

# QUAIL HOLLOW BRIDGE REPLACEMENT PROJECT

## Fifth Year Monitoring Report

Prepared for  
City of San Jose

December 2010





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# EXECUTIVE SUMMARY

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On behalf of the City of San Jose Environmental Science Associates (ESA) is conducting monitoring of the Quail Hollow Bridge Replacement Mitigation Project located in San Jose, Santa Clara County, California. Project installation was in 2005 and monitoring was conducted annually in Years 1 through 5. This report summarizes the fifth year monitoring results, compares the results of previous monitoring years, evaluates the sites success at meeting established performance standards, and provides recommendations.

In 2004 the City of San Jose completed construction of the Quail Hollow Bridge over Upper Penitencia Creek to replace the failing culverted low-water crossing. The Bridge Replacement Project permanently impacted about 150 linear feet of creek and a surface area of 7,500 square feet (0.17 acre). The Project also resulted in temporary impacts to a surface area of 0.04 acre and 225 linear feet of creek due to stream flow diversion. Mitigation for these impacts included installation of rock weirs and establishment of approximately 9,000 square feet (0.2 acre) of riparian woodland in and around the impact area in 2005.

The first year annual monitoring was conducted in 2007. The mitigation site performed moderately well for the first year. Container plant survival was high, but willow survival was low and invasive species cover was relatively high. Willows were replanted in Year 2 and 3, increasing overall survival and riparian cover. Frequent weed maintenance decreased the overall cover of invasive species. By Year 4, survival remained high, riparian cover increased again and invasive species cover decreased.

The mitigation site continues to perform very well in the fifth year. It has high plant survival, high native cover and low cover from invasive species. Over the past five years the site has shown significant increase in native species cover and decrease in invasive species cover.

Mitigation monitoring at the site should be considered complete. The site has met the percent survival for container stock, tree cover, shrub cover, invasive species cover and instream wetland vegetation extent performance standards. The site has not yet met the total percent cover, willow survival and cover, tree height, and SRA habitat cover extent standards. The total percent cover and height standards are difficult to meet within five years given the dense existing native canopy cover. Although all of the Year 5 final success criteria for the site have not been met, riparian vegetation has established and is reproducing on the site as a direct result of mitigation actions taken over the past 5 years. Overall success should be measured not only in terms of criteria that may not be entirely appropriate for the site but on the proven establishment of functional habitat and conditions conducive to natural recruitment of riparian vegetation.



# SECTION 1

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## Introduction

### 1.1 Purpose and Background

This report details the annual mitigation monitoring results for vegetation conducted on behalf of the City of San Jose (City) by Environmental Science Associates (ESA) for the Quail Hollow Bridge Replacement Mitigation Project. The Project was executed by the City of San Jose as mitigation for impacts to riparian woodland and shaded riverine aquatic (SRA) habitat from the project. Bridge construction was implemented in 2004 and riparian mitigation was implemented in 2005 in accordance with the following agency approvals:

- U.S. Army Corps of Engineers Nationwide Permit Numbers 14, 27, and 33 (File Number 27383S)
- Regional Water Quality Control Board (RWQCB) Water Quality Certification (File Number 2188.07 bkw; Site Number 02-43-C0423)
- California Department of Fish and Game Streambed Alteration (CDFG, Notification Number R3-2002-0903)
- U.S. Fish and Wildlife Service (USFWS) Reinitiation of Formal Consultation on the Phase 2 Bank Stabilization in Alum Rock Park (Service File Number 1-1-04-F-0071)
- Mitigated Negative Declaration, Quail Hollow Bridge Replacement Project, Applicant: City of San Jose Department of Public Works (Project File Number PP02-09-235)

Mitigation and monitoring was also implemented following guidelines presented in the *Alum Rock Park Riparian Management Plan* prepared by Biotic Resources Group in 2001 (LSA, 2007).

