YEAR THREE
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

December 13, 2011

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TABLE OF CONTENTS

FIGURES

(Behind Tab at Back of Report)

TABLES

(Behind Tab at Back of Report)

ATTACHMENTS
(Behind Tab at Back of Report)

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, that 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 third year (2010-2011) 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 December 23, 2010, January 5, 2011, January 20, February 17, February 21, March 17, April 23, May 22, and June 10, 2011, for a total of nine visits. This is two more visits than last year to check pond hydrology. The purpose of conducting two monitoring visits during the month of February was to note the change in the pond's water depth caused by heavy rains that occurred between February 17 and 19, 2011. 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 23, 2011 when the pond held only a small amount of water in a portion of the 3-foot deep area. 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 (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 2010 to June 2011 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 early summer, after pond dry down, when plants would be identifiable to species. In 2011, vegetation monitoring was conducted on June 23. 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 Reed (1988). 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 Control Pond

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 discussed herein. 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 storm water contributions. In the paragraphs below we provide our observations of the control pond in 2010-2011.

At the time of the December 23, 2010 monitoring visit there was only a small puddle of water in the bottom of the control pond. The December and January rains recharged the soil, preparing it for inundation in the coming months.

On February 17, 2011, the water in the control pond was turbid and only the bottom elevation of the pond was inundated. Turbid water during the filling stage is common; water flows over the ground into the pond and carries with it the surrounding sediments. The pond's southwestern corner was vegetated with cocklebur (*Xanthium strumarium*), a native but somewhat invasive wetland plant. There were also non-native bull thistle (*Cirsium vulgare*) and some non-native milk thistle (*Silybum marianum*) plants growing in this area.

On February 21, 2011, the water level had risen due to heavy rains over the past two days. The water level on this date covered the entire bottom of the pond, and the cocklebur plants were submerged. Killdeer (*Charadrius vociferus*) were observed along the shoreline.

By March 17, 2011, the control pond was at capacity with standing water extending approximately 20 feet up the drainage located at the pond's southwest corner. Water was flowing down this drainage and into the pond. Two Wilson's snipe (*Gallinago delicate*) (formerly known as common snipe) were observed at the pond's edge.

On April 23, 2011, high sediment deposits were noted in the pond. These deposits were emanating from the connected drainage. Approximately 8 to 10 inches of sediment were noted at the mouth of the drainage where it connects with the pond. Spike rush (*Eleocharis macrostachya*) was observed growing at the southwest edge of pond in the sediment area; this vegetation extended up along the drainage. In April the water level was high enough that the ground previously covered with cockleburs and thistles was underwater so there was no obvious thistle problem at that time. Rafts of western toad (*Bufo boreas*) were observed in the water. The pond's outlet, a culvert, was half full on this date with water trickling out the downstream side.

By May 22, 2011, the water had receded approximately 5 vertical feet below the winter's high water mark. Much barren mud with sheep tracks.

On June 10, 2011, the control pond was still approximately 5 vertical feet below capacity. It hadn't changed since the May visit.

4.2 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*." Did the created pond meet this criterion?

Total rainfall in the region of the project site was 10.40 inches during the 2010-2011 rainy season (October 2010-June 2011) (Figure 4). This is approximately 3.68 inches lower than last year (total rainfall for the 2009-2010 season was 14.08 inches for the area). The highest monthly rainfall amount during the 2010-2011 monitoring period was 3.12 inches, which occurred in December 2010, followed by 1.89 inches in February 2011. Rainfall was lower in the remaining months with amounts ranging between 1.51 inches in March 2011 and 0-inch in April (Figure 4). Surprisingly, rainfall amounts were higher in June than in April with almost an inch and a half (1.45 inches) falling in June 2011. The attached photo pages show the pond in various stages of inundation throughout the rainy season (Attachment A).

Rainfall, and to a lesser extent stormwater sheet flows, provide water for the 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. 2011 was the first year that water spilled over the berm and down the spillway.

The one-foot section was inundated for a total of four months (120 days) during the monitoring period (late-February through May 2011). On June 10, 2011, there were a few areas of the one-foot section with puddles of water but overall the one-foot section was dry at this time. For comparison, the one-foot section was inundated for five months the prior year (from January through May 2010, a higher rainfall year). During the 2010-2011 monitoring period the two-foot section was inundated from December through late-June. On June 23, 2011, the two-foot section

still had 6 inches of standing water (June 23, 2011 was the date of the last monitoring visit). This is an inundation period of 7 months. This is two months longer than last year. Similarly, the three-foot section also experienced a minimum of seven months of inundation. I state "minimum" because M&A did not conduct any monitoring visits in July 2011 and cannot state with certainty that this pond was not still inundated in July. There was approximately 18 inches of standing water in the three-foot section on June 23, 2011, so it is M&A's guess that this portion of the pond was still inundated in early to mid-July. Three significant storm events in June 2011, two in early June and one in late-June, resulted in approximately 1.45 inches of rain falling in the area; hence, part of the reason for a longer inundation period. Also likely contributors associated with the rainfall events were cooler temperatures and higher humidity which delayed evaporation.

