THIRD ANNUAL RESTORATION MONITORING REPORT (YEAR 3)

SOUZA II RESTORATION PROJECT
CONTRA COSTA COUNTY, CALIFORNIA

Prepared for

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Section 1. INTRODUCTION

1.1. SUMMARY

The East Contra Costa County Habitat Conservancy (Conservancy), in partnership with the East Bay Regional Park District (District), implemented the 94-acre Souza II Restoration Project. The 190-acre Souza II parcel was acquired by the District with support from the Conservancy. The Souza II acquisition and the restoration project were initiated as a component of the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) (Jones and Stokes 2006). This Plan provides regional conservation and development guidelines to protect natural resources while improving and streamlining the permit process for endangered species and wetland regulations. A critical component of the HCP/NCCP is the implementation of the conservation strategy, which provides for the creation of a preserve system that will protect land for the benefit of covered species, natural communities, biological diversity, and ecosystem function and compensate for habitat loss by restoring or creating specific habitats and land cover types.

The restoration project was completed in fall/winter of 2009 as outlined in the *Souza II Restoration Project Restoration Management Plan* (Restoration Management Plan; Jones and Stokes 2009). Additional plantings occurred in November 2011. Additional fairy shrimp inoculum was added to the southern wetland in September 2011.

This report provides the results of Year 3 restoration monitoring conducted in 2012 which was carried out as detailed in the Restoration Management Plan (Jones and Stokes 2009). Results of Year 1 and Year 2 restoration monitoring activities are detailed in the *First* and *Second Annual Monitoring Report, Souza II Restoration Project, Contra Costa County, CA* (Nomad 2010, 2011). This report provides a summary of the restoration project; monitoring requirements, timing, and methodology; performance standards; monitoring results; and recommendations.

1.2. SETTING

The 94-acre Souza II Restoration Project (project area) is located in southeastern Contra Costa County (Figure 1), approximately two miles from the town of Byron. The project area is near the Byron Airport, and bound on the west by Vasco Road, and on the north and east by Armstrong Road. The project area can be accessed from Armstrong Road via Byron Hot Springs Road. As recorded in the public land survey system, the project area lies within Township 1, Range 3 East, Section 21 of the Byron Hot Springs (37121g6) 7.5-minute U.S. Geological Survey (USGS) quadrangle.

The project area is located on the eastern edge of the Diablo Range near the San Joaquin County border, and lies approximately 16 miles southeast of Mount Diablo. It is located within the boundaries of the San Joaquin Valley subregions of the California Floristic Province and within the Brushy Creek watershed. The Brushy Creek Watershed drains eastward from the Byron Hills to the Clifton Court Forebay, a reservoir along the San Joaquin River.

The project area is situated between two existing park/open space areas – Byron Airport's Habitat Management Lands (adjacent to the Souza II parcel, just to the east), and the Martin Acquisition (immediately west). Private properties in the immediate vicinity are mainly large holdings (approximately 80 to 2,000 acres in size) dominated by annual grasslands, only a few of which have been improved with homesteads and structures (Jones and Stokes 2009). The entire parcel is designated as a high acquisition priority in the HCP/NCCP in Acquisition Analysis Zone 5a (Jones and Stokes 2006).

Cattle ranching was the primary historical land use on the parcel and surrounding area. Based on a historical ecology analysis prepared by Grossinger and Askevold (2008 in Jones and Stokes 2009), the parcel was historically a diffuse, seasonally flooded drainage system with alkali wetlands, perhaps vernal pool/swale features, and a discontinuous channel. The parcel probably had a high degree of topographic variability with shallow channels or sloughs and perhaps larger bodies of persistent surface water. It appears that this system was converted to a relatively straight artificial channel in the early 20th Century, presumably to improve drainage characteristics (Grossinger and Askevold 2008 in Jones and Stokes 2009).

The project area is relatively flat, ranging in elevation from approximately 75 feet in its lowlands to 200 feet in the gently sloping hills and ridges to the south. An unnamed intermittent tributary to Brushy Creek with seasonally continuous flow is the dominant hydrological feature in the study area. The unnamed tributary of Brushy Creek bisects the project area, flowing from west to east for approximately 2,700 linear feet. It flows eastward from the project area under Armstrong Road to the adjacent Byron Airport Habitat Management Lands. It then converges with Brushy Creek east of the parcel, which eventually reaches the Clifton Court Forebay (Jones and Stokes 2009).

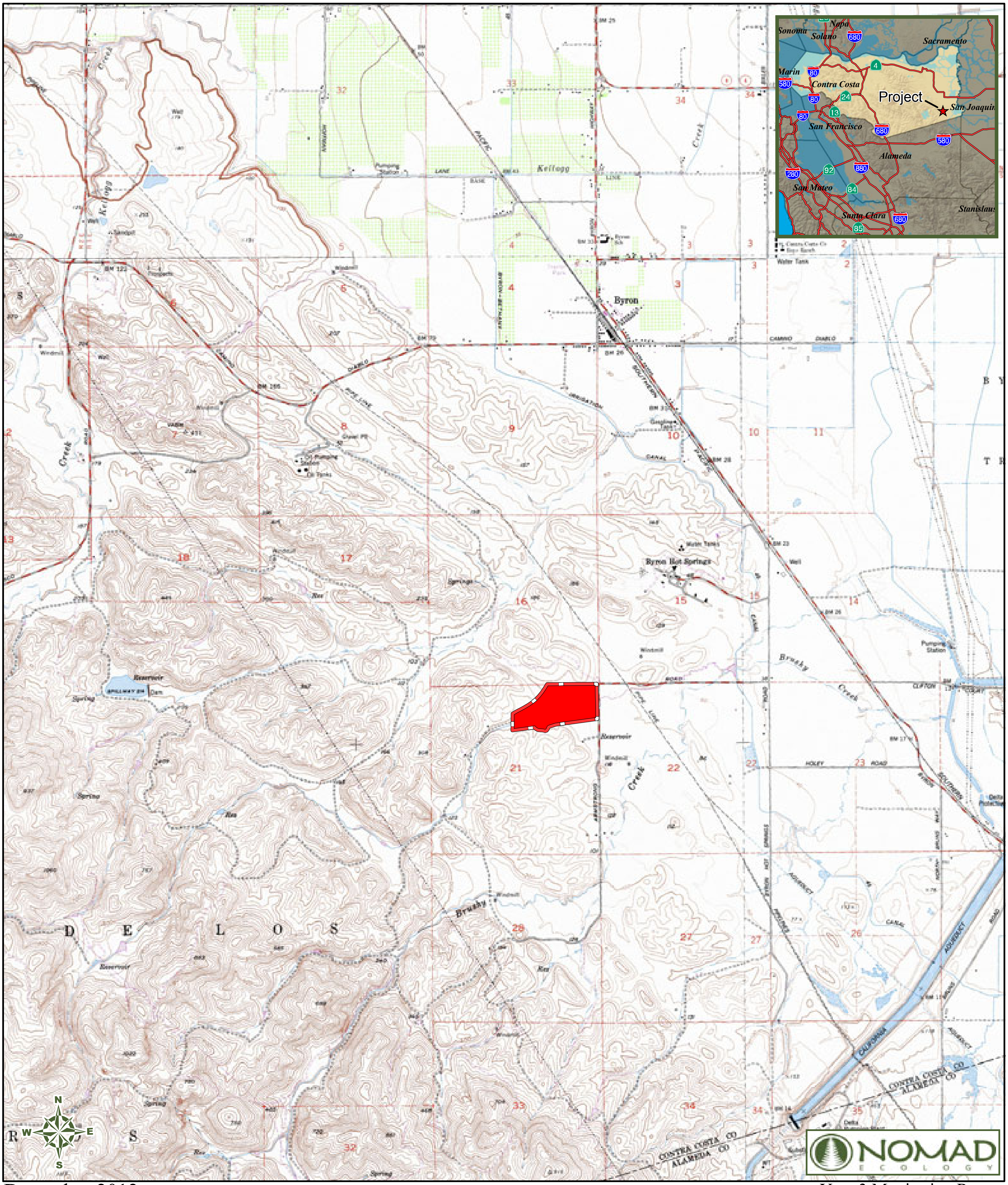
1.3. RESTORATION SUMMARY

The restoration project includes the unnamed tributary to Brushy Creek. The banks of the Brushy Creek tributary were stabilized and additional seasonal wetlands were restored in association with the tributary (Figure 2). Channel banks were sloped in a manner to promote onsite flooding, and seeded with native grass species (Figure 2). The berms north and south of the tributary were removed to increase tributary connectivity with the adjacent wetlands and floodplain. Rock weirs were installed in the tributary to increase structural diversity and provide ponding for California red-legged frog. Additionally, a 0.18-acre pond was created south of the channel to provide breeding habitat for California tiger salamander. The pond may also provide aquatic habitat for California red-legged frog, although it will not necessarily hold water for a sufficient period to support a breeding California red-legged frog subpopulation. An existing dirt road was retired, and restored to wetland habitat in the wetland portions (including removal of a culvert from the Brushy Creek tributary), and seeded with native grasses in the upland portions.

The planting plan included planting wetland, emergent wetland, and wetland transition plants and seeding with native grassland and sterile erosion control mix species (Figure 2). The restoration project components including construction specifications, grading plans, and planting plans are detailed in the Restoration Management Plan (Jones and Stokes 2009).

Approximately 100 additional plantings were installed in the created wetlands in November 2011 and included 100 saltgrass (*Distichlis spicata*), 20 Mexican rush (*Juncus mexicanus*), and 20 saltmarsh bulrush (*Bolboshoenus maritimus*). Approximately 200 saltgrass were planted along the banks of the tributary. Saltgrass and saltmarsh bulrush were transplanted from the site. Mexican rush was transplanted from Vaquero Farms.

Additional soil salvaged from the Deer Valley Road widening project was placed in the southern wetland, which is the large wetland south of the creek, in September 2012, with the intent to transfer vernal pool fairy shrimp to that wetland. No vernal pool fairy shrimp have been detected in this wetland, even though it has been inoculated twice.



