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2017 Vegetation Monitoring of the Napa River Flood Protection Project Napa Valley, California

PREPARED FOR

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Cover photos: Napa River Flood Protection Project during 2017 monitoring.

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1 INTRODUCTION

1.1 Project Purpose and Background

In the Napa Valley of California, a series of over-bank flooding events by the Napa River during the last half-century have resulted in cumulative economic damage in excess of 500 million dollars (County of Napa 2012). As a result, in the early 1960s Napa County officials endorsed and approved financial support to the U.S. Army Corps of Engineers (USACE) for the development and implementation of the Napa River Flood Protection Project (Project) with the Napa County Flood Control and Water Conservation District (NCFCWCD) acting as the local Project sponsor. The Project was initiated in 1964 with the U.S. Congress' authorization of a large-scale flood protection project along a six-mile reach of the main stem of the Napa River and a 1.4-mile reach of Napa Creek within the vicinity of the City of Napa (Figure 1). In 1998, the citizens of Napa County voted on, and approved, a ½-cent sales tax (Measure A) to fund the Project and implementation began in 2000. As part of the approval for the Project the voters included the adoption of the "Living River Goals and Strategy". The overarching goals of the Project and Living River Strategy include 1) achieving a 100-year level of flood protection by reconnecting the Napa River to its historical floodplain; 2) providing flood damage benefits that exceed Project costs when calculated according to official USACE benefit-to-cost methodologies; 3) mitigating Project impacts on fish and wildlife and their habitat by restoring wetlands throughout the floodplain; and 4) providing recreational facilities in the Project Area (JSA 2001). Conversion of the Project Area from the previously diked agricultural baylands to a mosaic of tidally influenced wetlands required levee removal and breaching, lowering levees, and channel modifications to create flood terraces (JSA 2001). Construction of the Project is ongoing and addresses multiple interests and Project goals in restoring the riparian and floodplain ecosystems of the Napa River.

This report documents long-term vegetation and habitat monitoring conducted by Stillwater Sciences for the NCFCWCD in 2017. Results from this monitoring are utilized to track achievement towards restoration goals and document habitat establishment in restored areas.

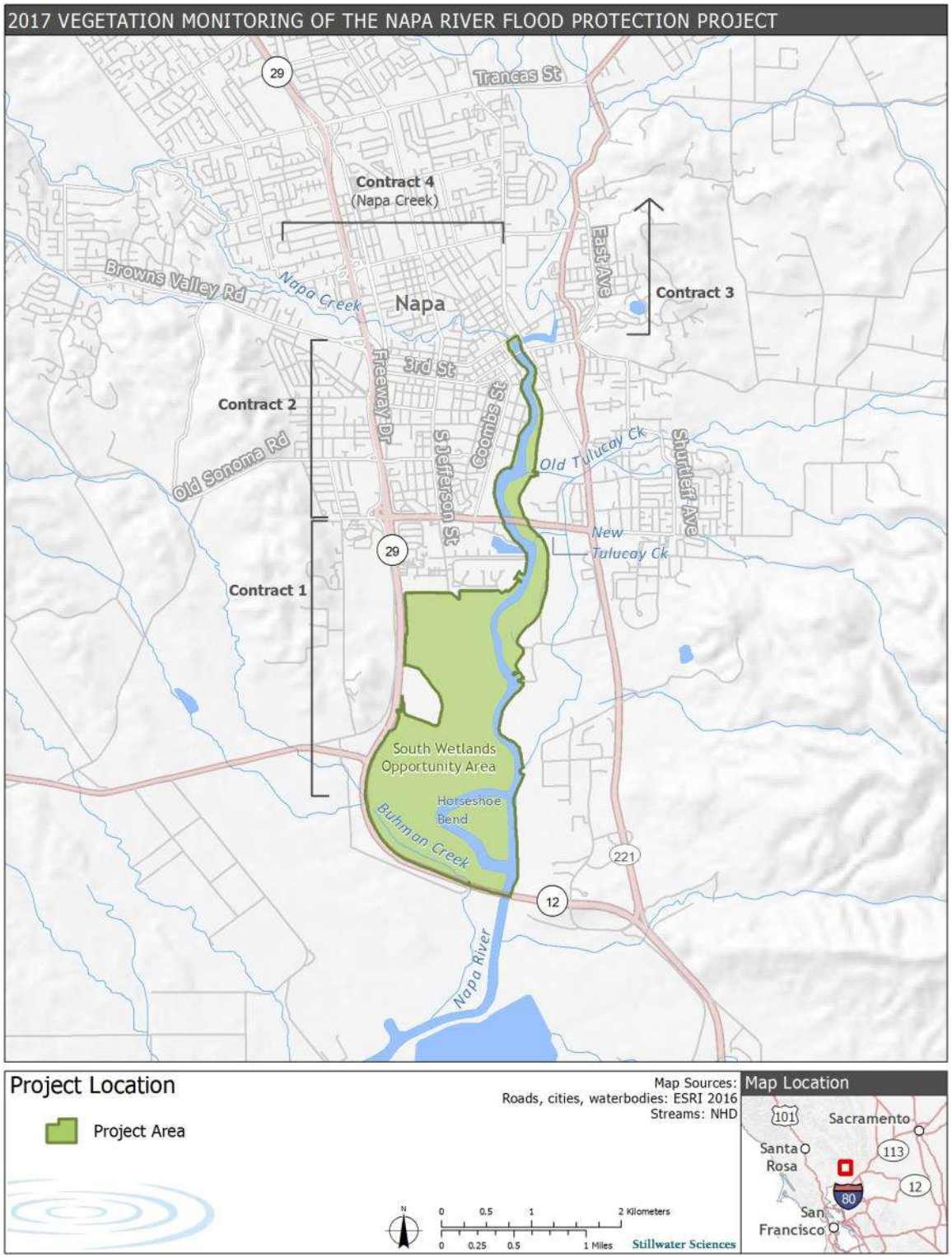


Figure 1. Location Map for the Napa River Flood Protection Project, Napa, California with four contract areas

1.2 Project Contracts

The Project includes multiple phases of work, four of which target flood control activities along three distinct reaches of the Napa River and one along Napa Creek. USACE and NCFCWCD (1998) designed flood control and riverine restoration projects for these four reaches of the Napa River based in large part upon a conceptual alluvial floodplain enhancement design developed by Phil Williams & Associates (PWA 1997). Specific areas of construction along the four reaches are known as 'Contracts' which are numbered sequentially 1 through 3, downstream to upstream (Figure 1). Contract 4 is the lower reach of Napa Creek including its confluence with the Napa River. Contracts 1 and 2 are partitioned further: Contract 1A and 2W refer to the west side of the river, and Contract 1B and 2E refer to the east side of the river.

As originally conceived and planned, construction of the four Project contracts was expected to occur over a ten-year period. However, completion of the project was delayed due to funding shortfalls. In July 2010, USACE announced the receipt of American Recovery and Reinvestment Act (ARRA) funds for construction of the Napa Creek Project (i.e., Contract 4). Specifically, USACE received funds to install two large diversion culverts and improve river bank protection along Napa Creek from its confluence with the Napa River approximately 3,500 feet (ft) upstream to the Jefferson Street crossing. Construction on Napa Creek initiated in 2010 and was completed in 2013. Additionally, the USACE Sacramento District received sufficient funding, combined with local matching funds, to complete the Napa River Dry Bypass segment of the Project. Construction of the Dry Bypass began in the fall of 2013 and was completed in 2015 providing significant flood protection in the heart of down town Napa and restoring 1.5 acres of wildlife habitat.

1.3 Mitigation and Monitoring Plan

The Project includes enhancement, restoration, and creation (collectively referred to as "restoration"), as well as monitoring of wetland habitats. In 2001, the *Napa River Flood Protection Project Mitigation and Monitoring Plan* (MMP) (JSA 2001) was prepared to comply with various regulatory requirements, such as the waste discharge requirements by the Regional Water Quality Control Board (RWQCB). The MMP describes Project mitigation features that were designed to protect and restore environmental resources within the Project Area. As defined in the MMP, the restoration goals include creating and restoring brackish emergent marsh, tidal mudflats, seasonal and emergent wetlands, shaded riverine aquatic habitat (SRA), riparian forest and scrub-shrub, high-value oak woodlands, and grasslands. The monitoring objective is to systematically and quantitatively measure changes in vegetation, soils, and hydrology over a 40-year period (JSA 2001). Initial monitoring of vegetation and created habitat establishment was originally the responsibility of USACE. In 2012, the responsibility transferred from USACE to the NCFCWCD. Further detail on goals and management objectives as well as monitoring indicators and performance standards are discussed below, in Section 2.

1.4 Project Area

The 2017 Project Area is approximately 1,233 acres (ac) and covers an approximate 4-mile reach of the Napa River and floodplain within the greater Project Area, extending from the junction of First Street and Soscol Avenue in Napa to State Route 29 (Figure 1). In 2003 and 2004, seven permanent vegetation monitoring transects were installed and monitored by CH2M Hill at a portion of the Project Area known as the South Wetlands Opportunity Area (SWOA; Transects 2, 2A, 3, 4, 5, 5A, and 6). In 2007, North State Resources, Inc. (NSR) surveyed the SWOA

transects, extended portions of the SWOA transects, and added two new transects located in Contract 1A and 1B (Transects 1 and 7). The results of the field monitoring conducted by NSR documented the biological, chemical, and physical conditions six years after completion of the Project features in the Project Area. Prior to 2012 field monitoring, NCFCWCD added five transects located from just south of Imola Avenue upstream through the Third Street bridge (Transects 8, 9, 10A, 10B, and 11). In 2017, on behalf of NCFCWCD, Stillwater Sciences added one additional transect (Transect 12), at the northern end of the Project in Contract 2, just downstream of the newly constructed Napa River Dry Bypass. This report documents the results of 2017 vegetation monitoring conducted by Stillwater Sciences along all 15 transects (Figures 2A–2E), including all transects established in 2003, 2007, 2012, and 2017.

Figure 2a. Location of transects and plots in 2017, Tile 1 of 5.

Figure 2b. Location of transects and plots in 2017, Tile 2 of 5.

Figure 2c. Location of transects and plots in 2017, Tile 3 of 5.

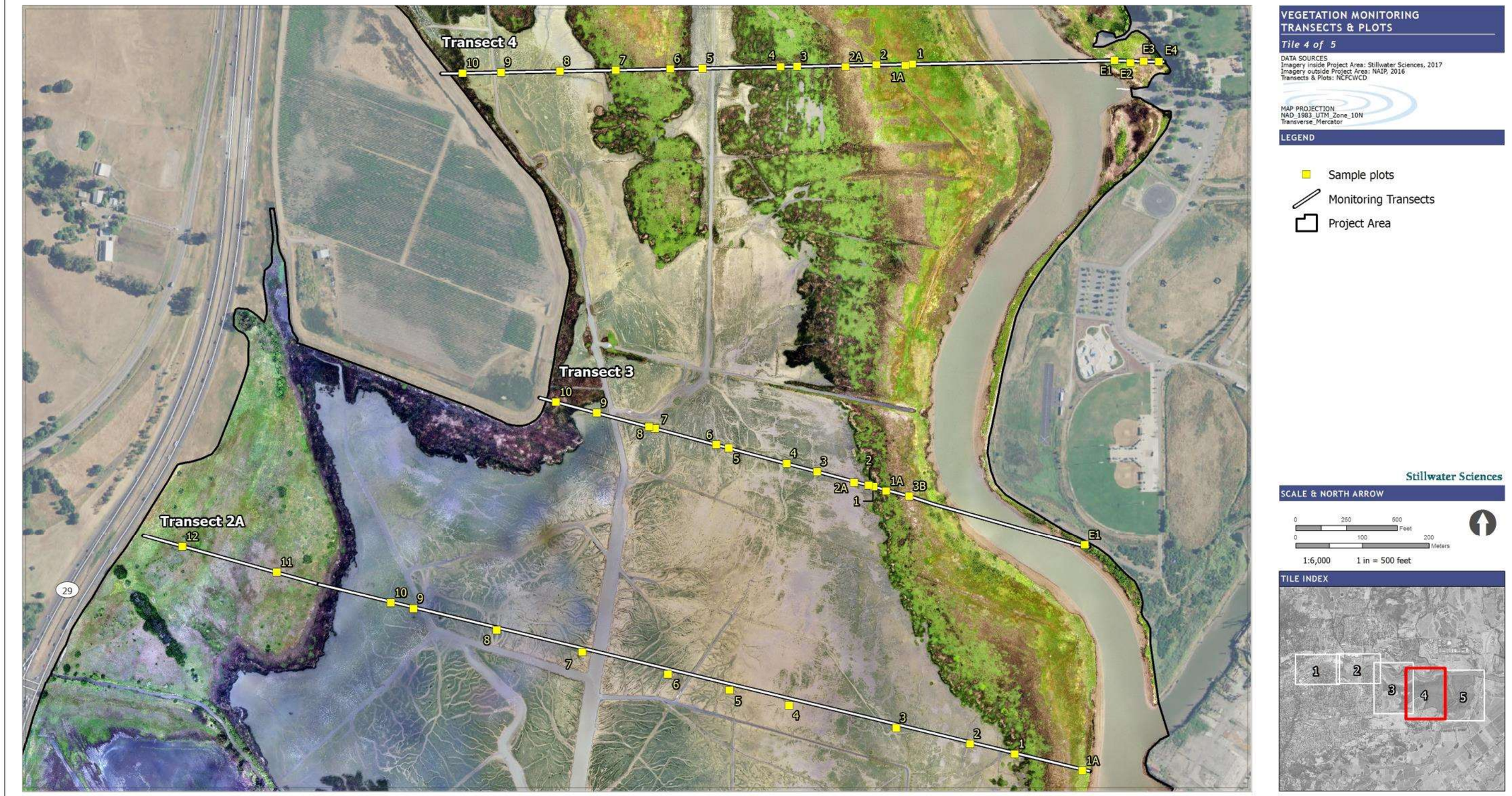


Figure 2d. Location of transects and plots in 2017, Tile 4 of 5.

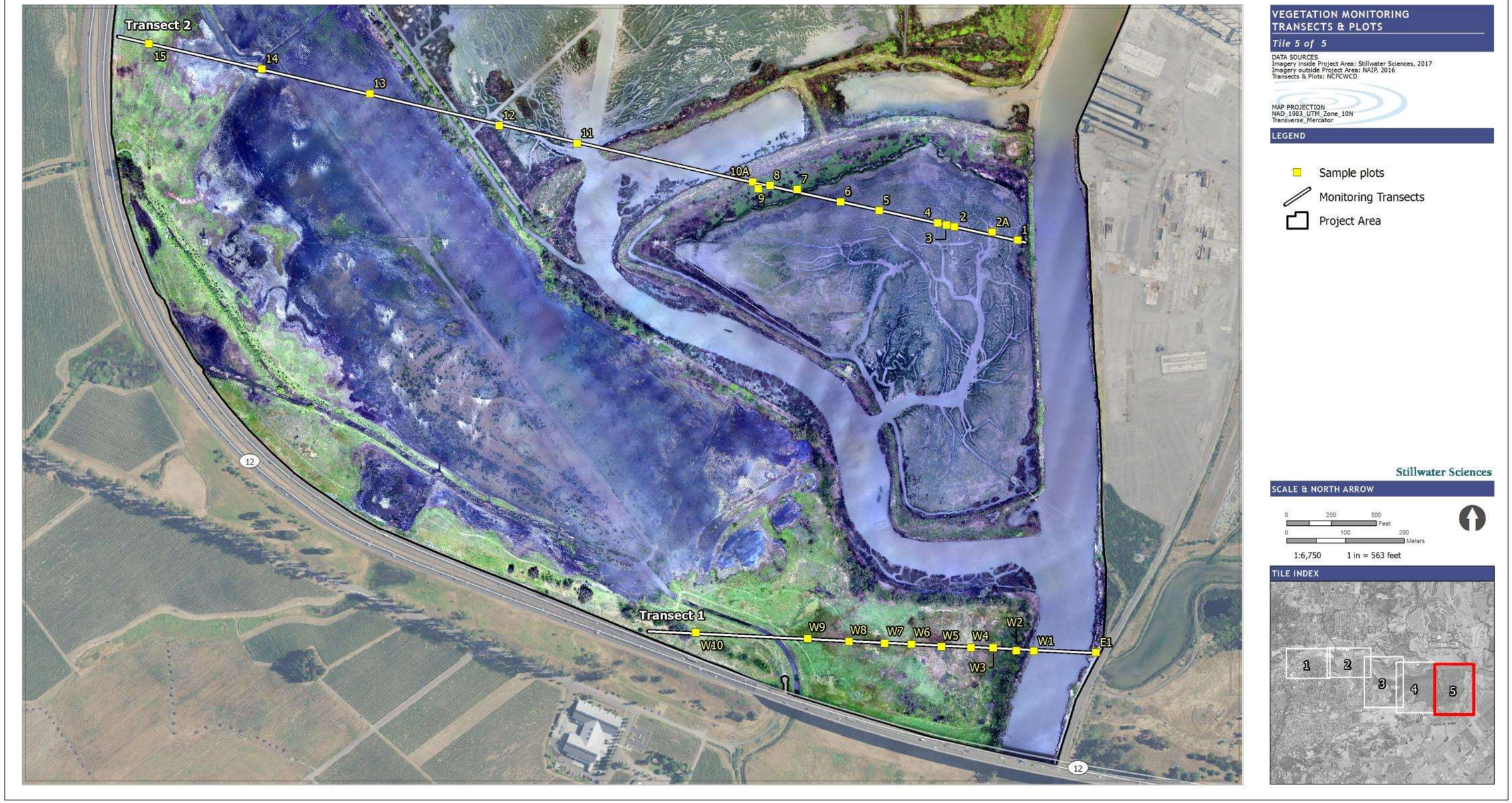


Figure 2e. Location of transects and plots in 2017, Tile 5 of 5.

2 HABITAT CREATION GOALS AND MANAGEMENT OBJECTIVES

2.1 Goals and Management Objectives

The habitat creation goals and management objectives for the Project Area, as described in the MMP (JSA 2001) and discussed in subsequent monitoring reports (CH2M Hill 2004, NSR 2008, Stillwater Sciences 2013), include the: (1) creation/restoration of brackish emergent marsh, tidal mudflats, seasonal and emergent wetlands, SRA, riparian forest and scrub-shrub, high-value oak woodland, and grasslands, and (2) establishment of an ecologically and hydrologically self-sustaining mosaic of habitats at the Project Area. Specific objectives are to:

- Construct an 8.7-ac marsh-plain terrace extending 5,000 ft downstream from the Newport North Marina;
- Construct a 29-acre floodplain terrace adjacent to the marsh-plain terrace;
- Lower the levees adjacent to the Napa River downstream of the terraces and the levees surrounding Horseshoe Bend;
- Dispose of the excavated soil in the northwestern part of the SWOA and construct new levees to protect the upland areas;
- Convert 78 ac of Horseshoe Bend Island (including 57 ac of existing seasonal wetlands) to brackish emergent marsh, which would be sustained by a tidal slough channel;
- Convert the 574-acre area north of Horseshoe Bend to 425 ac of brackish emergent marsh, 16 ac of open water/tidal mudflat, and 133 ac of oak woodland; and
- Convert 210 ac (excluding seasonal wetland areas) of grassland on the Stanley Ranch property to oak woodland.

The target habitat acreage goals as outlined in the MMP are expected to be achieved over the long-term monitoring period (defined as 40 years) of the Project. Continued long-term monitoring will quantify habitat creation and assess changes in vegetation and other ecological parameters through time to help further determine if the Project is achieving its goals and management objectives by the end of the monitoring period. A map of the targeted post-Project habitat types is shown in Appendix A. The following sections summarize the goals and management objectives, as well as the species composition, for each habitat type.

2.1.1 Brackish emergent marsh

Brackish emergent marsh establishes along an elevation gradient between tidal mudflats and adjacent upland areas; the distribution is dependent on the surface elevation, soil/water salinity, and duration of tidal inundation (JSA 2001). Brackish emergent marsh also occurs in some areas with minimal to no tidal influence where evapotranspiration combines with the salt content of maritime-influenced air to create high salinity conditions (NSR 2008). Within brackish emergent marsh habitat, the lower tidal salt marsh adjacent to tidal mudflat is dominated by common tule (*Schoenoplectus acutus* var. *occidentalis*) and southern bulrush (*Schoenoplectus californicus*), the middle tidal marsh is dominated by common pickleweed (*Salicornia pacifica*), and the high tidal marsh vegetation consists of common pickleweed in association with salt grass (*Distichlis spicata*),fat-hen (*Atriplex prostrata*), alkali heath (*Frankenia salina*), and marsh jaumea (*Jaumea carnosa*) (NSR 2008).

The goal for this habitat type is to restore tidal influence and the tidal marshland ecosystem. The management objective is to restore daily tidal flows to 56 ac of historical brackish emergent

marsh through construction of the marshplain terrace, and to restore additional brackish emergent marsh through construction of tidal inlets in the SWOA (JSA 2001). Total target acreage for brackish emergent marsh is 503 ac.

2.1.2 Tidal mudflats

Total mudflat habitat acreage in the intertidal zone is highly variable, with dynamic, seasonal variations in freshwater storm surges and the diurnal seawater tidal action affecting the patterns of sediment erosion and deposition. Tidal mudflats are predominately unvegetated areas, typically with less than 30% vascular plant cover. Plants that colonize the lowest tidal marsh zone include small spikerush (*Eleocharis parvula*), widgeongrass (*Ruppia maritima*) and southern bulrush; they can also harbor seasonal cover of algae such as sea lettuce (*Ulva* spp.) or red algae (*Gracilaria* spp.) (JSA 2001).

The goal for the tidal mudflat habitat type is to protect and restore tidal mudflats in the Napa River estuary and SWOA. The management objective is to create 2.5 ac of tidal mudflat habitat throughout the Project Area, including the SWOA. Specific areas within the SWOA targeted for mudflat restoration are between stations 610+00 and 675+00 on the west side of the river and from station 660+00 moving north beyond the SWOA boundary (Appendix A, JSA 2001).

2.1.3 Seasonal and emergent wetlands

Seasonal and emergent wetlands generally are dominated by hydrophytic vegetation with a wetland indicator status of 'facultative wet' or wetter. Dominant species include cattails (*Typha* spp.), bulrushes (*Schoenoplectus* spp.), water primrose (*Ludwigia peploides*), smartweeds (*Persicaria* spp.), sedges (*Carex* spp.), meadow barley (*Hordeum brachyantherum*), annual beard grass (*Polypogon monspeliensis*), bird's-foot trefoil (*Lotus corniculatus*), pale spikerush (*Eleocharis macrostachya*), and curly dock (*Rumex crispus*) (JSA 2001).

The goal for this habitat type is the restoration of non-tidal and seasonal freshwater marsh with native herbaceous wetland plant species in the SWOA and Imola Avenue bridge area. The management objective is to restore freshwater fluvial and tidal dynamics and 45 ac of native seasonal and emergent wetland vegetation through construction of floodplain terraces, and to restore additional seasonal and emergent wetlands through construction of tidal inlets in the SWOA (Appendix A).

2.1.4 Shaded riverine aquatic

Shaded riverine aquatic (SRA) cover is the overhead and instream shade provided by riparian forest vegetation located at the interface of a river and its adjacent riparian habitat (Fris and DeHaven 1993). Within the Project Area, SRA cover habitat includes the riparian vegetation within 15 ft of the summer shoreline (JSA 2001).

The goal for this habitat type is to protect and restore woody vegetation cover occurring at the interface of the Napa River/Napa Creek near shore aquatic habitat with adjacent riparian habitat. The management objective for this habitat type is to protect and restore 2.6 ac of SRA cover vegetation associated with the Project; approximately 16,000 linear ft are planned on the west side of the Napa River and approximately 23,500 linear ft on the east side (JSA 2001). CH2M Hill (2006) estimated a target acreage of 0.29 total ac of SRA, based on a calculation from the maps presented in the MMP (Appendix A).

2.1.5 Riparian forest and scrub-shrub

Riparian forest and scrub-shrub are the trees and shrubs within the riparian corridor. Dominant tree species include Fremont cottonwood (*Populus fremontii* subsp. *fremontii*), valley oak (*Quercus lobata*), coast live oak (*Quercus agrifolia*), box elder (*Acer negundo*), northern California black walnut (*Juglans hindsii*), California bay (*Umbellaria californica*), and California buckeye (*Aesculus californica*). Shrub species include red willow (*Salix laevigata*), Pacific willow (*Salix lasiandra*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix exigua*), blue elderberry (*Sambucus nigra* subsp. *caerulea*), poison oak (*Toxicodendron diversilobum*), California rose (*Rosa californica*), and California blackberry (*Rubus ursinus*) (JSA 2001).

The goal for this habitat type is to protect and restore the native riparian forest species composition and structure adjacent to the Napa River and Napa Creek. The management objective is to establish healthy, functioning riparian habitat that is resilient to tidal and fluvial inundation and resistant to extreme environmental conditions. Most of the restoration efforts for this habitat type occur upstream of the SWOA and targets include creation of 16.71 ac of riparian forest on the Napa River; 0.97 acre of riparian forest on Napa Creek; and 10.68 ac of riparian scrub-shrub. CH2M Hill (2006) estimated target acreage of 2 ac of riparian forest and scrub-shrub habitat, based on a calculation from the maps presented in the MMP (Appendix A).

2.1.6 High-value oak woodland

High-value oak woodlands occur in upland areas and are dominated by valley oak and coast live oak, but also include white alder (*Alnus rhombifolia*) and Fremont cottonwood. The shrub understory includes coyote brush (*Baccharis pilularis*), poison oak, California rose, California blackberry, and blue elderberry and the understory is typically dominated by non-native grasses (JSA 2001).

The goal for this habitat type was to protect existing high-value oak woodland habitat during construction and to establish native oak woodland vegetation in the Project Area. The management objective is to protect and restore existing high-value oak woodland adjacent to and intergrading with the riparian plant community; this included 11 ac of habitat on the west and east sides of the Napa River (JSA 2001). The MMP also calls for the conversion of 133 ac of upland ruderal habitat within the SWOA to oak woodland habitat; thus, the total target acreage for high-value oak woodland is 133 ac (Appendix A) which accounts for the 11ac of existing oak woodland.

2.1.7 Grasslands

Grasslands occur in upland areas and within the agricultural baylands of the north bay and are generally dominated by non-native perennial and annual grasses and forbs. Within the Project Area dominant species include annual ryegrass (*Festuca perennis*), harding grass (*Phalaris aquatica*), oats (*Avena* spp.), barley (*Hordeum* spp.), garden vetch (*Vicia sativa*), spiny cocklebur (*Xanthium spinosum*), radish (*Raphanus sativus*), curly dock, mayweed (*Anthemis cotula*), and ripgut grass (*Bromus diandrus*) (JSA 2001).

The goal for the non-native grassland habitat type is to maintain existing upland herbaceous habitat adjacent to wetlands in the SWOA, the Kennedy Park area, and along the Napa River and Napa Creek. The management objective is to maintain approximately 72 ac of grassland adjacent to wetland areas (Appendix A).

2.1.8 Open water

There are no goals or management objectives discussed in the MMP for the open water habitat type. The 2004 CH2M Hill report lists a total of 45.5 ac of open water habitat present within the SWOA. Open water is found within the Project Area in historical flood ditches, tidal channels, and the mainstem of the Napa River.

2.2 Vegetation Monitoring Indicators and Performance Standards

The monitoring objective is to systematically and quantitatively measure changes in vegetation, soils, and hydrology over a 40-year period with the intent of providing actionable information for adaptive management (JSA 2001). To measure these changes, performance standards and monitoring indicators were defined. Indicators are measurable characteristics that define biological, chemical, or physical features or processes of a site; monitoring indicators include presence/absence, vegetative cover, density cover class, Pest Plant Species, woody species, natural recruitment, water salinity, survival, health and vigor, and shaded stream surface (Table 1). Performance standards are defined as the threshold above which an indicator is deemed successful and below which an indicator is deemed unsuccessful (JSA 2001). The monitoring indicators, associated monitoring activities and interim and final performance standards are summarized in Table 5-1 of the MMP; this table is presented in Appendix B. Table 2 presents the vegetation monitoring indicators and performance standards for each habitat type monitored in 2017.

Table 1. Vegetation monitoring indicators applicable to habitats in the Project Area.

Indicator	Rationale	Relevant habitats
Survival	Survival is an important indicator of ecosystem health.	• shaded riverine aquatic • riparian forest and scrub-shrub • high-value oak woodland
Health and Vigor[1]	Health and vigor measurements provide an indication of ecosystem health.	• shaded riverine aquatic • riparian forest and scrub-shrub • high-value oak woodland
Presence/absence	Relative frequency of native and non-native species for each habitat provide information on species diversity and vegetation composition for each habitat.	• brackish emergent marsh • tidal mudflats • seasonal and emergent wetlands
Vegetative Cover[2]	Relative abundance and relative frequency of vegetative cover provide information on species diversity and vegetation composition for each habitat.	• brackish emergent marsh • tidal mudflats • seasonal and emergent wetlands • riparian forest and scrub-shrub • high-value oak woodland • grasslands
Density Cover Class	Dense, senescent vegetation stunts vegetation growth, reduces production of new biomass and vegetative reproduction, and decreases wildlife habitat quality.	• brackish emergent marsh • tidal mudflats • seasonal and emergent wetlands • riparian forest and scrub-shrub • high-value oak woodland
Pest Plant Species[3]	Pest plants have the potential to displace native plants and natural habitats, affect the quality of forage on rangelands, or affect cropland productivity.	• brackish emergent marsh • tidal mudflats • seasonal and emergent wetlands • shaded riverine aquatic • riparian forest and scrub-shrub • high-value oak woodland • grasslands

Indicator	Rationale	Relevant habitats
Woody Species	Measurements of woody species help predict roughness coefficient and flood freeboard within the floodplains.	• brackish emergent marsh • seasonal and emergent wetlands • riparian forest and scrub-shrub • grasslands
Tree height	Tree height measurements provide an indication of ecosystem health.	• riparian forest and scrub-shrub • high-value oak woodland
Tree basal area[4]	Tree measurements provide an indication of ecosystem health.	• riparian forest and scrub-shrub • high-value oak woodland
Shaded Stream Surface[5]	Overhead cover enhances habitat for fish and other aquatic organisms and minimizes potential increases in water temperature.	• shaded riverine aquatic
Water Salinity	Water salinity is the most important factor in salt marsh plant species composition and distribution.	• brackish emergent marsh • tidal mudflats
Natural Recruitment[6]	Natural recruitment is an indicator of the long-term sustainability of the different habitat types.	• brackish emergent marsh • seasonal and emergent wetlands • shaded riverine aquatic • riparian forest and scrub-shrub • high-value oak woodland

[1] Insect infestation, desiccation from drought, flooding stress, nutrient stress, and other signs of disease.
[2] The percentage of ground surface covered by a vertical projection of the vegetation.
[3] Non-native noxious weeds and/or invasive plants listed in the MMP, non-native noxious weeds that are listed by the California Department of Food and Agriculture (CDFA), and invasive plants identified by the California Invasive Plant Council (Cal-IPC) (Appendix C).
[4] Total area of tree stems measured at standardized breast height or 4.5 ft.
[5] The percentage of the total stream surface area shaded at midday.
[6] Establishment of native plants by natural reproduction (both sexual and vegetative).

Table 2. Vegetation monitoring indicators and performance standards for habitat types encountered in 2017.

Indicator	Monitoring activity and location of monitoring	Interim performance standard	Final performance standard
Brackish Emergent Marsh			
Presence/Absence	Relative frequency as measured in plots	>80% relative frequency representative of native tidal marsh species	>80% relative frequency representative of native tidal marsh species
Vegetative Cover	Relative abundance as measured in plots	>80% relative abundance representative of native tidal marsh species	>80% relative abundance representative of native tidal marsh species
Density Cover Class	Cover class estimate of vegetation density and % senescent stems as measured in plots	Density cover class <4[1]	Density cover class <4
Pest Plant Species	Vegetative cover as measured via line intercept along the transect along the transect and in plots	<1% vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern
Woody Species	A qualitative estimate of relative percent cover as measured along transects	Tree density <10 trees per acre, >50 ft apart	Tree density <10 trees per acre, >50 ft apart
Water Salinity	Parts per thousand as measured in plots	Baseline data	Baseline data
Natural Recruitment	Visual count of seedlings or vegetative reproduction as measured in plots	Marsh surface colonizing with native salt-tolerant wetland plant species after 3 years	Colonization of marsh surface with native salt-tolerant wetland plant species
Tidal Mudflats			
Presence/Absence	Relative frequency as measured in plots	~30% relative frequency representative of vascular plants	~30% relative frequency representative of vascular plants
Vegetative Cover	Relative abundance as measured in plots	~30% relative abundance representative of native tidal marsh vascular plants	~30% relative abundance representative of native tidal marsh vascular plants

Indicator	Monitoring activity and location of monitoring	Interim performance standard	Final performance standard
Density Class Cover	Cover class estimate of vegetation density and % senescent stems as measured in plots	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover as measured via line intercept along the transect and in plots	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern
Water Salinity	Parts per thousand as measured in plots	Baseline data	Baseline data
Seasonal and emergent wetlands			
Presence/Absence	Relative frequency as measured in plots	>80% relative frequency representative of native wetland species; >50% frequency with wetland indicator of facultative or wetter	80% relative frequency representative of native wetland species; over 50% frequency with wetland indicator of facultative or wetter
Vegetative Cover	Relative abundance as measured in plots	>80% relative abundance representative of native wetland species; >50% abundance with wetland indicator of facultative or wetter	80% relative abundance representative of native wetland species; over 50% abundance with wetland indicator of facultative or wetter
Density Cover Class	Cover class estimate of vegetation density and % senescent stems as measured in plots	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover as measured via line intercept along the transect and in plots	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern
Woody Species	A qualitative estimate of relative percent cover as measured along transects	Tree density <10 trees per acre, >50 ft apart	Tree density <10 trees per acre, >50 ft apart
Natural Recruitment	Visual count of seedlings or vegetative reproduction as measured in plots	Marsh surface colonizing with native salt-tolerant wetland plant species after 3 years	Colonization of marsh surface with native salt-tolerant wetland plant species

Indicator	Monitoring activity and location of monitoring	Interim performance standard	Final performance standard
Shaded riverine aquatic			
Survival	Counts of tagged planted trees and shrubs as measured in plots	90% survival each year monitored for first 5 years	80% survival
Health and Vigor	Visual assessment of foliage, wood and root crown in tagged, planted trees and shrubs as measured in plots	Average rating equal or exceed "good" (score >3)	Average rating must equal or exceed "good" (score >3)
Pest Plant Species	Vegetative cover as measured via line intercept along the transect and in plots	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern
Shaded Stream Surface	Evaluation of aerial photographs plus field verification	<2 ft of erosion per year, maintain minimum 15-foot buffer between floodwall and banks	<2 ft of erosion per year, maintain minimum 15-foot buffer between floodwall and banks
Natural Recruitment	Visual count of naturally recruited native woody species	Successful natural recruitment of native riparian tree and shrub species occurring within 5 years	Achievement of successful natural recruitment by year 40
Riparian forest and scrub-shrub			
Survival	Counts of tagged planted trees and shrubs as measured in plots	90% survival each year monitored for first 5 years	80% survival
Health and Vigor	Visual assessment of foliage, wood and root crown in tagged, planted trees and shrubs as measured in plots	Average rating equal or exceed "good" (score >3)	Average rating must equal or exceed "good" (score >3)
Vegetative Cover	Relative frequency and relative abundance as measured via line intercept along the transect and in plots	85% total cover within 5 years	85% total cover
Density Cover Class	Cover class estimate of vegetation density and % senescent stems as measured in plots	Density cover class <4	Density cover class <4

Indicator	Monitoring activity and location of monitoring	Interim performance standard	Final performance standard
Pest Plant Species	Vegetative cover as measured via line intercept along the transect and in plots	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern
Tree height	Stadia rod measurement of young trees, then clinometer as measured in plots	Tree height trajectory will be within one standard deviation of trees in reference area in 40 years	Meets average height of each species in riparian reference area
Tree basal area	Total area of tree stems measured at standardized breast height or 4.5 ft (1.4 m) as measured in plots	Basal area trajectory will be within one standard deviation of reference area in 40 years	Meets average basal area of each species in riparian reference area
Natural Recruitment	Visual count of naturally recruited native woody species	Successful natural recruitment of native riparian tree and shrub species occurring within 5 years	Achievement of successful natural recruitment by year 40
High-value oak woodlands			
Survival	Counts of tagged planted trees and shrubs as measured in plots	90% survival each year monitored for first 5 years	80% survival
Health and Vigor	Visual assessment of foliage, wood and root crown in tagged, planted trees and shrubs as measured in plots	Average rating equal or exceed "good" (score >3)	Average rating must equal or exceed "good" (score >3)
Vegetative Cover	Relative frequency and relative abundance as measured via line intercept along the transect and in plots	85% total cover within 5 years	85% total cover
Density Cover Class	Cover class estimate of vegetation density and % senescent stems as measured in plots	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover as measured via line intercept along the transect and in plots	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern

Indicator	Monitoring activity and location of monitoring	Interim performance standard	Final performance standard
Tree height	Stadia rod measurement of young trees, then clinometer as measured in plots	Tree height trajectory will be within one standard deviation of trees in reference area in 40 years	Meets average height of each species in reference area
Tree basal area	Total area of tree stems measured at standardized breast height or 4.5 ft (1.4 m) as measured in plots	Basal area trajectory will be within one standard deviation of reference area in 40 years	Meets average basal area of each species in reference area
Natural Recruitment	Visual count of naturally recruited native woody species	Successful natural recruitment of native riparian tree and shrub species occurring within 5 years	Achievement of successful natural recruitment by year 40
Grasslands			
Vegetative Cover	Relative abundance as measured in plots	>80% relative abundance representative of agricultural baylands of North Bay subregion	80% relative abundance representative of agricultural baylands of North Bay subregion
Pest Plant Species	Vegetative cover as measured via line intercept along the transect and in plots	<1% vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern	<1 % vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern
Woody Species	A qualitative estimate of relative percent cover as measured along transects	Tree density <10 trees per acre, >50 ft apart	Tree density <10 trees per acre, >50 ft apart

[1] Cover Class 4 is defined as a medium density of stems per unit area and high percent (50–75) of senescent stems (Section 3.4).