In total, during the 2010-2011 monitoring season the pond was 100% inundated over *all* surfaces for much longer than the required 60 day saturation period (Table 1 and Figure 5). ***Based on the success criteria established for the pond, it appears that in Year 3 the created pond met or exceeded the hydrologic success criteria.***

4.3 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*).

During the second year of vegetation monitoring (2009-2010) it became apparent that Italian rye grass (*Lolium multiflorum*) was becoming well-established along the pond's upland berm and in the one-foot section. Italian rye grass is listed on the CEPPC's Table 1 as a non-native plant with a severe impact on the landscape, other plants, and the environment. It is also categorized as a plant with "moderate" invasiveness and widespread distribution (distribution categorized as "severe"). If left untreated, Italian rye grass not only out-competes native grasses but other non-native grasses as well; grasslands become monotypic stands of Italian rye grass. Many hillsides in the East Bay have monotypic swaths of Italian rye grass. Knowing this about Italian rye grass, the Conservancy took a proactive approach to removing this non-native grass. A landscaping company with experience in native plants, Pacific Open Space, visited the created pond in September 2010 and mowed all the rye grass along the berm to remove the thatch and then seeded native grasses and forbs along the berm and in the pond in the hopes that the seeded natives would take the place of the Italian rye grass. Pacific Open Space also returned to the mitigation pond in the spring of 2011 to spot apply herbicide to emerging Italian rye grass. This practice proved successful. The vegetation monitoring results showed that Italian rye grass was not present along the vegetation transects of the 1-foot and 2-foot sections of the pond or in the

surrounding areas of these sections (that is, outside the transect declinations). Italian rye grass comprised only a low percentage of the cover on the pond's berm and its overall relative percent cover was down to 11.3 percent from 76.8 percent the previous year. This is a vast improvement.

Unfortunately, European manna grass (*Glyceria declinata*) appeared in the pond this year. Approximately 20 clumps of the plant were distributed throughout the three-foot section. M&A immediately notified the Conservancy of the presence of this invasive grass and a landscape contractor was hired to hand-pull the plants and haul them away. This work was completed in July 2011. M&A will look for this plant at the pond again during the 2011-2012 monitoring season, will hand-pull any observed and notify the Conservancy.

To summarize the vegetation monitoring results from 2010-2011, during the third year of vegetation monitoring the percent **total vegetative cover** for the one-foot section was approximately 46.75 percent. This percentage is down from last year's 88 percent due to the aggressive control of Italian rye grass which dominated the one-foot section in 2009-2010. Total percent vegetative cover for the two-foot section was approximately 14 percent. This is down from last year's 24 percent cover, again due to successful treatment of Italian rye grass. The three-foot section had 0 percent vegetative cover along the vegetation transect (Table 2) for the third year in a row due to long-term inundation and vegetation suppression. However, vegetation was observed in the three-foot section during the course of the 2010-2011 monitoring season in low amounts and outside the transect declination. Vegetation observed in the three-foot section during the 2010-2011 monitoring season was California semaphore grass (*Pleuropogon californicus*) (seeded this year), spike rush (*Eleocharis macrostachya*) (not seeded, but a volunteer native), and European manna grass (as mentioned above).

A total of ten (10) plant species were observed in the one-foot section of the pond (this does not include the berm; the berm is discussed below). Nine (9) of these species are wetland plants (i.e., species with hydrophytic designations (Reed 1988)) designated as FAC, FACW or OBL, and one is a non-wetland species (gum plant, *Grindelia camporum*, FACU). The total *relative* cover of hydrophytic species in the one-foot section was 74.2% (Table 3). These data show that the seeding effort that took place in September 2010 was successful. Downingia (*Downingia pulchella*), toad rush (*Juncus bufonius*), and California semaphore grass, all seeded species, were all present.

Last monitoring year (2009-2010), 10 hydrophytic plant species were observed in the two-foot section of the pond. This number decreased this monitoring year (2010-2011) due to the successful control of Italian rye grass and a noted absence of Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), another non-native species, in the two-foot section. This monitoring year, seven hydrophytic plant species were observed in the pond. All but two of these plants are native species and the two non-natives observed, rabbit's foot grass (*Polypogon monspilensis*) and hyssop loose strife (*Lythrum hyssopifolia*), were in very low numbers. Again, for the third year in a row, the **total relative cover** of hydrophytic species in the two-foot section was one hundred percent (100.0%) (Table 3). The major change in cover values between this year and last year is that last year Italian rye grass provided 61.1% of the cover in the two-foot section of the pond and this year Italian rye grass didn't comprise any of the cover in the two-foot section due to successful treatment/removal.

4.4 Wildlife Monitoring

During the third year of monitoring, a total of 18 vertebrate species were observed either at the mitigation pond or nearby in the uplands, at the control pond, or at the drainage that leads into the control pond. These 18 vertebrate species were: 11 birds, 3 mammals, and 4 amphibians. One of the most interesting observations was a long-billed curlew (*Numenius americanus*) foraging in the created pond. This migratory bird was observed during the winter months (February). Another significant observation was an adult California red-legged frog (*Rana draytonii*) in a plunge pool along the drainage that leads into the EBRPD control pond. This is the first sighting that M&A and the Conservancy are aware of, of this federally listed threatened frog in the vicinity of the created pond. This California red-legged frog sighting has been reported to California Department of Fish and Game's Natural Diversity Database (CNDDB).