December 2012

Year 3 Monitoring Report

Legend

Project Boundary

Figure 1

Location of the Project Boundary

Souza II Restoration Project

Contra Costa County Department of Conservation and Development

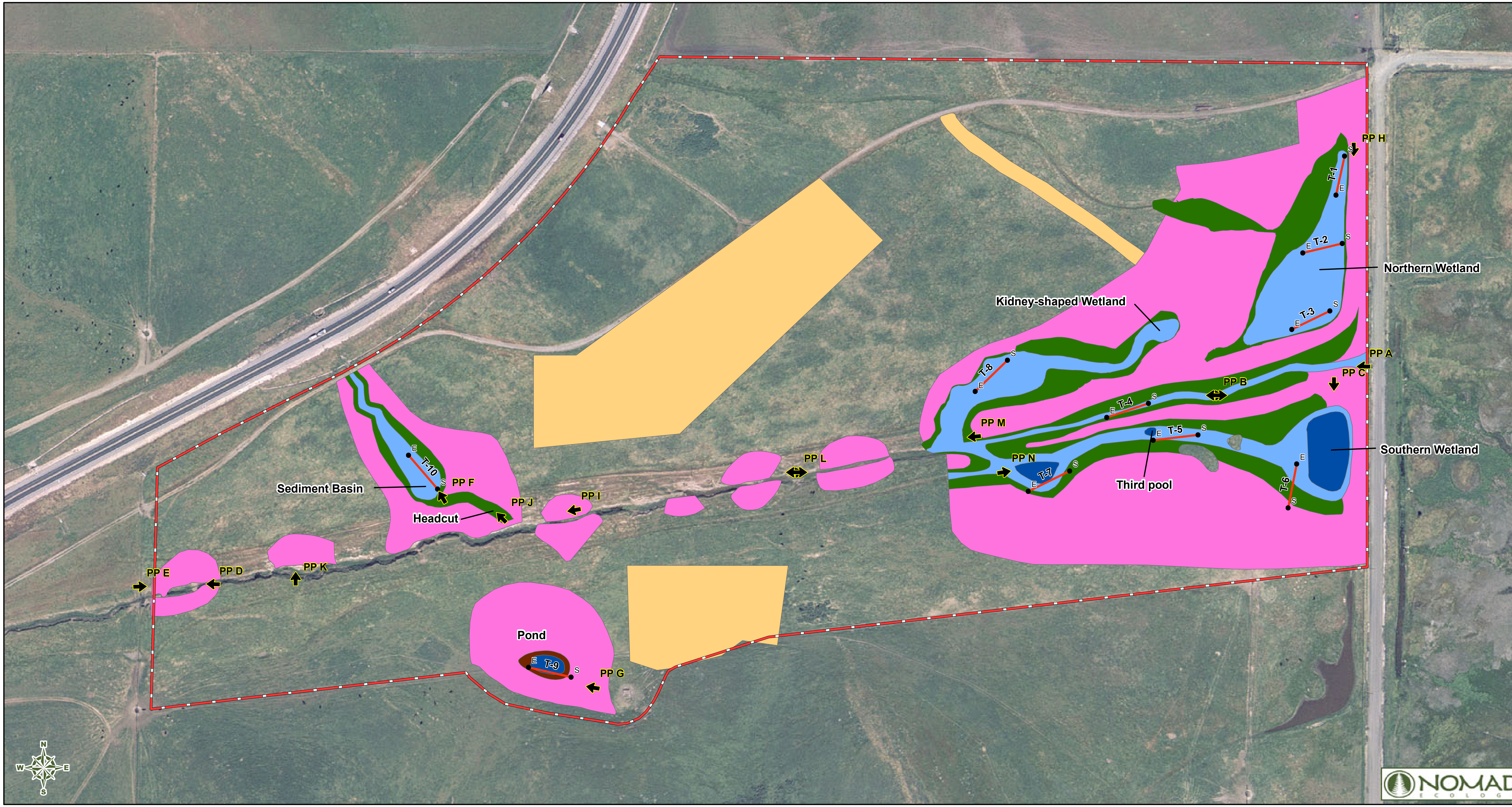
1:47,520

0 0.375 0.75

Miles

Sources: USGS, California Spatial Information Library, Contra Costa County
Projection: State Plane NAD 83 Feet.

Contra Costa County, California



December 2012

Year 3 Monitoring Report

Legend

Project Boundary
Photo Point Location and Direction
Transect Start and End
Transects

Planting Sites
Sterile Erosion Control Mix
Emergent Wetland
Grassland
No Planting/Seeding - Inoculum
Wetland
Wetland Transition

Figure 2

Planting Plan, Photo Point Locations, and Transect Locations

Souza II Restoration Project

Contra Costa County Department of Conservation and Development

1:2,400

0 100 200

Feet

Aerial photography (2008) provided by Contra Costa County Department of Information Technology. Planting Sites provided by Jones and Stokes. Projection:NAD 83 SP CA Zone III.

Section 2. MONITORING METHODS

2.1. MONITORING OBJECTIVES, PERFORMANCE CRITERIA, AND SCHEDULE

Table 1 outlines each monitoring activity, the project objectives, the performance criteria and timing for the monitoring activity as outlined in the Restoration Management Plan (Jones and Stokes 2009).

Table 1. Performance Standards for Restoration Activities

MONITORING ACTIVITY	PROJECT OBJECTIVES	PERFORMANCE CRITERIA	MONITORING ACTIVITY TIMING
Vegetation Monitoring	SO-1 Increase the abundance and distribution of native emergent vegetation onsite.	See Table 2	Early to mid spring, after the rainy season.
	SO-5 Reduce non-native plant species in the wetlands onsite	See Table 2	
	SO-6 Restore 8.5 acres of seasonal wetlands onsite.	Ensure 8.5 acres of seasonal wetlands have been restored.	
Erosion Monitoring	SO-2 Reduce erosion along the tributary to Brushy Creek	Qualitative assessment including photo-documentation before and annually for five years after restoration activity determines that erosion along the Brushy Creek tributary onsite has been reduced.	Late spring or early summer, after the rainy season.
Wetland and Pond Acreage Monitoring	SO-3 Increase wetland and pond capacity and water duration onsite	Wetland acreage onsite has increased by 8.3 acres and pond acreage onsite has increased by 0.18 acres by five years following restoration construction.	Early to mid spring, after or during the end of the rainy season.
Hydrologic Connectivity Monitoring	SO-4 Hydrologically reconnect the tributary to Brushy Creek with its floodplain and adjacent wetland complex.	Qualitative assessment based on photo-documentation before and annually for five years after restoration activity determines that the Brushy Creek tributary is hydrologically connected with its floodplain and adjacent wetland complexes	Within a week of a major storm event.
Depth and Duration of Inundation Monitoring	SO-7 Increase acreage of pond habitat onsite capable of supporting California Tiger Salamander	The depth and duration of inundation at the newly created pond is not significantly different than the reference pools (at $\alpha \leq 0.05$ or 95% confidence) over a five-year monitoring period.	During the rainy season.
	SO-8: Restore 8.5 acres of suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp	No performance standard.	
Milk Thistle Monitoring	SO-9 Eliminate milk thistle from the project area	No milk thistle is present five years after restoration	Late spring.

MONITORING ACTIVITY	PROJECT OBJECTIVES	PERFORMANCE CRITERIA	MONITORING ACTIVITY TIMING
Atriplex Monitoring	SO-10: Increase the population size and distribution of brittlescale (*Atriplex depressa*) to the project area, if feasible.	No performance standard.	Late spring.
In-stream Pool Monitoring	SO-11 Enhance structural diversity by creating in-stream pools in the Brushy Creek tributary	Qualitative assessment based photo-documentation before and annually for five years after restoration activity determines that pools have formed behind rock weirs along the Brushy Creek Tributary.	During the rainy season.
Photo Point Monitoring	To monitor overall project performance.	See performance criteria for Erosion Monitoring, Hydrologic Connectivity Monitoring, and In-stream Pool Monitoring for these specific photo points. No performance standards for general photo points.	During Vegetation Monitoring and Erosion Monitoring in early to mid-spring and during Hydrologic Connectivity Monitoring in winter.

Table 2. Performance Standards for Restoration Plantings

PERFORMANCE PERIOD	PERFORMANCE INDICATORS	TARGET VALUE
1	% of plants surviving	At least 75% survival in Good or Fair condition
2 (and subsequent years if necessary)	% of plants surviving	At least 70% survival in Good or Fair condition
3 - 5	Total absolute cover of native wetland vegetation	At least 60% cover
1 – 5	Total absolute cover of non-native invasive species*	No more than 5% cover

* Non-native invasive species = California Invasive Plant Council species with a level “high” rating, and any other species determined to threaten successful restoration of the native plant communities onsite.

2.2. FIELD DATA COLLECTION

The following personnel conducted the spring 2012 monitoring and report preparation:

Erin McDermott
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Nomad botanist/wetland specialist Erin McDermott conducted site monitoring visits on October 25 and November 28, 2011, and January 5, February 20, March 17, April 5, May 17, and May 22, 2012 to conduct: 1) Erosion Monitoring, 2) Hydrologic Connectivity Monitoring, 3) Depth and Duration of Inundation Monitoring, and 4) In-stream Pool Monitoring. Photo Point Monitoring was conducted by Ms.

McDermott during the January 5, February 20, March 18, and May 17, 2012 visits. Grazing monitoring was conducted by Nomad botanist Brian Peterson on March 12, 15, and 19, 2012.

Spring monitoring activities were conducted on May 17 and 22, 2012 by Erin McDermott and senior botanist Heath Bartosh. These monitoring activities included: 1) Vegetation Monitoring, 2) Wetland and Pond Acreage Monitoring, 3) Noxious Weed Monitoring, and 4) Atriplex Monitoring,. The results of these monitoring efforts are detailed in Section 3.