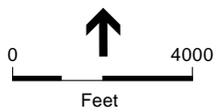
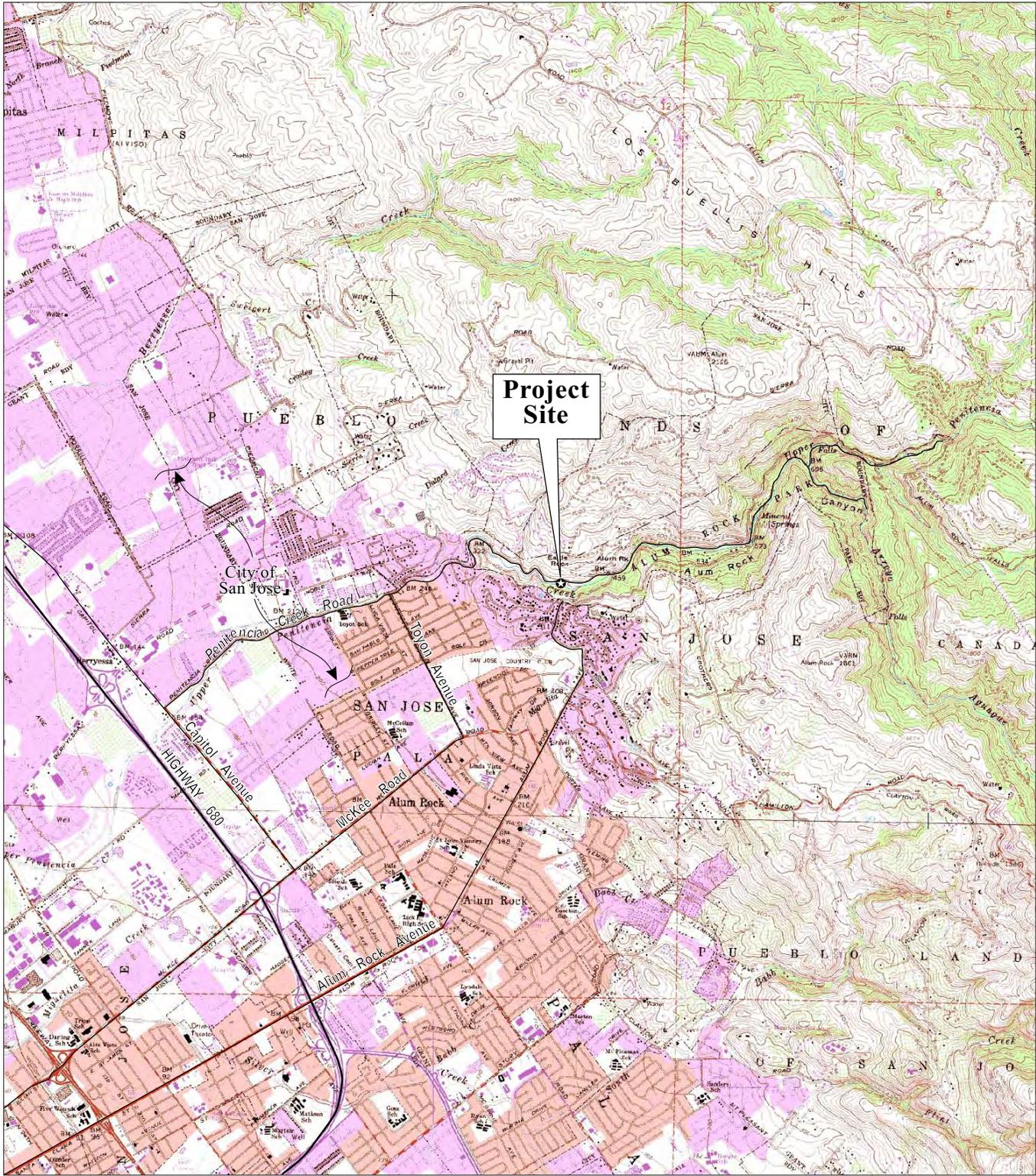
The following report summarizes the previous four years' vegetation maintenance and monitoring efforts and documents the fifth year monitoring results and recommendations. This report includes a description of the mitigation site, monitoring methods, results, conclusions, and recommendations. Permit conditions established requirements for geomorphological monitoring as well as for vegetation. The fifth year geomorphological monitoring results will be submitted in a stand-alone report.

## 1.2 Mitigation Location and Description

The Quail Hollow Bridge Replacement Project is located within the Upper Penitencia Creek watershed near the Quail Hollow Picnic Area in Alum Rock Park, San Jose, Santa Clara County, California (**Figure 1**). The project site is located within and on the banks of Upper Penitencia Creek and generally surrounded by undeveloped grassland, scrub and woodland habitats. The majority of the creek within the project vicinity is buffered by well-established riparian woodland habitat.

In 2004 the City of San Jose completed construction of the single-span pedestrian bridge over Upper Penitencia Creek. The project removed an existing culverted low-water crossing that acted as a partial fish passage barrier and replaced it with the new bridge. The culverts within the low-water crossing were also clogged with sediment, causing stream bank erosion. The project permanently impacted approximately 150 linear feet of creek and a surface area of 7,500 square feet (0.17 acre). The project also resulted in temporary impacts to a surface area of 0.04 acre and 225 linear feet of creek due to stream flow diversion.

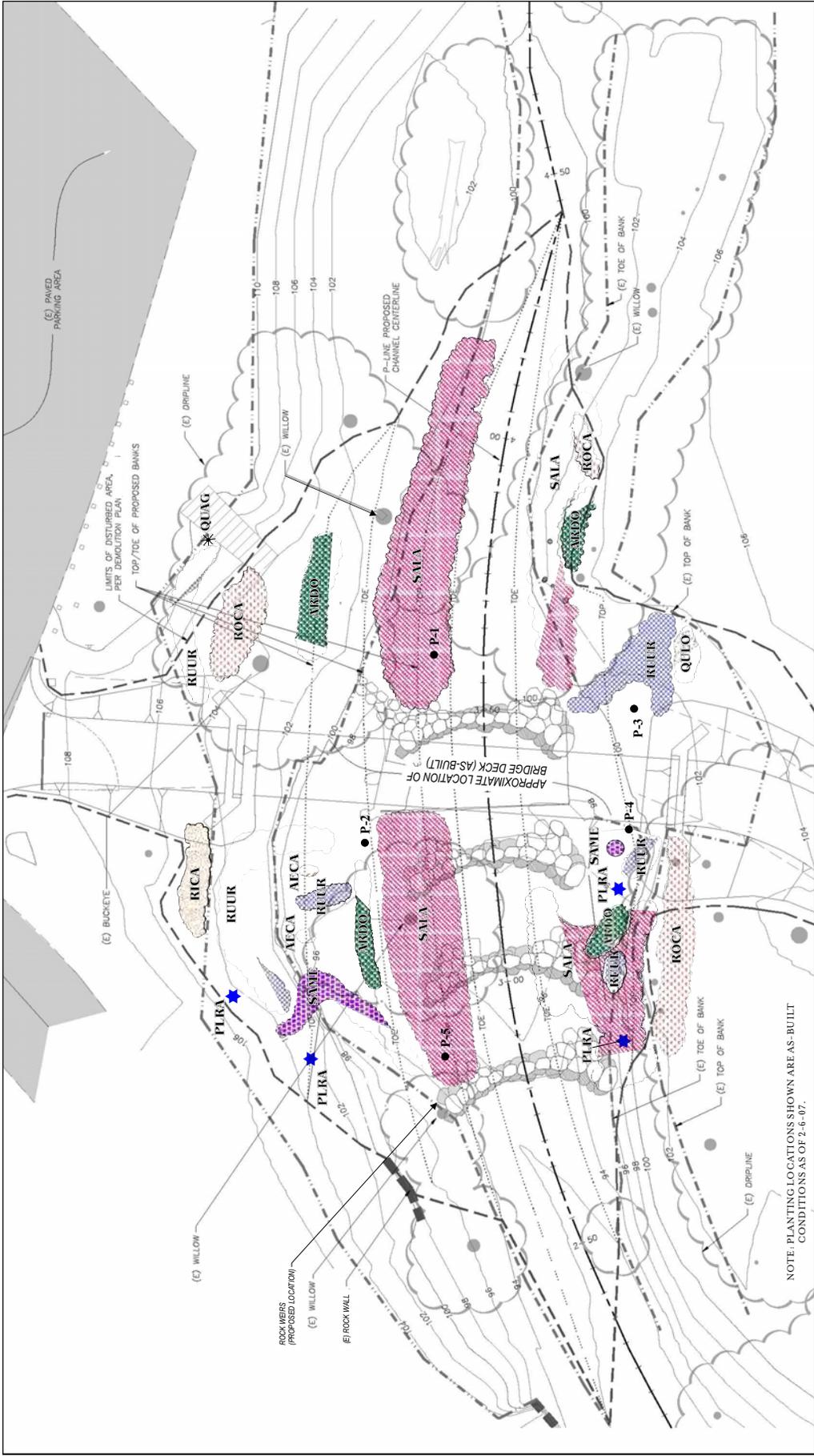
Creek channel restoration included the installation of rock weirs to provide grade control of the reconfigured project reach. Installation of the rock weirs was designed to prevent further scour, improve creek bank conditions, and create pool habitat for aquatic species. Mitigation for the bridge installation impacts also included the establishment of approximately 9,000 square feet (0.2 acre) of riparian woodland (**Figure 2**). Riparian mitigation plantings were installed in and around the impact area in 2005.