3 METHODS

3.1 Imagery Acquisition and Photo Interpretation

High-resolution aerial imagery was acquired in the field on April 24-25, 2017 using a remotely-operated, Federal Aviation Administration (FAA)-registered, small unmanned aircraft system (UAS). The flight was conducted under the direct supervision of an FAA-certified remote pilot (Stillwater Sciences' geomorphologist, Glen Leverich), using a DJI Phantom 3 Advanced quadcopter controlled with an autonomous flight operation application. Permission to operate in the vicinity of the nearby Napa County Airport was secured prior to the flight date, and coordination with the air traffic control tower was maintained during the entire flight operation. The UAS collected nadir perspective (i.e., downward-looking) imagery across the entire study area from an altitude of approximately 390 feet. Geographical ground-control points were surveyed separately in the field by Stillwater Sciences using a differential GPS unit (Trimble Geo7x [H-Star]). The collected imagery and ground-control points were subsequently processed together in a photogrammetry software application (Pix4Dmapper Pro) resulting in the creation of a compiled, orthorectified photo-mosaic having a resolution of approximately two inches per pixel. The geo-referenced photo-mosaic was then utilized in subsequent GIS analysis and map production.

Photo interpretation of the high-resolution digital ortho aerial photography (April 2017) was conducted to identify habitat types present throughout the entire Project Area. Using the heads-up digitizing technique, GIS specialists worked with botanists to update the extent of the target habitat types. Where visual interpretation was unclear, the vegetation polygons were flagged for ground-truthing during quality control field verification. In addition, staff selected a minimum of 5% of the polygons to assess for accuracy.

3.2 Field Preparation

The MMP (JSA 2001) and existing data from previous Project vegetation monitoring survey reports were compiled and reviewed, including CH2M Hill 2004, NSR 2008, and Stillwater Sciences 2013. All pre-existing spatial data were compiled in GIS, reviewed, and sampling locations (i.e., transects, plots, and photo monitoring stations) were loaded onto sub-meter accuracy GPS units (Trimble GPS) for field use. Finally, electronic and paper field data collection forms were prepared and reviewed by the technical lead prior to field work to ensure thorough and accurate data collection.

Coordinates for all end points associated with the 15 transects are provided in Table 3. Coordinates for all transect end points, sample plots associated with the 15 transects, and photopoints are presented in Appendix D.

Table 3. Coordinates for transect end points.

Transect number	End point	Latitude	Longitude
1	West	38.245996	-122.292818
	East	38.245606	-122.284061
2	West	38.255203	-122.303056
	East	38.251928	-122.285401
2A	West	38.259585	-122.300738
	East	38.256303	-122.284493
3	West	38.261417	-122.293909
	East	38.259331	-122.284477
4	West	38.265821	-122.295555
	East	38.265906	-122.283118
5	West	38.268933	-122.298025
	East	38.269139	-122.283843
5A	West	38.272887	-122.2979
	East	38.271429	-122.281885
6	West	38.274485	-122.285026
	East	38.271429	-122.281885
7	West	38.277982	-122.282532
	East	38.278422	-122.279889
8	West	38.280299	-122.284796
	East	38.280934	-122.282097
9	West	38.286556	-122.285622
	East	38.28495	-122.282636
10A	West	38.294158	-122.282741
	East	38.294808	-122.281397
10B	West	38.29109	-122.28243
	East	38.290239	-122.28067
11	West	38.297108	-122.282931
	East	38.297796	-122.281893
12	West	38.298917	-122.284698
	East	38.298917	-122.283

3.3 Field Data Collection

3.3.1 Habitat mapping

Habitat map field verification was conducted to confirm and refine the vegetation type boundaries mapped via photo interpretation. Simultaneous to vegetation transect monitoring conducted during spring 2017, field staff visited locations flagged during the office photo interpretation for further investigation, and visited the accuracy assessment points. Any necessary field revisions were delineated on the preliminary habitat map for subsequent editing in GIS.

3.3.2 Vegetation monitoring transects

Vegetation monitoring of the 15 transects and 182 sample plots (Figure 2a–e) was performed in May and June 2017. Transects and plots with greater tidal influence were monitored during the

lowest possible tides during daylight hours. Methods followed those outlined in the MMP (JSA 2001).

Stillwater Sciences field staff used the location data loaded into Trimble GPS units to navigate to sampling locations. Along each transect staff performed the following:

- Photo-documented existing conditions at all photo monitoring stations (taking a digital photograph in each cardinal direction);
- Recorded plant species including Pest Plant Species within 5 ft of the entire transect; and
- Recorded the number of woody plants by species including the height and diameter-at-breast-height (DBH) for each plant documented along the transect using line intercept methods.

At each of the pre-established sampling 0.5-m^2 quadrats, plots were positioned such that the stake was located at the southeastern corner of the plot. At these sample plots, botanists recorded:

- Percent absolute cover (to the nearest percent) of all vascular plant species including percent cover of thatch;
- Natural recruitment of woody species through a count of seedlings and vegetative reproduction; and
- Salinity using a handheld refractometer in inundated areas at or near permanent plots within the brackish emergent marsh and tidal mudflat.

Field staff also permanently marked newly established plots (i.e., plots specified with coordinates by NCFCWCD in 2017) with a 2-ft wooden stake in the southeastern corner of the plot. At the end of sampling prior to leaving the field site, all data sheets were reviewed for quality assurance (QA) and quality control (QC).

3.4 Data Entry and Analyses

Preliminary habitat maps were refined to accurately reflect existing habitat types and extents observed during 2017 monitoring. Any habitat polygons revised in the field were re-digitized to update the preliminary habitat map created in GIS and to create the final habitat map.

Vegetation monitoring data were reviewed before data entry, copied to ensure the master data sheet was protected, and checked for errors prior to data analysis. Plant species that could not be identified in the field were keyed using *The Second Edition Jepson Manual* (Baldwin et al. 2012) and all taxonomy followed this manual. Percent absolute cover measurements were converted to relative cover for analyses. Data were analyzed as follows:

1. The presence/absence of plant species was assessed using relative frequency of native species: Within each habitat type, plant occurrence data from plots were tallied to obtain: (a) the relative frequency of native and non-native species across plots (i.e., for each species, the number of plots the particular species occurred in was divided by the total number of plots) and (b) the frequency or relative abundance (i.e., the total number of times native plant species were observed within plots divided by the total number of all plant species [both native and non-native] observed within plots).
2. Vegetative cover using the relative frequency and relative abundance of plant species: Within each habitat type, relative percent cover data from plots were tallied to obtain the average relative percent cover for native and non-native plants species.

3. Density cover using the percent cover of thatch and live vegetation within sample plots: Absolute percent cover of thatch was used as a proxy to assess the density of senescent stems using the density cover classes provided in the MMP (JSA 2001). Table 4 details the ratios of absolute percent cover of thatch to absolute percent cover of vegetation used to obtain density cover classes for each plot. These values were then averaged by plot for each habitat type.
4. Vegetative cover of Pest Plant Species: Relative percent cover of Pest Plant Species were averaged across all plots within each habitat type.
5. Woody plant species: Relative percent cover of woody plants was averaged across all plots within each habitat type. Tree density (i.e., number of trees per acre) was assessed using counts of woody species documented along transects and dividing by the transect area within relevant habitat types. Tree height and tree basal area was assessed using the tree data collected along transects split by habitat type.
6. Natural recruitment: To determine if the marsh surface was being colonized with native salt-tolerant wetland plant species, counts of the number of species with a wetland indicator status of FAC (facultative), FACW (facultative wet), and OBL (obligate) as defined by Lichvar et al. (2016) for Region 0 (Arid West) were tallied, divided by the total number of species within each plot, and averaged by habitat type. Plot data on woody species recruitment were used to assess if recruitment of native riparian tree and shrub species occurred in the shaded riverine aquatic, riparian forest and scrub-shrub, and high-value oak woodland habitat types.
7. Water salinity: Salinity samples taken in plots within tidal mudflats and brackish emergent marsh were averaged and compared to the 2007 and 2012 data (NSR 2008 and Stillwater Sciences 2013).
8. Tree survival, health and vigor, and shaded stream surface: This required as assessment of assess tagged woody plants present within plots. As tagged woody plants were not present within sample plots, there were insufficient data to analyze this metric.

Table 4. Density cover classes (JSA 2001).

Cover class	Estimated vegetation density	Percent senescent stems	Ratio of cover thatch to total vegetation cover
1	Low	Low (0–25%)	0–25% cover thatch: 0–25% cover vegetation
2	Low	Moderate (25–50%)	25–50% cover thatch: 0–25% cover vegetation
3	Medium	Moderate (25–50%)	25–50% cover thatch: 25–50% cover vegetation
4	Medium	High (50–75%)	50–75% cover thatch: 25–50% cover vegetation
5	High	Very high (>75)	>75% cover thatch: >75% cover vegetation

Finally, the Google mash-up of the survey results was updated to maintain the interactive map for viewing monitoring survey results. This application allows point and click data access to the full GIS database through a web map that includes monitoring results. Attributes included are the transect and plot locations, plot data results, 2004, 2007, 2012, and 2017 habitat mapping, and photograph pop-ups at photo monitoring stations.

4 RESULTS

Habitat mapping, transect and plot data collection, and photographic documentation at photopoints was conducted throughout Project Area. Results are provided in the sections below, photographs from all photo stations are presented in Appendix E, and field data forms are presented in Appendix F. In addition, the 2017 habitat mapping and vegetation data are currently available as a Google mash-up at the following location: http://geo.stillwatersci.com/maps/napa/vegetationmonitoring.html.

4.1 Habitat Types

The Project Area included 320.3 ac of upland habitat, 749.2 ac of wetland habitat, 163.0 ac of aquatic habitat, and 0.9 ac of developed land. The habitats described in the MMP and monitored by CH2M Hill, NSR, and Stillwater Sciences in previous years were generally consistent with those encountered by Stillwater Sciences during the 2017 field monitoring effort. The vegetation types are summarized in Table 5 and presented in Figure 3. Table 6 summarizes the results of 2017 vegetation monitoring by habitat type and monitoring indicator, including an assessment of if the Project Area met a particular performance standard within the particular habitat type. Vegetation types are described in the sections below.

Table 5. Summary of vegetation types in the Project Area.

Vegetation type	Acres
Upland habitats	
High-value oak woodland[1]	55.0
Non-native grassland	216.3
Native grassland	49.0
Subtotal	**320.3**
Wetland habitats	
Brackish emergent marsh	256.6
Tidal mudflat	313.3
Seasonal and emergent wetlands	145.2
Shaded riverine aquatic (SRA)	6.6
Riparian scrub-shrub	27.5
Subtotal	**749.2**
Aquatic	
Tidal Channel	22.5
Open Water	140.5
Subtotal	**163.0**
Other	
Developed	0.9
Totals	**1,233.4**

[1] Includes areas mapped as coyote brush scrub as a subset of the oak woodland habitat (21.8 ac).

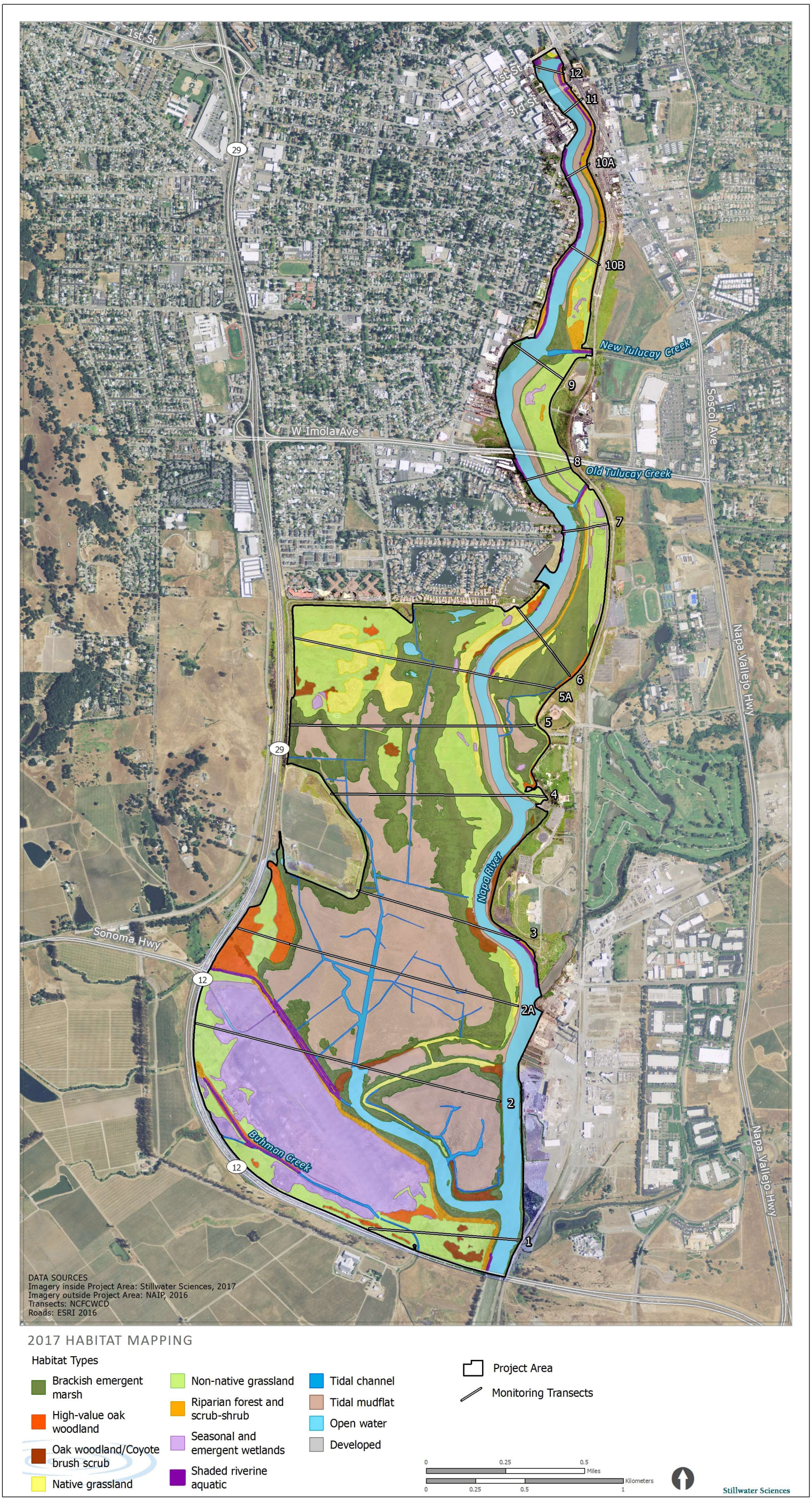


Figure 3. Habitat map for the 2017 Project Area.

Table 6. 2017 vegetation monitoring results by habitat type.

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland[1]	Grasslands
Presence/Absence							
Frequency/Relative Abundance							
Native Species	2–55%	3–50%	14%	N/A	N/A	N/A	N/A
Non-Native Species	2–17%	3-6%	14–43%	N/A	N/A	N/A	N/A
Relative Frequency							
Native Species	69%	86%	47%	N/A	N/A	N/A	N/A
Non-Native Species	31%	14%	53%	N/A	N/A	N/A	N/A
% FAC/FACW/OBL	N/A	N/A	73%	N/A	N/A	N/A	N/A
Performance Standards							
Interim	>80% relative frequency representative of native tidal marsh species	~30% relative frequency representative of vascular plants	>80% relative frequency representative of native wetland species; >50% frequency with wetland indicator of facultative or wetter	N/A	N/A	N/A	N/A
Final	Same as interim	Same as interim	Same as interim	N/A	N/A	N/A	N/A
Achieved Interim?	No	Yes	No, Yes	N/A	N/A	N/A	N/A

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland[1]	Grasslands
Vegetative Cover							
Relative Cover							
Native Species	82%	93%	63%	N/A	41%	14%	20% (all representative of agricultural baylands)
Non-Native Species	18%	7%	37%	N/A	58%	86%	80% (all representative of agricultural baylands)
% FAC/FACW/OBL	N/A	N/A	97%	N/A	N/A	N/A	N/A
Absolute Vegetative Cover	N/A	N/A	N/A	N/A	87%	111%	N/A
Performance Standards							
Interim	>80% relative abundance representative of native tidal marsh species	~30% relative abundance representative of native tidal marsh vascular plants	>80% relative abundance representative of native wetland species; >50% abundance with wetland indicator of facultative or wetter	N/A	85% total cover within 5 years		>80% relative abundance representative of agricultural baylands of North Bay subregion
Final	Same as interim	Same as interim	Same as interim	N/A	85% total cover		Same as interim
Achieved Interim?	Yes	Yes	No; Yes	N/A	Yes	Yes	Yes
Density Cover Class							
Average Cover Class	2.7	0.8	1.7	N/A	3.2	3.3	N/A
Performance Standards							
Interim	Density cover class <4			N/A	Density cover class <4		N/A
Final	Same as interim			N/A	Same as interim		N/A
Achieved Interim?	Yes	Yes	Yes	N/A	Yes	Yes	N/A

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland[1]	Grasslands
Pest Plant Species							
Relative Cover Values							
MMP A Priority Pest Plant Species	1.8%	0.6%	0.0%	N/A	1.0%	50.1%	2.9%
Other species of concern (MMP B Priority, Cal-IPC, CDFA)	8.2%	4.8%	4.8%	N/A	39.1%	4.1%	43.3%
Performance Standards							
Interim	<1% vegetative cover for MMP A-rated species; <5% vegetative cover for other species of concern						
Final	Same as interim						
Achieved Interim?	Almost; No	Yes; Yes	Yes; Yes	Insufficient data to analyze	Almost; No	No; Yes	No; No
Woody Species							
Relative Percent Cover	0%	N/A	0%	N/A	52.7%	47.2%	3%
Tree Density	0 trees/acre	N/A	0 trees/acre	N/A	N/A	N/A	3.05 trees/acre
Tree Height	N/A	N/A	N/A	N/A	9.1 ft	8.7 ft	N/A
Tree Basal Area	N/A	N/A	N/A	N/A	15 ft	16.7 ft	N/A
Performance Standards							
Interim	Tree density <10 trees per acre, >50 ft apart	N/A	Tree density <10 trees per acre, >50 ft apart	N/A	Tree height and basal area trajectories will be within one standard deviation of trees in reference area in 40 years		Tree density <10 trees per acre, >50 ft apart
Final	Same as interim	N/A	Same as interim	N/A	Meets average height and basal area of each species in riparian reference area		Same as interim
Achieved Interim?	Yes	N/A	Yes	N/A	No reference area data available for comparison[2]		Yes

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland[1]	Grasslands
Natural Recruitment							
% FAC/FACW/OBL	97%	N/A	48%	N/A	N/A	N/A	N/A
Recruitment of riparian	N/A	N/A	N/A	Yes	Yes	Yes	N/A
Performance Standards							
Interim	Marsh surface colonizing with native salt-tolerant wetland plant species after 3 years (at least 80% FAC or wetter)	N/A	Marsh surface colonizing with native salt-tolerant wetland plant species after 3 years	Successful natural recruitment of native riparian tree and shrub species occurring within 5 years			N/A
Final	Colonization of marsh surface with native salt-tolerant wetland plant species	N/A	Colonization of marsh surface with native salt-tolerant wetland plant species	Achievement of successful natural recruitment by year 40			N/A
Achieved Interim?	Yes	N/A	Yes	Yes	Yes	Yes	N/A
Water Salinity							
Average parts per thousand (ppt)	1.9	3.1	N/A	N/A	N/A	N/A	N/A
Baseline data (November 2007 [NSR 2008])	19.1	15.3	N/A	N/A	N/A	N/A	N/A
Performance Standards							
Interim	Baseline data[3]		N/A	N/A	N/A	N/A	N/A
Final	Same as interim		N/A	N/A	N/A	N/A	N/A
Achieved Interim?	Yes	Yes	N/A	N/A	N/A	N/A	N/A

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland[1]	Grasslands
Survival							
Counts of Tagged Woody	N/A	N/A	N/A	Tagged woody plants not present in plots	Tagged woody plants not present in plots	Tagged woody plants not present in plots	N/A
Performance Standards							
Interim	N/A	N/A	N/A	90% survival each year monitored for first 5 years			N/A
Final	N/A	N/A	N/A	80% survival			N/A
Achieved Interim?	N/A	N/A	N/A	Insufficient data to analyze;	Insufficient data to analyze	Insufficient data to analyze	N/A
Health and Vigor							
Assessment of Tagged Woody	N/A	N/A	N/A	Tagged woody plants not present in plots	Tagged woody plants not present in plots	Tagged woody plants not present in plots	N/A
Performance Standards							
Interim	N/A	N/A	N/A	Average rating equal or exceed "good" (score >3)			N/A
Final	N/A	N/A	N/A	Same as interim			N/A
Achieved Interim?	N/A	N/A	N/A	Insufficient data to analyze	Insufficient data to analyze	Insufficient data to analyze	N/A

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland[1]	Grasslands
Shaded Stream Surface							
Shaded Stream Surface	N/A	N/A	N/A	No plots located within SRA	N/A	N/A	N/A
Performance Standards							
Interim	N/A	N/A	N/A	<2 ft of erosion per year, maintain minimum 15-foot buffer between floodwall and banks	N/A	N/A	N/A
Final	N/A	N/A	N/A	Same as interim	N/A	N/A	N/A
Achieved Interim?	N/A	N/A	N/A	Insufficient data to analyze	N/A	N/A	N/A

[1] There were only three plots in the high-value oak woodland habitat type, therefore all indicators analyzed for this habitat type have an extremely small sample size.
[2] Data from reference sites were not provided to use for assessment of performance standards.
[3] Habitats with reduced water salinities of between 0.5 and 30 ppt are considered to be brackish or mixohaline (Cowardin et al. 1979).

4.1.1 Brackish emergent marsh

Brackish emergent marsh was the second most common habitat type observed in the Project Area in 2017; approximately 256.6 ac of brackish emergent marsh were documented (Table 5, Figure 3). This habitat was generally found along the edge of the Napa River and on low terraces, where it was subject to frequent inundation. Dominant species observed in the brackish emergent marsh habitat include southern bulrush, saltmarsh bulrush (*Bolboschoenus maritimus* subsp. *paludosus*), Oregon gumweed *(Grindelia stricta)*, marsh jaumea, several rush species (*Juncus* spp.), narrow-leaved cattail (*Typha angustifolia*), common pickleweed, and salt grass.

A total of 58 plots were located within brackish emergent marsh. Native plants species had frequency values ranging from 2–55%; non-native plant species had frequency values ranging from 2–17% (Table 6). The relative frequency of native plant species was 69% and relative vegetative cover of native species was 82%. Given the performance standard for presence/absence requires at least 80% relative frequency of native plant species, this was not achieved during 2017 monitoring. However, this habitat did exceed the performance standards for vegetative cover of native species of 80% relative cover of native species. The average density cover class throughout all plots in the brackish emergent marsh was 2.7, which met the performance standard of less than 4. The relative cover of MMP and other species of concern was 1.8% and 8.2% respectively, which did not meet the performance standards for these indicators. Relative cover of woody species (0%) and a tree density of 0 trees/acre met the performance standards for these indicators. Natural recruitment of the marsh surface with wetland plant species was successful in 2017, with 97% of the plants with a wetland indicator status of FAC or wetter. Finally, water salinity was an average of 1.9 ppt, under the baseline data documented in 2007 but above that of which would signify freshwater marsh (i.e., 0.5 ppt), so the performance standard was met.

4.1.2 Tidal mudflats

Tidal mudflat habitat was the most extensive habitat type within the Project Area in 2017; approximately 313.3 ac of tidal mudflat were documented (Table 5, Figure 3). This habitat occurred at low elevations within central portions of the SWOA as well as adjacent to the Napa River. Average cover of bare ground was high (89%), with the sparse vegetative cover predominantly due to small spikerush, widgeongrass, flowering quillwort (*Triglochin scilloides*), and algae.

A total of 36 plots were located within tidal mudflats. Native plants species had frequency values ranging from 3–50%; non-native plant species had frequency values of 3–6% (Table 6). The relative frequency of native plant species was 86% and relative vegetative cover of native species was 93%; both of which met the performance standards. The average density cover class throughout all plots in tidal mudflats was 0.8, which met the performance standard. The relative cover of MMP and other species of concern was 0.6% and 4.8%, which met the performance standards for these indicators. Finally, water salinity was an average of 3.1 ppt, under the baseline data documented in 2007 but above that of which would signify freshwater marsh (i.e., 0.5 ppt), so the performance standard was met.

4.1.3 Seasonal and emergent wetlands

In 2017, 145.2 ac of seasonal and emergent wetlands were documented within the Project Area (Table 5, Figure 3). With the exception of a few smaller seasonal and emergent wetlands documented by NCFCWCD after 2010 winter rains and confirmed during both 2012 and 2017

field monitoring, the majority of the seasonal and emergent wetlands were documented in the southern portion of the SWOA. Characteristic species included curly dock and annual beard grass.

A total of 7 plots were located within seasonal and emergent wetlands. Native plants species had a frequency value of 14%; non-native plant species had frequency values ranging from 14–43% (Table 6). The relative frequency of native plant species was 47% and relative vegetative cover of native species was 63%, both of which did not meet the performance standards requiring at least 80% relative frequency and abundance of native plant species. Seasonal and emergent wetlands were required to have at least 50% frequency and abundance of plant species with a wetland indicator status of FAC or wetter, which was achieved in 2017 (73% relative frequency was documented; 97% relative abundance was documented). The average density cover class throughout all plots in the seasonal and emergent wetlands was 1.7, which met the performance standard. The relative cover of MMP and other species of concern was 0% and 4.8%, which met the performance standards for both. Given that healthy seasonal and emergent wetlands do not support woody species, the indicators for relative cover of woody species (0%) and a tree density of 0 trees/acre also met the performance standards for this habitat type (tree density <10 trees per acre, >50 ft apart). Natural recruitment of the marsh surface with wetland plant species met the performance standard in 2017; 48% of the plants had a wetland indicator status of FAC or wetter.

4.1.4 Shaded riverine aquatic

In 2017, 6.6 ac of shaded riverine aquatic (SRA) were documented within the Project Area (Table 5, Figure 3). Species contributing to the overhanging shade included arroyo willow, red willow, American elm (*Ulmus americana*), blackwood acacia (*Acacia melanoxlyon*), and northern California black walnut.

In 2012, only one sample plot was located within SRA habitat (Stillwater Sciences 2013). In 2017 however, the riparian vegetation type had expanded towards the stream surface, resulting in the plot being located within the riparian vegetation type (as shaded riverine aquatic is riparian or woodland habitats within 15 ft of the shoreline) and no plots representing SRA habitat. Because there were no sample plots located within SRA habitat, no tagged woody plants were documented within this vegetation type. As such, there were insufficient data to analyze whether the habitat met the performance standards for survival, health and vigor, or shaded stream surface.

4.1.5 Riparian forest and scrub-shrub

In 2017, 27.5 ac of riparian forest and scrub-shrub were documented within the Project Area (Table 5, Figure 3). Dominant tree species included a mix of native and non-native species: red willow and arroyo willow, with intermittent stands of American elm, blackwood acacia, and coast live oak. Oats, ripgut grass, and beardless wild rye (*Elymus triticoides*) were common species in the herbaceous layer.

A total of 15 sample plots were located within riparian forest and scrub-shrub habitat. The relative vegetative cover within these plots was 41% native species and 58% non-native species (Table 6). The absolute vegetative cover was 87%, which met the performance standard of at least 85% total cover. The average density cover class throughout all plots in the riparian forest and scrub-shrub was 3.2, which met the performance standard of less than cover class 4. The relative cover for MMP A Priority and Other Pest Plant species was 1.0% and 39.1%, respectively, which came close to meeting the performance standards requiring less than 1% MMP A Priority species, but did not meet the performance standards requiring less than 5%

Other Pest Plant species. The relative cover of woody species was 52.7%, average tree height was 9.1 ft, and average tree basal area was 15 ft^2. It was unknown whether these indicators met the performance standards, as no reference data were available for comparison. In addition, natural recruitment of native species was occurring within this habitat. However, no tagged woody plants were documented within the riparian forest and scrub-shrub sample plots; therefore, there were insufficient data to analyze whether the habitat was meeting the performance standards for survival or health and vigor.

4.1.6 High-value oak woodland

In 2017, 55.0 ac of woodlands were documented within the Project Area (Table 5, Figure 3). Areas mapped as high-value oak woodland were predominantly those areas within the SWOA planted with coast live oak and valley oak in March of 2009. This vegetation type also included areas mapped as coyote brush scrub, as that vegetation type is a subset of the high-value oak woodland. Herbaceous species present included soft chess (*Bromus hordeaceus*), medusa head (*Elymus caput-medusae*), field bindweed (*Convolvulus arvensis*), rye grass (*Festuca perennis*), and brome fescue (*Festuca bromoides*). The mapped woodland habitat also included areas on the east side of Napa River planted from 2006–2008.

Only three sample plots were located within high-value oak woodland habitat; this represented a reduction from five plots in 2012 because some areas previously mapped as oak woodland had insufficient tree cover to qualify as woodland. Within the three plots, the relative vegetative cover was 14% native species and 86% non-native species (Table 6). The absolute vegetative cover was 111%, which met the performance standard of at least 85% total cover. The average density cover class throughout all plots in the riparian forest and scrub-shrub was 3.3, which met the performance standard requiring less than 4 density cover class. The relative cover for MMP A Priority and Other Pest Plant species was 50.1% and 4.1%, respectively, which did not meet the performance standards. The relative cover of woody species was 47.2%, average tree height was 8.7 ft, and average tree basal area was 16.7 ft^2. It is unknown whether these indicators met the performance standards, as no reference data were available for comparison. In addition, natural recruitment of native species was documented along transects through this habitat. Within the riparian forest and scrub-shrub sample plots, no tagged woody plants were documented; therefore, there were insufficient data to analyze whether the habitat was meeting the performance standards for either survival or health and vigor.

4.1.7 Grasslands

In 2017, 216.3 ac of non-native grassland and 49.0 ac of native grassland were documented within the Project Area (Table 5, Figure 3). Both non-native and native grasslands were located throughout the Project Area in areas well beyond the reach of tidal influence at higher relative elevations. Non-native grassland was characterized by non-native grasses such as brome fescue, rye grass, soft chess, ripgut grass, harding grass, and Mediterranean barley (*Hordeum marinum* subsp. *gussonianum*). Common forbs included radish and bristly ox-tongue (*Helminthotheca echioides*). As part of the restoration, approximately 50 ac of native perennial grasses were planted in parts of the SWOA, including the access road, floodplain terrace along the Napa River, and levees around Horseshoe Bend and the vineyard. Hanford ARC (2003) documented poor recruitment and survival on the access road and the vineyard levee, but native grasses have become well-established on the floodplain terrace and the levee around Horseshoe Bend (Figure 3). Beardless wild rye and meadow barley were the dominant grass species throughout the native grassland habitat. Non-native grasses were present and scattered at low to moderate cover

throughout the native grassland; species frequently represented were brome fescue, rye grass, and harding grass, and bristly ox-tongue.

A total of 59 sample plots were located within grasslands (37 plots within non-native grasslands and 22 plots within native grasslands). The relative vegetative cover within these plots was 20% native species and 80% non-native species (Table 6), all of which were species representative of agricultural baylands, and therefore met the performance standard requiring at least 80% species cover representative of agricultural baylands. The relative cover for MMP A Priority species and other Pest Plant Species was 2.9% and 43.3%, respectively, which did not meet the performance standards for this indicator requiring less than 1% MMP A Priority species and less than 5% Other Pest Plant species. The relative cover of woody species (3%) and a tree density of 3.05 trees/acre met the performance standards for these indicators requiring less than 10 trees per acre.

4.1.8 Aquatic

4.1.8.1 Tidal channel

In 2017, 22.5 ac of tidal channels were documented within the Project Area (Table 5, Figure 3). This habitat included channels and depressions that remained inundated during low tides and were scattered throughout the Project Area including Buhman Creek, Old Tulucay Creek, and New Tulucay Creek; the largest network of tidal channels occured in the mudflats within the SWOA. Tidal channels contained up to several ft of water throughout all tidal events and provide valuable shorebird and waterfowl habitat. No emergent vegetation was observed in this habitat type.

4.1.8.2 Open water

In 2017, 140.5 ac of open water were documented within the Project Area (Table 5, Figure 3). Open water occured within the active channel of the Napa River and within the deep-water portion of Horseshoe Bend. This habitat type was devoid of vegetation.

4.2 Vegetation Monitoring Transects

Within the 182 plots along the 15 permanent transects, all but one of the habitat types (SRA) were observed and a total of 90 vascular plant species were documented (Table 7). Appendix G provides a comprehensive list of the 167 plant species observed across all transects. Appendix H provides a summary of the relative percent cover, habitat type, and water salinity (where applicable) for each plot. Appendix I provides the average percent relative cover from plot data and frequency for each species by transect (e.g., blackwood acacia had an average of 7.07% cover across all plots on Transect 3, and occurred in 7.17% of the transect plots). Transect numbering followed the conventions presented in the MMP (JSA 2001) and previous monitoring reports (CH2M Hill 2004, NSR 2008, Stillwater Sciences 2013); although one new transect (Transect 12) and five new plots were installed. Transects crossed multiple habitat types.

Table 7. Plant species observed in sample plots during the 2017 vegetation monitoring.

