed within the Study Area, 2021
Appendix B. Potentially-occuring Special-status Plants



Salix consulting, inc.

N

0 1,000 2,000

Feet

Source Maps: USGS Topographic Map
Allendale and Almira Quads 1:24,000
Rancho Los Putos Land Grant

Figure 1

SITE AND VICINITY MAP

Greentree Development Project

Vacaville, Solano County, CA

Salix consulting, inc.

N

0 425 850

Feet

Study Area
(±189.37 acres)

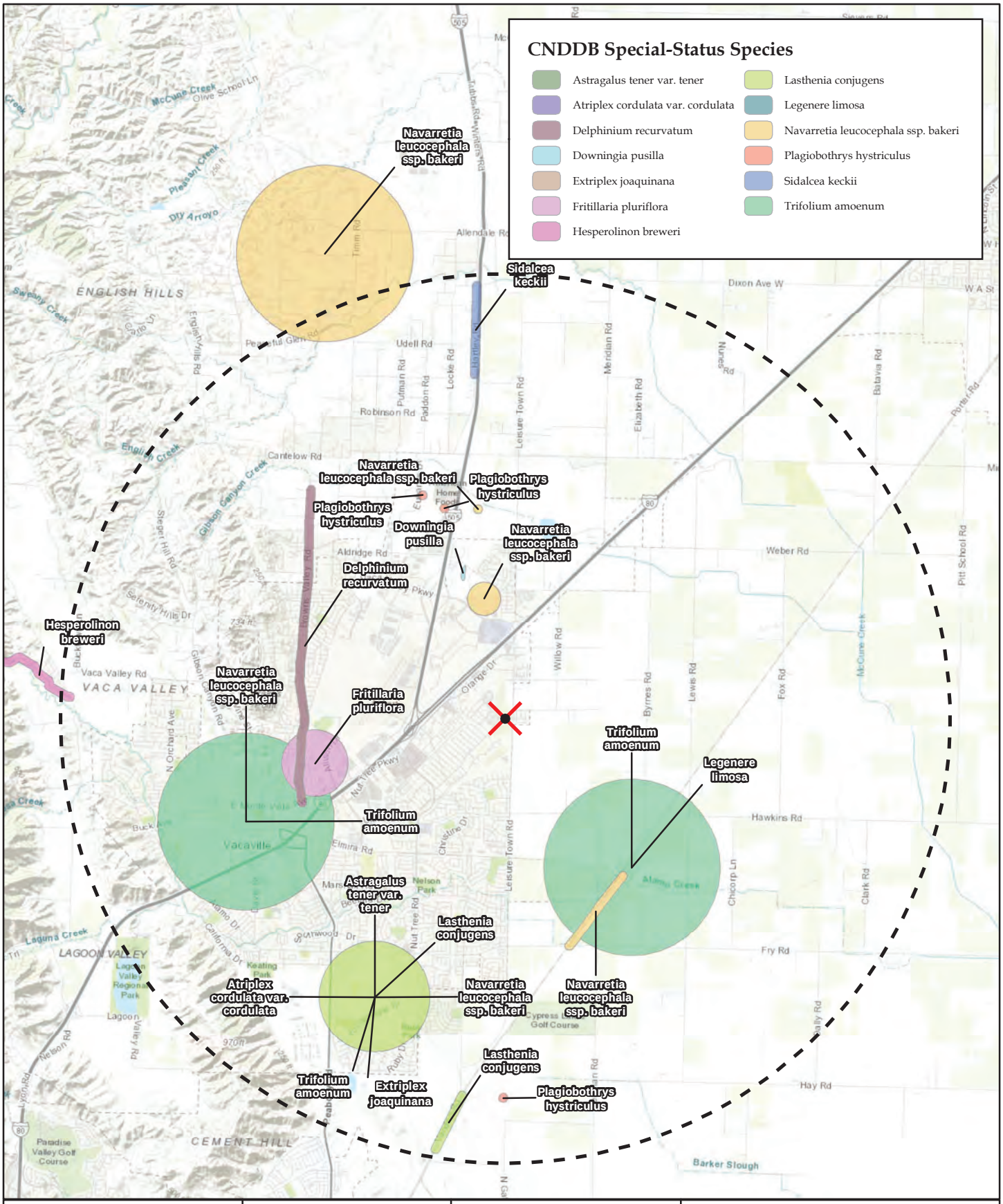
Imagery: 3-31-21 and 4-16-21
Salix Consulting, Inc.

Figure 2

AERIAL PHOTO

Greentree Development Project

Vacaville, Solano County, CA



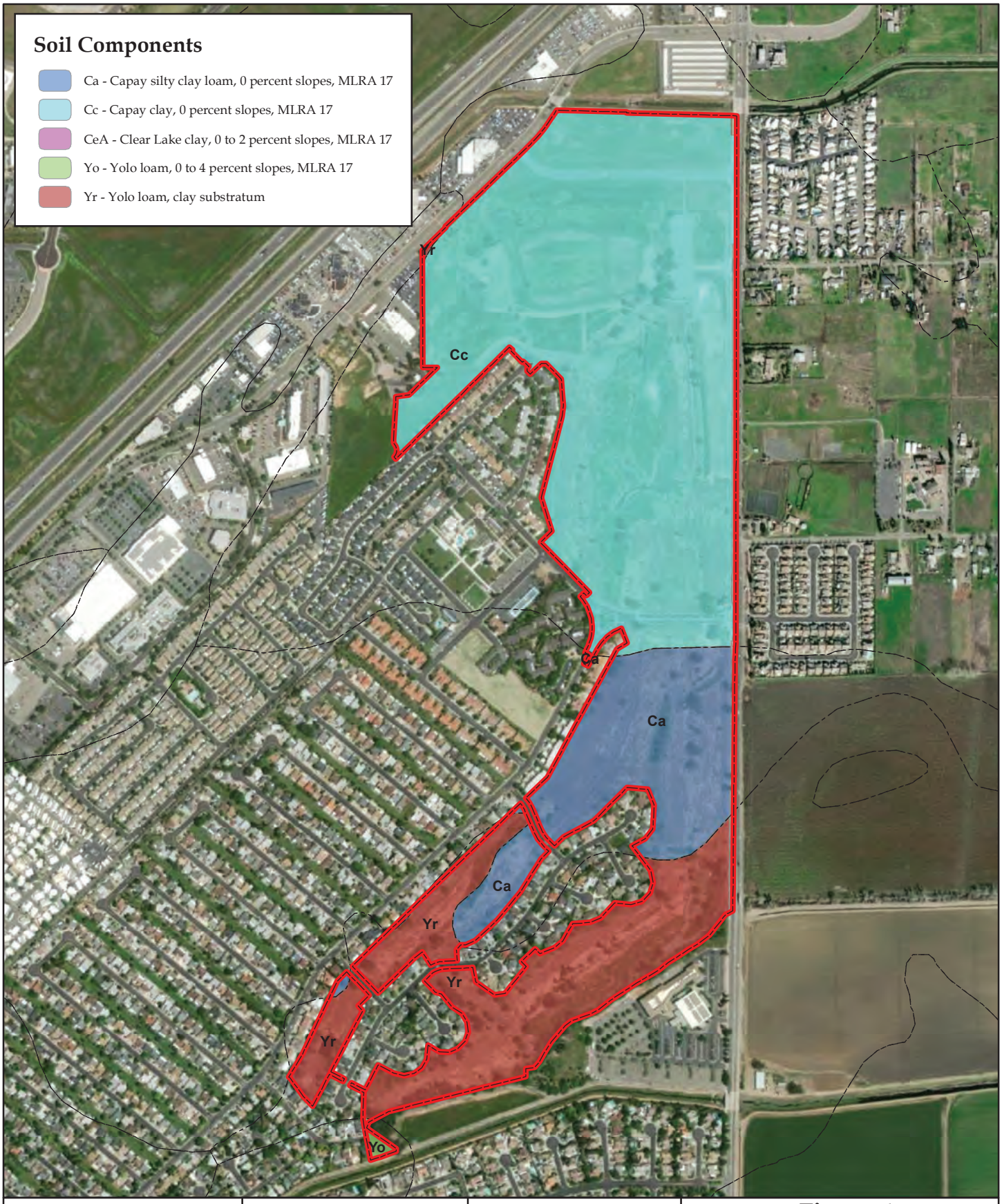
Salix consulting, inc.

Figure 3

CNDDB OCCURRENCES MAP

Greentree Development Project

Vacaville, Solano County, CA



Salix consulting, inc.

N

0 425 850

Feet

Study Area (±189.37 acres)

Figure 4

SOILS MAP

Greentree Development Project

Vacaville, Solano County, CA

Salix consulting, inc.

Figure 5

HABITAT MAP

Greentree Development Project

Vacaville, Solano County, CA

Looking west along Gilley Way towards I-80.
Photo Date 3-31-21

Looking south over Gilley Way over former driving range.
Photo Date 3-31-21

Salix consulting, inc.

Figure 6a

AERIAL SITE PHOTOS

Greentree Development Project

Vacaville, Solano County, CA

Looking south over middle area of site.
Photo Date 3-31-21

Looking northeast over Gilley Way and Leisure Town Road. *Photo Date 3-31-21*

Salix consulting, inc.

Figure 6b

AERIAL SITE PHOTOS

Greentree Development Project

Vacaville, Solano County, CA

Looking north over Sequoia Drive at northern area of site.
Photo Date 4-16-21

Looking south along Leisure Town Road at pond complex.
Photo Date 4-16-21

Salix consulting, inc.

Figure 6c

AERIAL SITE PHOTOS

Greentree Development Project

Vacaville, Solano County, CA

Looking southwest over southern portion of the study area.
Photo Date 4-16-21

Looking northeast from southwestern portion of the study area.
Photo Date 4-16-21

Salix consulting, inc.

Figure 6d

AERIAL SITE PHOTOS

Greentree Development Project

Vacaville, Solano County, CA

Appendix A

Green Tree Plants Observed March and April 2021

Gymnosperms

Cupressaceae - Cypress Family

Cupressus sempervirens	Italian cypress

Pinaceae - Pine Family

Cedrus deodara	Deodar cedar
Pinus sp.	Ornamental Pine

Angiosperms - Dicots

Adoxaceae - Muskroot Family

Sambucus nigra	Elderberry

Amaranthaceae

Amaranthus albus	Tumbleweed

Apiaceae - Carrot Family

Conium maculatum	Poison hemlock
Foeniculum vulgare	Sweet fennel

Apocynaceae - Dogbane/Milkweed Family

Nerium oleander	Oleander
Vinca major	Periwinkle
Asclepias fascicularis	whorled milkweed

Araliaceae - Ginseng Family

Hedera helix	English ivy

Asteraceae (Compositae) - Sunflower Family

Achyrachaena mollis	Blow-wives
Artemisia douglasiana	California mugwort
Baccharis pilularis	Coyote brush
Carduus pycnocephalus	Italian thistle
Centaurea solstitialis	Yellow starthistle
Centromadia fitchii	Fitch's spikeweed
Cichorium intybus	Chicory
Cirsium vulgare	Bull thistle
Cotula coronopifolia	Common brass-buttons
Dittrichia graveolens	Stinkwort
Erigeron canadensis	Canadian horseweed
Grindelia camporum	Great Valley gumplant
Helminthotheca echioides	Bristly ox-tongue
Heterotheca grandiflora	Telegraph weed
Lactuca serriola	Prickly lettuce
Leontodon saxatilis	Long-beaked hawkbit
Matricaria discoidea	Pineapple-weed
Microseris douglasii subsp. douglasii	Douglas' silverpuffs
Senecio vulgaris	Common groundsel
Silybum marianum	Milk thistle

Sonchus asper subsp. asper	Prickly sow-thistle
Sonchus oleraceus	Common sow-thistle
Taraxacum officinale	Common dandelion
Tragopogon porrifolius	Common salsify
Xanthium spinosum	Spiny cocklebur
Xanthium strumarium	Cocklebur