SOURCE: LSA

Quail Hollow Bridge Replacement . 210011

**Figure 1**  
Project Location



**LEGEND**

- P-4 ●** PERMANENT PHOTO POINT (P-1 THROUGH P-5)
- EXISTING TREES

**PLANTINGS**

- AECA - California buckeye (*Ascalus californica*)
- ARDO - mugwort (*Achillea californica*)
- ★ PLRA - California yucca (*Yucca californica*)
- ★ QUAG - coast live oak (*Quercus agrifolia*)
- QUULO - valley oak (*Quercus lobata*)
- RICA - hillside gooseberry (*Ribes californica*)
- ROCA - California rose (*Rosa californica*)
- RUUR - California blackberry (*Rubus ursinus*)
- SALA - red willow (*Salix lasiolepis*) and arroyo willow (*Salix lasiolepis*)
- SAME - Mexican elderberry (*Sambucus mexicana*)

North  
Not to Scale

SOURCE: LSA, 2009

Quail Hollow Bridge Replacement . 210011

**Figure 2**

Riparian Plantings

## 1.3 Mitigation Program Goals

The goal of the mitigation program is to fully compensate for biotic impacts to Upper Penitencia Creek and adjacent riparian resources from implementation of the Quail Hollow Bridge Replacement Project. Compensation will be accomplished by restoration of riparian and SRA habitats adjacent to the impacted habitats. Mitigation is designed to comply with all agency approvals for the project.

## 1.4 Monitoring Purpose

Monitoring is to be conducted annually in Years 1 through 5, or until the mitigation site meets established performance standards. The purpose of the monitoring is to:

- determine total percent survivorship for the entire planting area as well as on a per species basis;
- determine percent cover of planted species throughout the entire riparian restoration area;
- determine percent cover of invasive species;
- determine the extent of SRA habitat;
- determine the extent of instream wetland vegetation establishment;
- determine the average height of each tree and shrub species;
- qualitatively evaluate site conditions (e.g., cover of native versus non-native, areas of significant die-off, areas of erosion, diseases) and make observations about necessary remedial actions (e.g., refuse removal, weed control, irrigation repairs, plant replacement); and
- photodocument the site at permanent photopoints.

## 1.5 Success Criteria

During the five-year monitoring period the mitigation areas were monitored and evaluated against the following established success criteria. These criteria are contained in the permits and approvals obtained for the project. The final success criteria for vegetation for this project consist of the following:

*Plant Survival.* The RWQCB Water Quality Certification states that for the first three years of monitoring following planting, container stock plantings should have 80% survival and willow poles should have 60% survival. The CDFG Streambed Alteration Agreement states that by the fifth year of monitoring the survival rate for all plantings should be 80%. The Mitigated Negative

Declaration and USFWS Reinitiation of the Biological Opinion include 75% survival of all species as the standard.

*Percent Cover.* According to the CDFG Streambed Alteration Agreement, by Year 3 percent cover of planted trees and shrubs should be 70% and by Year 5 it should be 75%. The *Alum Rock Park Riparian Management Plan* states that by Year 5, native tree cover should be 25% and native shrub cover should be 20% (LSA, 2007).

Invasive species cover should be maintained at less than 10% cover, with the exception of periwinkle (*Vinca major*), which can have a cover of up to 25%. These standards are not included in the permits and approvals for the project, but have been used in the previous four monitoring reports and will be included as a standard in this report.

*Shaded Riverine Aquatic Habitat.* The mitigated negative declaration states that within the 9,000 square foot riparian restoration area, 1,660 square feet of SRA habitat will be established by Year 5. Additional plantings and monitoring shall occur until this determination has been made.

*Instream Wetland Vegetation Establishment.* The mitigated negative declaration also states that instream wetlands impacted by the project should naturally reestablish within two years. As indicated in previous monitoring reports (LSA, 2008, 2009a, and 2009b), 100 square feet of instream wetlands were impacted by the project. If wetlands do not naturally re-establish after two years, then additional in-kind wetland mitigation would be provided at a 1:1 ratio.

