2012 ANNUAL EROSION RECONNAISANCE ENGINEERING REPORT

Sacramento River Bank Protection Project
Sacramento River and Tributaries

US Army Corps
of Engineers
Sacramento District

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February 2013

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1.0 Authorization

The Sacramento River Bank Protection Project (SRBPP) was authorized for the protection of the existing levees and flood control facilities. It was originally authorized by the 86th Congress under the Flood Control Act of 1960, Public Law 86-645, Title II. It is currently authorized by the Water Resource Development Act of 2007. Under the current authorization there is just less than 5,000[i] linear feet available for repairs. An additional 80,000 linear feet will be available at the completion of the Post Authorization Change Report. The project area consists of the leveed portion of the Sacramento River and its tributaries and sloughs, as shown in **Figure 1**.

2.0 Purpose

This report summarizes and documents the annual and extended erosion reconnaissance of the Sacramento River Flood Control System (SRFCS). The erosion inventory is conducted every year and consists of a visual inspection of the levees and banks of the Sacramento River Flood Control System by the Engineering Division. The purpose of the reconnaissance is to maintain and update an inventory of erosion sites, identify new erosion sites, monitor existing erosion sites, and collect data to prioritize the sites for repair. A site is deemed an erosion site if the erosion is into the projection of the levee slope (section 5.0). Personnel from various sections of the US Army Corps of Engineers collected photos with a GPS camera and data using a Trimble XH with GPS and GIS capabilities.

3.0 Project Background

The annual erosion inventory started in 1997, following the large flood event in the winter of 1996 and 1997. This flood event caused a levee breach and numerous flood fighting efforts throughout the SRFCS. The original goal of the inventory was to identify the eroded areas in the levee system and repair them. However, concerns for the environment and endangered species limited the repair work by the SRBPP. During that time repairs were primarily performed under emergency work (PL84-99) or through local maintenance efforts. Under the SRBPP, one site on the Sacramento River and a few sites on the American River were repaired between 1997 and 2006.

In February 2006, after high flows in the rivers of the Sacramento Valley, the Governor of California declared a state of emergency for the Central Valley levees. In the following years, all the sites that were defined as “critical” in the 2005 inventory were repaired. Repairs have continued every year since and over 100 sites have been repaired since the declaration through the combined efforts of the U.S. Army Corps of Engineers (USACE) and the California Department of Water Resources (DWR).

While sites are currently being repaired, more sites enter the erosion inventory every year. The number of sites in need of repair far exceeds the number of sites that can be repaired each year. Due to this, a ranking system was developed to help determine which sites should be considered the highest priority for repair.

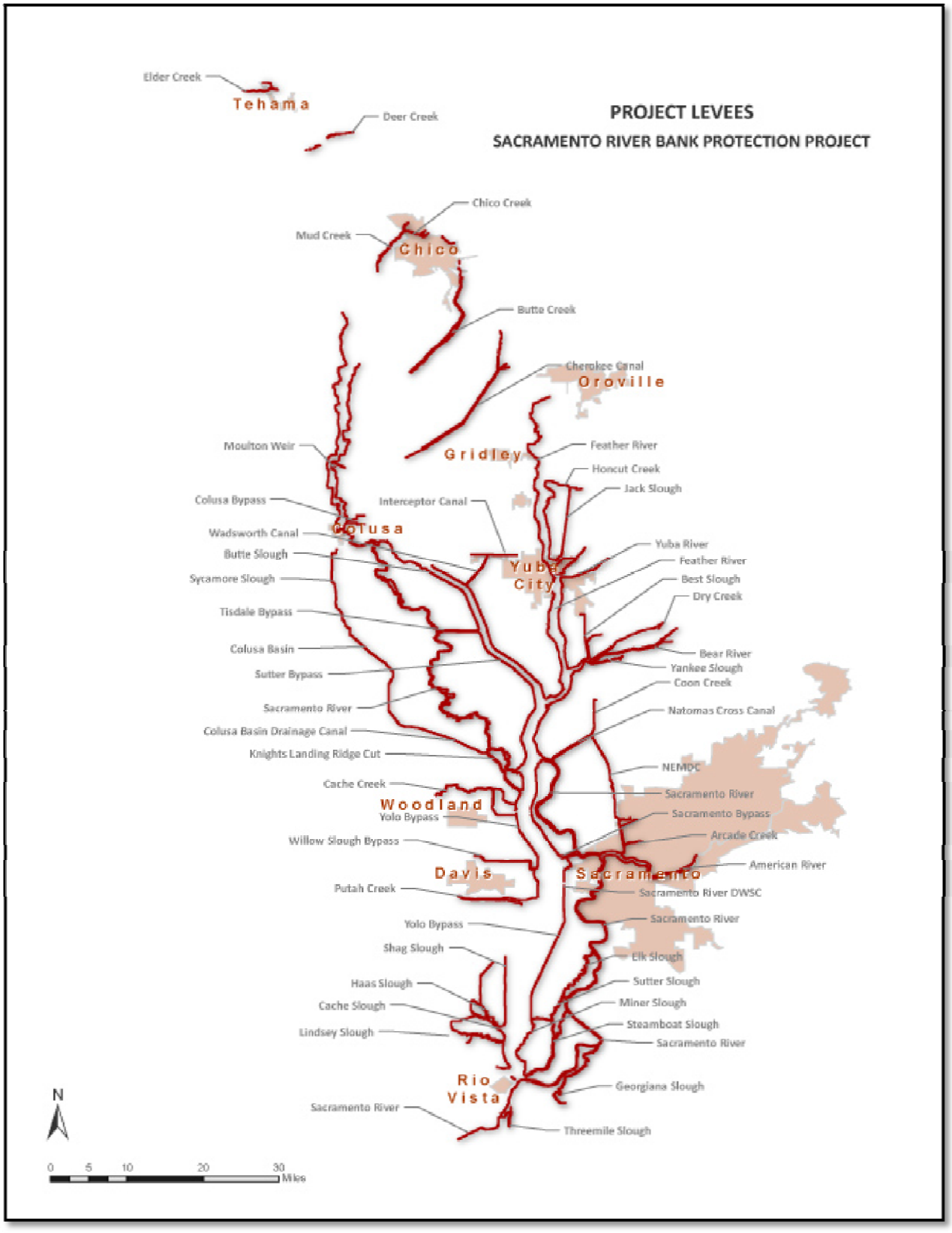

Figure 1. Project Levees of the Sacramento River Flood Control System

4.0 Reconnaissance Team and Inventoried Levees

There are two parts to the erosion inventory; these two parts are typically referred to as the "annual erosion inventory" and the "extended erosion inventory". The annual erosion inventory includes the levees of the SRFCS that are inspected every year. This includes the reaches that convey flow through the SRFCS on an annual basis. The extended inventory is only conducted after high flow events or a minimum of once every five years. The extended erosion inventory includes reaches of the SRFCS that either convey seasonal flow or do not typically convey flow on an annual basis, such as the bypasses.

The 2012 reconnaissance included only the annual inventory, which was conducted from September 17 through September 27. The extended inventory was last conducted in 2011 and data reported for those sites is based on the 2011 Erosion Reconnaissance Report (USACE, 2012). The inspection was conducted by the USACE Engineering Division, and included team members from Hydraulic Analysis, GIS, Soil Design, Civil Design, and Levee Safety.

The majority of the inventory was conducted by boat for optimal viewing of the channel banks and levees. However, some of the channels did not contain enough flow to navigate by boat, so they were inventoried by vehicle. **Table 1** lists the reaches of the SRFCS, frequency of inspection (annually or extended), and the method of inspection. **Figure 2** shows the levees that are inspected annually and those inspected during the extended inventory.

Table 1. Inspected Reaches of the Sacramento River Flood Control System

SRFCS Reach	River Miles or Length	Inspection Frequency	Inspection Method
American River	RM 0 - 13	Annual	Boat/Car
Arcade Creek	2 miles	Extended	Car
Bear River	RM 0 - 14	Annual	Car
Best Slough	2 miles	Extended	Car
Butte Creek	15 miles	Annual	Car
Butte Slough	7 miles	Extended	Car
Cache Creek and Cache Creek Settling Basin	11 miles	Annual	Car
Cache Slough	14 miles	Annual	Boat
Cherokee Canal	20 miles	Extended	Car
Chico/Sycamore Creek	2 miles	Extended	Car
Colusa Basin Drainage Canal and Sycamore Slough	35 miles	Extended	Car
Colusa Weir Bypass	1 mile	Extended	Car
Coon Creek Interceptor	5 miles	Extended	Car
Cottonwood Creek	1 mile	Extended	Car
Deer Creek	5 miles	Extended	Car
Dry Creek	9 miles	Extended	Car
East Interceptor Canal	3 miles	Extended	Car

Table 1. cont. Inspected Reaches of the Sacramento River Flood Control System

SRFCS Reach	River Miles or Length	Inspection Frequency	Inspection Method
Elder Creek	4 miles	Extended	Car
Elk Slough	9 miles	Annual	Boat
Feather River	RM 0 - 34	Annual	Boat
Feather River	RM 34 - 60	Extended	Car
Georgiana Slough	12 miles	Annual	Boat
Haas Slough	8 miles	Extended	Car
Honcut Creek	4 miles	Extended	Car
Jack Slough	6 miles	Extended	Car
Knights Landing Ridge Cut	6 miles	Extended	Car
Linda Creek (Dry)	2 miles	Extended	Car
Lindsey Slough	7 miles	Extended	Car
Marysville Ring Levee	7 miles	Extended	Car
Miner Slough	7 miles	Annual	Boat
Moulton Weir Bypass	2 miles	Extended	Car
Mud Creek	7 miles	Extended	Car
Natomas Cross Canal	5 miles	Extended	Car
Natomas East Main Drainage Canal	4 miles	Extended	Car
Pleasant Grove Canal	4 miles	Extended	Car
Putah Creek	9 miles	Extended	Car
Sacramento Bypass	2 miles	Extended	Car
Sacramento Deep Water Ship Channel	18 miles	Extended	Car
Sacramento River	RM 3 - 184	Annual	Boat
Steamboat Slough	11 miles	Annual	Boat
Sutter Bypass	34 miles	Extended	Car
Sutter Slough	6 miles	Annual	Boat
Three Mile Slough	3 miles	Annual	Boat
Tisdale Weir Bypass	4 miles	Extended	Car
Ulatis Creek	4 miles	Extended	Car
Wadsworth Canal	5 miles	Extended	Car
West Interceptor Canal	2 miles	Extended	Car
Western Pacific Interceptor Canal	6 miles	Extended	Car
Willow Slough Bypass	8 miles	Extended	Car
Yankee Slough	4 miles	Extended	Car
Yolo Bypass	37 miles	Extended	Car
Yuba River	RM 0 - 5	Extended	Car

