

# AMERICAN RIVER PARKWAY OFF-PAVED TRAIL PILOT PROGRAM

## Environmental Monitoring Plan

Prepared for  
Sacramento County  
Department of Regional Parks

Revised: June 2017





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2600 Capitol Avenue  
Suite 200  
Sacramento, CA 95816  
916.564.4500  
[www.esassoc.com](http://www.esassoc.com)



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# TABLE OF CONTENTS

## American River Parkway Off-Paved Trail Pilot Program- Environmental Monitoring Plan

	<u>Page</u>
<b>Chapter 1, Introduction.....</b>	<b>1-1</b>
<b>Chapter 2, Off-Paved Trail Pilot Program.....</b>	<b>2-1</b>
2.1 Description of the Pilot Program .....	2-1
2.2 Anticipated Levels of Use .....	2-5
2.3 Potential Environmental Impacts .....	2-5
<b>Chapter 3, Existing Conditions.....</b>	<b>3-1</b>
3.1 Biotic Conditions .....	3-1
3.1.1 Woodlake Land Use Area .....	3-1
3.1.2 Cal Expo Land Use Area.....	3-1
3.2 Existing Uses .....	3-2
3.2.1 American River Parkway Land Use Designations.....	3-2
3.2.2 Additional Uses .....	3-2
<b>Chapter 4, Environmental Monitoring .....</b>	<b>4-1</b>
4.1 Environmental Indicators .....	4-1
4.2 Monitoring Methods .....	4-1
4.2.1 Permanent Monitoring Points.....	4-3
4.2.2 Observations of Environmental Indicators.....	4-4
4.3 Monitoring Schedule and Reporting.....	4-7
<b>Chapter 5, References .....</b>	<b>5-1</b>

### List of Figures

Figure 1	Regional Location .....	2-2
Figure 2	Pilot Program Trails .....	2-3
Figure 3a	Woodlake Land Use Area Vegetation and Location of Elderberry Shrubs.....	3-3
Figure 3b	Cal Expo Land Use Area Vegetation and Location of Elderberry Shrubs .....	3-4
Figure 4	Pilot Program Permanent Trail Width Monitoring Points.....	4-5

### List of Tables

Table 1	Indicators of Environmental Effects of Off-Paved Trail Cycling and Equestrian Recreation .....	4-2
Table 2	Permanent Monitoring Points Along the Pilot Program Trails .....	4-3

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# CHAPTER 1

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## Introduction

The American River Parkway Plan (County of Sacramento, 2008) includes an off-paved trail pilot program (pilot program) that would open some existing maintenance and fire roads within the Cal Expo and Woodlake land use areas to bicycling on a temporary basis for the purpose of evaluation of potential environmental impacts. The pilot program will be three years long. Prior to the pilot program, bicycling in the Cal Expo and Woodlake land use areas has been limited to the paved bike trails, and off-paved trail bicycling was prohibited. The pilot program was proposed in the 2008 American River Parkway Plan and its potential environmental impacts were assessed in the American River Parkway Plan Environmental Impact Report (EIR).

To track and evaluate impacts to natural resources along the pilot program trails, a three-year monitoring program will be implemented. This monitoring plan has been prepared to guide the three-year environmental monitoring of pilot program trails to ensure consistent application of methods, data collection, and analysis. The following chapters describe the pilot program and anticipated levels of use, discuss existing conditions, and present the environmental indicators, methods, and schedule that will be used to assess environmental impacts of the pilot program.

