YEAR FOUR
CREATED POND MONITORING REPORT
EAST CONTRA COSTA COUNTY
HABITAT CONSERVANCY
VASCO SOUZA I, HCP POND
VASCO CAVES REGIONAL PARK,
BYRON, CALIFORNIA

PROJECT APN #: 005-160-005

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1. INTRODUCTION

In 2008, Monk & Associates, Inc. (M&A) assisted with the design and construction of a 1.09-acre pond (herein referred to as created pond or pond) on approximately 2.60 acres of land (the project site) in Vasco Caves Regional Park, Byron, Contra Costa County, California (Figures 1-3). The pond was constructed by the East Contra Costa Habitat Conservancy (Conservancy) on land owned and managed by the East Bay Regional Park District (EBRPD) (the Project Team). Pond design specifications were developed between the Conservancy, M&A, and Carlson, Barbee Gibson (Civil Engineers), with input from EBRPD. Construction of the pond was initiated on September 17, 2008 and was completed on October 24, 2008.

The constructed pond was designed as a component of the East Contra Costa County Habitat Conservation Plan (Figure 3). The objective was to create seasonal wetland. Since the federally and State listed threatened California tiger salamander (*Ambystoma californiense*) (CTS) is present in Vasco Caves Regional Park adjacent to the project site, EBRPD wanted to be sure that the pond did not become a "reproductive sink" where CTS could lay eggs, but would not have sufficient ponding duration to allow larvae to metamorphose. Other design considerations included that the pond site is subject to very high winds over much of the year (the site is in a wind farm resource area) and is subject to relatively low rainfall rates. It was reasoned that constructing the pond too shallow, in consideration of the high winds and high evaporation rate, may not allow sufficient duration of saturation/ponding to promote colonization of the pond by hydrophytic plant species or allow successful breeding by CTS. Finally, constructing the pond too deep might also create very long duration ponding which could suppress vegetation growth of herbaceous hydrophytic species. Thus, the Project Team had considerable discussions about how deep the pond should be designed to both ensure adequate hydration that would promote seasonal wetland, while not being so deep that CTS would reproduce unsuccessfully in the pond.

The Project Team agreed that most of the pond should only inundate one-foot deep, which would promote hydrophytic species colonization in spite of high evaporation rates and low rainfall. In addition, it was agreed that there should be smaller portions of the pond that would inundate to two and three feet deep when the pond was full. In this fashion, it was reasoned that if CTS reproduced in the pond that larvae could retreat to the deeper areas of the pond allowing sufficient duration of ponding for CTS larvae to metamorphose. While vegetation suppression was considered (due to long-term inundation) in the two and three-foot deep areas, it was determined that from an experimental standpoint, that a one-foot pond depth was an excellent experimental elevation that had the greatest likelihood of achieving the overall objective of creating seasonal wetland.

In 2008-2009, M&A conducted the first year of hydrology and vegetation monitoring in the created pond. This report presents hydrological, vegetation, and animal colonization data from the fourth year (2011-2012) of pond operation.

2. CREATED POND MONITORING METHODS

During construction of the pond a permanent staff gauge was installed in the pond's two-foot section to allow measurements of inundation during each monitoring visit. Site visits were made to conduct hydrologic monitoring on November 28 and December 27, 2011, January 31, February 16, March 27, April 24, May 29, and June 25, 2012 for a total of eight visits. In addition to hydrologic monitoring, vegetation monitoring was also conducted. Vegetation growing within the pond was recorded on each site visit and annual vegetation sampling along set transect declinations was conducted on June 25, 2012 when the pond was dry. Wildlife species observed in or near the created pond were also recorded during each site visit. Methods for monitoring hydrology and vegetation are outlined in the sections below. Photographs were taken during each site visit (Representative photographs are provided in Attachment A).

2.1 Hydrologic Monitoring

M&A used rainfall data from nearby weather stations and hydrologic data recorded during site visits to monitor and assess the hydrology of the created pond during the October 2011 to June 2012 rainy season. Precipitation in the project vicinity was estimated from rainfall data recorded at a Brentwood, California Irrigation Management Information System (CIMIS) Station #47, a California Department of Water Resources weather station. This station is located approximately 4.5 miles northeast of the project site (Latitude: 37.9333 N; Longitude: 121.6667 W) and occurs in the same Mount Diablo rain shadow as the project site. In addition, direct observations of the created pond were made during each site visit using the following hydration categories:

> Dry – Standing water is not present on the surface within the created pond and water is not present within subsurface soils (4-6 inches deep).
>
> Saturated – Standing water is not present on the surface within the created pond. Water is present in surface and subsurface soils.
>
> Inundated – Standing water is present on the surface within the created pond.

Water depths in the created pond were recorded for each month of inundation. These data will be evaluated with successive years of data to analyze hydrophytic plant species response.

2.2 Vegetation Monitoring

Vegetation monitoring in the created pond was conducted in the summer when plants could be identified to species. In 2012, vegetation monitoring was conducted on June 25, 2012. All upland and hydrophytic (wetland) species observed in the created pond were recorded in order to determine species diversity and plant community composition. In addition, M&A examined the pond and surrounding upland to determine if undesirable, invasive pest plants are colonizing the pond and surrounding upland area. Finally, a systematic point-intercept sampling method was used to determine the frequency of plant species in each section of the pond. By installing permanent stakes as markers, five permanent transect lines were established in the pond (see Figure 3 for transect locations). These transects are as follows: one permanent 100-foot long transect was established in the one-foot section of the pond. A second 100-foot transect was established on the upland berm adjacent to the one-foot section. In the two-foot deep portion of

the pond one, 50-foot long transect was established along one edge of the pond bottom and one, 100-foot long transect was established at a 90 degree angle from the other transect along another edge of the pond bottom. Finally, a 38-foot transect was established in the three-foot portion of the pond. The transect declinations and locations were permanently recorded using a GPS with submeter accuracy so that the exact locations could be found in subsequent years (Figure 3).