*Tree Height.* Planted trees shall reach specified tree height standards presented in the *Alum Rock Park Riparian Management Plan* and provided below in **Table 1.1**.

**TABLE 1.1  
QUAIL HOLLOW YEAR 5 TREE HEIGHT PERFORMANCE STANDARDS**

Scientific Name	Common Name	Year 5 Average Height Performance Standard (Feet)
<i>Aesculus californica</i>	California buckeye	N/A
<i>Platanus racemosa</i>	sycamore	10
<i>Quercus lobata</i>	valley oak	6
<i>Salix</i> sp.	willows	10
<i>Sambucus mexicana</i>	blue elderberry	8

# SECTION 2

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## Revegetation Monitoring

### 2.1 Background

In June 2005 the riparian plantings and drip irrigation system were installed according to the planting plan (see **Figure 2**). **Table 2.1** below details the number of plants of each species required for installation. A total of 153 plants were installed; this included 64 container plants and 89 willow (*Salix* sp.) poles. Container stock included typical riparian woodland species such as California rose (*Rosa californica*), valley oak (*Quercus lobata*), sycamore (*Platanus racemosa*), and mugwort (*Artemisia douglasiana*).

Since the percent survival criterion was not met for willows in Years 1 and 2, 83 additional willow poles were installed in 2007 and 67 additional poles in 2008.

Two memorial native plants have also been added to the mitigation area. One holly-leaved cherry (*Prunus ilicifolia*) was installed in 2007 and one valley oak was installed in 2009. These plants are not included in the survival count.

**TABLE 2.1**  
**QUAIL HOLLOW PLANTING LIST 2005**

Scientific Name	Common Name	# Specified in Planting Plans
<i>Aesculus californica</i>	California buckeye	2
<i>Artemisia douglasiana</i>	mugwort	12
<i>Platanus racemosa</i>	sycamore	4
<i>Quercus lobata</i>	valley oak	2
<i>Ribes californica</i>	hillside gooseberry	5
<i>Rosa californica</i>	California rose	12
<i>Rubus ursinus</i>	California blackberry	20
<i>Sambucus mexicana</i>	blue elderberry	7
<b>Total Container Stock</b>		<b>64</b>
<i>Salix</i> sp.	willows	89
<b>Total Plants Installed</b>		<b>153</b>

## 2.2 Methods

The mitigation site has been monitored annually for a period of five years. This is the fifth year of monitoring following plant installation. The methods implemented followed the methods utilized in the previous four monitoring years, as described below.

### General Site Conditions

The general condition of each planting site was qualitatively evaluated for the presence of native species recruits, invasive species, erosion, vandalism, animal damage, etc.

### Percent Survival

All surviving trees and shrubs were counted and tallied by species. Percent survival was then calculated by dividing the total number of surviving plants by the total number originally installed, then multiplying by 100. Past monitoring efforts (LSA, 2009b) included volunteers in the percent survival counts. ESA counted only plants that had been installed as part of the project.

### Percent Cover

The total absolute cover of the plantings was visually estimated to the nearest five percent. Cover was estimated over the entire project area and in each of the four quadrants (or corners) of the project area. The percentage of shrub cover, tree cover, and invasive species cover was also visually estimated in each of the four quadrants and over the entire project area. In addition, the combined cover of both planted individuals and native volunteers was estimated for each quadrant and for the entire site. Native volunteers, including coyote brush and poison oak, were dense in some areas and are an indicator that site conditions are conducive to natural recruitment.

### Shaded Riverine Aquatic Habitat

The square footage of SRA habitat (vegetation overhanging the creek channel) was visually estimated in each of the four quadrants and over the entire project area.

### Instream Wetland Vegetation

The square footage of instream wetlands within each of the four quadrants and over the entire project area was visually estimated.

### Tree Height

The height of each planted tree and shrub was measured using a graduated rod. The height of all volunteers was also measured.

## Photomonitoring

Five permanent photo points were established at the mitigation site during the first monitoring year and their locations are shown on Figure 2. **Appendix B** includes representative photographs from each photo point from Years 1, 4 and 5.

## SECTION 3

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### Results

On September 24, 2010, ESA conducted the annual mitigation monitoring of the Quail Hollow Bridge Replacement Project site. This was the fifth year of monitoring following installation in 2005. The following section describes the current site conditions, a general summary of the results from the previous four years of monitoring, and the results from this year.

#### 3.1 General Site Conditions

The Quail Hollow Bridge Replacement Restoration site is in very good condition. The planting area contains high cover of native species, including installed, volunteer, and existing plants. Non-native invasive species cover is relatively low and there are only a few small patches of periwinkle present on-site. The drip-irrigation has been shut-off over the majority of the site and existing plantings are growing well without supplemental water. The memorial plants are the only remaining plants within the site to receive irrigation.

The site does not contain any areas of excess erosion or sedimentation. Most of the banks are supported by either rock weirs or native vegetation. The rock weirs appear to be stable and functioning well through the winter flows. The depth of the step pools continues to perform well and provides aquatic habitat. Aquatic vegetation is also present along the edges of the pools and interspersed within the weirs.

#### 3.2 Year 1 through 4 Monitoring

##### Year 1

The first year annual monitoring was conducted on November 7, 2006 and January 3, 2007 by LSA Associates, Inc (LSA, 2007). Container plant survival was high at 98%, but willow survival was low at only 24%. Many willows were lost due to high flood events in March and April of 2006. Absolute cover of riparian plantings over the entire project site was approximately 10%. Periwinkle covered approximately 10% of the site and other invasive species such as poison hemlock (*Foeniculum vulgare*), black mustard (*Brassica nigra*) and Bermuda buttercup (*Oxalis pes-caprae*) covered approximately 20% of the site. SRA habitat was supplied by only two

planted willows and was approximately 8 square feet in extent. Instream wetland vegetation was approximately 1,368 square feet, well above the 100-square-foot performance standard.