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 11 bird species observed, 6 were observed foraging in or over the pond. These species are: Brewer's blackbird (*Euphagus cyanocephalus*), mallard (*Anas platyrhynchos*), greater yellowlegs (*Tringa melanoleuca*), killdeer and cliff swallow (*Petrochelidon pyrrhonota*). Sierran tree frog and western toad laid eggs in the pond, and their larvae and juveniles were observed in the deeper sections and outer edges of the pond during the spring and early summer months. This is the second year in a row that eggs of the federally and state listed California tiger salamander (*Ambystoma californiense*) were observed attached to submerged vegetation in the three-foot section of the pond. The eggs successfully hatched and California tiger salamander larvae were observed in the two and three-foot sections of the pond in April, May, and June 2011. There was still quite a bit of water in the 2- and 3-foot sections of the pond in early June so the larval salamanders had not yet begun their metamorphosis and still had long gills and larval coloration. By June 23, 2011, only the three-foot section of the pond was still inundated. The pond was completely dry by August (M&A observation). Such drying would prohibit non-native amphibians such as bullfrogs (*Rana catesbeiana*) (not known from the area now, but a very invasive species known from the region) from over-summering in the pond; thus, effectively eliminating any ability for this frog to successfully breed in the pond. This is the water balance that was targeted in the design phase of the pond. That is, the pond was designed to provide habitat for native amphibians yet not provide a hydroperiod suitable for non-native amphibians (for example, bullfrogs) and non-native fish that prey on native amphibian species.

4.5 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. The Conservancy contracted with Pacific Open Space to assist with the invasive species control. Pacific Open Space has spot applied herbicide to Italian rye grass and thistles (*Cirsium vulgare* and *Silybum marianum*) both at the pond and on the upland slopes above the created pond and at the control pond. Pacific Open Space has also used mowing as a means to reduce the Italian rye grass thatch on the upland berm around the created pond. Both of these methods have been effective in controlling the Italian rye grass; the percent cover of this species within the pond has dropped dramatically this year (down to 11.3 percent along the 1-foot transects from 76.8 percent the prior year). Also, the amount of re-emerging thistles this November (2011) is much lower than in the prior year.

In June 2011, M&A hand pulled or flagged European manna grass plants emerging from the created pond's 2- and 3-foot sections. Due to standing water in the 3-foot section at that time, M&A was unable to reach all the plants and remove them without trampling over the inundated bottom and potentially mucking up the inundated habitat or stepping on a CTS, so the remaining plants were flagged with pin flags and left for Pacific Open Space to remove after the pond dried down completely. In July, Pacific Open Space hand pulled all the remaining plants and hauled them away. The created pond and surrounding area will be carefully checked in 2011-2012 for sign of invasive plants and the Conservancy will be notified if any are observed.

4.6 Grazing

Grazing is currently not permitted within the created pond area. However, in the summer of 2011, the sheep rancher let his sheep graze within the created pond and surrounding area. In August 2011, M&A went out the created pond to observe the damage caused by grazing sheep. The pond had been denuded by the grazing animals. The sheep had removed (eaten) all native grasses (specifically, California semaphore grass) and wildflowers that had been seeded in the pond. The sheep also left behind an enormous amount of pellets (excrement) that had to be removed from the pond prior to the next season's rains to prevent eutrophication of the water and excess algae growth which could deplete oxygen from the water and be harmful to the local CTS population. The Conservancy completed the removal of the sheep pellets by the end of summer, well before the first fall rains.

5. DISCUSSION AND CONCLUSION

The created pond met the hydrology performance criterion by remaining inundated or saturated for a period longer than 60 days. The pond was inundated in the deepest portion to 33.6 inches and overall, the entire pond remained fully inundated for over 4 months (120 days), while the deeper sections of the created pond remained inundated for up to 7 months (Figure 5). The one-foot section was inundated from February through June reaching a maximum depth of 9.6 inches. It should be noted that while portions of the one-foot section had standing water in June, the water amounted to only an inch in most places. The last month that the overall one-foot area was inundated was in May; two inches of standing water were observed over the one-foot section that month. The two-foot section of the pond remained inundated into June. This is a month longer than last year. The three-foot section remained inundated from December 23, 2010 through June 23, 2011.

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 third monitoring year (2010-2011), the relative percent cover of hydrophytic species with a wetland status of FAC, FACW or OBL was 74.2% for the one-foot section and 100.0% for the two-foot section. The three-foot section remained inundated throughout the monitoring season which suppressed vegetative growth; therefore, relative percent cover in the three-foot section was 0%. Over time, Monk & Associates fully expects that there will be an increase in hydrophytic plant species' diversity and cover in the created pond. Ultimately, Monk & Associates expects that the long-term inundation in the one-foot section of pond will not favor dominance of FAC species such as Italian rye grass. Thus

over time it is likely that this species will eventually decrease in cover value owing to the long-term duration of inundation.