Scientific name [Synonym in Hickman (1993)]	Common name	Family	Native?	Pest Plant Species?	Wetland indicator status[1]
Acacia	blackwood	Fabaceae	No	Yes	NL

Scientific name [Synonym in Hickman (1993)]	Common name	Family	Native?	Pest Plant Species?	Wetland indicator status[1]
melanoxylon	acacia				
Acmispon americanus var. *americanus*	American bird's-foot trefoil	Fabaceae	Yes	No	UPL
Alisma triviale	northern water plantain	Alismataceae	Yes	No	OBL
Ambrosia psilostachya	western ragweed	Asteraceae	Yes	No	FACU
Artemisia douglasiana	mugwort	Asteraceae	Yes	No	FAC
Atriplex prostrata	fat-hen	Chenopodiaceae	Yes	No	FACW
Avena barbata	slender wild oat	Poaceae	No	Yes	NL
Baccharis pilularis	coyote brush	Asteraceae	Yes	No	NL
Bolboschoenus maritimus subsp. *paludosus*	saltmarsh bulrush, alkali bulrush	Cyperaceae	Yes	No	OBL
Briza minor	annual quaking grass, small quaking grass	Poaceae	No	No	FAC
Bromus diandrus	ripgut grass	Poaceae	No	Yes	NL
Bromus hordeaceus	soft chess	Poaceae	No	Yes	FACU
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Asteraceae	No	Yes	NL
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	Yes	No	OBL
Centaurea solstitialis	yellow star-thistle	Asteraceae	No	Yes	NL
Cichorium intybus	chicory	Asteraceae	No	No	FACU
Conium maculatum	poison hemlock	Apiaceae	No	Yes	FACW
Convolvulus arvensis	bindweed, orchard morning-glory	Convolvulaceae	No	No	NL
Cotula coronopifolia	brass-buttons	Asteraceae	No	No	OBL
Cyperus eragrostis	tall flatsedge	Cyperaceae	Yes	No	FACW
Distichlis spicata	salt grass	Poaceae	Yes	No	FAC
Eleocharis	small spikerush	Cyperaceae	Yes	No	OBL

Scientific name [Synonym in Hickman (1993)]	Common name	Family	Native?	Pest Plant Species?	Wetland indicator status[1]
parvula					
Elymus caput-medusae	medusa head	Poaceae	No	Yes	NL
Elymus glaucus subsp. *glaucus*	blue wildrye	Poaceae	Yes	No	FACU
Elymus repens	quack grass	Poaceae	No	Yes	FAC
Elymus triticoides	beardless wild rye	Poaceae	Yes	No	FAC
Festuca arundinacea	tall fescue	Poaceae	No	Yes	FACU
Festuca bromoides	brome fescue	Poaceae	No	No	FACU
Festuca perennis	rye grass	Poaceae	No	Yes	FAC
Foeniculum vulgare	fennel	Apiaceae	No	Yes	NL
Frankenia salina	alkali heath	Frankeniaceae	Yes	No	FACW
Galium aparine	goose grass	Rubiaceae	Yes	No	FACU
Geranium dissectum	cutleaf geranium	Geraniaceae	No	No	NL
Grindelia stricta	Oregon gumweed	Asteraceae	Yes	No	FACW
Hedera helix	English ivy	Araliaceae	No	Yes	FACU
Helminthotheca echioides	bristly ox-tongue	Asteraceae	No	No	FAC
Hirschfeldia incana	shortpod mustard	Brassicaceae	No	Yes	NL
Hordeum brachyantherum	meadow barley	Poaceae	Yes	No	FACW
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	Poaceae	No	Yes	NL
Hordeum murinum	wall barley	Poaceae	No	Yes	FACU
Hypochaeris radicata	rough cat's-ear	Asteraceae	No	Yes	FACU
Jaumea carnosa	marsh jaumea	Asteraceae	Yes	No	OBL
Juglans hindsii	northern California black walnut	Juglandaceae	Yes	No	FAC
Juncus bufonius var. *bufonius*	toad rush	Juncaceae	Yes	No	FACW
Juncus mexicanus	mexican rush	Juncaceae	Yes	No	FACW
Juncus patens	spreading rush	Juncaceae	Yes	No	FACW

Scientific name [Synonym in Hickman (1993)]	Common name	Family	Native?	Pest Plant Species?	Wetland indicator status[1]
Lactuca serriola	prickly lettuce	Asteraceae	No	Yes	FACU
Lepidium latifolium	broadleaved pepperweed	Brassicaceae	No	Yes	FAC
Lotus corniculatus	bird's-foot trefoil	Fabaceae	No	No	FAC
Lythrum hyssopifolia	hyssop loosestrife	Lythraceae	No	No	OBL
Medicago polymorpha	California burclover	Fabaceae	No	No	FACU
Melica californica	California melic	Poaceae	Yes	No	NL
Melilotus albus	white sweetclover	Fabaceae	No	Yes	FACU
Mentha spicata	spearmint	Lamiaceae	No	No	FACW
Olea europaea	olive	Oleaceae	No	No	NL
Persicaria amphibia	water smartweed	Polygonaceae	Yes	No	OBL
Phalaris aquatic	harding grass	Poaceae	No	Yes	FACU
Phalaris minor	littleseed canarygrass	Poaceae	No	No	NL
Plantago lanceolata	English plantain	Plantaginaceae	No	No	FAC
Polygonum aviculare	knotweed, knotgrass	Polygonaceae	No	No	FAC
Polypogon monspeliensis	annual beard grass, rabbitfoot grass	Poaceae	No	No	FACW
Quercus agrifolia	coast live oak, encina	Fagaceae	Yes	No	NL
Ranunculus muricatus	spinyfruit buttercup	Ranunculaceae	No	No	FACW
Raphanus sativus	radish	Brassicaceae	No	No	NL
Rubus armeniacus	Himalayan blackberry	Rosaceae	No	Yes	FAC
Rumex acetosella	sheep sorrel	Polygonaceae	No	Yes	FACU
Rumex crispus	curly dock	Polygonaceae	No	No	FAC
Rumex occidentalis	western dock	Polygonaceae	Yes	No	FACW
Rumex salicifolius	willow dock	Polygonaceae	Yes	No	FACW
Ruppia maritima	widgeongrass	Ruppiaceae	Yes	No	OBL
Salicornia pacifica	Pacific swampfire	Chenopodiaceae	Yes	No	OBL

Scientific name [Synonym in Hickman (1993)]	Common name	Family	Native?	Pest Plant Species?	Wetland indicator status[1]
Salix lasiandra	Pacific willow	Salicaceae	Yes	No	FACW
Salix lasiolepis	arroyo willow	Salicaceae	Yes	No	FACW
Schoenoplectus acutus var. *occidentalis*	common tule	Cyperaceae	Yes	No	OBL
Schoenoplectus americanus	Olney's three-square bulrush	Cyperaceae	Yes	No	OBL
Schoenoplectus californicus	southern bulrush	Cyperaceae	Yes	No	OBL
Silybum marianum	blessed milkthistle	Asteraceae	No	No	NL
Sonchus asper subsp. *asper*	prickly sow thistle	Asteraceae	No	No	NL
Spergula arvensis	stickwort, starwort	Caryophyllaceae	No	No	NL
Stipa pulchra	purple needle grass	Poaceae	Yes	No	NL
Trifolium subterraneum	subterranean clover	Fabaceae	No	No	NL
Triglochin maritima	common arrow-grass	Juncaginaceae	Yes	No	OBL
Triglochin scilloides	flowering-quillwort	Juncaginaceae	Yes	No	OBL
Typha angustifolia	narrow-leaved cattail	Typhaceae	No	Yes	OBL
Ulmus americana	American elm	Ulmaceae	Yes	No	FAC
Ulmus sp.	elm	Ulmaceae	No	No	NL
Veronica anagallis-aquatica	water speedwell	Plantaginaceae	Yes	No	OBL
Vicia sativa	garden vetch	Fabaceae	No	No	FACU
Vicia villosa	hairy vetch, winter vetch	Fabaceae	No	No	NL
Zeltnera muehlenbergii	Monterey centaury	Gentianaceae	Yes	No	FAC

[1] Wetland indicator status from the 2017 national list of plant species that occur in wetlands for Region 0, Arid West (Lichvar et al. 2016):
OBL = obligate
UPL = upland
FACW = facultative wet
FAC = facultative
FACU = facultative upland
NL= not listed (considered upland)

4.2.1 Transect 1

Transect 1 was located at the southern end of the SWOA and was approximately 2,519 ft long

(Figure 2e). Elevations ranged from approximately -3 to 26 ft mean sea level (msl). Transect 1 was installed and first monitored in 2007 and consisted of 11 sample plots, one on the east side of Napa River and 10 on the west side of Napa River. The average combined vegetative cover from all sample plots along this transect was 93% (Appendix H, Table H-1). Transect 1 bisected several habitat types including brackish emergent marsh, riparian forest and scrub-shrub, high-value oak woodland, and non-native grasslands (Figure 3).

4.2.2 Transect 2

Transect 2 was located in the Horseshoe Bend Island area and was approximately 5,208 ft long (Figure 2e). Elevations ranged from approximately -3 to 10 ft msl. Transect 2 was installed and first monitored in 2003 (Plots 1–10A) and 2007 (Plots 11–15) and consisted of 16 sample plots all on the west side of Napa River. The average combined vegetative cover from all sample plots along this transect was approximately 42% (Appendix H, Table H–1). Transect 2 bisected brackish emergent marsh, tidal mudflats, high-value oak woodland, seasonal and emergent wetlands, and native and non-native grasslands (Figure 3).

4.2.3 Transect 2A

Transect 2A was located within the southern central portion of the SWOA and was approximately 4,816 ft long (Figure 2d). Elevations ranged from approximately -3 to 24 ft msl. Transect 2A was installed and first monitored in 2003 (Plots 1A–10) and 2007 (Plots 11 and 12) and consisted of 13 sample plots all on the west side of the Napa River. The average combined vegetative cover from all sample plots along this transect was approximately 71% (Appendix H, Table H–1). Transect 2A was primarily within tidal mudflat habitat, but also transected brackish emergent marsh, native and non-native grasslands, and high-value oak woodland (Figure 3).

4.2.4 Transect 3

Transect 3 was located within the central portion of the SWOA and was approximately 2,813 ft long (Figure 2d). Elevations ranged from approximately -3 to 20 ft msl. Transect 3 was installed and first monitored in 2003 (Plots 1A–10) and 2007 (Plot E1) and consisted of 13 sample plots, 12 of which were on the west side of the Napa River and one of which was on the east side. The average combined vegetative cover from all sample plots along the western portion of this transect (i.e., west of the Napa River) was approximately 50%, and along the eastern portion of this transect was approximately 5% (Appendix H, Table H–1). Transect 3 was primarily within tidal mudflats, but also crossed through high-value oak woodland (coyote brush scrub), and brackish emergent marsh on the west side, as well as riparian forest and scrub-shrub, SRA, and tidal mudflat on the east side.

4.2.5 Transect 4

Transect 4 was located within the northern central portion of the SWOA and was approximately 3,572 ft long (Figure 2d). Elevations ranged from approximately -3 to 20 ft msl. Transect 4 was installed and first monitored in 2004 (Plots 1–10) and 2007 (Plots E1–E4) and consisted of 16 sample plots, 12 of which were on the west side of the Napa River and four of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of this transect was approximately 73%, and along the eastern portion of this transect was 90% (Appendix H, Table H–1). Transect 4 was primarily within tidal mudflat, brackish marsh and non-native grassland (Figure 3).

4.2.6 Transect 5

Transect 5 was located within the northern central portion of the SWOA and was approximately 4,073 ft long (Figure 2c). Elevations ranged from -3 to 6 ft msl. Transect 5 was installed and first monitored in 2004 (Plots 1–10) and 2007 (Plots 11–13 and E1–E5) and consisted of 18 sample plots, 13 of which were on the west side of the Napa River and five of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was approximately 87%, and along the eastern portion of the transect was 73% (Appendix H, Table H–1). Transect 5 was primarily within brackish emergent marsh, tidal mudflats, and native and non-native grasslands (Figure 3).

4.2.7 Transect 5A

Transect 5A was located within the northern portion of the SWOA and was approximately 4,419 ft long (Figure 2c). Elevations ranged from -3 to 14 ft msl. Transect 5A was installed and first monitored in 2004 (Plots 1A–10) and 2007 (Plots 11–13 and E1–E10) and consisted of 26 sample plots, 16 of which were on the west side of the Napa River and 10 of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was approximately 79% and along the eastern portion of the transect was 84% (Appendix H, Table H–1). Transect 5A was predominantly within brackish emergent marsh and native and non-native grasslands, and crossed through narrow segments of riparian forest scrub-shrub, tidal mudflats, seasonal emergent wetlands, and high-value oak woodland habitats (Figure 3).

4.2.8 Transect 6

Transect 6 was located within the northern portion of the SWOA and was approximately 1,433 ft long (Figure 2c). Elevations ranged from -3 to 8 ft msl. Transect 6 was installed and first monitored in 2004 (Plots 1–10) and 2007 (Plots E1–E10) and consisted of 20 sample plots, 10 of which were on the west side of the Napa River and 10 of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was 98% and along the eastern portion of the transect was also 87% (Appendix H, Table H–1). Transect 6 was predominantly within brackish emergent marsh and native grasslands, and crossed through narrow segments of high-value oak woodland, tidal mudflats, and riparian forest and scrub-shrub habitats (Figure 3).

4.2.9 Transect 7

Transect 7 was located northeast of the SWOA and was approximately 778 ft long (Figure 2b). Elevations ranged from -3 to 10 ft msl. Transect 7 was installed and first monitored in 2007 and consisted of 10 sample plots, one of which was on the west side of the Napa River, and nine of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was 100% and along the eastern portion of the transect was approximately 87% (Appendix H, Table H–1). Transect 7 was predominantly within native and non-native grasslands, but also bisected tidal mudflats, brackish emergent marsh, riparian forest and scrub-shrub, SRA, and seasonal and emergent wetland habitats (Figure 3).

4.2.10 Transect 8

Transect 8 was located north of the SWOA, near the Imola Avenue bridge and was approximately 808 ft long (Figure 2b). Elevations ranged from approximately -2 to 12 ft msl. Transect 8 was installed and first monitored in 2012 and consisted of eight sample plots, one of which was on the

west side of the Napa River and seven of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was approximately 62% and along the eastern portion of the transect was approximately 85% (Appendix H, Table H–1). Transect 8 was predominantly within non-native grasslands, but also bisected tidal mudflats seasonal and emergent wetlands, brackish marsh, SRA, and riparian forest and scrub-shrub habitats (Figure 3).

4.2.11 Transect 9

Transect 9 was located north of the SWOA near New Tulucay Creek and was approximately 1,037 ft long (Figure 2b). Elevations ranged from approximately -2 to 12 ft msl. Transect 9 was installed and first monitored in 2012 and consisted of seven sample plots, two of which were on the west side of the Napa River and five of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was 32% and along the eastern portion of the transect was approximately 87% (Appendix H, Table H–1). Transect 9 was predominantly within non-native grasslands, but also bisected brackish emergent marsh and tidal mudflats (Figure 3).

4.2.12 Transect 10B

Transect 10B was located north of the SWOA approximately halfway between the Imola Avenue and 3rd Street bridges and was approximately 600 ft long (Figure 2a). Elevations ranged from approximately -2 to 12 ft msl. Transect 10B was installed and first monitored in 2012 and consisted of six sample plots, one of which was on the west side of the Napa River and five of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was approximately 100% and along the eastern portion of the transect was 65% (Appendix H, Table H–1). Transect 10B was predominantly within non-native grasslands, but also bisected tidal mudflats, brackish emergent marsh, riparian forest and scrub-shrub, and shaded riverine aquatic habitats (Figure 3).

4.2.13 Transect 10A

Transect 10A was located north of the SWOA approximately 1,400 ft downstream of the 3rd Street bridge and was approximately 400 ft long (Figure 2a). Elevations ranged from approximately -1 to 5 ft msl. Transect 10A was installed and first monitored in 2012 and consisted of six sample plots, one of which was on the west side of the Napa River and five of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was 100% and along the eastern portion of the transect was approximately 79% (Appendix H, Table H–1). Transect 10A was predominantly within riparian forest and scrub-shrub, tidal mudflats, shaded riverine aquatic habitats, and brackish emergent marsh (Figure 3).

4.2.14 Transect 11

Transect 11 was located north of the SWOA approximately 250 ft downstream of the 3rd Street bridge and was approximately 340 ft long (Figure 2a). Elevations ranged from approximately -1 to 5 ft msl. Transect 11 was installed and first monitored in 2012 and consisted of six sample plots, two of which were on the west side of the Napa River and four of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was approximately 44% and along the eastern portion of the transect was approximately 71% (Appendix H, Table H–1). Transect 11 was predominantly within tidal

mudflats, riparian forest and scrub-shrub, but also bisected brackish emergent marsh and shaded riverine aquatic habitats (Figure 3).

4.2.15 Transect 12

Transect 12 was located north of the SWOA approximately 400 ft south of the intersection of the Soscol Avenue and First Street bridges and was approximately 490 ft long (Figure 2a). Elevations ranged from approximately -3 to 18 msl. Transect 12 was newly installed and monitored in 2017 and consisted of five sample plots, three of which were on the west side of the Napa River and two of which were on the east side. The average combined vegetative cover from all sample plots along the western portion of the transect was approximately 29% and along the eastern portion of the transect was approximately 42% (Appendix H, Table H-1). Transect 12 crossed through riparian forest and scrub-shrub, shaded riverine aquatic, tidal wetlands, and brackish emergent marsh habitats (Figure 3).

4.3 Pest Plant Species

Table 8 summarizes the Pest Plant Species observed in sample plots and within five ft of either side of monitoring transects and the various ranks of each species. Further detail regarding cover and locations of the documented species is presented in the following sections.

Table 8. Pest Plant Species observed in the Project Area during 2017 vegetation monitoring.

Scientific name	Common name	Family	MMP	Cal-IPC	CDFA
Acacia dealbata	silver wattle	Fabaceae	B Priority	Moderate	-
Acacia melanoxylon	blackwood acacia	Fabaceae	B Priority	Limited	-
Allium vineale	wild garlic	Alliaceae	-	-	B
Avena barbata	slender wild oat	Poaceae	B Priority	Moderate	-
Avena fatua	wild oat	Poaceae	B Priority	Moderate	-
Brassica nigra	black mustard	Brassicaceae	B Priority	Moderate	-
Bromus diandrus	ripgut grass	Poaceae	B Priority	Moderate	-
Bromus hordeaceus	soft chess	Poaceae	B Priority	Limited	-
Bromus madritensis	compact brome	Poaceae	B Priority	-	-
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Asteraceae	B Priority	Moderate	-
Centaurea solstitialis	yellow star-thistle	Asteraceae	B Priority	High	-
Cirsium vulgare	bull thistle	Asteraceae	-	Moderate	-
Conium maculatum	poison hemlock	Apiaceae	B Priority	Moderate	-
Cynodon dactylon	Bermuda grass	Poaceae	-	Moderate	-
Dipsacus fullonum	wild teasel	Dipsacaceae	-	Moderate	-
Dittrichia graveolens	stinkwort	Asteraceae	-	Moderate	-
Elymus caput-medusae	medusa head	Poaceae	A Priority	High	-
Elymus repens	quack grass	Poaceae	-	-	B

Scientific name	Common name	Family	MMP	Cal-IPC	CDFA
Eucalyptus globulus	blue gum	Myrtaceae	B Priority	Moderate	-
Festuca arundinacea	tall fescue	Poaceae	-	Moderate	-
Festuca myuros	rattail sixweeks grass	Poaceae	-	Moderate	-
Festuca perennis	rye grass	Poaceae	B Priority	Moderate	-
Foeniculum vulgare	fennel	Apiaceae	A Priority	High	-
Genista monspessulana	French broom	Fabaceae	A Priority	High	-
Hedera helix	English ivy	Araliaceae	B Priority	High	-
Hirschfeldia incana	shortpod mustard	Brassicaceae	B Priority	Moderate	-
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	Poaceae	-	Moderate	-
Hordeum murinum	wall barley	Poaceae	-	Moderate	-
Hypochaeris radicata	rough cat's-ear	Asteraceae	-	Moderate	-
Lactuca serriola	prickly lettuce	Asteraceae	B Priority	-	-
Lepidium latifolium	broadleaved pepperweed	Brassicaceae	A Priority	High	B
Ludwigia hexapetala	Uruguayan primrose-willow	Onagraceae	-	High	-
Malva nicaeensis	bull mallow	Malvaceae	B Priority	-	-
Melilotus albus	white sweetclover	Fabaceae	B Priority	-	-
Melilotus indicus	sourclover	Fabaceae	B Priority	-	-
Mentha pulegium	pennyroyal	Lamiaceae	-	Moderate	-
Phalaris aquatica	harding grass	Poaceae	B Priority	Moderate	-
Rubus armeniacus	Himalayan blackberry	Rosaceae	B Priority	High	-
Rumex acetosella	sheep sorrel	Polygonaceae	-	Moderate	-
Typha angustifolia	narrow-leaved cattail	Typhaceae	B Priority	-	-

4.3.1 MMP A-Rated Pest Plant Species

Four MMP A-priority Pest Plant Species were observed within the Project Area in 2017. Medusa head was found along four transects (2A, 5, 5A, 6) and was documented in four plots (36% average absolute cover). Fennel (*Foeniculum vulgare*) was found along all transects except 10B, and was documented in four plots (17% average absolute cover). Broadleaved pepperweed (*Lepidium latifolium*) was found along twelve transects (1, 2, 2A, 3, 4, 5, 6, 7, 8, 9, and 11) and was documented in 8 plots (7% average absolute cover). French broom (*Genista monspessulana*) was found only on Transect 3 and was not documented in any plots.

As fennel and broadleaved pepperweed were the most commonly encountered, they were considered to have the greatest potential to warrant adaptive management strategies to ensure control and/or eradication is accomplished. The other MMP A priority species exhibited low frequencies and cover values and were therefore determined to not be of concern at this time.

4.3.2 MMP B-Rated and CDFA/Cal-IPC Pest Plant Species

MMP B-priority and CDFA/Cal-IPC Pest Plant Species within the Project Area in 2017 included 40 different species. Most of these species occurred sporadically throughout the Project Area. Exceptions to this include relative high frequencies of rye grass in 44 plots [19.6% average absolute cover]) and 10 transects, soft chess (in 25 plots [12.0% average absolute cover] and 12 transects), harding grass (16 plots [21.2 average absolute cover] and 13 transects), and Mediterranean barley (16 plots [13.2 average absolute cover] and 12 transects).

Additional species that were documented in very few sample plots, but were observed on over half of the transects include slender wild oat (*Avena barbata*) (12 transects), ripgut grass (11 transects), Italian thistle (*Carduus pycnocephalus* subsp. *Pycnocephalus*) (9 transects), and shortpod mustard (*Hirschfeldia incana*) (8 transects).

5 DISCUSSION

The Project has met many of the habitat goals and management objectives including target acreages of most habitat types, presence of native species in tidal mudflats, frequency of wetland plants in seasonal emergent wetlands, vegetative cover in most habitat types, density cover class, woody species, natural recruitment, and water salinity (Table 9). However, there were some goals that have not yet been met including habitat acreages of brackish emergent marsh and high-value oak woodland, the relative frequency (presence/absence) of native species within brackish emergent marsh and seasonal emergent wetland, relative cover of native species in seasonal emergent wetland, and the cover of pest plant species in most habitat types (Table 9). An analysis of the habitat types and indicators that had not met the performance standards are provided in the sections below, including recommendations for adaptive management.

Table 9. Summary of achievement of performance standards by indicator and habitat type.

Indicator	Brackish emergent marsh	Tidal mudflats	Seasonal and emergent wetlands	Shaded riverine aquatic	Riparian forest and scrub-shrub	High-value oak woodland	Grasslands
Geographical extent of habitats (habitat mapping)							
Goal	503 acres	2.5 acres	45 acres	0.29 acres	2 acres	133 acres	72 acres
2004 acreages	107 acres	288 acres	122 acres	0 acres	8.5 acres[1]		255 acres
2007 acreages	210 acres	295 acres	87 acres	0 acres	0 acres	0 acres	332 acres
2012 acreages	292 acres	327 acres	117 acres	2 acres	7 acres	102 acres	227 acres
2017 acreages	257 acres[2]	313 acres	145 acres	7 acres	27.5 acres	55 acres	265 acres
Goal achieved?	**No**	Yes	Yes	Yes	Yes	**No**	Yes
Habitat quality (transect and plots)							
Presence/Absence	**No**	Yes	**No (frequency of native)**; Yes (frequency of wetland plants)	N/A	N/A	N/A	N/A
Vegetative Cover	Yes	Yes	**No (relative cover)**; Yes (abundance of wetland plants)	N/A	Yes	Yes	Yes
Density Cover Class	Yes	Yes	Yes	N/A	Yes	Yes	N/A
MMP A Priority Pest Plant Species; Other Pest Plant Species	Almost; **No**	Yes; Yes	Yes; Yes	Insufficient data to analyze	Almost; **No**	**No**; Yes	**No; No**
Woody Species	Yes	N/A	Yes	N/A	No reference area data available for comparison		Yes
Natural Recruitment	Yes	N/A	Yes	Yes	Yes	Yes	N/A
Water Salinity	Yes	Yes	N/A	N/A	N/A	N/A	N/A
Survival	N/A	N/A	N/A	Insufficient data to analyze			N/A
Health and Vigor	N/A	N/A	N/A	Insufficient data to analyze			N/A
Shaded Stream Surface	N/A	N/A	N/A	Insufficient data to analyze	N/A	N/A	N/A

[1] Data source refers to this as "woodland;" it is not specified whether it is oak woodland or riparian woodland.
[2] Decrease in acreage documented from 2012 to 2017 is largely attributed to a re-classification of a 26-acre portion of the SWOA that was misclassified as brackish marsh in 2007.

5.1 Achievement of Habitat Goals and Performance Standards

5.1.1 Habitat types

Nearly all habitat types well-exceeded the original goals in terms of total acreage for each habitat (Table 9). However, two habitats, brackish emergent marsh and high-value oak woodland, were documented at a geographic extent below the target acreages.

Brackish emergent marsh occurred across 257 acres, only 51% of the goal of 503 acres, which was less than the 292 acres documented in 2012 but more than the 210 acres documented in 2007 and 107 acres documented in 2004. The decrease in acreages documented between 2012 and 2017 was largely attributed to a re-classification of a 26-acre portion of the SWOA that was misclassified as brackish marsh in 2007 (corrected in 2017 to seasonal emergent marsh). In addition, reductions in the waterside extent of brackish emergent marsh were observed in a few spots within the SWOA, potentially due to the high water levels that occurred during winter and spring of 2017. However, in other areas brackish emergent marsh plant species had and will likely continue to colonize the tidal mudflat habitat over time, as aggradation of sediments is predicted and the subsequent rise in surface elevations will create favorable habitat conditions. Under climate change scenarios, it is possible that mean sea level rise could outpace sediment deposition. The acreage goal for brackish emergent marsh will be met if at least 79% of the existing tidal mudflats convert to brackish emergent marsh.

High-value oak woodlands occurred across 55 acres, only 41% of the goal of 133 acres, which was a significant decrease from what was documented in 2012 (i.e., 102 acres). However, during 2012 monitoring it was noted that a large portion of the area mapped as oak woodland was not functioning as oak woodland habitat, as it was largely recently planted with oaks that had not yet obtained appropriate canopy heights or canopy cover. During 2017 monitoring, little if any oak plantings that were of significant size class to be considered this habitat type were documented within these areas, and as such, the habitat was reclassified as grasslands. The acreage goals for high-value oak woodlands may be met if natural recruitment begins to occur in the surrounding grasslands, the quality of the oak woodland habitat improves, or if active planting is continued in the adjacent grasslands habitat.

5.1.2 Native plant frequency and cover

The relative frequency of native plants provides an indication of whether site elevations are suitable for the target habitat type. Within the brackish emergent marsh, 2017 results nearly met the performance standard (69% relative frequency of native tidal marsh species documented, goal was >80%), which was less than the 2012 native frequency of 78%. The frequency of several non-native species contributed to the reduction of native species, including the presence of narrow-leaved cattail (OBL), annual beard grass (FACW), broadleaved pepperweed (FAC), and bird's-foot trefoil (FAC). All of these species are wetland species; therefore, it is unlikely that site elevations are unsuitable; rather, non-native species have displaced and thus reduced the frequency of native species. Within the seasonal and emergent wetlands habitat, 2017 results for the relative frequency and relative cover of native species were below the performance standards (47% relative frequency and 63% relative cover rather than >80%, respectively). This can be attributed to a combination of the presence of non-native wetland species (e.g., rye grass [FAC], bird's-foot trefoil [FAC], curly dock [FAC], hyssop loosestrife [OBL], and annual beard grass [FACW]) as well as the presence of other non-native forbs (e.g., radish). However, there was a large increase in native species relative frequency and cover from the 2012 surveys that showed 36% relative frequency and 51% relative cover of native species.

5.1.3 Pest plant species

Four habitat types failed to meet the performance standards for MMP A Priority Pest Plant Species: brackish emergent marsh, riparian forest and scrub-shrub, high-value oak woodland, and grasslands. Brackish emergent marsh, riparian forest and scrub-shrub, and grasslands were all very close to the target at 1.8%, 1.0%, and 2.9% respectively. In all four of these vegetation types, broadleaved pepperweed, fennel, and medusa head were the largest contributors to cover of MMP A Priority Pest Plants within plots. In the high-value oak woodland, high cover of MMP A Priority Pest Plants (50.1%) was largely cover of non-native annual grasses (primarily medusa head). However, these data were from the only three plots located within the current extent of oak woodland habitat; as such, this may not have been representative of all the oak woodland habitat.

Three habitat types failed to meet the performance standards of the other pest species including MMP B Priority, Cal-IPC, and CDFA pest species: brackish emergent marsh, riparian scrub-shrub, and grasslands. In brackish emergent marsh, the primary contributor to this non-native species cover was narrow-leaved cattail. In riparian scrub-shrub and grasslands, the non-native species were almost exclusively annual grasses including ripgut grass, rye grass, harding grass, and slender wild oat.

One habitat type, shaded riverine aquatic, could not be analyzed as no monitoring plots were currently located within the habitat type. If information regarding this variable is desired for the shaded riverine aquatic habitat, new variable-location plots could be established such that the plots move in tandem with the shoreline and adjacent 15-ft of riparian habitat.

5.1.4 Woody species, survival, and health and vigor

Several performance standards for woody species required a comparison to reference area data, which were not included within the 2017 field monitoring (Table 9). Thus, it was unknown whether these habitat types met the performance standards for woody species in riparian forest and scrub-shrub and high-value oak woodland habitats. In addition, during 2017 monitoring, survival, health and vigor, and shaded stream surface were not analyzed as there were no tagged woody plants located within plots. Tagged woody plants are being monitored separately by the NCFCWCD and results are not presented within this monitoring report but are available in the annual monitoring and maintenance reports prepared by the NCFCWCD.

5.1.5 Natural recruitment

Natural recruitment was documented within shaded riverine aquatic, riparian forest and scrub-shrub, and high-value oak woodland habitats. This was an improvement from 2012 monitoring results when no recruitment was documented in high value oak woodland, likely a result of the then recent oak plantings (oaks were planted in March 2009). This suggests that sufficient time has passed to allow for the successful reproduction of coast live oak and valley oak plantings.

5.2 Management Recommendations

Weed control is focused on non-native, Pest Plant species that create serious problems in California's native ecosystems. Within the brackish emergent marsh and seasonal and emergent wetland habitats, non-native species were reducing the frequency and cover of native plant species to levels below performance standards. In addition, the percent cover of MMP A-rated

and other Pest Plant Species exceeded the performance standards in the brackish emergent marsh, seasonal emergent wetland, riparian forest and scrub-shrub, high-value oak woodland, and grasslands. Thus, additional weed control activities should be implemented. As detailed in Section 4.3, common target Pest Plant Species in these habitats included broadleaved pepperweed, fennel, medusa head, and a compendium of non-native grass species. Broadleaved pepperweed is particularly aggressive and therefore received special attention from NCFCWCD, which has surveyed for and treated nearly 75 acres of broadleaved pepperweed in the Project area over the last nine years (Table 10).

Table 10. Acres of broadleaved pepperweed surveyed and treated by NCFCWCD.

Survey Year	Acres Surveyed	Acres Treated
2017	525.0	19.4
2016	525.0	16.8
2015	292.0	12.1
2014	109.0	5.6
2013	39.2	0.07
2012	371.7	8.6
2011	371.7	4.6
2010	371.7	3.6
2009	371.7	3.7
Total Treated		***74.5***

To reduce the cover of non-native species, mechanical methods that do not disturb the ground (e.g., hand removal) as well as the spot use of herbicides are recommended. General descriptions of treatment methods used to control weed species are given below:

- Manual and mechanical—hand pulling with various tools, mowing, cutting, and burning. These treatments are often the most labor intensive but are commonly the most successful for smaller infestations.
- Chemical—treatment with a variety of chemicals approved for use in designated habitats. Chemical treatment is often the quickest and lowest cost response to an infestation; however, there are potential detrimental effects on habitat quality when herbicides are used. For instance, many commonly used herbicides persist in the soil where they can affect local terrestrial wildlife and those applied adjacent to stream corridors can affect water quality and habitat for fish and macroinvertebrates.
- Biological—approved biocontrol agents such as insects and fungi that damage or kill the host plant or grazing by sheep, cows, horses, or goats. Biocontrol agents, if proven successful, can be applied to a large infested area. Grazing can also be applied to both small and large infestations. Disadvantages of grazing may be the effect on native species (e.g., trampling or eating).
- Integrative—treatments that combine categories of treatment; for instance, mowing or cutting followed by herbicide application. These treatments are often the most creative and can be the most effective, though results may vary from site to site depending on micro-site characteristics.

Finally, further management actions may be necessary to reach the target acreage for the oak woodland habitat type by the end of the 40-year monitoring period. Although natural recruitment has begun in the western portion of the SWOA along upland slopes, it was not sufficient to support the 40-year acreage targets. If areas planted with oaks in 2009 that were re-classified as grasslands in 2017 due to low oak survival and/or vigor reach 10% canopy cover of oak species, the areas may be reclassified as oak woodland. Surveyors noted that many of the failed oak plantings were stunted and in poor health particularly in low-lying, moist areas. Testing soil conditions or identifying other factors contributing to the stunted growth of the oak plantings is recommended before additional plantings are considered.

5.3 Conclusions

Overall, the habitat restoration elements of the Project have been highly successful and most of the target acreage goals of the various created and restored habitat types are expected to be achieved in the long-term, which was defined in the MMP as 40 years (JSA 2001). The created habitats are providing important foraging and breeding wildlife and bird habitat. Although the target acreage goal for brackish emergent marsh has not yet been met, it has more than doubled from the acreages documented in 2004 (i.e., it has increased from 107 ac to 257 ac over the 13-year period). This indicated that conversion of tidal mudflats was occurring naturally, as predicted. In addition, most of the site-wide performance standards were being met, and with the exception of the need for weed control and potentially additional oak plantings, little active management is required at this time.

6 REFERENCES

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, Second Edition. University of California Press, Berkeley.

CH2M Hill. 2004. Vegetation mapping of the South Wetlands Opportunity Area, Napa River/Napa Creek Flood Protection Project, Napa County, California. Contract No. DACW05-99-D-0021. Prepared by CH2M Hill, Sacramento, California for U.S. Army Corps of Engineers, Sacramento, California.

CH2M Hill. 2006. Vegetation mapping of the South Wetlands Opportunity Area, Napa River/Napa Creek Flood Protection Project, Napa County, California. Contract No. DACW05-99-D-0021. Prepared by CH2M Hill, Sacramento, California for U.S. Army Corps of Engineers, Sacramento, California.

County of Napa. 2012. Flood Control and Water Conservation District. Website. http://www.countyofnapa.org/Pages/DepartmentContent.aspx?id=4294968276 [Accessed 12 December 2012]. Prepared by County of Napa, California.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington, D.C.

Fris, M. B., and R. W. DeHaven. 1993. A community-based habitat suitability index model for Shaded Riverine Aquatic Cover, selected reaches of the Sacramento River system. U.S. Fish and Wildlife Service, Sacramento Field Office, Sacramento, California.

Hickman, J., editor. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley, California.

JSA (Jones & Stokes). 2001. Napa River Flood Protection Mitigation and Monitoring Plan. Prepared by Jones & Stokes, Sacramento, California for U.S. Army Corps of Engineers, Sacramento, California.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. The national wetland plant list: 2016 wetland ratings. Phytoneuron 2016-30: 1–17.