2.2.1 VEGETATION MONITORING

As detailed in the Restoration Management Plan (Jones and Stokes 2009), vegetation monitoring will occur annually in early to mid spring, after the end of the rainy season. During years one through three, performance criteria will be measured in ten 30-meter long belt transects. Plant survival and health will be measured in the area within five meters on either side of the transect line.

The condition (vigor) of surviving plants will be evaluated on the basis of leaf color and size, as well as the presence of browse damage, disease symptoms and insect infestation, using the following qualifiers.

- Good Condition—Most or all leaves show healthy color and size, and/or <25% of plant's aboveground growth is affected by browse damage, disease or insect infestation.
- Fair Condition—Most leaves show healthy color and size, and/or 25–75% of plant's aboveground growth is affected by browse damage, disease or insect infestation.
- Poor Condition—Few or some leaves show healthy color and size, and/or more than >75% of plant's aboveground growth is affected by browse damage, disease or insect infestation.

As detailed in the Restoration Management Plan (Jones and Stokes 2009), percent absolute cover will be measured for non-native species during years one through eight, and for native species during years four through eight. Based on the recommendations outlined in the First Annual Monitoring Report (Nomad 2010), percent absolute cover was measured in 60 4-meter-square (2 m. x 2 m.) quadrats, randomly located along the ten 30-meter long transects (six quadrats per transect), instead of 40 1-meter-square (1 m. x 1 m.) quadrats, randomly located along the ten 30-meter long transects (four quadrats per transect), as originally designed. Each year the quadrat locations along the line are randomly chosen utilizing a random number table to identify six start points along each transects. The quadrat is aligned such that one corner of the quadrat touches the transect and the quadrat lies to the northwest of that point. During monitoring of vegetative cover, a monitor estimates the percentage of absolute cover of each plant species located in the quadrat.

After the target values are met for restoration plantings, monitoring will measure and evaluate native wetland vegetative cover annually for five years. If after five years, the target values detailed in Table 2 for vegetative cover and abundance are met each year, then monitoring will cease and the project will be considered successful. If performance criteria are not met each year, then adaptive management decisions will be made. Monitoring will continue until the criteria are met for five consecutive years.

During spring 2010 monitoring, ten permanent transects were established (Figure 2). The end points of each transect were permanently marked using 3 foot long rebar posts. Transect end points were recorded with a submeter precision global positioning system (GPS) unit and labeled start and end (Table 3). Colored planting flags were present on site in 2010, which showed the location and species of planted plants (Table 4). It was assumed that there were 3 plants per planting flag for calculation of percent survival. The planting flags were removed in March 2011 prior to bringing cattle onto the site.

Table 3. GPS Coordinates for Vegetation Monitoring Permanent Transects

Transect Number	GPS Coordinates[1]			
	Transect Start		Transect End	
	Easting	**Northing**	**Easting**	**Northing**
1	619505	4188683	619500	4188657
2	619505	4188625	619479	4188618
3	619498	4188580	619473	4188567
4	619379	4188515	619352	4188505
5	619413	4188495	619383	4188491
6	619474	4188449	619479	4188478
7	619328	4188469	619301	4188455
8	619285	4188542	619264	4188520
9	618972	4188329	618972	4188329
10	618909	4188446	618889	4188468

Table 4. Planting Flag Color and Species

Species	Flag Color
narrowleaf milkweed (*Asclepias fascicularis*)	Purple
saltgrass (*Distichlis spicata*)	Orange
spikerush (*Eleocharis macrostachya*)	Red
alkali heath (*Frankenia salina*)	Blue
gumplant (*Grindelia camporum*)	Pink
salt heliotrope (*Heliotropium curassavicum* var. *oculatum)*	Yellow
baltic rush & Mexican rush[2] (*Juncus balticus and Juncus mexicanus*)	Florescent Yellow
common rush (*Juncus effusus*)	Green
iris-leaved rush (*Juncus xiphioides*)	White

Meadow barley (*Hordeum brachyantherum)* was seeded and saltgrass (*Distichlis spicata*) was planted as plugs. In 2010 there were several small individuals of both species present in the vicinity of the planting flags as well as other locations, making them impractical to count and give a health rating. In 2012 saltgrass was counted along each transect and given a health rating.

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[1] GPS Coordinates are in datum UTM NAD83 Zone 10N.
[2] Mexican rush and Baltic rush are treated together. Mexican rush is known from the region but plantings were labeled as Baltic rush.

2.2.2 Erosion Monitoring

As detailed in the Restoration Management Plan (Jones and Stokes 2009), erosion monitoring will occur in late spring or early summer, after the rainy season. Permanent photo stations at the location of erosional features were not established prior to the onset of construction. Therefore a complete baseline assessment is not available for comparison to annual monitoring observations or written descriptions.

During the spring 2010 monitoring, Nomad established three photo stations (Photo Points I, J, and K; Figure 2) where erosional problems were identified along the Brushy Creek tributary (Table 5). The photo point locations were permanently marked using 3 foot long rebar posts and recorded with a submeter precision global positioning system (GPS) unit.

During site visits conducted in 2011 and 2012, photographs and notes were prepared at each erosional feature location. These written descriptions will be compared at each location with conditions from the previous year in terms of bank stability or degree of erosion. At the end of five years, a determination will be made as to whether the restoration has successfully resulted in reduced erosion along the Brushy Creek Tributary. Table 5 shows the locations of all photo points for the project.

Table 5. GPS Coordinates for Photo Points

Photo Point	Monitoring Type	GPS Coordinates[3]	
		Easting	Northing
A	Hydrologic Connectivity	619521	4188544
B	In-stream Pool Monitoring	619424	4188522
C	General Performance	619502	4188531
D	In-stream Pool Monitoring	618761	4188379
E	In-stream Pool Monitoring	618713	4188376
F	General Performance	618912	4188441
G	General Performance	619015	4188317
H	General Performance	619511	4188687
I	Erosion	619000	4188434
J	Erosion	618952	4188428
K	Erosion	618816	4188384
L	Hydrologic Connectivity	619147	4188463
M	Hydrologic Connectivity	619264	4188490
N	Hydrologic Connectivity	619285	4188467

[3] GPS Coordinates are in datum UTM NAD83 Zone 10N.

2.2.3 WETLAND AND POND ACREAGE MONITORING

Wetland and pond acreage monitoring will occur in early to mid spring, after or during the end of the rainy season. Nomad will prepare a habitat map at year 5, and the acreage of each habitat type will be calculated. These acreages will be compared with the baseline habitat map and the differences in acreages between baseline and year 5 for each habitat type will be calculated.

In 2011, wetland and pond acreage monitoring occurred on April 20 and May 12. In 2012, wetland and pond acreage monitoring did not occur because lower than normal rainfall resulted in the wetlands being dry.

2.2.4 HYDROLOGIC CONNECTIVITY MONITORING

As detailed in the Restoration Management Plan (Jones and Stokes 2009), hydrologic connectivity monitoring will occur within a week of a major storm event During the spring 2010 monitoring, Nomad established three photostations (Photo Points L, M, and N; Figure 2) where hydrologic connectivity between Brushy Creek tributary and adjacent wetlands were improved, to be used for the duration of the monitoring period. During the monitoring period Nomad will take photographs and prepare written descriptions from each station on an annual basis. The written descriptions will compare each station with conditions from the previous year in terms of hydrologic connectivity. At the end of five years, a determination will be made as to whether the restoration has successfully resulted in hydrologic connectivity between the Brushy Creek tributary and restored seasonal wetlands.

In 2012, Nomad conducted hydrology monitoring at each of the monthly site visits.

2.2.5 DEPTH AND DURATION OF INUNDATION MONITORING

As detailed in the Restoration Management Plan (Jones and Stokes 2009), depth and duration of inundation monitoring will occur during the rainy season. Nomad installed six depth gauges on Souza II (Table 6 and Figure 3) and one depth gauge in a reference pond known to support California tiger salamander on the adjacent Byron Airport's Habitat Management Lands on October 26, 2010. The depth gauges were installed in the lowest elevation in each wetland. The lateral extent of inundation will also be estimated based on visual observation and recorded on standardized site base maps. Hydrographs for each created wetland will be compared with hydrographs for the reference wetlands on an annual basis and for the entire 5-year monitoring period.

As detailed in the Restoration Management Plan (Jones and Stokes 2009), if the first five years of monitoring are characterized by abnormally dry conditions, an assessment will be conducted that compares the observed hydrological responses of each wetland to various rainfall events during the 5-year period. These rainfall/response relationships will be projected to more normal rainfall years. If the assessment suggests that created the created pool will respond in normal rainfall years in the same pattern as reference wetlands, then the performance criterion will be considered satisfied. If not, then monitoring will continue until the created pond sustains three consecutive years of hydrology that meet the performance criterion.

Staff gauges were installed in the project area and reference site on October 26, 2010. Rainfall during the 2011-2012 rainy season was low[4] so staff gauges were monitored less frequently than during the 2010-2011 season. Staff gauges were monitored on the following dates: January 5, February 20, March 18, and May 17, 2012 (Table 11).