Berberidaceae

Nandina domestica	Sacred bamboo

Boraginaceae - Borage Family

Amsinckia menziesii	Rancher's fireweed
Plagiobothrys stipitatus	Stalked popcorn-flower

Brassicaceae (Cruciferae) - Mustard Family

Brassica nigra	Black mustard
Brassica rapa	Field mustard
Capsella bursa-pastoris	Shepherd's purse
Hirschfeldia incana	Short-podded mustard
Lepidium latifolium	Broadleaf pepperweed
Lepidium latipes	Dwarf peppergrass
Lepidium nitidum	Shining peppergrass
Raphanus sativus	Wild radish
Sinapis arvensis	Charlock mustard
Sisymbrium irio	London rocket

Cactaceae - Cactus Family

Opuntia sp.	Opuntia

Caprifoliaceae - Honeysuckle Family

Lonicera japonica	Japanese honeysuckle

Caryophyllaceae - Pink Family

Cerastium glomeratum	Sticky mouse-ear chickweed
Spergularia rubra	Ruby sand-spurrey
Stellaria media	Common chickweed

Chenopodiaceae - Goosefoot Family

Chenopodium album	White pigweed
Salsola tragus	Russian-thistle

Convolvulaceae - Morning-Glory Family

Convolvulus arvensis	Bindweed

Cucurbitaceae - Gourd Family

Marah fabacea	California manroot

Euphorbiaceae - Spurge Family

Croton setiger	Turkey mullein
Euphorbia oblongata	Eggleaf spurge
Triadica sebifera	Chinese tallow tree

Fabaceae (Leguminosae) - Legume Family

Acmispon americanus	Spanish lotus
Lotus corniculatus	Bird's-foot trefoil
Lupinus bicolor	Miniature lupine
Medicago polymorpha	California burclover
Melilotus albus	White sweetcover
Melilotus indicus	Annual yellow sweetclover

Trifolium depauperatum	Dwarf sack clover
Trifolium hirtum	Rose clover
Trifolium microcephalum	Hairy clover
**Trifolium repens*	White clover
**Vicia sativa*	Common vetch
Vicia villosa	Winter vetch

Fagaceae - Oak Family

Quercus lobata	Valley oak

Geraniaceae - Geranium Family

Erodium botrys	Broad-leaf filaree
Erodium cicutarium	Red-stem filaree
Geranium dissectum	Cut-leaf geranium

Juglandaceae - Walnut Family

Juglans hindsii	Northern California black walnut

Juncaceae

Juncus balticus	Baltic rush
Juncus bufonius	Common toad rush

Lamiaceae (Labiatae) - Mint Family

Lamium amplexicaule	Giraffe head
Marrubium vulgare	White horehound
Rosmarinus officinalis	Rosemary

Lythraceae - Loosestrife Family

Lythrum hyssopifolia	Hyssop loosestrife

Malvaceae - Mallow Family

Malva parviflora	Cheeseweed
Malvella leprosa	Alkali mallow

Martyniaceae

Proboscidea louisianica	Ram's horn

Montiaceae - Miner's Lettuce Family

Calandrinia menziesii	Red maids

Moraceae - Mulberry Family

Ficus carica	Common fig
Morus alba	White mulberry

Myrsinaceae - Myrsine Family

Lysimachia arvensis	Scarlet pimpernel

Myrtaceae - Myrtle Family

Eucalyptus camaldulensis	Red gum
Eucalyptus globulus	Blue gum

Oleaceae - Olive Family

Fraxinus sp.	Ash
Ligustrum sp.	Privet
Olea europaea	Olive

Onagraceae - Evening Primrose Family

Epilobium brachycarpum	Summer cottonweed
Epilobium ciliatum	Hairy willow-herb

Orobanchaceae

Castilleja attenuate	Narrow leaved owl's clover

Triphysaria eriantha	Butter 'n' eggs

Papaveraceae - Poppy Family

Eschscholzia californica	California poppy

Phrymaceae

Erythranthe guttata	Seep monkey flower

Plantaginaceae - Plantain Family

Plantago erecta	California plantain
Plantago lanceolata	English plantain
Plantago major	Common plantain

Polygonaceae - Buckwheat Family

Persicaria hydropiperoides	False waterpepper
Polygonum aviculare	Common knotweed
Rumex acetosella	sheep sorrel
Rumex crispus	Curly dock
Rumex pulcher	Fiddle dock
Rumex salicifolius	Willow dock

Ranunculaceae

Ranunculus californicus	California buttercup

Rosaceae - Rose Family

Cotoneaster sp.	Cotoneaster
Prunus spp..	Prunus
Rosa californica	California rose
Rosa sp.	Rose
Rubus armeniacus	Himalayan blackberry

Rubiaceae - Madder Family

Galium aparine	Goose grass

Salicaceae - Willow Family

Populus alba	White poplar
Populus fremontii	Fremont cottonwood
Populus nigra	Lombardy poplar
Salix exigua	Narrow-leaved willow
Salix gooddingii	Goodding's black willow
Salix laevigata	Red willow
Salix lasiolepis	Arroyo willow

Scrophulariaceae

Verbascum blattaria	Moth mullein

Simaroubaceae - Quassia Family

Ailanthus altissima	Tree of heaven

Verbenaceae - Vervain Family

Phyla nodiflora	Common frog-fruit

Viscaceae - Mistletoe Family

Phoradendron leucarpum subsp. tomentosum	Oak mistletoe

Angiosperms -Monocots

Alismataceae - Water-Plantain Family

Alisma triviale	California water plantain

Amaryllidaceae - Amaryllis Family

Agapanthus orientalis	Lilly-of-the-Nile

Arecaceae (Palmae) - Palm Family

Washingtonia filifera	California fan palm

Cyperaceae - Sedge Family

Cyperus eragrostis	Tall flatsedge

Poaceae (Gramineae) - Grass Family

Avena fatua	Wild oat
Briza minor	Small quaking grass
Bromus diandrus	Ripgut grass
Bromus hordeaceus	Soft chess
Bromus rubens	Red brome
Crypsis schoenoides	Swamp grass
Cynodon dactylon	Bermudagrass
Dactylis glomerata	Orchard grass
Echinochloa crus-galli	Barnyard grass
Elymus caput-medusae	Medusahead
Elymus triticoides	Beardless wildrye
Festuca arundinacea	Tall fescue
Festuca myuros	Rattail sixweeks grass
Festuca perennis	Italian ryegrass
Hordeum marinum subsp. gussoneanum	Mediterranean barley
Hordeum murinum subsp. leporinum	Hare barley
Paspalum dilatatum	Dallis grass
Phalaris aquatica	Harding grass
Phalaris paradoxa	Paradox canary-grass
Poa annua	Annual bluegrass
Polypogon monspeliensis	Annual beard grass
Setaria verticillate	Hooked bristlegrass
Sorghum halepense	Johnsongrass

Themidaceae

Brodiaea elegans	Harvest brodiaea
Triteleia hyacinthina	Wild hyacinth

Typhaceae - Cattail Family

Typha angustifolia	Narrow-leaved cattail
Typha latifolia	Broad-leaved cattail

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Adoxaceae				
Viburnum ellipticum Western viburnum	Fed: - State: - CNPS: Rank 2B.3	May-July	Chaparral; cismontane woodland; lower montane coniferous forest.	None. No suitable habitat. Site lacks shaded, wooded slopes.
Apiaceae (Umbelliferae)				
Cicuta maculata bolanderi Bolander's waterhemlock	Fed: - State: - CNPS: Rank 2B.1	July-September	Marshes and swamps (coastal, fresh, or brackish). 0 to 200 meters.	None. No suitable habitat. Site lacks coastal wetlands.
Lilaeopsis masonii Mason's lilaeopsis	Fed: - State: CR CNPS: Rank 1B.1	April-October	Marshes and swamps (brackish or freshwater); riparian scrub.	None. No suitable habitat. Site lacks tidal areas.
Asteraceae (Compositae)				
Centromadia parryi parryi Pappose tarplant	Fed: - State: - CNPS: Rank 1B.2	May-November	Coastal prairie; meadows and seeps; marshes and swamps; vernally wet grassland (sometimes alkaline).	Unlikely. Species requires alkaline conditions which are minimal on the site.
Isocoma arguta Carquinez goldenbush	Fed: - State: - CNPS: Rank 1B.1	August-December	Valley and foothill grassland (alkaline).	Unlikely. Species requires alkaline conditions which are minimal on the site.
Lasthenia chrysantha Alkali-sink goldfields	Fed: - State: - CNPS: Rank 1B.1	February-June	Vernal pools, wet saline flats	None. No suitable habitat. Site lacks vernal pools, saline flats.

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Lasthenia conjugens Contra Costa goldfields	Fed: FE State: - CNPS: Rank 1B.1	March-June	Valley and foothill grassland (mesic); vernal pools.	None. No suitable habitat. Site lacks vernal pools and wet meadows.
Lasthenia glabrata coulteri Coulter goldfields	Fed: - State: - CNPS: Rank 1B.1	February-June	Marshes and swamps (coastal salt); playas; vernal pools.	None. No suitable habitat. Site lacks saline conditions, vernal pools.
Symphyotrichum lentum Suisun Marsh aster	Fed: - State: - CNPS: Rank 1B.2	August-November	Marshes and swamps (brackish and fresh water)	Unlikely. Marginal habitat present in abandoned golf course pond,
Boraginaceae				
Plagiobothrys hystriculus Bearded-nut popcornflower	Fed: - State: - CNPS: Rank 1B.1	April-May	Valley and foothill grasslands (mesic); vernal pools.	Unlikely. Marginal habitat present in northern area grassland. No vernal pools.
Brassicaceae (Cruciferae)				
Lepidium latipes heckardii Heckard's peppergrass	Fed: - State: - CNPS: Rank 1B.2	April-May	Valley and foothill grassland (alkaline flats).	None. No suitable habitat. Site lacks alkaline soils.
Campanulaceae				
Downingia pusilla Dwarf downingia	Fed: - State: - CNPS: Rank 2B.2	March-May	Vernal pools and seasonal wetlands.	Unlikely. Marginal habitat present in seasonal wetland.

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Legenere limosa Legenere	Fed: - State: - CNPS: Rank 1B.1	April-June	Vernal pools and seasonal wetlands.	Unlikely. Marginal habitat present in seasonal wetland.
Chenopodiaceae				
Atriplex cordulata cordulata Heartscale	Fed: - State: - CNPS: Rank 1B.2	April-October	Meadows and seeps; chenopod scrub; valley and foothill grassland (sandy); [saline or alkaline].	None. No suitableh abitat. Site lacks saline/alkaline areas.
Atriplex depressa Brittlescale	Fed: - State: - CNPS: Rank 1B.2	May-October	Chenopod scrub; playas; valley and foothill grassland; [alkaline or clay].	None. No suitable habitat. Site lacks saline/alkaline areas.
Atriplex persistens Vernal pool smallscale	Fed: - State: - CNPS: Rank 1B.2	July-October	Vernal pools (alkaline).	None. No suitable habitat. Site lacks saline/alkaline areas, vernal pools.
Extriplex joaqinana San Joaquin spearscale	Fed: - State: - CNPS: Rank 1B.2	April-September	Chenopod scrub; meadows; valley and foothill grassland; [alkaline].	None. No suitable habitat. Site lacks alkaline areas.
Fabaceae (Leguminosae)				
Astragalus tener ferrisiae Ferris' milkvetch	Fed: - State: - CNPS: Rank 1B.1	April-May	Meadows (vernally mesic); valley and foothill grassland (subalkaline flats).	None. No suitable habitat. Site lacks alkaline areas.