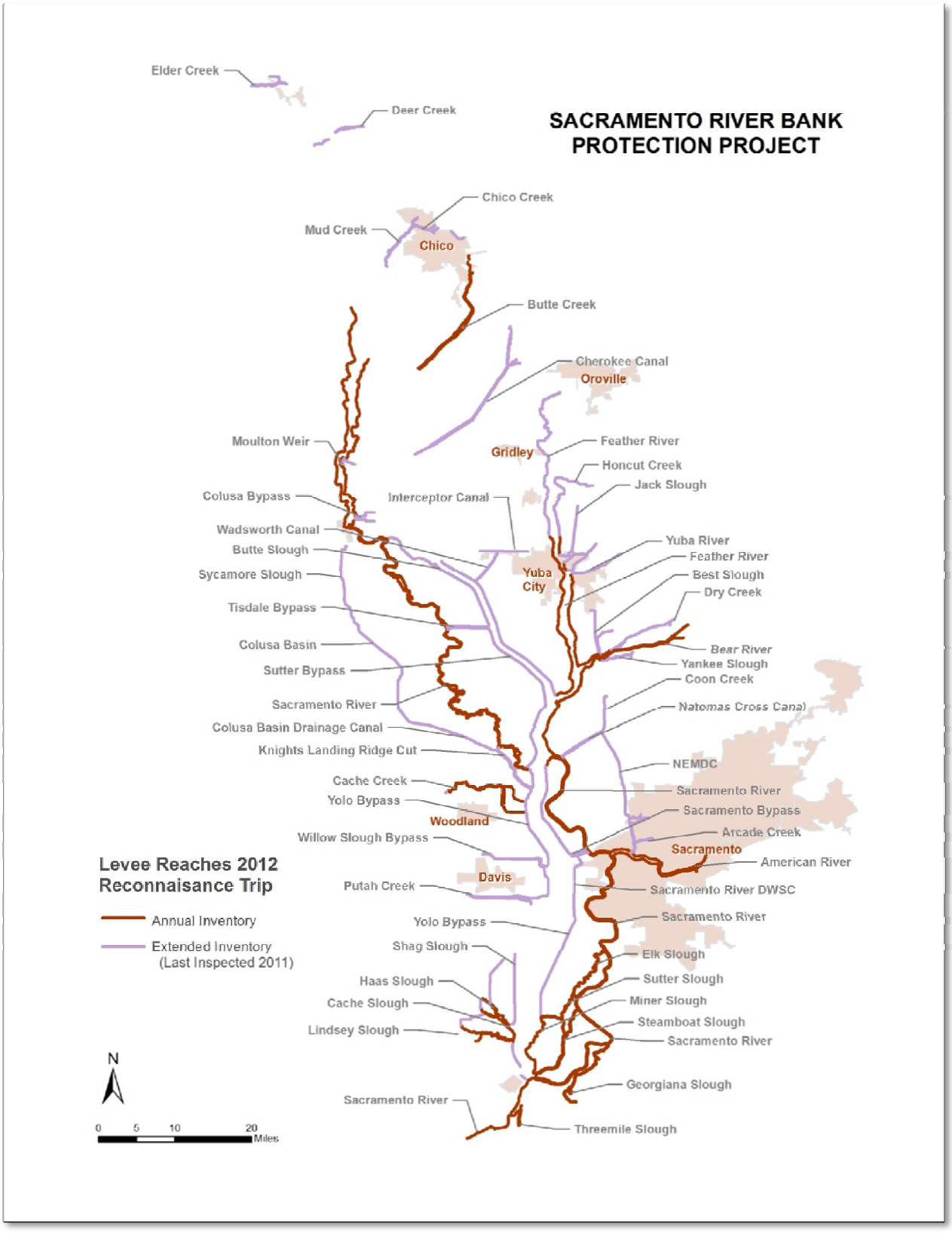

Figure 2. Levees Inspected in 2012, Northern Portion of the SRFCS

5.0 Inventory Criteria and Data Collection

The criteria for when an erosion site should be added to the inventory is if the erosion is into the projection of the 3H:1V levee slope, as shown in **Figure 3**. If a berm is present on an eroding bank, the site is added if the berm is typically less than 35 ft (this distance may vary given the levee height). There are areas in the SRFCS where the bank is visibly eroding, but if the erosion is away from the projection of the levee slope, then it does not meet the criteria for an erosion site. Within the criteria, we have six (6) terms for the status of the sites as described below:

- Eroding: A site that is susceptible to an erosional breach during flood and/or normal flow conditions.
- New Erosion: A site identified in the current year as susceptible to an erosional breach during flood and/or normal flow conditions.
- Critical: A site that is an imminent threat to the integrity of the SRFCS and of highest priority for repair.
- Repaired: A site that was previously an erosion site that has since been repaired.
- Removed: A site that was previously an erosion site but was taken out of the inventory because it no longer meets the criteria.
- Under Construction: A site in which either a repair is under way or a contract has been awarded and the construction should begin shortly. This site will likely move to the repaired list in the next year's inventory.

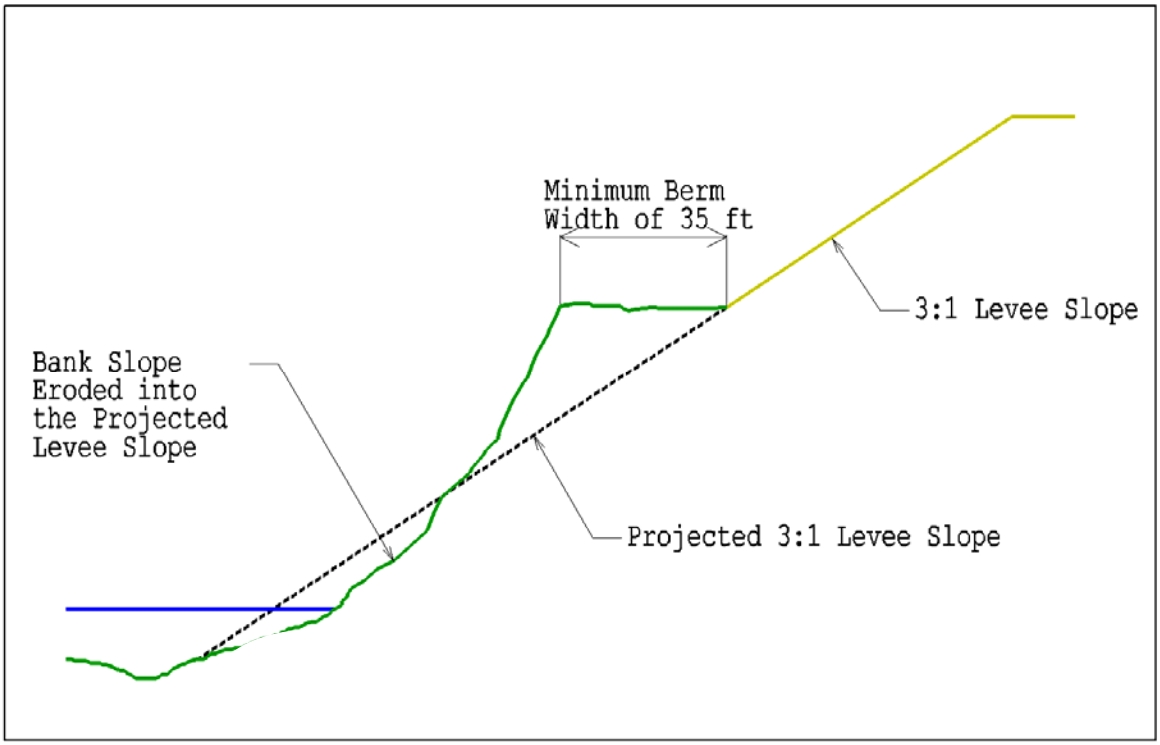

Figure 3. Schematic of Erosion Site Criteria

Each erosion site is identified with a unique name based on the naming scheme described below:

AAA_BB-B_C

Where:

AAA: Three letter river code

BB-B: River or Levee Mile (dash represents the decimal)

C: Bank designation (left or right bank, when looking downstream)

For example, Sacramento River RM 92.8 left bank would be expressed as SAC_92-8_L (All letters are capitalized, no spaces, and no periods)

Three letter river codes:

ACD - Arcade Creek
BER - Bear River
BES - Best Slough
BTC - Butte Creek
BTS - Butte Slough
CHC - Cache Creek
CHI - Chico Creek
CHS - Cache Slough
CHK - Cherokee Canal
CBD - Colusa Basin Drainage Canal
COB - Colusa Bypass
COO - Coon Creek
CWC - Cottonwood Creek
DEC - Deer Creek
DCN - Dry Creek (North, flows to Bear River)
DCS - Dry Creek (South, flows to NEMDC)
DWS - Deep Water Ship Channel
EMD - East Main Drain (Natomas)
EIC - East Interceptor Canal
ELC - Elder Creek
ELK - Elk Slough
FHR - Feather River
GEO - Georgiana Slough
HAS - Haas Slough
HNC - Honcut Creek
JSK - Jack Slough
KLR - Knights Landing Ridge Cut
LAR - Lower American River
LDS - Lindsey Slough
MR1 - Marysville Unit 1
MR2 - Marysville Unit 2
MR3 - Marysville Unit 3
MIR - Miner Slough
MLW - Moulton Weir Bypass
MUD - Mud Creek
MRS - Murphy Slough
NCC - Natomas Cross Canal
PGC - Pleasant Grove Canal
PUC - Putah Creek
SAC - Sacramento River
SAP - Sacramento Bypass
SAS - Sacramento Slough
SBP - Sutter Bypass
SHG - Shag Slough
STM - Steamboat Slough
STR - Sutter Slough
SYC - Sycamore Creek
SYS - Sycamore Slough
TIB - Tisdale Bypass
TMS - Three Mile Slough
ULB - Ulatis Creek Bypass
WAC - Wadsworth Canal
WIC - West Interceptor Canal
WPC - Western Pacific Interceptor Canal
WSB - Willow Slough Bypass
YAS - Yankee Slough
YOL - Yolo Bypass
YUB - Yuba River

At the erosion sites, specific data was collected for use in the inventory and the site ranking. This data included: Site Name, Waterway, River or Levee Mile, Bank Designation, Site Status, Length of Erosion, Width of Berm, Erosion Mechanism, Bank Slope, Soil Classification, Issues effecting Stability, Observed Eddies, Wave Action, Bank Protection, Visible Encroachments, and Field Notes.

6.0 Reaches within the Sacramento River Flood Control System

The Sacramento River Flood Control System covers a large area and is made up of many different rivers, creeks, sloughs, and bypasses. Each reach within the system is unique and subject to different erosion processes. Below is a brief description of the different reaches.

Upper Reach of the Sacramento River – Ord Bend to Colusa (RM 185 to 144) – The upper reach of the Sacramento River is unique in that the levees are setback and the channel naturally meanders and erodes. A typical picture of the Upper Sacramento River is shown in **Figure 4**. In general, the river has become somewhat sediment starved due to upstream reservoirs reducing the bedload from upstream. The river is highly erosive and erosion of the outer banks of the meandering bends and the development of sandbars are evident throughout the reach. The natural erosion of the banks is considered good for a healthy river system and environmental factors. However, when the erosion creeps into the projection of the levee slope, it can threaten the integrity of the SRFCS. There are currently 9 erosion sites in this reach.