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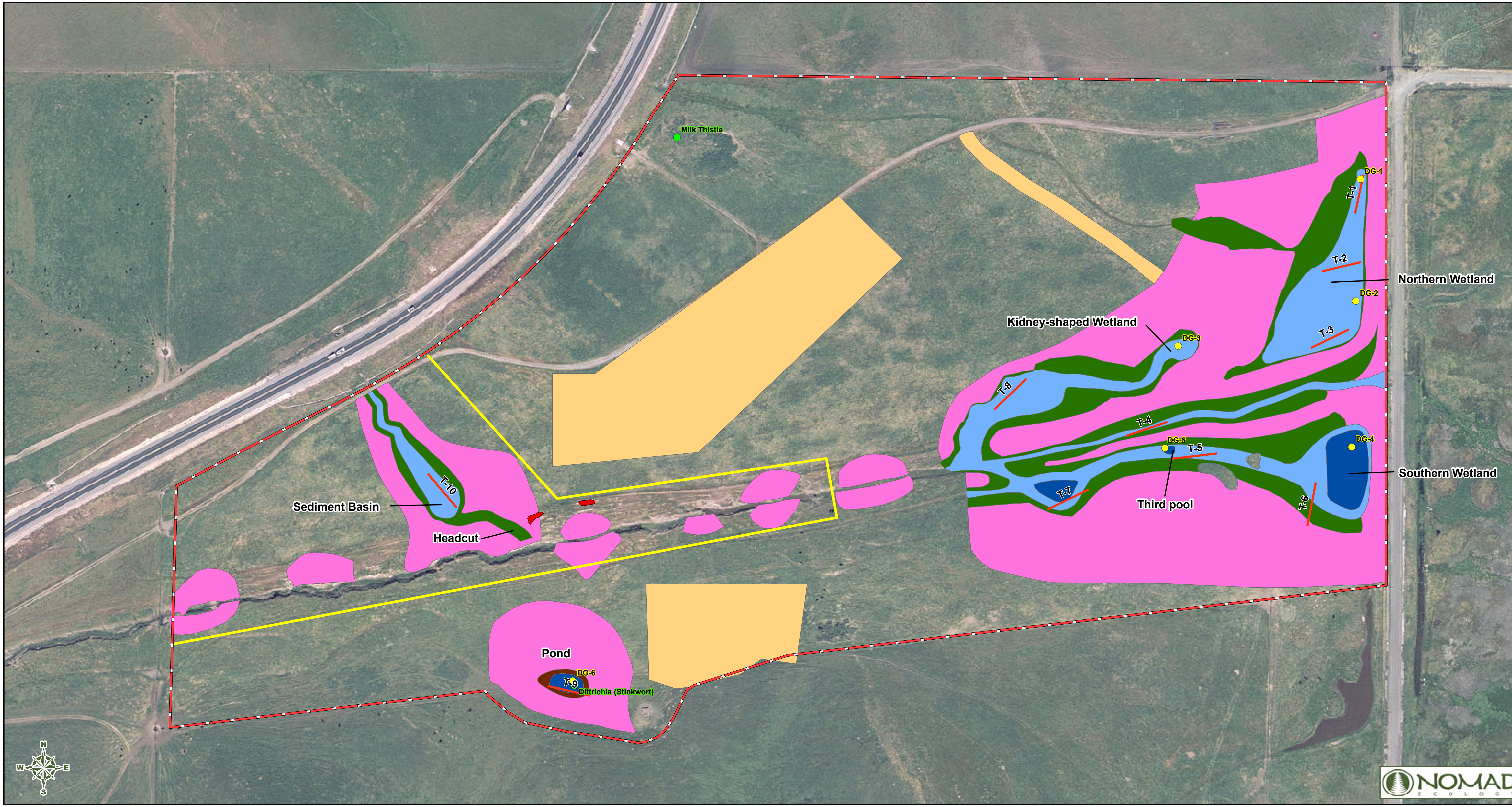
[4] Department of Water Resources California Data Exchange Center



December 2012

Year 3 Monitoring Report

Legend		Planting Sites	
	Project Boundary		Sterile Erosion Control Mix
	Cattle Exclusion Fence Location		Emergent Wetland
	Transect Locations		Grassland
	Depth Gage Location and Name		No Planting/Seeding - Inoculum
	Invasive Weed Locations		Wetland
	San Joaquin Spearscale Topsoil Transplant Area		Wetland Transition

Figure 3

Location of Depth Gages, Cattle Exclusion Fence, San Joaquin Spearscale Transplant, and Invasive Weeds and Wetland Boundaries

Souza II Restoration Project

East Contra Costa County Habitat Conservancy

1:2,400

0 100 200 Feet

Aerial photography (2008) provided by Contra Costa County Department of Information Technology. Planting Sites provided by Jones and Stokes. Projection:NAD 83 SP CA Zone III.

Contra Costa County, California

Table 6. GPS Coordinates of Depth Gauges

DEPTH GAGE	GPS COORDINATES[5]	
	EASTING	NORTHING
DG-1	619503	4188680
DG-2	619502	4188599
DG-3	619385	4188566
DG-4	619502	4188502
DG-5	619378	4188498
DG-6	618989	4188333
Byron Airport Reference Site	619713	4188084

2.2.6 NOXIOUS WEED MONITORING

As detailed in the Restoration Management Plan (Jones and Stokes 2009), milk thistle monitoring will occur during the late spring. All milk thistle found in the project area will be mapped, and population numbers will be estimated.

During the spring 2012 monitoring, Nomad botanist surveyed for milk thistle and other invasive plant[6] species including yellow star thistle (*Centaurea solstitialis*[*]), stinkwort (*Dittrichia graveolens**), and perennial pepperweed (*Lepidium latifolium**). All invasive plants found in the project area were mapped, population numbers estimated, and reported to the Conservancy for immediate control.

2.2.7 ATRIPLEX MONITORING

What was thought to be brittlescale (*Atriplex depressa*; California Native Plant Society List 1B.2) seed was collected on site in fall 2008 and summer 2009. Seeds were spread in bare areas near the locations of existing populations with slope and aspect similar to populations from which seed was collected. Based on the results of the initial site visit, it was determined that a different species of *Atriplex*, valley saltbush (*Atriplex fruticulosa*) was seeded on site. The areas where this species was seeded are doing well and no further monitoring of these areas is required.

On February 9, 2011, topsoil containing seeds of San Joaquin spearscale (*Atriplex joaquinana*) was translocated from the Vasco Road Widening Project to the Souza II site. The topsoil was distributed into two discrete sites: east and west (Figure 3). These sites were monitored for *Atriplex* plants on May 22, 2012. The translocation areas were hand weeded on May 31, 2012 during which all annual grasses were removed.

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[5] GPS Coordinates are in datum NAD83 State Plane CA III feet.

[6] California Invasive Plant Council species with a level "high" rating, and any other species determined to threaten successful restoration of the native plant communities onsite.

[*] Denotes a non-native species that has an origin other than that of California

2.2.8 In-Stream Pool Monitoring

As detailed in the Restoration Management Plan (Jones and Stokes 2009), in-stream pool monitoring will occur during the rainy season. Three permanent photo stations (Photo Points B, D, and E; Figure 2) at the location of rock weirs were established prior to the onset of construction.

In-stream pool monitoring was conducted by Nomad during each of the site visits; however lower than normal rainfall in 2012 resulted in little pooling.

2.2.9 Grazing Monitoring

A portion of the site was grazed with approximately 110 head of cattle (cow/calf operation) in March and April 2012. An electric fence was erected to exclude cattle from the western portion of the creek but allow them access to the grassland and wetlands on the east side of the study area (Figure 3). The goal of grazing was to reduce biomass and thatch buildup of Italian ryegrass (*Festuca perennis*[*]) and other non-native annual grasses on site. Cattle were excluded from the portion of the creek that is incised with steep banks because trampling can cause erosion along the channel and on the banks. Grazing was limited to a two month window to prevent trampling of wetlands and planted areas.

Grazing monitoring was completed on March 12, 2012. Monitoring activities included recording observations about cattle activity around the wetlands, evidence of creek erosion, grazing of desirable vegetation, biomass of non-native grasses, and other observations about the cattle on site.

2.3. Limitations

Based on the timing of the surveys, all plant species growing within the study area may not have been observed due to varying flowering phenologies and life forms, such as bulbs, biennials, and annuals. Other potentially dominant species within vegetation communities on site may be present during other times of the year. The present study is not floristic in nature. A floristic study not only requires every plant observed to be identified to a level necessary to determine their regulatory status, it also necessitates a sufficient number of site visits spaced throughout the growing season within the blooming periods of all plant species, including common taxa, to ensure a complete inventory is obtained (CNPS 2001, CDFG 2000, USFWS 2000). Additionally, certain plant species, especially annuals, may be absent in some years due to annual variations in temperature and rainfall, which influence germination and plant phenology. Colonization of new populations within an area may also occur from year to year.

[*] Denotes a nonnative species that has an origin other than that of California

Section 3. RESULTS AND DISCUSSION

This section provides the results of the monitoring activities. A summary table showing performance standards, results of monitoring, and recommendations is included in Section 4. Recommendations (Tables 13 and 14).

3.1. VEGETATION MONITORING

3.1.1 TRANSECT SAMPLING

During the spring 2012 monitoring, plant survival and health was recorded for each species within 5 meters on either side of the ten transects. The number of plants surviving in good or fair condition by transect is shown in Table 7. The percent survival was calculated by comparing the number of plants recorded during the 2012 monitoring to the number planted in 2009. Photos of the transects are in Appendix A.

Table 7. Percent Survival by Transect for 2012

TRANSECT	TOTAL NUMBER OF PLANTS PLANTED[7]	TOTAL NUMBER OF PLANTS IN GOOD CONDITION OR FAIR CONDITION	PERCENT SURVIVAL IN GOOD OR FAIR CONDITION
1	208	46	22%
2	145	57	39%
3	163	11	7%
4	73	0	0%
5	160	265	>100%
6	97	35	36%
7	193	1	1%
8	143	9	6%
9	118	8	7%
10	76	1	1%
Average Percent Survival 2012			**22%**

Overall, plants had 22 percent survival, which is well below the performance standard of at least 75 percent survival. Transects 1, 2, 5, and 6 had highest percent survival (22%, 39%, 100%, and 36% respectively). Transects 1 and 2 contained Mexican rush (*Juncus mexicanus*), salt heliotrope

[7] Total number planted includes saltgrass. Prior year's reports did not include saltgrass.

(*Heliotropium curassavicum* var. *oculatum*), gumplant (*Grindelia camporum*), and saltgrass (*Distichlis spicata*). Transect 5 contained Mexican rush, alkali heath (*Frankenia salina*), gumplant, and saltgrass with very high numbers of gumplant which resulted in greater than 100% survival. Transect 6 contained Mexican rush, alkali heath, gumplant, and saltgrass. Gumplant and salt heliotrope appear to be naturally recruiting in the transects. Saltgrass was planted and is spreading to form large healthy clumps with high cover. It should be noted that none of these plants are strong wetland plants and gumplant is an upland plant.