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## CHAPTER 2

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# Off-Paved Trail Pilot Program

## 2.1 Description of the Pilot Program

The American River Parkway Plan policy 5.17 states the following:

5.17 Off-pavement bicycle use may be permitted on existing or reconfigured maintenance and emergency roadways in the Woodlake and Cal Expo areas, at the discretion of the Parkway Manager, and as approved on locally adopted area plans, which requires a public approval process. Off-pavement bicycle use may be permitted under the following conditions:

- a) Develop an Implementation Plan prior to allowing the use of unpaved maintenance roads by users on mountain bikes. The Implementation Plan shall include both an educational and design component,
- b) Acquire additional stable and continued funding to support and monitor the use,
- c) Add natural buffers and design elements to minimize off-trail behavior and protect sensitive habitat areas,
- d) Use only authorized maintenance and emergency roadways where appropriately signed and designated,
- e) Close maintenance roads to bicyclists at the onset of the rainy season and keep closed until the trails dry out in the spring, as determined by the Parkway Manager. During rainy seasons, signs at access points should inform bicyclists of trail closures, and
- f) Provide access points near clustered parking areas

5.17.1 Off-pavement bicycle use may be further expanded in other areas of the Parkway after a three-year trial period and evaluation, subject to Parkway Manager discretion. Locally adopted area plans shall be updated to reflect permitted areas of use, consistent with conditions 5.17 a-f.

The off-paved trail pilot program is proposed in accordance with this policy. The planned location of the pilot program is along approximately 6.0 miles of existing maintenance and firebreak roads in the Woodlake and Cal Expo land use areas (**Figures 1 and 2**). Off-paved trail cycling is prohibited throughout the Parkway, but would be opened in the Woodlake and Cal Expo land use areas for the pilot program. The start of the program would coincide with installation of new signs that will designate the approved uses on each trail.