Figure 4. Typical View of the Upper Reach of the Sacramento River.

Middle Reach of the Sacramento River – Colusa to Sacramento (RM 144 to RM 61) – The middle reach of the Sacramento River has the levees close to the river and multiple diversion structures to move flow into the bypass system. This reach was intentionally designed with the levees close to the banks to help move some of the bedload and debris that remained from the days of hydraulic mining. In addition, the USACE was responsible for keeping the river navigable up to the city of Colusa. As a result of this design, much of the reach is protected with rock, especially the outsides of bends. The majority of the rock in this reach is cobbles placed prior to the 1960's and some areas with more recent quarry stone. The cobble sites are reaching the end of their design life and starting to fail. Roughly one-third of the sites in this reach are from failed cobble sites. **Figure 5** shows a typical view of the Middle Sacramento River. There are currently 40 erosion sites in this reach.

Figure 5. Typical View of the Middle Reach of the Sacramento River.

Sacramento River – Delta Section (RM 61 to RM 15) – The delta reach of the Sacramento River has levees close to the banks and is tidally influenced. The location of the channel has been relatively stable for the past 150 years. A large percentage of this reach is already rocked. This area has heavy action from recreational boating, wind wave run-up, and the banks are heavily used by the public. Many of the levees are constructed of deposited dredge tailings from the bottom of the river. **Figure 6** shows a typical view of the Delta section of the Sacramento River. The causes of erosion in this reach are boat wake, wind wave, mass slope failure, fluvial processes, and human usage. There are currently 37 erosion sites in this reach, of which one (1) is new, two (2) are critical, and three (3) are under construction.

Figure 6. Typical View of the Sacramento River – Delta Section.

Lower Reach of the Sacramento River (RM 15 to RM 3) – The lower reach of the Sacramento River is very wide and the water surface is controlled by the tides. Only the left bank is leveed in this reach; the right bank is considered high ground. There is a narrow highway with no shoulder on top of the levee for half of the reach. Ocean-going cargo ships travel through this reach creating large wakes. The area is also subject to high winds and wind waves. Wind waves and boat wakes are the main cause of erosion in this reach. Bank stability is also an issue; the slopes of the levees are steep and constructed of poor (non-cohesive) soils; however the toe often contains some clay. **Figure 7** shows a typical view of the lower section of the Sacramento River. There are currently eight (8) erosion sites in this reach, of which four (4) are critical.

Figure 7. Typical View of the Lower Reach of the Sacramento River.

Steamboat Slough, Miner Slough, Sutter Slough, and Cache Slough – These distributary channels in the Sacramento Delta are predominately backwater channels with low velocities that are controlled by the tides. The erosion mechanism in these sloughs comes from wind wave, boat wake, tidal influences, slumping, human use, and tree pop-outs. **Figure 8** shows the confluence of Sutter and Miner Sloughs. Steamboat Slough has had over ten (10) repairs in the past decade and the levees continue to degrade. Steamboat currently has thirteen (13) erosion sites, of which one is critical. Miner Slough currently does not have any erosion sites and has had no identified erosion sites since the beginning of the inventory. Sutter Slough currently has six (6) erosion sites, of which one is new. A portion of Cache Slough is used by cargo ships to enter the Deep Water Ship Channel and therefore is subject to larger boat wakes. Cache Slough currently has six (6) erosion sites.

Figure 8. View of the confluence of Miner and Sutter Sloughs.

Lindsey Slough, Haas Slough, Shag Slough, and Ulatis Creek Bypass – These channels are in the western Delta side of the SRFCS and they all conclude at Cache Slough. Lindsey Slough is a wide shallow channel with the levees set close to the banks. Haas Slough, Shag Slough, and Ulatis Creek Bypass are small channels that primarily carry agricultural runoff. The velocities in these channels are low and tidally influenced. The erosion mechanism in these channels comes from wind wave, tidal influences, and tree pop-outs. Haas Slough also has issues with the banks being trampled by cattle. **Figures 9** and **10** show a typical view of Haas Slough and Lindsey Slough, respectfully. Lindsey Slough has five (5) erosion sites and Haas Slough has two (2) erosion sites. There are no erosion sites on Shag Slough and Ulatis Creek Bypass.

Figure 9. Typical View of Haas Slough.

Figure 10. Typical View of Lindsey Slough.

Georgiana Slough – Georgiana Slough is unique in that it flows from the Sacramento River System into the San Joaquin River System. Until recently there was a no-wake zone for the entire slough, now only the upstream most two miles are regulated as a no wake zone. Georgiana Slough is completely influenced by the tides and subject to severe winds. The majority of the levee and bank slopes are steep with no berm. The banks are composed of poor soils, which do not meet current design standards. The left bank is in worse shape and contains 90% of the sites. Biotechnical repairs in the form of brush boxes have been used to try and protect the banks from wind waves and boat wakes; however, the majority of them have had limited to no success. The primary erosion factors are from wind wave, boat wake, tidal influence, and poor soils. Many of the sites along the left bank have started to merge together and soon the entire bank may be considered an erosion site. **Figure 11** shows a typical view of a Georgiana Slough levee. This reach may benefit from a reach-wide repair. There are currently fifteen (15) erosion sites, of which four (4) are critical.

Figure 11. Typical View of Georgiana Slough.

Elk Slough – Elk Slough was cut off from the Sacramento River on the upstream end by the Sacramento River levee and therefore has no inflow, it is purely a backwater channel with some tidal influence. The channel is shallow, and the banks are full of vegetation and heavily used by humans. The levee slopes are over-steepened and built out of non-cohesive dredge material. The entire levee reach is in poor condition, with slumping, holes, and slope stability problems. **Figure 12** shows a typical view of Elk Slough. With the levees being in such poor shape the entire leveed reach (right bank and left bank) is classified as an erosion site. This reach would benefit from a reach wide repair.

Figure 12. Typical View of Elk Slough.

American River – The American River is fed by Folsom Dam and is therefore generally sediment starved and has been eroding and transporting the fine materials from the channel bed. Once the fines have been removed and the bed armors, the channel is expected to move laterally and erode the banks. The right bank is setback from the channel for the lower 5 miles. Boat wake is not a concern as there is a no wake zone for the entire river. The main causes of erosion are fluvial, tree pop-outs, and public use. This river is generally well maintained and has had many bank repairs in the recent years. **Figure 13** shows a typical view of the American River. There is currently one erosion site on the American River, and it is new.

Figure 13. Typical View of the American River.

Feather River, Northern Reach (RM 62 - 46) – The northern portion of the Feather River has a levee only on the right bank. The channel is meandering and the upstream overbanks still show the impacts of past hydraulic mining, with large gravel and dirt mounds visible throughout. The levees are heavily vegetated and there are places where structures (e.g. houses, canals) have been built into the landside of the levee. **Figure 14** shows a typical view of the northern reach of the Feather River. There are two (2) erosion sites in this reach of the Feather River, and one is new.

Upper Reach of Feather River, North of Yuba River (RM 46 to RM 28) - The Feather River upstream of the Yuba River is a meandering river with setback levees on both sides. The channel gets close to the levees at a few of the meandering bends, which have been armored from past repairs. The river appears to have pushed the majority of the sediment leftover from hydraulic mining through this reach and with the construction of Oroville Dam, it has started to become sediment starved. Some active erosion was observed, but it was not close to the levees. There are currently no erosion sites in this reach.

Figure 14. Typical View of the Northern Reach of the Feather River.

Middle Reach of the Feather River, South of Yuba River (RM 28 to RM 7) – The middle reach of the Feather River is wide and shallow and has a large amount of sand bedload coming from the Yuba River. There is a large clay plug at RM 24.8 that had been slowly moving through the system. This feature acted as a grade control feature in the river and as of early February 2012, this clay plug has been breached. The impacts of this breach are not yet known, but there will most likely be further erosion to the system and potentially new erosion sites in the future. **Figures 15** shows the clay plug in its current state. The levees are setback in this reach and a new setback levee was recently constructed on the left bank from RM 25 to RM 18. The primary causes of erosion in this reach are fluvial and mass failure of eroded banks. There is currently one erosion site in this reach of the Feather River.

Figure 15. View of Clay Plug on the Feather River at RM 24.8 in late 2012.

Lower Feather River (RM7 to RM 0) – The lower reach of the Feather River has a tight levee on the left bank and the Sutter Bypass on the right bank. The river is shallow and wide, with large sandbars throughout the channel. The primary causes of failure in this reach are fluvial and mass failure of eroded banks. There are currently seven (7) erosion sites in this reach of the river.

Yuba River – The Yuba River is a meandering channel and the levees are setback by over a mile from the channel. The south levee was recently constructed and is generally in good condition for most of the reach. In the last year, the local RD has constructed improvements to the south levee in order to meet the current USACE levee standards, including adding a slurry wall. There are currently no erosion sites in this river.

Bear River – The Bear River is an incised channel due to the loss of sediments from the Camp Far West Dam and historic sand and gravel mining. The levees are setback a short distance from the slightly meandering channel. **Figure 16** shows a typical view of the Bear River. A setback levee was recently constructed for the first two miles on the right bank. There are currently five (5) erosion sites on this river.

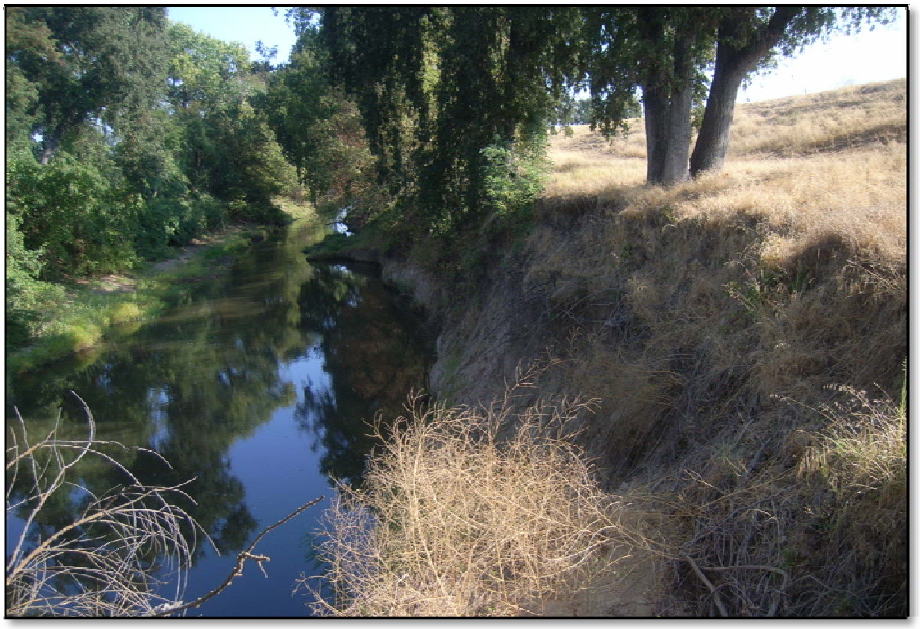

Figure 16. Typical View of Bear River.