North State Resources, Inc. (NSR). 2008. Final vegetation monitoring report, Napa River Flood Protection Project, Napa Valley, California. Contract No. W91238-07-D-0020. Prepared by North State Resources, Redding, California for U.S. Army Corps of Engineers, Sacramento, California.

PWA (Philip Williams & Associates, Ltd.). 1997. Conceptual plan for enhancement of the alluvial floodplains and tidal marshlands of the upper Napa River estuary. California State Coastal Conservancy and Napa County Flood Control and Water Conservation District.

Stillwater Sciences. 2013. 2012 Vegetation monitoring of the Napa River Flood Protection Project, Napa Valley, California. Final Report. Prepared by Stillwater Sciences, Berkeley, California for Napa County Flood Control and Water Conservation District, Napa, California.

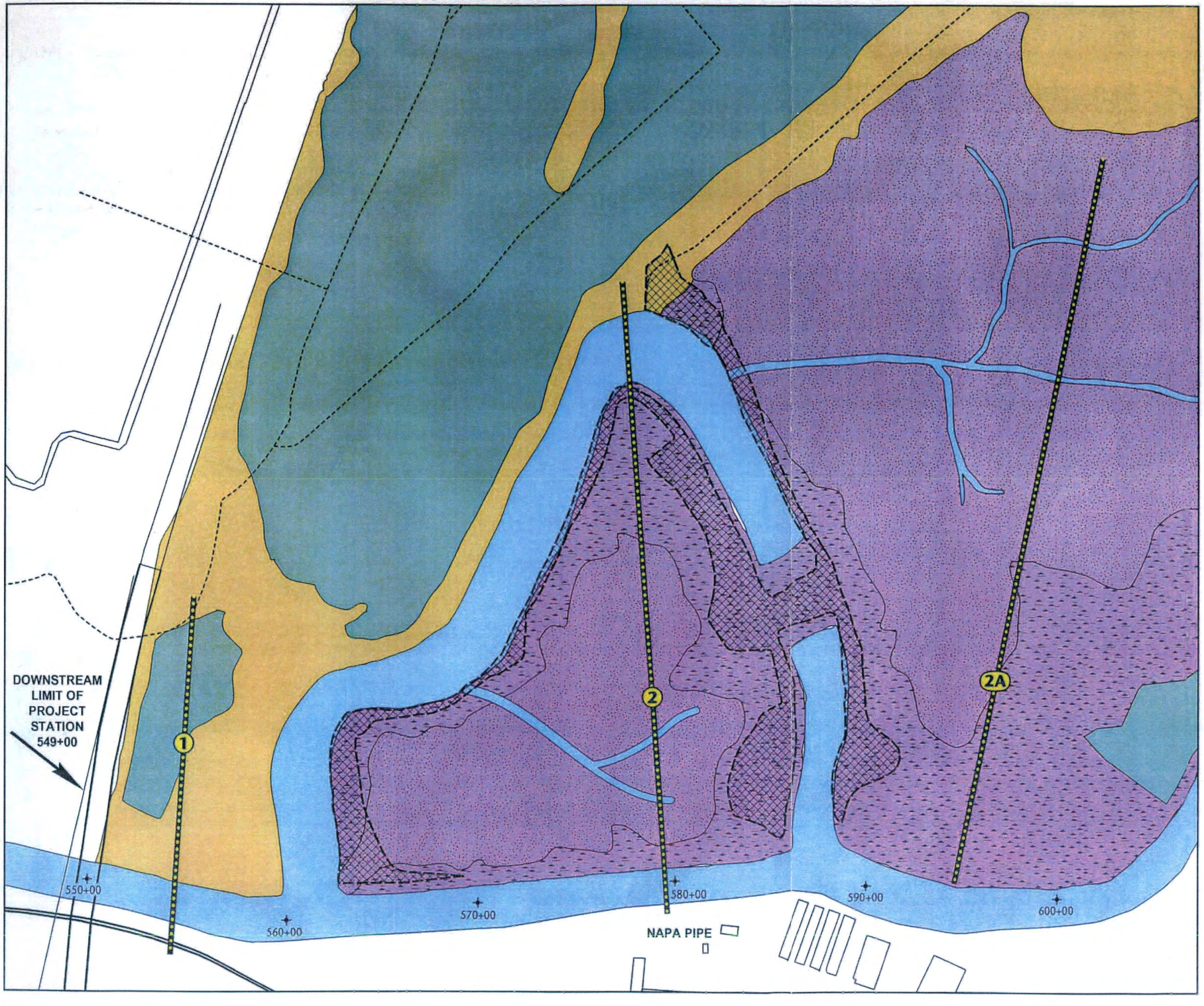
USACE and NCFCWCD (U.S. Army Corps of Engineers and Napa County Flood Control and Water Conservation District). 1998. Napa River/Napa Creek flood protection project, final supplemental general design memorandum. Main report. October. Sacramento, California.

USACE. 2010. Press release #2010-S-015, July 15, 2010. USACE, Sacramento District, California.

Appendices

Appendix A

Future Habitat Conditions



Legend

- Upland
- Woodland
- Seasonal and Emergent Wetland (Freshwater)
- Drainage Ditch
- High Marsh } Brackish Emergent Marsh
- Low and Mid-Marsh } Brackish Emergent Marsh
- Tidal Mudflat
- Open Water
- Existing Levee to be Lowered
- 1 Monitoring Cross-Sections
- + 570+00 Project Station

NOTE: Area shown on maps is the South Wetlands Opportunity Area

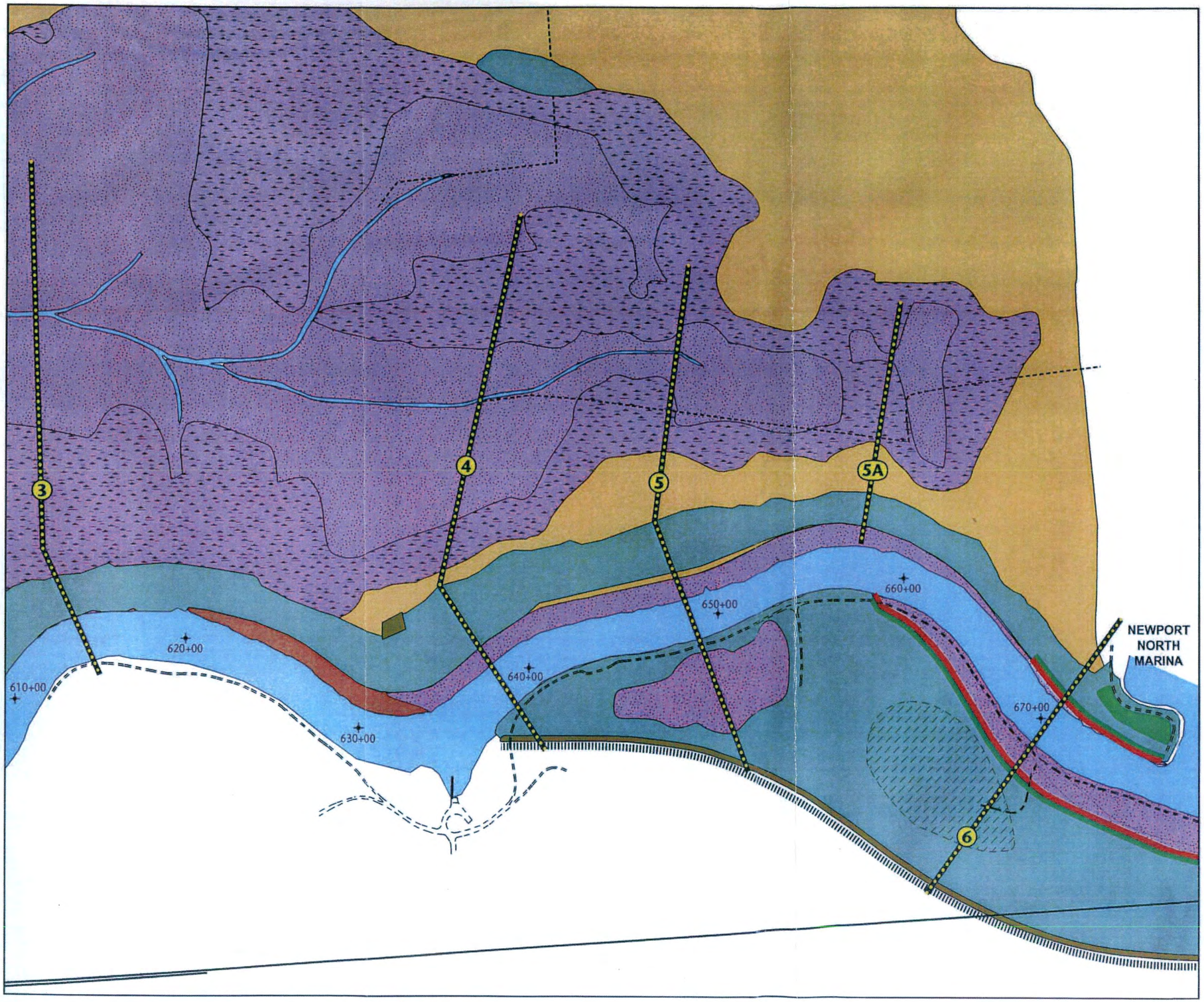
SOURCE: Jones & Stokes Associates, 2001
Napa River Flood Protection Project
Mitigation and Monitoring Plan

N

0 200 400 600 800 1,000
Feet

Jones & Stokes

FIGURE A-1
FUTURE (POTENTIAL) HABITAT CONDITIONS
NAPA RIVER FLOOD PROTECTION PROJECT



Legend

- Upland
- Woodland
- Riparian Forest/Scrub-Shrub Habitat
- Shaded Riverine Aquatic (SRA) Cover
- Seasonal and Emergent Wetland (Freshwater)
- Seasonal Wetland
- Drainage Ditch
- High Marsh } Brackish Emergent Marsh
- Low and Mid-Marsh } Brackish Emergent Marsh
- Tidal Mudflat
- Open Water
- 1 Monitoring Cross-Sections
- Floodwall
- 570+00 Project Station

NOTE: Area shown on maps is the South Wetlands Opportunity Area

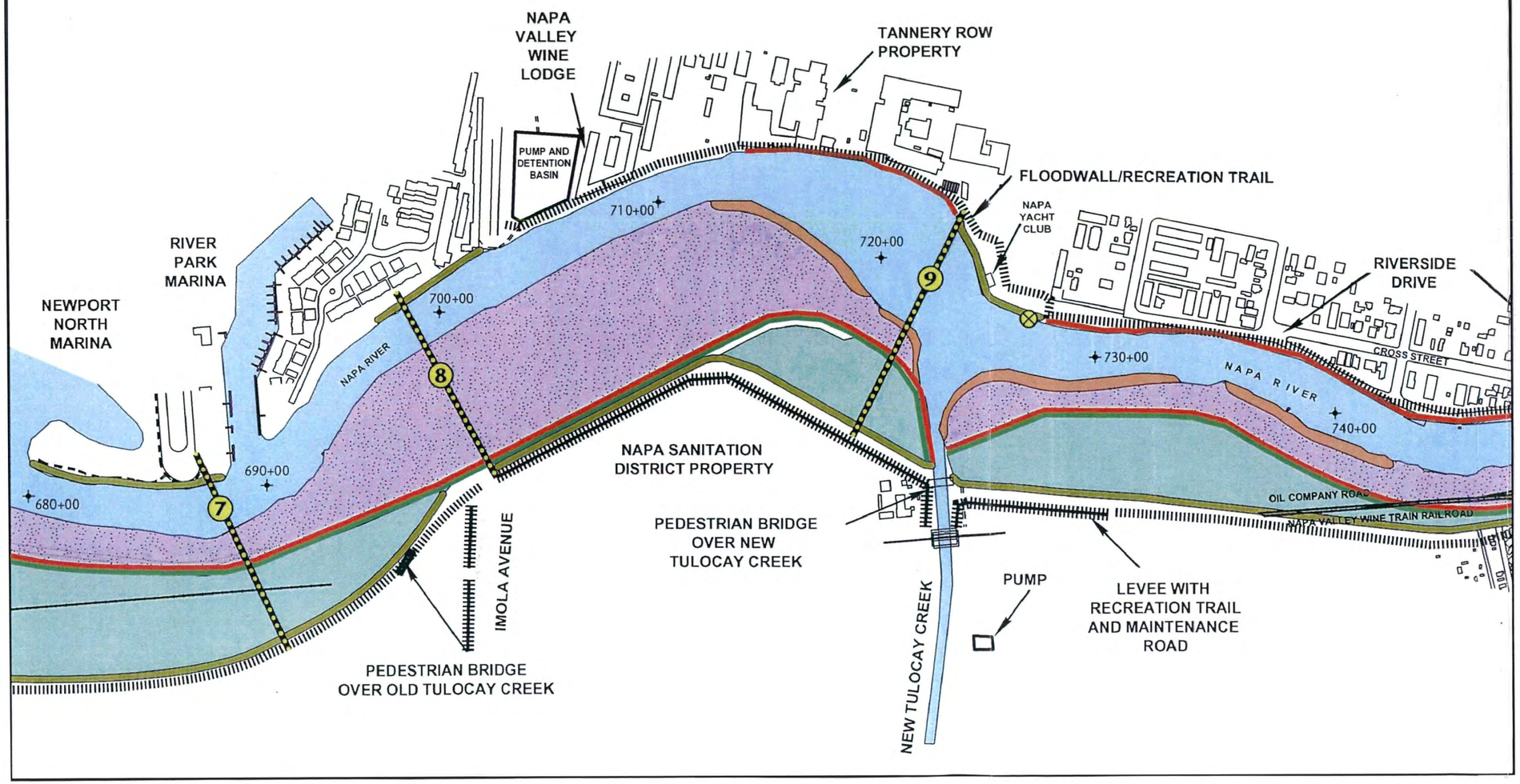
SOURCE: Jones & Stokes Associates, 2001
Napa River Flood Protection Project
Mitigation and Monitoring Plan

N

0 200 400 600 800 1,000
Feet

Jones & Stokes

FIGURE A-2
FUTURE (POTENTIAL) HABITAT CONDITIONS
NAPA RIVER FLOOD PROTECTION PROJECT



Legend

- Woodland
- Riparian Forest/Scrub-Shrub Habitat
- Shaded Riverine Aquatic (SRA) Cover
- Seasonal and Emergent Wetland (Freshwater)
- Seasonal Wetland
- High Marsh, Low and Mid-Marsh } Brackish Emergent Marsh
- Tidal Mudflat
- Open Water
- 1 Monitoring Cross-Sections
- Peak Stage Gage
- Floodwalls
- 570+00 Project Station

N

0 200 400 600 800 1,000
Feet

Jones & Stokes

Figure A-3
Future (Potential)
Habitat Conditions
NAPA RIVER FLOOD PROTECTION PROJECT

Appendix B

MMP Indicators/Performance Standards

Table 5-1. Monitoring of Indicators to Assess Ecological Functions and Habitat Values for the Napa River

Indicator	Monitoring Activity	Location of Monitoring	Begin Monitoring	Frequency of Monitoring	Interim Performance Standard	Final Performance Standard
Riparian Habitat Type						
Survival	Counts of tagged planted trees and shrubs	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	90% survival each year monitored for first 5 years	80% survival
Health and Vigor	Visual assessment of foliage, wood and root crown in tagged planted trees and shrubs	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	Average rating equal or exceed "good" (score >3)	Average rating must equal or exceed "good" (score >3)
Vegetative Cover	Relative frequency and relative abundance measured by line intercept and quadrat methods	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	85% total cover within 5 years	85% total cover
Density Cover Class	Cover class estimate of vegetation density and % senescent stems measured by quadrat method	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover measured by line intercept and quadrat method	Permanent plots and qualitative observation in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Quantitative sample - annual for 10 years; every 5 years to year 40. Qualitative sample - annual	Appendix A species <1% total cover; other pest plant species of concern <5% total cover	Appendix A species <1% total cover; other pest plant species of concern <5% total cover
Tree height	Stadia rod measurement of young trees, then clinometer	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	Tree height trajectory will be within one standard deviation of trees in reference area in 40 years	Meets average height of each species in riparian reference area
Tree basal area	Total area of tree stems measured at standardized breast height or 4.5 feet (1.4 meters)	Measurement of trees in permanent plots; Bitterlich method	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	Basal area trajectory will be within one standard deviation of reference area in 40 years	Meets average basal area of each species in riparian reference area

Table 5-1. Continued

Indicator	Monitoring Activity	Location of Monitoring	Begin Monitoring	Frequency of Monitoring	Interim Performance Standard	Final Performance Standard
Natural recruitment	Visual count of naturally recruited native woody species	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	Successful natural recruitment of native riparian tree and shrub species occurring within 5 years	Achievement of successful natural recruitment by year 40
				Oak Woodland		
Survival	Counts of tagged planted trees and shrubs	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	90% survival each year monitored for first 5 years	80% survival
Health and Vigor	Visual assessment of foliage, wood, and root crown in tagged planted trees and shrubs	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	Average rating equal or exceed "good" (score >3)	Average rating must equal or exceed "good" (score >3)
Vegetative Cover	Relative frequency and relative abundance measured by line intercept and quadrat methods	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	85% total cover within 5 years	85% total cover
Density Cover Class	Cover class estimate of vegetation density and % senescent stems measured by quadrat method	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover measured by line intercept and quadrat methods	Permanent plots and qualitative observation in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Quantitative sample - annual for 10 years; every 5 years to year 40. Qualitative sample - annual	Appendix A species <1% total cover; other pest plant species of concern <5% total cover	Appendix A species < 1 % total cover; other pest plant species of concern <5% total cover
Tree height	Stadia rod measurement of young trees, then clinometer	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	Tree height trajectory will be within one standard deviation of trees in reference area in 40 years	Meets average height of each species in riparian reference area

Table 5-1. Continued

Indicator	Monitoring Activity	Location of Monitoring	Begin Monitoring	Frequency of Monitoring	Interim Performance Standard	Final Performance Standard
Tree basal area	Total area of tree stems measured at standardized "breast height" or 4.5 feet (1 .4 meters)	Measurement of trees in permanent plots and the Bitterlich method	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Every fifth year beginning in year 5	Basal area trajectory will be within one standard deviation of reference area in 40 years	Meets average basal area of each species in reference area
Natural recruitment	Visual count of naturally recruited native woody species	Permanent plots in Project and reference areas	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	Success natural recruitment of native riparian tree and shrub species is occurring within 5 years	Achievement of successful natural recruitment by year 40
			Shaded Riverine Aquatic (SRA) Cover			
Survival	Counts of tagged planted trees and shrubs	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	90% survival each year monitored for first 5 years	80% survival
Health and Vigor	Visual assessment of foliage, wood, and root crown in tagged planted trees and shrubs	Permanent plots in Project area	Aug/Sept 2002 Phase 1, 2003 Phase 2, 2006 Phase 3, 2005 Phase 4	Annual for 1 0 years; every 5 years to year 40	Average rating must equal or exceed "good" (score >3)	Average rating must equal or exceed "good" (score >3)
Pest Plant Species	Vegetative cover measured by line intercept and quadrat methods	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Quantitative sample - annual for 1 0 years; every 5 years to year 40. Qualitative sample - annual	Appendix A species < 1 % total cover; other pest plant species of concern < 5% total cover	Appendix A species < 1% total cover; other pest plant species of concern < 5% total cover
Shaded Stream Surface	Evaluation of aerial photographs; field verification	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Each year aerial photos are available. Cross sections every 2 yrs; every 4 yrs if <0. 5 foot change in average bed elevation and <1 foot change in average terrace elevation over a given 4-year period. Also following each flood event >5-year return interval.	<2 feet of erosion per year. Maintain minimum 15 -foot buffer between floodwall and banks	<2 feet of erosion per year. Maintain minimum 15 -foot buffer between floodwall and banks
Natural Recruitment	Visual count of naturally recruited native woody species	Permanent plots in Project area	Aug/Sept 2002 Phase 1 2003 Phase 2 2006 Phase 3 2005 Phase 4	Annual for 10 years; every 5 years to year 40	Successful natural recruitment of native riparian tree and shrub species occurring within 5 years	Achievement of successful natural recruitment by year 40

Table 5-1. Continued

Indicator	Monitoring Activity	Location of Monitoring	Begin Monitoring	Frequency of Monitoring	Interim Performance Standard	Final Performance Standard
Brackish Emergent Marsh (Tidal)						
Presence/ Absence	Relative frequency measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	>80% relative abundance representative of native tidal marsh species	>80% relative abundance representative of native tidal marsh species
Vegetative Cover	Relative abundance measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	>80% relative abundance representative of native tidal marsh species	>80% relative abundance representative of native tidal marsh species
Density Cover Class	Cover class estimate of vegetation density and % senescent stems measured by quadrat method	Permanent plots in Project area	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover measured in permanent quadrats	Permanent plots in Project area, qualitative observation	Aug/Sept following project reach construction	Quantitative sample - annual for 1 0 years; every 5 years to year 40. Qualitative sample - annual	Appendix A species <1% total cover; other pest plant species of concern <5% total cover	Appendix A species <1 % total cover; other pest plant species of concern <5% total cover
Woody Species	Relative percent cover - qualitative estimate	Ocular estimate in design freeboard of Project area	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	Predicted water surface elevations cannot exceed 50% encroachment into design freeboard. Tree density <10 trees per acre, >50 feet apart	Predicted water surface elevations cannot exceed 50% encroachment into design freeboard. Tree density £10 trees per acre, >50 feet apart
Soil Water Salinity	Refractometer to spot check soil salinity (ppt) in permanent quadrats	Permanent vegetation plots and reference areas	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	Baseline data	Baseline data
Natural Recruitment	Visual counts of seedlings or vegetative reproduction in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	Marsh surface colonizing with native salt-tolerant wetland plant species after 3 years	Colonization of marsh surface with native salt-tolerant wetland plant species

Table 5-1. Continued

Indicator	Monitoring Activity	Location of Monitoring	Begin Monitoring	Frequency of Monitoring	Interim Performance Standard	Final Performance Standard
			Seasonal and Emergent Wetlands (Freshwater)			
Presence/ Absence	Relative frequency measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	>80% relative frequency representative of native wetland species; >50% frequency with wetland indicator of facultative or wetter	>80% relative frequency representative of native wetland species; over 50% frequency with wetland indicator of facultative or wetter
Vegetative Cover	Relative abundance measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	>80% relative abundance representative of native wetland species; >50% frequency with wetland indicator of facultative or wetter	>80% relative abundance representative of native wetland species; >50% frequency with wetland indicator of facultative or wetter
Density Cover Class	Cover class estimate of vegetation density and % senescent stems measured by quadrat method	Permanent plots in Project area	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Density cover class <4	Density cover class <4
Pest Plant Species	Vegetative cover measured in permanent quadrats	Permanent plots in Project area, qualitative observation	Aug/Sept following project reach construction	Quantitative sample - annual for 10 years; every 5 years to year 40. Qualitative sample - annual	Appendix A species <1% total cover; other pest plant species of concern <5% total cover	Appendix A species <1% total cover; other pest plant species of concern <5% total cover
Woody Species	Relative percent cover - qualitative estimate	Ocular estimate in design freeboard of Project area	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Predicted water surface elevations cannot exceed 50% encroachment into design freeboard. Tree density <10 trees per acre, >50 feet apart	Predicted water surface elevations cannot exceed 50% encroachment into design freeboard. Tree density <10 trees per acre, >50 feet apart
Natural Recruitment	Visual counts of seedlings or vegetative reproduction in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 1 0 years; every 5 years to year 40	Marsh surface colonizing with native salt-tolerant wetland plant species after 3 years	Colonization of marsh surface with native salt-tolerant wetland plant species
			Tidal Mudflats			
Presence/ Absence	Relative frequency measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Approximately 30% total cover vascular plants	Approximately 30% total cover vascular plants

Table 5-1. Continued

Indicator	Monitoring Activity	Location of Monitoring	Begin Monitoring	Frequency of Monitoring	Interim Performance Standard	Final Performance Standard
Vegetative Cover	Relative abundance measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	[30% total cover native tidal marsh vascular plants	[30% total cover native tidal marsh vascular plants
Density Cover Class	Cover class estimate of vegetation density and % senescent stems measured by quadrat method	Permanent plots in Project area	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Density cover class <4	Density cover class <4
Pest plant Species	Vegetative cover measured in permanent quadrats	Permanent plots in Project area, qualitative observation	Aug/Sept following project reach construction	Quantitative sample - annual for 10 years; every 5 years to year 40. Qualitative sample annual.	Appendix A <1% total cover; other pest plant species of concern <5% total cover	Appendix A<1%total cover; other pest plant species of concern <5% total cover
Soil Water Salinity	Refractometer to spot check soil salinity (ppt) in permanent quadrats	Permanent vegetation plots and reference areas	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Baseline data	Baseline data
				Grassland		
Vegetative Cover	Relative abundance measured in permanent quadrats	Permanent plots in Project and reference areas	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	>80% of grassland cover should be representative of agriculture baylands of North Bay subregion	>80% of grassland cover should be representative of agriculture baylands of North Bay subregion
Pest Plant Species	Vegetative cover measured in permanent quadrats	Permanent plots in Project area, qualitative observation	Aug/Sept following project reach construction	Quantitative sample - annual for 10 years; every 5 years to year 40. Qualitative sample - annual	Appendix A species <1% total cover; other pest plant species of concern <5% total cover	Appendix A species <1% total cover; other pest plant species of concern <5% total cover
Woody Species	Relative percent cover	Ocular estimate in design freeboard of Project area	Aug/Sept following project reach construction	Annual for 10 years; every 5 years to year 40	Predicted water surface elevations cannot exceed 50% encroachment into design freeboard. Tree density <10 trees per acre, >50 feet apart	Predicted water surface elevations cannot exceed 50% encroachment into the design freeboard. Tree density <10 trees per acre, >50 feet apart

Appendix C

Pest Plant Species

Table C-1. List of pest plant species.

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Acacia baileyana	Cootamundra wattle	B Priority		
Acacia cyclops	western coastal wattle	B Priority		
Acacia dealbata	silver wattle	B Priority	Moderate	
Acacia decurrens	green wattle	B Priority		
Acacia longifolia	Sydney golden wattle	B Priority		
Acacia mearnsii	black wattle	B Priority		
Acacia melanoxylon	blackwood acacia	B Priority	Limited	
Acacia paradoxa	kangaroo thorn	B Priority		B
Acacia podalyriifolia	Queensland silver wattle	B Priority		
Acacia pycnantha	golden wattle	B Priority		
Acacia redolens	vanilla-scented wattle	B Priority		
Acacia retinodes	everblooming wattle	B Priority		
Acacia saligna	golden wreath wattle	B Priority		
Acacia verticillata	star acacia, prickly moses	B Priority		
Acaena anserinifolia	biddy-biddy			A
Acaena novae-zelandiae	biddy-biddy			A
Acaena pallida	pale biddy-biddy			A
Acroptilon repens	Russian knapweed		Moderate	B
Aegilops cylindrica	jointed goatgrass			B
Aegilops ovata	ovate goatgrass			B
Aegilops triuncialis	barb goatgrass		High	B
Aeschynomene rudis	rough jointvetch			A
Ageratina adenophora	eupatory, croftonweed		Moderate	
Ailanthus altissima	tree of heaven	A Priority	Moderate	C
Alhagi maurorum	camelthorn		Moderate	A
Allium paniculatum	panicled onion			B
Allium vineale	wild garlic			B
Alternanthera philoxeroides	alligatorweed		High	A
Alternanthera sessilis	sessile joyweed			A
Amaranthus albus	tumbleweed	B Priority		
Ambrosia trifida	giant ragweed			B
Ammophila arenaria	European beachgrass		High	
Anthoxanthum odoratum	sweet vernal grass; vanilla grass		Moderate	
Araujia sericifera	bladderflower			B
Arctotheca calendula	capeweed			A
Arctotheca calendula (fertile forms)	fertile capeweed		Moderate	

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Arctotheca prostrata	capeweed; South African capeweed		Moderate	
Arundo donax	giant reed	A Priority	High	B
Asparagus asparagoides	bridal creeper; African asparagus fern		Moderate	
Asphodelus fistulosus	onionweed		Moderate	B
Atriplex amnicola	river saltbush			B
Atriplex semibaccata	Australian saltbush; berry saltbush		Moderate	
Avena barbata	slender wild oat	B Priority	Moderate	
Avena fatua	wild oat	B Priority	Moderate	
Avena sativa	cultivated oat	B Priority		
Avena sterilis	animated oat	B Priority		
Berteroa incana	hoary alyssum			B
Brachypodium distachyon	annual false-brome; false brome		Moderate	
Brachypodium sylvaticum	slender false-brome		Moderate	A
Brassica fruticulosa	Mediterranean cabbage	B Priority		
Brassica juncea	India mustard	B Priority		
Brassica napus	swede rape, rapeseed	B Priority		
Brassica nigra	black mustard	B Priority	Moderate	
Brassica oleracea	cabbage	B Priority		
Brassica rapa	turnip, field mustard	B Priority	Limited	
Brassica tournefortii	Sahara mustard; Morrocan mustard	B Priority	High	
Bromus arenarius	Australian chess	B Priority		
Bromus arvensis	field brome	B Priority		
Bromus berteroanus	Chilean chess	B Priority		
Bromus briziformis	rattlesnake chess	B Priority		
Bromus caroli-henrici	weedy brome	B Priority		
Bromus catharticus	rescuegrass	B Priority		
Bromus catharticus var. *catharticus*	rescue grass	B Priority		
Bromus catharticus var. *elatus*	Chilean brome	B Priority		
Bromus commutatus	hairy chess, meadow brome	B Priority		
Bromus diandrus	ripgut grass	B Priority	Moderate	
Bromus hordeaceus	soft chess	B Priority	Limited	
Bromus inermis	smooth brome, Hungarian brome	B Priority		
Bromus japonicus	Japanese chess, Japanese brome	B Priority	Limited	
Bromus madritensis	compact brome	B Priority		

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Bromus madritensis subsp. *madritensis*	foxtail chess, Madrid brome	B Priority		
Bromus madritensis subsp. *rubens*	red brome	B Priority	High	
Bromus racemosus	smooth brome	B Priority		
Bromus secalinus	rye brome	B Priority		
Bromus squarrosus	corn brome	B Priority		
Bromus sterilis	poverty brome	B Priority		
Bromus tectorum	cheat grass, downy chess	B Priority	High	
Carduus acanthoides	plumeless thistle		Limited	A
Carduus crispus	welted thistles			A
Carduus nutans	musk thistle		Moderate	A
Carduus pycnocephalus	Italian thistle		Moderate	C
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	B Priority		
Carpobrotus chilensis	sea fig; iceplant		Moderate	
Carpobrotus edulis	highway iceplant		High	
Carrichtera annua	Ward's weed		Moderate	
Carthamus baeticus	smooth distaff thistle			B
Carthamus lanatus	woolly distaff thistle	A Priority	Moderate	B
Carthamus leucocaulos	whitestem distaff thistle			A
Caulerpa spp.	feather alga			A
Centaurea calcitrapa	purple starthistle	B Priority	Moderate	B
Centaurea diffusa	diffuse knapweed		Moderate	A
Centaurea iberica	Iberian star-thistle	A Priority		A
Centaurea jacea subsp. *pratensis*	meadow knapweed		Moderate	
Centaurea melitensis	Malta starthistle		Moderate	C
Centaurea solstitialis	yellow star-thistle	B Priority	High	C
Centaurea squarrosa	squarrose knapweed			A
Centaurea stoebe subsp. *Micranthos*	spotted knapweed		High	A
Centaurea sulphurea	Sicilian starthistle			B
Centaurea virgata var. *squarrosa*	squarrose knapweed		Moderate	
Centaurea X monktonii	meadow knapweed			A
Ceratopteris thalictroides	watersprite			B
Chondrilla juncea	skeletonweed		Moderate	A
Chorispora tenella	purple mustard			B
Chrysanthemoides monilifera subsp. *monilifera*	boneseed; Higgin's curse		Moderate	

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Cirsium arvense	Canada thistle		Moderate	B
Cirsium ochrocentrum	yellowspine thistle			A
Cirsium undulatum	wavyleaf thistle			B
Cirsium vulgare	bullthistle		Moderate	C
Clematis vitalba	old man's beard; traveler's joy		Moderate	
Coincya monensis	star-mustard			B
Colocasia esculenta	taro root; wild taro		Moderate	
Conium maculatum	poison-hemlock	B Priority	Moderate	
Cortaderia jubata	juba grass	A Priority	High	B
Cortaderia selloana	pampasgrass; white pampasgrass		High	
Cotoneaster franchetii	orange cotoneaster; cotoneaster		Moderate	
Cotoneaster lacteus	milkflower cotoneaster; Parney's cotoneaster		Moderate	
Cotoneaster pannosus	silverleaf cotoneaster; velvet cotoneaster		Moderate	
Crupina vulgaris	bearded creeper		Limited	A
Cucumis melo var. *dudaim*	dudaim melon			A
Cucumis myriocarpus	paddy melon			B
Cuscuta spp. non-native	giant dodder			A
Cynara cardunculus	artichoke thistle	A Priority	Moderate	B
Cynodon dactylon	Bermuda grass; couch grass		Moderate	
Cynoglossum officinale	common houndstongue; beggar's-lice		Moderate	
Cynosurus echinatus	hedgehog dogtail; annual dogtail		Moderate	
Cyperus esculentus	yellow nutsedge			B
Cyperus rotundus	purple nutsedge			B
Cytisus scoparius	Scotch broom	A Priority	High	C
Cytisus striatus	Portugese broom; hairy-fruited broom		Moderate	
Delairea odorata	cape-ivy	B Priority	High	B
Diodia virginiana	buttonweed			B
Dipsacus fullonum	common teasel; wild teasel		Moderate	
Dipsacus sativus	Fullers teasel		Moderate	
Dittrichia graveolens	stinkwort; stinkweed		Moderate	
Drymaria cordata	whitesnow			B
Egeria densa	Brazilian elodea		High	C
Egeria najas	narrow-leaf waterweed			A

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Ehrharta calycina	purple veldtgrass; African veldtgrass		High	
Ehrharta erecta	panic veldt grass	B Priority	Moderate	
Ehrharta longiflora	long-flowered veldtgrass		Moderate	
Eichhornia crassipes	water-hyacinth		High	C
Elaeagnus angustifolia	Russian olive; oleaster		Moderate	
Elymus caput-medusae	medusa head	A Priority	High	C
Elymus repens	quackgrass			B
Emex spinosa	devil's thorn; spiny threecornerjack		Moderate	
Eucalyptus globulus	blue gum	B Priority	Limited	
Euphorbia esula	leafy spurge			A
Euphorbia graminea	grass-leaf spurge			B
Euphorbia oblongata	oblong spurge		Limited	B
Euphorbia serrata	serrate spurge			A
Euphorbia terracina	Feraldton carnation spurge		Moderate	Q
Euphorbia virgata	leafy spurge; Faitours-grass		Moderate	
Fallopia japonica	Japanese knotweed		Moderate	B
Fallopia sachalinensis	giant knotweed		Moderate	B
Fatoua villosa	hairy crabweed			B
Festuca arundinacea	reed fescue; alta fescue		Moderate	
Festuca myuros	rat-tail fescue; red-tailed fescue		Moderate	
Festuca perennis	rye grass	B Priority	Moderate	
Ficus carica	edible fig		Moderate	
Foeniculum vulgare	fennel	A Priority	High	
Gaura coccinea	scarlet gaura			B
Gazania linearis	gazania; treasure flower		Moderate	
Genista linifolia	flax-leaf broom; flax broom		Moderate	
Genista monosperma	bridal veil broom		Moderate	
Genista monspessulana	French broom	A Priority	High	C
Glebionis coronaria	garland chrysanthemum; crown daisy		Moderate	
Glyceria declinata	mannagrass; sweetgrass		Moderate	
Gypsophila paniculata	baby's breath			B
Halimodendron halodendron	Russian salttree			A
Halogeton glomeratus	halogeton		Moderate	A
Hedera canariensis	Algerian ivy		High	
Hedera helix	English ivy	B Priority	High	