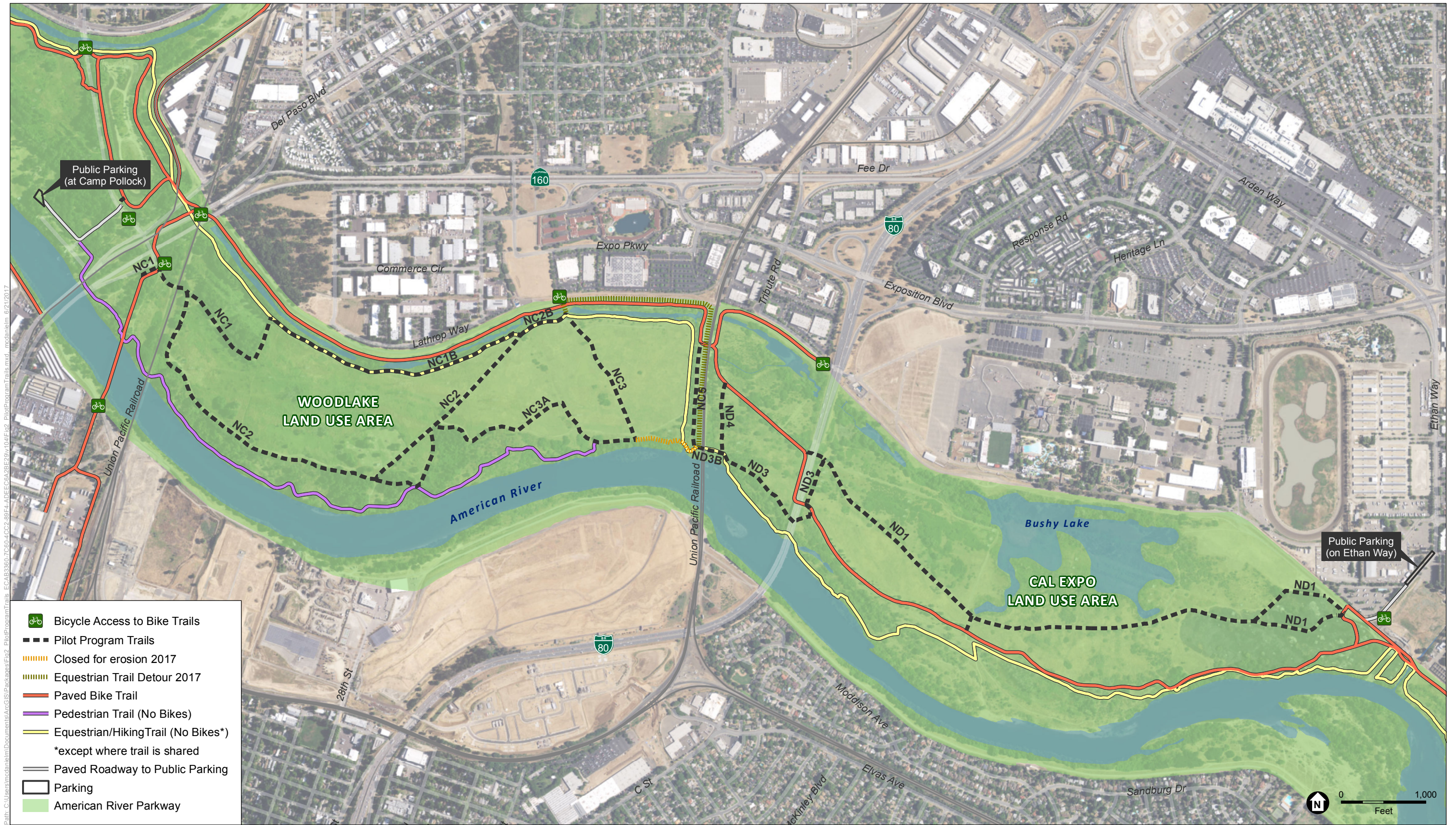


SOURCE: USDA, 2014; Sacramento County, 2017; ESA, 2017

American River Parkway Off-Paved Trail Bicycle Pilot Program

**Figure 1**  
Regional Location





SOURCE: USDA, 2014; Sacramento County, 2017; ESA, 2017

American River Parkway Off-Paved Trail Bicycle Pilot Program

**Figure 2**  
Pilot Program Trails

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The pilot program trail system is shown in Figure 2. This trail system was designed to provide trail loops of different distances throughout the Cal Expo and Woodlake land use areas. There are access points from parking areas at Ethan Way (Cal Expo land use area) and from Camp Pollock (Woodlake land use area) and the pilot program trails intersect with the paved recreation trail at multiple points throughout the Cal Expo and Woodlake land use areas.

There are a few locations within the Woodlake land use area where existing equestrian trails would be opened to the pilot program. However, there are other segments of the existing equestrian trail that will not be opened to the pilot program. Similarly, the trail close to the river will not be part of the pilot program. Off-paved bicycle use is not permitted on that trail.

## 2.2 Anticipated Levels of Use

It is difficult to estimate the number of individuals who will use the pilot program trails for biking. There has been interest from groups in the Sacramento area and these groups are likely to start using the trails at the start of the pilot program. In addition, given the location of the Woodlake and Cal Expo land use areas near residential and commercial parts of Sacramento along with the many intersections with the paved recreation trail, the pilot program trails are very accessible and visible and therefore likely to have regular use. Use patterns are likely to be similar to the paved bike trail with greater use on weekends and during the spring and fall. At present, there is unsanctioned use of the unpaved trails by cyclists and this use has not been quantified.

## 2.3 Potential Environmental Impacts

Potential environmental impacts of the pilot program include:

- Vegetation damage along the margins of trails that may negatively affect wildlife habitat, such as broken stems or branches of elderberry (*Sambucus nigra* subsp. *caerulea*) the host plant for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), a federally threatened insect.
- Habitat fragmentation caused by new informal trails.
- Habitat degradation such as trail scouring that causes erosion within and adjacent to the trails, trash on the trails, and constructed technical trail features (TTFs) that modify the trail physical structure.

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## CHAPTER 3

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# Existing Conditions

### 3.1 Biotic Conditions

The terrestrial and aquatic biological resources within the Parkway are described in the American River Parkway Plan and summarized here.