Yankee Slough, Dry Creek, Western Pacific Interceptor Canal, and Best Slough – These channels are all tributaries to the Bear River. The leveed portion of Yankee Slough is four miles long and joins the Bear River at RM 3. The levees are set close to the channel and most of the channel is heavily vegetated. Dry Creek (often called North Dry Creek) joins the Bear River at RM 5. The north levee is just over a mile long and the south levee runs for 7 miles. Best Slough and the northern portion of the Western Pacific Interceptor collect the flows from the east and direct it down the southern portion of the Western Pacific Interceptor Canal (WPIC). The floodplain of the WPIC is a mixed use of wetland habitat and agriculture. There is one erosion site on Yankee Slough.

Natomas East Main Drainage Canal, Arcade Creek, and Dry Creek – Arcade Creek and Dry Creek (formerly known as Linda Creek, and now more commonly referred to as South Dry Creek) drain water from the Rio Linda, Roseville, Antelope, Citrus Heights, and Carmichael areas. Arcade Creek has the levees relatively close to the channel, however the small floodplain maintains a healthy riparian habitat. Dry Creek has a large floodplain but relatively little riparian habitat, as the floodplains appear to be used for cattle grazing. **Figure 17** shows a typical view of Dry Creek. The Natomas East Main Drainage Canal (NEMDC) directs the flow from Arcade and Dry creeks and sends it south to the American River. NEMDC is a man-made channel that runs north-south and protects the east side of Natomas. There are currently no erosion sites in this section of the system.

Figure 17. Typical View of Dry (Linda) Creek.

Natomas Cross Canal, Pleasant Grove Canal, and Coon Creek Interceptor – Pleasant Grove Canal and Coon Creek Interceptor collect water from the east foothills and communities of Lincoln and Pleasant Grove. These flows are then directed into the Natomas Cross Canal which moves the water down to the Sacramento River. Pleasant Grove Canal and Coon Creek only have levees on the east side. The levees are steep with some grass and shrub vegetation. The Natomas Cross Canal is man-made and the levee on the south side was recently rebuilt. The south levee is mowed and grazed by sheep in the summer while the north levee is tall grasses with shrubs/trees on the lower bank. **Figure 18** shows a typical view of the Natomas Cross Canal. There is one erosion site on the Natomas Cross Canal.

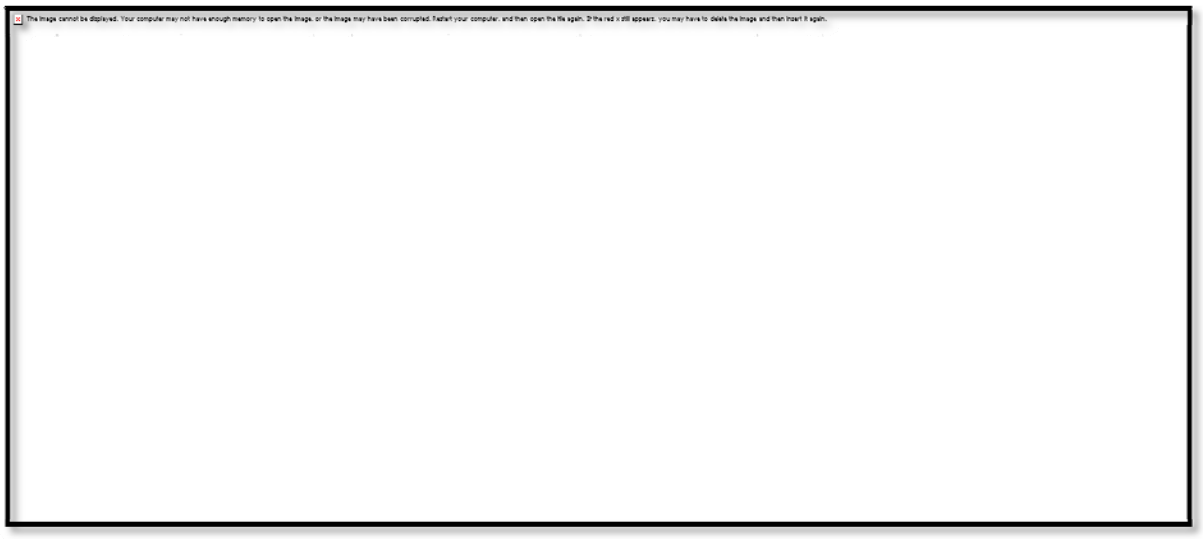

Figure 18. Typical View of the Natomas Cross Canal.

Cache Creek – The Cache Creek levees start near the town of Yolo and terminate at the Yolo Bypass. Cache Creek is a deeply incised channel with near vertical banks (over 20 ft in height) for the entire leveed reach. The channel is sediment starved from excessive in-stream gravel mining. Some sand and gravel are present in the channel bed, indicating that the channel may be starting to recover and become more stable. **Figure 19** shows a typical view of Cache Creek. The erosional mechanisms in this reach are toe erosion, fluvial and mass failure. The natural banks are too steep and the channel is too narrow for a traditional bank protection repair; setback levees have been the selected option for repair. This creek may benefit from a reach-wide repair. There are currently seven (7) erosion sites on Cache Creek, three (3) of which are considered critical. DWR currently has plans to repair four (4) of these erosion sites with setback levees, two (2) of which are critical.

Willow Slough Bypass – The Willow Slough levees start just north of the City of Davis and terminate at the Yolo Bypass. The Willow Slough Bypass directs flow from Willow Slough and agricultural runoff to the Yolo Bypass. Erosion is present along a good portion of the natural bank, but the erosion is not into the projection of the levee slope. There are currently no erosion sites on Willow Slough Bypass.

Putah Creek – Putah Creek runs from the Coastal Range to the Yolo Bypass. Most of the flow is stopped by the Monticello Dam, however the levees were designed prior to the construction of the Dam. The levees are set a good distance from the creek. There is a riparian corridor on the natural banks of the creek and the floodplains are used for crops and orchards. There are currently two (2) erosion sites on Putah Creek.

Figure 19. Typical View of Cache Creek.

Elder Creek – Elder Creek is located in the upper Sacramento Valley, it flows from the east side of the Coastal Mountain range and ends at the Sacramento River near RM 230. Only portions of the creek, near the lower end, are leveed to protect the towns of Gerber and Tehama. Elder Creek is an incised channel with short levees. The channel meanders through a gravel bed and has multiple point bars. The primary mechanisms of erosion are fluvial and whole bank failure. **Figure 20** shows a typical view of Elder Creek channel and eroding bank. There are currently two (2) erosion sites on this creek.

Deer Creek – Deer Creek is located in the upper Sacramento Valley, it drains water from Lassen Mountain/Cascade Range and ends at the Sacramento River near RM 220. Only portions of the lower end are leveed and in most of the places where the creek is close to the levee, it is already rocked. Deer Creek is a natural stream with a boulder/cobble bottom and a riparian habitat. **Figure 21** shows a typical view of Deer Creek. The primary mechanisms of erosion are fluvial, whole bank failure, and tree pop-outs. There are currently two (2) erosion sites on this creek. The Deer Creek Watershed Conservancy is planning a reach wide repair and restoration to the lower portion of Deer Creek.

Figure 20. Typical View of the Channel and Eroding Bank of Elder Creek.

Figure 21. Typical View of Deer Creek.

Butte Creek – Butte Creek is located in the Upper Sacramento Valley, near the City of Chico, it drains water from the Mount Lassen area into the Butte Sink. Butte Creek has levees close in distance to the natural bank on the upper leveed section and slightly setback levees on the lower portion of the creek. There are multiple grade control structures with fish ladders in the creek. The natural banks are generally made of sandy (non-cohesive) materials. The primary erosion mechanism in this reach is whole bank failure. There are currently no erosion sites on this creek.

Big Chico Creek, Sycamore Creek, and Mud Creek – These three creeks drain from the Mount Lassen/Cascade Range and terminates at the Sacramento River at RM 196. Only a small portion of Big Chico Creek is leveed to protect the City of Chico. The levee is heavily used for running, biking, and horseback riding. The channel is braided and incised with a sand/gravel/cobble bed and an occasional tree. Sycamore Creek is a straightened channel that becomes more natural as it approaches Mud Creek. Mud Creek is a narrow channel, with incised portions and levees set close to the channel. **Figure 22** shows a typical view of Mud Creek. There is only one erosion site in this section and it is on Mud Creek.

Cherokee Canal and Cottonwood Creek – Cherokee Canal is a man-made canal, roughly 100 to 200ft wide that diverts water from the Lake Oroville area and Cottonwood Creek to the Butte Sink area. Cherokee Canal's floodplain serves multiple uses, it is grazed by cows in the summer, rice is grown, and it has some riparian habitat with many species of birds. There is only one erosion site on Cherokee Canal.

Figure 22. Typical View of Mud Creek.

Moulton Weir Bypass, Colusa Weir Bypass, Tisdale Weir Bypass, and Sacramento Weir Bypass – These four weirs and bypasses are important features to the flood control project by diverting the high flows from the Sacramento River into either the Sutter Bypass or Yolo Bypass. The Moulton Weir is located on the left bank of the Sacramento River at RM 158 and feeds water into the Butte Sink. It is a non-gated gravity weir, with a design capacity of 25,000 cfs, and it is typically the last of the gravity weirs to start spilling. The Moulton Bypass only has a levee on the south side and there are no erosion sites. The Colusa Weir is located on the left bank of the Sacramento River at RM 145 and feeds water into the Butte Sink, just north of the top of the Sutter Bypass. It is a non-gated gravity weir, with a design capacity of 70,000 cfs, and it is typically the second of the gravity weirs to start spilling. The Colusa Bypass only has two miles of levees on both sides and there are no erosion sites. The Tisdale Weir is located on the left bank of the Sacramento River at RM 118 and feeds water into the Sutter Bypass. It is a non-gated gravity weir, with a design capacity of 38,000 cfs, and it is typically the first of the gravity

weirs to start spilling. The Tisdale Bypass has four miles of levees on both sides and there are no erosion sites. The Sacramento Weir is located on the right bank of the Sacramento River at RM 63 and feeds water into the Yolo Bypass. It is a gated weir, with 48 wood plank gates that are opened manually when the river reaches a specified elevation at the I St Bridge. It has a design capacity of 112,000 cfs. The Sacramento Bypass has two miles of levees on both sides, the face of the south levee was recently relined with concrete. There are no erosion sites on the Sacramento Bypass.