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, two plants on the CEPPC's list were observed in the pond during Year 3: European manna grass and Italian rye grass. The Conservancy was very proactive in treating and controlling these two plants in and around the pond using hand removal, mowing, and spot applications of herbicide as the chosen removal techniques. Hand pulling was effective in removing the European manna grass from the pond and it is our hope that it will not reappear; we will keep an eye out for it during the 2011-2012 monitoring season. While spot spraying was effective in removing the Italian rye grass from the aquatic portions of the pond, mowing to remove the thatch from the berm will only temporarily control this grass since it is a dominant species on the berm and this grass is ubiquitous in East Bay grasslands. Hence, its complete removal from the created pond's upland areas seems unlikely. Therefore, for purposes of this monitoring report, future monitoring reports, and the overall success of this created pond, we are assuming that if Italian rye grass is effectively controlled/ removed from within the aquatic portion of the pond, we have met this success criterion.

This pond has been successful in providing habitat for common wildlife, endangered wildlife (CTS), and migratory birds (long-billed curlew). 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 a medium in which to experiment and explore with scientific methods for controlling invasive plants, propagating native plants, and maintaining/increasing endangered species population numbers. This report fulfills the annual reporting requirements for the third year of the created pond's five-year monitoring period for the Vasco Souza Pond I 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

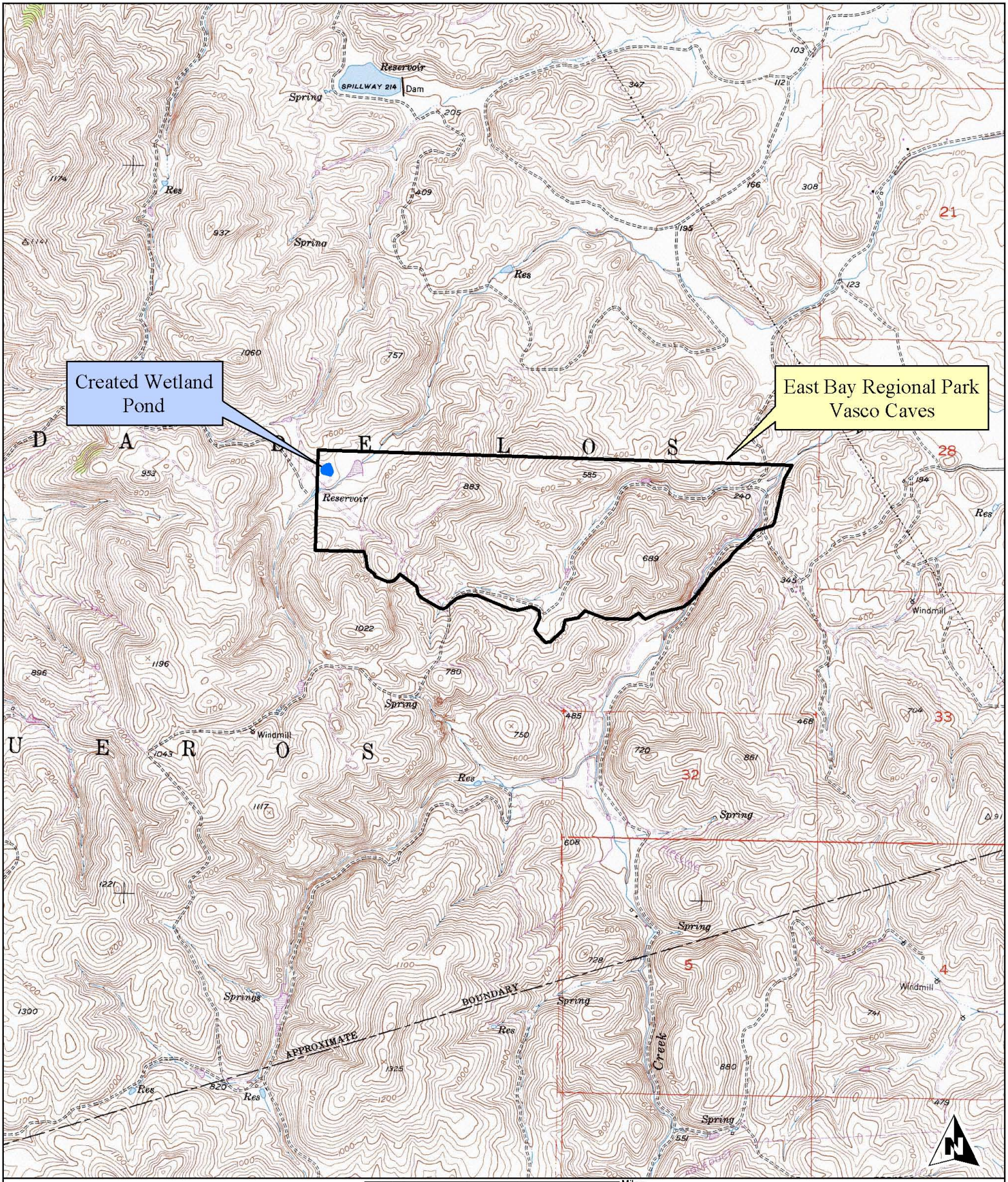

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Figure 2. Vasco Souza I, HCP Pond
Project Site Location Map
Contra Costa County, California