#### 3.1.1 Woodlake Land Use Area

The Woodlake land use area includes approximately 373 acres of natural habitats. Mixed riparian scrub, and Fremont cottonwood and valley oak-dominated riparian forests are present on the lower floodplain along the bank of the American River (**Figure 3a**). The upper floodplain that makes up the majority of the Woodlake land use area is an expansive area of relatively level terrain dominated by annual exotic plants, many of which are highly invasive such as yellow starthistle (*Centaurea solstitialis*), perennial pepperweed (*Lepidium latifolium*), poison hemlock (*Conium maculatum*) and milk thistle (*Silybum marinum*). There are additional areas of riparian and wetland habitats along the northern portion of the Woodlake land use area, located between the equestrian trail and the paved bike trail. These areas support mature riparian trees and wetland areas that remain inundated seasonally. Elderberry shrubs (*Sambucus nigra* subsp. *caerulea*) are present throughout the Woodlake land use area with highest concentrations in the riparian habitat along the river and in the northeastern and southeastern areas along trails NC4 and NC3B, respectively (Figure 3a).

Large wildfires have burned through parts of the Woodlake and Cal Expo land use areas in recent years, damaging portions of the riparian forest.

#### 3.1.2 Cal Expo Land Use Area

The Cal Expo land use area covers approximately 408 acres and extends from the Southern Pacific Railroad tracks along the western end to the intersection of Ethan Way on the eastern end (**Figure 3b**). There are riparian habitats throughout the Cal Expo land use area including Fremont cottonwood and mixed riparian scrub. Riparian habitats are mainly associated with the American River along the south side of the Cal Expo land use area, and with Bushy Lake along the north side. The remainder of the Cal Expo land use area is dominated by annual and perennial grasses and herbs, including many invasive plants, as described above for the Woodlake land use area.

Bushy Lake is a complex of open water, freshwater emergent wetland, and riparian habitat types that was created many decades ago. It is maintained as a State Natural Preserve, and although the

water levels and inundation periods vary from year to year this area supports a complex mosaic of habitats as well as many mature riparian trees. Elderberry shrubs are dispersed throughout the Cal Expo land use area and across habitat types.

As mentioned in the previous section, large wildfires have burned through the Cal Expo land use area in recent years. Large portions of the Cal Expo land use area have burned in multiple years causing damage to the riparian habitats throughout the area including at Bushy Lake and along the American River.

## **3.2 Existing Uses**

### **3.2.1 American River Parkway Land Use Designations**

The County of Sacramento has five broad land use designations for the Parkway, four of which are present in the Cal Expo and Woodlake land use areas: Protected Area, Nature Study Area, Limited Recreation, and Developed Recreation. The majority of the Woodlake and Cal Expo land use areas are designated as Protected Areas, which are large areas of contiguous natural habitats that are maintained for their natural habitat values. Recreation is encouraged in Protected Areas although facilities are limited. Bushy Lake in the Cal Expo land use area is designated as a Nature Study Area because of its important resources; the intended activities in this area include interpretive education and pedestrian use on designated trails.

Small portions of the Woodlake and Cal Expo land use areas are designated for Limited Recreation and the Northgate Blvd. access point in the Woodlake land use area is designated as Developed Recreation. These are locations where extensive recreation use is permitted, and, in the case of Developed Recreation, where development of new recreation facilities may be proposed.