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Helianthus ciliaris	blueweed			A
Heteropogon contortus	tanglehead			A
Hirschfeldia incana	short-pod mustard; Mediterranean mustard	B Priority	Moderate	
Holcus lanatus	common velvet grass; yorkshire fog		Moderate	
Hordeum marinum	Mediterranean barley; seaside barley		Moderate	
Hordeum murinum	hare barley; foxtail; wild barley		Moderate	
Hydrilla verticillata	hydrilla		High	A
Hydrocharis morsus-ranae	frogbit			A
Hygrophila polysperma	swampweed			A
Hypericum canariense	Canary Island St. Johnswort; grenadillo		Moderate	
Hypericum perforatum	Klamathweed		Moderate	C
Hypochaeris radicata	rough cat's-ear; false dandelion		Moderate	
Ilex aquifolium	English holly		Moderate	
Isatis tinctoria	dyer's woad		Moderate	B
Lactuca serriola	prickly lettuce	B Priority		
Lagarosiphon major	curly waterweed			A
Lepidium appelianum	globe-podded hoarycress		Limited	B
Lepidium chalepense	lens-podded hoarycress		Moderate	B
Lepidium coronopus	swinecress			B
Lepidium draba	heart-podded hoarycress		Moderate	B
Lepidium latifolium	perennial peppercress	A Priority	High	B
Leucanthemum vulgare	ox-eye daisy; dog daisy		Moderate	
Limnobium laevigatum	South American spongeplant		High	Q
Limnophila sessiliflora	dwarf ambulia			A
Limonium duriusculum	European sea lavendar		Moderate	
Linaria dalmatica subsp. *Dalmatica*	Dalmatian toadflax		Moderate	A
Linaria vulgaris	yellow toadflax; butter and eggs		Moderate	
Ludwigia decurrens	winged water-primrose			A
Ludwigia hexapetala	creeping waterprimrose; Uruguay waterprimrose		High	
Ludwigia peploides	floating water primrose; California waterprimrose		High	
Ludwigia peruviana	Peruvian water-primrose			A
Lythrum salicaria	purple loosestrife	A Priority	High	B
Malva arborea	tree mallow	B Priority		

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Malva neglecta	common mallow	B Priority		
Malva nicaeensis	bull mallow	B Priority		
Malva parviflora	cheeseweed, little mallow	B Priority		
Malva pseudolavatera	Cretan mallow	B Priority		
Malva sylvestris	high mallow	B Priority		
Malva verticillata var. *crispa*	crisped mallow, curled mallow	B Priority		
Melilotus albus	white sweetclover	B Priority		
Melilotus indicus	sourclover	B Priority		
Melilotus officinalis	yellow sweetclover	B Priority		
Mentha pulegium	pennyroyal; European pennyroyal		Moderate	
Mercurialis ambigua	Spanish mercury			B
Mesembryanthemum crystallinum	crystalline iceplant; common iceplant		Moderate	
Muhlenbergia schreberi	nimblewill			B
Myoporum laetum	ngaio tree; false sandalwood		Moderate	
Myriophyllum aquaticum	parrotfeather; Brazilian watermilfoil		High	
Myriophyllum spicatum	spike watermilfoil		High	
Nasturtium officinale	water cress	B Priority		
Nicotiana glauca	tree tobacco		Moderate	
Nothoscordum gracile	false garlic			B
Nymphaea mexicana	banana waterlily			B
Oenothera sinuosa	wavy-leaved gaura			B
Oenothera xenogaura	Drummond's gaura			B
Onopordum acanthium	Scotch thistle		High	A
Onopordum illyricum	Illyrian thistle			A
Onopordum tauricum	Taurian thistle			A
Orobanche ramosa	branched broomrape			A
Oryza rufipogon	perennial wild red rice			B
Oxalis pes-caprae	Bermuda buttercup	B Priority	Moderate	
Panicum antidotale	blue panicgrass			B
Peganum harmala	harmel			A
Pennisetum clandestinum	kikuyu grass	A Priority	Limited	C
Pennisetum setaceum	crimson fountaingrass		Moderate	C
Persicaria wallichii	Himalayan knotweed			B
Phalaris aquatica	harding grass	B Priority	Moderate	
Physalis longifolia	long-leaf groundcherry			A
Physalis viscosa	grape groundcherry			B

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Pistia stratiotes	water lettuce			B
Pontederia cordata	pickerelweed			B
Potamogeton crispus	curly-leaved pondweed; curled pondweed		Moderate	
Potentilla recta	sulfur cinquefoil			A
Prosopis strombulifera	creeping mesquite			A
Retama monosperma	bridal broom			B
Rhagadiolus stellatus	endive daisy			B
Rorippa austriaca	Austrian fieldcress			B
Rorippa sylvestris	creeping yellow fieldcress			B
Rubus armeniacus	Himalayan blackberry	B Priority	High	
Rumex acetosella	sheep sorrel		Moderate	
Saccharum ravennae	ravennagrass; hardy pampas grass		Moderate	
Salsola soda	glasswort; oppositeleaf Russian thistle		Moderate	
Salsola tragus	Russian thistle, tumbleweed	A Priority	Limited	
Salsola vermiculata	wormleaf salsola			A
Salvia aethiopis	Mediterranean sage		Limited	B
Salvia virgata	meadow sage			A
Salvinia auriculata	salvinia			A
Salvinia molesta	giant salvinia; karibaweed; water velvet		High	
Schinus terebinthifolius	Brazilian pepper tree	A Priority	Limited	
Scolymus hispanicus	golden thistle			A
Senecio elegans	purple ragweed			B
Senecio glomeratus	cutleaf burnweed; cutleaf fireweed		Moderate	
Senecio jacobaea	tansy ragwort		Limited	B
Senecio linearifolius	narrowleaf ragweed			B
Senecio squalidus	Oxford ragwort			B
Sesbania punicea	scarlet wisteria		High	B
Setaria faberi	giant foxtail			B
Sisymbrium irio	London rocket		Moderate	
Solanum cardiophyllum	heartleaf nightshade			A
Solanum carolinense	Carolina horsenettle			B
Solanum dimidiatum	Torrey's nightshade			A
Solanum elaeagnifolium	white horsenettle			B
Solanum lanceolatum	lanceleaf nightshade			B
Solanum marginatum	white-margined nightshade			B

Scientific name	Common name	MMP status	Cal-IPC status	CDFA status
Sonchus arvensis	perennial sowthistle			A
Sorghum halepense	Johnson grass	B Priority		C
Spartina (hybrids)	cordgrass	A Priority		
Spartina alterniflora	salt-water cord grass	A Priority		B
Spartina alterniflora x foliosa	smooth hybrid cordgrass		High	
Spartina anglica	common cordgrass		Moderate	B
Spartina densiflora	dense-flowered cord grass	A Priority	High	B
Spartina patens	saltmeadow cordgrass		Limited	B
Spartium junceum	Spanish broom		High	C
Sphaerophysa salsula	Austrian peaweed			A
Stipa brachychaeta	punagrass			A
Stipa capensis	cape ricegrass		Moderate	
Striga asiatica	witchweed			A
Symphytum asperum	rough comfrey			B
Tagetes minuta	wild marigold			A
Tamarix parviflora	smallflower tamarisk		High	
Tamarix aphylla	athel	B Priority	Limited	
Tamarix chinenesis	Chinese tamarisk			B
Tamarix chinensis	fivestamen tamarisk	B Priority	High	
Tamarix gallica	French tamarisk	B Priority	High	B
Tamarix parviflora	smallflower tamarisk	B Priority		B
Tamarix ramosissima	saltcedar	B Priority	High	B
Tanacetum vulgare	common tansy; golden buttons		Moderate	
Torilis arvensis	hedgeparsley; spreading hedgeparsley		Moderate	
Triadica sebifera	Chinese tallow tree; popcorn tree		Moderate	
Tribolium obliteratum	cape grass			B
Typha angustifolia	narrow-leaved cattail	B Priority		
Ulex europaeus	gorse		High	B
Vinca major	greater periwinkle	B Priority	Moderate	
Viscum album	European mistletoe			B
Volutaria canariensis	Canary Island knapweed			A
Washingtonia robusta	Mexican fan palm; Washington palm		Moderate	
Watsonia meriana	bulbil bugle-lily		Limited	B
Zostera japonica	Japanese eelgrass		Moderate	A
Zygophyllum fabago	Syrian beancaper			A

Appendix D

Transect End Point and Sample Plot Locations

Table D-1. Coordinates for transect end points and sample plots.

Transect number	End point and sample plot	Easting	Northing
1	**West end point**	**38.2459960000**	**-122.292818000**
	E1	38.2456167645	-122.284101640
	W1	38.2456442566	-122.285309192
	W2	38.2456520807	-122.285654990
	W3	38.2457037457	-122.286102845
	W4	38.2457029514	-122.286538235
	W5	38.2457239866	-122.287113829
	W6	38.2457642498	-122.287690260
	W7	38.2457851663	-122.288218790
	W8	38.2458128236	-122.288911531
	W9	38.2458619596	-122.289715541
	W10	38.2459689931	-122.291889000
	East end point	**38.2456060000**	**-122.284061000**
2	**West end point**	**38.2552030000**	**-122.303056000**
	1	38.2519628762	-122.285562794
	2	38.2521780941	-122.286791913
	2A	38.2520892983	-122.286060306
	3	38.2522051539	-122.286952201
	4	38.2522380764	-122.287119482
	5	38.2524366800	-122.288253197
	6	38.2525741237	-122.289004786
	7	38.2527706652	-122.289850148
	8	38.2528352312	-122.290380538
	9	38.2527863506	-122.290610826
	10A	38.2528860517	-122.290720432
	11	38.2535038063	-122.294129176
	12	38.2537851750	-122.295645726
	13	38.2542903753	-122.298160535
	14	38.2546859013	-122.300259201
	15	38.2550864388	-122.302459469
	East end point	**38.2519280000**	**-122.285401000**

Transect number	End point and sample plot	Easting	Northing
2A	**West end point**	**38.2595850000**	**-122.300738000**
	1A	38.2563097432	-122.284620227
	1	38.2565436651	-122.285784315
	2	38.2566814150	-122.286551788
	3	38.2569058443	-122.287813899
	4	38.2572209441	-122.289653215
	5	38.2574347397	-122.290677944
	6	38.2576547661	-122.291732583
	7	38.2579609964	-122.293200494
	8	38.2582683471	-122.294673960
	9	38.2585657787	-122.296099896
	10	38.2586472607	-122.296490548
	11	38.2590717968	-122.298447864
	12	38.2594279719	-122.300065246
	East end point	**38.2563030000**	**-122.284493000**
3	**West end point**	**38.2614170000**	**-122.293909000**
	1	38.2601746017	-122.288173395
	1A	38.2601135370	-122.287955501
	2	38.2601934028	-122.288260166
	2A	38.2602329699	-122.288509707
	3	38.2603844195	-122.289141791
	3B	38.2600418392	-122.287560676
	4	38.2604976789	-122.289664542
	5	38.2607129425	-122.290658130
	6	38.2607595060	-122.290873048
	7	38.2609872850	-122.291924474
	8	38.2610100920	-122.292029751
	9	38.2612038455	-122.292924155
	10	38.2613555557	-122.293624496
	E1	38.2593584943	-122.284551961
	East end point	**38.2593310000**	**-122.284477000**

Transect number	End point and sample plot	Easting	Northing
4	**West end point**	**38.2658210000**	**-122.295555000**
	1	38.2658994335	-122.287453092
	1A	38.2658836058	-122.287567718
	2	38.2658933396	-122.288068239
	2A	38.2658700459	-122.288598579
	3	38.2658798213	-122.289430874
	4	38.2658769539	-122.289719693
	5	38.2658636401	-122.291058855
	6	38.2658580838	-122.291616746
	7	38.2658488003	-122.292549617
	8	38.2658392452	-122.293510698
	9	38.2658291331	-122.294525446
	10	38.2658225258	-122.295186981
	E1	38.2659299451	-122.283975579
	E2	38.2658970060	-122.283699463
	E3	38.2659094364	-122.283473552
	E4	38.2659048309	-122.283210741
	East end point	**38.2659060000**	**-122.283118000**
5	**West end point**	**38.2689330000**	**-122.298025000**
	1	38.2690353798	-122.287383267
	2	38.2689782094	-122.288219578
	3	38.2690129301	-122.289058871
	4	38.2689988359	-122.290111300
	5	38.2689968799	-122.290255662
	6	38.2689789558	-122.291591310
	7	38.2689685655	-122.292365289
	8	38.2689631452	-122.292769884
	9	38.2689474586	-122.293938184
	10	38.2689375619	-122.294674026
	11	38.2689233958	-122.295134486
	12	38.2689227624	-122.296183839
	13	38.2688743887	-122.297523092
	E1	38.2690722340	-122.285629167
	E2	38.2690981197	-122.285570191
	E3	38.2691077089	-122.284636015
	E4	38.2691226851	-122.284328492
	E5	38.2691388988	-122.283972303
	East end point	**38.2691390000**	**-122.283843000**

Transect number	End point and sample plot	Easting	Northing
5A	**West end point**	**38.2728870000**	**-122.297900000**
	1	38.2715295204	-122.287989021
	1A	38.2714077137	-122.287812809
	2	38.2715634408	-122.288292842
	2A	38.2715211763	-122.288558648
	3	38.2716857483	-122.289211627
	4	38.2717177646	-122.289474487
	5	38.2717174010	-122.289848676
	6	38.2717954086	-122.290406289
	7	38.2718549107	-122.290831575
	8	38.2719228529	-122.291317363
	8A	38.2719528178	-122.291618565
	9	38.2720486719	-122.292216834
	10	38.2721057128	-122.292624697
	11	38.2723085507	-122.294027624
	12	38.2724985883	-122.295288749
	13	38.2726764803	-122.296532026
	E1	38.2712751107	-122.286297608
	E2	38.2712442791	-122.286192671
	E3	38.2712144862	-122.285654337
	E4	38.2711382704	-122.285152441
	E5	38.2711006448	-122.284908311
	E6	38.2710616200	-122.284482702
	E7	38.2709881482	-122.283894421
	E8	38.2709591605	-122.283641332
	E9	38.2708748776	-122.283159627
	E10	38.2708252726	-122.282804328
	East end point	**38.2708200000**	**-122.282739000**

Transect number	End point and sample plot	Easting	Northing
6	**West end point**	**38.2744850000**	**-122.285026000**
	1	38.2740090893	-122.284536111
	2	38.2740441482	-122.284571953
	3	38.2741029813	-122.284632098
	4	38.2741691274	-122.284699727
	5	38.2742165116	-122.284748193
	6	38.2742415457	-122.284773789
	7	38.2743081026	-122.284841838
	8	38.2743413263	-122.284875792
	9	38.2744073354	-122.284943281
	10	38.2744675104	-122.285004791
	E1	38.2730873424	-122.283562484
	E2	38.2730011271	-122.283482132
	E3	38.2728533706	-122.283336922
	E4	38.2727603014	-122.283240711
	E5	38.2724853297	-122.282942958
	E6	38.2723118764	-122.282763291
	E7	38.2720754130	-122.282540733
	E8	38.2719103084	-122.282370844
	E9	38.2716691261	-122.282120409
	E10	38.2714892366	-122.281947065
	East end point	**38.2714290000**	**-122.281885000**
7	**West end point**	**38.2779820000**	**-122.282532000**
	W1	38.2779704291	-122.282516174
	E1	38.2781788502	-122.281170426
	E2	38.2782109242	-122.281014646
	E3	38.2782234500	-122.280935014
	E4	38.2782466329	-122.280822769
	E5	38.2782645298	-122.280690989
	E6	38.2783064549	-122.280530102
	E7	38.2783316840	-122.280347231
	E8	38.2783687011	-122.280153885
	E9	38.2783992884	-122.279954812
	East end point	**38.2784220000**	**-122.279889000**

Transect number	End point and sample plot	Easting	Northing
8	**West end point**	**38.2802990000**	**-122.284796000**
	8W1	38.2803205303	-122.284702308
	8E1	38.2805985996	-122.283523198
	8E2	38.2806274006	-122.283399569
	8E3	38.2807019483	-122.283083621
	8E4	38.2807582716	-122.282844055
	8E5	38.2808053288	-122.282643901
	8E6	38.2808732625	-122.282354946
	8E7	38.2809230499	-122.282143174
	East end point	**38.2809340000**	**-122.282097000**
9	**West end point**	**38.2865560000**	**-122.285622000**
	9W1	38.2863106802	-122.285165564
	9W2	38.2865377125	-122.285589036
	9E1	38.2857280243	-122.284083203
	9E2	38.2855589593	-122.283767703
	9E3	38.2855241169	-122.283702916
	9E4	38.2853170795	-122.283318968
	9E5	38.2850841675	-122.282882881
	East end point	**38.2849500000**	**-122.282636000**
10A	**West end point**	**38.2941580000**	**-122.282741000**
	10AW1	38.2941690763	-122.282717869
	10AE1	38.2945520929	-122.281926316
	10AE2	38.2945950295	-122.281837580
	10AE3	38.2946270315	-122.281771443
	10AE4	38.2946815889	-122.281658691
	10AE5	38.2947312542	-122.281559419
	East end point	**38.2948080000**	**-122.281397000**
10B	**West end point**	**38.2910900000**	**-122.282430000**
	10BW1	38.2910474043	-122.282342549
	10BE1	38.2905905505	-122.281397501
	10BE2	38.2905455383	-122.281304390
	10BE3	38.2905173251	-122.281246030
	10BE4	38.2904005795	-122.281004535
	10BE5	38.2902948936	-122.280785920
	East end point	**38.2902390000**	**-122.280670000**

Transect number	End point and sample plot	Easting	Northing
11	**West end point**	**38.2971080000**	**-122.282931000**
	11W1	38.2971434611	-122.282883442
	11W2	38.2971079490	-122.282930930
	11E1	38.2974774875	-122.282373955
	11E2	38.2975882933	-122.282206945
	11E3	38.2976202162	-122.282158829
	11E4	38.2976686291	-122.282085859
	East end point	**38.2977960000**	**-122.281893000**
12	**West end point**	**38.2989170000**	**-122.284698000**
	12W1	38.2992189460	-122.284660438
	12W2	38.2991332882	-122.284420410
	12W3	38.2991518798	-122.284328513
	12E1	38.2989770360	-122.283323117
	12E2	38.2989552521	-122.283178243
	East end point	**38.2989170000**	**-122.283000000**

Appendix E

Photographs at Photopoint Locations

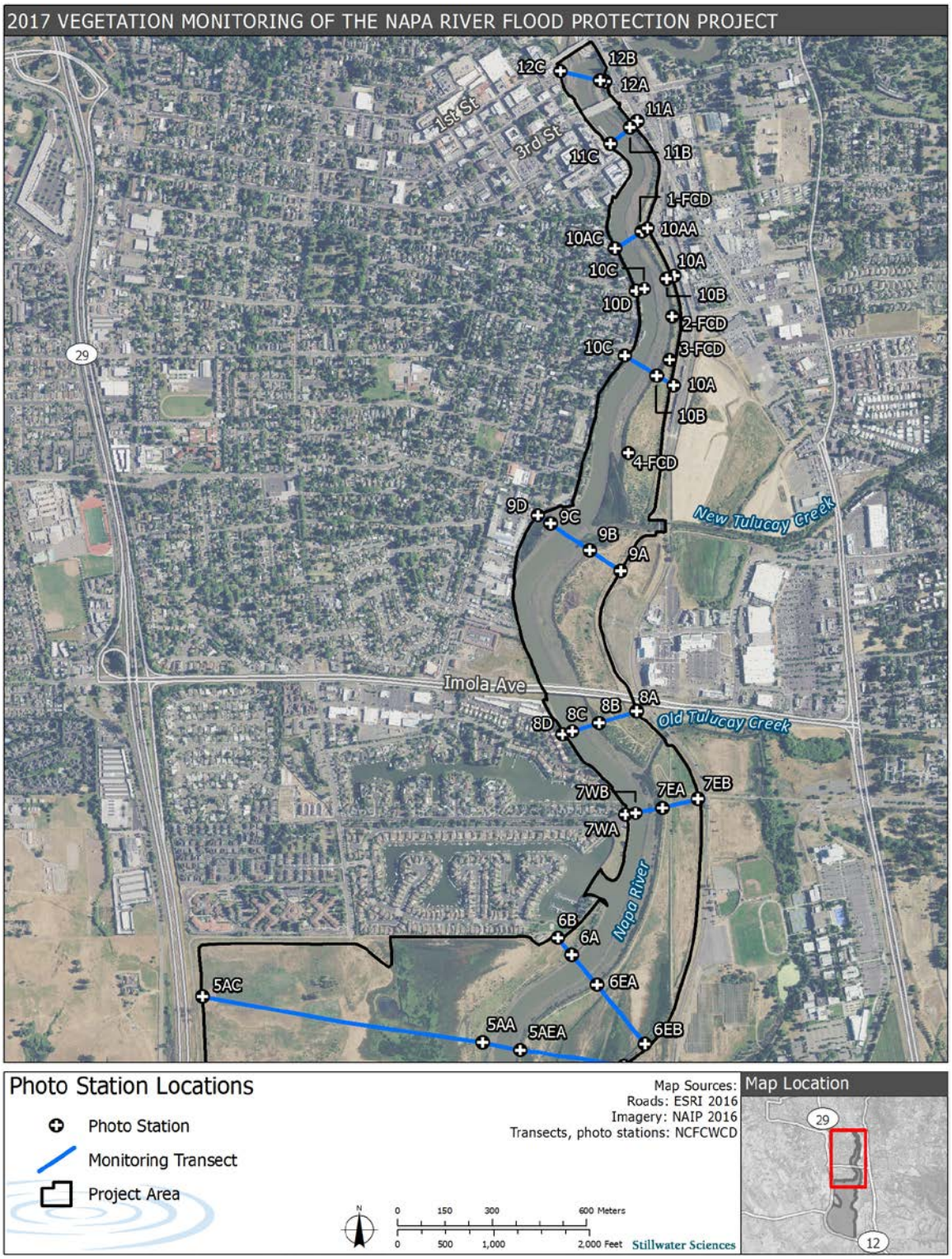


Figure E-1. Photo station location reference map, northern portion of the Project Area.

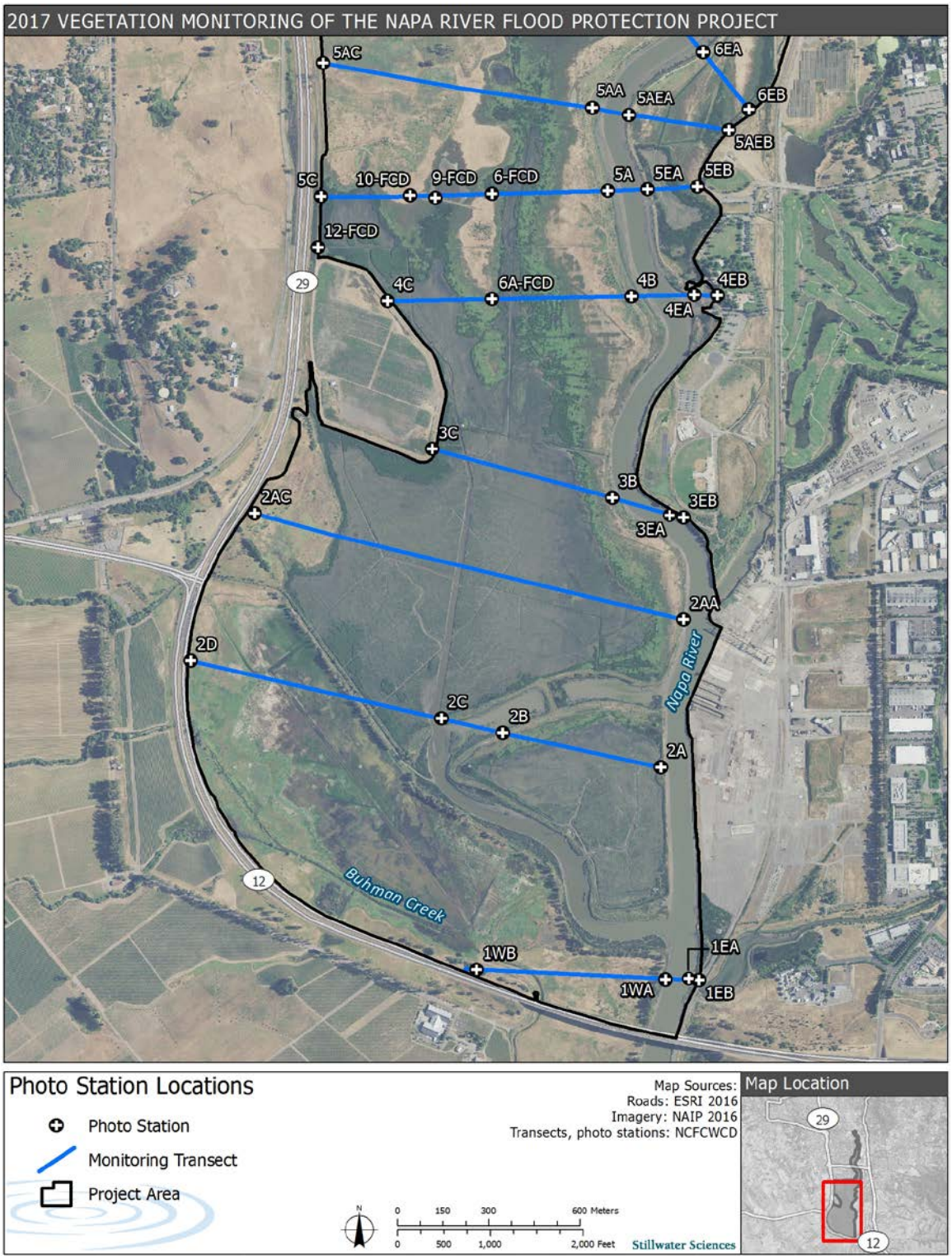


Figure E-2. Photo station location reference map, southern portion of the Project Area.

Figure E-1. Transect 1, Photopoint 1EA.

Figure E-2. Transect 1, Photopoint 1EB.

Figure E-3. Transect 1, Photopoint 1WA.

Figure E-4. Transect 1, Photopoint 1WB.

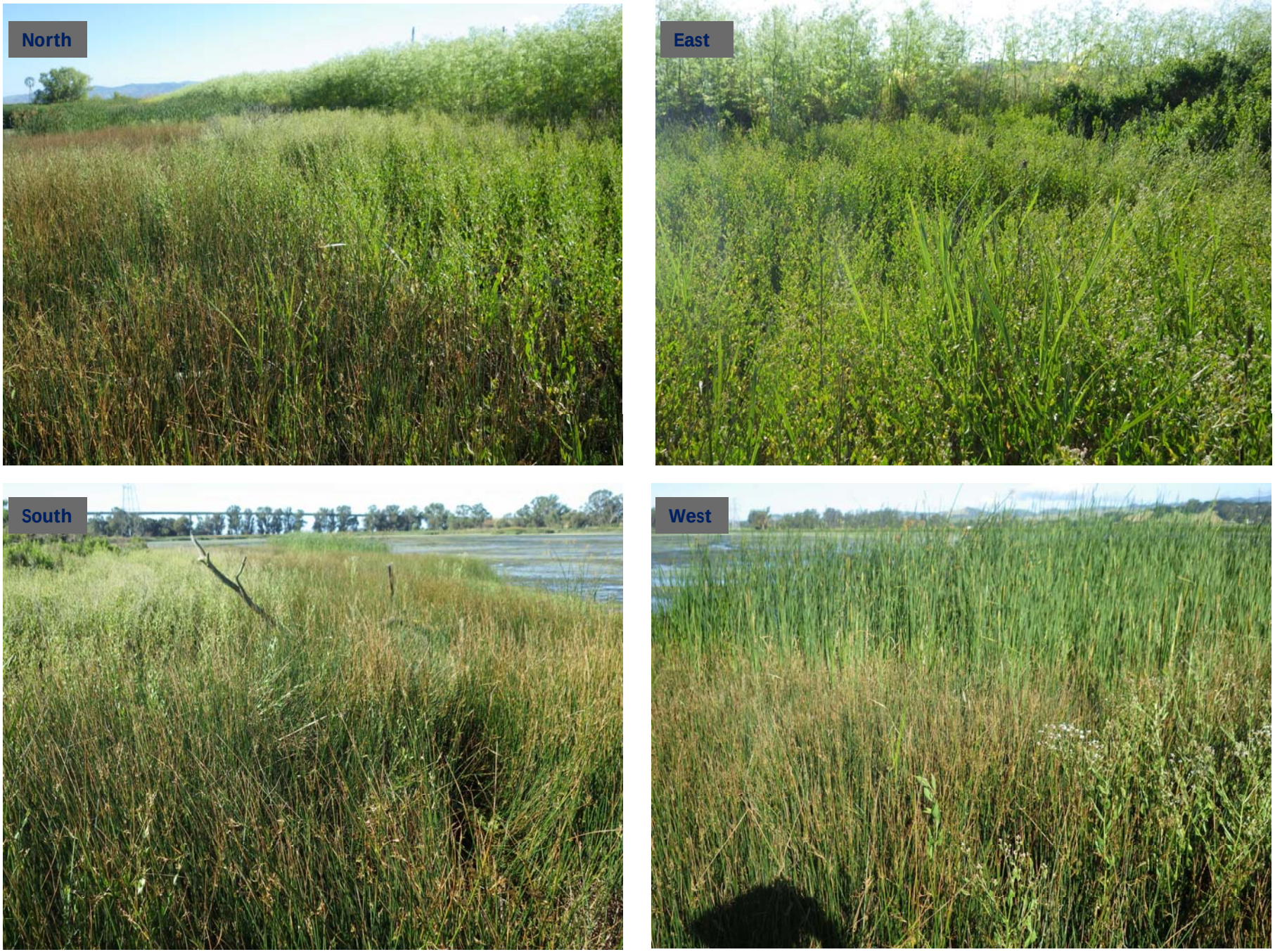


Figure E-5. Transect 2, Photopoint 2A.

Figure E-6. Transect 2, Photopoint 2B.

Figure E-7. Transect 2, Photopoint 2C.

Figure E-8. Transect 2, Photopoint 2D.

Figure E-9. Transect 2A, Photopoint 2AA.

Figure E-10. Transect 2A, Photopoint 2AC.

Figure E-11. Transect 3 , Photopoint 3EB.

Figure E-12. Transect 3 , Photopoint 3EA.

Figure E-13. Transect 3 , Photopoint 3B.

Figure E-14. Transect 3 , Photopoint 3C.

Figure E-15. Transect 4, Photopoint 4EB.

Figure E-16. Transect 4, Photopoint 4EA.

Figure E-17. Transect 4, Photopoint 4B.

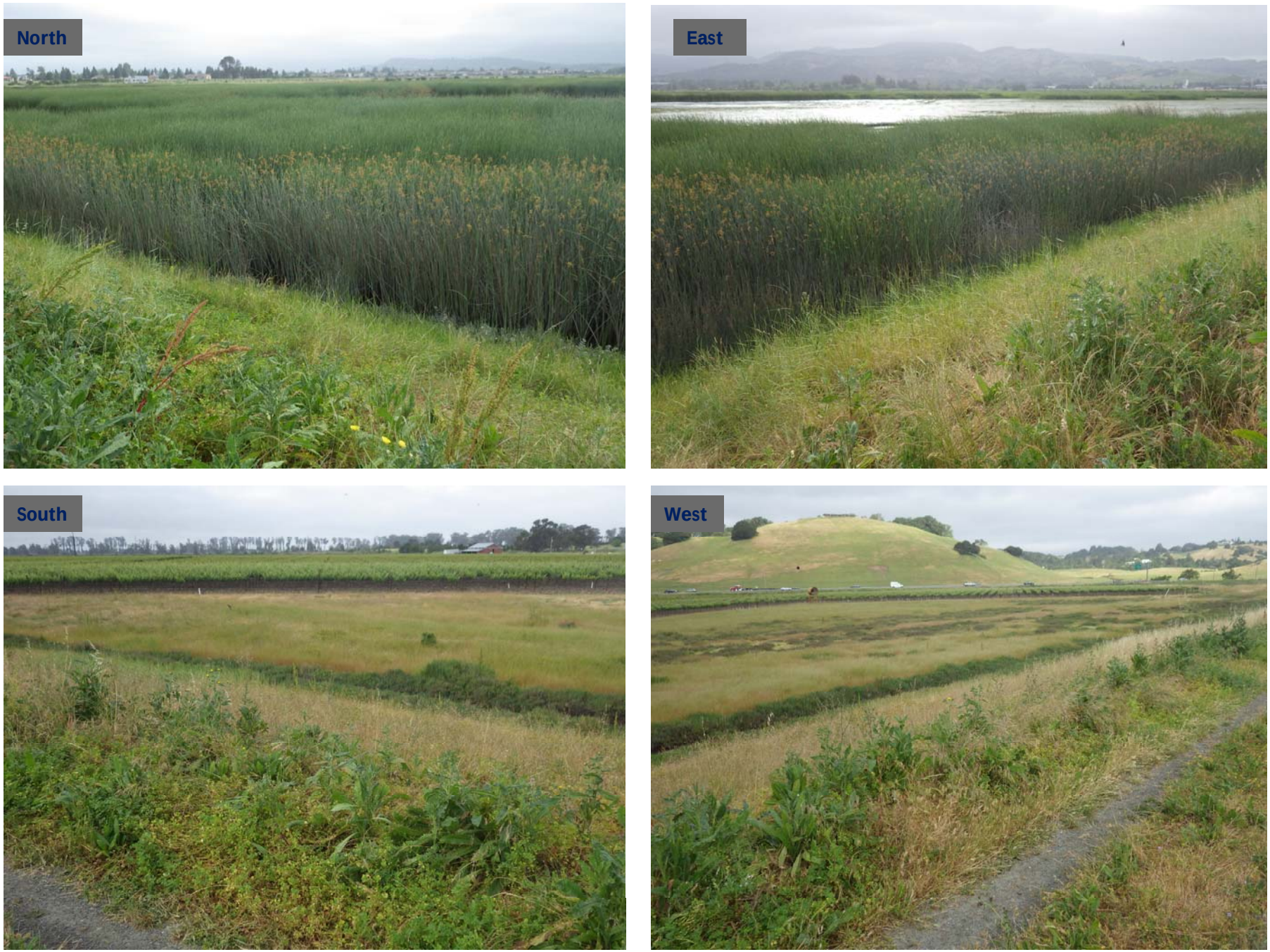


Figure E-18. Transect 4, Photopoint 4C.

Figure E-19. Transect X, Photopoint 5EB.

Figure E-20. Transect X, Photopoint 5EA.

Figure E-21. Transect 5, Photopoint 5AEB.

Figure E-22. Transect 5, Photopoint 5AEA.

Figure E-23. Transect 5A, Photopoint 5AA.

Figure E-24. Transect 5A, Photopoint 5AC.

Figure E-25. Transect 5, Photopoint 5A.

Figure E-26. Transect 5, Photopoint 5C.

Figure E-27. Transect 6, Photopoint 6EB.

Figure E-28. Transect 6, Photopoint 6EA.

Figure E-29. Transect 6, Photopoint 6A.

Figure E-30. Transect 6, Photopoint 6B.

Figure E-31. Transect 7, Photopoint 7EB.

Figure E-32. Transect 7, Photopoint 7EA.

Figure E-33. Transect 7, Photopoint 7WB.

Figure E-34. Transect 7, Photopoint 7WA.

Figure E-35. Transect 8, Photopoint 8A.