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Astragalus tener tener Alkali milkvetch	Fed: - State: - CNPS: Rank 1B.2	March-June	Playas; valley and foothill grassland (adobe clay), vernal pools (alkaline).	None. No suitable habitat. Site lacks alkaline areas, vernal pools.
Lathyrus jepsonii jepsonii Delta tule pea	Fed: - State: - CNPS: Rank 1B.2	May-September	Marshes and swamps (freshwater and brackish).	None. No suitable habitat. Site lacks coastal marsh.
Trifolium amoenum Showy Indian clover	Fed: FE State: - CNPS: Rank 1B.1	April-June	Coastal bluff scrub; Valley and foothill grassland (sometimes serpentinite)	None. No suitable habitat. Site lacks mois heavy soils.
Trifolium hydrophilum Saline clover	Fed: - State: - CNPS: Rank 1B.2	April-June	Marshes and swamps; valley and foothill grassland (mesic, alkaline); vernal pools. 0-300 m.	None. No suitable habitat. Site lacks salt marsh, vernal pools.
Liliaceae				
Calochortus pulchellus Mt. Diablo fairy lantern	Fed: - State: - CNPS: Rank 1B.2	April-June	Chaparral; cismontane woodland; valley and foothill grassland.	None. No suitable habitat. Site lacks wooded slopes.
Fritillaria liliacea Fragrant fritillary	Fed: - State: - CNPS: Rank 1B.2	February-April	Coastal prairie; coastal scrub; valley and foothill grassland; [often serpentinite].	None. No suitable habitat. Site too disturbed and too distant from Coast.
Fritillaria pluriflora Adobe-lily	Fed: - State: - CNPS: Rank 1B.2	February-April	Chaparral; cismontane woodland; valley and foothill grassland; [often adobe, generally serpentine of interior foothills].	None. No sitable habitat. Site lacks serpentine on hills.

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Linaceae				
Hesperolinon breweri Brewer's dwarf flax	Fed: - State: - CNPS: Rank 1B.2	May-July	Chaparral; cismontane woodland; valley and foothill grassland; [mostly serpentinite].	None. No suitable habitat. Site lacks chaparral, serpentinite.
Malvaceae				
Hibiscus lasiocarpos occidentalis Wooly rose-mallow	Fed: - State: - CNPS: Rank 1B.2	June-September	Marshes and swamps (freshwater).	None. No suitable habitat. Site lacks suitable marsh habitat.
Sidalcea keckii Keck's checkerbloom	Fed: FE State: - CNPS: Rank 1B.1	April-May	Cismontane woodland; valley and foothill grassland; [serpentinite].	None. No uitable habitat. Site lacks undisturbed grassy slopes
Orobanchaceae				
Chloropyron molle hispidum Hispid salty bird's-beak	Fed: - State: - CNPS: Rank 1B.1	June-September	Meadows; playas; [alkaline]. 1-155m.	None. No suitable habitat. Site lacks alkaline soils.
Plantaginaceae				
Gratiola heterosepala Bogg's Lake hedge-hyssop	Fed: - State: CE CNPS: Rank 1B.2	April-August	Vernal pools.	None. No suitable habitat. Site lacks vernal pools.
Poaceae (Gramineae)				
Neostapfia colusana Colusa grass	Fed: FT State: CE CNPS: Rank 1B.1	May-July	Vernal pools.	None. No suitable habitat. Site lacks vernal pools.

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Orcuttia inaequalis San Joaquin Valley Orcutt grass	Fed: FT State: CE CNPS: Rank 1B.1	May-September	Vernal pools.	None. No suitable habitat. Site lacks vernal pools.
Puccinellia simplex California alkali grass	Fed: - State: - CNPS: Rank 1B.2	March-May	Alkaline, vernally mesic; sinks, flats, lake margins. Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools.	None. No suitable habitat. Site lacks alkaline areas.
Tuctoria mucronata Crampton's tuctoria	Fed: FE State: CE CNPS: Rank 1B.	April-July	Vernal pools.	None. No suitable habitat. Site lacks vernal pools.
Polemoniaceae				
Gilia capitata tomentosa Woolly-headed gilia	Fed: - State: - CNPS: Rank 1B.1	May-July	Coastal bluff scrub (rocky, outcrops). 15-155 m.	None. No suitable habitat. Site lacks coastal bluffs.
Navarretia leucocephala bakeri Baker's navarretia	Fed: - State: - CNPS: Rank 1B.1	May-July	Cismontane woodland; lower montane coniferous forest; meadows (mesic); valley and foothill grassland; vernal pools.	None. No suitable habitat. Site lacks vernal pools.
Potamogetonaceae				
Stuckenia filiformis alpina Slender-leaved pondweed	Fed: FSW State: - CNPS: Rank 2B.2	May-July	Marshes and swamps (assorted shallow freshwter).	None. No suitable habitat. Site lacks suitable aquatic habitat. Species occurs at higher elevation.

Appendix B

Green Tree - Potentially-occuring Special-status Plants

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Ranunculaceae				
Delphinium recurvatum Recurved larkspur	Fed: - State: - CNPS: Rank 1B.2	March-June	Chenopod scrub; cismontane woodland; valley and foothill grassland; [alkaline].	None. No suitable habitat. Site lacks alkaline areas.
Myosurus minimus apus Little mousetail	Fed: - State: - CNPS: Rank 3.	March-June	Vernal pools (alkaline).	None. No suitable habitat. Site lacks alkaline areas.
Scrophulariaceae				
Limosella australis Delta mudwort	Fed: - State: - CNPS: Rank 2B.1	May-August	Usually mud banks; marshes and swamps (freshwater or brackish); riparian scrub	None. No suitable habitat. Site lacks intertidal flats.

***Status**

Federal:
FE - Federal Endangered
FT - Federal Threatened
FPE - Federal Proposed Endangered
FPT - Federal Proposed Threatened
FC - Federal Candidate
FSS - Forest Service Sensitive
FSW - Forest Service Watchlist

State:
CE - California Endangered
CT - California Threatened
CR - California Rare
CSC - California Species of Special Concern

CNPS (California Native Plant Society - List.RED Code):
Rank 1A - Extinct
Rank 1B - Plants rare, threatened, or endangered in California and elsewhere
Rank 2A- Plants extinct in California, but more common elsewhere
Rank 2B - Plants rare, threatened, or endangered in California, more common elsewhere
Rank 3 - Plants about which more information is needed, a review list
Rank 4 - Plants of limited distribution, a watch list
RED Code
1 - Seriously endangered (>80% of occurrences threatened)
2 - Fairly endangered (20 to 80% of occurrences threatened)
3 - Not very endangered (<20% of occurrences threatened)

Appendix G

Vernal Pool Branchiopod Survey Reports

PROTOCOL-LEVEL
WET-SEASON SAMPLING
FOR
FEDERALLY-LISTED LARGE BRANCHIOPODS
AT THE
GREENTREE DEVELOPMENT PROJECT,
SOLANO COUNTY, CALIFORNIA
(USFWS# 2021-TA-0570)

Prepared for:

Briscoe Ivester & Bazel LLP

BRISCOE IVESTER & BAZEL, LLP
235 Montgomery Street, Suite 935
San Francisco, CA 94104
Contact: **Peter Prows**
(415) 994-8991

Prepared by:

HELM BIOLOGICAL CONSULTING
A Tansley Team Division
4600 Karchner Rd, Sheridan, CA 95681

HELM BIOLOGICAL CONSULTING
4600 Karchner Road
Sheridan, CA 95681
***Contact*: Brent Helm**
(530) 633-0220

May 2021

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A Tansley Team Division
4600 Karchner Rd, Sheridan, CA 95681

PROTOCOL-LEVEL WET-SEASON SAMPLING FOR FEDERALLY-LISTED LARGE BRANCHIOPODS AT THE GREENTREE DEVELOPMENT PROJECT, SOLANO COUNTY, CALIFORNIA

(USFWS# 2021-TA-0570)

INTRODUCTION

Helm Biological Consulting (HBC), a division Tansley Team, Inc., was contracted by Briscoe, Ivester, and Bazel, LLC to conduct protocol-level wet-season sampling for large branchiopods (fairy shrimp, tadpole shrimp, and clam shrimp) that are listed as threatened or endangered under the federal Endangered Species Act (e.g., vernal pool fairy shrimp [*Branchinecta lynchi*] and vernal pool tadpole shrimp [*Lepidurus packardi*]) at the Greentree Development Project (hereafter "Study Area").

The Study Area is comprised of approximately 189.37 acres and is located west of Leisure Town Road, southeast of Orange Drive, and north of Ulatis Creek, in the City of Vacaville, Solano County, California (Exhibit A). Additionally, the Study Area is located within an unsectioned portion of Township 6 North, Range 1 West, Mount Diablo Base and Meridian of the Allendale and Elmira U.S. Geological Survey 7.5-minute quadrangle maps (Exhibit A); approximate center coordinates (World Geodetic System 1984 [WGS84]) are: 38.3791°N, 121.9372°W). The Study Area consists of an abandoned golf course with small ephemeral pools in areas that were not leveled correctly during development and ponds that are associated with the adjacent residential community storm-water system.

The remainder of this report discusses the methods and results of the wet-season sampling for the presence of federally-listed large branchiopods at the Project.

"We certify that the information in this survey report and attached exhibits fully and accurately represents our work."

Brent P. Helm Signature _____ Date 05-21-2021
(TE-795930-10.2)

Sean M. O'Brien Signature _____ Date 05-21-2021
(TE-795930-10.2)

METHODS

Dr. Brent Helm and/or Mr. Sean O'Brien of HBC conducted seven rounds of protocol-level wet-season sampling during the 2020/2021 wet-season as follows:

- 1st round: December 22
- 2nd round: January 5
- 3rd round: January 19
- 4th round: February 5
- 5th round: February 19
- 6th round: March 5
- 7th round: March 19

The wet-season sampling was conducted under permit TE-795930-10.2 of Section 10(a)(1)(A) of the federal Endangered Species Act, 16 U.S.C. 1531 et seq., and its implementing regulations as authorized by the U.S. Fish and Wildlife Service (USFWS) (Appendix A). Methods generally followed USFWS's (2017) *Survey Guidelines for Listed Large Branchiopods* (hereafter "Survey Guidelines") for wet-season sampling.

Wet sampling was conducted in all basins (habitats) at the Study Area that had potential to support federally-listed large branchiopods. An aquatic resources map (Moore Biological Consultants 2021, Exhibit B), aerial imagery of the Study Area obtained from Google Earth© (2021), and other documents provided by the Client were utilized to target appropriate habitats for sampling. Habitats sampled that were not previously included on the aquatic resources map were mapped using a point in the center of the wetland with the aid of a handheld Global Positioning System (GPS) unit with sub meter accuracy and numbered chronologically with a HBC prefix.

Potential habitat for federally-listed large branchiopods is defined as any seasonal inundated depression that on average ponds water at a sufficient depth and duration for a listed large branchiopod to complete its lifecycle (generally 2.0 inches or greater in depth for 14 or more consecutive days for fairy shrimp and 30 or more consecutive days for tadpole shrimp) (USFWS 2017). Generally these habitats occur within the California Floristic Province at elevations below 1,707 meters in the Coast Ranges (CNDDB #178) and below 914 meters for the rest of California and Oregon (CNDDB #244) and Oregon (USFWS 2017). Habitats that swiftly flow water (e.g., creeks, streams, and ephemeral drainages), semi-to-permanently inundated areas that support perennial population of predators (e.g., bullfrogs, fish, and crayfish), and habitats that receive water during the dry season (i.e., artificial water sources) were not generally considered suitable habitat for federally-listed large branchiopods (USFWS 2017).