## Years 2 and 3

The second and third year annual monitoring results were combined into one report. The second year monitoring was conducted on February 4 and 14, 2008 and the third year monitoring was conducted on November 5 and 6, 2008, both by LSA Associates, Inc (LSA, 2009a). Container stock plantings had over 100% survival for both years. Willow survival was 45% for Year 2, but additional poles were installed following that monitoring event and willow survival was over 100% for Year 3. In Year 2 the absolute cover of plantings was 10% (or 15% including volunteers). By Year 3 cover of plantings increased to 20% (or 35% including volunteers). Periwinkle cover was 20% and 10% in Years 2 and 3 respectively. Other invasive species cover was 8% and 4% in Years 2 and 3 respectively. SRA increased and by Year 3 had reached 473 square feet. Instream wetland vegetation establishment also remained above the performance standard through Year 3.

## Year 4

The fourth year annual monitoring was conducted on November 5 and 11, 2009 by LSA Associates, Inc (LSA, 2009b). Container stock survival was over 100% again. Only 52 of the installed willows survived, but an additional 93 volunteer willows were counted. When combined survival of planted and volunteer willows exceeded 100%. The cover of riparian plantings was approximately 40% (or 55% including volunteers). Periwinkle and other invasive species cover decreased dramatically to 3% and 2% respectively. SRA habitat increased again to 1,211 square feet and instream wetland vegetation cover remained above the performance standard.

## 3.3 Fifth Year Monitoring Results

### Percent Survival

Fifth year container stock plant survival was 100%. Container stock survival has remained well above the 80% survival performance standard during all monitoring years. **Table 3.1** below details the percent survival of each container stock species over the last three monitoring years.

Willow survival has been lower than that of container stock over the five year monitoring period. This year 43 willows (or 48%) survived. However, an additional 36 volunteer willows were counted within the project site. The total number of planted and volunteer willows is 79.

Overall survival at the project site, including container species and planted willows is 69% (107 out of 153). ESA's results are not directly comparable to those of previous monitoring efforts because we did not include volunteers in our percent survival calculations, as was done by LSA in 2009. However, the fact that there are 36 volunteer willows on the project site is an indicator that the site is providing conditions for successful natural willow recruitment.

**TABLE 3.1  
QUAIL HOLLOW CONTAINER PLANT SURVIVAL YEARS 3 THROUGH 5**

Scientific Name	Common Name	# Specified in Planting Plans	# Alive 2008 (Year 3)	Percent Survival 2008 (Year 3)	# Alive 2009 (Year 4)	Percent Survival 2009 (Year 4)	# Alive 2010 (Year 5)	Percent Survival 2010 (Year 5)
<i>Aesculus californica</i>	California buckeye	2	2	100%	2	100%	2	100%
<i>Artemisia douglasiana</i>	mugwort	12	12	100%	12	100%	12	100%
<i>Platanus racemosa</i>	sycamore	4	4	100%	4	100%	3	75%
<i>Quercus lobata</i>	valley oak	2	2	100%	2	100%	2	100%
<i>Ribes californica</i>	hillside gooseberry	5	5	100%	5	100%	5	100%
<i>Rosa californica</i>	California rose	12	12	100%	12	100%	12	100%
<i>Rubus ursinus</i>	California blackberry	20	23	115%	22	110%	23	115%
<i>Sambucus mexicana</i>	blue elderberry	7	6	86%	6	86%	5	71%
<b>Total Container Stock</b>		<b>64</b>	<b>66</b>	<b>103%</b>	<b>65</b>	<b>102%</b>	<b>64</b>	<b>100%</b>

## Percent Cover

**Table 3.2** below summarizes the percent cover of trees, shrubs, and non-native species in each of the four quadrants and an average for the entire site.

Overall, the site is meeting most of its cover performance standards. Planted and volunteer shrub cover is 21%, which is above the *Alum Rock Riparian Management Plan* 20% performance standard, and planted and volunteer tree cover is 29%, which is also above its 25% performance standard. Total cover of planted and volunteer species is 50%, which is less than the 75% performance standard required by CDFG. However, given the high density of existing native canopy, it would be difficult for new plantings to achieve such high cover in five years. The site has shown great improvement in total percent cover over the past five monitoring years and is expected to continue to increase over time. Total absolute cover of riparian plantings in Year 1 was estimated at 10%, 15% in Year 2, 30% in Year 3, 55% in Year 4 and 50% in Year 5<sup>1</sup>. Given this growth rate, it may take several more years before the site achieves 75% cover, however the trend has been positive and there is no reason to think that it will not continue.

<sup>1</sup> The small decrease this year is most likely due differences in estimating percent cover since monitoring was conducted by different individuals in Years 4 and 5. The photographs presented in Appendix B show that there was an increase in riparian cover between Years 4 and 5.

**Table 3.3** below provides a comparison of periwinkle and other invasive species cover over the past three monitoring years. Periwinkle and other invasive species percent cover have continued to decrease every year and remain below the performance standard. This decrease can be attributed to frequent site maintenance and weed control every year.