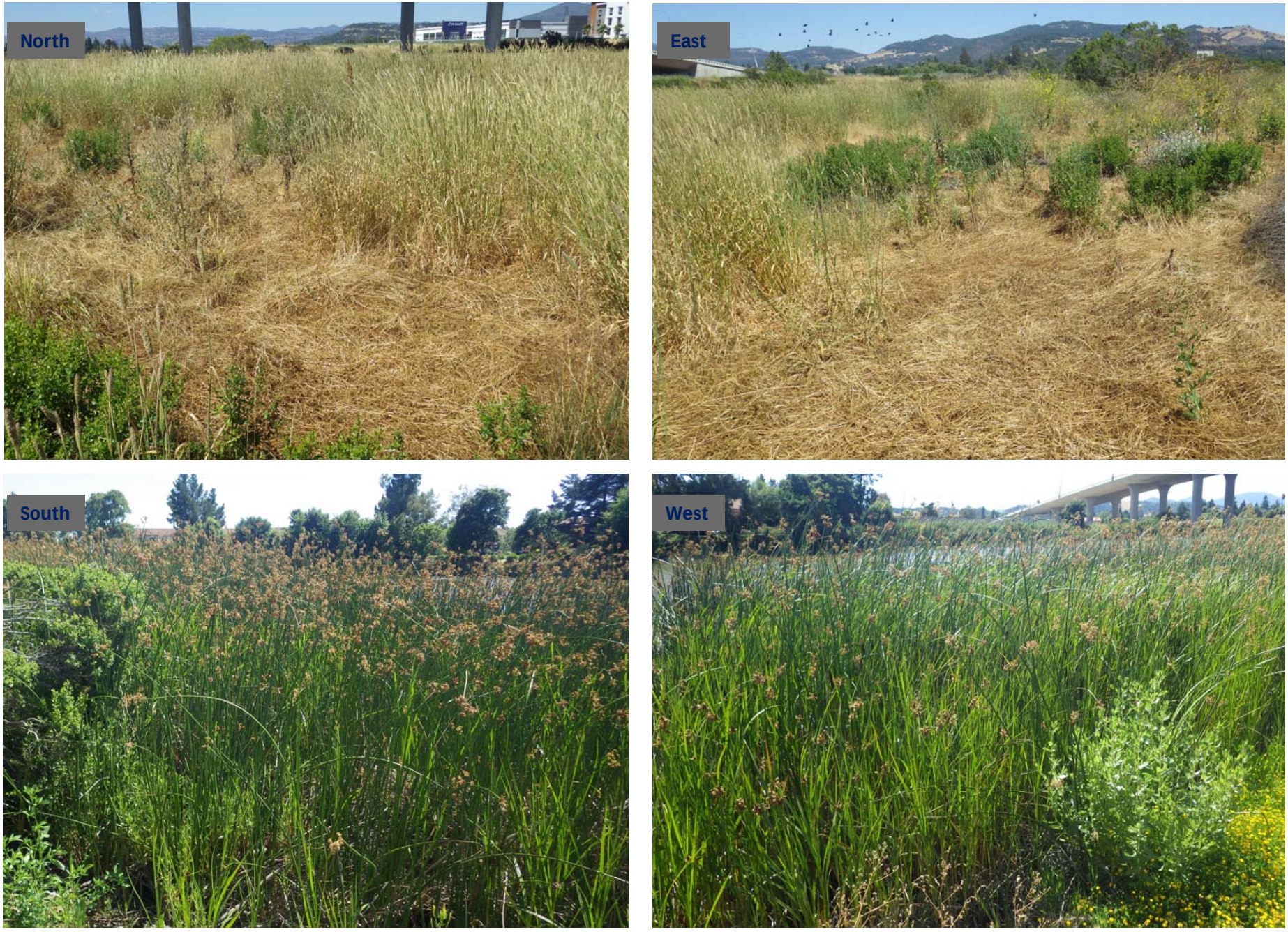


Figure E-36. Transect 8, Photopoint 8B.

Figure E-37. Transect 8, Photopoint 8C-8D.

Figure E-38. Transect 9, Photopoint 9A.

Figure E-39. Transect 9, Photopoint 9B.

Figure E-40. Transect 9, Photopoint 9C.

Figure E-41. Transect 9, Photopoint 9D.

Figure E-42. Transect 10, Photopoint 10A.

Figure E-43. Transect 10, Photopoint 10B.

Figure E-44. Transect 10, Photopoint 10C.

Figure E-45. Transect 10, Photopoint 10D.

Figure E-46. Transect 10, Photopoint 10A_T10B.

Figure E-47. Transect 10, Photopoint 10B_T10B.

Figure E-48. Transect 10A, Photopoint 10AA.

Figure E-49. Transect 10A, Photopoint 10AC.

Figure E-50. Transect 10, Photopoint 10C_T10B.

Figure E-51. Transect 11, Photopoint 11A.

Figure E-52. Transect 11, Photopoint 11B.

Figure E-53. Transect 11, Photopoint 11C.

Figure E-54. Transect 12, Photopoint 12A.

Figure E-55. Transect 12, Photopoint 12B.

Figure E-56. Transect 12, Photopoint 12C.

Figure E-57. Photopoint 1FCD (no transect).

Figure E-58. Photopoint 2FCD (no transect).

Figure E-59. Photopoint 3FCD (no transect).

Figure E-60. Photopoint 4FCD (no transect).

Figure E-61. Photopoint 6AFCD (Transect 4).

Figure E-62. Photopoint 6FCD (Transect 5).

Figure E-63. Photopoint 9FCD (Transect 5).

Figure E-64. Photopoint 10FCD (Transect 5).

Figure E-65. Photopoint 12FCD (no transect).

Appendix F

Field Data Spreadsheets

Table F-1. Compiled plot forms.

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T1_E1	1	1	R. Thoms, S. Gabrielson	6/12/2017		not available	25	40	Grindelia stricta	8	Lepidium latifolium	30													Brackish Marsh
T1_W1		W1	R. Thoms, S. Gabrielson	6/12/2017		not available	50	2	Polypogon monspeliensis	20	Spergula arvensis	20	Cotula coronopifolia	5	Atriplex prostrata	3	Alisma triviale	1	Lythrum hyssopifolia	2					Open Water
T1_W10		W10	R. Thoms, S. Gabrielson	6/12/2017		not available	2	70	Raphanus sativus	5	Lactuca serriola	1	Galium aparine	5	Festuca bromoides	20	Bromus hordeaceus	40	Festuca perennis	40					Non-Native Grassland
T1_W2		W2	R. Thoms, S. Gabrielson	6/12/2017		not available	3	40	Bromus diandrus	25	Centaurea solstitialis	10	Carduus pycnocephalus ssp. pycnocephalus	3	Avena barbata	2	Festuca perennis	10	Bromus hordeaceus	10	Phalaris aquatica	1			Riparian
T1_W3		W3	R. Thoms, S. Gabrielson	6/12/2017		not available	3	50	Lythrum hyssopifolia	7	Polypogon monspeliensis	3	Festuca perennis	35	Hordeum marinum ssp. gussoneanum	5	Festuca bromoides	20							Non-Native Grassland
T1_W4		W4	R. Thoms, S. Gabrielson	6/12/2017		not available	15	60	Festuca bromoides	15	Rumex acetosella	10	Festuca perennis	12	Bromus hordeaceus	15									Non-Native Grassland
T1_W5		W5	R. Thoms, S. Gabrielson	6/12/2017		not available	5	35	Festuca perennis	35	Hordeum marinum ssp. gussoneanum	20	Festuca bromoides	5	Briza minor	1	Lotus corniculatus	1							Non-Native Grassland
T1_W6		W6	R. Thoms, S. Gabrielson	6/12/2017		not available	2	70	Festuca perennis	60	Bromus hordeaceus	15	Lotus corniculatus	5	Hordeum marinum ssp. gussoneanum	15	Festuca bromoides	10							Non-Native Grassland
T1_W7		W7	R. Thoms, S. Gabrielson	6/12/2017		not available	10	40	Festuca bromoides	15	Briza minor	8	Polypogon monspeliensis	4	Phalaris aquatica	15	Festuca perennis	12							Non-Native Grassland
T1_W8		W8	R. Thoms, S. Gabrielson	6/12/2017		not available	8	60	Festuca perennis	80	Lotus corniculatus	6	Bromus hordeaceus	10	Festuca bromoides	15									Non-Native Grassland
T1_W9		W9	R. Thoms, S. Gabrielson	6/12/2017		not available	2	60	Briza minor	1	Festuca perennis	30	Hordeum brachyantherum	3	Festuca bromoides	20	Bromus hordeaceus	15	Hordeum marinum ssp. gussoneanum	8	Phalaris aquatica	25			Non-Native Grassland

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T2_1	2	1	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	95	1	Ruppia maritima	4															Mudflat
T2_10A		10a	R. Thoms, S. Gabrielson	5/12/2017		not available	30	40	Grindelia stricta	30	Sonchus asper ssp. asper	8	Salicornia pacifica	5	Distichlis spicata	5	Lotus corniculatus	1	Polypogon monspeliensis	1					Brackish Marsh
T2_11		11	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	not available	100	0																	Mudflat
T2_12		12	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	not available	65	0	Eleocharis parvula	35															Mudflat
T2_13		13	M. Keever, R. Thoms	5/10/2017	Inaccessible	not available	not available	not available																	Seasonal & Emergent Wetlands
T2_14		14	M. Keever, R. Thoms	5/10/2017		1	50	10	Alisma triviale	40															Seasonal & Emergent Wetlands
T2_15		15	M. Keever, R. Thoms	5/10/2017		not available	15	10	Helminthotheca echioides	60	Lythrum hyssopifolia	8	Atriplex prostrata	1	Phalaris aquatica	30									Non-Native Grassland
T2_2		2	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	70	0	Ruppia maritima	1	Eleocharis parvula	30													Mudflat
T2_2A		2a	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	90	0	Ruppia maritima	1	Eleocharis parvula	9													Mudflat
T2_3		3	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	98	0	Eleocharis parvula	2															Mudflat
T2_4		4	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	92	0	Ruppia maritima	1	Eleocharis parvula	8													Mudflat
T2_5		5	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	88	0	Ruppia maritima	8	Eleocharis parvula	5													Mudflat
T2_6		6	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	85	0	Ruppia maritima	15	Eleocharis parvula	1													Mudflat
T2_7		7	R. Thoms, S. Gabrielson	5/12/2017		not available	40	20	Distichlis spicata	10	Salicornia pacifica	20	Jaumea carnosa	8	Bolboschoenus maritimus ssp. paludosus	8	Lepidium latifolium	2							Brackish Marsh
T2_8		8	R. Thoms, S. Gabrielson	5/12/2017		1	1	65	Distichlis spicata	75	Salicornia pacifica	6													Brackish Marsh
T2_9		9	R. Thoms, S. Gabrielson	5/12/2017		1	3	65	Distichlis spicata	80	Juncus mexicanus	8													Brackish Marsh

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T2A_1	2a	1	R. Thoms, S. Gabrielson	5/12/2017		1	35	1	Eleocharis parvula	12	Cotula coronopifolia	65													Brackish Marsh
T2A_10		10	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	3	60	0	Eleocharis parvula	40	Triglochin scilloides	1													Mudflat
T2A_11		11	M. Keever, R. Thoms	5/10/2017		not available	1	10	Elymus caput-medusae	95	Bromus hordeaceus	1	Festuca perennis	1											Woodland
T2A_12		12	M. Keever, R. Thoms	5/10/2017		not available	5	10	Elymus caput-medusae	55	Bromus hordeaceus	5	Festuca bromoides	40	Convolvulus arvensis	5									Woodland
T2A_1A		1a	R. Thoms, S. Gabrielson	5/12/2017		not available	0	85	Distichlis spicata	45	Elymus triticoides	8													Native Grassland
T2A_2		2	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	1	40	0	Eleocharis parvula	60															Mudflat
T2A_3		3	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	not available	55	0	Eleocharis parvula	45															Mudflat
T2A_4		4	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T2A_5		5	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T2A_6		6	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T2A_7		7	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T2A_8		8	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T2A_9		9	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	3	60	0	Eleocharis parvula	40	Triglochin scilloides	1													Mudflat

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T3_1	3	1	R. Thoms, S. Gabrielson	5/12/2017		5	94	0	Eleocharis parvula	6															Brackish Marsh
T3_10		10	M. Keever, R. Thoms	5/10/2017		1	10	18	Typha angustifolia	15	Bolboschoenus maritimus ssp. paludosus	80													Brackish Marsh
T3_1A		1a	R. Thoms, S. Gabrielson	5/12/2017		not available	4	85	Bolboschoenus maritimus ssp. paludosus	75															Brackish Marsh
T3_2		2	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	80	0	Eleocharis parvula	20															Mudflat
T3_2A		2a	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	5	95	0	Eleocharis parvula	5															Mudflat
T3_3		3	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T3_3B		3b	R. Thoms, S. Gabrielson	5/12/2017		not available	20	45	Salicornia pacifica	60	Lepidium latifolium	6													Brackish Marsh
T3_4		4	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T3_5		5	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T3_6		6	R. Thoms, S. Gabrielson	5/12/2017	Inaccessible	not available	not available	not available																	Mudflat
T3_7		7	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	1	60	0	Eleocharis parvula	40	Triglochin scilloides	1													Mudflat
T3_8		8	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	1	60	0	Eleocharis parvula	40	Triglochin scilloides	1													Mudflat
T3_9		9	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	1	60	0	Eleocharis parvula	40	Triglochin scilloides	1													Mudflat
T3_E1		E1	R. Thoms, S. Gabrielson	6/12/2017		not available	12	4	Polygonum aviculare	1	Acacia melanoxylon	85													Riparian

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T4_1	4	1	R. Thoms, S. Gabrielson	5/12/2017		not available	20	60	Briza minor	2	Festuca perennis	25	Vicia sativa	3	Geranium dissectum	2	Lotus corniculatus	1	Trifolium subterraneum	12	Bromus hordeaceus	8	Ranunculus muricatus	1	Non-Native Grassland
T4_10		10	M. Keever, R. Thoms	5/10/2017		not available	10	10	Typha angustifolia	60	Schoenoplectus californicus	45													Brackish Marsh
T4_1A		1a	R. Thoms, S. Gabrielson	5/12/2017		not available	15	30	Festuca perennis	25	Bromus hordeaceus	4	Sonchus asper ssp. asper	3	Festuca bromoides	8	Zeltnera muehlenbergii	2	Briza minor	2	Trifolium subterraneum	15			Non-Native Grassland
T4_2		2	R. Thoms, S. Gabrielson	5/12/2017		not available	30	40	Salicornia pacifica	12	Bromus hordeaceus	3	Polypogon monspeliensis	10	Rumex crispus	4	Lotus corniculatus	2	Zeltnera muehlenbergii	5					Non-Native Grassland
T4_2A		2a	R. Thoms, S. Gabrielson	5/12/2017		not available	25	30	Salicornia pacifica	65	Atriplex prostrata	2													Brackish Marsh
T4_3		3	R. Thoms, S. Gabrielson	5/12/2017		2	15	1	Triglochin maritima	80	Bolboschoenus maritimus ssp. paludosus	2	Jaumea carnosa	18	Distichlis spicata	2									Brackish Marsh
T4_4		4	R. Thoms, S. Gabrielson	5/12/2017		3	20	10	Typha angustifolia	11	Bolboschoenus maritimus ssp. paludosus	12	Jaumea carnosa	80	Distichlis spicata	5									Brackish Marsh
T4_5		5	R. Thoms, S. Gabrielson	5/12/2017	Viewed from Distance	not available	94	0	Eleocharis parvula	6															Mudflat
T4_6		6	R. Thoms, S. Gabrielson	6/14/2017		not available	15	3	Distichlis spicata	82															Brackish Marsh
T4_7		7	R. Thoms, S. Gabrielson	6/14/2017		not available	10	2	Distichlis spicata	48	Jaumea carnosa	55													Brackish Marsh
T4_8		8	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	1	90	0	Ruppia maritima	10	Triglochin scilloides	1													Mudflat
T4_9		9	M. Keever, R. Thoms	5/10/2017	Viewed from Distance	1	90	0	Ruppia maritima	10	Triglochin scilloides	1													Mudflat
T4_E1		E1	R. Thoms, S. Gabrielson	6/12/2017		not available	15	35	Raphanus sativus	85															Non-Native Grassland
T4_E2		E2	R. Thoms, S. Gabrielson	6/12/2017		not available	45	50	Raphanus sativus	10	Lepidium latifolium	6	Conium maculatum	2											Non-Native Grassland
T4_E3		E3	R. Thoms, S. Gabrielson	6/12/2017		not available	40	25	Atriplex prostrata	60	Lepidium latifolium	5													Non-Native Grassland
T4_E4		E4	R. Thoms, S. Gabrielson	6/12/2017		not available	5	60	Phalaris aquatica	20	Raphanus sativus	4	Elymus triticoides	60											Non-Native Grassland

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T5_1	5	1	R. Thoms, S. Gabrielson	5/11/2017		not available	2	80	Festuca perennis	20	Geranium dissectum	6	Hordeum brachyantherum	2	Vicia villosa	1	Festuca bromoides	4	Elymus triticoides	15					Native Grassland
T5_10		10	R. Thoms, S. Gabrielson	5/11/2017		not available	5	80	Bromus hordeaceus	3	Festuca perennis	10	Bromus diandrus	3	Vicia sativa	1	Hordeum marinum ssp. gussoneanum	3	Festuca bromoides	8	Helminthotheca echioides	5	Raphanus sativus	1	Non-Native Grassland
T5_11		11	R. Thoms, S. Gabrielson	5/11/2017		not available	8	80	Bromus hordeaceus	2	Festuca perennis	18	Bromus diandrus	10	Geranium dissectum	1	Hordeum marinum ssp. gussoneanum	3	Festuca bromoides	8	Convolvulus arvensis	1	Briza minor	1	Non-Native Grassland
T5_12		12	R. Thoms, S. Gabrielson	5/11/2017		2	25	10	Schoenoplectus californicus	40	Typha angustifolia	70													Brackish Marsh
T5_13		13	R. Thoms, S. Gabrielson	5/11/2017		not available	80	15	Bolboschoenus maritimus ssp. paludosus	8	Schoenoplectus californicus	6													Mudflat
T5_2		2	R. Thoms, S. Gabrielson	5/11/2017		not available	10	60	Festuca perennis	30	Hordeum marinum ssp. gussoneanum	25	Convolvulus arvensis	5	Geranium dissectum	2	Festuca bromoides	15	Foeniculum vulgare	2					Non-Native Grassland
T5_3		3	R. Thoms, S. Gabrielson	5/11/2017		not available	30	10	Salicornia pacifica	65	Atriplex prostrata	2													Brackish Marsh
T5_4		4	R. Thoms, S. Gabrielson	5/11/2017		1	1	70	Typha angustifolia	85	Bolboschoenus maritimus ssp. paludosus	4													Brackish Marsh
T5_5		5	R. Thoms, S. Gabrielson	5/11/2017		1	5	80	Typha angustifolia	60	Bolboschoenus maritimus ssp. paludosus	4													Brackish Marsh
T5_6		6	R. Thoms, S. Gabrielson	5/11/2017		not available	5	60	Distichlis spicata	55	Lepidium latifolium	3	Lotus corniculatus	10	Sonchus asper ssp. asper	5	Polypogon monspeliensis	12	Salicornia pacifica	1					Brackish Marsh
T5_7		7	R. Thoms, S. Gabrielson	5/11/2017	mostly underwater	4	70	2	Salicornia pacifica	30															Brackish Marsh
T5_8		8	R. Thoms, S. Gabrielson	5/11/2017	Inaccessible	4	not available	not available																	Mudflat
T5_9		9	R. Thoms, S. Gabrielson	5/11/2017		not available	25	15	Carduus pycnocephalus ssp. pycnocephalus	70	Avena barbata	2	Bromus diandrus	5	Geranium dissectum	35	Stipa pulchra	8	Lotus corniculatus	2					Non-Native Grassland
T5_E1		E1	R. Thoms, S. Gabrielson	6/14/2017		not available	35	15	Mentha spicata	18	Phalaris aquatica	32	Elymus triticoides	4	Festuca bromoides	16	Geranium dissectum	1							Native Grassland
T5_E2		E2	R. Thoms, S. Gabrielson	6/14/2017		2	70	8	Bolboschoenus maritimus ssp. paludosus	22															Brackish Marsh
T5_E3		E3	R. Thoms, S. Gabrielson	6/14/2017		not available	25	5	Schoenoplectus americanus	70															Brackish Marsh
T5_E4		E4	R. Thoms, S. Gabrielson	6/14/2017		not available	28	2	Salicornia pacifica	70															Brackish Marsh
T5_E5		E5	R. Thoms, S. Gabrielson	6/14/2017		not available	4	45	Festuca perennis	15	Vicia sativa	5	Medicago polymorpha	2	Distichlis spicata	4	Festuca bromoides	8	Bromus hordeaceus	35					Non-Native Grassland

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T5A_1	5a	1	R. Thoms, S. Gabrielson	5/11/2017		not available	3	75	Geranium dissectum	5	Carduus pycnocephalus ssp. pycnocephalus	10	Elymus triticoides	20	Foeniculum vulgare	8	Festuca bromoides	15	Vicia sativa	2	Festuca arundinacea	2			Native Grassland
T5A_10		10	R. Thoms, S. Gabrielson	5/11/2017		not available	5	60	Festuca perennis	70	Festuca bromoides	15	Hordeum brachyantherum	20	Hordeum marinum ssp. gussoneanum	5	Geranium dissectum	2	Trifolium subterraneum	2					Non-Native Grassland
T5A_11		11	R. Thoms, S. Gabrielson	5/11/2017		not available	1	80	Elymus glaucus ssp. glaucus	98															Native Grassland
T5A_12		12	R. Thoms, S. Gabrielson	5/11/2017		not available	2	10	Bromus diandrus	60	Bromus hordeaceus	30	Hordeum marinum ssp. gussoneanum	15	Trifolium subterraneum	45	Geranium dissectum	5	Vicia sativa	2	Raphanus sativus	2	Festuca bromoides	10	Non-Native Grassland
T5A_13		13	R. Thoms, S. Gabrielson	5/11/2017		not available	15	30	Carduus pycnocephalus ssp. pycnocephalus	50	Silybum marianum	10	Raphanus sativus	15	Lactuca serriola	5	Geranium dissectum	5	Bromus hordeaceus	2	Festuca bromoides	1			Native Grassland
T5A_1A		1a	R. Thoms, S. Gabrielson	5/11/2017		not available	35	25	Baccharis pilularis	50	Festuca bromoides	65	Bromus hordeaceus	2	Festuca perennis	5	Lotus corniculatus	1	Geranium dissectum	3	Juncus patens	3	Elymus triticoides	1	Native Grassland
T5A_2		2	R. Thoms, S. Gabrielson	5/11/2017		not available	5	80	Elymus triticoides	5	Distichlis spicata	12	Bromus hordeaceus	15	Festuca bromoides	35	Geranium dissectum	1	Lepidium latifolium	1					Native Grassland
T5A_2A		2a	R. Thoms, S. Gabrielson	5/11/2017	Algal mat	3	100	0																	Seasonal & Emergent Wetlands
T5A_3		3	R. Thoms, S. Gabrielson	5/11/2017		3	50	10	Distichlis spicata	15	Salicornia pacifica	15	Jaumea carnosa	20											Brackish Marsh
T5A_4		4	R. Thoms, S. Gabrielson	5/11/2017		1	25	45	Distichlis spicata	55	Bolboschoenus maritimus ssp. paludosus	2	Jaumea carnosa	15											Brackish Marsh
T5A_5		5	R. Thoms, S. Gabrielson	5/11/2017		not available	40	15	Salicornia pacifica	55	Lepidium latifolium	3													Brackish Marsh
T5A_6		6	R. Thoms, S. Gabrielson	5/11/2017		2	65	10	Salicornia pacifica	15	Jaumea carnosa	12	Distichlis spicata	3	Bolboschoenus maritimus ssp. paludosus	10									Brackish Marsh
T5A_7		7	R. Thoms, S. Gabrielson	5/11/2017		1	55	15	Salicornia pacifica	20	Jaumea carnosa	3	Distichlis spicata	20											Brackish Marsh
T5A_8		8	R. Thoms, S. Gabrielson	5/11/2017		1	70	10	Salicornia pacifica	8	Jaumea carnosa	5	Bolboschoenus maritimus ssp. paludosus	35											Brackish Marsh
T5A_8A		8a	R. Thoms, S. Gabrielson	5/11/2017		not available	45	5	Salicornia pacifica	55															Brackish Marsh
T5A_9		9	R. Thoms, S. Gabrielson	5/11/2017		not available	2	30	Festuca perennis	50	Festuca bromoides	5	Vicia sativa	5	Hordeum marinum ssp. gussoneanum	3	Geranium dissectum	1	Trifolium subterraneum	60					Non-Native Grassland
T5A_E1		E1	R. Thoms, S. Gabrielson	6/14/2017		not available	15	80	Baccharis pilularis	11	Elymus triticoides	22	Geranium dissectum	2	Rumex occidentalis	1	Festuca perennis	35							Native Grassland
T5A_E10		E10	R. Thoms, S. Gabrielson	6/14/2017		not available	12	3	Lotus corniculatus	60	Polypogon monspeliensis	4	Lythrum hyssopifolia	12	Bolboschoenus maritimus ssp. paludosus	11	Salicornia pacifica	2	Festuca perennis	2					Seasonal & Emergent Wetlands

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T5A_E2	5a (cont.)	E2	R. Thoms, S. Gabrielson	6/14/2017		not available	40	2	Salicornia pacifica	54	Atriplex prostrata	4	Distichlis spicata	11											Seasonal & Emergent Wetlands
T5A_E3		E3	R. Thoms, S. Gabrielson	6/14/2017		not available	15	80	Festuca perennis	60	Bromus hordeaceus	18	Festuca bromoides	19	Elymus triticoides	2									Native Grassland
T5A_E4		E4	R. Thoms, S. Gabrielson	6/14/2017		not available	15	5	Salicornia pacifica	15	Distichlis spicata	62	Lotus corniculatus	8	Elymus triticoides	3	Grindelia stricta	1							Seasonal & Emergent Wetlands
T5A_E5		E5	R. Thoms, S. Gabrielson	6/14/2017		not available	35	5	Distichlis spicata	38	Salicornia pacifica	24	Jaumea carnosa	11											Seasonal & Emergent Wetlands
T5A_E6		E6	R. Thoms, S. Gabrielson	6/14/2017		not available	35	2	Salicornia pacifica	44	Polypogon monspeliensis	2	Lotus corniculatus	16	Lythrum hyssopifolia	9									Seasonal & Emergent Wetlands
T5A_E7		E7	R. Thoms, S. Gabrielson	6/14/2017		not available	30	20	Salicornia pacifica	65	Atriplex prostrata	5	Jaumea carnosa	3											Seasonal & Emergent Wetlands
T5A_E8		E8	R. Thoms, S. Gabrielson	6/14/2017		3	75	20	Typha angustifolia	22	Bolboschoenus maritimus ssp. paludosus	10													Seasonal & Emergent Wetlands
T5A_E9		E9	R. Thoms, S. Gabrielson	6/14/2017		not available	60	35	Schoenoplectus americanus	15	Typha angustifolia	12	Bolboschoenus maritimus ssp. paludosus	22	Salicornia pacifica	5									Seasonal & Emergent Wetlands

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T6_1	6	1	M. Keever, R. Thoms	5/10/2017		not available	20	40	Salicornia pacifica	40	Rumex crispus	2													Brackish Marsh
T6_10		10	M. Keever, R. Thoms	5/10/2017		not available	0	5	Phalaris aquatica	99	Geranium dissectum	1													Native Grassland
T6_2		2	M. Keever, R. Thoms	5/10/2017		not available	2	20	Baccharis pilularis	60	Elymus triticoides	30	Festuca bromoides	20	Raphanus sativus	2	Geranium dissectum	1							Native Grassland
T6_3		3	M. Keever, R. Thoms	5/10/2017		not available	5	30	Elymus triticoides	25	Festuca bromoides	25	Grindelia stricta	5	Helminthotheca echioides	30	Raphanus sativus	2							Native Grassland
T6_4		4	M. Keever, R. Thoms	5/10/2017		not available	10	10	Festuca perennis	25	Phalaris aquatica	40	Festuca bromoides	40	Hordeum marinum ssp. gussoneanum	5									Native Grassland
T6_5		5	M. Keever, R. Thoms	5/10/2017		not available	5	45	Festuca perennis	25	Juncus bufonius var. bufonius	20	Hordeum marinum ssp. gussoneanum	5	Lotus corniculatus	10									Native Grassland
T6_6		6	M. Keever, R. Thoms	5/10/2017		not available	2	30	Festuca perennis	60	Lotus corniculatus	2	Hordeum marinum ssp. gussoneanum	10	Hordeum brachyantherum	15	Festuca bromoides	5							Native Grassland
T6_7		7	M. Keever, R. Thoms	5/10/2017		not available	5	15	Festuca perennis	70	Elymus caput-medusae	1	Elymus triticoides	5	Hordeum brachyantherum	15									Native Grassland
T6_8		8	M. Keever, R. Thoms	5/10/2017		not available	3	15	Festuca perennis	40	Elymus caput-medusae	5	Vicia sativa	10	Festuca bromoides	10	Lotus corniculatus	10	Hordeum brachyantherum	40	Bromus hordeaceus	5			Native Grassland
T6_9		9	M. Keever, R. Thoms	5/10/2017		not available	2	15	Festuca perennis	25	Elymus caput-medusae	25	Elymus triticoides	5	Festuca bromoides	25	Lotus corniculatus	12	Hordeum brachyantherum	2	Bromus hordeaceus	2			Native Grassland
T6_E1		E1	R. Thoms, S. Gabrielson	6/13/2017		not available	2	60	Medicago polymorpha	6	Festuca perennis	5	Elymus triticoides	17	Vicia sativa	3	Festuca bromoides	19							Native Grassland
T6_E10		E10	R. Thoms, S. Gabrielson	6/13/2017		not available	30	10	Salicornia pacifica	22	Distichlis spicata	30	Lotus corniculatus	5	Polypogon monspeliensis	5	Atriplex prostrata	6	Festuca perennis	3	Lythrum hyssopifolia	8			Brackish Marsh
T6_E2		E2	R. Thoms, S. Gabrielson	6/13/2017		not available	20	75	Geranium dissectum	5	Juncus patens	8	Elymus triticoides	12	Festuca bromoides	4									Native Grassland
T6_E3		E3	R. Thoms, S. Gabrielson	6/13/2017		not available	20	5	Salicornia pacifica	15	Jaumea carnosa	70	Bolboschoenus maritimus ssp. paludosus	5											Brackish Marsh
T6_E4		E4	R. Thoms, S. Gabrielson	6/13/2017		not available	40	20	Vicia sativa	4	Elymus triticoides	18	Bromus hordeaceus	6	Festuca perennis	1	Helminthotheca echioides	12	Rumex crispus	5					Native Grassland
T6_E5		E5	R. Thoms, S. Gabrielson	6/13/2017		not available	30	30	Salicornia pacifica	15	Frankenia salina	23	Festuca perennis	17	Polypogon monspeliensis	3	Atriplex prostrata	2							Brackish Marsh
T6_E6		E6	R. Thoms, S. Gabrielson	6/13/2017		not available	25	5	Salicornia pacifica	55	Lythrum hyssopifolia	6	Distichlis spicata	20											Brackish Marsh
T6_E7		E7	R. Thoms, S. Gabrielson	6/13/2017		not available	30	5	Salicornia pacifica	70	Lythrum hyssopifolia	5	Sonchus asper ssp. asper	2											Brackish Marsh
T6_E8		E8	R. Thoms, S. Gabrielson	6/13/2017		not available	30	5	Salicornia pacifica	65	Festuca perennis	3	Lythrum hyssopifolia	7	Polypogon monspeliensis	5	Sonchus asper ssp. asper	3							Brackish Marsh
T6_E9		E9	R. Thoms, S. Gabrielson	6/13/2017		not available	30	17	Salicornia pacifica	35	Festuca perennis	3	Lotus corniculatus	2	Polypogon monspeliensis	2	Atriplex prostrata	4	Lythrum hyssopifolia	10	Sonchus asper ssp. asper	5			Brackish Marsh

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T7_E1	7	E1	R. Thoms, S. Gabrielson	6/13/2017		not available	5	20	Elymus triticoides	30	Festuca bromoides	35	Medicago polymorpha	13	Geranium dissectum	4	Festuca perennis	8							Riparian
T7_E2		E2	R. Thoms, S. Gabrielson	6/13/2017		not available	25	35	Geranium dissectum	2	Carduus pycnocephalus ssp. pycnocephalus	4	Elymus triticoides	18	Phalaris aquatica	8	Festuca bromoides	15							Non-Native Grassland
T7_E3		E3	R. Thoms, S. Gabrielson	6/13/2017		not available	67	22	Polypogon monspeliensis	28	Festuca perennis	8													Seasonal & Emergent Wetlands
T7_E4		E4	R. Thoms, S. Gabrielson	6/13/2017		not available	6	90	Elymus triticoides	80	Convolvulus arvensis	5	Phalaris aquatica	8	Vicia sativa	2									Native Grassland
T7_E5		E5	R. Thoms, S. Gabrielson	6/13/2017		not available	1	30	Raphanus sativus	8	Carex lyngbyei	95	Galium aparine	6	Carduus pycnocephalus ssp. pycnocephalus	2									Seasonal & Emergent Wetlands
T7_E6		E6	R. Thoms, S. Gabrielson	6/13/2017		not available	40	10	Helminthotheca echioides	28	Festuca perennis	30	Phalaris aquatica	3	Festuca bromoides	10	Hordeum marinum ssp. gussoneanum	2							Non-Native Grassland
T7_E7		E7	R. Thoms, S. Gabrielson	6/13/2017		not available	1	60	Rumex crispus	35	Distichlis spicata	20	Polypogon monspeliensis	8	Acmispon americanus var. americanus	1									Seasonal & Emergent Wetlands
T7_E8		E8	R. Thoms, S. Gabrielson	6/13/2017		not available	30	20	Rumex crispus	6	Festuca perennis	22	Helminthotheca echioides	44											Non-Native Grassland
T7_E9		E9	R. Thoms, S. Gabrielson	6/13/2017		not available	30	40	Phalaris aquatica	5	Avena barbata	3	Helminthotheca echioides	23											Non-Native Grassland
T7_W1		W1	R. Thoms, S. Gabrielson	6/13/2017		not available	1	70	Hedera helix	95	Ulmus sp.	8	Olea europaea	40											Riparian
T8_E1	8	E1	R. Thoms, S. Gabrielson	6/13/2017		not available	65	2	Bolboschoenus maritimus ssp. paludosus	30	Salicornia pacifica	6	Veronica anagallis-aquatica	3	Eleocharis parvula	2									Brackish Marsh
T8_E2		E2	R. Thoms, S. Gabrielson	6/13/2017		not available	7	60	Phalaris minor	18	Bromus hordeaceus	10	Medicago polymorpha	12	Hypochaeris radicata	2	Festuca bromoides	5	Bromus diandrus	4					Non-Native Grassland
T8_E3		E3	R. Thoms, S. Gabrielson	6/13/2017		not available	2	98	Phalaris aquatica	85															Non-Native Grassland
T8_E4		E4	R. Thoms, S. Gabrielson	6/13/2017		not available	60	15	Bolboschoenus maritimus ssp. paludosus	12	Salicornia pacifica	20	Cotula coronopifolia	2	Polypogon monspeliensis	2									Seasonal & Emergent Wetlands
T8_E5		E5	R. Thoms, S. Gabrielson	6/13/2017		not available	30	35	Baccharis pilularis	50	Phalaris aquatica	8	Raphanus sativus	4	Festuca perennis	12									Non-Native Grassland
T8_E6		E6	R. Thoms, S. Gabrielson	6/13/2017		not available	13	27	Baccharis pilularis	5	Phalaris aquatica	55	Bromus hordeaceus	4	Festuca perennis	8	Festuca bromoides	5							Non-Native Grassland
T8_E7		E7	R. Thoms, S. Gabrielson	6/13/2017		not available	30	50	Elymus repens	5	Cichorium intybus	4	Avena barbata	8	Foeniculum vulgare	65									Non-Native Grassland
T8_W1		W1	R. Thoms, S. Gabrielson	6/13/2017		not available	90	3	Schoenoplectus acutus var. occidentalis	4	Juglans hindsii	55													Brackish Marsh