According the Survey Guidelines, the Study Area is within Survey Zone A (Southern Oregon, Sacramento Valley, San Francisco Bay Area, North Coast Ranges, Northern Sierra Valley Foothills, Cascade Range foothills, and South Coast Ranges) (USFWS 2017). Therefore wet-season sampling was initiated 14 days after any of the habitats on site (determined to potential large branchiopod habitat) ponded a minimum of 3 centimeters (cm) of standing water. The

habitats were first inundated following storm events between December 12-17, 2020 (Weather Underground 2021), therefore wet-season sampling was initiated on December 22, 2020. Wet-season sampling was then continued at a minimum of 14-day intervals until the habitats were dry or 90 continuous ponding days had occurred. In cases when the habitats dried and refilled the 90 days would start over. Specific sampling methods are described below.

Each habitat was viewed for active large branchiopods prior to entering the water. Any large branchiopods observed were quickly netted, viewed with the aid of a 30x hand lens to determine species, and released unharmed back into the environment from which they were obtained. If no large branchiopods were observed, then a semi-quantitative sample was taken to determine the relative abundance of large branchiopods as follows.

A dip net was lowered vertically into the deepest portion of the inundated habitat (usually the center) and rested on the bottom. The 80-µm mesh size dip net was then moved in the direction of the longest axis of the habitat for approximately one-meter. In instances where half of the habitat length is less than one meter in length, the dip net was repositioned in the deepest portion of the habitat and moved in the opposite direction for the remainder of the one-meter sample. Given the aperture of the dip net of 0.025 m^2 and distance the dip net was moved, roughly 0.025 m^3 or 25 liters of the water column was sampled horizontally each time. In those cases when the water column was shallower than the dip net aperture height, the volume of water per sweep was calculated by the horizontal distance the net is moved multiplied by the width of the dip net (25-cm) multiplied by the depth of water. After the completion of each sample sweep, the contents of the net were examined for large branchiopods. All large branchiopods captured in the dip net were identified to the lowest justifiable taxon in the field, and recorded on standardized data sheets. The relative numbers of individuals observed within each taxonomic group was recorded in one of five categories: rare (≤2 individuals), not common (3-10 individuals), common (11-50 individual), very common (51 -100 individuals), and abundant (>100 individuals). This method allows for the relative abundances and richness of large branchiopods to be compared between and among wetlands through time. Additionally, this method allows for concentration estimates of large branchiopods to be calculated as number of individuals per liter of water (= number of individuals/net aperture area x length of sweep).

If federally-listed large branchiopods were not detected during the semi-quantified sampling method, then the entire habitat was sampled as follows. Starting at one end of the habitat, the net was moved from one side of the habitat to the other in a zigzag fashion, until the opposite end of the habitat was reached. During this procedure, the net was often bounced along the habitat bottom (to encourage large branchiopods to move up into the water column from hiding places for easier capture) and viewed often for evidence of large branchiopods. If still no federally listed large branchiopods were captured, then additional netting took place in specific locations within the habitat that may have not been sampled during prior efforts. Additional taxonomic groups of large branchiopods detected using this alternative method is noted as present by an “X” on the standardized field data sheet. After the taxonomic identification and enumeration were

completed, the contents of the net were placed back into the habitat from which they were collected.

Data concerning air and water temperatures, present depths (maximum and average [ft]), present ponding surface area (percent inundation), and habitat conditions were collected during each field visit. The potential depths (maximum and average [ft]) and potential ponding surface area percentage were visually estimated. Additionally, presence and abundance data were recorded for all other aquatic species using the same methods as described above for large branchiopod sampling. Representative photographs were taken of the habitats sampled and species observed.

RESULTS

A total of 40 basins were evaluated for their potential to support federally-listed large branchiopods (Exhibit B). After the first three sampling rounds (December 22, 2020; January 5 and 19, 2021), it was determined that twenty-one (21) of these basins (D-3, D-5, D-7, D-8, D-9, P-1, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9, P-10, P-11, P-12, P-13, P-14, RC-1, and RC-2) were not considered suitable habitat for federally-listed large branchiopods because they are semi-to-permanently inundated areas that support populations of perennial aquatic predators (e.g., fish and crayfish). Most of these habitats are hydrologically connected via a roadside ditch. Fish and crayfish were observed in several of these habitats during wet-season sampling (Appendix B). Additionally, conversations with the site manager revealed that all of the onsite perennial ponds, freshwater emergent wetlands, open water habitats and the ditches connecting them are annually stocked with western mosquitofish (*Gambusia affinis*) for mosquito abatement.

Eleven basins from the aquatic resources map (D-1, D-2, D-4, D-6, P-1, SW-1, SW-2, SW-3, SW-4, SW-5, and SW-6) and eight additional basins (HBC-1, HBC-2, HBC-3, HBC-4, HBC-5, HBC-6, HBC-7, and HBC-8) are ephemeral and were considered potential habitat for federally-listed large branchiopods and therefore wet-season sampling was continued. During wetter years, P-1 likely inundates more completely and would also be stocked with western mosquitofish. However, since P-1 is hydrological isolated from the interconnected system of ponds and ditches onsite, wet-season sampling was conservatively continued within this habitat.

Of the 19 habitats that had potential to support large branchiopods, only two basins (D-4 and P-1) ponded for any duration during the 2020/2021 wet-season. After all seven rounds of wet-season sampling, no federally-listed large branchiopods were detected within the habitats sampled. Field data forms from each wet-season sampling date are provided in Appendix B. Representative photographs of the habitats sampled are provided in Appendix C.

LITERATURE CITED

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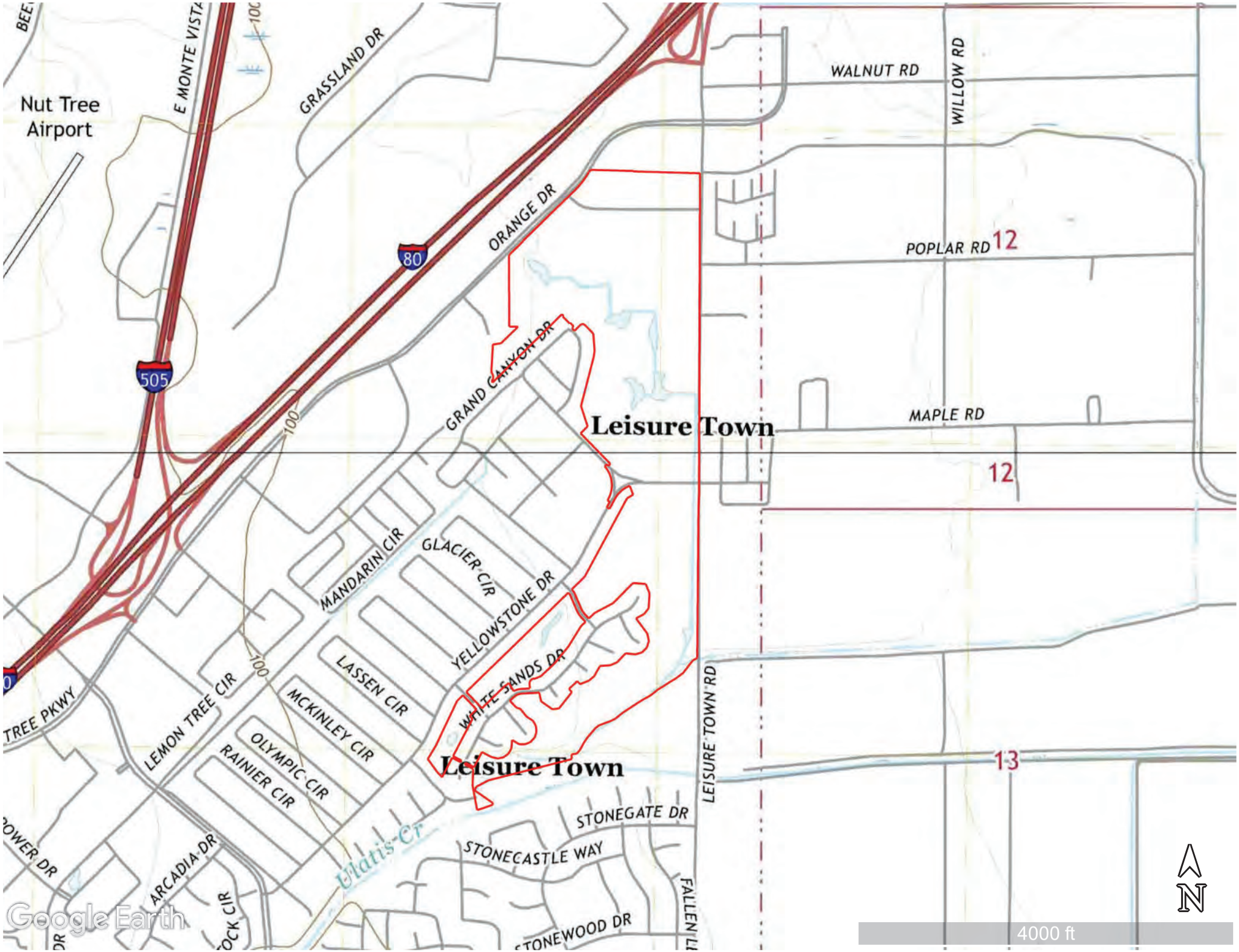
U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). 2017. Survey guidelines for the listed large branchiopods. 24 pp. Dated: 31 May 2015 (Revised November 13, 2017)

Weather Underground. 2021. Weather History for Vacaville, CA. Nut Tree Station. Available online: https://www.wunderground.com/history/monthly/KVCB/date/1982-1

EXHIBIT A.
LOCATION OF STUDY AREA ON USGS TOPOGRAPHIC QUADRANGLE MAP (RED BOUNDARY = STUDY AREA LOCATION)


Nut Tree Airport
E MONTE VISTA
GRASSLAND DR
WALNUT RD
WILLOW RD
ORANGE DR
80
505
POPLAR RD
12
GRAND CANYON DR
Leisure Town
MAPLE RD
12
MANDARIN CIR
GLACIER CIR
YELLOWSTONE DR
LASSEN CIR
MCKINLEY CIR
OLYMPIC CIR
RAINIER CIR
LEMON TREE CIR
WHITE SANDS DR
LEISURE TOWN RD
Leisure Town
13
STONEGATE DR
STONECASTLE WAY
ARCADIA DR
Ulatis Cr
STONEWOOD DR
Google Earth
4000 ft
N

HELM
BIOLOGICAL CONSULTING
A Tansley Team Division
4600 Karchner Rd, Sheridan, CA 95681

EXHIBIT B.
AQUATIC RESOURCES
GREENTREE DEVELOPMENT PROJECT
(MOORE BIOLOGICAL CONSULTING 2021)

Ph: (530) 633-0220
Fax: (530) 633-0230

AQUATIC RESOURCES

Feature	Label	Area (sf)	Area (acre)
Seasonal Wetland	SW-1	498	0.01
	SW-2	324	0.01
	SW-3	282	0.01
	SW-4	193	0.01
	SW-5	258	0.01
	SW-6	2,403	0.06
	subtotal	*3,959*	*0.11*
Pond	P-1	34,703	0.80
	P-2	35,436	0.81
	P-3	36,747	0.84
	P-4	44,831	1.03
	P-5	44,501	1.02
	P-6	4,280	0.10
	P-7	3,251	0.07
	P-8	7,546	0.17
	P-9	3,718	0.09
	P-10	33,044	0.76
	P-11	3,221	0.07
	P-12	34,788	0.80
	P-13	28,215	0.65
	P-14	11,162	0.26
	subtotal	*325,442*	*7.47*
Ditch	D-1	1,395	0.03
	D-2	1,512	0.03
	D-3	3,621	0.08
	D-4	2,752	0.06
	D-5	13,213	0.30
	D-6	3,377	0.08
	D-7	15,205	0.35
	D-8	2,508	0.06
	D-9	10,307	0.24
	subtotal	*53,891*	*1.24*
Remnant Channel	RC-1	14,920	0.34
	RC-2	1,600	0.04
	subtotal	*16,520*	*0.38*
	Total	**399,812**	**9.20**

Data Disclaimer:
The delineation has been done in accordance with the 1987 Wetlands Delineation Manual, US Army Corps of Engineers and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. The boundaries and jurisdictional status of all waters shown on this map are preliminary and subject to verification by the U.S. Army Corps of Engineers.