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

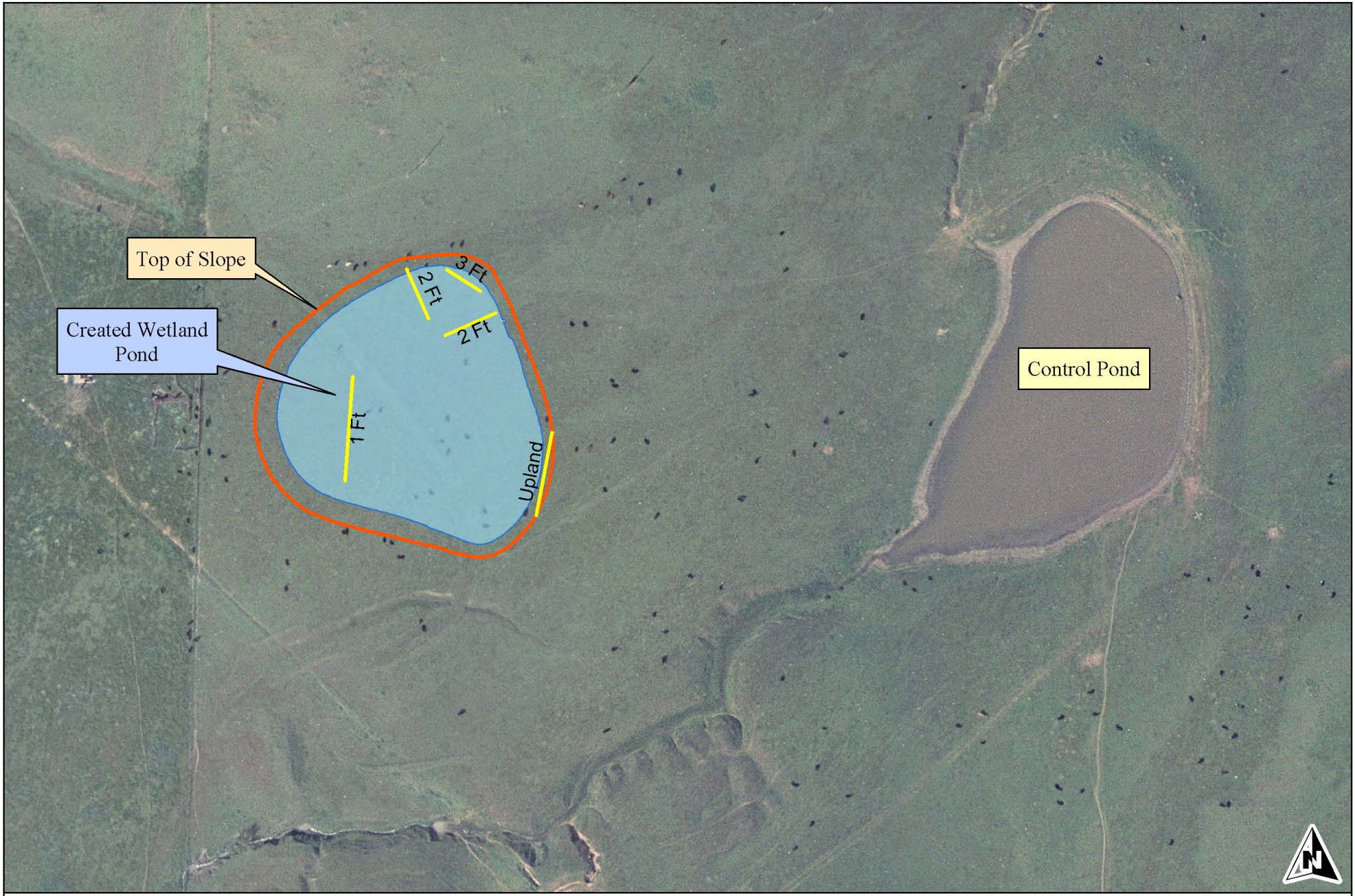

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Figure 3. Aerial Photograph of
Vasco Souza I, HCP Pond Project Site
Byron, California

County: Contra Costa
Aerial Photograph Source: http://gdw.apfo.usda.gov
Map Revision Date: February 24, 2011