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T9_E1	9	E1	R. Thoms, S. Gabrielson	6/13/2017		not available	45	5	Schoenoplectus californicus	55	Alisma triviale	6													Brackish Marsh
T9_E2		E2	R. Thoms, S. Gabrielson	6/13/2017		not available	8	45	Bolboschoenus maritimus ssp. paludosus	12	Distichlis spicata	30	Salicornia pacifica	8											Brackish Marsh
T9_E3		E3	R. Thoms, S. Gabrielson	6/13/2017		not available	4	75	Lotus corniculatus	18	Festuca perennis	40	Bromus hordeaceus	8	Medicago polymorpha	10	Helminthotheca echioides	2							Non-Native Grassland
T9_E4		E4	R. Thoms, S. Gabrielson	6/13/2017		not available	35	20	Polygonum aviculare	18	Festuca perennis	20	Helminthotheca echioides	5	Lotus corniculatus	8	Hordeum marinum ssp. gussoneanum	5							Non-Native Grassland
T9_E5		E5	R. Thoms, S. Gabrielson	6/13/2017		not available	3	80	Festuca perennis	85															Non-Native Grassland
T9_W1		W1	R. Thoms, S. Gabrielson	6/13/2017		1	100	0																	Open Water
T9_W2		W2	R. Thoms, S. Gabrielson	6/13/2017		not available	45	5	Schoenoplectus acutus var. occidentalis	50	Bolboschoenus maritimus ssp. paludosus	8													Brackish Marsh
T10A_E1	10a	E1	R. Thoms, S. Gabrielson	6/14/2017		0	95	0	Veronica anagallis-aquatica	3	Eleocharis parvula	2													Open Water
T10A_E2		E2	R. Thoms, S. Gabrielson	6/14/2017		not available	10	30	Juncus patens	40	Lotus corniculatus	15	Elymus triticoides	4	Alisma triviale	3									Brackish Marsh
T10A_E3		E3	R. Thoms, S. Gabrielson	6/14/2017		not available	25	70	Salix lasiolepis	45	Salix lasiandra	23	Elymus triticoides	10	Stipa pulchra	20	Elymus glaucus ssp. glaucus	3							Riparian
T10A_E4		E4	R. Thoms, S. Gabrielson	6/14/2017		not available	10	5	Lotus corniculatus	20	Hordeum marinum ssp. gussoneanum	70	Avena barbata	2											Riparian
T10A_E5		E5	R. Thoms, S. Gabrielson	6/14/2017		not available	5	45	Quercus agrifolia	6	Melica californica	15	Avena barbata	9	Bromus diandrus	28	Vicia sativa	10	Convolvulus arvensis	4					Riparian
T10A_W1		W1	R. Thoms, S. Gabrielson	6/13/2017		not available	2	90	Ulmus americana	60	Acacia melanoxylon	70													Riparian
T10B_E1	10b	E1	R. Thoms, S. Gabrielson	6/14/2017		0	100	0																	Mudflat
T10B_E2		E2	R. Thoms, S. Gabrielson	6/14/2017		not available	68	3	Schoenoplectus californicus	32															Brackish Marsh
T10B_E3		E3	R. Thoms, S. Gabrielson	6/14/2017		not available	25	10	Quercus agrifolia	3	Festuca bromoides	20	Avena barbata	45	Bromus diandrus	8	Phalaris aquatica	5	Salix lasiolepis	3					Riparian
T10B_E4		E4	R. Thoms, S. Gabrielson	6/14/2017		not available	25	10	Hypochaeris radicata	6	Festuca bromoides	20	Avena barbata	45	Lotus corniculatus	8	Elymus triticoides	5							Non-Native Grassland
T10B_E5		E5	R. Thoms, S. Gabrielson	6/14/2017		not available	1	90	Quercus agrifolia	90	Rubus armeniacus	3	Elymus triticoides	5											Riparian
T10B_W1		W1	R. Thoms, S. Gabrielson	6/13/2017		not available	1	70	Hordeum murinum	25	Galium aparine	12	Acacia melanoxylon	55	Bromus diandrus	3									Riparian

UID	Transect	Plot#	Observers	Date	Notes 1	Salinity	Bareground	Thatch	Species name 1	Percent cover 1	Species name 2	Percent cover 2	Species name 3	Percent cover 3	Species name 4	Percent cover 4	Species name 5	Percent cover 5	Species name 6	Percent cover 6	Species name 7	Percent cover 7	Species name 8	Percent cover 8	Habitat type
T11_E1	11	E1	R. Thoms, S. Gabrielson	6/14/2017		not available	87	1	Veronica anagallis-aquatica	11	Persicaria amphibia	2													Open Water
T11_E2		E2	R. Thoms, S. Gabrielson	6/14/2017		not available	20	1	Salix lasiolepis	70	Schoenoplectus californicus	25													Brackish Marsh
T11_E3		E3	R. Thoms, S. Gabrielson	6/14/2017		not available	25	5	Salix lasiolepis	70															Riparian
T11_E4		E4	R. Thoms, S. Gabrielson	6/14/2017		not available	15	15	Salix lasiolepis	18	Gallium aperene	8	Bromus diandrus	40	Ambrosia psilostachya	22									Riparian
T11_W1		W1	R. Thoms, S. Gabrielson	6/13/2017	Spring water ~35%	0	100	0																	Open Water
T11_W2		W2	R. Thoms, S. Gabrielson	6/13/2017		not available	20	68	Grindelia stricta	6	Veronica anagallis-aquatica	2	Cyperus eragrostis	3	Polypogon monspeliensis	5	Rumex salicifolius	3							Brackish Marsh
T12_E1	12	E1	R. Thoms, S. Gabrielson	6/14/2017	Installed today	not available	75	1	Hirschfeldia incana	18	Melilotus albus	11	Foeniculum vulgare	5											Mudflat
T12_E2		E2	R. Thoms, S. Gabrielson	6/14/2017	Installed today	not available	65	15	Plantago lanceolata	2	Artemisia douglasiana	3	Salix lasiolepis	10	Foeniculum vulgare	5	Baccharis pilularis	4	Agrostis gigantea	8	Festuca bromoides	1			Riparian
T12_W1		W1	R. Thoms, S. Gabrielson	6/14/2017	Installed today	not available	75	5	Schoenoplectus californicus	9	Grindelia stricta	5	Lythrum hyssopifolia	4	Cyperus eragrostis	7	Veronica anagallis-aquatica	5	Juncus bufonius var. bufonius	2					Brackish Marsh
T12_W2		W2	R. Thoms, S. Gabrielson	6/14/2017	Installed today	not available	85	12	Plantago lanceolata	9	Frankenia salina	8	Melilitus albus	12	Medicago polymorpha	10									Mudflat
T12_W3		W3	R. Thoms, S. Gabrielson	6/14/2017	Installed today	not available	100	0	0																Open Water

Table F-2. Compiled transect species.

Transect	Species	Species common name
1	*Agrostis gigantea*	redtop
	Alisma triviale	northern water plantain
	Allium vineale	wild garlic
	Apium graveolens	celery
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Brassica nigra	black mustard
	Briza minor	annual quaking grass, small quaking grass
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Bromus madritensis	compact brome
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Centaurea solstitialis	yellow star-thistle
	Cirsium vulgare	bull thistle
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cotula coronopifolia	brass-buttons
	Distichlis spicata	salt grass
	Dittrichia graveolens	stinkwort
	Eleocharis macrostachya	pale spikerush
	Eleocharis parvula	small spikerush
	Elymus repens	quack grass
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Erodium cicutarium	redstem stork's bill
	Eucalyptus globulus	blue gum
	Festuca bromoides	brome fescue
	Foeniculum vulgare	fennel
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hirschfeldia incana	shortpod mustard
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hypochaeris radicata	rough cat's-ear
	Jaumea carnosa	marsh jaumea

Transect	Species	Species common name
1 (cont.)	*Juncus bufonius* var. *bufonius*	toad rush
	Juncus mexicanus	mexican rush
	Juncus patens	spreading rush
	Lactuca serriola	prickly lettuce
	Lemna minuta	least duckweed
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Malvella leprosa	alkali-mallow, white-weed
	Mentha pulegium	pennyroyal
	Phalaris aquatica	Harding grass
	Phalaris minor	littleseed canarygrass
	Plantago lanceolata	English plantain
	Polygonum aviculare	knotweed, knotgrass
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Potentilla anserina ssp. *pacifica*	Pacific silverweed
	Pseudognaphalium luteoalbum	Jersey cudweed
	Quercus agrifolia	coast live oak, encina
	Quercus douglasii	blue oak
	Quercus lobata	valley oak, roble
	Raphanus sativus	radish
	Rumex acetosella	sheep sorrel
	Rumex crispus	curly dock
	Rumex transitorius	willow dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Salsola tragus	Russian thistle, tumbleweed
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus americanus	Olney's three-square bulrush
	Schoenoplectus californicus	southern bulrush
	Sonchus asper ssp. *asper*	prickly sow thistle
	Spergula arvensis	stickwort, starwort
	Spergularia marina	saltmarsh sand-spurrey
	Trifolium glomeratum	clustered clover
	Trifolium hirtum	rose clover
	Triglochin maritima	common arrow-grass
	Typha angustifolia	narrow-leaved cattail
	Veronica anagallis-aquatica	water speedwell
	Vicia sativa	garden vetch

Transect	Species	Species common name
1 (cont.)	*Xanthium strumarium*	cocklebur
2	*Achillea millefolium*	common yarrow
	Agrostis gigantea	redtop
	Alisma triviale	northern water plantain
	Atriplex prostrata	fat-hen
	Baccharis pilularis	coyote brush
	Bidens frondosa	sticktight
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Bromus hordeaceus	soft chess
	Cirsium vulgare	bull thistle
	Cotula coronopifolia	brass-buttons
	Cyperus eragrostis	tall flatsedge
	Distichlis spicata	salt grass
	Eleocharis macrostachya	pale spikerush
	Eleocharis parvula	small spikerush
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Festuca bromoides	brome fescue
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Jaumea carnosa	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush
	Juncus mexicanus	mexican rush
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Malvella leprosa	alkali-mallow, white-weed
	Mentha pulegium	pennyroyal
	Phalaris aquatica	Harding grass
	Pleuropogon californicus	annual semaphoregrass
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Rumex crispus	curly dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus californicus	southern bulrush

Transect	Species	Species common name
2 (cont.)	*Sonchus asper* ssp. *asper*	prickly sow thistle
	Stipa pulchra	purple needle grass
	Triglochin maritima	common arrow-grass
	Typha angustifolia	narrow-leaved cattail
	Vicia sativa	garden vetch
	Xanthium strumarium	cocklebur
2A	*Anagallis arvensis*	scarlet pimpernel
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Briza minor	annual quaking grass, small quaking grass
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Cirsium vulgare	bull thistle
	Conium maculatum	poison hemlock
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cotula coronopifolia	brass-buttons
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus caput-medusae	medusa head
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Eschscholzia californica	California poppy
	Festuca arundinacea	tall fescue
	Festuca bromoides	brome fescue
	Festuca myuros	rattail sixweeks grass
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hirschfeldia incana	shortpod mustard
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hypochaeris radicata	rough cat's-ear

Transect	Species	Species common name
2A (cont.)	*Jaumea carnosa*	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush
	Lactuca serriola	prickly lettuce
	Lathyrus latifolius	perennial sweet pea
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lupinus bicolor	miniature lupine
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Quercus agrifolia	coast live oak, encina
	Quercus lobata	valley oak, roble
	Raphanus sativus	radish
	Rumex acetosella	sheep sorrel
	Rumex crispus	curly dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Sonchus asper ssp. *asper*	prickly sow thistle
	Trifolium glomeratum	clustered clover
	Triglochin scilloides	flowering-quillwort
	Typha angustifolia	narrow-leaved cattail
	Vicia sativa	garden vetch
	Vicia villosa	hairy vetch, winter vetch
3	*Acacia dealbata*	silver wattle
	Acacia melanoxylon	blackwood acacia
	Anagallis arvensis	scarlet pimpernel
	Apium graveolens	celery
	Artemisia douglasiana	mugwort
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Avena fatua	wild oat
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Briza minor	annual quaking grass, small quaking grass
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Conium maculatum	poison hemlock

Transect	Species	Species common name
3 (cont.)	*Cotula coronopifolia*	brass-buttons
	Dipsacus fullonum	wild teasel
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus triticoides	beardless wild rye
	Festuca bromoides	brome fescue
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Galium aparine	goose grass
	Genista monspessulana	French broom
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hordeum murinum	wall barley
	Jaumea carnosa	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush
	Juncus mexicanus	mexican rush
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Malva nicaeensis	bull mallow
	Medicago polymorpha	California burclover
	Mentha spicata	spearmint
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Poa pratensis ssp. *pratensis*	Kentucky bluegrass
	Polygonum aviculare	knotweed, knotgrass
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Potentilla anserina	silverweed cinquefoil
	Raphanus sativus	radish
	Rosa californica	California rose
	Rumex crispus	curly dock
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus americanus	Olney's three-square bulrush
	Schoenoplectus californicus	southern bulrush

Transect	Species	Species common name
3 (cont.)	*Senecio hydrophilus*	water ragwort, alkali-marsh ragwort
	Sonchus asper ssp. *asper*	prickly sow thistle
	Sonchus oleraceus	common sow thistle
	Triglochin maritima	common arrow-grass
	Triglochin scilloides	flowering-quillwort
	Typha angustifolia	narrow-leaved cattail
	Typha latifolia	broad-leaved cattail
	Vicia sativa	garden vetch
	Vicia villosa	hairy vetch, winter vetch
4	*Agoseris retrorsa*	spearleaf agoseris
	Agrostis gigantea	redtop
	Ammi majus	large bullwort
	Anagallis arvensis	scarlet pimpernel
	Apium graveolens	celery
	Artemisia douglasiana	mugwort
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Avena fatua	wild oat
	Baccharis pilularis	coyote brush
	Bidens frondosa	sticktight
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Briza minor	annual quaking grass, small quaking grass
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Conium maculatum	poison hemlock
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cotula coronopifolia	brass-buttons
	Cryptantha sp.	cryptantha
	Cyperus eragrostis	tall flatsedge
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Erodium botrys	longbeak stork's bill
	Festuca bromoides	brome fescue
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath

Transect	Species	Species common name
4 (cont.)	*Galium aparine*	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Hainardia cylindrica	barbgrass
	Helminthotheca echioides	bristly ox-tongue
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hypochaeris radicata	rough cat's-ear
	Jaumea carnosa	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush
	Juncus mexicanus	mexican rush
	Juncus patens	spreading rush
	Lactuca serriola	prickly lettuce
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lupinus bicolor	miniature lupine
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Melilotus indicus	sourclover
	Parentucellia viscosa	yellow glandweed
	Persicaria amphibia	water smartweed
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Quercus agrifolia	coast live oak, encina
	Ranunculus muricatus	spinyfruit buttercup
	Raphanus sativus	radish
	Rumex crispus	curly dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus californicus	southern bulrush
	Senecio vulgaris	common groundsel
	Sonchus asper ssp. *asper*	prickly sow thistle
	Stipa pulchra	purple needle grass
	Trifolium dubium	little hop clover
	Trifolium repens	white clover
	Trifolium subterraneum	subterranean clover
	Triglochin maritima	common arrow-grass

Transect	Species	Species common name
4 (cont.)	*Triglochin scilloides*	flowering-quillwort
	Typha angustifolia	narrow-leaved cattail
	Typha latifolia	broad-leaved cattail
	Vicia sativa	garden vetch
	Vicia villosa	hairy vetch, winter vetch
	Zeltnera muehlenbergii	Monterey centaury
5	*Allium vineale*	wild garlic
	Ammi majus	large bullwort
	Anagallis arvensis	scarlet pimpernel
	Apium graveolens	celery
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis glutinosa	marsh baccharis
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Briza minor	annual quaking grass, small quaking grass
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Cirsium vulgare	bull thistle
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cotula coronopifolia	brass-buttons
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus caput-medusae	medusa head
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Festuca bromoides	brome fescue
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hypochaeris radicata	rough cat's-ear
	Jaumea carnosa	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush

Transect	Species	Species common name
5 (cont.)	*Juncus mexicanus*	mexican rush
	Kickxia elatine	sharpleaf cancerwort
	Lactuca serriola	prickly lettuce
	Lamium amplexicaule	henbit deadnettle
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Mentha pulegium	pennyroyal
	Parentucellia viscosa	yellow glandweed
	Persicaria amphibia	water smartweed
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Pseudognaphalium luteoalbum	Jersey cudweed
	Raphanus sativus	radish
	Rumex crispus	curly dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus americanus	Olney's three-square bulrush
	Schoenoplectus californicus	southern bulrush
	Sonchus asper ssp. *asper*	prickly sow thistle
	Sonchus oleraceus	common sow thistle
	Stipa pulchra	purple needle grass
	Trifolium dubium	little hop clover
	Trifolium hirtum	rose clover
	Trifolium subterraneum	subterranean clover
	Triglochin maritima	common arrow-grass
	Typha angustifolia	narrow-leaved cattail
	Typha latifolia	broad-leaved cattail
	Vicia sativa	garden vetch
	Vicia villosa	hairy vetch, winter vetch
5A	*Acmispon americanus* var. *americanus*	American bird's-foot trefoil
	Anagallis arvensis	scarlet pimpernel
	Artemisia douglasiana	mugwort
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush

Transect	Species	Species common name
5A (cont.)	*Bidens frondosa*	sticktight
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Briza minor	annual quaking grass, small quaking grass
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Cirsium vulgare	bull thistle
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cotula coronopifolia	brass-buttons
	Cynodon dactylon	Bermuda grass
	Cyperus eragrostis	tall flatsedge
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus caput-medusae	medusa head
	Elymus glaucus ssp. *glaucus*	blue wildrye
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Festuca arundinacea	tall fescue
	Festuca bromoides	brome fescue
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Iris pseudacorus	paleyellow iris
	Jaumea carnosa	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush
	Juncus mexicanus	mexican rush
	Juncus patens	spreading rush
	Kickxia elatine	sharpleaf cancerwort
	Lactuca serriola	prickly lettuce
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover

Transect	Species	Species common name
5A (cont.)	*Phalaris aquatica*	Harding grass
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Prunus sp.	plum
	Pseudognaphalium luteoalbum	Jersey cudweed
	Raphanus sativus	radish
	Rumex crispus	curly dock
	Rumex occidentalis	western dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus americanus	Olney's three-square bulrush
	Schoenoplectus californicus	southern bulrush
	Silybum marianum	blessed milkthistle
	Sonchus asper ssp. *asper*	prickly sow thistle
	Sonchus oleraceus	common sow thistle
	Trifolium dubium	little hop clover
	Trifolium subterraneum	subterranean clover
	Triglochin maritima	common arrow-grass
	Typha angustifolia	narrow-leaved cattail
	Veronica anagallis-aquatica	water speedwell
	Vicia sativa	garden vetch
	Vicia villosa	hairy vetch, winter vetch
6	*Artemisia douglasiana*	mugwort
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush
	Bidens frondosa	sticktight
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Briza minor	annual quaking grass, small quaking grass
	Bromus hordeaceus	soft chess
	Cirsium vulgare	bull thistle
	Conium maculatum	poison hemlock
	Cotula coronopifolia	brass-buttons
	Distichlis spicata	salt grass
	Elymus caput-medusae	medusa head
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Erigeron canadensis	horseweed
	Festuca bromoides	brome fescue

Transect	Species	Species common name
6 (cont.)	*Festuca myuros*	rattail sixweeks grass
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Isolepis cernua	low bulrush
	Jaumea carnosa	marsh jaumea
	Juncus bufonius var. *bufonius*	toad rush
	Juncus patens	spreading rush
	Lactuca serriola	prickly lettuce
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Quercus agrifolia	coast live oak, encina
	Raphanus sativus	radish
	Rubus armeniacus	Himalayan blackberry
	Rumex crispus	curly dock
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus californicus	southern bulrush
	Sonchus asper ssp. *asper*	prickly sow thistle
	Typha angustifolia	narrow-leaved cattail
	Veronica anagallis-aquatica	water speedwell
	Vicia sativa	garden vetch
	Xanthium strumarium	cocklebur
	Zeltnera muehlenbergii	Monterey centaury
7	*Acmispon americanus* var. *americanus*	American bird's-foot trefoil
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush

Transect	Species	Species common name
7 (cont.)	*Bromus hordeaceus*	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Carex lyngbyei	Lyngbye's sedge
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cynodon dactylon	Bermuda grass
	Cyperus eragrostis	tall flatsedge
	Distichlis spicata	salt grass
	Elymus triticoides	beardless wild rye
	Eucalyptus globulus	blue gum
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Hedera helix	English ivy
	Helminthotheca echioides	bristly ox-tongue
	Hirschfeldia incana	shortpod mustard
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Juglans hindsii	Northern California black walnut
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Olea europaea	olive
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Pleuropogon californicus	annual semaphoregrass
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Populus fremontii ssp. *fremontii*	Fremont cottonwood
	Raphanus sativus	radish
	Rosa californica	California rose
	Rumex crispus	curly dock
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Typha angustifolia	narrow-leaved cattail
	Ulmus americana	American elm
	Ulmus sp.	elm
	Vicia sativa	garden vetch

Transect	Species	Species common name
	Alisma triviale	northern water plantain
	Artemisia douglasiana	mugwort
	Atriplex prostrata	fat-hen
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Bromus madritensis	compact brome
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Cotula coronopifolia	brass-buttons
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus repens	quack grass
	Elymus triticoides	beardless wild rye
	Festuca bromoides	brome fescue
	Foeniculum vulgare	fennel
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
8	*Helminthotheca echioides*	bristly ox-tongue
	Hirschfeldia incana	shortpod mustard
	Hypochaeris radicata	rough cat's-ear
	Jaumea carnosa	marsh jaumea
	Juglans hindsii	Northern California black walnut
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Medicago polymorpha	California burclover
	Melilotus albus	white sweetclover
	Melilotus indicus	sourclover
	Phalaris aquatica	Harding grass
	Phalaris minor	littleseed canarygrass
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Raphanus sativus	radish
	Rumex crispus	curly dock
	Salicornia pacifica	Pacific swampfire
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus californicus	southern bulrush
	Sonchus asper ssp. *asper*	prickly sow thistle
	Ulmus americana	American elm

Transect	Species	Species common name
8 (cont).	*Veronica anagallis-aquatica*	water speedwell
9	*Agrostis gigantea*	redtop
	Alisma triviale	northern water plantain
	Artemisia douglasiana	mugwort
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Avena fatua	wild oat
	Baccharis pilularis	coyote brush
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Brassica nigra	black mustard
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle
	Conium maculatum	poison hemlock
	Cotula coronopifolia	brass-buttons
	Cyperus eragrostis	tall flatsedge
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus glaucus ssp. *glaucus*	blue wildrye
	Elymus triticoides	beardless wild rye
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Galium aparine	goose grass
	Helminthotheca echioides	bristly ox-tongue
	Hordeum brachyantherum	meadow barley
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Juglans hindsii	Northern California black walnut
	Lactuca serriola	prickly lettuce
	Lepidium latifolium	broadleaved pepperweed
	Lotus corniculatus	bird's-foot trefoil
	Ludwigia hexapetala	Uruguayan primrose-willow
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Melilotus sp.	sweetclover
	Mentha pulegium	pennyroyal
	Persicaria amphibia	water smartweed
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Plantago major	common plantain

Transect	Species	Species common name
9 (cont.)	*Polygonum aviculare*	knotweed, knotgrass
	Pseudognaphalium luteoalbum	Jersey cudweed
	Raphanus sativus	radish
	Rubus armeniacus	Himalayan blackberry
	Rumex crispus	curly dock
	Rumex occidentalis	western dock
	Rumex salicifolius	willow dock
	Ruppia maritima	widgeongrass
	Salicornia pacifica	Pacific swampfire
	Salix lasiolepis	arroyo willow
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus californicus	southern bulrush
	Sium suave	hemlock waterparsnip
	Sonchus asper ssp. *asper*	prickly sow thistle
	Typha angustifolia	narrow-leaved cattail
	Typha latifolia	broad-leaved cattail
	Veronica anagallis-aquatica	water speedwell
	Vicia sativa	garden vetch
	Xanthium strumarium	cocklebur
10A	*Acacia melanoxylon*	blackwood acacia
	Alisma triviale	northern water plantain
	Artemisia douglasiana	mugwort
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush
	Bromus diandrus	ripgut grass
	Bromus hordeaceus	soft chess
	Cichorium intybus	chicory
	Convolvulus arvensis	bindweed, orchard morning-glory
	Eleocharis parvula	small spikerush
	Elymus triticoides	beardless wild rye
	Epilobium ciliatum	fringed willowherb
	Erodium moschatum	musky stork's bill
	Eschscholzia californica	California poppy
	Festuca perennis	rye grass
	Foeniculum vulgare	fennel
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Grindelia stricta	Oregon gumweed
	Helminthotheca echioides	bristly ox-tongue

Transect	Species	Species common name
10A (cont.)	*Hirschfeldia incana*	shortpod mustard
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hordeum murinum	wall barley
	Juncus patens	spreading rush
	Kickxia elatine	sharpleaf cancerwort
	Lactuca serriola	prickly lettuce
	Lotus corniculatus	bird's-foot trefoil
	Malva nicaeensis	bull mallow
	Medicago polymorpha	California burclover
	Melica californica	California melic
	Plantago lanceolata	English plantain
	Prunus sp.	plum
	Quercus agrifolia	coast live oak, encina
	Rumex crispus	curly dock
	Salix lasiandra	Pacific willow
	Salix lasiolepis	arroyo willow
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus californicus	southern bulrush
	Stipa pulchra	purple needle grass
	Ulmus americana	American elm
	Vicia sativa	garden vetch
10B	*Acacia melanoxylon*	blackwood acacia
	Agrostis gigantea	redtop
	Apium graveolens	celery
	Artemisia douglasiana	mugwort
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis glutinosa	marsh baccharis
	Bidens frondosa	sticktight
	Bolboschoenus maritimus ssp. *paludosus*	saltmarsh bulrush, alkali bulrush
	Bromus carinatus	California brome
	Bromus diandrus	ripgut grass
	Cichorium intybus	chicory
	Elymus triticoides	beardless wild rye
	Festuca bromoides	brome fescue
	Festuca perennis	rye grass
	Galium aparine	goose grass
	Geranium dissectum	cutleaf geranium
	Helminthotheca echioides	bristly ox-tongue

Transect	Species	Species common name
10B (cont.)	*Hirschfeldia incana*	shortpod mustard
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley
	Hordeum murinum	wall barley
	Hypochaeris radicata	rough cat's-ear
	Lotus corniculatus	bird's-foot trefoil
	Lythrum hyssopifolia	hyssop loosestrife
	Malva nicaeensis	bull mallow
	Medicago polymorpha	California burclover
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Populus fremontii ssp. *fremontii*	Fremont cottonwood
	Quercus agrifolia	coast live oak, encina
	Raphanus sativus	radish
	Rubus armeniacus	Himalayan blackberry
	Rumex crispus	curly dock
	Rumex pulcher	fiddle dock
	Salicornia pacifica	Pacific swampfire
	Salix laevigata	red willow
	Salix lasiandra	Pacific willow
	Salix lasiolepis	arroyo willow
	Schoenoplectus acutus var. *occidentalis*	common tule
	Schoenoplectus californicus	southern bulrush
	Stipa pulchra	purple needle grass
	Veronica anagallis-aquatica	water speedwell
	Vicia sativa	garden vetch
	Vicia villosa	hairy vetch, winter vetch
11	*Ambrosia psilostachya*	western ragweed
	Atriplex prostrata	fat-hen
	Avena barbata	slender wild oat
	Baccharis pilularis	coyote brush
	Bromus diandrus	ripgut grass
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cyperus eragrostis	tall flatsedge
	Eleocharis parvula	small spikerush
	Epilobium ciliatum	fringed willowherb
	Erodium moschatum	musky stork's bill
	Foeniculum vulgare	fennel
	Grindelia stricta	Oregon gumweed

Transect	Species	Species common name
11 (cont.)	*Heteromeles arbutifolia*	toyon
	Hirschfeldia incana	shortpod mustard
	Juncus bufonius var. *bufonius*	toad rush
	Lepidium latifolium	broadleaved pepperweed
	Ludwigia hexapetala	Uruguayan primrose-willow
	Ludwigia sp.	primrose-willow
	Lythrum hyssopifolia	hyssop loosestrife
	Malva nicaeensis	bull mallow
	Medicago polymorpha	California burclover
	Melica californica	California melic
	Persicaria amphibia	water smartweed
	Plantago lanceolata	English plantain
	Polypogon monspeliensis	annual beard grass, rabbitfoot grass
	Rumex salicifolius	willow dock
	Ruppia maritima	widgeongrass
	Salix lasiolepis	arroyo willow
	Schoenoplectus californicus	southern bulrush
	Veronica anagallis-aquatica	water speedwell
	Veronica peregrina ssp. *xalapensis*	purslane speedwell
12	*Acmispon americanus* var. *americanus*	American bird's-foot trefoil
	Agrostis gigantea	redtop
	Anagallis arvensis	scarlet pimpernel
	Anthemis cotula	mayweed
	Artemisia douglasiana	mugwort
	Baccharis pilularis	coyote brush
	Bidens frondosa	sticktight
	Conium maculatum	poison hemlock
	Convolvulus arvensis	bindweed, orchard morning-glory
	Cotula coronopifolia	brass-buttons
	Cyperus eragrostis	tall flatsedge
	Datura stramonium	jimsonweed
	Distichlis spicata	salt grass
	Eleocharis parvula	small spikerush
	Elymus triticoides	beardless wild rye
	Festuca bromoides	brome fescue
	Foeniculum vulgare	fennel
	Frankenia salina	alkali heath
	Grindelia stricta	Oregon gumweed
	Hirschfeldia incana	shortpod mustard

Transect	Species	Species common name
12 (cont.)	*Hypochaeris radicata*	rough cat's-ear
	Juncus bufonius var. *bufonius*	toad rush
	Juncus mexicanus	mexican rush
	Lotus corniculatus	bird's-foot trefoil
	Ludwigia sp.	primrose-willow
	Lythrum hyssopifolia	hyssop loosestrife
	Medicago polymorpha	California burclover
	Melilotus albus	white sweetclover
	Mentha pulegium	pennyroyal
	Mimulus guttatus	seep monkeyflower
	Persicaria amphibia	water smartweed
	Phalaris aquatica	Harding grass
	Plantago lanceolata	English plantain
	Plantago major	common plantain
	Pseudognaphalium luteoalbum	Jersey cudweed
	Raphanus sativus	radish
	Salix lasiolepis	arroyo willow
	Schoenoplectus californicus	southern bulrush
	Verbascum blattaria	moth mullein
	Veronica anagallis-aquatica	water speedwell
	Vicia sativa	garden vetch
	Xanthium strumarium	cocklebur

Table F-3. Compiled woody forms.

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
1	*Baccharis pilularis*	3	12					Yes
		3	15					Yes
		4	15					Yes
		2	6				Yes	Yes
		1					Yes	Yes
		1					Yes	Yes
		3	10					Yes
	Quercus agrifolia	4					Yes	Yes
	Quercus lobata	1					Yes	Yes
		5		0.25			Yes	Yes
		30		9				Yes
2	*Baccharis pilularis*	5	22	2.75	0.125			Yes
		3	18					Yes
		5	4	1	0.25			Yes
		5	7	2.625	0.375			Yes
		7	16	8	0.5			Yes
		6	18	9	0.5			Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
2 (cont.)	*Baccharis pilularis*	0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		3	2					Yes
		3	100					Yes
		2	12				Yes	Yes
		4	2					Yes
		3	3					Yes
		4	30					Yes
		2	5				Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
		0.75					Yes	Yes
3	*Baccharis pilularis*	5	15	1.875	0.125			Yes
		6	15	3.75	0.25			Yes
		8	10	5	0.5			Yes
		8	12	6	0.5			Yes
		7	15	7.5	0.5			Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
3	*Baccharis pilularis*	8	18	9	0.5			Yes
		7	20	10	0.5			Yes
		7	20	10	0.5			Yes
		7	30	15	0.5			Yes
		6	8	4	0.5			Yes
		6		0.75				Yes
		10	16	32	2			Yes
		7	7	3.5	0.5			Yes
		5	12	3	0.25			Yes
		4	8					Yes
	Rosa californica	3	45					Yes
4	*Baccharis pilularis*	6	15	7.5	0.5			Yes
		8	40	40	1			Yes
		10	15	18.75	1.25			Yes
		2	12				Yes	Yes
		1					Yes	Yes
		1					Yes	Yes
		1					Yes	Yes
		4	30					Yes
		1					Yes	Yes
5	*Baccharis pilularis*	5	5	2.5	0.5			Yes
		3	5					Yes
		4	12					Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
5	*Baccharis pilularis*	7	1	0.5	0.5			Yes
		9	15	13.125	0.875			Yes
		7	20	10	0.5			Yes
		6	25	7.5	0.3			Yes
		7	40	10	0.25			Yes
		2	5				Yes	Yes
		7	5	2.5	0.5			Yes
	Baccharis glutinosa	4	100				Yes	Yes
6	*Baccharis pilularis*	7		1				Yes
		7		3				Yes
		7		5				Yes
		3	7					Yes
7	*Baccharis pilularis*	8	40	20	0.5			Yes
		3	8					Yes
	Eucalyptus globulus	16	9	13	1.4			No
	Olea europa	32		13				No
	Rosa californica	3						Yes
	Ulmus americana	6		0.75				No
		6		0.75				No
		6		0.75				No
		9		1				No
		15		1.5				No
		12		2				No

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
8	*Baccharis pilularis*	7	10	5	0.5			Yes
		2	12				Yes	Yes
		3	15					Yes
		8	15	7.5	0.5			Yes
		2	2				Yes	Yes
		6	4	2	0.5			Yes
		3	45					Yes
		6	8	6	0.75			Yes
9	*Baccharis pilularis*	5	15	5.625	0.375			Yes
		7	15	22.5	1.5			Yes
		8	16	12	0.75			Yes
		8	20	15	0.75			Yes
		9	20	20	1			Yes
		7	25	18.75	0.75			Yes
		8	30	22.5	0.75			Yes
		1					Yes	Yes
	Salix lasiolepis	2					Yes	Yes
11	*Heteromeles arbutifolia*	12	10	3	0.3			Yes
	Salix lasiolepis	2					Yes	Yes
		24	18	44	2.4			Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
12	*Baccharis pilularis*	3	18					Yes
		3	3					Yes
		3	5					Yes
		7	6	3	0.5			Yes
		12	7	10.5	1.5			Yes
	Salix lasiolepis	1					Yes	Yes
10a	*Acacia melanoxylon*	10		1			Yes	No
		20		3			Yes	No
		25		3			Yes	No
		35		4			Yes	No
		45		8			Yes	No
		30		10			Yes	No
	Baccharis pilularis	5	10	5	0.5			Yes
		4	15					Yes
		3	3					Yes
		2	5				Yes	Yes
		5	7	3.5	0.5			Yes
	Prunus sp.	3						No
		12		1				No
		15		2				No
		18		2				No
		28		8				No
	Quercus agrifolia	0.25					Yes	Yes
		8	3	3	1			Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
10a (cont.)	*Salix lasiandra*	17	25	25	1			Yes
		14	16	12	0.75			Yes
	Ulmus americana	7		0.25				No
10b	*Acacia melanoxylon*	2					Yes	No
		4					Yes	No
		2					Yes	No
		4					Yes	No
		10		0.75			Yes	No
		10		0.75			Yes	No
		26		7			Yes	No
		26		7			Yes	No
	Quercus agrifolia	30		16				Yes
2a	*Baccharis pilularis*	3	7					Yes
		3						Yes
	Quercus agrifolia	7		1.5				Yes
		3					Yes	Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
2a (cont.)	*Quercus lobata*	7		2				Yes
		15		3				Yes
		25		6				Yes
		25		6				Yes
		25		7				Yes
		30		8				Yes
		28		10				Yes
		4					Yes	Yes
		2					Yes	Yes
3e	*Acacia melanoxylon*	18		2.5			Yes	No
		30		5		Possibly one tree-branched at ground level	Yes	No
		25		7			Yes	No
		40		8			Yes	No
		35		9			Yes	No
		35		13			Yes	No
		45		15			Yes	No
	Genista monspessulana	4						No
4e	*Quercus agrifolia*	1					Yes	Yes
		15	5	12	2.4			Yes

Transect	Species	Height (ft)	Stem Count	DBH (inches)	Average diameter (in)	Notes	Recruit?	Native?
5a	*Baccharis pilularis*	2					Yes	Yes
		1					Yes	Yes
		4						Yes
		3	10					Yes
		4	10					Yes
		4	12					Yes
		6	20	12.5	0.625			Yes
		9	35	35	1			Yes
		2	8				Yes	Yes
		1					Yes	Yes
		1					Yes	Yes
		2					Yes	Yes

Appendix G

Species Present in the Study Area by Transect

Table G-1. Species present in the Study Area by transect.