**TABLE 3.2  
QUAIL HOLLOW PERCENT COVER YEAR 5**

Monitoring Parameter	Percent Cover by Quadrant				Average Percent Plant Cover Across all Four Quadrants	
	Quadrant	North	South	West	East	All
Planted Tree Cover		20	3	30	15	17
Planted Shrub Cover		10	17	10	10	12
<b>Total Planted Cover</b>		<b>30</b>	<b>20</b>	<b>40</b>	<b>25</b>	<b>29</b>
Planted and Volunteer Tree Cover		30	5	45	35	29
Planted and Volunteer Shrub Cover		20	25	15	25	21
<b>Total Planted and Volunteer Cover</b>		<b>50</b>	<b>30</b>	<b>60</b>	<b>60</b>	<b>50</b>
Invasive Weeds (excluding periwinkle)		0	0	5	0	1.3
Periwinkle		15	0	10	0	6.3

**TABLE 3.3  
INVASIVE SPECIES COVER YEARS 3 THROUGH 5**

Monitoring Element	Average Percent Cover Year 3 (2008)	Average Percent Cover Year 4 (2009)	Average Percent Cover Year 5 (2010)	Year 5 Percent Cover Performance Standard
Invasive Weeds (excluding periwinkle)	4%	2%	1.3%	<25%
Periwinkle	10%	3%	6.3%	<10%

## Shaded Riverine Aquatic Habitat

There is an estimated 1,360 square feet of SRA habitat from planted and volunteer species. This includes an estimated 250 square feet in the north quadrant, 10 in the south, 500 in the west, and 600 in the east. Although this is 300 square feet below the 1,660 square foot performance standard, it is an increase in 149 square feet from 1,211 square feet last year. SRA habitat cover has increased every year during the monitoring period and is expected to meet the performance standard within the next few years as the willows continue to mature.

## Instream Wetland Vegetation

There is an estimated 250 square feet of instream aquatic vegetation, which exceeds the required 100 square feet. Instream wetland vegetation cover has continued to meet the required performance standard every monitoring year. Dominant species include water cress (*Rorippa nasturtium-aquaticum*) and various rushes (*Juncus* spp.).

## Height

**Table 3.4** shows the average height of each tree species at each site over the past three years as well as their final success criteria. Overall, all species are below their height performance standard. Blue elderberry (*Sambucus mexicana*) is the only species that is nearly reaching its 8-foot standard; with an average height of 6.8 feet. The average height of nearly all species, with the exception of sycamore and California rose, has increased since last year. In general, the average height of each species has continually increased each year, although the rate of increase is rather low. Plants are slowly increasing in height, but at the rate they are growing, it may take at least a few more seasons before they reach their height standards. This slow growth rate may be due to dense existing canopy cover and competition with mature, established trees for sunlight, water, and nutrients.

**TABLE 3.4**  
**QUAIL HOLLOW PLANTED SPECIES HEIGHT YEARS 3 THROUGH 5**

Scientific Name	Common Name	Average Height Year 3 (2008) (Feet)	Average Height Year 4 (2009) (Feet)	Average Height Year 5 (2010) (Feet)	Average Height <sup>a</sup> Final Performance Standard (Feet)
<i>Aesculus californica</i> *	California buckeye	1.0	1.3	1.6	N/A
<i>Artemisia douglasiana</i> *	mugwort	1.9	1.3	2.9	N/A
<i>Platanus racemosa</i>	sycamore	3.5	4.1	3.6	10
<i>Quercus lobata</i>	valley oak	3.7	3.6	3.9	6
<i>Ribes californica</i> *	hillside gooseberry	3.6	3.9	4.4	N/A
<i>Rosa californica</i> *	California rose	3.7	4.1	3.3	N/A
<i>Rubus ursinus</i> *	California blackberry	1.4	1.6	2.6	N/A
<i>Salix</i> sp.	willows	2.8	5.1	6.3	10
<i>Sambucus mexicana</i>	blue elderberry	5.1	5.9	6.8	8

### NOTES:

a Average height does not include volunteer plants.

\* There were no height standards set for these species but they were measured in previous years and are presented here to show that they are establishing and increasing in height over time.

## SECTION 4

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### Conclusion and Recommendations

The Quail Hollow Bridge Replacement mitigation area is performing very well. It has high native cover, high survival of planted species, and little cover from invasive species. Over the past five years the site has shown a significant increase in native species cover and decrease in invasive species cover.

Container stock plant survival has ranged between 98% and 103% during all five monitoring years, well surpassing the 80% survival performance standard. Willow survival has been lower than container stock throughout the 5 year monitoring period. Even with two replacement plantings, willow survival in 2010 was 48%, which is below the 80% performance standard. The survival rate for all plantings combined is 70%, which is short of the CDFG requirement of 80% survival at five years. However, including natural recruitment of willows within the project area would bring the number of existing willows to 88% of that planted. This would also bring the total survival rate up to 93%.

Planted trees and shrubs, when combined with volunteers (primarily coyote brush seedlings and saplings) that have established as a positive result of project maintenance, have exceeded the 20% shrub cover and 25% tree cover performance standard established in the *Alum Rock Riparian Management Plan* and adopted as a condition of approval by the RWQCB. The CDFG Streambed Alteration Agreement states that by Year 5 planted trees and shrubs should achieve 75% cover. The site has met the RWQCB standard, but not the CDFG standard. The CDFG standard has proven difficult to achieve at this site, at least within the 5 year monitoring period, given the extent of existing native canopy cover. The dense tree canopy and competition with mature trees may be retarding the growth of installed plants.

Due to frequent weed maintenance at the site, invasive species cover has continually decreased with each monitoring year and remained below established performance standards for the last four monitoring years.

Tree height standards have not been met and it may have been unreasonable to expect trees to reach these heights in 5 years. However, average tree height has generally increased every year. Since the trees have been proven to grow without supplemental irrigation, we expect them to reach their height standards within the next couple of years. Their slow growth rates may be due to dense canopy cover and competition with established vegetation.