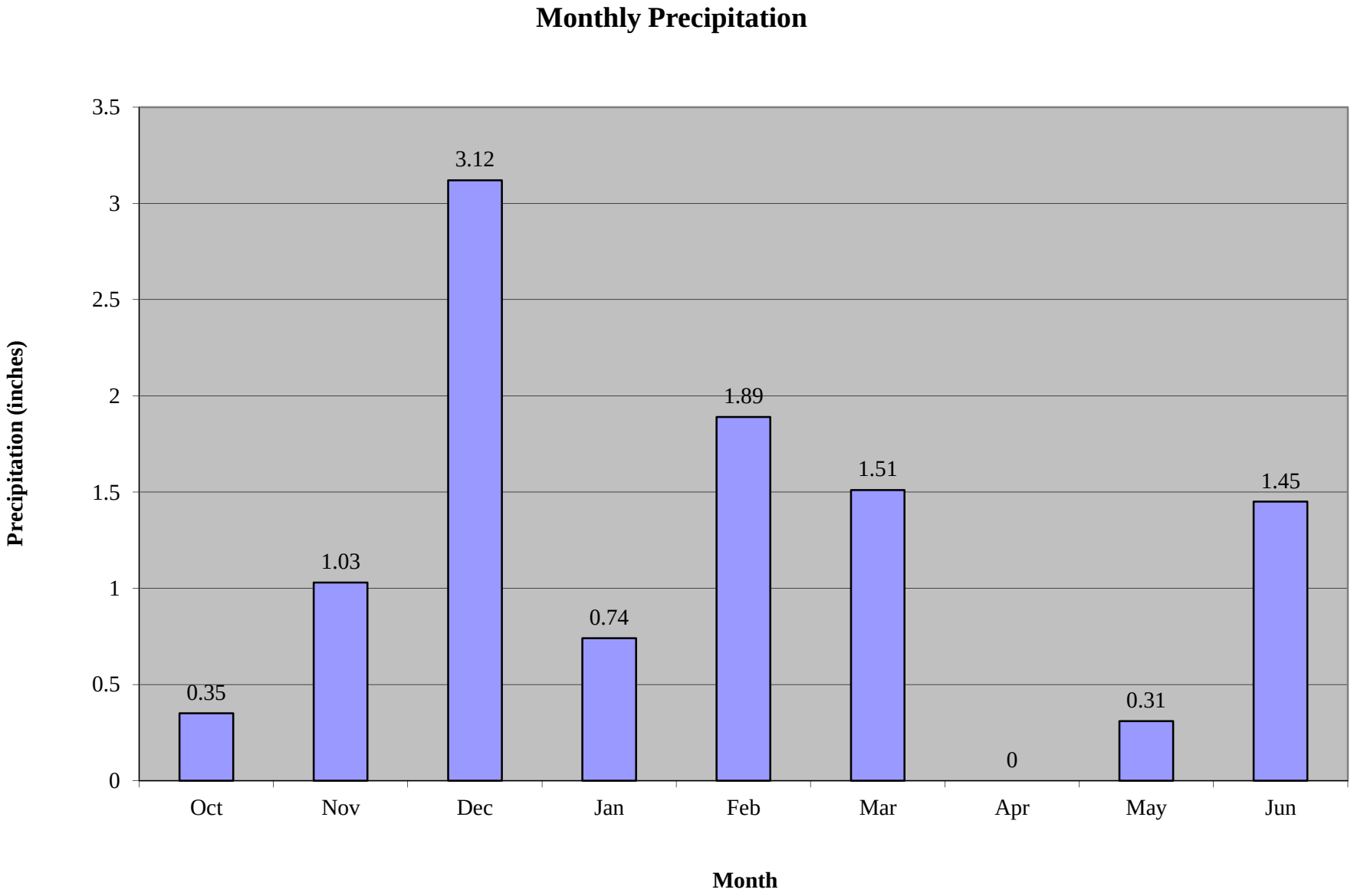


Figure 4. Monthly Rainfall (Inches) From October 2010 Through June 2011 Near the Vasco Souza I Pond Site.