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect													
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Acacia dealbata	silver wattle	Fabaceae	No	Yes	NL				X											
Acacia melanoxylon	blackwood acacia	Fabaceae	No	Yes	NL				X								X	X		
Achillea millefolium	common yarrow	Asteraceae	Yes	No	FACU		X													
Acmispon americanus var. *americanus*	American bird's-foot trefoil	Fabaceae	Yes	No	UPL							X		X						X
Agoseris retrorsa	spearleaf agoseris	Asteraceae	Yes	No	NL					X										
Agrostis gigantea	redtop	Poaceae	No	No	FACW	X	X			X						X		X		X
Alisma triviale	northern water plantain	Alismataceae	Yes	No	OBL	X	X								X	X	X			
Allium vineale	wild garlic	Alliaceae	No	Yes	FACU	X					X									
Ambrosia psilostachya	western ragweed	Asteraceae	Yes	No	FACU														X	
Ammi majus	large bullwort	Apiaceae	No	No	NL					X	X									
Anagallis arvensis	scarlet pimpernel	Myrsinaceae	No	No	FAC			X	X	X	X	X								X
Anthemis cotula	mayweed	Asteraceae	No	No	FACU															X
Apium graveolens	celery	Apiaceae	No	No	NL	X			X	X	X							X		
Artemisia douglasiana	mugwort	Asteraceae	Yes	No	FAC				X	X		X	X		X	X	X	X		X
Atriplex prostrata	fat-hen	Chenopodiaceae	Yes	No	FACW	X	X	X	X	X	X	X	X	X	X	X		X	X	
Avena barbata	slender wild oat	Poaceae	No	Yes	NL	X		X	X	X	X	X	X	X		X	X	X	X	
Avena fatua	wild oat	Poaceae	No	Yes	NL				X	X						X				
Baccharis glutinosa	marsh baccharis	Asteraceae	Yes	No	FACW						X							X		
Baccharis pilularis	coyote brush	Asteraceae	Yes	No	NL	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Bidens frondosa	sticktight	Asteraceae	Yes	No	FACW		X			X		X	X					X		X
Bolboschoenus maritimus subsp. *paludosus*	saltmarsh bulrush, alkali bulrush	Cyperaceae	Yes	No	OBL	X	X	X	X	X	X	X	X	X	X	X		X		
Brassica nigra	black mustard	Brassicaceae	No	Yes	NL	X										X				

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Briza minor	annual quaking grass, small quaking grass	Poaceae	No	No	FAC	X		X	X	X	X	X	X							
Bromus carinatus	California brome	Poaceae	Yes	No	NL													X		
Bromus diandrus	ripgut grass	Poaceae	No	Yes	NL	X		X	X	X	X	X			X	X	X	X	X	
Bromus hordeaceus	soft chess	Poaceae	No	Yes	FACU	X	X	X	X	X	X	X	X	X	X	X	X			
Bromus madritensis	compact brome	Poaceae	No	Yes	UPL	X									X					
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Asteraceae	No	Yes	NL	X		X	X	X	X	X		X	X	X				
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	Yes	No	OBL									X						
Centaurea solstitialis	yellow star-thistle	Asteraceae	No	Yes	NL	X														
Cichorium intybus	chicory	Asteraceae	No	No	FACU												X	X		
Cirsium vulgare	bull thistle	Asteraceae	No	Yes	FACU	X	X	X			X	X	X							
Conium maculatum	poison hemlock	Apiaceae	No	Yes	FACW			X	X	X			X			X				X
Convolvulus arvensis	bindweed, orchard morning-glory	Convolvulaceae	No	No	NL	X		X		X	X	X		X			X		X	X
Cotula coronopifolia	brass-buttons	Asteraceae	No	No	OBL	X	X	X	X	X	X	X	X		X	X				X
Cryptantha sp.	cryptantha	Boraginaceae	Yes	No	NA					X										
Cynodon dactylon	Bermuda grass	Poaceae	No	Yes	FACU							X		X						
Cyperus eragrostis	tall flatsedge	Cyperaceae	Yes	No	FACW		X			X		X		X		X			X	X
Datura stramonium	jimsonweed	Solanaceae	No	No	NL															X
Dipsacus fullonum	wild teasel	Dipsacaceae	No	Yes	FAC				X											
Distichlis spicata	salt grass	Poaceae	Yes	No	FAC	X	X	X	X	X	X	X	X	X	X	X				X
Dittrichia graveolens	stinkwort	Asteraceae	No	Yes	NL	X														
Eleocharis macrostachya	pale spikerush	Cyperaceae	Yes	No	OBL	X	X													
Eleocharis parvula	small spikerush	Cyperaceae	Yes	No	OBL	X	X	X	X	X	X	X			X	X	X		X	X

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Elymus caput-medusae	medusa head	Poaceae	No	Yes	NL			X			X	X	X							
Elymus glaucus subsp. *glaucus*	blue wildrye	Poaceae	Yes	No	FACU							X				X				
Elymus repens	quack grass	Poaceae	No	Yes	FAC	X									X					
Elymus triticoides	beardless wild rye	Poaceae	Yes	No	FAC	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Epilobium ciliatum	fringed willowherb	Onagraceae	Yes	No	FACW	X	X	X		X	X	X	X				X		X	
Erigeron canadensis	horseweed	Asteraceae	Yes	No	FACU								X							
Erodium botrys	longbeak stork's bill	Geraniaceae	No	No	FACU					X										
Erodium cicutarium	redstem stork's bill	Geraniaceae	No	No	NL	X														
Erodium moschatum	musky stork's bill	Geraniaceae	No	No	NL												X		X	
Eschscholzia californica	California poppy	Papaveraceae	Yes	No	NL			X									X			
Eucalyptus globulus	blue gum	Myrtaceae	No	Yes	NL	X								X						
Festuca arundinacea	tall fescue	Poaceae	No	Yes	FACU			X				X								
Festuca bromoides	brome fescue	Poaceae	No	No	FACU	X	X	X	X	X	X	X	X		X			X		X
Festuca myuros	rattail sixweeks grass	Poaceae	No	Yes	FACU			X					X							
Festuca perennis	rye grass	Poaceae	No	Yes	FAC			X	X	X	X	X	X	X		X	X	X		
Foeniculum vulgare	fennel	Apiaceae	No	Yes	NL	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Frankenia salina	alkali heath	Frankeniaceae	Yes	No	FACW		X	X	X	X	X	X	X							X
Galium aparine	goose grass	Rubiaceae	Yes	No	FACU	X		X	X	X		X		X	X	X	X	X		
Genista monspessulana	French broom	Fabaceae	No	Yes	NL				X											
Geranium dissectum	cutleaf geranium	Geraniaceae	No	No	NL	X	X	X	X	X	X	X	X	X	X		X	X		
Grindelia stricta	Oregon gumweed	Asteraceae	Yes	No	FACW	X	X	X	X	X	X	X	X	X	X		X		X	X

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Hainardia cylindrica	barbgrass	Poaceae	No	No	FACW					X										
Hedera helix	English ivy	Araliaceae	No	Yes	FACU									X						
Helminthotheca echioides	bristly ox-tongue	Asteraceae	No	No	FAC	X	X	X	X	X	X	X	X	X	X	X	X	X		
Heteromeles arbutifolia	toyon	Rosaceae	Yes	No	NL														X	
Hirschfeldia incana	shortpod mustard	Brassicaceae	No	Yes	NL	X		X						X	X		X	X	X	X
Hordeum brachyantherum	meadow barley	Poaceae	Yes	No	FACW	X		X	X	X	X	X	X			X				
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	Poaceae	No	Yes	NL	X	X	X	X	X	X	X	X	X		X	X	X		
Hordeum murinum	wall barley	Poaceae	No	Yes	FACU				X								X	X		
Hypochaeris radicata	rough cat's-ear	Asteraceae	No	Yes	FACU	X		X		X	X				X			X		X
Iris pseudacorus	paleyellow iris	Iridaceae	No	No	OBL							X								
Isolepis cernua	low bulrush	Cyperaceae	Yes	No	OBL								X							
Jaumea carnosa	marsh jaumea	Asteraceae	Yes	No	OBL	X	X	X	X	X	X	X	X		X					
Juglans hindsii	Northern California black walnut	Juglandaceae	Yes	No	FAC									X	X	X				
Juncus bufonius var. *bufonius*	toad rush	Juncaceae	Yes	No	FACW	X	X	X	X	X	X	X	X						X	X
Juncus mexicanus	mexican rush	Juncaceae	Yes	No	FACW	X	X		X	X	X	X								X
Juncus patens	spreading rush	Juncaceae	Yes	No	FACW	X				X		X	X				X			
Kickxia elatine	sharpleaf cancerwort	Plantaginaceae	No	No	UPL						X	X					X			
Lactuca serriola	prickly lettuce	Asteraceae	No	Yes	FACU	X		X		X	X	X	X			X	X			
Lamium amplexicaule	henbit deadnettle	Lamiaceae	No	No	NL						X									
Lathyrus latifolius	perennial sweet pea	Fabaceae	No	No	NL			X												
Lemna minuta	least duckweed	Araceae	Yes	No	OBL	X														

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Lepidium latifolium	broadleaved pepperweed	Brassicaceae	No	Yes	FAC	X	X	X	X	X	X	X	X	X	X	X			X	
Lotus corniculatus	bird's-foot trefoil	Fabaceae	No	No	FAC	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Ludwigia hexapetala	Uruguayan primrose-willow	Onagraceae	No	Yes	OBL											X			X	
Ludwigia sp.	primrose-willow	Onagraceae	No	No	NA														X	X
Lupinus bicolor	miniature lupine	Fabaceae	Yes	No	NL			X		X										
Lythrum hyssopifolia	hyssop loosestrife	Lythraceae	No	No	OBL	X	X	X	X	X	X	X	X	X		X		X	X	X
Malva nicaeensis	bull mallow	Malvaceae	No	Yes	NL				X								X	X	X	
Malvella leprosa	alkali-mallow, white-weed	Malvaceae	Yes	No	FACU	X	X													
Medicago polymorpha	California burclover	Fabaceae	No	No	FACU			X	X	X	X	X	X	X	X	X	X	X	X	X
Melica californica	California melic	Poaceae	Yes	No	NL												X		X	
Melilotus albus	white sweetclover	Fabaceae	No	Yes	FACU										X					X
Melilotus indicus	sourclover	Fabaceae	No	Yes	FACU					X					X					
Melilotus sp.	sweetclover	Fabaceae	No	No	NL											X				
Mentha pulegium	pennyroyal	Lamiaceae	No	Yes	OBL	X	X				X					X				X
Mentha spicata	spearmint	Lamiaceae	No	No	FACW				X											
Mimulus guttatus	seep monkeyflower	Phrymaceae	Yes	No	OBL															X
Olea europaea	olive	Oleaceae	No	No	NL									X						
Parentucellia viscosa	yellow glandweed	Orobanchaceae	No	No	FAC					X	X									
Persicaria amphibia	water smartweed	Polygonaceae	Yes	No	OBL					X	X					X			X	X
Phalaris aquatica	Harding grass	Poaceae	No	Yes	FACU	X	X	X	X	X	X	X	X	X	X	X		X		X
Phalaris minor	littleseed canarygrass	Poaceae	No	No	NL	X									X					
Plantago lanceolata	English plantain	Plantaginaceae	No	No	FAC	X		X	X	X	X		X	X		X	X	X	X	X
Plantago major	common plantain	Plantaginaceae	No	No	FAC											X				X

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Pleuropogon californicus	annual semaphoregrass	Poaceae	Yes	No	OBL		X							X						
Poa pratensis subsp. *pratensis*	Kentucky bluegrass	Poaceae	Yes	No	FAC				X											
Polygonum aviculare	knotweed, knotgrass	Polygonaceae	No	No	FAC	X			X							X				
Polypogon monspeliensis	annual beard grass, rabbitfoot grass	Poaceae	No	No	FACW	X	X		X	X	X	X	X	X	X			X	X	
Populus fremontii subsp. *fremontii*	Fremont cottonwood	Salicaceae	Yes	No	FAC									X				X		
Potentilla anserina	silverweed cinquefoil	Rosaceae	Yes	No	OBL				X											
Potentilla anserina subsp. *pacifica*	Pacific silverweed	Rosaceae	Yes	No	OBL	X														
Prunus sp.	plum	Rosaceae	No	No	NL							X					X			
Pseudognaphalium luteoalbum	Jersey cudweed	Asteraceae	No	No	FAC	X					X	X				X				X
Quercus agrifolia	coast live oak, encina	Fagaceae	Yes	No	NL	X		X		X			X				X	X		
Quercus douglasii	blue oak	Fagaceae	Yes	No	NL	X														
Quercus lobata	valley oak, roble	Fagaceae	Yes	No	FACU	X		X												
Ranunculus muricatus	spinyfruit buttercup	Ranunculaceae	No	No	FACW					X										
Raphanus sativus	radish	Brassicaceae	No	No	NL	X		X	X	X	X	X	X	X	X	X		X		X
Rosa californica	California rose	Rosaceae	Yes	No	FAC				X					X						
Rubus armeniacus	Himalayan blackberry	Rosaceae	No	Yes	FAC								X			X		X		
Rumex acetosella	sheep sorrel	Polygonaceae	No	Yes	FACU	X		X												
Rumex crispus	curly dock	Polygonaceae	No	No	FAC	X	X	X	X	X	X	X	X	X	X	X	X	X		
Rumex occidentalis	western dock	Polygonaceae	Yes	No	FACW							X				X				
Rumex pulcher	fiddle dock	Polygonaceae	No	No	FAC													X		
Rumex salicifolius	willow dock	Polygonaceae	Yes	No	FACW											X			X	

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Rumex transitorius	willow dock	Polygonaceae	Yes	No	FACW	X														
Ruppia maritima	widgeongrass	Ruppiaceae	Yes	No	OBL	X	X	X		X	X	X				X			X	
Salicornia pacifica	Pacific swampfire	Chenopodiaceae	Yes	No	OBL	X	X	X	X	X	X	X	X	X	X	X		X		
Salix laevigata	red willow	Salicaceae	Yes	No	FACW													X		
Salix lasiandra	Pacific willow	Salicaceae	Yes	No	FACW												X	X		
Salix lasiolepis	arroyo willow	Salicaceae	Yes	No	FACW											X	X	X	X	X
Salsola tragus	Russian thistle, tumbleweed	Chenopodiaceae	No	No	FACU	X														
Schoenoplectus acutus var. *occidentalis*	common tule	Cyperaceae	Yes	No	OBL	X			X	X	X	X	X	X	X	X	X	X		
Schoenoplectus americanus	Olney's three-square bulrush	Cyperaceae	Yes	No	OBL	X			X		X	X								
Schoenoplectus californicus	southern bulrush	Cyperaceae	Yes	No	OBL	X	X		X	X	X	X	X		X	X	X	X	X	X
Senecio hydrophilus	water ragwort, alkali-marsh ragwort	Asteraceae	Yes	No	OBL				X											
Senecio vulgaris	common groundsel	Asteraceae	No	No	FACU					X										
Silybum marianum	blessed milkthistle	Asteraceae	No	No	NL							X								
Sium suave	hemlock waterparsnip	Apiaceae	Yes	No	OBL											X				
Sonchus asper subsp. *asper*	prickly sow thistle	Asteraceae	No	No	NL	X	X	X	X	X	X	X	X		X	X				
Sonchus oleraceus	common sow thistle	Asteraceae	No	No	UPL				X		X	X								
Spergula arvensis	stickwort, starwort	Caryophyllaceae	No	No	NL	X														
Spergularia marina	saltmarsh sand-spurrey	Caryophyllaceae	Yes	No	OBL	X														

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect														
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Stipa pulchra	purple needle grass	Poaceae	Yes	No	NL		X			X	X						X	X		
Trifolium dubium	little hop clover	Fabaceae	No	No	UPL					X	X	X								
Trifolium glomeratum	clustered clover	Fabaceae	No	No	NL	X		X												
Trifolium hirtum	rose clover	Fabaceae	No	No	NL	X					X									
Trifolium repens	white clover	Fabaceae	No	No	FACU					X										
Trifolium subterraneum	subterranean clover	Fabaceae	No	No	NL					X	X	X								
Triglochin maritima	common arrow-grass	Juncaginaceae	Yes	No	OBL	X	X		X	X	X	X								
Triglochin scilloides	flowering-quillwort	Juncaginaceae	Yes	No	OBL			X	X	X										
Typha angustifolia	narrow-leaved cattail	Typhaceae	No	Yes	OBL	X	X	X	X	X	X	X	X	X		X				
Typha latifolia	broad-leaved cattail	Typhaceae	Yes	No	OBL				X	X	X					X				
Ulmus americana	American elm	Ulmaceae	Yes	No	FAC									X	X		X			
Ulmus sp.	elm	Ulmaceae	No	No	NL									X						
Verbascum blattaria	moth mullein	Scrophulariaceae	No	No	UPL															X
Veronica anagallis-aquatica	water speedwell	Plantaginaceae	Yes	No	OBL	X						X	X		X	X		X	X	X
Veronica peregrina subsp. *xalapensis*	purslane speedwell	Plantaginaceae	Yes	No	FAC														X	
Vicia sativa	garden vetch	Fabaceae	No	No	FACU	X	X	X	X	X	X	X	X	X		X	X	X		X
Vicia villosa	hairy vetch, winter vetch	Fabaceae	No	No	NL			X	X	X	X	X						X		
Xanthium strumarium	cocklebur	Asteraceae	Yes	No	FAC	X	X						X			X				X

Scientific name	Common name	Family	Native?	Pest plant?	Indicator status[1] (AW)	Transect													
						1	2	2A	3	4	5	5A	6	7	8	9	10A	10B	11	12
Zeltnera muehlenbergii	Monterey centaury	Gentianaceae	Yes	No	FAC					X			X							

[1] Wetland indicator status from the 2012 national list of plant species that occur in wetlands for Region 0, Arid West (Lichvar and Kartesz 2009):
OBL = obligate
FACW = facultative wet
FAC = facultative
FACU = facultative upland
NL= not listed
N/A = not applicable as the indicator status cannot be determined at the genus level

Appendix H

Summary of Relative Percent Cover, Habitat Type, and Salinity for all Plots

Table H-1. Monitoring plot relative percent cover values, habitat type, and water salinity measurements.

Transect		Plot																			Average
		1	1A	2	2A	3	3B	4	5	6	7	8	8A	9	10	10A	11	12	13	14	15	
1 E	Percent Cover	78																				78
	Habitat Type	BM																				
	Salinity																					
1 W	Percent Cover	53		100		100		100	97	100	94	100		100	100							94
	Habitat Type	BM		Rip		N-NG		N-NG	N-NG	N-NG	N-NG	N-NG		N-NG	N-NG							
	Salinity																					
2 W	Percent Cover	5		31	10	2		9	13	16	68	100		100		90	0	35	I	50	100	42
	Habitat Type	M		M	M	M		M	M	M	BM	BM		BM		BM	M	M	SEW	SEW	N-NG	
	Salinity	5		5	5	5		5	5	5		1		1						1		
2A W	Percent Cover	78	100	60		45		I	I	I	I	I		41	41		100	100				71
	Habitat Type	BM	NG	M		M		M	M	M	M	M		M	M		W	W				
	Salinity	1		1										3	3							
3 E	Percent Cover	90																				90
	Habitat Type	Rip																				
	Salinity																					
3 W	Percent Cover	6	100	20	5	I	100	I	I	I	41	41		41	100							50
	Habitat Type	BM	BM	M	M	M	BM	M	M	M	M	M		M	BM							
	Salinity	5		5	5						1	1		1	1							

Transect		Plot																			Average
		1	**1A**	**2**	**2A**	**3**	**3B**	**4**	**5**	**6**	**7**	**8**	**8A**	**9**	**10**	**10A**	**11**	**12**	**13**	**14**	**15**	
4 E	Percent Cover	100		68		90		100													90
	Habitat Type	N-NG		N-NG		N-NG		N-NG													
	Salinity																				
4 W	Percent Cover	100	89	76	97	100		100	6	85	100	11		11	100						73
	Habitat Type	N-NG	N-NG	N-NG	BM	BM		BM	M	BM	BM	M		M	BM						
	Salinity					2		3				1		1							
5 E	Percent Cover	86		30		75		72	100												73
	Habitat Type	NG		BM		BM		BM	N-NG												
	Salinity			2																	
5 W	Percent Cover	100		100		77		100	100	100	32	I		100	100		100	100	29		87
	Habitat Type	NG		N-NG		BM		BM	BM	BM	BM	M		N-NG	N-NG		N-NG	BM	M		
	Salinity							1	1		4	4						2			
5A E	Percent Cover	100		71		100		94	78	73	93	52		89	94						84
	Habitat Type	NG		BM		NG		BM	BM	BM	BM	BM		BM	BM						
	Salinity											3									
5A W	Percent Cover	100	100	100	0	60		100	73	50	58	58	60	100	100		100	100	100		79
	Habitat Type	NG	W	NG	SEW	BM		BM	BM	BM	BM	BM	BM	N-NG	N-NG		NG	N-NG	NG		
	Salinity				3	3		1		2	1	1									

Transect		Plot																			Average
		1	**1A**	**2**	**2A**	**3**	**3B**	**4**	**5**	**6**	**7**	**8**	**8A**	**9**	**10**	**10A**	**11**	**12**	**13**	**14**	**15**	
6 E	Percent Cover	100		100		95		66	90	86	82	88		78	89							87
	Habitat Type	NG		NG		BM		NG	BM	BM	BM	BM		BM	BM							
	Salinity																					
6 W	Percent Cover	82		100		100		100	100	100	100	100		100	100							98
	Habitat Type	BM		NG		NG		NG	NG	NG	NG	NG		NG	NG							
	Salinity																					
7 E	Percent Cover	100		82		58		100	100	83	100	92		71								87
	Habitat Type	Rip		N-NG		SEW		NG	SEW	N-NG	SEW	N-NG		N-NG								
	Salinity																					
7 W	Percent Cover	100																				100
	Habitat Type	Rip																				
	Salinity																					
8 E	Percent Cover	43		100		100		51	100	100	100											85
	Habitat Type	BM		N-NG		N-NG		SEW	N-NG	N-NG	N-NG											
	Salinity																					
8 W	Percent Cover	62																				62
	Habitat Type	Rip																				
	Salinity																					

Transect		Plot																				Average
		1	**1A**	**2**	**2A**	**3**	**3B**	**4**	**5**	**6**	**7**	**8**	**8A**	**9**	**10**	**10A**	**11**	**12**	**13**	**14**	**15**	
9 E	Percent Cover	66		95		100		76	100													87
	Habitat Type	BM		BM		N-NG		N-NG	N-NG													
	Salinity																					
9 W	Percent Cover	0		63																		32
	Habitat Type	OW		BM																		
	Salinity	1																				
10A E	Percent Cover	5		92		100		97	100													79
	Habitat Type	M		BM		Rip		Rip	Rip													
	Salinity	0																				
10A W	Percent Cover	100																				100
	Habitat Type	Rip																				
	Salinity																					
10B E	Percent Cover	0		35		94		94	100													65
	Habitat Type	M		BM		Rip		N-NG	Rip													
	Salinity	0																				
10B W	Percent Cover	100																				100
	Habitat Type	Rip																				
	Salinity																					

Transect		Plot																				Average
		1	**1A**	**2**	**2A**	**3**	**3B**	**4**	**5**	**6**	**7**	**8**	**8A**	**9**	**10**	**10A**	**11**	**12**	**13**	**14**	**15**	
11 E	Percent Cover	14		96		75		100														71
	Habitat Type	OW		BM		Rip		Rip														
	Salinity																					
11 W	Percent Cover	0		87																		44
	Habitat Type	OW		BM																		
	Salinity	0																				
12 E	Percent Cover	35		48																		42
	Habitat Type	M		Rip																		
	Salinity																					
12 W	Percent Cover	37		51		0																29
	Habitat Type	BM		M		OW																
	Salinity																					

Appendix I

Average Percent Relative Cover and Frequency for all Species

Table I-1. Average percent relative cover and frequency by species.

Species name (Synonym in Hickman [1993])	Transect 1		Transect 2		Transect 2A		Transect 3		Transect 4		Transect 5		Transect 5A		Transect 6		Transect 7		Transect 8		Transect 9		Transect 11		Transect 10A		Transect 10B		Transect 12		All transects
	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Freq.
Acacia melanoxylon							7.07%	7.41%																	8.97%	16.67%	9.65%	16.67%			1.65%
Acmispon americanus var. *americanus*																	0.16%	10.00%													0.55%
Agrostis gigantea																													4.85%	20.00%	0.55%
Alisma triviale	0.18%	9.09%	6.25%	6.25%																	1.41%	14.29%			0.81%	16.67%					2.20%
Ambrosia psilostachya																							4.17%	16.67%							0.55%
Artemisia douglasiana																													1.82%	20.00%	0.55%
Atriplex prostrata	0.53%	9.09%	0.06%	6.25%					2.98%	12.50%	0.17%	5.56%	0.24%	7.69%	0.29%	15.00%															5.49%
Avena barbata	0.30%	9.09%									0.09%	5.56%					0.97%	10.00%	1.22%	12.50%					1.22%	33.33%	8.93%	33.33%			4.40%
Baccharis pilularis													1.04%	7.69%	2.65%	5.00%			4.63%	25.00%									2.42%	20.00%	3.30%
Bolboschoenus maritimus s sp. *paludosus*			1.04%	6.25%			6.58%	14.29%	0.41%	12.50%	2.33%	22.22%	1.18%	23.08%	0.28%	5.00%			6.66%	25.00%	2.70%	28.57%									10.99%
Briza minor	0.53%	27.27%							0.22%	12.50%	0.13%	5.56%																			3.30%
Bromus diandrus	3.73%	9.09%									0.66%	16.67%	1.37%	3.85%					0.98%	12.50%			7.58%	16.67%	6.48%	16.67%	1.06%	33.33%			5.49%
Bromus hordeaceus	1.81%	54.55%			0.22%	15.38%			0.62%	18.75%	1.19%	16.67%	0.47%	19.23%	0.32%	15.00%			1.55%	25.00%	1.47%	14.29%									13.74%
Carduus pycnocephalus ssp. *pycnocephalus*	0.45%	9.09%									3.19%	5.56%	1.40%	7.69%			0.52%	20.00%													3.30%
Carex lyngbyei																	8.56%	10.00%													0.55%
Centaurea solstitialis	1.49%	9.09%																													0.55%
Cichorium intybus																			0.61%	12.50%											0.55%
Conium maculatum									0.69%	6.25%																					0.55%
Convolvulus arvensis					0.37%	7.69%					0.24%	11.11%					0.53%	10.00%							0.93%	16.67%					2.75%
Cotula coronopifolia	0.89%	9.09%			6.49%	7.69%													0.69%	12.50%											1.65%
Cyperus eragrostis																							2.63%	16.67%					4.38%	20.00%	1.10%
Distichlis spicata			3.35%	25.00%	6.53%	7.69%			2.39%	25.00%	1.94%	11.11%	1.52%	30.77%	1.57%	10.00%	3.13%	10.00%			8.57%	14.29%									12.64%
Eleocharis parvula			4.65%	43.75%	6.32%	38.46%	7.06%	42.86%	6.25%	6.25%									0.61%	12.50%					6.67%	16.67%					11.54%
Elymus caput-medusae					5.78%	15.38%									0.52%	15.00%															2.75%
Elymus glaucus ssp. *glaucus*													3.85%	3.85%											0.50%	16.67%					1.10%
Elymus repens																			0.76%	12.50%											0.55%
Elymus triticoides					1.16%	7.69%			4.46%	6.25%	1.02%	11.11%	0.49%	23.08%	1.29%	35.00%	5.19%	30.00%							1.36%	33.33%	0.92%	33.33%			13.19%
Festuca arundinacea													0.12%	3.85%																	0.55%
Festuca bromoides	1.75%	72.73%			2.93%	7.69%			0.85%	6.25%	0.96%	33.33%	0.81%	30.77%	1.09%	40.00%	2.82%	30.00%	1.02%	25.00%							3.97%	33.33%	0.61%	20.00%	21.98%
Festuca perennis	3.66%	81.82%			0.08%	7.69%			2.77%	12.50%	1.91%	27.78%	1.40%	23.08%	1.33%	60.00%	2.57%	40.00%	1.66%	25.00%	8.90%	42.86%									24.18%
Foeniculum vulgare											0.14%	5.56%	0.50%	3.85%					9.91%	12.50%									2.99%	40.00%	2.75%
Frankenia salina															1.92%	5.00%													4.10%	20.00%	1.10%
Galium aparine	0.41%	9.09%															0.54%	10.00%									2.11%	16.67%			1.65%
Gallium aperene																							1.52%	16.67%							0.55%

Species name (Synonym in Hickman [1993])	Transect 1		Transect 2		Transect 2A		Transect 3		Transect 4		Transect 5		Transect 5A		Transect 6		Transect 7		Transect 8		Transect 9		Transect 11		Transect 10A		Transect 10B		Transect 12		All transects
	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Freq.
Geranium dissectum									0.23%	6.25%	0.53%	27.78%	0.12%	30.77%	0.32%	15.00%	0.43%	20.00%												10.44%
Grindelia stricta	1.91%	9.09%	3.75%	6.25%									0.04%	3.85%	0.29%	5.00%							5.26%	16.67%					3.13%	20.00%	3.30%
Hedera helix																	6.64%	10.00%													0.55%
Helminthotheca echioides			3.79%	6.25%							0.82%	5.56%			1.51%	10.00%	5.79%	30.00%			0.82%	28.57%									4.95%
Hirschfeldia incana																													10.59%	20.00%	0.55%
Hordeum brachyantherum	0.27%	9.09%									0.23%	5.56%	0.67%	3.85%	0.85%	20.00%															3.85%
Hordeum marinum ssp. *gussoneanum*	1.40%	36.36%									0.88%	16.67%	0.20%	11.54%	0.40%	15.00%	0.27%	10.00%			1.28%	14.29%			12.68%	16.67%					8.79%
Hordeum murinum																											4.39%	16.67%			0.55%
Hypochaeris radicata																			0.49%	12.50%							1.19%	16.67%			1.10%
Jaumea carnosa			1.04%	6.25%					3.02%	18.75%			0.70%	26.92%	3.89%	5.00%															6.59%
Juglans hindsii																			11.65%	12.50%											0.55%
Juncus bufonius															1.67%	5.00%													1.25%	20.00%	1.10%
Juncus mexicanus			0.57%	6.25%																											0.55%
Juncus patens													0.09%	3.85%	1.38%	5.00%									10.75%	16.67%					1.65%
Lactuca serriola	0.08%	9.09%											0.22%	3.85%																	1.10%
Lepidium latifolium	7.18%	9.09%	0.26%	6.25%			0.65%	7.14%	1.28%	12.50%	0.19%	5.56%	0.13%	7.69%																	4.40%
Lotus corniculatus	0.36%	27.27%	0.13%	6.25%					0.23%	12.50%	0.37%	11.11%	0.94%	15.38%	0.41%	30.00%					2.67%	28.57%			3.83%	33.33%	1.59%	16.67%			12.64%
Lythrum hyssopifolia	0.63%	18.18%	0.51%	6.25%									0.50%	7.69%	0.49%	25.00%													2.50%	20.00%	6.04%
Medicago polymorpha											0.16%	5.56%			0.60%	5.00%	1.44%	10.00%	2.94%	12.50%	1.83%	14.29%							5.13%	20.00%	3.30%
Melica californica																									3.47%	16.67%					0.55%
Melilitus albus																													6.15%	20.00%	0.55%
Melilotus albus																													6.47%	20.00%	0.55%
Mentha spicata											1.41%	5.56%																			0.55%
Olea europaea																	2.80%	10.00%													0.55%
Persicaria amphibia																							2.56%	16.67%							0.55%
Phalaris aquatica	1.63%	27.27%	1.89%	6.25%					1.49%	6.25%	2.50%	5.56%			3.38%	10.00%	1.14%	40.00%	7.59%	37.50%							0.99%	16.67%			8.79%
Phalaris minor																			4.41%	12.50%											0.55%
Plantago lanceolata																													2.91%	40.00%	1.10%
Polygonum aviculare							7.14%	7.14%													4.59%	14.29%									1.10%
Polypogon monspeliensis	1.54%	27.27%	0.13%	6.25%					1.74%	6.25%	0.78%	5.56%	0.14%	7.69%	0.26%	20.00%	4.51%	20.00%	0.69%	12.50%			4.39%	16.67%							8.79%
Quercus agrifolia																									1.39%	16.67%	7.95%	33.33%			1.65%
Ranunculus muricatus									0.12%	6.25%																					0.55%
Raphanus sativus	0.41%	9.09%							3.34%	18.75%	0.16%	5.56%	0.35%	7.69%	0.10%	10.00%	0.72%	10.00%	0.68%	12.50%											6.04%
Rubus armeniacus																											0.51%	16.67%			0.55%
Rumex acetosella	1.75%	9.09%																													0.55%
Rumex crispus									0.69%	6.25%					0.39%	10.00%	3.15%	20.00%													2.75%

Species name (Synonym in Hickman [1993])	Transect 1		Transect 2		Transect 2A		Transect 3		Transect 4		Transect 5		Transect 5A		Transect 6		Transect 7		Transect 8		Transect 9		Transect 11		Transect 10A		Transect 10B		Transect 12		All transects
	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Cover	Freq.	Freq.
Rumex occidentalis													0.05%	3.85%																	0.55%
Rumex salicifolius																							2.63%	16.67%							0.55%
Ruppia maritima			2.91%	37.50%					5.68%	12.50%																					4.40%
Salicornia pacifica			1.23%	18.75%			6.49%	7.14%	4.07%	12.50%	4.14%	22.22%	1.82%	50.00%	2.87%	40.00%			4.39%	25.00%	2.29%	14.29%									18.68%
Salix lasiandra																									3.80%	16.67%					0.55%
Salix lasiolepis																							10.79%	50.00%	7.43%	16.67%	0.60%	16.67%	6.06%	20.00%	3.30%
Schoenoplectus acutus var. *occidentalis*																			0.85%	12.50%	12.32%	14.29%									1.10%
Schoenoplectus americanus											5.56%	5.56%	1.07%	3.85%																	1.10%
Schoenoplectus californicus									2.68%	6.25%	2.20%	11.11%									12.88%	14.29%	4.39%	16.67%			16.67%	16.67%	5.63%	20.00%	3.85%
Silybum marianum													0.44%	3.85%																	0.55%
Sonchus asper ssp. *asper*			1.00%	6.25%					0.32%	6.25%	0.32%	5.56%			0.24%	15.00%															3.30%
Spergula arvensis	3.57%	9.09%																													0.55%
Stipa pulchra											0.36%	5.56%													3.30%	16.67%					1.10%
Trifolium subterraneum									1.49%	12.50%			0.98%	11.54%																	2.75%
Triglochin maritima									4.90%	6.25%																					0.55%
Triglochin scilloides					0.19%	15.38%	0.17%	21.43%	0.57%	12.50%																					3.85%
Typha angustifolia							1.13%	7.14%	2.10%	12.50%	4.68%	16.67%	1.75%	7.69%																	4.40%
Ulmus americana																									7.69%	16.67%					0.55%
Ulmus sp.																	0.56%	10.00%													0.55%
Veronica anagallis-aquatica																			0.91%	12.50%			7.93%	33.33%	10.00%	16.67%			3.13%	20.00%	2.75%
Vicia sativa									0.35%	6.25%	0.28%	11.11%	0.11%	11.54%	0.38%	15.00%	0.21%	10.00%							2.31%	16.67%					6.04%
Vicia villosa											0.12%	5.56%																			0.55%