Point counts were made along each transect at 6-inch intervals, resulting in a total of 200 points at each transect along the one-foot section, 100 points at each transect along the two-foot section, and 76 data points along the transect in the three-foot section. The frequency of each plant species observed in the created pond was calculated as follows:

$$\%\ \text{plant 'X' in section Y} = \frac{\text{number of plant 'X' counted along transect}}{\text{(200, 100, or 76) total observations along transect}} * 100$$

Habitat affinities (i.e. obligate, facultative wetland, or facultative species) of all plants encountered during transect vegetation sampling was determined following the classification of Lichvar and Kartesz (2009). Habitat affinities include the following categories:

Obligate wetland plants (OBL) – Plants occur over 99% of the time in wetlands.

Facultative wetland plants (FACW) - Plants occur 67 to 99% of the time in wetlands.

Facultative plants (FAC) - Plants occur 67 to 33% of the time in wetlands.

Facultative upland plants (FACU) - Plants occur 33% to 1% of the time in wetlands.

Upland plants (UPL) - Plants occur less than 1% of the time in wetlands.

Non-indicator plants (NI) – No classification given in Reed (1988) due to lack of information.

Wetland indicator species are those plant species that can tolerate prolonged inundation or soil saturation during the growing season. Wetland indicator species include those classified as OBL, FACW and FAC, as described above.

2.3 Wildlife Monitoring

Wildlife observed within the created pond and in the immediate vicinity of the created pond was recorded during each site visit. Section 4.4 details the wildlife monitoring results.

3. SUCCESS CRITERIA

Performance and success of the created pond is based upon typical success criteria used by the U.S. Army Corps of Engineers for wetland mitigation projects. Typically, success of created wetland habitats is assessed over a 5-year monitoring period. Success criteria are suggested as follows. There are no success criteria for wildlife.

3.1 Year 1

- A portion of the created pond will remain inundated for at least 30 days each year. The remainder of created pond shall remain saturated for at least 60 days each year.

- The created pond will have at least three wetland plant species established.

- The created pond will not have any plant species on the California Exotic Pest Plant Council's (CEPPC) Table 1: *Invasive Non-native Plants That Threaten Wildlands in California* (this list supersedes CEPPC's 1999 List A-1: *Most Invasive and Damaging Wildland Pest Plants*) (Appendix A).

3.2 Year 3

- A portion of the created pond will remain inundated for at least 30 days each year. The remainder of the created pond shall remain saturated for at least 60 days each year.

- The created pond will have a relative percent cover of vegetation of at least 50 percent for at least 30 to 60 days after the created pond dries in the spring, except in areas that remain inundated for periods of 30 days or longer. Vegetation in the created pond will be dominated by hydrophytic plant species.

- The created pond will not have any plant species on the California Exotic Pest Plant Council's (CEPPC) Table 1: *Invasive Non-native Plants That Threaten Wildlands in California* (this list supersedes CEPPC's 1999 List A-1: *Most Invasive and Damaging Wildland Pest Plants*) (Appendix A).

3.3 Year 5

- A portion of the created pond will remain inundated for at least 30 days each year. The remainder of the created pond shall remain saturated or inundated for at least 60 days each year.

- The pond edges and margin will be dominated by wetland vegetation (FAC, FACW and/or OBL species). An allowance will be made for vegetation suppression in inundated areas of the created pond since one of the desired design parameters was to establish a sufficiently long inundation period that will allow CTS larvae to successfully metamorphose.

- The created pond will not have any plant species on the California Exotic Pest Plant Council's (CEPPC) Table 1: *Invasive Non-native Plants that Threaten Wildlands in California* (this list supersedes CEPPC's 1999 List A-1: Most Invasive and Damaging Wildland Pest Plants).

If the above success criteria are met during the five year monitoring period of the created pond, it will be deemed successful. At the time the pond meets success criteria, the U.S. Army Corps of Engineers would be expected to exert jurisdiction over the pond pursuant to Section 404 of the Clean Water Act.

4. CREATED POND AND CONTROL POND MONITORING RESULTS

This section discusses the results of monthly monitoring visits to the created pond and the nearby EBRPD control pond.

4.1 Rainfall Data

Total rainfall in the region of the created pond and control pond between October 2011 and June 2012 was 7.54 inches (Figure 4). This is approximately 3 inches less than during the 2010-2011 rainy season which was 10.40 inches (October 2010-June 2011), and approximately 6.55 inches less than the 2009-2010 rainy season (total rainfall for the 2009-2010 season was 14.08 inches for the area). The highest monthly rainfall amount during the 2011-2012 monitoring period was 1.83 inches, which occurred in April 2012. It is not often that the month of April has the highest total monthly rainfall. (For example, in April 2011 there was no measurable precipitation). April 2012 was followed by January 2012 for the next highest precipitation month with 1.70 inches. Rainfall was lower in the remaining months with amounts ranging between 1.56 inches in March 2012 and 0-inch in May (Figure 4).

4.2 Control Pond Hydrologic Monitoring

The EBRPD's control pond is located 400-feet east of the created pond. It is subject to grazing pressure from sheep during the late-winter and spring months. Because of the control pond's proximity to the created pond, and its long history of operation, it serves as a good control site that can be compared with the created pond. Since the control pond has been functioning for years, comparisons of hydrology between the two ponds have significance. For example, if the control pond does not inundate or only inundates for relatively short periods due to low rainfall, the created pond discussed herein would be expected to exhibit similar hydrology. This is important since with new ponds the hydrologic function or absence of function can be attributed to poor construction or design of the pond, or may be indicative of some sort of failure (e.g., the pond liner cracks). On the other hand, if the control pond is dry and so is the created pond, then the absence of function can likely be attributed to low rainfall.

The control pond has a relatively large watershed that is likely several hundred acres in size. In contrast the watershed of the created pond is relatively small (less than 30 acres). Thus, hydrologically the control pond should have superior functions relative to the created pond. That is, it should pond water deeper and longer than the created pond owing to larger watershed area for storm water contributions. In the paragraphs below we provide our observations of the control pond in 2011-2012.