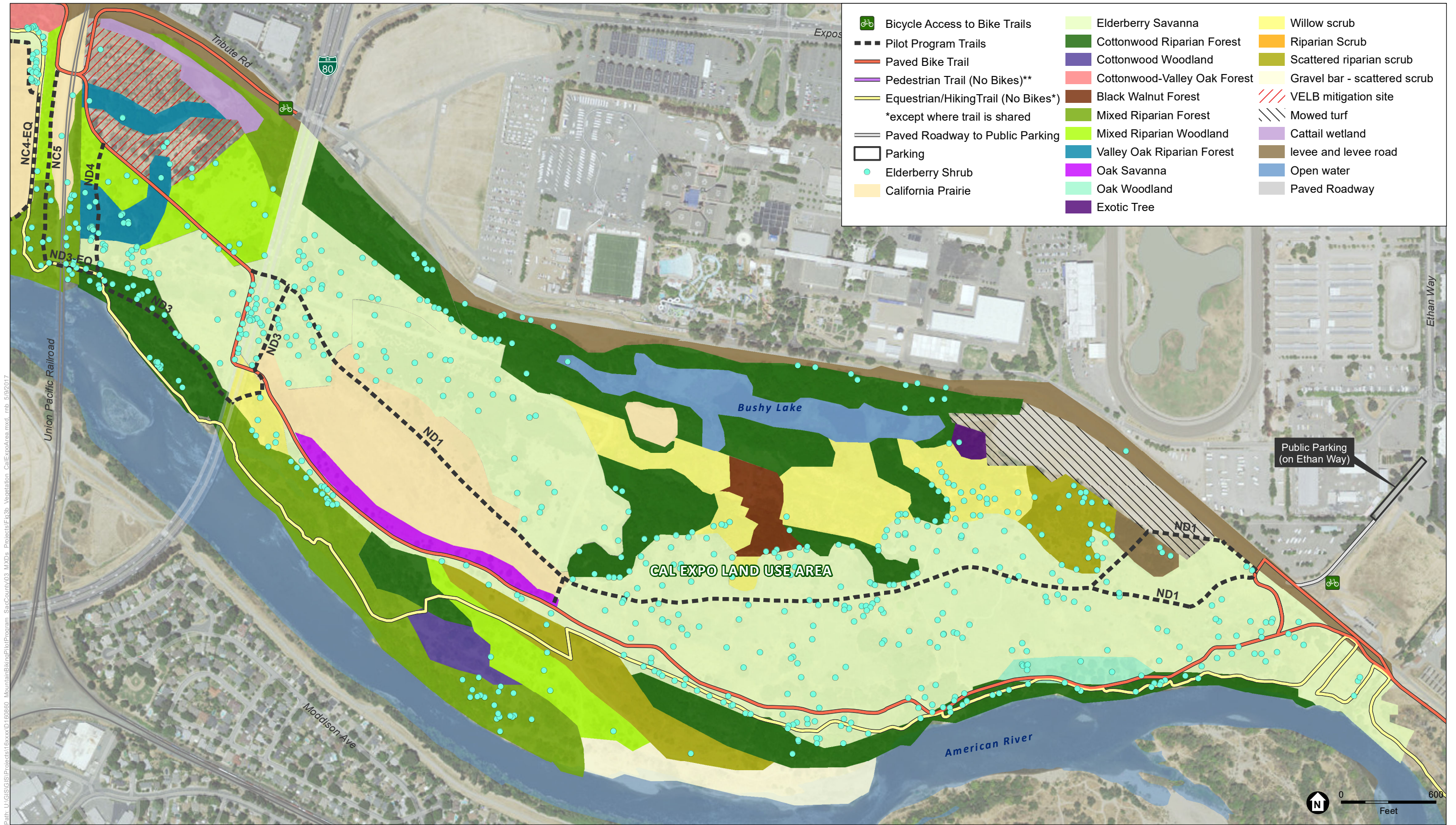
### **3.2.2 Additional Uses**

There are a number of operations and maintenance activities that are conducted throughout the year in the Woodlake and Cal Expo land use areas. These include the maintenance of unpaved access and fire roads that provide access for Sacramento County maintenance patrol and emergency fire vehicles. These roads also provide access for transmission line utility vehicles and equipment entering the Parkway to maintain the Right of Ways in the Cal Expo and Woodlake land use area. Many of the unpaved roads have been in regular use for maintenance activities for decades, though they were most recently improved in 2012 during California's extended drought, which increased the need for emergency fire access. Unpaved road improvements included establishing a 30-foot wide area by either mowing or spraying herbicide along a 10-foot wide buffer on each side of the 10-foot wide road. Since 2012, the maintenance and fire road buffers have been maintained through mowing twice each year in the spring and early summer.