Sacramento Deep Water Ship Channel – The Sacramento Deep Water Ship Channel runs from the Port of Sacramento (located in West Sacramento) to Cache Slough at RM 18. This man-made dredged channel was completed in 1963 and the navigable section is 30 ft deep and roughly 200 to 400 ft wide. The channel provides access for large ocean-going cargo ships to the Sacramento region. There is no inflow to the channel and it is tidally influenced for the entire length. While there are levees on both sides of the channel, only the east levee is considered a federal levee. The west side of the channel is the Yolo Bypass. The channel has wide berms on both sides, ranging from 300 to 700 ft. There is only one erosion site in this channel.

Yolo Bypass – The Yolo Bypass runs from the Fremont Weir to the Sacramento River at RM 15 and carries the high flows from the Sacramento River, Feather River, and Sutter Bypass to the Delta. The bypass is several miles wide in sections. The land is used for agriculture, primarily rice, in the summers. Portions of the east levee (near West Sacramento) are heavily rocked (typically with quarry stone). Upstream of Cache Creek and downstream of Willow Slough Bypass, the lower half of the west levee is rocked to protect against wave wash. The primary erosion mechanism in this reach is wind wave. There are currently seven (7) erosion sites on the Yolo Bypass levees.

Sutter Bypass – The Sutter Bypass starts at the bottom of the Sutter Buttes, joins the Feather River at RM 7, and runs parallel to the Feather River until it joins the Sacramento River between RM 84 and 80. During high flows when the Sutter Bypass is running, the flow bisects the Sacramento River and continues over the Fremont Weir into the Yolo Bypass. It gets progressively larger and carries progressively more flow, with the capacity around 400,000 cfs at the confluence with the Sacramento River. The upper part of the floodplain is National Wildlife Refuge and the lower part is primarily agricultural use. The primary erosion mechanism is from wind waves. There is currently one erosion site on the bypass.

Colusa Basin Drainage Canal and Sycamore Slough – The Colusa Basin Drainage Canal runs along the west side of RD 108 and is often referred to as the Back Levee. The upper portion of this Back Levee is Sycamore Slough. It protects the area from the runoff of the east side of the Coastal Mountain Range. It ends at the Knights Landing Ridge Cut and there is also a connection to the Sacramento River, however the flow is controlled by a gated structure. There is one erosion site on Sycamore Slough and three (3) erosion sites on the Colusa Basin Drainage Canal.

Knights Landing Ridge Cut – The Knights Landing Ridge Cut runs from the Colusa Basin Drainage Canal to the Yolo Bypass. The levees are in poor condition with steep slopes and slumping of the toe throughout most of the system. There are cracks along the middle of the left levee crest that may indicate potential

mass movement and further slumping. **Figure 23** shows a typical view of the Knights Landing Ridge Cut. There are seven (7) erosion sites in this reach.

Wadsworth Canal, East and West Interceptor Canals – The East and West Interceptor Canals collect runoff from the Sutter Buttes and directs it into the Wadsworth Canal. The canals are man-made and the levees are short, steep and vegetated with thick grasses. Wadsworth Canal is man-made with the purpose of directing flow into the Sutter Bypass. The levees have poor soils, over-steepened slopes, and active erosion throughout most of the channel. The primary mechanism of failure is whole bank failure. There are currently five (5) erosion sites on Wadsworth.

Figure 23. Typical View of the Knights Landing Ridge Cut.

7.0 Summary of the 2012 Erosion Reconnaissance

The 2012 inventoried erosion sites are tabulated in **Appendix A** and are shown graphically in **Appendix B - 2012 Sacramento River Erosion Reconnaissance Atlas**. Within Appendix A, Table A-1 lists all the erosion sites, Table A-2 lists the critical erosion sites, Table A-3 lists the new erosion sites, Table A-4 lists the erosion sites under construction, Table A-5 lists the removed and repaired sites, and Table A-6 lists the geographic coordinates for the erosion sites.

7.1 Erosion Sites

Based on the field investigation, the total number of erosion sites within the Sacramento River Flood Control System is 201 sites, of which 14 are critical, 4 are new, 3 are under construction, 3 were repaired, and 5 were removed. A detailed list of the sites per river/channel is provided in **Table 2**. This table includes the number of sites/channel for the 2011 erosion sites, the 2012 erosion sites, the new sites in 2012, and the repaired/removed sites in 2012.

Table 3 breaks the sites down into linear feet to demonstrate the overall linear footage that still needs repair. The actual repair length may vary, depending on the design. Table 3 shows the amount of linear feet from the previous year, the linear feet from the current year and the amount of linear feet added

this year. In 2011, there were 261,379 linear feet of erosion within the SRFCS. In 2012, there is a total of 265,625 linear feet of concerning erosion in the SRFCS.

7.2 Critical Erosion Sites

Based on the field investigation, the total number of critical sites is fourteen (14). Three of these sites are on Cache Creek and account for 1,375 linear feet. Four of these sites are on Georgiana Slough and account for 5,888 linear feet (a reduction of one critical site from the previous year due to the efforts of the local RD to fix the worst spots). Six of these sites are on the Sacramento River (twice as many as the previous year) and account for 4,679 linear feet. One of these sites is on Steamboat Slough (a reduction of one site due to a bank repair by the local RD) and accounts for 949 linear feet.

Within the priority ranking discussed later, a site marked as critical may not come out on top with the ranking methodology. The ranking methodology takes into account many factors which may result in a breach. The more issues a site has, the more likely it is to breach and therefore it is higher on the priority list. However, if one or more factor(s) is severe enough, based on engineering judgment, that it may result in a breach from the next high flow event it is classified as critical and should be considered for repair before the top ranking sites within the methodology.

7.3 New Erosion Sites

Based on the field investigation, four (4) erosion sites were added to the inventory. This is a relatively low number of new sites and can be attributed to a mild 2011 – 2012 winter where the system did not see any significant flows. The total linear feet added in 2012 was 7,654 ft, which includes 1,397 ft from new sites and 6,257 ft from extending existing erosion sites.

7.4 Erosion Sites Under Construction

Of all the sites in the erosion inventory, three (3) are currently under construction for repair. These erosion sites account for 994 linear feet within the system. Two sites, Sacramento River at RM 57.2 and 57.0 right banks are currently being repaired with a setback levee. The erosion site on the Sacramento River at RM 46.7L is being repaired by the Department of Water Resources with a rock bank repair. These sites should be repaired within the next year and should be removed from the inventory in the next year.

7.5 Repaired and Removed Sites

Based on the field investigation and knowledge of construction activities, three (3) sites were repaired and five (5) sites were removed. The total linear feet repaired in 2011/2012 was 1,792 ft, with repairs being completed by the local maintaining agencies. The total linear feet removed was 1,620 ft and these sites were removed since they no longer qualify as erosion sites. It is possible that some of the removed sites were repaired with soil infill by some other authority, while others had natural deposition occur.

Table 2. Summary of 2012 Erosion Sites by Channel

Waterway	2011 Erosion Sites	2012 New Erosion Sites	2012 Repaired/ Removed Erosion Sites	2012 Erosion Sites	2012 Critical Erosion Sites
American River	0	1	0	1	0
Arcade Creek	0	0	0	0	0
Bear River	5	0	0	5	0
Best Slough	0	0	0	0	0
Butte Creek	1	0	1	0	0
Butte Slough	0	0	0	0	0
Cache Creek	7	0	0	7	3
Cache Slough	6	0	0	6	0
Cherokee Canal	1	0	0	1	0
Chico/Sycamore Creek	0	0	0	0	0
Colusa Basin Drainage Canal	3	0	0	3	0
Colusa Weir Bypass	0	0	0	0	0
Coon Creek Interceptor	0	0	0	0	0
Cottonwood Creek	0	0	0	0	0
Deer Creek	2	0	0	2	0
Dry Creek (North)	0	0	0	0	0
Dry Creek (South)	0	0	0	0	0
East Interceptor Canal	0	0	0	0	0
Elder Creek	2	0	0	2	0
Elk Slough	2	0	0	2	0
Feather River	9	1	0	10	0
Georgiana Slough	15	0	0	15	4
Haas Slough	2	0	0	2	0
Honcut Creek	0	0	0	0	0
Jack Slough	0	0	0	0	0
Knights Landing Ridge Cut	7	0	0	7	0
Lindsey Slough	5	0	0	5	0
Marysville Ring Levee	0	0	0	0	0
Miner Slough	0	0	0	0	0
Moulton Weir Bypass	0	0	0	0	0
Mud Creek	1	0	0	1	0
Natomas Cross Canal	1	0	0	1	0
Natomas East Main Drainage Canal	0	0	0	0	0
Pleasant Grove Canal	0	0	0	0	0
Putah Creek	2	0	0	2	0
Sacramento Bypass	0	0	0	0	0

Table 2 cont. Summary of 2012 Erosion Sites by Channel

Waterway	2011 Erosion Sites	2012 New Erosion Sites	2012 Repaired/ Removed Erosion Sites	2012 Erosion Sites	2012 Critical Erosion Sites
Sacramento Deep Water Ship Channel	1	0	0	1	
Sacramento River	98	1	5	94	6
Steamboat Slough	14	0	1	13	1
Sutter Bypass	1	0	0	1	0
Sutter Slough	5	1	0	6	0
Sycamore Slough	1	0	0	1	0
Three Mile Slough	0	0	0	0	0
Tisdale Weir Bypass	0	0	0	0	0
Ulatis Creek	0	0	0	0	0
Wadsworth Canal	5	0	0	5	0
West Interceptor Canal	0	0	0	0	0
Western Pacific Interceptor Canal	0	0	0	0	0
Willow Slough Bypass	0	0	0	0	0
Yankee Slough	1	0	0	1	0
Yolo Bypass	7	0	0	7	0
Yuba River	1	0	1	0	0
Total	**205**	**4**	**8**	**201**	**14**

Table 3. Summary of 2012 Linear Footage of Erosion by Channel

Waterway	2011 Linear Feet	2012 New Linear Feet	2012 Repaired/ Removed Linear Feet	2012 Linear Feet
American River	0	190	0	190
Arcade Creek	0	0	0	0
Bear River	1,525	118	0	1,643
Best Slough	0	0	0	0
Butte Creek	142	0	142	0
Butte Slough	0	0	0	0
Cache Creek	2,718	0	0	2,718
Cache Slough	3,873	0	0	3,874
Cherokee Canal	34	0	0	34
Chico/Sycamore Creek	0	0	0	0
Colusa Basin Drainage Canal	1,976	0	0	1,976
Colusa Weir Bypass	0	0	0	0
Coon Creek Interceptor	0	0	0	0
Cottonwood Creek	0	0	0	0