At the time of the November 2011 monitoring visit, water covered the lowest elevation of the control pond (see Photograph #1 in Attachment A) while the created pond was dry (Photograph #2). As stated in the paragraph above, the control pond is deeper and has a larger watershed area which provides the control pond with more water and allows it to stay inundated for a longer period of time than the created pond. Thus, it may be that this pond remained inundated through the summer of 2011 and the inundation M&A observed in November 2011 was water that persisted through the summer months. An indication of this is that in June 2011, M&A noted that the control pond's water level was "approximately 5 vertical feet below capacity." The created pond by comparison in June 2011 held approximately 18 inches of water only in the 3-foot

section and 6 inches of water in the 2-foot section; this is a much smaller inundated area than the control pond's inundated area. Neither the control pond nor the created pond were monitored over the summer months (July, August, and September 2011) so it is unknown whether or not the control pond dried down completely over this period. It is likely though that the control pond remained inundated all summer with water evaporating slowly and bringing the water level down, but the pond never drying completely. Due to the paucity of rain events/rain water contributions in October and November 2011, it is likely that explains the water level observed in the control pond in November 2011.

The number of rain events and amount of total rainfall during the 2011-2012 rainy season was also low, barely increasing the control pond's inundation level over the winter months. Typically, in the winter months M&A has observed the water level of the control pond rising to meet the tributary that feeds this pond so that there is a stasis in the two water features. However, during the winter of 2011-2012, this pond's inundation level did not increase enough and the tributary did not receive enough input for this stasis in water levels to occur. Rather what appeared to happen is that the control pond's inundation level decreased, rather than increased, over the next several months (see Photograph #4 of the control pond in March 2012). By May 2012, the control pond was completely dry and the wetland vegetation that normally characterizes the edges of this pond and the adjacent, connecting tributary was not present. The tributary, which normally supports rushes and bulrushes, supported Italian thistle (*Carduus pycnocephala*) in May 2012.

4.3 Created Pond Hydrologic Monitoring

The hydrology success criterion for Year 3 states: "*A portion of the created pond will remain inundated for at least 30 days each year. The remainder of the created pond shall remain saturated for at least 60 days each year*." Since there is no success criterion stipulated for Year 4, we will use the Year 3 criterion as a guide for the Year 4 monitoring. The attached photo pages (Attachment A) show the created pond in various stages of inundation throughout the rainy season.

Rainfall, and to a much lesser extent stormwater sheet flows, provide water for the created pond. A spillway was constructed through the berm on the northwest side of the pond so that if, and when, water reaches the maximum inundation elevation, the spillway will provide a controlled egress for water leaving the pond. 2012 was a particularly dry year and water in the pond never reached the spillway and never spilled.

Unfortunately, due to a paucity of rain events during the 2011-2012 rainy season, the one- and two-foot sections of the pond never inundated during the November 2011 to June 2012 monitoring period. These two sections of the pond were dry most of the year. The 2-foot section did saturate in March 2012, but M&A never observed standing water in this section of the pond. In fact, the saturated condition likely did not persist for long because upland grasses and forbs (broad-leaved plants) were observed in this section of the pond suggesting that conditions were not wet enough in 2011-2012 to support a prevalence of hydrophytic vegetation.

The 3-foot section, while inundating during the winter of 2011-2012, was not inundated for as long or as deep as in past years. Its maximum depth was 11 inches. In comparison, the 3-foot

section inundated to almost 34 inches and spilled during the 2010-2011 monitoring period. While Table 1 shows that the 3-foot section was inundated for 5 months, during the month of January only a very small area of the 3-foot section held any water. The 3-foot section was dry by the June 25, 2012 monitoring visit.

While the 3-foot section met the hydrology success criterion in 2011-2012 since it remained inundated for the 30-day minimum period, the remainder of the pond did not meet the success criterion because the 1- and 2-foot sections were not saturated for the minimum 60-day period. This is not a failure of the pond but rather insufficient rainfall during the winter of 2011-2012.

4.4 Created Pond Vegetation Monitoring

To reiterate, the vegetation success criteria for Year 3 are:

- The created pond will have a relative percent cover of vegetation of at least 50 percent for at least 30 to 60 days after the created pond dries in the spring, except in areas that remain inundated for periods of 30 days or longer. Vegetation in the created pond will be dominated by hydrophytic plant species.

- The created pond will not have any plant species on the California Exotic Pest Plant Council's (CEPPC) Table 1: Invasive Non-native Plants That Threaten Wildlands in California (this list supersedes CEPPC's 1999 List A-1: *Most Invasive and Damaging Wildland Pest Plants*).

In the fall of 2010 and the spring of 2011, the Conservancy hired a landscape company familiar with the created pond to mow and spot apply herbicide to the Italian rye grass (*Festuca perennis*, formerly known as *Lolium multiflorum*) that was establishing in the pond's 1-foot section and along the upland berm. This mowing and herbicide application was effective in controlling the Italian rye grass as the percent cover of this plant greatly decreased during the 2010-2011 monitoring season (Year 3). It was then expected that with adequate rainfall and pond inundation during the 2011-2012 (Year 4) monitoring season that this non-native grass would not get a foothold in the created pond because conditions would be too wet for it to re-establish. Unfortunately, however, rainfall amounts during 2011-2012 were even lower than during the previous year. Since the 1-foot section of the pond did not inundate or saturate during the 2011-2012 (Year 4) monitoring season, the conditions were dry enough for the Italian rye grass to sprout and grow throughout the 1-foot section. The relative percent cover of Italian rye grass in the 1-foot section was 82.2%. The 2-foot section, while it did have saturated soils for approximately one month, never inundated and also provided prime conditions for the Italian rye grass to grow and thrive. This non-native grass accounts for 62.3% relative cover within the 2-foot section. The 3-foot section of the pond was inundated for a period of 5 months during the 2011-2012 (Year 4) monitoring season. This inundation period was long enough for vegetation suppression to occur. Hence, similar to last year, no vegetation was recorded in this portion of the pond along the transect (or outside the transect declination).