Plant survival decreased from 43% in 2010 to 13% in 2011 and then increased to 22% in 2012. The increase is due to planting of Mexican rush and saltgrass, counting the saltgrass in percent survival calculations, and natural recruitment of gumplant and salt heliotrope. Overall wetland transition areas (Transect 4 and 7) and some wetland areas (Transects 9 and 10) had low survival because they do not have wetland hydrology[8] and are overgrown by Italian ryegrass*.

Percent survival by species for all transects is shown in Table 8.

Table 8. Percent Survival in Good or Fair Condition by Species

Species	Total Planted in 10 Transects	Total Number of Plants in Good Condition or Fair Condition	Percent Survival in Good or Fair Condition
alkali heath (*Frankenia salina*)	216	31	14%
baltic or Mexican rush (*Juncus balticus* or *J. mexicanus*)	326	74	23%
common rush (*Juncus effusus*)	267	0	0%
gumplant (*Grindelia camporum*)	12	296	2,467%
iris-leaved rush (*Juncus xiphioides*)	186	0	0%
narrowleaf milkweed (*Asclepias fascicularis*)	14	0	0%
salt heliotrope (*Heliotropium curassavicum* var. *oculatum)*	51	32	63%
spikerush (*Eleocharis macrostachya*)	204	0	0%
saltgrass (*Distichlis spicata*)	200	275	138%

[8] As defined by the Corps (Environmental Laboratory 1987) wetland hydrology is an area that is inundated either permanently or periodically at mean water depths <6.6 ft, or where the soil is saturated to the surface at some time during the growing season of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and non-tidal situations.

Gumplant had greater than 100% survival and salt heliotrope had 63% survival due to natural recruitment. Saltgrass had greater than 100% survival due to additional plantings, the fact that it was seeded (which is not included in the total plantings number), and possibly natural recruitment. Alkali heath and Mexican rush had moderate survival on site (14% and 23%, respectively) due to the conditions on site, which include alkaline soils and very low moisture in the summer. Mexican rush did moderately well in the deeper portions of the wetlands but was also planted in wetland transition areas where it did not survive.

Several of the plant species did not do well because they are not suited to the site. Common rush (*Juncus effusus*), iris-leaved rush (*Juncus xiphioides*), narrowleaf milkweed (*Asclepias fascicularis*), and spikerush (*Eleocharis macrostachya*) had 0% survival. All of these, except narrowleaf milkweed, are obligate wetland plants that require wetter conditions than are present in the wetlands on site. Common rush typically grows in slow moving creeks or shallow pools on the west side of the County and is not suitable for alkaline soils. Iris-leaved rush is known to grow in seasonal wetlands in alkali soils in the region but is not seen at Byron Airport or Vaquero Farms in seasonal wetlands, which are two good reference sites for the project. Spikerush requires moister conditions.

3.1.2 Quadrat Sampling

During the spring 2012 monitoring, percent absolute cover for each species was measured in 6 2-meter-square quadrats randomly located along each of the ten transects (60 quadrats total). Table 9 shows the total absolute cover for native and non-native plant species for each transect. Photos taken at the photo points are shown in Appendix B.

The performance standard requires that the total absolute cover of native vegetation is at least 60% cover by year 3 and that total absolute cover of invasive species[9] is no more than 5% cover. No species considered an invasive plant species by Cal-IPC were recorded in the plots.

Table 9. Absolute and Relative Cover of Native and Non-Native Plant Species per Transect

Transect	Absolute Cover[10] All Plants	Absolute Cover Native Plants	Relative Cover[11] Native Plants	Absolute Cover Non-Native Plants	Absolute Cover Italian Ryegrass
1	18%	4%	22%	14%	9%
2	21%	5%	24%	17%	9%
3	8%	4%	45%	4%	1%
4	45%	19%	38%	26%	19%
5	7%	1%	9%	6%	4%
6	16%	3%	26%	13%	4%

[9] Non-native invasive species = California Invasive Plant Council species with a level "high" rating, and any other species determined to threaten successful restoration of the native plant communities onsite

[10] *Absolute cover* refers to the actual percentage of the ground (surface of the plot) that is covered by a species or group of species.

[11] *Relative cover* refers to the amount of the surface of the plot sampled that is covered by a group of species as compared to (relative to) the amount of surface of the plot or stand covered by all species. Relative Cover Native Wetland Plants = (Absolute Cover of Native Wetland Plants)/(Absolute Cover All Plants)*100.

Transect	Absolute Cover[10] all Plants	Absolute Cover Native Plants	Relative Cover[11] Native Plants	Absolute Cover Non-Native Plants	Absolute Cover Italian Ryegrass
7	12%	4%	36%	8%	5%
8	6%	5%	85%	1%	0%
9	11%	6%	53%	5%	1%
10	76%	1%	1%	75%	73%
Average 2012	**22%**	**5%**	**34%**	**17%**	**13%**

The average absolute cover (includes both native and non-native) for all plots is 22%. Many of the transects had large areas of bare soil which is typical of alkali wetlands in the region which have an abundance of bare ground, with a very elevated pH, most commonly referred to as alkaline scalds.

The average absolute cover of native plants is 5% which is below the performance standard of 60%. The average relative cover of native plants is 34% which shows on average a third of the cover in each plot is comprised of native species. The absolute cover of native plants was lower than the cover of non-native plants along all transects except Transects 3, 8, and 9, which had equal or greater absolute cover by natives. The highest native cover was along Transect 4 and that was due to high cover of saltgrass. Most of the native cover within the plots is attributable to the native seeded and planted grasses: meadow barley (*Hordeum brachyantherum*), saltgrass (*Distichlis spicata*), and purple needlegrass (*Stipa pulchra*). Alkali mallow (*Malvella leprosa*) contributed significant native cover. Other native species that contributed native cover include alkali weed (*Cressa truxilensis*), creeping wildrye (*Elymus triticoides*), alkali heath, gumweed, salt heliotrope, alkali barley (*Hordeum depressum*), Mexican rush, sticky sand spurry (*Spergularia macrotheca*), and robust vervain (*Verbena lasiostachys* var. *scabrida*).

Non-native plants comprised an average of 17% total absolute cover. Italian ryegrass* had an average total absolute cover of 13% and was the most abundant non-native species present on site. Other non-native species that contributed to the cover of non-native species but much less than Italian ryegrass* include Mediterranean barley (*Hordeum marinum* subsp. *gussoneanum**), hare barley (*Hordeum murinum* subsp. *leporinum**), black mustard (*Brassica nigra**), ripgut brome (*Bromus diandrus**), curved sicklegrass (*Parapholis incurva**), rabbitfoot grass (*Polypogon monspeliensis**), bindweed (*Convolvulus arvensis**), and burclover (*Medicago polymorpha**).

Overall, the plantings on site did not perform well and performance standards were not met. However, the site is improving more than the percent cover measurements and percent survival suggest. Native plant species, including saltgrass, creeping wildrye, and western sea-purslane (*Sesuvium verrucosum*) are colonizing the wetlands and forming stands that will likely spread and provide high vegetative cover. Scattered Mexican rush have survived and are also expanding.

Table 10 shows absolute and relative percent cover of for 1) all wetland species and 2) native wetland species for each transect.

Table 10. Absolute and Relative Cover of Wetland Plant Species per Transect

Transect	Absolute Cover Wetland Plants[12]	Relative Cover Wetland Plants	Absolute Cover Native Wetland Plants	Relative Cover Native Wetland Plants	Wetland Vegetation Present?[13]
1	5%	30%	3%	17%	No (Transition Zone)
2	5%	27%	5%	23%	No (Transition Zone)
3	6%	77%	4%	45%	**Yes**
4	18%	34%	18%	34%	No (Transition Zone)
5	0%	2%	0%	2%	No
6	8%	57%	2%	26%	**Yes**
7	0%	1%	0%	1%	No
8	6%	98%	6%	85%	**Yes**
9	3%	23%	1%	10%	No
10	3%	7%	1%	1%	No
Average 2012	**5%**	**36%**	**4%**	**24%**	**--**

This table provides an overview of the wetland conditions by transect and is not to indicate whether performance standards are being met but to demonstrate overall cover by wetland plant species. These calculations excluded Italian ryegrass*, a FAC wetland species, because it grows in uplands throughout the site. Based on absolute cover values wetland vegetative cover is low in all transects (averages 5% overall) and does not provide a meaningful evaluation of wetland species dominance. In comparison, relative cover values provide a more robust look at wetland plant cover despite the alkalinity of the substrate at the restoration site which keeps cover values low naturally.

By this metric, average relative cover of wetland plants is 36%. Transects 3, 6, and 8 appear to support greater than 50% relative cover of wetland plants which suggests they are wetlands. Transects 1, 2, and 4 contain greater then 25% relative cover of wetland plants which suggests they are on the margins of wetlands or in transition zones between wetlands and uplands. Transects 5, 7, and 10 have less than 7% relative cover of wetland plants which suggests these transects are not located in wetlands.

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[12] Wetland plant species are defined as those having a FAC, FACW, or OBL wetland indicator status. Italian ryegrass (FAC) was excluded form these calculations because it is ubiquitous on site in uplands.
[13] Wetland vegetation was considered to be present if the relative cover of wetland plants was >50% excluding Italian ryegrass. The transect was considered to be in a transition zone if relative cover of wetland plants was >30% excluding Italian ryegrass.

Average relative cover of native wetland plants is 24%. Transects 3, 4, and 8 have the highest relative cover of native wetland species (45%, 34% and 85% cover respectively) and are dominated by saltgrass, meadow barley, and alkali barley.