Study Area (±189.37 ac.)

Culvert

▲-1 3-Parameter Data Point

N

0 250 500

Moore Biological Consultants

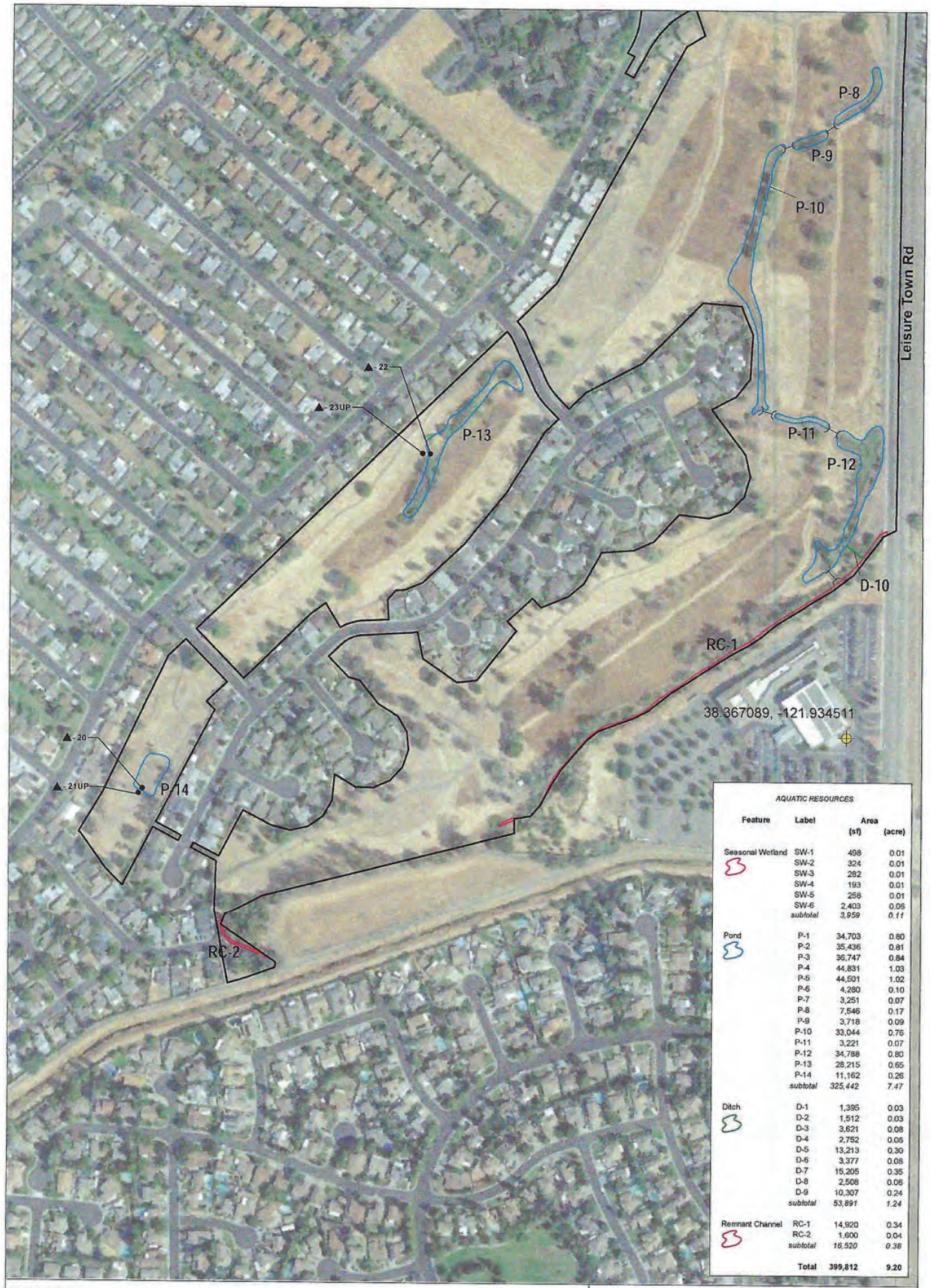
Page 1 of 2

Map Date: 05/19/2021

Aquatic Resources

Greentree Development Project

City of Vacaville, Solano County, CA



AQUATIC RESOURCES

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	SW-4	193	0.01
	SW-5	258	0.01
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	P-8	7,546	0.17
	P-9	3,718	0.09
	P-10	33,044	0.76
	P-11	3,221	0.07
	P-12	34,788	0.80
	P-13	28,215	0.65
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	subtotal	*325,442*	*7.47*
Ditch	D-1	1,395	0.03
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	D-7	15,205	0.35
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	subtotal	*16,520*	*0.38*
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Data Disclaimer:
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Study Area (±189.37 ac.)

Culvert

▲-1 3-Parameter Data Point

N

0 250 500

Moore Biological Consultants

Map Date: 05/19/2021

Aquatic Resources

Greentree Development Project

City of Vacaville, Solano County, CA

APPENDIX A.
USFWS AUTHORIZATION LETTER

Gmail

Sean O'Brien <sobrien@tansleyteam.com>

USFWS Sampling Request for Helm Biological Consulting (TE-795930-10.2) - Green Tree Project

Lantz, Samantha M <samantha_lantz@fws.gov> Thu, Dec 17, 2020 at 8:25 AM
To: Sean O'Brien <sobrien@tansleyteam.com>
Cc: Brent Helm <bhelm@tansleyteam.com>, "Havens, Michelle R" <michelle_havens@fws.gov>

Hi Sean and Brent,

By this email message, you are authorized to conduct 2020-2021 protocol-level vernal pool branchiopod surveys (dry and wet-season), as specified in your December 14, 2020 email request and per the conditions of your recovery permit (TE-795930). Surveys will be conducted at the Green Tree Project in Solano County, CA.

Surveys may be conducted within all areas identified on-site that may provide suitable habitat. Please remember to carry a copy of your permit while doing the work and to follow the terms and conditions of the permit, including the reporting requirements. In your report(s), please include which activities were authorized, the names of all persons involved in each activity, their recovery permit numbers, if applicable, and the date of this authorization, to help ensure that we correctly record the fulfillment of the reporting requirement under this authorization. Please let us know if the activities are not performed as authorized, or if they are done by a different permittee under a separate authorization. This authorization does not include access to the property which must be arranged with the landowner or manager. **Please send electronic copies of the report(s) to Sam Lantz (samantha_lantz@fws.gov) and Michelle Havens (michelle_havens@fws.gov) and use Service reference number 2021-TA-0570 in future correspondence for these surveys.**

Thanks,

Sam

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Samantha Lantz, PhD
Fish and Wildlife Biologist
USFWS, Sacramento Field Office
Listing and Recovery Division
2800 Cottage Way W-2605
Sacramento, CA 95825-1888
Phone: 916-414-6526
Pronouns: she/her/hers

In an effort to slow the spread of the coronavirus (COVID-19), staff in the Sacramento Fish and Wildlife Office have implemented an aggressive telework schedule. At this time, we are responding to requests for information via email or phone as often as possible as we do not have the in-office capacity to support regular mail service. We appreciate your understanding.

From: Sean O'Brien <sobrien@tansleyteam.com>
Sent: Monday, December 14, 2020 11:33 AM
To: Lantz, Samantha M <samantha_lantz@fws.gov>
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cc: Brent Helm <bhelm@tansleyteam.com>
Subject: [EXTERNAL] USFWS Sampling Request for Helm Biological Consulng (TE -795930-10.2) - Green Tree Project

[Quoted text hidden]

APPENDIX B.
WET-SEASON
FIELD DATA FORMS

Project: Green Tree Project | **Surveyor(s): O'Brien** | **Quad: Allendale and Elmira** | **County: Solano**
Date: 12/22/2020 | **Weather Cond: 10% cloud cover** | **Township: 6 North** | **Lat.: 38.3791**
Time: 12:00 PM to 3:00 PM | **Air Temperature(°F): 59** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,

l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odonata		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
D-1	Dry																																					
D-2	Dry																																					
D-3	53	12	7	36+	36+	5																																
D-4	54	10	5	24	12	25															X																	
D-5	54	8	4	36+	36+	2																																
D-6	Dry																																					
D-7	54	36+	36	36+	36+	20																																
D-8	53	6	4	36+	30	5																																
D-9	54	8	5	36+	30	10																																
D-10	Dry																																					
P-1	Dry																																					
P-2	Dry																																					
P-3	Dry																																					
P-4	52	36+	36+	36+	36+	15															NC			R														
P-5	52	36+	36+	36+	36+	15															X			X														
P-6	52	36	20	36+	36+	25															X																	
P-7	53	36	20	36+	36+	30															X			X														
P-8	Dry																																					
P-9	Dry																																					
P-10	52	18	7	36+	36+	3																																
P-11	53	6	4	36+	36+	2																																
P-12	51	36+	36+	36+	36+	10															X																	
P-13	52	36+	36	36+	36+	25															X							X										Fish (likely *Gambusia* sp.) observed
P-14	51	36+	36+	36+	36+	60																																
RC-1	Dry																																					
RC-2	Dry																																					
SW 1	Dry																																					
SW 2	Dry																																					
SW 3	Dry																																					
SW 4	Dry																																					
SW 5	Dry																																					
SW 6	Dry																																					
HBC-1	Dry																																					
HBC-2	Dry																																					
HBC-3	Dry																																					
HBC-4	Dry																																					
HBC-5	Dry																																					
HBC-6	Dry																																					
HBC-7	Dry																																					
HBC-8	Dry																																					

Project: Green Tree Project | **Surveyor(s): O'Brien** | **Quad: Allendale and Elmira** | **County: Solano**

Date: 1/5/2021 | **Weather Cond: 10% cloud cover** | **Township: 6 North** | **Lat.: 38.3791**

Time: 12:00 PM to 3:00 PM | **Air Temperature(°F): 54** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,

l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
D-1	Dry																																				
D-2	Dry																																				
D-3	51	10	6	36+	36+	5																					NC										
D-4	51	9	4	24	12	20																															
D-5	52	6	3	36+	36+	1													R																		
D-6	Dry																																				
D-7	53	36+	30	36+	36+	15															NC					NC		R									
D-8	Dry																																				
D-9	52	12	8	36+	30	5	NC																														Fish (likely Gambusia sp.) observed
D-10	Dry																																				
P-1	Dry																																				
P-2	Dry																																				
P-3	Dry																																				
P-4	52	36+	36+	36+	36+	15															NC					NC		R									
P-5	51	36+	36+	36+	36+	15															NC					X		X									
P-6	53	36	30	36+	36+	20															C					NC		X									
P-7	51	36	26	36+	36+	20															NC					NC		R									Immature crayfish observed, amphipods observed
P-8	Dry																																				
P-9	Dry																																				
P-10	50	36	26	36+	36+	2																															
P-11	51	20	10	36+	36+	3															R																
P-12	50	36+	30	36+	36+	7																															
P-13	51	36+	32	36+	36+	20	C			C											NC			NC		NC		C			NC						
P-14	50	36+	36+	36+	36+	50															NC																
RC-1	Dry																																				
RC-2	Dry																																				
SW-1	Dry																																				
SW-2	Dry																																				
SW-3	Dry																																				
SW-4	Dry																																				
SW-5	Dry																																				
SW-6	Dry																																				
HBC-1	Dry																																				
HBC-2	Dry																																				
HBC-3	Dry																																				
HBC-4	Dry																																				
HBC-5	Dry																																				
HBC-6	Dry																																				
HBC-7	Dry																																				
HBC-8	Dry																																				

Project: Green Tree Project | **Surveyor(s): O'Brien** | **Quad: Allendale and Elmira** | **County: Solano**