A total of ten (10) plant species were observed in the 1-foot section of the pond (this does not include the berm). Seven (7) of these species are wetland plants (i.e., species with hydrophytic designations (Lichvar and Kartesz 2009) designated as FAC, FACW or OBL, and six are non-

wetland species (see Table 3). The total *relative* cover of hydrophytic (wetland) species in the one-foot section was 96.3% (Table 3). This high relative percent cover is due to the high percentage of Italian rye grass (FAC) present in the pond. Most of the wetland plant species that were seeded in the pond over the past few years (for example, *Downingia pulchella, Juncus bufonius*) did not germinate this year due to lack of sufficient rainfall. However, a few coyote thistle (*Eryngium vaseyi*) plants, and one obligate (OBL), non-native wetland species, swamp prickle grass (*Crypsis schoenoides*), were observed in the 1-foot section during the 2011-2012 (Year 4) monitoring season.

It is also interesting to note that gumplant (*Grindelia camporum*), which was seeded in the pond at its inception, and that is thriving along the 1-foot section's outer edges, has been re-categorized by the current authors of the National Wetland Plant List (Lichvar and Kartesz 2009) from a Facultative Upland (FACU) (non-wetland) plant species to a Facultative Wetland (FACW) plant species. Thus, if 2012-2013 is another dry year and this plant continues to spread throughout the 1-foot area, this plant will help the pond meet its hydrophytic vegetation criterion.

A total of 13 plant species were observed within the 2-foot section of the pond during the 2011-2012 monitoring period. Italian rye grass (FAC) made up the highest relative percent vegetative cover in this section at 62.3%. Rabbit's foot grass (*Polypogon monspilensis*), a non-native, yet FACW hydrophytic plant species, made up approximately 20% of the relative percent cover. It is important to note that 15.2% of the relative percent vegetative cover in the 2-foot section was comprised of non-native, upland grass and forb species such as Spanish brome (*Bromus madritensis madritensis*), black mustard (*Brassica nigra*), wild oats (*Avena barbata*) and rip-gut grass (*Bromus diandrus*). This is a shift from Year 3 in which the vegetation in the 2-foot section was dominated by hydrophytic vegetation.

The pond's 3-foot section was unvegetated as in past years due to vegetation suppression from 5 months of continuous inundation. Rabbit's foot grass was observed in high numbers, however, along the 3-foot section's outer edge.

4.5 Wildlife Monitoring

During the 2011-2012 (Year 4) monitoring season, a total of 11 vertebrate species were observed either at the created pond or nearby in the uplands, or at the control pond (Table 4). These 11 vertebrate species were: 6 birds, 4 mammals, and 1 reptile. Many of the mammal species observed are expected to forage directly in the created pond or use the pond as a water source. Of the 6 bird species observed, 2 were observed foraging in or over the pond. These species were: greater yellowlegs (*Tringa melanoleuca*) and killdeer (*Charadrius vociferus*). Raccoon (*Procyon lotor*) and coyote (*Canis latrans*) tracks were observed in the created pond bottom's mud.

M&A did not detect California tiger salamander (*Ambystoma californiense*) eggs or larvae in the created pond this monitoring year. Reproductive efforts by California tiger salamander were curtailed during the 2011-2012 winter by drought. U.S. Fish and Wildlife Service biologists stated that in locales where California tiger salamander egg laying did occur that the wetlands dried down completely due to lack of rainfall before the larvae could metamorphose.

4.6 Invasive Species Control

The Conservancy has taken a very proactive approach to controlling the invasive weeds that have colonized the created pond and the adjacent uplands. Over the past few past years the Conservancy has contracted with Pacific Open Space to assist with invasive species control. Italian rye grass in the pond and along the berm, thistles (*Cirsium vulgare* and *Silybum marianum*) both at the pond and on the upland slopes, and European manna grass (*Glyceria declinata*) in the 3-foot section of the created pond have all been treated with herbicide, mowing, controlled sheep grazing, hand-pulling or a combination of all means, to control these invasive plants.

No European manna grass was observed at the created pond this past monitoring year. The thistle population was also low, though a few Italian thistle plants (*Carduus pycnocephala*) were observed on the spillway and along the berm (see Photograph 5). Unfortunately, the Italian rye grass has become re-established in the pond over the past year. We are hopeful that with adequate rainfall in 2012-2013 that this plant will not persist as a dominant species in the pond.

5. DISCUSSION AND CONCLUSION

The Year 3 hydrology success criterion states: "*A portion of the created pond will remain inundated for at least 30 days each year. The remainder of the created pond shall remain saturated for at least 60 days each year*." Due to drought-like conditions during the winter of 2011-2012, the created pond only met one part of this two part criterion. The 3-foot section of the pond was inundated for a 5-month period. However, the remainder of the created pond was not saturated for a 60-day period.

One of two vegetation performance criteria was met for the pond. The vegetation criteria for Year 3 are as follows: "The created pond will have a relative percent cover of vegetation of at least 50 percent for at least 30 to 60 days after the created pond dries in the spring, except in areas that remain inundated for periods of 30 days or longer. Vegetation in the created pond will be dominated by hydrophytic plant species." During the fourth monitoring year (2011-2012), the relative percent cover of hydrophytic species with a wetland status of FAC, FACW or OBL was 96.3% for the one-foot section and 84.4% for the two-foot section. The three-foot section remained inundated for most of the monitoring season which suppressed vegetative growth; therefore, relative percent cover in the three-foot section was 0%.

The other vegetation criterion that must be met in Year 3 is: "The created pond will not have any plant species on the California Exotic Pest Plant Council's (CEPPC) Table 1: Invasive Non-native Plants That Threaten Wildlands in California (this list supersedes CEPPC's 1999 List A-1: *Most Invasive and Damaging Wildland Pest Plants*)." Unfortunately, one plant on the CEPPC's list was observed in the pond during Year 4: Italian rye grass. The Conservancy was very proactive in treating and controlling this plant in and around the pond using mowing, focused sheep grazing, and spot applications of herbicide as the chosen removal techniques. However, due to low rainfall amounts and a lack of inundation in the 1-foot and 2-foot pond sections, this grass thrived in the pond last winter. So while this vegetation criterion was not met during Year 4, we are hopeful that with normal rainfall this coming winter and in future winters, this grass will not remain the dominant plant and will be outcompeted by native, hydrophytic plant species.