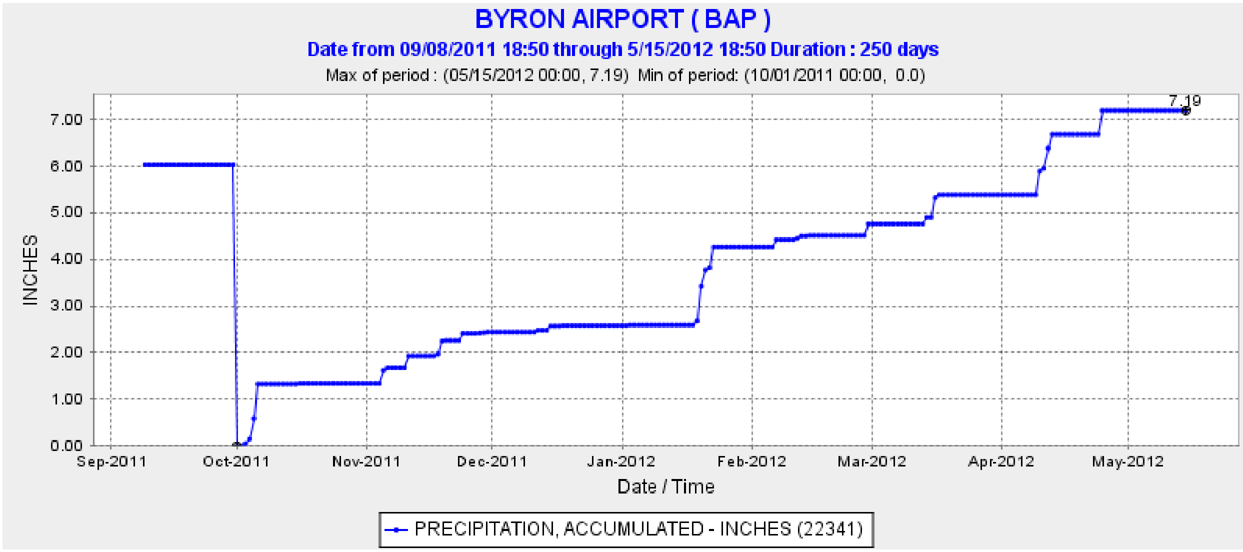
3.2. Erosion Monitoring

A large headcut, several feet wide and several feet deep, is present where the drainage joins the main unnamed tributary to Brushy Creek (Photo Point J in Appendix B). This erosional feature was present during Year 1 and 2 of monitoring and temporarily repaired in fall 2010 and 2011 by placing straw bales and straw wattles in the gully, however the headcut needs a permanent repair. During monitoring visits, the straw bales had silt pooled behind them upstream which shows they captured some sediment from the flowing water before it flowed into the creek. The portion of the drainage above the sediment basin is not eroding, only the portion downstream of the sediment basin is eroding.

In most areas where the bank was laid back, the bank is vegetating with dense stands of saltgrass, creeping wildrye, and other vegetation (Photo Point I in Appendix B). A few areas had sparser vegetation with small amounts of erosion occurring including rills that were several inches wide (Photo Point K in Appendix B). Overall, erosion on these banks has decreased as the vegetation has become established. Areas on laid back slopes that are bare will be planted with saltgrass transplants in December 2012. Recommendations to control erosion on site are made in Section 4.

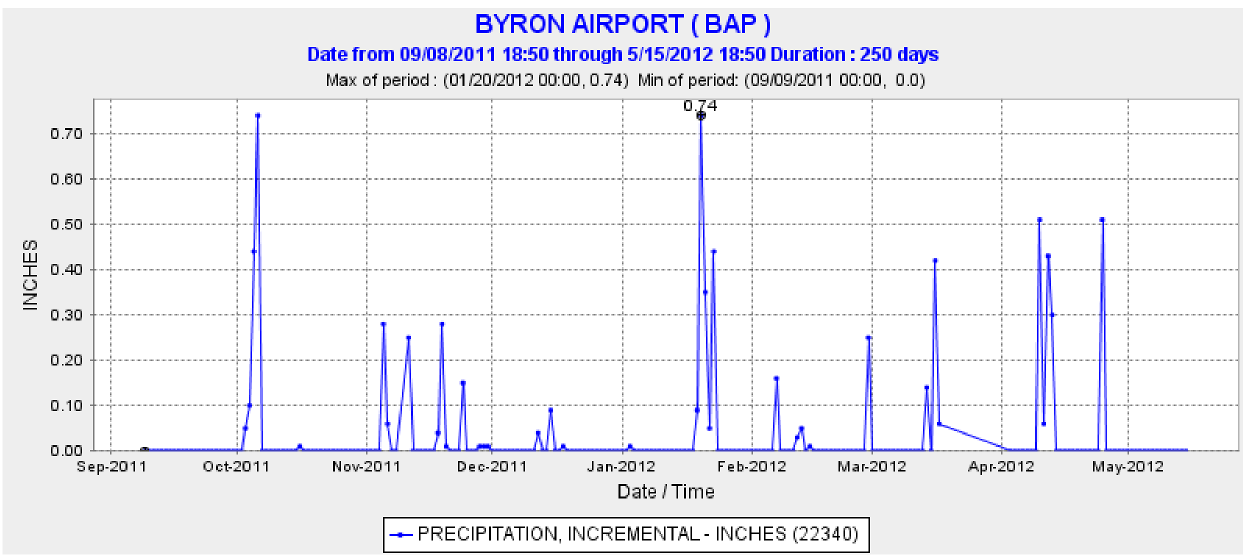
3.3. Wetland and Pond Acreage Monitoring

The winter of 2011-2012 was drier than usual with a total rainfall of approximately 7 inches over the entire winter (Figure 4) compared to almost 13 inches in winter 2010-2011 (Nomad 2011). In winter 2011-2012, small storm events (less than 0.75 inch precipitation) were evenly spaced throughout the winter from October to May (Figure 5) which never resulted in the seasonal wetlands or ponds filling. In contrast, in winter 2010-2011 several large storm events occurred in Feb and March which filled the ponds and seasonal wetlands. Because the seasonal wetlands and ponds never filled, wetland acreage was not mapped in winter 2011-2012.



Source: Department of Water Resources California Data Exchange Center.

Figure 4. Accumulated precipitation data from the Byron Airport Weather Station from 9/8/2011 to 5/15/2012.



Source: Department of Water Resources California Data Exchange Center.

Figure 5. Incremental precipitation data from the Byron Airport Weather Station from 9/8/2011 to 5/15/2012.

3.4. HYDROLOGIC CONNECTIVITY MONITORING

Hydrologic connectivity monitoring occurred at all site visits in 2012 (Photo points L, M, and N in Appendix B).Water did not flow over the constructed overflow into the northern wetland complex at any time in winter 2011-2012. In 2011 after a large storm in late March, water was observed flowing over the constructed overflow and into the northern wetland complex, however water overtopped the creek banks in other places and overtopped the northern wetland at the northeast corner, which shows how much water was flowing on site (Nomad 2011). Lowering the constructed overflow in elevation would result in water overflowing into the northern wetland complex more frequently and in a normal rain event, and not only during a large storm event like in March 2011.

Water has not been observed flowing over the constructed overflow and into the southern wetland complex at any time, including in March, 2011 immediately following the major storm.

3.5. DEPTH AND DURATION OF INUNDATION MONITORING

Table 11 shows the results of the monthly depth gauge monitoring. Table 12 show the results of the monthly depth gauge monitoring at Souza I for comparison. At Souza 2, water did not pond anywhere on site with the exception of the Sediment Basin that is just upstream of the erosional feature, where water ponded at a depth of 3 inches from February to March 2012. At Souza 1, water ponded only in the deepest section and ponded between January and April, 2012 at a depth ranging from 3-12 inches. The reference site at Byron Airport did not pond water at any of the monitoring visits.

Table 11. Depth Gauge Data for Souza II Ponds in Inches

DEPTH GAUGE	11/28/11	1/5/12	1/20/12	2/20/12	3/18/12	4/5/12	5/17/12
DG-1 (northern wetland)	0	0	0	0	0	0	0
DG-2 (northern wetland)	0	0	0	0	0	0	0
DG-3 (kidney-shaped wetland)	0	0	0	0	0	0	0
DG-4 (southern wetland)	0	0	0	0	0	0	0
DG-5 (third pool)	0	0	0	0	0	0	0
DG-6 (pond)	0	0	0	0	0	0	0
Sediment Basin	0	0	0	**3**	**3**	0	0
Byron Airport (Reference Site)	0	0	0	0	0	0	0

Table 12. Depth Gauge Data for Souza I Ponds in Inches

DEPTH GAGE	11/28/11	12/27/11	1/31/12	2/16/12	3/27/12	4/24/12	5/31/12	6/26/12
Souza 1 1-foot section	0	0	0	0	0	0	0	0
Souza 1 2-foot section	0	0	0	0	0	0	0	0

Souza 1 3-foot section	0	0	**3**	**6**	**12**	**12**	0	0

In summary, due to the lower than normal rainfall and lack of ponding, no conclusions can be made about depth and duration of inundation based on the 2012 data.

3.6. NOXIOUS WEED MONITORING

Milk thistle* was detected near the Vasco Road vehicle tunnel on May 22, 2012. Approximately 100 individuals of stinkwort (*Dittrichia graveolens**) were detected in the pond on May 22, 2012. Crews controlled these weed infestations, bagged the plants and removed them from site.

3.7. ATRIPLEX MONITORING

The Atriplex soil translocation sites were monitored on May 22, 2012. In the west soil translocation site, one San Joaquin spearscale (*Atriplex joaquinana*) and one crownscale (*Atriplex coronata* var. *coronata*) were observed. In the east soil translocation site, no San Joaquin spearscale nor crownscale were observed.

The transplant site contained dense tall annual grasses. To provide bare soil and reduce competition for the San Joaquin spearscale and crownscale, the translocation areas were hand weeded on May 31, 2012 during which all annual grasses were removed.