SOURCE: USDA, 2014; Sacramento County, 2017; ESA, 2017

American River Parkway Off-Paved Trail Bicycle Pilot Program

\*\* Pedestrian Trails exist on Woodlake Land Use Area only.

**Figure 3b**  
Cal Expo Land Use Area Vegetation and Location of Elderberry Shrubs



Pedestrian use of the unpaved maintenance and fire roads (pilot program trails) is permitted, and walkers and runners actively use these paths. Equestrian use is permitted on designated equestrian trails. There is also some level of use by unauthorized bicycles, though this use has not been quantified. Illegal camping is prevalent in the Woodlake and Cal Expo land use areas, and the main areas of this unauthorized use are within dense riparian vegetation between the American River and the upper floodplain.

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## **CHAPTER 4**

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# **Environmental Monitoring**

### **4.1 Environmental Indicators**

Environmental indicators will be used to document and assess changes in trail conditions over time. Indicators are “measurable physical, ecological, or social variables used to track trends in conditions caused by human activity so that progress toward goals and desired conditions can be assessed” (Merigliano, 1990 as referenced in Marion and Carr, 2007, pg. 17). The focus of environmental monitoring for the pilot program is on variables that have ecological significance such as wildlife habitat damage (vegetation damage, trail widening), degradation (erosion, trash, constructed features), or fragmentation (informal trails) (Marion and Wimpey, 2007) (**Table 1**).

Pilot program impacts to wildlife will be assessed through indicators for wildlife habitat rather than direct measures of wildlife populations, use, or behavior based on the assumption that off-paved trail cycling is more likely to impact wildlife through habitat modifications than through direct harassment. Informal trails, for example, can interrupt continuous wildlife corridors (Marion and Wimpey, 2007). It would also be very difficult to assign behavioral or population changes of wildlife to one specific land use (such as off-paved trail cycling), when there are numerous other land uses in the Woodlake and Cal Expo land use areas.

### **4.2 Monitoring Methods**

Monitoring methods are described below for each of the indicators identified in Table 1. These methods are based on methods described in reviewed literature, to the extent available. However, there is little research on trails in urban settings that meet multiple use objectives such as the ones in the Parkway that in addition to recreation uses also serve as fire breaks and maintenance roads. Most research on trail impacts and monitoring is for trails in wilderness or national park settings.

The methods are divided into two categories: (1) permanent monitoring points; and, (2) observations of environmental indicators. The two categories cover all of the indicators listed in Table 1, and are divided into these two categories for ease of implementation during the twice annual monitoring events.