Over the past four years the created pond has been successful in providing habitat for common wildlife (western toads, Sierran tree frogs, raccoons, coyotes, Brewer's black birds, killdeer), endangered wildlife (California tiger salamanders), and migratory birds (for example, long-billed curlew (*Numenius americanus*). This pond creates habitat diversity in the landscape and will become increasingly attractive to a greater range of wildlife species over the years. Finally, this pond has provided both M&A biologists and Conservancy staff with an opportunity to experiment and explore with scientific methods for controlling invasive plants, propagating native plants, and maintaining/increasing endangered species population numbers. We are confident this pond will continue to provide us with these opportunities over the next monitoring year and, with normal to greater than normal rainfall, meet the success criteria stipulated. This report fulfills the annual reporting requirements for the fourth year of the created pond's five-year monitoring period for the Vasco Souza I Pond site.

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Figure 1. Vasco Souza I, HCP Pond
Project Site Regional Map
Contra Costa County, California

County: Contra Costa
Map Revision Date: June 11, 2009

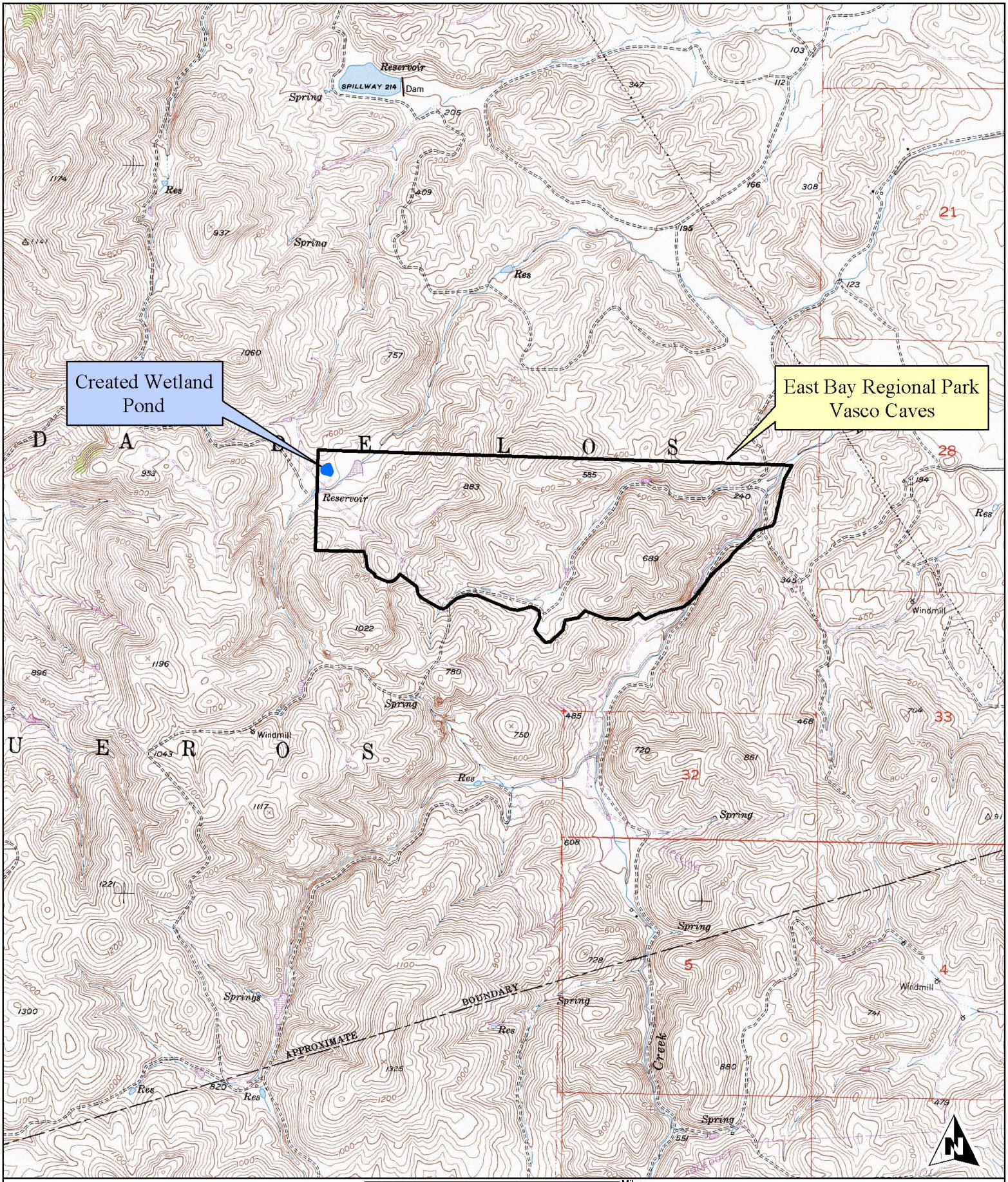

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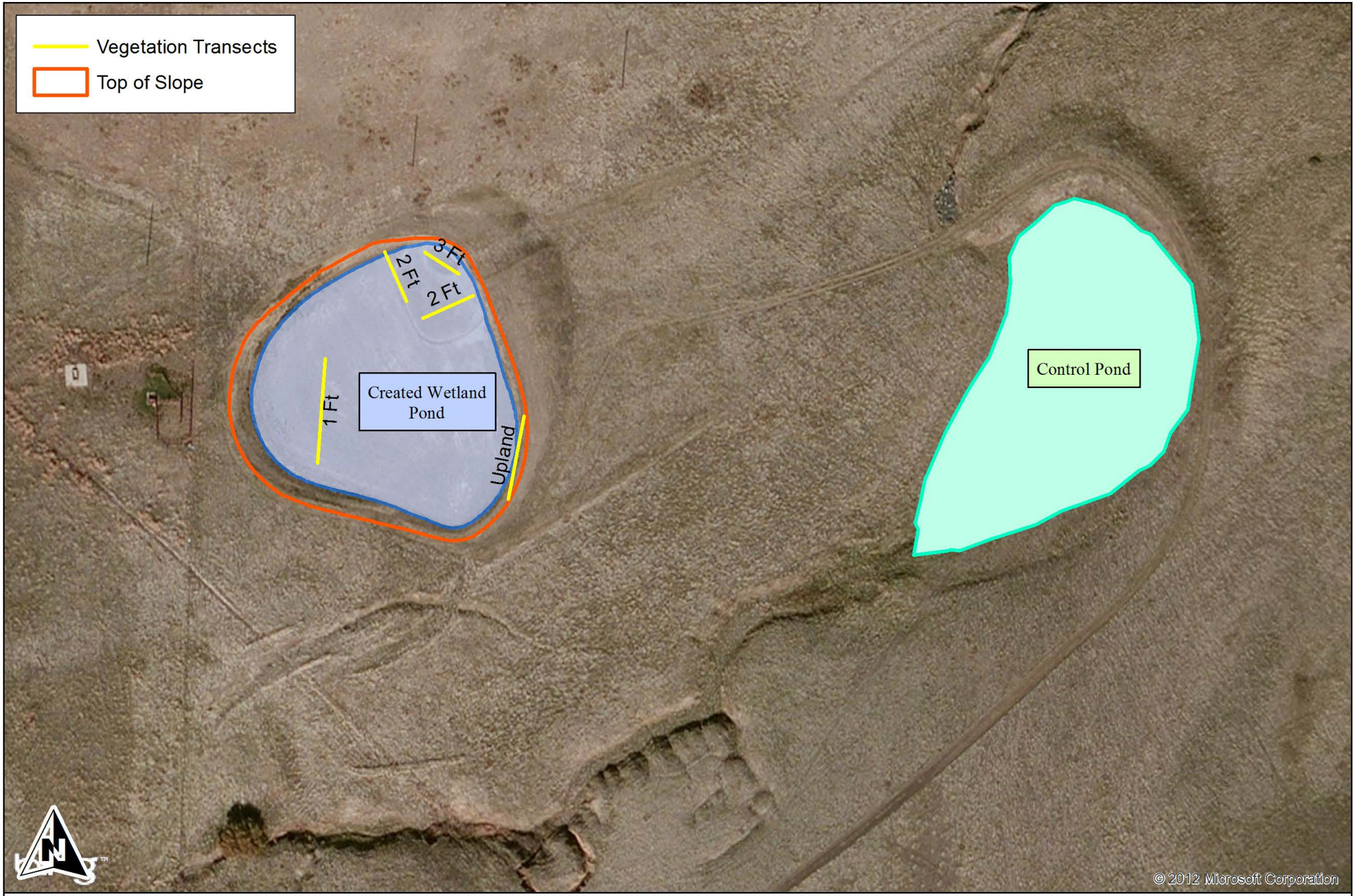
Figure 2. Vasco Souza I, HCP Pond
Project Site Location Map
Contra Costa County, California

7.5-Minute Byron Hot Springs quadrangle
Topography Source: http://gis.ca.gov
Map Revision Date: November 1, 2010



0 25 50 100 150 200 250 Feet

Figure 3. Aerial Photograph Showing
Vegetation Transect Locations Souza Pond 1
East Contra Costa County, California

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County: Contra Costa
Aerial Photograph Source: Bing Maps
Map Revision Date: November 26, 2012