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

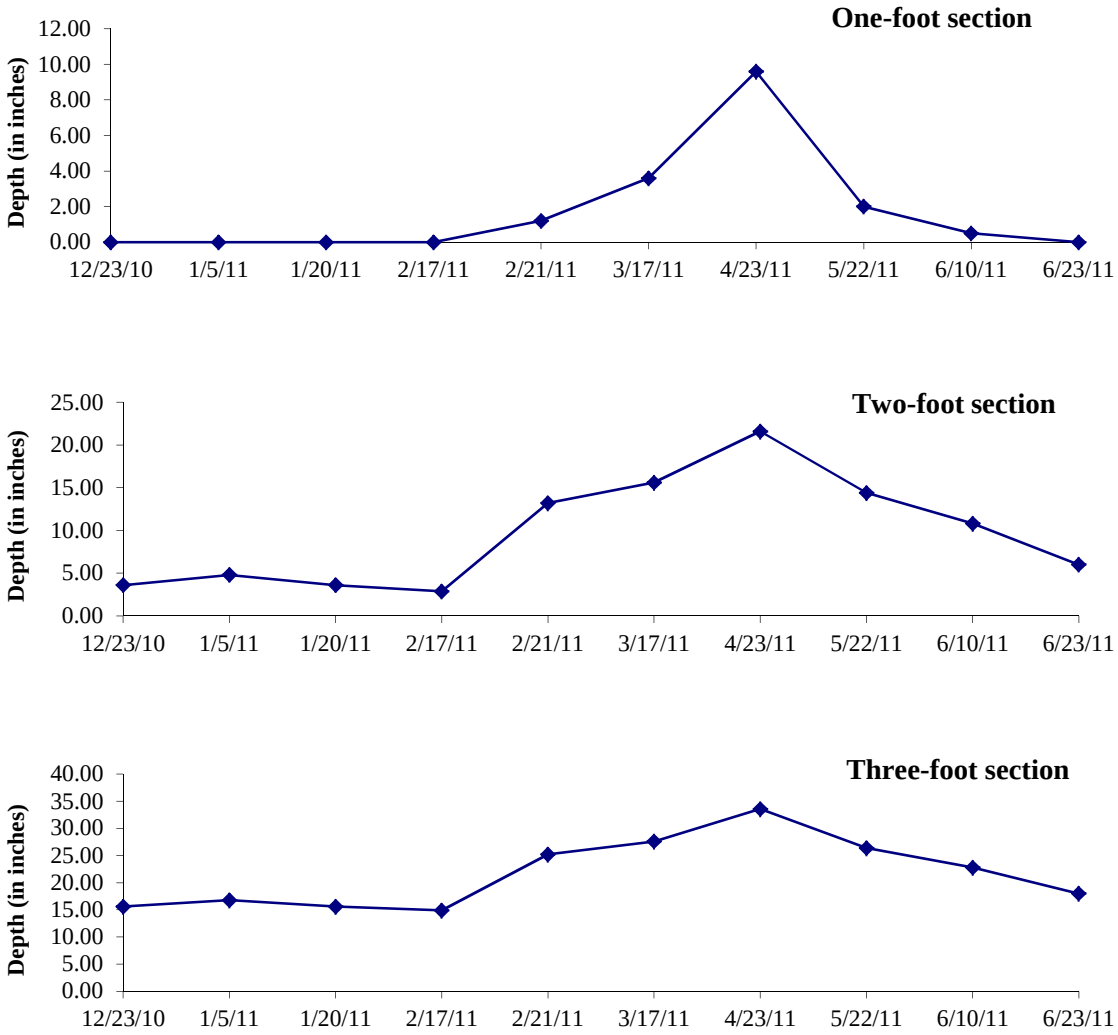


Table 1. Monthly Hydrological Conditions of the Vasco Souza I Pond Sections (Dec 2010 through June 2011)

Wetland Feature	Dec. 23	Jan. 5 Jan. 20	Feb. 17 Feb. 21	Mar. 17	Apr. 23	May 22	Jun 10 Jun 23	# Months S or I	Max. Inundation Depth (inches)
One-foot section	D	S	I	I	I	I	I	6	9.6
Two-foot section	I	I	I	I	I	I	I	7	21.6
Three-foot section	I	I	I	I	I	I	I	7	33.6

D = Dry, I = Inundated, S = Saturated.

Table 2. Total Percent Vegetative Cover Observed in Year 3 Along Transects at Vasco Souza Pond I

	One-foot Section	Two-foot Section	Three-foot Section
Vegetation Cover	46.75	14.00	0.00
Bare Ground/ Open Water	53.25	86.00	100.0

Table 3. Relative Percent Vegetative Cover Observed in Year 2 Along Transects at Vasco Souza Pond I

Species	Wetland Status	One-foot Section	Two-foot Section	Three-foot Section*
Callitriche sp. (N)	OBL			x
Downingia pulchella (N) (S)	OBL	6.1	16.7	
Eleocharis macrostachya (N)	OBL	2.2	2.4	x
Glyceria declinata	OBL			x
Navarretia sp. (N)[1]	OBL			
Pleuropogon californicus (N)	OBL	5.5	76.2	x
Plagiobothrys sp. (N)	OBL	x		
Potamogeton sp. (N)	OBL			x
Ranunculus aquatilis	OBL			
Total Relative Cover of OBL Species		**6.10**	**95.3**	**0.00**
Juncus bufonius (N) (S)	FACW+	4.3	x	
Polypogon monspeliensis	FACW+	0.6	x	
Eryngium vaseyi (N) (S)	FACW	1.1	4.8	
Lythrum hyssopifolium	FACW		x	
Rumex crispus	FACW-			
Total Relative Cover of FACW Species		**6.00**	**4.80**	**0.00**
Capsella bursa-pastoris	FAC-			
Hordeum marinum gussoneanum	FAC	50.8		
Lactuca serriola	FAC			
Leymus triticoides (N) (S)	FAC+	x		
Lolium multiflorum	FAC	11.3	0.0	
Total Relative Cover of FAC Species		**62.1**	**0.0**	**0.00**
Elymus glaucus (N) (S)	FACU			
Grindelia camporum (N)	FACU	2.8	0.0	
Bromus hordeaceus	FACU	3.3	0.0	
Total Relative Cover of FACU Species		**6.1**	**0.00**	**0.00**
Hordeum murinum ssp. *leporinum*	NI			
Total Relative Cover of NI Species		**0.0**	**0.00**	**0.00**
Avena barbata	UPL	0.6		
Avena sativa	UPL			
Bromus alopecurus	UPL	0.6		
Bromus diandrus	UPL	1.1		
Lepidium nitidum ssp. *nitidum*	UPL			
Nassella pulchra (N) (S)	UPL			
Sinapis arvensis	UPL			
Trifolium hirtum	UPL	0.0		
Total Relative Cover of UPL Species		2.3		
Total relative cover of hydrophytic species (OBL, FACW, & FAC)		**74.2**	**100**	**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.

*The three foot section was still inundated at the time of the June vegetation transect survey.