Date: 1/19/2021 | **Weather Cond: 5% cloud cover** | **Township: 6 North** | **Lat.: 38.3791**

Time: 1:00 PM to 2:30 PM | **Air Temperature(°F): 58** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,

l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odonata		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
D-1	Dry																																				
D-2	Dry																																				
D-3	53	8	4	36+	36+	3																					X										
D-4	52	5	2	24	12	5																				X											
D-5	53	3	2	36+	36+	1																															
D-6	Dry																																				
D-7	53	36+	28	36+	36+	12				X											X					X		NC			X						
D-8	Dry																																				
D-9	53	10	6	36+	30	5	C			X											X										X						
D-10	Dry																																				
P-1	Dry																																				
P-2	Dry																																				
P-3	Dry																																				
P-4	53	36+	36+	36+	36+	15				NC											C					NC		X									
P-5	52	36+	36+	36+	36+	15				NC											X					X		R									
P-6	52	36	28	36+	36+	15	X			X											C					X		NC			NC						
P-7	52	36	26	36+	36+	15	X			C											X					NC		NC			NC						
P-8	Dry																																				
P-9	Dry																																				
P-10	53	30	20	36+	36+	2				X											X					X											
P-11	52	10	5	36+	36+	2															R																
P-12	52	36	24	36+	36+	5				NC											X					X					NC						
P-13	54	36+	28	36+	36+	15	C			C											C			X		X		C			C						
P-14	55	36+	36+	36+	36+	50				X											X					X											
RC-1	Dry																																				
RC-2	Dry																																				
SW-1	Dry																																				
SW-2	Dry																																				
SW-3	Dry																																				
SW-4	Dry																																				
SW-5	Dry																																				
SW-6	Dry																																				
HBC-1	Dry																																				
HBC-2	Dry																																				
HBC-3	Dry																																				
HBC-4	Dry																																				
HBC-5	Dry																																				
HBC-6	Dry																																				
HBC-7	Dry																																				
HBC-8	Dry																																				

Project: Green Tree Project | **Surveyor(s): O'Brien, Helm** | **Quad: Allendale and Elmira** | **County: Solano**

Date: 2/05/2021 | **Weather Cond: Cool, slight breeze from north** | **Township: 6 North** | **Lat.: 38.3791**

Time: 11:00 AM to 1:00 PM | **Air Temperature(°F): 55** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,

l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
P-1	47	11	6	96	60	1																								NC				C			
D-1	Dry																																				
D-2	Dry																																				
D-4	52	5	3.5	24	12	25	NC										R								X					NC				NC			
D-6	Dry																																				
SW-1	Dry																																				
SW-2	Dry																																				
SW-3	Dry																																				
SW-4	Dry																																				
SW-5	Dry																																				
SW-6	Dry																																				
HBC-1	Dry																																				
HBC-2	Dry																																				
HBC-3	Dry																																				
HBC-4	Dry																																				
HBC-5	Dry																																				
HBC-6	Dry																																				
HBC-7	Dry																																				
HBC-8	Dry																																				

Project: Green Tree Project | **Surveyor(s): O'Brien** | **Quad: Allendale and Elmira** | **County: Solano**
Date: 2/19/2021 | **Weather Cond: 90% cloud cover** | **Township: 6 North** | **Lat.: 38.3791**
Time: 11:00 AM to 1:00 PM | **Air Temperature(°F): 54** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing
UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,
l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
D-1	Dry																																				
D-2	Dry																																				
D-4	52	5	2	24	12	15															R									NC							
D-6	Dry																																				
P-1	47	10	5	96	60	1	C										R													NC				NC			
SW-1	Dry																																				
SW-2	Dry																																				
SW-3	Dry																																				
SW-4	Dry																																				
SW-5	Dry																																				
SW-6	Dry																																				
HBC-1	Dry																																				
HBC-2	Dry																																				
HBC-3	Dry																																				
HBC-4	Dry																																				
HBC-5	Dry																																				
HBC-6	Dry																																				
HBC-7	Dry																																				
HBC-8	Dry																																				

Project: Green Tree Project | **Surveyor(s): Helm** | **Quad: Allendale and Elmira** | **County: Solano**

Date: 3/5/2021 | **Weather Cond: 10% cloud cover, wind from SW** | **Township: 6 North** | **Lat.: 38.3791**

Time: 1:00 PM to 3:00 PM | **Air Temperature(°F): 69** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,

l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
D-1	Dry																																				
D-2	Dry																																				
D-4	Dry																																				
D-6	Dry																																				
P-1	62	5	2	96	60	1	C			C							X				NC				X					C							
SW-1	Dry																																				
SW-2	Dry																																				
SW-3	Dry																																				
SW-4	Dry																																				
SW-5	Dry																																				
SW-6	Dry																																				
HBC-1	Dry																																				
HBC-2	Dry																																				
HBC-3	Dry																																				
HBC-4	Dry																																				
HBC-5	Dry																																				
HBC-6	Dry																																				
HBC-7	Dry																																				
HBC-8	Dry																																				

Project: Green Tree Project | **Surveyor(s): O'Brien** | **Quad: Allendale and Elmira** | **County: Solano**

Date: 3/19/2021 | **Weather Cond: 70% cloud cover** | **Township: 6 North** | **Lat.: 38.3791**

Time: 12:00 PM to 1:30 PM | **Air Temperature(°F): 68** | **Range: 1 West** | **Long.: -121.9372**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition: UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p = plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing,

l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)			Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
								Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Feature No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Surface Area Inundation (% of maximum)	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRME*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
D-1	Dry																																				
D-2	Dry																																				
D-4	Dry																																				
D-6	Dry																																				
P-1	Dry																																				
SW-1	Dry																																				
SW-2	Dry																																				
SW-3	Dry																																				
SW-4	Dry																																				
SW-5	Dry																																				
SW-6	Dry																																				
HBC-1	Dry																																				
HBC-2	Dry																																				
HBC-3	Dry																																				
HBC-4	Dry																																				
HBC-5	Dry																																				
HBC-6	Dry																																				
HBC-7	Dry																																				
HBC-8	Dry																																				

APPENDIX C.
REPRESENTATIVE PHOTOGRAPHS

Photograph of D-8 taken facing northwest on December 22, 2020 (1st sampling round).

Photograph of P-13 taken facing northwest on December 22, 2020 (1st sampling round).

Photograph of P-14 taken facing southwest on December 22, 2020 (1st sampling round).

Photograph of P-1 (dry) taken facing northwest on December 22, 2020 (1st sampling round).

Photograph of P-2 (dry) taken facing northwest on December 22, 2020 (1st sampling round).

Photograph of P-5 taken facing north on December 22, 2020 (1st sampling round).

Photograph of P-12 taken facing northeast on December 22, 2020 (1st sampling round).

Photograph of HBC-3 (dry) taken facing west on December 22, 2020 (1st sampling round).

Photograph of D-4 taken facing west on January 5, 2021 (2nd sampling round).

Photograph of D-6 (dry) taken facing north on January 5, 2021 (2nd sampling round).

Photograph of D-9 taken facing southwest on January 5, 2021 (2nd sampling round).

Photograph of D-5 taken facing south on January 5, 2021 (2nd sampling round).

Photograph of P-13 taken facing southwest on January 5, 2021 (2nd sampling round).

Photograph of P-7 taken facing east on January 5, 2021 (2nd sampling round).

Photograph of juvenile cray fish observed in P-7 on January 5, 2021 (2nd sampling round).

Photograph of P-10 taken facing west on January 5, 2021 (2nd sampling round).

Photograph of SW-6 taken facing northwest on January 5, 2021 (2nd sampling round).

Photograph of D-4 taken facing west on January 19, 2021 (3rd sampling round).

Photograph of P-13 taken facing southwest on January 19, 2021 (3rd sampling round).

Photograph of P-4 taken facing east on January 19, 2021 (3rd sampling round).

Photograph of P-5 taken facing north on January 19, 2021 (3rd sampling round).

Photograph of D-4 taken facing east on February 5, 2021 (4th sampling round).

Photograph of D-6 (dry) taken facing south on February 5, 2021 (4th sampling round).

Photograph of P-1 taken facing northwest on February 5, 2021 (4th sampling round).

Photograph of D-4 taken facing east on February 19, 2021 (5th sampling round).

Photograph of P-1 taken facing northwest on February 19, 2021 (5th sampling round).

Photograph of HBC-4 (dry) taken facing north on February 19, 2021 (5th sampling round).

Photograph of SW-6 (dry) taken facing southwest on March 19, 2021 (7th sampling round).

PROTOCOL-LEVEL
DRY-SEASON SAMPLING
FOR
FEDERALLY-LISTED LARGE BRANCHIOPODS
AT THE
GREENTREE DEVELOPMENT PROJECT,
SOLANO COUNTY, CALIFORNIA
(USFWS# 2021-TA-0570)

Prepared for:

Briscoe Ivester & Bazel LLP

BRISCOE IVESTER & BAZEL, LLP
235 Montgomery Street, Suite 935
San Francisco, CA 94104
Contact: **Peter Prows**
(415) 994-8991

Prepared by:

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HELM BIOLOGICAL CONSULTING
4600 Karchner Road
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***Contact*: Brent Helm**
(530) 633-0220

May 2021

HELM
BIOLOGICAL CONSULTING
A Tansley Team Division
4600 Karchner Rd, Sheridan, CA 95681

PROTOCOL-LEVEL DRY-SEASON SAMPLING FOR FEDERALLY-LISTED LARGE BRANCHIOPODS AT THE GREENTREE DEVELOPMENT PROJECT, SOLANO COUNTY, CALIFORNIA

(USFWS# 2021-TA-0570)

INTRODUCTION

Helm Biological Consulting (HBC), a division of Tansley Team, Inc., was contracted by Briscoe, Ivester, and Bazel, LLC to conduct protocol-level dry-season sampling for large branchiopods (fairy shrimp, tadpole shrimp) that are listed as threatened or endangered under the federal Endangered Species Act (e.g., vernal pool fairy shrimp [*Branchinecta lynchi*] and vernal pool tadpole shrimp [*Lepidurus packardi*]) at the Greentree Development Project (hereafter "Study Area").

The Study Area is comprised of approximately 189.37 acres and is located west of Leisure Town Road, southeast of Orange Drive, and north of Ulatis Creek, in the City of Vacaville, Solano County, California (Exhibit A). Additionally, the Study Area is located within an unsectioned portion of Township 6 North, Range 1 West, Mount Diablo Base and Meridian of the Allendale and Elmira U.S. Geological Survey 7.5-minute quadrangle maps (Exhibit A); approximate center coordinates (World Geodetic System 1984 [WGS84]) are: 38.3791°N, 121.9372°W). The Study Area consists of an abandoned golf course with small ephemeral pools in areas that were not leveled correctly during development and ponds that are associated with the adjacent residential community storm-water system.

Earlier this year, HBC (2021) conducted protocol-level wet-season sampling for federally-listed large branchiopods at the Study Area. In summary, HBC found no evidence of federally-listed large branchiopods onsite.

The remainder of this report discusses the methods and results of the 2021 dry-season sampling for the presence of federally-listed large branchiopods at the Study Area.

"We certify that the information in this survey report and attached exhibits fully and accurately represents our work."

Brent P. Helm Signature _____ Date 05-21-2021
(TE-795930-10.2)

Sean M. O'Brien Signature _____ Date 05-21-2021
(TE-795930-10.2)

METHODS

Methods followed U.S. Fish and Wildlife Service's (USFWS 2017) *Survey Guidelines for Listed Large Branchiopods* (hereafter "Survey Guidelines") for dry-season sampling and consisted of first soil collection and second soil processing and analysis as described below.

SOIL COLLECTION

Mr. Sean O'Brien of HBC conducted dry-season sampling on May 14 and 21, 2021 as authorized by the U.S. Fish and Wildlife Service (USFWS) (Appendix A) under recovery permit TE-795930-10.2 of Section 10(a)(1)(A) of the federal Endangered Species Act, 16 U.S.C. 1531 et seq., and its implementing regulations.