Mitigation monitoring at the site should be considered complete. The site has met the percent survival for container stock, tree cover, shrub cover, invasive species cover, and instream wetland

vegetation extent performance standards. Although the total percent cover, willow survival and cover, tree heights, and SRA habitat cover extent standards have not yet been met, the site is performing extremely well. The total percent cover and height standards are considered difficult to meet within five years given the dense existing native canopy cover. Overall, the mitigation plants have generally increased in height and extent each year and, given the excellent condition of the site, should meet the performance standards within several years. The extent of SRA habitat cover has also increased every year and has nearly reached the required performance standard. The majority of the SRA habitat cover is provided by willows, and as this species has shown a steady increase in area over the monitoring period, should reach the standard within the next few years.

Although all of the Year 5 final success criteria for the site have not been met, riparian vegetation has established and is reproducing on the site as a direct result of mitigation actions taken over the past 5 years. Overall success should be measured not only in terms of criteria that may not be entirely appropriate for the site but on the proven establishment of functional habitat and conditions conducive to natural recruitment of riparian vegetation.

## SECTION 5

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# Report Preparation and References

### 5.1 Report Preparation

Prepared by: Michelle Giolli, Field Biologist  
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Oakland, CA  
(510) 839-5066

Other contributors: Martha Lowe, Project Biologist and Deputy Project Manager  
Chris Rogers, Project Manager  
Perry Jung, Graphics

### 5.2 References

LSA Associates, 2007. *Quail Hollow Bridge Replacement Project First Annual Monitoring Report* prepared for the City of San Jose – Parks, Recreation and Neighborhood Services. Point Richmond, California. March 22.

LSA Associates, 2009a. *Quail Hollow Bridge Replacement Project Second and Third Annual Monitoring Report* prepared for the City of San Jose – Parks, Recreation and Neighborhood Services. Point Richmond, California. July 17.

LSA Associates, 2009b. *Quail Hollow Bridge Replacement Project Fourth Annual Monitoring Report* prepared for the City of San Jose – Parks, Recreation and Neighborhood Services. Point Richmond, California. December 3.



# **APPENDIX A**

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## **Monitoring Data Sheets**



**Quail Hollow Cover Estimation Data Sheet**

Date: 9/24/10

Surveyors: M. Giolli L. Thompson

Time:

Weather Conditions:

Area	Cover estimate	Notes
<b>Riparian Plant Cover* Include a) planted cover only and b) both planted and volunteer cover</b>		
		Planted + vol. trees > 30 Planted + vol shrub > 20
North Quadrant	a. 30 b. 50	Planted tree cover > 20 Shrubs > 10 lots of 20 large cork oak brush + poison oak
South Quadrant	a. 20 b. 30	Planted tree cover > 30% Shrubs > 17% Planted vol tree > 5 Planted vol shrubs > 25
West Quadrant	a. 40 b. 60	Planted trees > 30 Planted shrubs > 10 Planted vol tree > 45 Planted vol shrubs > 15
East Quadrant	a. 25 b. 60	Planted tree cover > 15 shrubs > 10 includes canyon brush MIS plants
Entire Site	a. b.	Planted + vol tree > 85 Planted + vol shrubs > 25
Invasive Weed (except periwinkle)	0	10% bermuda grass
Periwinkle (Vinca major)	10-15%	
<b>Instream Wetland Vegetation (Shaded Riverine Cover) Plantings and Volunteers Total**</b>	> 250 ft <sup>2</sup>	
North Quadrant	10 x 25 = 250	
South Quadrant	10 x 8 ft 10	Existing provides majority of cover ~70%
West Quadrant	8 x 5 + (20 x 20) (15 x 4)	Willow + elderberry
East Quadrant	Bridge area 10 x 50 5 x 20	
Entire Site		
<b>Overall</b>		
Existing Trees and shrubs	75%	
Planted Tree Cover		
Planted Shrub Cover		
Volunteer Shrub Cover		
Volunteer Tree Cover		
Planted and Their Volunteers		
Grasses and Forbs	30	including rock banks

\*Cover estimated to the nearest five percent

\*\*Square footage of instream wetlands visually estimated

Native cover at least 80%

APDO/ROOZ - Spreading, providing excellent ground cover for successful

BAP1 - lots of volunteers providing majority of cover in areas

Existing tree canopy high overall. Stream most cover over 50% trees pine, buck eye, redwood, willows, QUAG, Toyon

Quail Hollow Tree and Shrub Cover and Height Data Sheet

Date: 9/29/10 Surveyors: M. Giallari & C. Thoreson  
 Time: Weather Conditions: cool/clear

n 5-10' Volunteer ROCA in E area. ~3' height.

Planted Species	Height						
ARDO	4.7	SAME	7.5	*ROCA	2.6	Salix	15'
RUUR	2	SAME	6.8	ROCA	3.7	*Salix	2.7
AECA	1.9	ARDO	3.9	RUUR	4.1	*Salix	1.5
RUIZ	5.1	ARDO	3.3	ROCA	4.5	*ARDO	2.1
RUUR	4.1	Salix	dead	ROCA	4.8	Salix	7
RUIZ	5	Salix		Salix	5.5	Salix	4.6
RUIZ	3.7	Salix		ROCA	4.5	Salix	5.4
RUUR	2.8	Salix		*ROCA	1.5	Salix	3.3
RUUR	3.1	Salix	↓	ARDO	7.5	Salix	3.7
RICA	5.2	Salix	6.7	ARDO	1.7	*Salix	2.1
RICA	4.3	Salix	3.9	Salix	dead	Salix	6.2
RICA	4.2	*Salix	1.5	ARDO	1.9	Salix	5.1
RICA	3.8	*Salix	1.5	ARDO	3.4	*Salix, *5	less than 1'
RICA	4.4	*Salix	1.5	Salix	3.5	Salix	8
PLRA	4.4	Salix	12	Salix	5.3	*Salix	6.5
AECA	1.2	*Salix	1.2	Salix	6.6	Salix	3.1
SAME	10	*Salix	1.5	Salix	1.6	Salix	2.7
RUIZ	1.5	ROCA	3.6	Salix	3.1	*Salix	7
SAME	1	ROCA	4.2	Salix	5.1	*Populus	10
SAME	1.4	*SAME	8	*Salix	2.8	Salix	5.5
PLRA	1.1	*RUUR	1.8	*Salix	1.6	Salix	11