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*		
American kestrel	*Falco sparverius*		
Barn swallow	*Hirundo rustica*		
Brewer's blackbird	*Euphagus cyanocephalus*	X	X
Cliff swallow	*Petrochelidon pyrrhonota*	X	X
Common raven	*Corvus corax*		X
European Starling	*Sturnus vulgaris*		
Golden eagle	*Aquila chrysaetos*		
Greater yellowlegs	*Tringa melanoleuca*	X	X
Long-billed curlew	*Numenius americanus*	X	X
Killdeer	*Charadrius vociferus*	X	X
Loggerhead shrike	*Lanius ludovicianus*		
Mallard	*Anas platyrhynchos*	X	
Mourning dove	*Zenaida macroura*		X
Northern flicker	*Colaptes auratus*		X
Northern harrier	*Circus cyaneus*		
Red-winged blackbird	*Euphagus phoeniceus*		
Savannah Sparrow	*Passerculus sandwichensis*		
Say's phoebe	*Sayornis saya*		
Turkey vulture	*Cathartes aura*		X
Western burrowing owl	*Athene cunicularia hypugaea*		
Western meadowlark	*Sturnella neglecta*		X
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*		X
Coyote	*Canis latrans*		
Raccoon	*Procyon lotor*		
AMPHIBIANS/REPTILES			
California red-legged frog	*Rana draytonii*		X
California tiger salamander	*Ambystoma californiense*	X	
Sierran tree frog	*Pseudacris sierra*	X	
Western toad	*Bufo boreas*	X	
Western fence lizard	*Sceloporus occidentalis*		
Western rattlesnake	*Crotalus viridis*		
INVERTEBRATES			
Crickets	Gryllidae		
Damselflies	Zygotera		
Dragonflies	Anisoptera		
Notonectid	Notonectidae	X	
Water Boatmen	Corixidae	X	

Attachment A. Photographs of Vasco Souza Pond I
2011 Monitoring Season

Photograph #1. Overview of the created pond on November 24, 2010.

Photograph #2. Close up of the 2-foot section of the created pond on December 23, 2010. The 2-foot section held 3.6 inches of water; the 3-foot section held 15.6 inches of water on this date.

Photograph #3. Overview of created pond January 5, 2011. 1-foot section mostly dry.

Photograph #4. Created pond on February 21, 2011 after a large storm event. All three sections of the pond inundated.

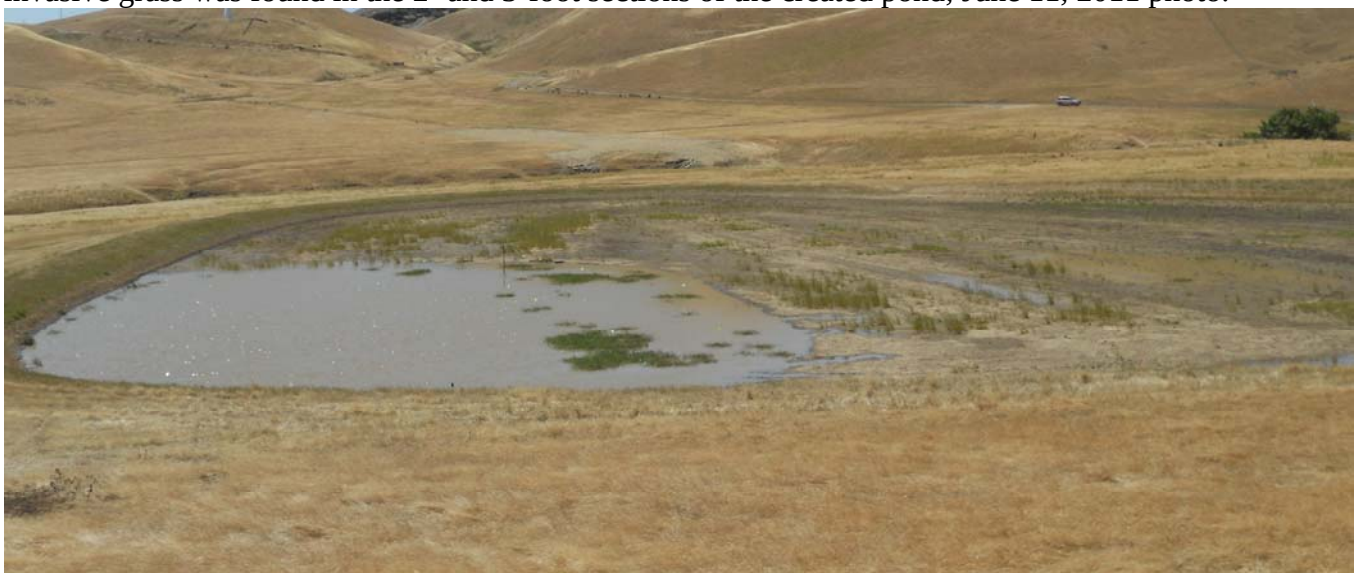
Photograph #5. Control pond. February 17, 2011, one day before a storm event brought 0.6-inch of rain to the area.

Photograph #6. Control pond on February 21, 2011 after rain storm reached the area.

Photograph #7. Overview of created pond on April 23, 2011.

Photograph #8. California semaphore grass (*Pleuropogon californicus*) growing in created pond; May 22, 2011.

Photograph #9. Showing European manna grass (*Glyceria occidentalis*) flagged for removal. This invasive grass was found in the 2- and 3-foot sections of the created pond; June 11, 2011 photo.



Photograph #10. Overview of the created pond showing drying conditions and flagged European manna grass plants.