Table 3 cont. Summary of 2012 Linear Footage of Erosion by Channel

Waterway	2011 Linear Feet	2012 New Linear Feet	2012 Repaired/ Removed Linear Feet	2012 Linear Feet
Deer Creek	363	0	0	363
Dry Creek (North)	0	0	0	0
East Interceptor Canal	0	0	0	0
Elder Creek	460	0	0	460
Elk Slough	97,515	2,100	0	99,615
Feather River	9,677	1,335	0	11,012
Georgiana Slough	21,053	1,092	0	22,145
Haas Slough	3,745	0	0	3,745
Honcut Creek	0	0	0	0
Jack Slough	0	0	0	0
Knights Landing Ridge Cut	7,483	0	0	7,484
Linda Creek (Dry Creek South)	0	0	0	0
Lindsey Slough	2,484	0	0	2,484
Marysville Ring Levee	0	0	0	0
Miner Slough	0	0	0	0
Moulton Weir Bypass	0	0	0	0
Mud Creek	300	0	0	300
Natomas Cross Canal	191	0	0	191
Natomas East Main Drainage Canal	0	0	0	0
Pleasant Grove Canal	0	0	0	0
Putah Creek	728	0	0	728
Sacramento Bypass	0	0	0	0
Sacramento Deep Water Ship Channel	81	0	0	81
Sacramento River	70,288	2,377	1,592	71,073
Steamboat Slough	5,925	0	144	5,783
Sutter Bypass	162	0	0	162
Sutter Slough	5,041	442	0	5,483
Sycamore Slough	98	0	0	98
Three Mile Slough	0	0	0	0
Tisdale Weir Bypass	0	0	0	0
Ulatis Creek	0	0	0	0
Wadsworth Canal	16,124	0	0	16,124
West Interceptor Canal	0	0	0	0
Western Pacific Interceptor Canal	0	0	0	0
Willow Slough Bypass	0	0	0	0
Yankee Slough	147	0	0	147
Yolo Bypass	7,712	0	0	7,712
Yuba River	1,534	0	1,534	0
Total	**261,379**	**7,654**	**3,412**	**265,625**

8.0 Site Priority Ranking

8.1 Site Priority Ranking Factors

The erosion sites catalogued in this 2012 Erosion Reconnaissance Report were ranked to help decide which sites should be the highest priority for repair. The sites were ranked using a methodology based on engineering factors. The ranking factors are described in detail below and the score sheet is shown in **Table 4**. For this ranking, sites with higher scores are considered to have higher potential for levee breaching.

Ranking Factors:

1. Site Length – Linear feet of the erosion site. This measurement is made based on measured GPS points taken in the field, either along the water's edge or top of levee, depending on inspection method.
2. Berm Width – Width of the berm or bench, if present. This measurement is an estimate based on visual inspection.
3. Bank Slope – The horizontal to vertical ratio of the eroding bank slope. This slope is an estimate of the overall bank slope throughout the eroding section.
4. Soil Characteristic – Soil characteristic of the eroding section. This is a generalized assessment of soils and broken down into simplistic options based on the cohesive properties of the bank/levee.
5. Velocity – The average channel velocity for a 100-yr event, based on a UNET model of the entire Sacramento River System. This factor also takes into account the presences of visible eddies or perceived potential for eddies based on engineering judgment.
6. Erosion Rate – The rate at which each site is retreating, in feet per year. This rate is an average rating based on the BSTEM (Bank Stability and Toe Erosion Model) study results performed by the USDA (USDA, 2010) where available, the Sediment Study performed by Northwest Hydraulics, and historic aerial imagery.
7. Additional Stability Factors – Additional factors that could contribute to stability issues, including trees with exposed roots, slumping, seepage, holes from either animals or tree pop-outs, vertical sections of bank, cracks, and wind/boat waves.

Again, the methodology used here can result in some non-critical sites being ranked higher than critical sites. The ranking methodology takes into account many factors which may result in a breach. The more issues a site has, the more likely it is to breach and therefore it is higher on the priority list. However, if one or more factor(s) is severe enough, based on engineering judgment, that it may result in a breach from the next high flow event it is classified as critical and should be considered for repair before the top ranking sites within the methodology.

Table 4. Site Ranking Score Sheet

actor	Score	Definition
Site Length	0	less than 100 ft
	1	100 to 500 ft
	2	500 to 1000 ft
	3	1000 to 2000 ft
	4	2000 to 5000 ft
	5	greater than 5000 ft
Berm Width	0	Greater than 35 ft of berm
	1	35 to 30 ft of berm
	2	26 to 30 ft of berm
	3	21 to 25 ft of berm
	4	16 to 20 ft of berm
	5	11 to 15 ft of berm
	6	5 to 10 ft of berm
	8	less than 5 ft of berm
	10	No berm
Bank Slope	0	3H:1V Slope (33%)
	2	2.5H:1V Slope (40%)
	4	2H:1V Slope (50%)
	6	1.5H:1V Slope (66.6%)
	8	1H:1V Slope (100%)
	9	0.5H:1V Slope
	10	Vertical Slope
Velocity	0	Backwater
	1	Less than 1 ft/s
	2	1 to 2 ft/s
	3	2 to 3 ft/s
	4	3 to 4 ft/s
	5	4 to 5 ft/s
	7	5 to 6 ft/s
	8	6 to 7 ft/s
	9	7 to 8 ft/s
	10	greater than 8 ft/s
	+1	Eddy Observed

Factor	Score	Definition
Soil Character-istic	2	Cohesive
	5	Stratified
	7	Non-Cohesive
Erosion Rate	0	0 ft/yr
	1	Less than 0.2 ft/yr
	2	0.2 to 0.4 ft/yr
	3	0.4 to 0.6 ft/yr
	4	0.6 to 0.8 ft/yr
	5	0.8 to 1 ft/yr
	6	1 to 2 ft/yr
	7	2 to 3 ft/yr
	8	3 to 4 ft/yr
	9	4 to 5 ft/yr
	10	Greater than 5 ft/yr
	+1	5 ft of erosion within last year
	+2	10 ft of erosion within last year
Additional Stability Factors	+2	Trees with exposed roots
	+4	Slumping
	+2	Seepage
	+1	Holes from animals
	+2	Holes from tree pop-outs
	+1	Short vertical sections
	+2	Tall vertical sections
	+1	Shallow cracks
	+2	Deep Cracks
	+1	Wind Waves
	+1	Recreational Boat waves
	+2	Waves from Cargo Ships

8.2 Site Priority Ranking Results

Table 5 provides the engineering site ranking and erosion score based on the erosion factors discussed earlier. The table also provides information as to the length of the site and the damage basin. In this table, erosion sites in red indicate critical erosion sites, sites in green indicate new sites, and sites in blue indicate sites that are currently being repaired. For the most part, sites upgraded to critical this year experienced additional erosion that has left sections of vertical banks that extend from the waterside edge of the top of levee to the water's edge. Further erosion at these sites increases the probability of potential levee breach, threatening the integrity of the SRFCD.

The Sacramento River at RM 12.1L is ranked highest due to the lack of any berm, steep banks, with some vertical sections, poor soil materials, slumping, wave wash from wind and cargo ships, and the high density of large trees with exposed roots, many of which are leaning and may soon fail and remove a large piece of the levee. This is the second year that this site has occupied the top spot. While none of the factors are so severe that it is critical, the rate at which it is eroding will likely result in a critical ranking within the next few years. The other top spots this year are also located in the Sacramento River in the lower tidally influenced areas and include: Sacramento River at RM 11.2L, Sacramento River at RM 13.6L , and Sacramento River at RM 8.2L.

Table 5. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
1	Sacramento River RM 12.1 L	57	1165	Brannan Andrus Islands
2	Sacramento River RM 11.2 L	52	1229	Brannan Andrus Islands
3	Sacramento River RM 13.6 L	50	303	Brannan Andrus Islands
4	Sacramento River RM 8.2 L	48	203	Sherman Island
5	Georgiana Slough RM 0.3 L	47	1907	Tyler Island
5	Georgiana Slough RM 2 L	47	652	Tyler Island
5	Sacramento River RM 7.9 L	47	481	Sherman Island
5	Sacramento River RM 17.2 L	47	1001	Brannan Andrus Islands
9	Feather River RM 17.8 L	46	1858	Arboga
9	Sacramento River RM 7.3 L	46	619	Sherman Island
9	Sacramento River RM 41.9 R	46	1360	Clarksburg
9	Sacramento River RM 55.7 R	46	1150	Southport
13	Cache Creek LM 3.9 L*	45	429	Yolo
13	Georgiana Slough RM 3.8 L	45	2589	Tyler Island

Note: Erosion sites in red indicate critical erosion sites, sites in green indicate new sites, and sites in blue indicate sites that are currently being repaired.

Table 5 cont. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
13	Sacramento River RM 16.8 L	45	591	Brannan Andrus Islands
13	Sacramento River RM 43.2 R	45	992	Borges
13	Sacramento River RM 172 L	45	1546	Butte Basin
13	Sutter Slough RM 24.7 R	45	2180	Clarksburg
13	Sutter Slough RM 27.3 R	45	1023	Clarksburg
20	Feather River RM 5.0 L	44	1666	Rio Oso
20	Cache Creek LM 2.4 L	44	218	Yolo
20	Feather River RM 3.8 L	44	2094	Rio Oso
20	Sacramento River RM 8 L	44	758	Sherman Island
20	Steamboat Slough RM 24.7 R	44	949	Sutter Island
25	Feather River RM 5.8 L	43	1030	Rio Oso
25	Feather River RM 6 L	43	487	Rio Oso
25	Sacramento River RM 26 L	43	1547	Brannan Andrus Islands
25	Georgiana Slough RM 6.8 L	43	1251	Tyler Island
29	Cache Creek LM 4.2 L*	42	728	Yolo
29	Bear River RM 5.7 L	42	474	Bear
29	Cache Creek LM 3.4 L*	42	487	Yolo
29	Georgiana Slough RM 4.5 L	42	1396	Tyler Island
29	Sacramento River RM 116.5 L	42	3393	South Sutter
34	Cache Creek LM 3.5 R	41	450	Woodland
34	Cache Slough RM 15.9 L	41	377	Ryer Island
34	Elk Slough RM 0.2 L	41	49631	Merritt Island
34	Elk Slough RM 0.2 R	41	49983	Clarksburg
34	Sutter Slough RM 25.7 R	41	709	Clarksburg
34	Sutter Slough RM 26.5 L	41	621	Sutter Island
40	Feather River RM 6.6 L	40	710	Rio Oso
40	Georgiana Slough RM 6.3 L	40	4152	Tyler Island
40	Sacramento River RM 163 L	40	1482	Butte Basin
40	Georgiana Slough RM 4.3 L	40	1052	Tyler Island
44	Cache Creek LM 5.4 L	39	198	Yolo
44	Feather River RM 1 L	39	1054	Rio Oso
44	Sacramento River RM 27 L	39	504	Tyler Island
44	Sacramento River RM 43.1 R	39	646	Borges
44	Sacramento River RM 48.6 R	39	581	Borges
44	Sacramento River RM 57 R	39	184	Southport
44	Sacramento River RM 57.2 R	39	647	Southport