Dry-season sampling was conducted in all basins (habitats) within the Study Area with the potential to support federally-listed large branchiopods as determined during prior wet-season sampling efforts (HBC 2021) with the aid of an aquatic resources map (prepared by Moore Biological Consultants 2021, Exhibit B) and other documents provided by the Client.

Habitat characteristics of large branchiopods are based on the life history of Central Valley endemics (Eriksen and Belk 1999; Helm 1998, 1999; Helm and Vollmar 2002, Helm and Noyes 2016). The presence of water marks, algae mats, driftlines, hydrophytic vegetation ("water-loving plants"), slope, contributing watershed, maximum potential ponding depth, and aquatic arthropods (i.e., crustaceans and insects) exoskeletons were helpful indicators for evidence of ponding depth and duration. Habitats that swiftly flow water (e.g., creeks, streams, and ephemeral drainages), semi-to-permanently inundated areas that support population of predators (e.g., bullfrogs, fish, and crayfish), and habitats that receive water during the dry season (i.e., artificial water sources) were not generally considered suitable habitat for federally listed large branchiopods.

Soil samples were collected mainly from the lowest topographic areas within each sampled basin. Soil samples were placed in liter size plastic sealable bags and marked with the project name, basin, and date. Representative photographs were taken of the basins sampled (Appendix B). The soil was then transported to HBC for processing and analysis as described below.

SOIL PROCESSING AND ANALYSIS

In HBC's laboratory, a brine solution was prepared by mixing table salt (NaCl) with lukewarm tap water in a large container. The collected soil material was placed in the brine solution. The soil material was then gently worked by hand to breakdown any persistent soil structure. The organic material rising to the top of the brine solution was skimmed off and placed in a 600-micron diameter pore-size sieve stacked atop a 75-micron diameter pore-size sieve. The soil material was processed through the top sieve by flushing it with lukewarm tap water while

gently rubbing it with a soft-bristle brush. The soil retained from the 75-micron diameter pore size sieve was then removed and thinly (≈1.0 mm) spread into plastic petri dishes.

The contents of each petri dish were examined under a 10 to 252-power zoom binocular microscope. A minimum of 0.5-hour was spent searching the contents of each petri dish for large branchiopod cysts (embryonic eggs). Dr. Helm's large branchiopod cyst reference collection and scanning electron micrographs of cysts (Belk 1989, Brendock *et al*. 2008, Gilchrist 1978, Hill and Shepard 1998, Mura 1991, and Rabet 2010) were used to identify and compare any cysts observed within the soil samples. This processing method (described above) favors the detection of cysts belonging to the genera *Branchinecta*, *Lepidurus*, and *Streptocephalus* since these three genera have species that are federally listed. Evidence of other macroscopic aquatic invertebrates encountered was also noted on the laboratory data sheet.

RESULTS

SOIL COLLECTION

A total of 19 basins were considered potential habitat for federally-listed large branchiopods and therefore sampled (Exhibit B).

SOIL PROCESSING AND ANALYSIS

Soils collected from a total of 19 basins were analyzed (Exhibit B). No evidence of federally-listed large branchiopods (i.e., cysts belonging to the genus *Branchinecta* or *Lepidurus* or carapaces of *Lepidurus*) were observed in the soils collected (Table 1). Representative photographs of the habitats sampled are provided in Appendix B.

Table 1. Results of Soil Examinations at the Greentree Development Project

Basin Number	Invertebrates Present (X)						
	Insects Exo-skeletons	Micro-turbellarian Cysts	Cladocera Ephippia	Ostracod Cysts/ Carapaces	Hydracarina	Nematoda	Collembola
D-1	X	X	X	X		X	X
D-2	X	X	X				X
D-4	X						
D-6	X						X
P-1	X		X	X			X
SW-1	X						X
SW-2	X						X
SW-3	X						X
SW-4	X						X
SW-5	X						X
SW-6	X		X				
HBC-1	X					X	X
HBC-2	X						X
HBC-3	X						X
HBC-4	X						X
HBC-5	X						
HBC-6	X						X
HBC-7	X						X
HBC-8	X						X

LITERATURE CITED

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Brendock, L., D. C. Rogers, J. Olesen, S. Weeks, and W. R. Hoch. 2008. Global diversity of large branchiopods (Crustacea: Branchiopoda) in freshwater. *Hydrobiologia*. 595: 167-176.

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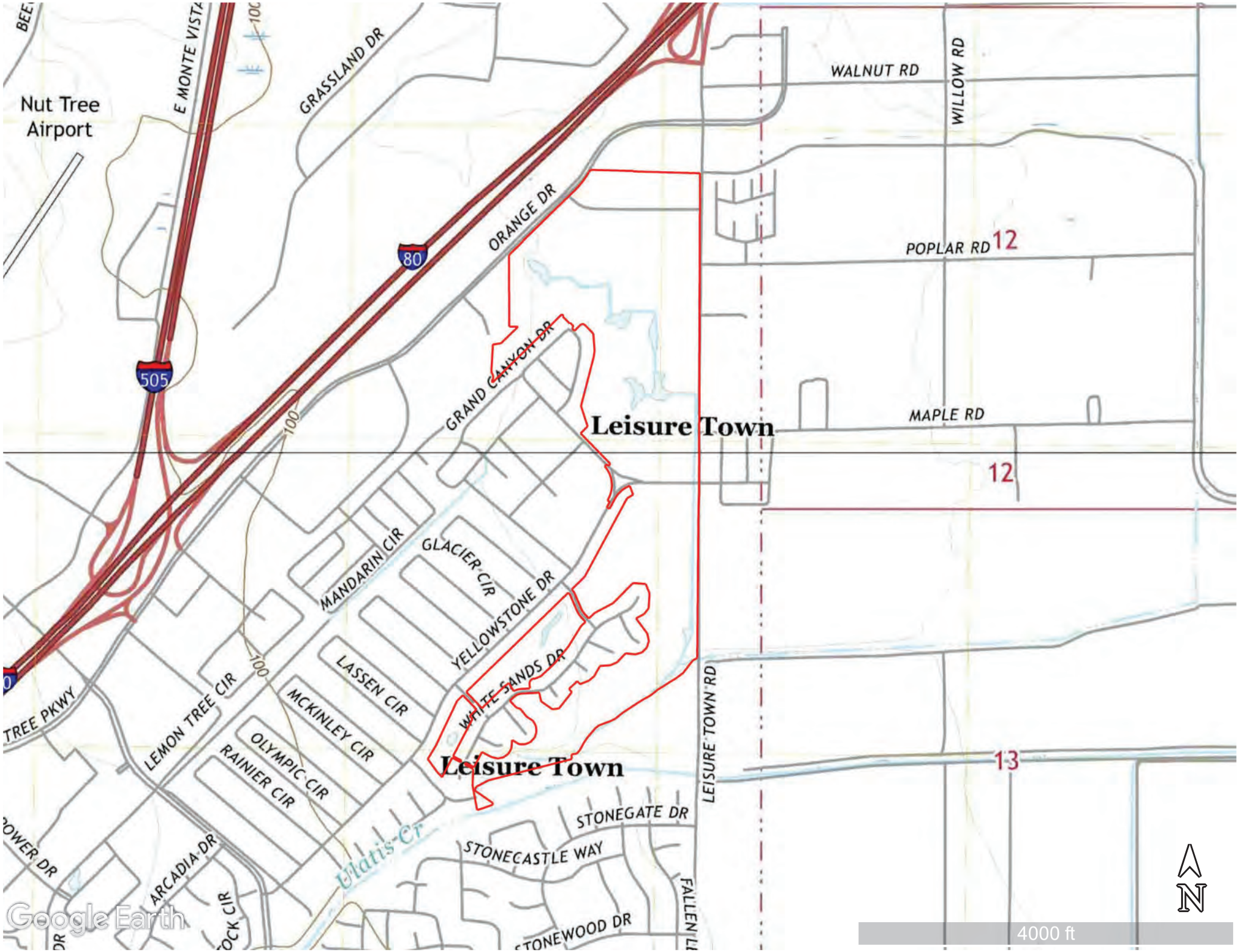
U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). 2017. Survey guidelines for the listed large branchiopods. 24 pp. Dated: 31 May 2015 (Revised November 13, 2017).

EXHIBIT A.
LOCATION OF STUDY AREA ON USGS TOPOGRAPHIC QUADRANGLE MAP (RED BOUNDARY = STUDY AREA LOCATION)


Nut Tree Airport
E MONTE VISTA
GRASSLAND DR
WALNUT RD
WILLOW RD
ORANGE DR
80
505
POPLAR RD
12
GRAND CANYON DR
Leisure Town
MAPLE RD
12
MANDARIN CIR
GLACIER CIR
YELLOWSTONE DR
LASSEN CIR
MCKINLEY CIR
OLYMPIC CIR
RAINIER CIR
LEMON TREE CIR
WHITE SANDS DR
LEISURE TOWN RD
Leisure Town
13
STONEGATE DR
STONECASTLE WAY
ARCADIA DR
Ulatis Cr
STONEWOOD DR
Google Earth
4000 ft
N

HELM
BIOLOGICAL CONSULTING
A Tansley Team Division
4600 Karchner Rd, Sheridan, CA 95681

EXHIBIT B.
AQUATIC RESOURCES
GREENTREE DEVELOPMENT PROJECT
(MOORE BIOLOGICAL CONSULTANTS 2021)

Ph: (530) 633-0220
Fax: (530) 633-0230

AQUATIC RESOURCES

Feature	Label	Area (sf)	Area (acre)
Seasonal Wetland	SW-1	498	0.01
	SW-2	324	0.01
	SW-3	282	0.01
	SW-4	193	0.01
	SW-5	258	0.01
	SW-6	2,403	0.06
	subtotal	*3,959*	*0.11*
Pond	P-1	34,703	0.80
	P-2	35,436	0.81
	P-3	36,747	0.84
	P-4	44,831	1.03
	P-5	44,501	1.02
	P-6	4,280	0.10
	P-7	3,251	0.07
	P-8	7,546	0.17
	P-9	3,718	0.09
	P-10	33,044	0.76
	P-11	3,221	0.07
	P-12	34,788	0.80
	P-13	28,215	0.65
	P-14	11,162	0.26
	subtotal	*325,442*	*7.47*
Ditch	D-1	1,395	0.03
	D-2	1,512	0.03
	D-3	3,621	0.08
	D-4	2,752	0.06
	D-5	13,213	0.30
	D-6	3,377	0.08
	D-7	15,205	0.35
	D-8	2,508	0.06
	D-9	10,307	0.24
	subtotal	*53,891*	*1.24*
Remnant Channel	RC-1	14,920	0.34
	RC-2	1,600	0.04
	subtotal	*16,520*	*0.38*
	Total	**399,812**	**9.20**

Data Disclaimer:
The delineation has been done in accordance with the 1987 Wetlands Delineation Manual, US Army Corps of Engineers and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. The boundaries and jurisdictional status of all waters shown on this map are preliminary and subject to verification by the U.S. Army Corps of Engineers.

Study Area (±189.37 ac.)