**TABLE 1**  
**INDICATORS OF ENVIRONMENTAL EFFECTS OF OFF-PAVED TRAIL CYCLING AND EQUESTRIAN RECREATION**

<b>Indicator</b>	<b>Indicator Reference</b>	<b>Environmental Effect Measured</b>	<b>Methods</b>
Trail widening	Wimpey and Marion, 2011	Width of bare ground in the trail tread	<ul style="list-style-type: none"> <li>• At permanent points, measure width of unvegetated tread</li> <li>• Take photos in both directions from permanent points</li> <li>• Record the location of any bike tracks, horse hoof prints, or horse manure outside of the established trail tread.</li> </ul>
Erosion	Chiu and Kriwoken, 2003	Evidence of water, sediment, or debris transport off the trail, or within the trail.  Topographic modification	<ul style="list-style-type: none"> <li>• Record location, type, surface area and approximate volume of erosion, along with possible causes (e.g., tracks of maintenance vehicles, bicycles, equestrian or human foot trampling)</li> <li>• Record bicycle wheel ruts (location, size, and depth) within the trail tread</li> </ul>
Informal trails	Wimpey and Marion, 2011	Number of informal trails <sup>1</sup>  Width of informal trails at intersection with pilot program trails	<ul style="list-style-type: none"> <li>• Record location of informal trails where they diverge from pilot program trails with GPS and photos.</li> <li>• Measure width of unvegetated tread of informal trails at the intersection with pilot program trails.</li> <li>• Use baseline map in subsequent years to record any new informal trails and note whether bicycle tracks, horse hoof prints, or horse manure are present and whether the size (and by extension- use) is increasing over time.</li> </ul>
Trash	No reference	Presence of trash on or directly adjacent to the trail	Record trash within and adjacent to the trail (limited to recreation associated trash such as food wrappers and water bottles).
Vegetation damage	Thurston and Reader, 2001	Habitat modification for common or special-status wildlife (e.g., valley elderberry longhorn beetle)	<ul style="list-style-type: none"> <li>• Record elderberry plant damage alongside pilot program trails (broken branches, mangled leaves, approximate percent of the canopy damaged )</li> <li>• Record other plant damage alongside trails (riparian trees and shrubs, oak trees)</li> <li>• Record changes to wildlife habitat structure resulting from vegetation damage, such as a decrease in canopy structure or density.</li> </ul>
Unauthorized constructed features	Davies and Newsome, 2009	Constructed "technical trail features" (TTFs) for mountain biking such as jumps, ladders, drop offs, or skinnies	Document location, type, and area of constructed TTFs with GPS and photos

**NOTE:**

<sup>1</sup> Information from Sacramento County on informal trail closures would be incorporated into the annual tracking of informal trails in order to account for any decrease in informal trails that may result from Sacramento County closures.

## 4.2.1 Permanent Monitoring Points

Randomly assigned permanent monitoring points were identified for the various pilot program trails, by trail segment, to provide an unbiased location where representative trail conditions can be measured. These same locations will be measured during each monitoring event. Between one and four points were assigned to each trail segment, depending on trail segment length, and a minimum distance of 200 feet between points was used to generate the random locations, using analysis tools in ArcGIS 10.2. **Table 2** gives the number of points by trail segment, the type of trail, and the adjacent habitats. **Figure 4** shows the locations of the permanent monitoring points.

**TABLE 2**  
**PERMANENT MONITORING POINTS ALONG THE PILOT PROGRAM TRAILS**

Trail Segment	Length (linear feet)	Number of fixed points	Monitoring points	Trail Type	Adjacent habitats
<b>Woodlake</b>	<b>(21,292 total)</b>	<b>(19 total)</b>			
NC1	2,379	2	1, 2	Bike	Cottonwood-Valley Oak Forest; Riparian Scrub; California Prairie
NC1B	3,273	3	3, 4, 5	Bike/ Equestrian	Cottonwood-Valley Oak Forest; California Prairie
NC2	6,260	3	6, 7, 8	Bike	Cottonwood Riparian Forest; California Prairie; Mowed Turf
NC2B	640	1	9	Bike/ Equestrian	Cottonwood-Valley Oak Forest; California Prairie
NC3	1,630	1	10	Bike	California Prairie
NC3A	2,832	2	11,12	Bike	Black Walnut Forest; California Prairie
NC5	1,229	2	13	Bike	Mixed Riparian Woodland; Mixed Riparian Forest; California Prairie
<b>Cal Expo</b>	<b>(9,360 total)</b>	<b>(10 total)</b>			
ND1	5,776	6	19-24	Bike	Elderberry Savannah; California Prairie; Levee and Levee Road; Mowed Turf
ND3	2,385	2	17, 18	Bike	Cottonwood Riparian Forest; Willow Scrub; Elderberry Savannah; California Prairie
ND3B	363	-	16	Bike/ Equestrian	Mixed Riparian Forest; Cottonwood Riparian Forest
ND4	836	2	14, 15	Bike	Mixed Riparian Woodland; Valley Oak Riparian Forest; Elderberry Savannah; Cottonwood Riparian Forest