Table 5 cont. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
44	Sacramento River RM 131.8 L	39	665	North Sutter
44	Steamboat Slough RM 25 L	39	264	Grand Island
44	Sutter Slough RM 25.2 R	39	694	Clarksburg
44	Sacramento River RM 18.1 L	39	267	Brannan Andrus Islands
55	Cache Creek LM 2.8 L*	38	209	Yolo
55	Feather River RM 0.6 L	38	901	Rio Oso
55	Lower American River RM 1.8 L	38	190	Sacramento
55	Putah Creek LM 7.2 L	38	305	Davis
55	Sacramento River RM 56.7 R	38	662	Southport
55	Sacramento River RM 62.9 R	38	215	West Sacramento
55	Sacramento River RM 77.7 R	38	156	Elkhorn
55	Steamboat Slough RM 15.7 R	38	338	Ryer Island
63	Bear River RM 4.9 R	37	64	Johnson Ranch
63	Georgiana Slough RM 2.5 L	37	992	Tyler Island
63	Georgiana Slough RM 5.3 L	37	3389	Tyler Island
63	Sacramento River RM 55.2 L	37	866	Sacramento
63	Sacramento River RM 63 R	37	168	West Sacramento
63	Sacramento River RM 87.1 L	37	1239	South Sutter
63	Sacramento River RM 122.3 R	37	236	Grimes
63	Sacramento River RM 123.3 L	37	679	North Sutter
63	Steamboat Slough RM 18.8 R	37	359	Ryer Island
63	Sutter Slough RM 27.1 R	37	255	Clarksburg
63	Wadsworth Canal LM 2.1 L	37	3422	Yuba City
63	Wadsworth Canal LM 2.1 R	37	3376	Sutter Town
75	Colusa Basin Drainage Canal LM 0.9 L	36	968	RD 787
75	Georgiana Slough RM 1.7 L	36	1528	Tyler Island
75	Georgiana Slough RM 8.3 L	36	565	Tyler Island
75	Haas Slough LM 7.9 L	36	2150	Moore Tract
75	Sacramento River RM 10.8 L	36	820	Brannan Andrus Islands
75	Sacramento River RM 18 L	36	444	Brannan Andrus Islands
75	Sacramento River RM 38.5 R	36	364	Merritt Island
75	Sacramento River RM 56.6 L	36	262	Sacramento
75	Sacramento River RM 58.5 L	36	386	Sacramento
75	Sacramento River RM 74.4 R	36	1343	Elkhorn
75	Sacramento River RM 143.5 R	36	602	Colusa Basin
75	Steamboat Slough RM 24.8 L	36	773	Grand Island

Table 5 cont. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
75	Steamboat Slough RM 23.9 R	36	168	Sutter Island
88	Cache Slough RM 21.1 R	35	1158	Hastings Tract
88	Lindsey Slough RM 0.7 R	35	280	Lindsey
88	Sacramento River RM 54.8 L	35	49	Sacramento
88	Steamboat Slough RM 22.8 R	35	643	Sutter Island
88	Steamboat Slough RM 23.6 R	35	768	Sutter Island
88	Steamboat Slough RM 26 L	35	312	Grand Island
94	Deer Creek LM 0.9 R	34	265	Butte Basin
94	Knights Landing Ridge Cut LM 3.7 L	34	678	Knights Landing
94	Sacramento River RM 22.7 L	34	311	Brannan Andrus Islands
94	Sacramento River RM 52.7 L	34	158	Sacramento
94	Sacramento River RM 56.5 R	34	465	Southport
94	Sacramento River RM 83.9 R	34	565	Knights Landing
94	Sacramento River RM 152.6 L	34	1555	Butte Basin
94	Steamboat Slough RM 18.9 R	34	330	Ryer Island
102	Bear River RM 1.9 L	33	432	Rio Oso
102	Colusa Basin Drainage Canal LM 19.2 L	33	397	Grimes
102	Georgiana Slough RM 9.3 L	33	1117	Tyler Island
102	Knights Landing Ridge Cut LM 4.7 L	33	1266	Knights Landing
102	Sacramento River RM 46.7 L	33	162	Sacramento
102	Sacramento River RM 52.4 L	33	117	Sacramento
102	Sacramento River RM 75.3 R	33	2753	Elkhorn
102	Sacramento River RM 86.3 L	33	3035	South Sutter
102	Sacramento River RM 86.9 R	33	517	Knights Landing
102	Sacramento River RM 118 R	33	837	Grimes
102	Sacramento River RM 122 R	33	311	Grimes
102	Sacramento River RM 164.3 R	33	1200	Colusa Basin
102	Sacramento River RM 164.7 R	33	1117	Colusa Basin
102	Steamboat Slough RM 24.1 R	33	55	Sutter Island
102	Steamboat Slough RM 25.8 R	33	243	Sutter Island
117	Bear River RM 0.8 L	32	452	Rio Oso
117	Colusa Basin Drainage Canal LM 0.5 L	32	611	RD 787
117	Knights Landing Ridge Cut LM 5.8 L	32	2986	Knights Landing
117	Sacramento River RM 31.6 R	32	442	Grand Island
117	Sacramento River RM 53.8 L	32	155	Sacramento
117	Sacramento River RM 127.9 R	32	562	Grimes

Table 5 cont. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
117	Sacramento River RM 130 L	32	712	North Sutter
117	Yankee Slough LM 1.7 L	32	147	Rio Oso
125	Bear River RM 2.5 L	31	222	Rio Oso
125	Elder Creek LM 1.4 L	31	331	Butte Basin
125	Georgiana Slough RM 7.2 L	31	332	Tyler Island
125	Haas Slough LM 9.7 L	31	1595	Moore Tract
125	Knights Landing Ridge Cut LM 3 L	31	1113	Knights Landing
125	Lindsey Slough RM 1.9 L	31	358	Hastings Tract
125	Sacramento River RM 50.3 L	31	89	Sacramento
125	Sacramento River RM 71.3 R	31	522	Elkhorn
125	Sacramento River RM 92.8 L	31	1283	South Sutter
125	Sacramento River RM 136.6 L	31	616	North Sutter
125	Sacramento River RM 136.6 R	31	725	Grimes
125	Sacramento River RM 152.8 L	31	299	Butte Basin
125	Wadsworth Canal LM 2.4 L	31	4603	Yuba City
125	Wadsworth Canal LM 2.4 R	31	4617	Sutter Town
139	Lindsey Slough RM 2.4 L	30	139	Hastings Tract
139	Sacramento River RM 15.0 L	30	203	Brannan Andrus Islands
139	Sacramento River RM 22.5 L	30	900	Brannan Andrus Islands
139	Sacramento River RM 120.6 L	30	190	North Sutter
139	Yolo Bypass LM 2.3 R	30	1822	Woodland
144	Deer Creek LM 2.4 L	29	97	Butte Basin
144	Sacramento River RM 24.8 L	29	783	Brannan Andrus Islands
144	Sacramento River RM 96.2 L	29	1489	South Sutter
144	Sacramento River RM 99 L	29	1745	South Sutter
144	Sacramento River RM 116 L	29	831	South Sutter
144	Steamboat Slough RM 25.5 R	29	580	Sutter Island
144	Yolo Bypass LM 2.8 R	29	2502	Woodland
151	Cache Slough RM 23.6 R	28	799	Hastings Tract
151	Knights Landing Ridge Cut LM 3.5 R	28	418	Yolo
151	Lindsey Slough RM 0.8 R	28	86	Lindsey
151	Sacramento River RM 23.2 L	28	589	Brannan Andrus Islands
151	Sacramento River RM 23.3 L	28	584	Brannan Andrus Islands
151	Sacramento River RM 26.3 R	28	472	Grand Island
151	Sacramento River RM 85.4 R	28	1025	Knights Landing
151	Sacramento River RM 104.5 L	28	1424	South Sutter

Table 5 cont. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
151	Sacramento River RM 125.6 R	28	415	Grimes
151	Wadsworth Canal LM 4.3 R	28	106	Sutter Town
151	Yolo Bypass LM 4.2 R	28	1652	Woodland
151	Yolo Bypass LM 0.1 R	28	427	Woodland
163	Cache Slough RM 22.8 R	27	258	Hastings Tract
163	Cache Slough RM 23 R	27	348	Hastings Tract
163	Georgiana Slough RM 7 R	27	774	Brannan Andrus Islands
163	Sacramento River RM 104 L	27	3443	South Sutter
163	Sacramento River RM 111 R	27	110	Grimes
168	Cherokee Canal LM 11.7 R	26	34	Butte Basin
168	Cache Slough RM 22.6 R	26	933	Hastings Tract
168	Feather River RM 50.9 R	26	371	Live Oak
168	Lindsey Slough LM 0.6 R	26	1620	Lindsey
168	Sacramento River RM 77 R	26	347	Elkhorn
168	Sacramento River RM 138.1 L	26	1308	North Sutter
168	Sycamore Creek LM 9.3 L	26	98	Grimes
168	Yolo Bypass LM 1.2 R	26	215	Woodland
168	Yolo Bypass LM 2 R	26	267	Woodland
177	Georgiana Slough RM 11 L	25	449	Tyler Island
177	Knights Landing Ridge Cut LM 3.1 L	25	658	Knights Landing
177	Knights Landing Ridge Cut LM 3.9 R	25	366	Yolo
177	Sacramento River RM 21.5 L	25	159	Brannan Andrus Islands
177	Sacramento River RM 25.2 L	25	326	Brannan Andrus Islands
177	Sacramento River RM 35.4 L	25	484	Courtland
177	Sacramento River RM 78.3 L	25	654	Natomas
177	Sacramento River RM 95.8 L	25	912	South Sutter
177	Sacramento River RM 141.5 R	25	641	Colusa Basin
177	Sacramento River RM 151 R	25	1748	Colusa Basin
187	Sacramento River RM 115.9 R	24	540	Grimes
188	Mud Creek LM 4.4 R	23	300	Butte Basin
188	Putah Creek LM 0.1 L	23	423	Davis
188	Sacramento River RM 55.5 L	23	384	Sacramento
188	Sacramento River RM 125.8 L	23	115	North Sutter
188	Yolo Bypass LM 2.6 R	23	827	Knights Landing
193	Feather River RM 47.5 R	22	842	Live Oak
193	Sacramento River RM 101.3 R	22	188	Grimes

Table 5 cont. Engineering Site Priority Ranking

Site Ranking	Erosion Site	Erosion Ranking Score	Erosion Length (ft)	Damage Basin
193	Sacramento River RM 123.7 R	22	122	Grimes
196	Elder Creek LM 3 R	21	129	Butte Basin
197	Sacramento River RM 157.7 R	20	484	Colusa Basin
198	Natomas Cross Canal LM 3 R	19	191	Rio Oso
199	Sacramento River RM 168.3 L	18	149	Butte Basin
199	Sutter Bypass LM 11.1 L	18	162	Yuba City
201	Deep Water Ship Channel LM 5 L	17	81	Clarksburg

* DWR plans to repair these sites in 2013/2014.