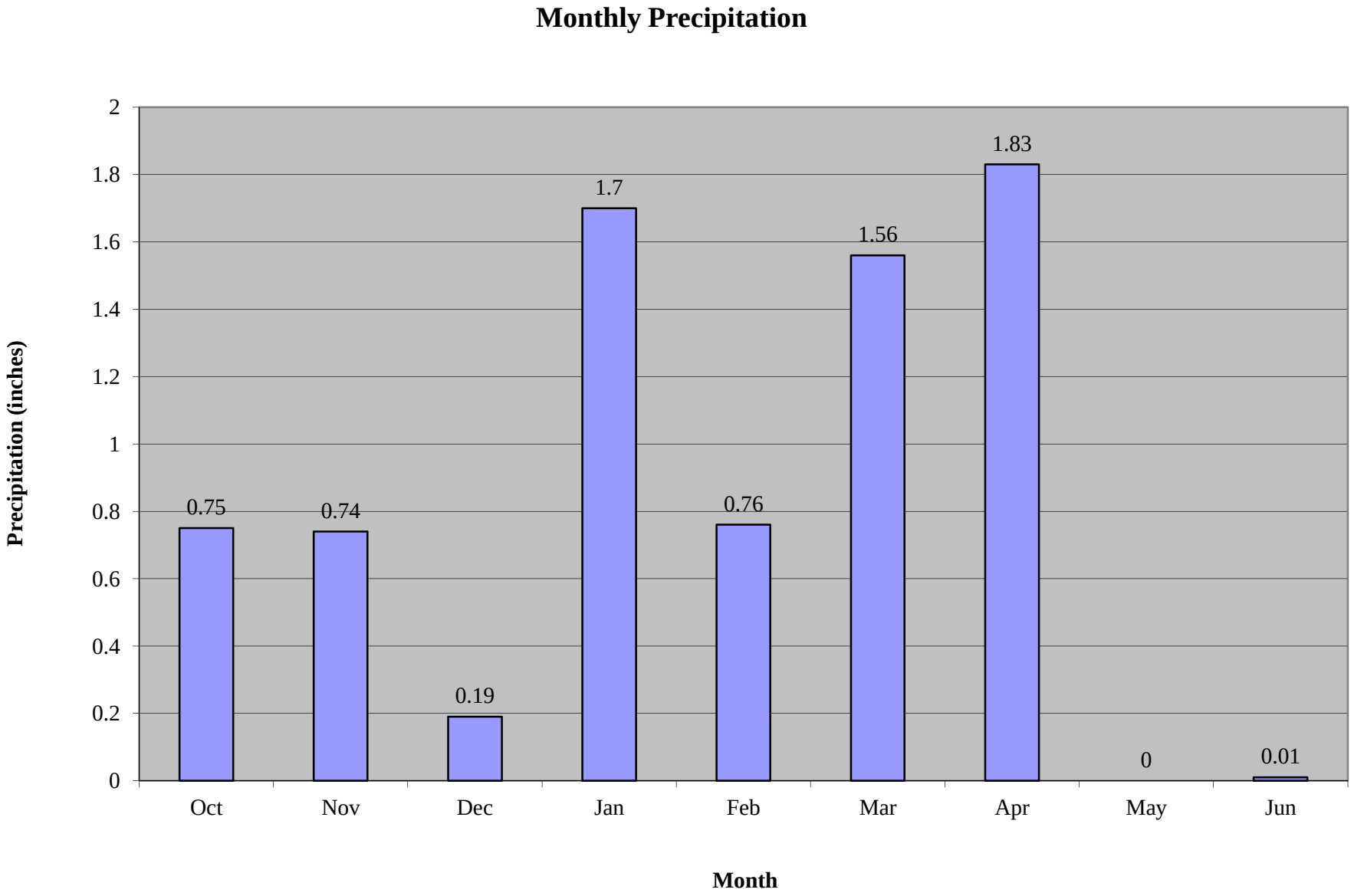

Figure 4. Monthly Rainfall (Inches) From October 2011 Through June 2012 Near the Vasco Souza I Pond Site.

Figure 5. Monthly Maximum Water Depths (inches) in the Created Pond

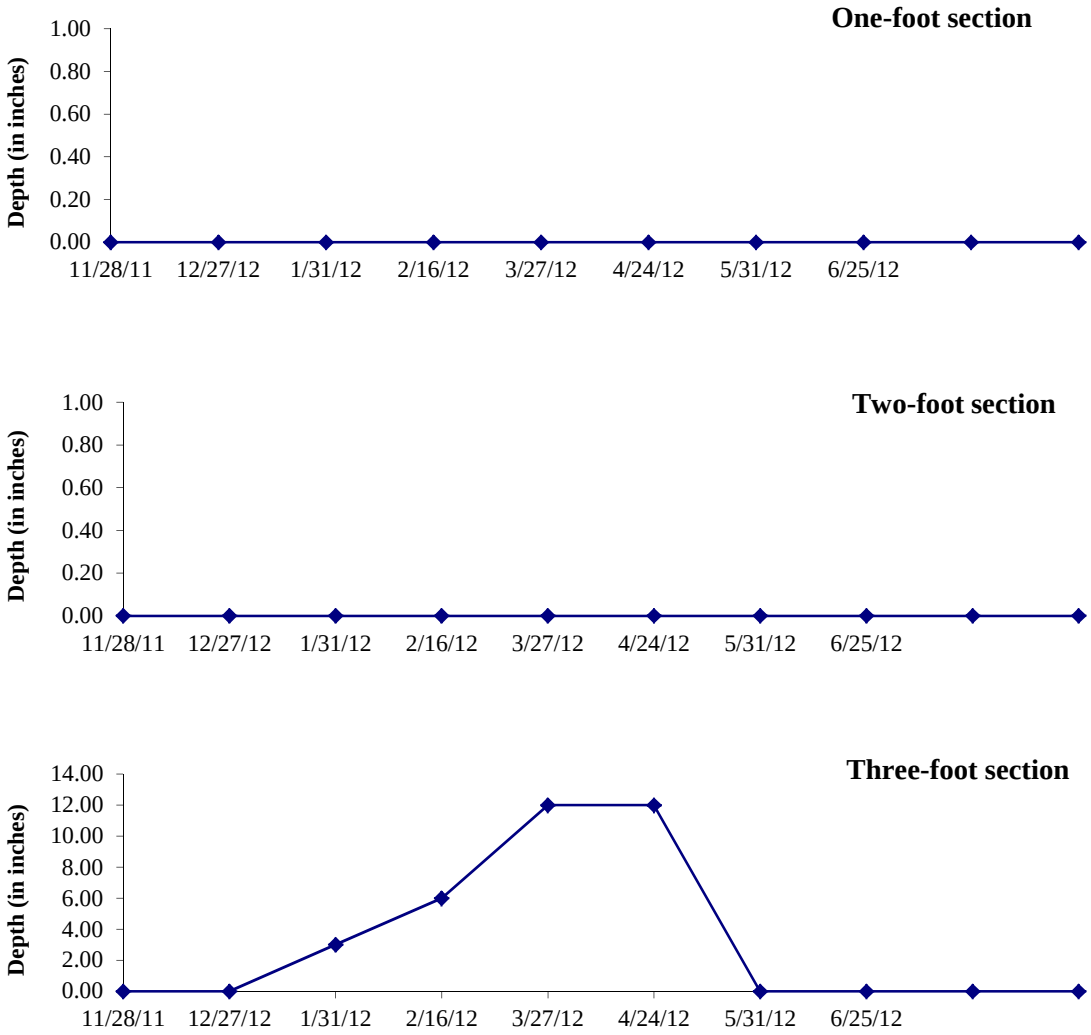

Table 1. Monthly Hydrological Conditions of the Vasco Souza I Pond Sections (Nov. 2011 through June 2012)

Wetland Feature	Nov. 28	Dec. 27	Jan. 31	Feb. 16	Mar. 27	Apr. 24	May 31	Jun 25	# Months S or I	Max. Inundation Depth (inches)
One-foot section	D	D	D	D	D	D	D	D	0	0.0
Two-foot section	D	D	D	D	S	D	D	D	1	0.0
Three-foot section	D	D	I*	I	I	I	S	D	5	11.0

*The inundated area of the three-foot section was very small in Janauary, covering only a 20' by 15' area with a few inches of water.
D = Dry, I = Inundated, S = Saturated.