(CA buckeye) Aesculus californica: AECA  
 (mugwort) Artemisia douglasiana: ARDO  
 (Sycamore) Platanus racemosa: PLRA  
 (coast live oak) Quercus agrifolia: QEAG

(valley oak) Quercus lobata: QULO  
 (gooseberry) Ribes californica: RICA  
 (CA rose) Rosa californica: ROCA

(CA blackberry) Rubus ursinus: R  
 (willow) Salix sp.: SASP  
 (Elderberry) Sambucus mexicana

Quail Hollow Tree and Shrub Cover and Height Data Sheet

Date: \_\_\_\_\_ Surveyors: \_\_\_\_\_  
 Time: \_\_\_\_\_ Weather Conditions: \_\_\_\_\_

Area ~15 x 7'  
 Solid ARDO + RUVR cover  
 Estimated approx. 4 species planted based on  
 previous planting proximity. This area being very  
 well. See photo # 778

Planted Species	Height						
QULO	4.7	*ROCA	2.5	ARDO	2.7	Salix	dead
RUVR	1.5	ROCA	3.1	ARDO	2.7	Salix	10
RUVR	3.7	Salix	dead	ARDO	2.7	Salix	3.5
RUVR	2.3	Salix	dead	RUVR	2.8	Salix	8
RUVR	3.2	Salix	dead	*QUAG	3.7	Salix	7
RUVR	2.7	Salix	2.4	ROCA	4.1	*RUVR	3.3
RUVR	1.4	Salix	dead	*ROCA	1.6	*Salix	2.7
QULO	0.9	*QUAG	1.3	ROCA	2.5	Salix	10
RUVR	2.1	ARDO	2.9	SAME	8.3	ARDO	3.4
QUAG	2.3	Salix	dead	ROCA	1.8	Salix	8'
QULO	6.0	*RUVR	1	ROCA	1.9	Salix	4.2
QUAG	2.6	RUVR	1.9	ROCA	1.9	Salix	15
QUAG	3.1	RUVR	1.7	ROCA	2.8	Salix	10'
QUAG	4.1	RUVR	1.5	PLRA	5.2	Salix	6.5
ROCA	2.7	*Salix	4.1	ARDO	2.1	Salix	3.9
ROCA	3.4	SAME	9.5	Salix	dead	Salix	2
ROCA	2	RUVR	2.5	Salix	20+	Salix	2.5
RRA	2.6	RUVR	1	*Salix	2.7	RUVR	0.9
ROCA	4.5	Salix	2	*ARDO	1.3	Salix	dead
ROCA	3.6	RUVR	5	Salix	2.5	RUVR	0.7
*QUAG	2.9	PLRA	4.5	*Salix	2.5	Salix	4.5

(CA buckeye) Aesculus californica: AECA  
 (mugwort) Artemisia douglasiana: ARDO  
 (Sycamore) Platanus racemosa: PLRA  
 (coast live oak) Quercus agrifolia: QEAG

(valley oak) Quercus lobata: QULO  
 (gooseberry) Ribes californica: RICA  
 (CA rose) Rosa californica: ROCA

(CA blackberry) Rubus ursinus: R  
 (willow) Salix sp.: SASP  
 (Elderberry) Sambucus mexicana

\* - Volunteer

note: 10' under 1' tall Salix  
 volunteers w side



# **APPENDIX B**

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## Photodocumentation





Photo 1: **Photo Point 1** Looking southwest at rock weirs and southwestern bank.

**Year 1, November 7, 2006**



Photo 2: **Photo Point 1** Looking southwest at rock weirs and southwestern bank.

**Year 4, November 5, 2009**



Photo 3: **Photo Point 1** Looking southwest at rock weirs and southwestern bank.

**Year 5, September 24, 2010**



Photo 4: **Photo Point 1**  
Looking southeast at  
southeastern bank.

**Year 1, November 7, 2006**



Photo 5: **Photo Point 1**  
Looking southeast at  
southeastern bank.

**Year 4, November 5, 2009**



Photo 6: **Photo Point 1**  
Looking southeast at  
southeastern bank.

**Year 5, September 24, 2010**



Photo 7: **Photo Point 2**  
Looking south at southwest bank.

**Year 3, February 14, 2008**  
(No photo available from this location for Years 1 and 2)



Photo 8: **Photo Point 2**  
Looking south at southwest bank.

**Year 4, November 5, 2009**



Photo 9: **Photo Point 2**  
Looking south at southwest bank.

**Year 5, September 24, 2010**



Photo 10: **Photo Point 3**  
Looking north at  
northeastern bank.

**Year 1, November 7, 2006**



Photo 11: **Photo Point 3**  
Looking north at northeastern  
bank.

**Year 4, November 5, 2009**



Photo 12: **Photo Point 3**  
Looking north at  
northeastern bank.

**Year 5, September 24, 2010**



Photo 13: **Photo Point 4**  
Looking northwest at  
northwestern bank.

**Year 1, November 7, 2006**



Photo 14: **Photo Point 4**  
Looking northwest at  
northwestern bank.

**Year 4, November 5, 2009**



Photo 15: **Photo Point 4**  
Looking northwest at  
northwestern bank.

**Year 5, September 24, 2010**



Photo 16: **Photo Point 5**  
Looking east at  
northwestern bank.

**Year 1, November 7, 2006**



Photo 17: **Photo Point 5**  
Looking east at  
northwestern bank.

**Year 4, November 5, 2009**



Photo 18: **Photo Point 5**  
Looking east at  
northwestern bank.

**Year 5, September 24, 2010**