In addition to the pilot program trail permanent monitoring points, informal trails will also be measured at permanent locations where they intersect pilot program trails.<sup>1</sup> Unlike the pilot program trail points, the informal trail points are not randomly assigned since every informal trail will be measured at its intersection with pilot program trails. Monitors will locate the informal trails as they walk the pilot program trail system. For informal trails, trail width will be measured

<sup>1</sup> This effort includes monitoring informal trails that intersect pilot program trails. It does not include monitoring other informal trails in the Woodlake or Cal Expo land use areas.

at the intersection between the informal trail and the pilot program trail, as described below. The intersection point between pilot program and informal trails will be recorded with a global positioning system (GPS) to document the location of informal trails.

Trail width will be measured in inches using a measuring tape pulled taut across the trail perpendicular to the direction of travel. The total width of unvegetated tread will be recorded, and would include any vegetated strips or islands within the tread (such as the vegetated strip created by vehicle use on unpaved roads). Monitors will record evidence of vehicle tracks, bicycle tracks, horse hoof prints, and any other physical evidence of vegetation damage along the trail margins that may cause trail widening. Photos of the pilot program trails will be taken in both directions along the centerline of the trail from the permanent monitoring points for visual comparison in future years. Trail width will be measured instead of trail depth because the trail system is relatively flat and while trail width tends to increase with use across slopes, trail depth (incision) increases with increasing slope (White et. al., 2006).

#### **4.2.2 Observations of Environmental Indicators**

Indicators including: erosion; trash; vegetation damage; and unauthorized constructed features will be recorded where they are observed along the pilot program trails. Monitors will walk or bike the entire pilot program trail system during each monitoring event to record the location and characteristics of observed indicators. For example, evidence of erosion within the trail, or originating from the trail, will be recorded with a GPS point, line, or polygon (depending on the extent). Monitors will record the type, surface area and possible causes of erosion including any evidence of bicycle tracks, horse hoof prints, or vehicle tracks. The indicator will also be documented with photos. Similarly, vegetation damage alongside pilot program trails such as broken branches, mangled leaves, and any resulting structural changes to shrub or tree canopies will be recorded with GPS, photos, and a narrative description of the damage, including the percent of the canopy damaged, potential causes of damage (e.g., biking impacts, roadway maintenance, unauthorized intentional clearing to access camp sites, or others), and potential impacts to wildlife habitat.

Recreation related trash and unauthorized constructed features will be monitored using this approach as well. Location and description of trash will be recorded where it is encountered on or adjacent to pilot program trails. Unauthorized constructed features would also be measured (height, width) and the materials described (soil, wood, metal, etc.).





SOURCE: USDA, 2014; Sacramento County, 2017; ESA, 2017

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**Figure 4**  
Pilot Program Permanent Trail Width Monitoring Points

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Data tracking will be carried out primarily using spatial tools. Observed indicators will be recorded with GPS and an updated map and data table will accompany the reports and memoranda (described below). Assessing the number and types of indicators observed as well as documenting their locations along the pilot program trails will provide an understanding of how environmental effects are changing over the course of the pilot program, and whether there are certain trail segments that have a larger number of indicators, and therefore potentially greater environmental impacts.

### **4.3 Monitoring Schedule and Reporting**

Prior to the start of the pilot program, trail monitoring will be conducted once to document baseline conditions. The expected timeframe for baseline monitoring is following acceptance of the monitoring plan. The pilot program will start shortly thereafter, and the first monitoring event during the pilot program period will follow the baseline study. Monitoring will be carried out twice per year (once in May and once in October) for the duration of the three year pilot program.

Two environmental monitoring reports will be prepared: the baseline monitoring report and the final monitoring report. A memorandum will also be prepared in years 1 and 2 of the pilot program to document interim findings. A current trails map showing the locations of recorded informal trails and other important monitoring results will be included with the reports and memoranda.

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## CHAPTER 5

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