Table 2. Total Percent Vegetative Cover Observed in Year 4 Along Transects at Vasco Souza I Pond

	One-foot Section	Two-foot Section	Three-foot Section
Vegetation Cover	95.50	92.00	0.00
Bare Ground/ Open Water	4.50	8.00	100.00

Table 3. Relative Percent Vegetative Cover Observed in Year 4 Along Transects at Vasco Souza I Pond

Species	Wetland Status	One-foot Section	Two-foot Section	Three-foot Section*
Crypsis schoenoides	OBL	0.5	0.4	
Pleuropogon californicus	OBL		x	
Total Relative Cover of OBL Species		**0.5**	**0.4**	**0.00**
Eryngium vaseyi (N) (S)	FACW	x	1.4	
Grindelia camporum (N)(S)	FACW	x		
Hordeum brachyantherum (N)(S)	FACW	0.5	0.4	
Polypogon monspeliensis	FACW	13.1	19.9	x
Total Relative Cover of FACW Species		**13.60**	**21.70**	**0.00**
Asclepias fascicularis	FAC	x		
Festuca perennis	FAC	82.2	62.3	
Hordeum marinum gussoneanum	FAC	0.0		
Total Relative Cover of FAC Species		**82.2**	**62.3**	**0.00**
Hordeum murinum ssp. *leporinum*	FACU	0.0	0.40	
Bromus hordeaceus	FACU	x	x	
Total Relative Cover of FACU Species		**0.0**	**0.40**	**0.00**
Avena barbata	UPL	0.0	1.4	
Brassica nigra	UPL	0.0	3.3	
Bromus diandrus	UPL	0.0	1.1	
Bromus madritensis madritensis	UPL	3.7	9.4	
Carduus pycnocephala	UPL	x	x	
Cirsium vulgare	UPL	x		
Erodium moschatum	UPL	x		
Silybum marianum	UPL	x		
Total Relative Cover of UPL Species		**3.7**	**15.2**	**0**
Total relative cover of hydrophytic species (OBL, FACW, & FAC)		**96.3**	**84.4**	**0.00**

(N) = Native Species; (S) = Seeded as part of project
x = Species observed at the pond or surrounding upland but not occurring within the transect line.

Table 4. Wildlife Species Observed Within and In Immediately Surrounding Area of Vasco Souza I Pond

Common Name	Scientific Name	Created Pond	Surrounding Area
BIRDS			
American crow	*Corvus brachyrhynchos*	X	
American kestrel	*Falco sparverius*		
Barn swallow	*Hirundo rustica*		
Brewer's blackbird	*Euphagus cyanocephalus*		
Cliff swallow	*Petrochelidon pyrrhonota*	X	X
Common raven	*Corvus corax*		
European Starling	*Sturnus vulgaris*		
Golden eagle	*Aquila chrysaetos*		
Greater yellowlegs	*Tringa melanoleuca*	X	X
Long-billed curlew	*Numenius americanus*		
Killdeer	*Charadrius vociferus*	X	X
Loggerhead shrike	*Lanius ludovicianus*		
Mallard	*Anas platyrhynchos*		
Mourning dove	*Zenaida macroura*		
California quail	*Calipepla californica*		X
Northern flicker	*Colaptes auratus*		
Northern harrier	*Circus cyaneus*		
Red-winged blackbird	*Euphagus phoeniceus*		
Savannah Sparrow	*Passerculus sandwichensis*		
Say's phoebe	*Sayornis saya*		
Turkey vulture	*Cathartes aura*		
Western burrowing owl	*Athene cunicularia hypugaea*		X
Western meadowlark	*Sturnella neglecta*		
Western scrub-jay	*Aphelocoma californica*		
White-crowned sparrow	*Zonotrichia leucophrys*		
MAMMALS			
Black-tailed hare	*Lepus californicus*		
Botta's pocket gopher	*Thomomys bottae*		X
California ground squirrel	*Spermophilus beecheyi*		X
California meadow vole	*Microtus californicus*		
Coyote	*Canis latrans*		X
Raccoon	*Procyon lotor*		X
AMPHIBIANS/REPTILES			
California red-legged frog	*Rana draytonii*		
California tiger salamander	*Ambystoma californiense*		
Sierran tree frog	*Pseudacris sierra*		
Western toad	*Bufo boreas*		
Western fence lizard	*Sceloporus occidentalis*		
Western rattlesnake	*Crotalus viridis*	X	
INVERTEBRATES			
Crickets	Gryllidae		
Damselflies	Zygotera		
Dragonflies	Anisoptera		
Notonectid	Notonectidae		
Water Boatmen	Corixidae		

Attachment A. Photographs of Vasco Souza I Pond
2012 Monitoring Season

Photograph #1. Overview of the control pond on November 28, 2011. Note it is holding some water on this date. Spiny cocklebur plants (*Xanthium strumarium*) in the foreground leading up to the tributary that enters this pond.

Photograph #2. Overview of the created pond which was dry on November 28, 2011.

Photograph #3. Created pond on March 28, 2012. Only the three-foot section is inundated. No other sections have inundated yet and the 1-foot section has a dense covering of Italian rye grass (*Festuca perennis*) and mustard (*Hirschfelda incana*) plants.

Photograph #4. Control pond on March 28, 2012. Water level in this pond is lower than it was November 2011.

Photograph #5. Created pond May 2012. The 3-foot section (bare soil in foreground) is usually still inundated in May. Due to dry conditions, Italian thistle (*Carduus pycnocephala*) is growing on the bank in the foreground.

Photograph #6. The staff gauge installed in the two-foot section (May 2012 photo). Upland grasses and mustard surround this gauge where California semaphore grass (*Pleuropogon californicus*) and rabbit's foot grass (*Polypogon monspilensis*) (wetland plants) are typically found.

Photograph #7. Coyote thistle (*Eryngium vaseyi*), an obligate wetland plant seeded in the pond, is growing in the two-foot section despite dry conditions in 2012. A number of coyote thistles sprouted and thrived in 2012.