Culvert

▲-1 3-Parameter Data Point

N

0 250 500

Moore Biological Consultants

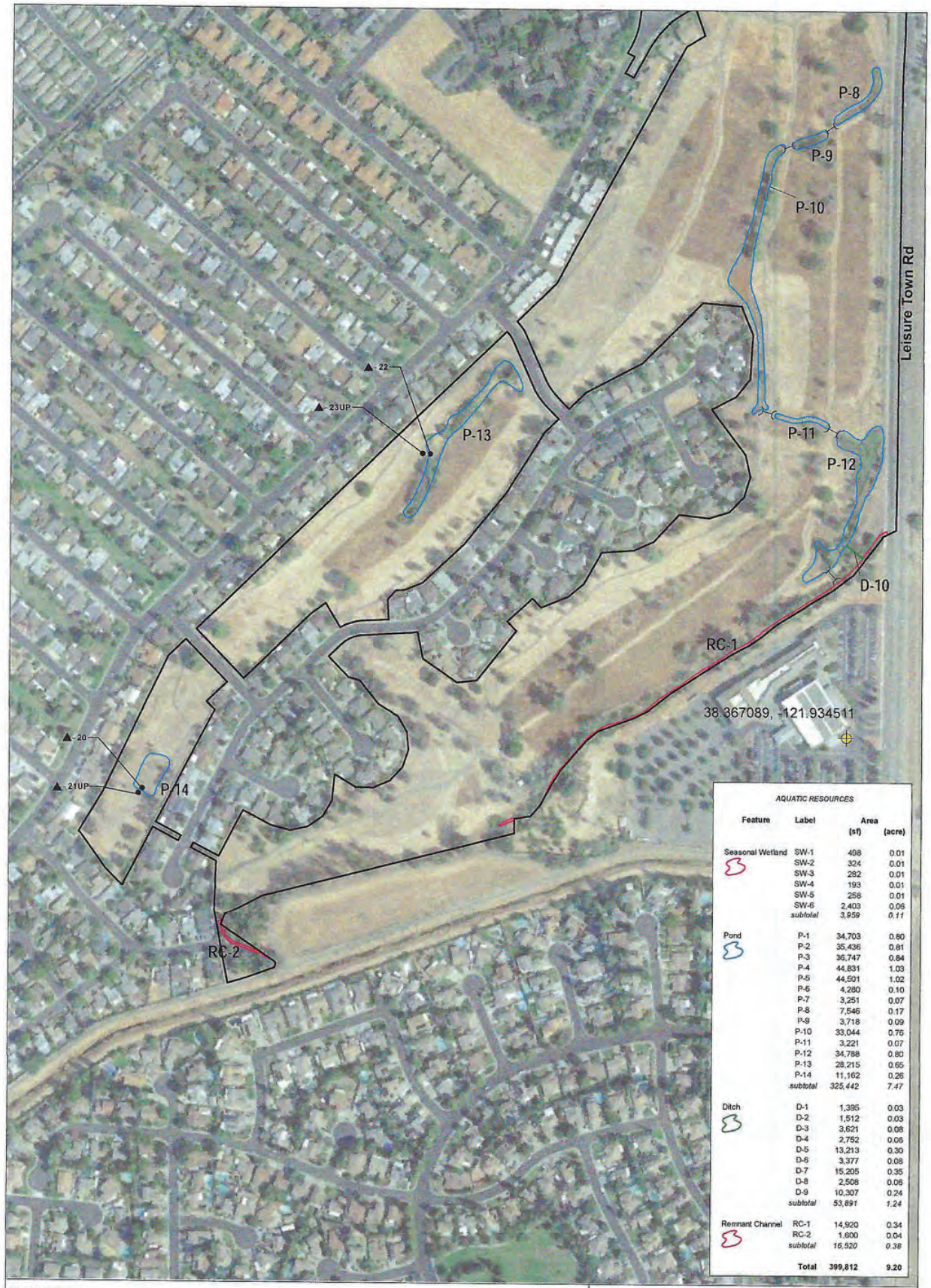
Page 1 of 2

Map Date: 05/19/2021

Aquatic Resources

Greentree Development Project

City of Vacaville, Solano County, CA



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	P-10	33,044	0.76
	P-11	3,221	0.07
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	subtotal	*16,520*	*0.38*
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The delineation has been done in accordance with the 1987 Wetlands Delineation Manual, US Army Corps of Engineers and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. The boundaries and jurisdictional status of all waters shown on this map are preliminary and subject to verification by the U.S. Army Corps of Engineers.

Study Area (±189.37 ac.)

Culvert

▲-1 3-Parameter Data Point

N

0 250 500

Moore Biological Consultants

Map Date: 05/19/2021

Aquatic Resources

Greentree Development Project

City of Vacaville, Solano County, CA

APPENDIX A.
USFWS AUTHORIZATION

Gmail

Sean O'Brien <sobrien@tansleyteam.com>

USFWS Sampling Request for Helm Biological Consulting (TE-795930-10.2) - Green Tree Project

Lantz, Samantha M <samantha_lantz@fws.gov> Thu, Dec 17, 2020 at 8:25 AM
To: Sean O'Brien <sobrien@tansleyteam.com>
Cc: Brent Helm <bhelm@tansleyteam.com>, "Havens, Michelle R" <michelle_havens@fws.gov>

Hi Sean and Brent,

By this email message, you are authorized to conduct 2020-2021 protocol-level vernal pool branchiopod surveys (dry and wet-season), as specified in your December 14, 2020 email request and per the conditions of your recovery permit (TE-795930). Surveys will be conducted at the Green Tree Project in Solano County, CA.

Surveys may be conducted within all areas identified on-site that may provide suitable habitat. Please remember to carry a copy of your permit while doing the work and to follow the terms and conditions of the permit, including the reporting requirements. In your report(s), please include which activities were authorized, the names of all persons involved in each activity, their recovery permit numbers, if applicable, and the date of this authorization, to help ensure that we correctly record the fulfillment of the reporting requirement under this authorization. Please let us know if the activities are not performed as authorized, or if they are done by a different permittee under a separate authorization. This authorization does not include access to the property which must be arranged with the landowner or manager. **Please send electronic copies of the report(s) to Sam Lantz (samantha_lantz@fws.gov) and Michelle Havens (michelle_havens@fws.gov) and use Service reference number 2021-TA-0570 in future correspondence for these surveys.**

Thanks,

Sam

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Samantha Lantz, PhD
Fish and Wildlife Biologist
USFWS, Sacramento Field Office
Listing and Recovery Division
2800 Cottage Way W-2605
Sacramento, CA 95825-1888
Phone: 916-414-6526
Pronouns: she/her/hers

In an effort to slow the spread of the coronavirus (COVID-19), staff in the Sacramento Fish and Wildlife Office have implemented an aggressive telework schedule. At this time, we are responding to requests for information via email or phone as often as possible as we do not have the in-office capacity to support regular mail service. We appreciate your understanding.

From: Sean O'Brien <sobrien@tansleyteam.com>
Sent: Monday, December 14, 2020 11:33 AM
To: Lantz, Samantha M <samantha_lantz@fws.gov>
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cc: Brent Helm <bhelm@tansleyteam.com>
Subject: [EXTERNAL] USFWS Sampling Request for Helm Biological Consulng (TE -795930-10.2) - Green Tree Project

[Quoted text hidden]

APPENDIX B.
REPRESENTATIVE PHOTOGRAPHS

Photograph of D-1 taken on May 14, 2021 (facing southeast).

Photograph of D-2 taken on May 14, 2021 (facing east).

Photograph of D-4 taken on May 14, 2021 (facing west).

Photograph of D-6 taken on May 14, 2021 (facing south).

Photograph of P-1 taken on May 14, 2021 (facing northwest).

Photograph of SW-1 taken on May 21, 2021 (facing east).

Photograph of SW-2 taken on May 21, 2021 (facing west).

Photograph of SW-3 and SW-4 taken on May 14, 2021 (facing north).

Photograph of SW-5 taken on May 14, 2021 (facing west).

Photograph of SW-6 taken on May 14, 2021 (facing northeast).

Photograph of HBC-1 taken on May 14, 2021 (facing west).

Photograph of HBC-2 taken on May 14, 2021 (facing west).

Photograph of HBC-3 taken on May 14, 2021 (facing west).

Photograph of HBC-4 taken on May 14, 2021 (facing north).

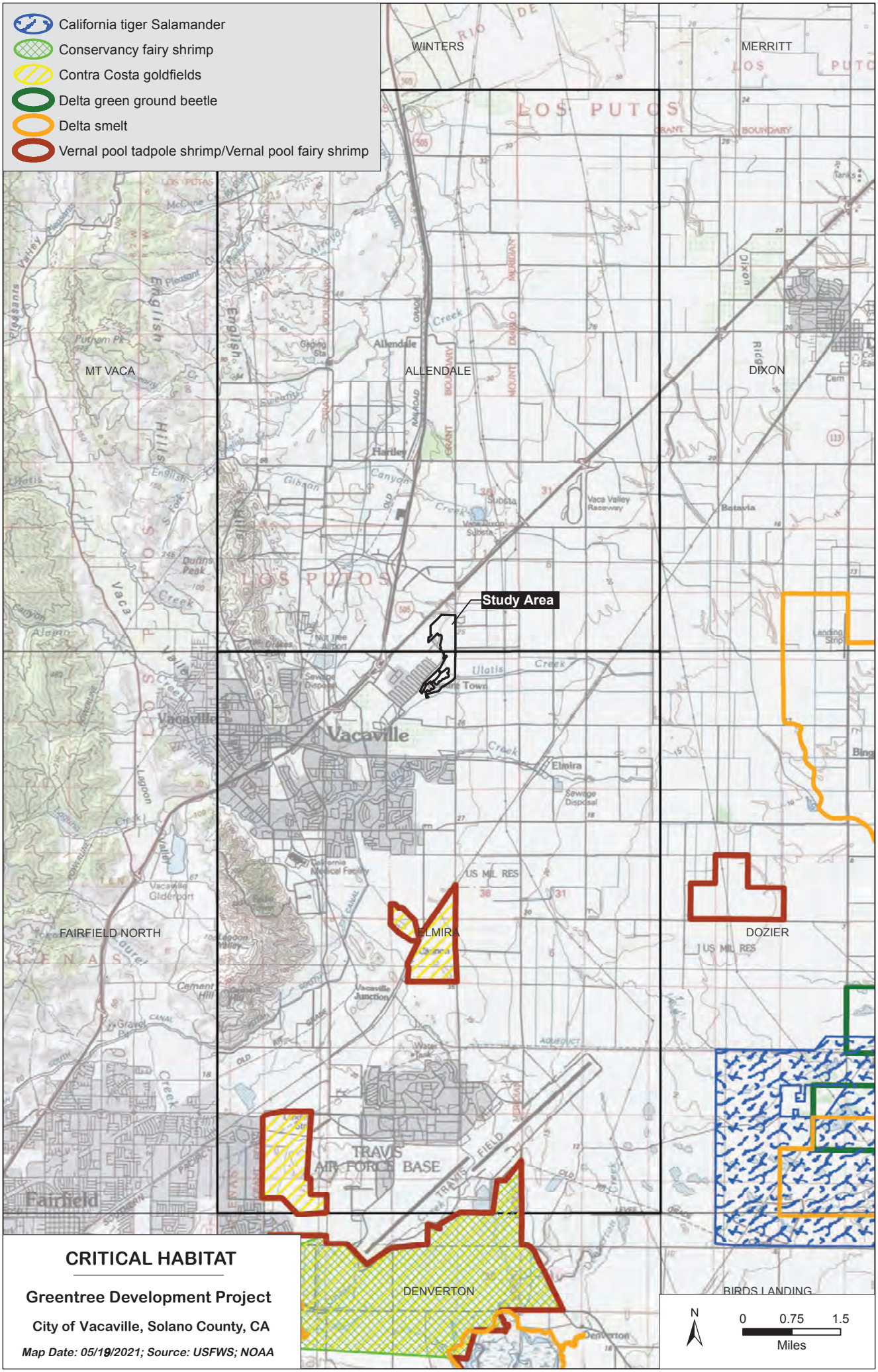
Photograph of HBC-5 taken on May 14, 2021 (facing east).

Photograph of HBC-7 taken on May 14, 2021 (facing south).

Photograph of HBC-8 taken on May 14, 2021 (facing northeast).

Appendix H

Designated Critical Habitat



CRITICAL HABITAT

Greentree Development Project

City of Vacaville, Solano County, CA

Map Date: 05/19/2021; Source: USFWS; NOAA