3.8. IN-STREAM POOL MONITORING

Water was not observed ponded behind the rock weirs that are in the channel but that is likely due to low rainfall as it has been observed ponding here in the past. Ponding was visible in the western-most portion of the tributary, at its upstream end (Photo Points D and E in Appendix B).

3.9. GRAZING MONITORING

Cattle were kept onsite for approximately two months in March and April 2012. Timing of cattle grazing was such that the wetlands were not ponded but were slightly wet. Cattle hoof prints were observed in portions of the wetlands but were very low density. Cattle caused some erosion and damaged vegetation on the banks of the creek where they accessed the creek particularly in the vicinity of the electric fence.

Survival of the plantings was low enough that the benefits of grazing (reducing Italian ryegrass* thatch and biomass) outweighed the impacts of grazing (some trampled vegetation in wetlands and some bank erosion).

Section 4. Recommendations

The results of monitoring and recommendations are summarized in Table 13 and 14 below. Details of the recommendations are discussed below.

Table 13. Summary of Results and Recommendations for Restoration Activities

Monitoring Activity	Performance Criteria	Results	Recommendations
Vegetation Monitoring	See Table 13	See Table 14	See Table 14
	Ensure 8.5 acres of seasonal wetlands have been restored.	2.3 acres of wetland (seasonal wetlands and pond) were present in Spring 2011. Wetlands were not mapped in Spring 2012 due to low rainfall. The wetland mapping did not include existing wetlands on the northwest side of the project.	Reduce acreage goals of restoration project or plan for additional excavation.
Erosion Monitoring	Qualitative assessment including photo-documentation before and annually for five years after restoration activity determines that erosion along the Brushy Creek tributary onsite has been reduced.	Large erosional feature is present. Small rills and gullys present on laid back banks.	Fix large erosional feature. Continue to plant saltgrass on the banks where bank has been laid back.
Wetland and Pond Acreage Monitoring	Wetland acreage onsite has increased by 8.3 acres and pond acreage onsite has increased by 0.18 acres by five years following restoration construction.	2.3 acres of wetland (seasonal wetlands and pond) were present in Spring 2011. Wetlands were not mapped in Spring 2012 due to low rainfall. The wetland mapping did not include existing wetlands on the northwest side of the project.	Reduce acreage goals of restoration project or plan for additional excavation.
Hydrologic Connectivity Monitoring	Qualitative assessment based on photo-documentation before and annually for five years after restoration activity determines that the Brushy Creek tributary is hydrologically connected with its floodplain and adjacent wetland complexes	Creek overflowed banks and onto floodplain during storm in March 2011. Creek did not overflow banks in 2012.	Continue scheduled monitoring in 2013 to determine if this happens annually or only in year's with above-average rainfall.
Depth and Duration of Inundation Monitoring	The depth and duration of inundation at the newly created pond is not significantly different than the reference pools (at α ≤0.05 or 95% confidence) over a five-year monitoring period.	Neither the wetlands on site nor the reference wetlands ponded in 2012. Wetlands on site pooled at the same depth as the reference pool and for a similar duration 2011.	Continue scheduled monitoring in 2013.
	No performance standard.		

Monitoring Activity	Performance Criteria	Results	Recommendations
Milk Thistle Monitoring	No milk thistle is present five years after restoration	Only a few scattered milk thistle were present on site and these were controlled.	Continue monitoring for and controlling milk thistle.
Atriplex Monitoring	No performance standard.	San Joaquin Spearscale and Crownscale were present in the soil translocation areas.	Continue annual monitoring to see if species persist.
In-stream Pool Monitoring	Qualitative assessment based photo-documentation before and annually for five years after restoration activity determines that pools have formed behind rock weirs along the Brushy Creek Tributary.	Pools did not form behind rock weirs along the Brushy Creek Tributary in 2012 but did pond in the upstream portion of the tributary. Pools formed in 2011.	Continue scheduled monitoring.
Photo point Monitoring	See performance criteria for Erosion Monitoring, Hydrologic Connectivity Monitoring, and In-stream Pool Monitoring for these specific photo points. No performance standards for general photo points.	Photo point monitoring completed.	Continue scheduled monitoring.

Table 14. Summary of Results and Recommendations for Restoration Plantings

Performance Period	Performance Indicators	Target Value	Results	Recommendations
2 (and subsequent years if necessary)	% of plants surviving	At least 70% survival in Good or Fair condition	22% survival in good or fair condition in 2012.	Plant additional alkali wetland plant species (i.e. saltgrass) in Fall 2013 and 2014.
3 - 5	Total absolute cover of native wetland vegetation	At least 60% cover	4% cover in Year 2. Not likely to meet target value.	Plant additional alkali wetland plant species (i.e. saltgrass) in Fall 2013 and 2014. Revise performance standard based on cover measurement at reference sites.
1 – 5	Total absolute cover of non-native invasive species*	No more than 5% cover	No species considered an invasive plant species by Cal-IPC were recorded in the plots. Non-native invasive species had less than 1 percent cover overall on site.	Continue scheduled monitoring and control invasive weeds.

* Non-native invasive species = California Invasive Plant Council species with a level “high” rating, and any other species determined to threaten successful restoration of the native plant communities onsite.

4.1. ACREAGE OF WETLANDS

Several areas that were intended to be Wetland and Wetland Transition on the planting plan have not exhibited wetland hydrology even after the series of storms at the end of March 2011. These areas will not become wetlands without further modifications to introduce wetland hydrology, such as lowering the elevation or increasing the water holding capacity of the soil. It is recommended that the Conservancy re-evaluate goals for the site and decide if the wetland acreage that has been achieved meets project goals.

4.2. HYDROLOGIC MONITORING

Monthly hydrologic monitoring conducted in 2010 and 2011 demonstrated where water ponds on site and where it does not. Due to low rainfall in 2012, none of the wetlands ponded with the exception of the sediment basin just upstream of the large erosion feature. Observing the exact locations in the wetlands that pond water first and remained wet the longest, as well as the areas that pond less water would be useful for determining the location of plantings in Fall 2012 and 2013. Monthly hydrologic monitoring should continue in 2013.

4.3. ATRIPLEX MONITORING

In the soil transplant sites, one San Joaquin spearscale (*Atriplex joaquinana*) and one crownscale (*Atriplex coronata* var. *coronata*) were observed. These sites should be monitored in spring 2013 to determine if individuals of these annual species are persisting on site. Annual grasses should be removed from the site as needed under the direction of the project biologist.

4.4. ADDITIONAL PLANTING IN FALL 2012 AND 2013

In Fall 2012, additional saltgrass (*Distichlis spicata*) should be planted in the seasonal wetlands on site. After the hydrology of the site is better understood, a planting plan should be prepared for additional plantings in Fall 2013 if additional vegetation cover is desired. The original plantings had low survival likely because some of the species were not appropriate plant species for the site and appropriate species were planted in upland areas. The site has alkaline soils and dries in the summer since there is no spring or seep water source and the only source of water appears to be rainfall runoff. Plant species typical of alkaline seasonal wetlands in the region would be appropriate for the site and likely would do well. These species include alkali weed (*Cressa truxillensis*), mexican rush (*Juncus mexicanus*), alkali heath (*Frankenia salina*), iodine bush (*Allenrolfia occidentalis*), and saltgrass (*Distichlis spicata*), among others.

4.5. VEGETATION MONITORING PROTOCOL MODIFICATION

After the areas are replanted, the location of transects should be relocated so that they are in areas that have wetland hydrology. Currently, many of the transects are in areas that do not have wetland hydrology and are not expected to gain it in the future. These areas will most likely never meet performance standards so continuing to sample them will reduce the overall success of the site.

4.6. PERFORMANCE STANDARD REVISION

The performance standard for vegetation cover monitoring in the quadrats should be revised to use relative cover instead of absolute cover. An absolute cover of 60% is very high and does not take into account that naturally-occurring alkali wetland communities in the region often have areas of bare soil and low cover of vegetation. Alkaline wetland and scalds characteristically have low vegetative cover but high relative cover of native plant species. The performance standard that requires that "the total *absolute* cover of native wetland vegetation is at least 60% cover by the year 3" should be revised to read "the total *relative* cover of native vegetation is at least 60% cover by the year 5". The total *absolute* cover of native wetland vegetation is currently 4% which is well below the 60% performance criteria. The total relative cover of native vegetation on site is 24%, which is well below the recommended revised performance criteria of 60%.

4.7. Continued Grazing

Grazing in 2011 reduced the cover of Italian ryegrass* thatch and standing material on site with little damage to native plants and native wetlands. Grazing should occur in 2012 at a similar time of year for a similar length of time. The timing of grazing will be adjusted based on the depth of water in the wetlands. The cattle-exclusion fencing should be extended to exclude the cattle from a larger portion of the tributary since they were causing some erosion to the creek banks particularly in the vicinity of the fence.

4.8. Erosion Control

In some areas where the bank was laid back, the banks are unvegetated and erosion is occurring. We recommend continued planting of saltgrass plugs to armor the banks. The large erosional feature is scheduled for repair in 2012.

Section 5. REFERENCES

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APPENDIX A PHOTOGRAPHS OF TRANSECTS[14]

[14] All photographs in Appendix A were taken during vegetation monitoring conducted on May 17 and 22, 2012.

Transect 1

View to south

View to north

Transect 2

View to west

View to east

Transect 3

View to west

View to east

Transect 4

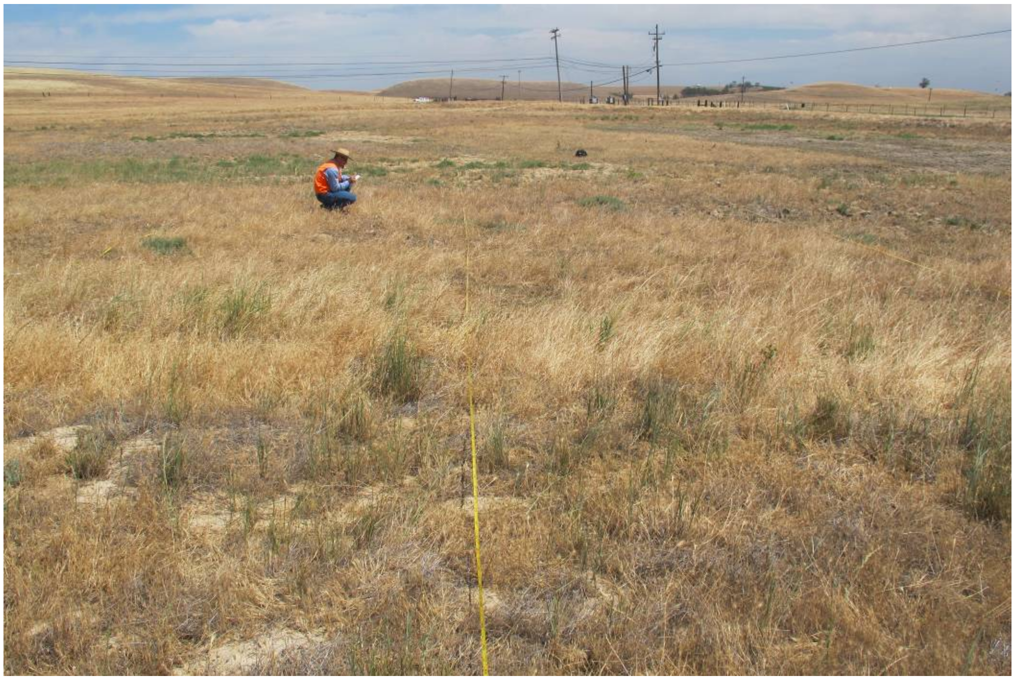
View to west

View to east

Transect 5

View to west

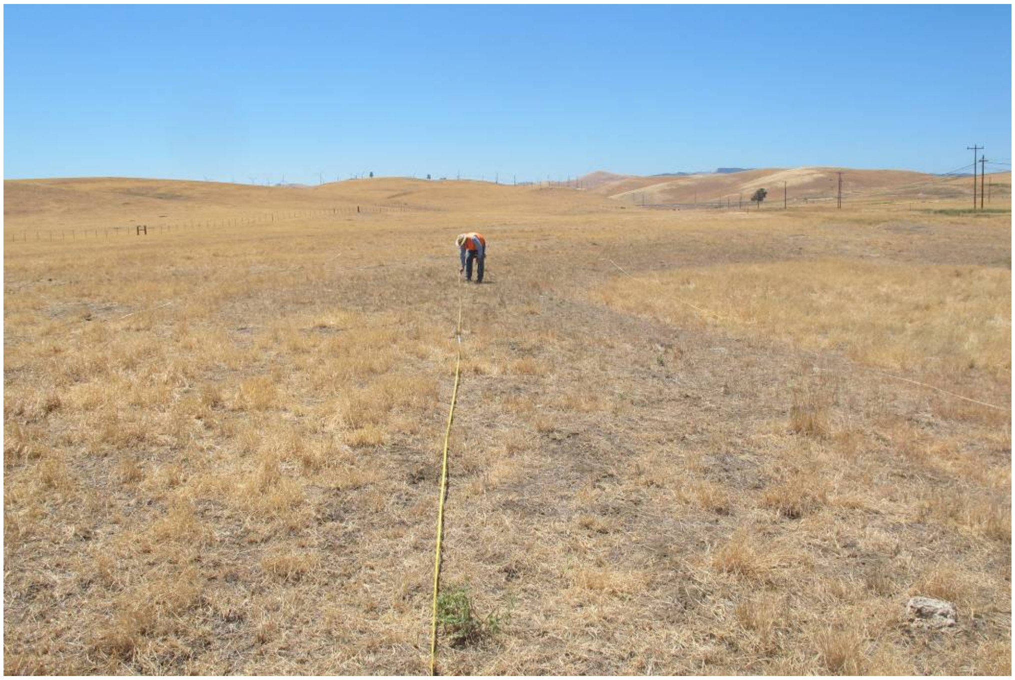
Transect 6



View to north

View to south

Transect 7


View to west

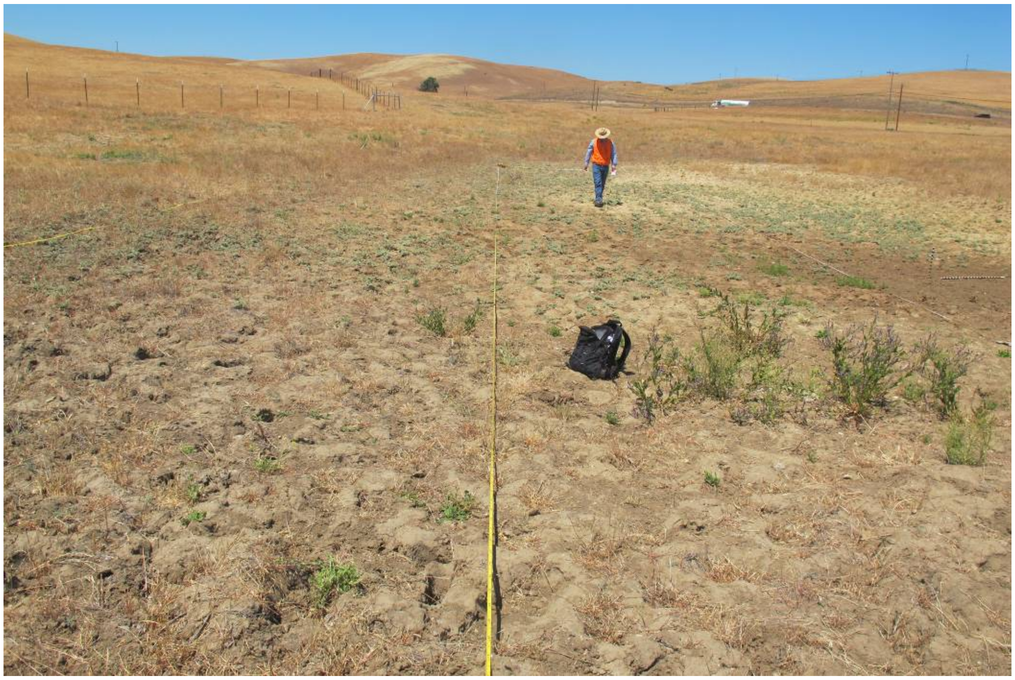

View to east

Transect 8

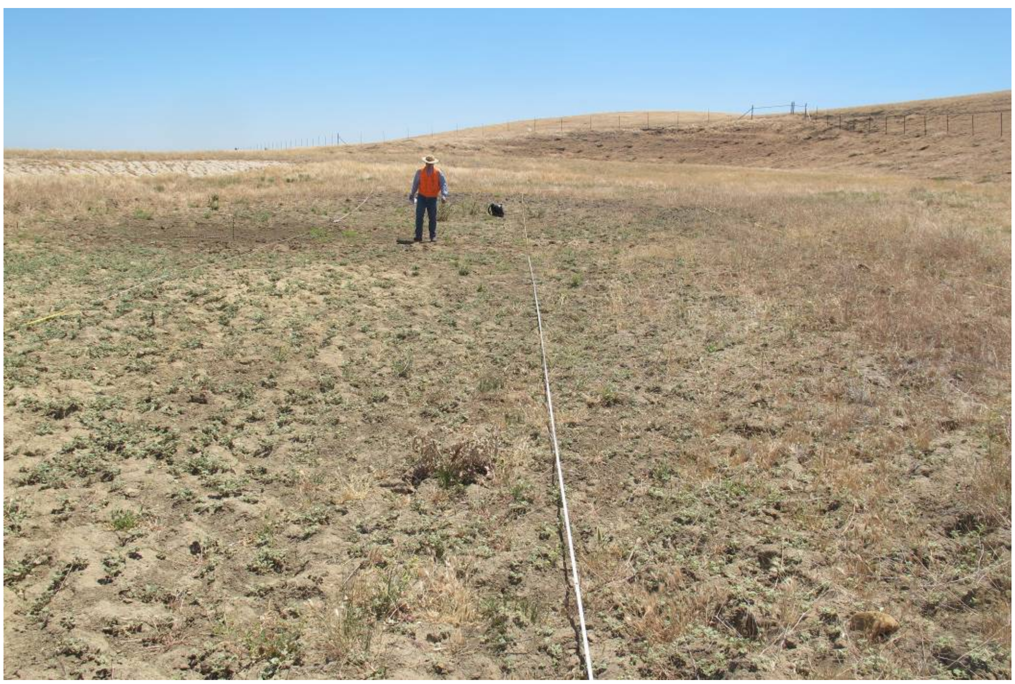
View to southwest

View to northeast

Transect 9



View to west



View to east

Transect 10

View to north

View to south

APPENDIX B PHOTO POINT PHOTOS

Photo Point A: Looking upstream from Armstrong Rd

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point B: Old creek crossing

2/20/12 Downstream

2/20/12 Upstream

3/18/12 Downstream

3/18/12 Upstream


5/17/12 Downstream


5/17/12 Upstream

Photo Point C: Wetland south of creek along Armstrong Rd

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point D: West end of creek at rock weir

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point E: West end of property at creek looking downstream

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point F: Looking upstream at swale to Vasco Rd

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point G: Pond


1/5/12


3/18/12


5/17/12

Photo Point H: Large wetland on the N side of creek

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point I: Erosion monitoring

1/5/12

3/18/12

5/17/12

Photo Point J: Erosion monitoring

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point K: Erosion monitoring


1/5/12


2/20/12


3/18/12

Photo Point L: Hydrologic connectivity monitoring


1/5/12 Downstream


1/5/12 Upstream


2/20/12 Downstream


2/20/12 Upstream


3/18/12 Downstream


3/18/12 Upstream

Photo Point M: Hydrologic connectivity monitoring

1/5/12

2/20/12

3/18/12

5/17/12

Photo Point N: Hydrologic connectivity monitoring

1/5/12

2/20/12

3/18/12

5/17/12