9.0 Conclusions

Following the 2012 annual erosion inventory we offer the following conclusions:

- There are currently 201 erosion sites in the inventory, or approximately 265,625 linear feet of eroding sites within the system.
- There are 4 new erosion sites and 7,654 linear feet of eroding bank which were added this year.
- There are 14 critical erosion sites: three on Cache Creek, four on Georgiana Slough, six on the Sacramento River, and one on Steamboat Slough. Three of these erosion sites were upgraded to critical this year.
- All identified erosion sites need to be repaired. Critical and top ranking erosion sites should be considered the highest priority for repair.

10.0 References

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- US Department of Agriculture, Watershed Physical Processes Research Unit. National Sedimentation Laboratory Technical Report Number 71: Sediment Loading from Streambanks and Levees along the Sacramento River ad Selected Tributaries - Draft. Prepared for the US Army Corps of Engineers by Natasha Bankhead, Andrew Simon, Tobert Thomas, Lauren Klimetz, and Danny Klimetz. December 2010.

[i] The previous erosion report had only 3,000 linear feet remaining, however a more accurate accounting of the linear feet was performed in the last year.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
BER_0-8_L	Bear River	0.8	0.0	L	RD 1001 (Unit 3)	Rio Oso	eroding	2006	452	15	Fluvial	none	none	No	2006 - Multiple rotational failures in the berm. Erosion is into the levee toe and lower slope. Tension cracks extensive at top of bank. Cohesive toe creates a bench on which failures occur. 2007 - Still steep bank with some berm with pistol-butted reeds.	Site extended upstream due to additional slumping. Slopes slightly steeper.
BER_1-9_L	Bear River	1.9	0.0	L	RD 1001 (Unit 3)	Rio Oso	eroding	2011	432	5	Whole Bank Failure	none	none	No	2011 - Large slumped sections of bank.	Slopes slightly steeper
BER_2-5_L	Bear River	2.5	0.0	L	RD 1001 (Unit 3)	Rio Oso	eroding	2011	222	25	Whole Bank Failure	none	none	No	2011 - Large section of bank has slumped off. RD has flagged and appears to be watching.	Slopes slightly steeper
BER_4-9_R	Bear River	4.9	0.0	R	RD 784 (Unit 3)	Johnson Ranch	eroding	2009	64	10	Fluvial		none	No	2009 - Small site which could be repaired with maintenance. Erosion into the levee toe, rock has started to fail.	No observed change.
BER_5-7_L	Bear River	5.7	0.0	L	RD 1001 (Unit 3)	Bear	eroding	2008	474	15	Whole Bank Failure	Fluvial	none	No	2008 - Sandy/silty banks with rotational slab failures creating near vertical bank with pop-outs due to tree failures. Narrow berm.	No observed change.
CHC_2-4_L	Cache Creek	0.0	2.4	L	DWR Cache Creek (Unit 1)	Yolo	critical	2002	218	15	Toe Scour	Whole Bank Failure	none	No	Site identified as CRITICAL in 2002. 2006 - Currently constructing a setback levee. New failures present and extensive. Downstream end of the setback levee did not extend far enough. Upstream end was repaired. 2007 - DWR repaired with a setback levee, but the levee did not go far enough downstream.	New cracks observed.
CHC_2-8_L	Cache Creek	0.0	2.8	L	DWR Cache Creek (Unit 1)	Yolo	eroding	2002	209	15	Toe Scour	Whole Bank Failure	none	No	2006 - Large new failure. 2008 - Plans for repair currently in the design phase. 2010 - Planned setback levee by CA DWR, 60% design complete, construction planned for 2012. 2011 - Construction delayed to 2013.	Construction planned for 2013 - 2014.
CHC_3-4_L	Cache Creek	0.0	3.4	L	DWR Cache Creek (Unit 1)	Yolo	eroding	2002	487	15	Toe Scour	Whole Bank Failure	none	No	2006 - Some significant new erosion, especially fresh upper bank slumping. Still substantial berm. 2010 - Site extended downstream, some new erosion, heavily vegetated and hard to see. Planned setback levee by CA DWR, 60% design complete, construction planned for 2012. 2011 - Construction delayed to 2013.	Construction planned for 2013 - 2014.
CHC_3-5_R	Cache Creek	0.0	3.5	R	DWR Cache Creek (Unit 2)	Woodland	eroding	2010	450	15	Fluvial	Tree Pop-Outs	none	No	2010 - Large slump on the upper berm, a tree has recently slid down the slope. 2011 - Large slump and new erosion.	Slightly steeper slopes and cracks observed.
CHC_3-9_L	Cache Creek	0.0	3.9	L	DWR Cache Creek (Unit 1)	Yolo	critical	2002	429	10	Toe Scour	Whole Bank Failure	none	No	Site identified as CRITICAL in 2006. 2006 - Some significant new erosion, especially fresh upper bank slumping. Also have a small piping failure due to recent overbank flows. 2007 - Some new minor upper bank slumps. 2010 - Planned setback levee by CA DWR, 100% design complete, construction planned for 2011. 2011 - Minor new erosion, construction delayed to 2012.	Minimal new erosion. Construction planned for 2013 - 2014.
CHC_4-2_L	Cache Creek	0.0	4.2	L	DWR Cache Creek (Unit 1)	Yolo	critical	2002	728	10	Toe Scour	Whole Bank Failure	none	No	Site identified as CRITICAL in 2006. 2006 - Some significant new erosion, especially fresh upper bank slumping. Also have a small piping failure due to recent overbank flows. 2010 - New erosion, flood fought in early 2010. Planned setback levee by CA DWR, 100% designs complete, construction planned for 2011. 2011 - Large sections of bank have slumped since the previous year.	Significant new erosion along top of bank. Construction planned for 2013 - 2014.
CHC_5-4_L	Cache Creek	0.0	5.4	L	DWR Cache Creek (Unit 2)	Yolo	eroding	2009	198	15	Whole Bank Failure	Tree Pop-Outs	none	No	2009 - Erosion into the levee slope. 2010 - Minor new erosion. 2011 - New erosion and a freshly fallen tree.	New animal holes and slightly steeper slopes.
CHS_15-9_L	Cache Slough	15.9	0.0	L	RD 501 (Unit 2)	Ryer Island	eroding	2005	377	3	Wave Wash	none	quarry stone on part of the bank in fair condition	Pipes through levee	2005 - Large vertical sections due to wave wash. New stone dumped on the bank with exposed geotextile. Cohesive toe has thin weak stratigraphic unit that is washing out. 2006 - Partially repaired, but 100 ft in the middle of the reach has exposed filter fabric and stone riprap is gone. 2010 - Site extended downstream to include new erosion pocket.	No observed change, chanel marker 42.
CHS_21-1_R	Cache Slough	21.1	0.0	R	RD 2060 (Unit 3)	Hastings Tract	eroding	2011	1158	0	Toe Scour	Wave Wash	none	Pipe	2011 - Several pockets of erosion from rotational failure and slumping toe.	No observed change.
CHS_22-6_R	Cache Slough	22.6	0.0	R	RD 2060 (Unit 3)	Hastings Tract	eroding	2008	933	0	Erosion Pockets	Whole Bank Failure	none	No	2008 - Small scour pockets and mid-slope wave wash. 2010 - More vegetation growth, could be fixed through maintenance. 2011 - Site extended downstream and new erosion.	No observed change.
CHS_22-8_R	Cache Slough	22.8	0.0	R	RD 2060 (Unit 3)	Hastings Tract	eroding	2007	258	0	Wave Wash	Erosion Pockets	none	No	2007 - Geotechnical failure of midside slope and wave wash/scalloping in toe area. Stone revetment upstream and downstream of site. Similar sites are present all along the right bank downstream of this site, most could be repaired with some maintenance. 2010 - Minor new erosion.	No observed change.
CHS_23-0_R	Cache Slough	23.0	0.0	R	RD 2060 (Unit 3)	Hastings Tract	eroding	2010	348	0	Toe Scour	Erosion Pockets	none	No	2010 - Small maintenance site.	No observed change.
CHS_23-6_R	Cache Slough	23.6	0.0	R	RD 2060 (Unit 3)	Hastings Tract	eroding	2005	799	0	Fluvial	none	quarry stone at toe in sections in fair condition	PG&E overhead transmission line	Site added in 1997 and removed in 2003. 2005 - Put back in the inventory. 2006 - Stone repair at the middle of the site. 2011 - Some rock place at toe in the past year.	No observed change.
CHK_11-7_R	Cherokee Canal	0.0	11.7	R	M.A. 13 (Unit 1)	None	eroding	2011	34	0	eddy scour		none	Weir and headwall	2011 - Small erosion pocket likely caused by irrigation diversion structure.	Site is part of the extended inventory, last inspected 2011.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
CBD_0-5_L	Colusa Basin Drainage Canal	0.0	0.5	L	RD 787 (Unit 1)	RD 787	eroding	2011	611	5	fluvial	tree pop-outs	none	No	2011 - Large scallops throughout the entire reach. Toe scour due to tree pop-outs, resulting in a steepening slope. The reduced resistive forces plus clay levee may increase the loading. Additional erosion due to human use.	Site is part of the extended inventory, last inspected 2011.
CBD_0-9_L	Colusa Basin Drainage Canal	0.0	0.9	L	RD 787 (Unit 1)	RD 787	eroding	2011	968	0	tree pop-outs	fluvial	none	No	2011 - Large scallops throughout the entire reach. Toe scour due to tree pop-outs, resulting in a steepening slope. The reduced resistive forces plus clay levee may increase the loading.	Site is part of the extended inventory, last inspected 2011.
CBD_19-2_L	Colusa Basin Drainage Canal	0.0	19.2	L	RD 108 (Unit 1)	Grimes	eroding	2011	397	0	fluvial	toe scour	none	No	2011 - Toe scour at the bottom of a steep bank, large sections of the toe are sliding down. Erosion may be due to the upstream bend.	Site is part of the extended inventory, last inspected 2011.
DWS_5-0_L	Deep Water Ship Channel	0.0	5.0	L	RD 999 (Unit 1)	Clarksburg	eroding	2006	81	200	wave wash		none	No	2006 - Slump failure of lower slope. Longitudinal cracks present along the levee slope. 2011 - Difficult to see due to overgrown vegetation. A small section of the levee has slumped. Sties DWS 5.0 and DWS 5.01 were combined.	Site is part of the extended inventory, last inspected 2011.
DEC_0-9_R	Deer Creek	0.0	0.9	R	Tehama County (Unit 2)	None	eroding	2006	265	15	tree pop-outs	fluvial	Old cobbles in sections	No	2006 - Banks are composed of lithified cobble alluvial soils (relict alluvial fan deposits). Slow erosion of lithified lower bank materials with faster erosion of overlying less cohesive soils resulting in channel "skating" across lithified horizon. 2011 - The Deer Creek Watershed Conservation Group is planning a reach-wide repair for Deer Creek.	Site is part of the extended inventory, last inspected 2011.
DEC_2-4_L	Deer Creek	0.0	2.4	L	Tehama County (Unit 1)	None	eroding	2006	97	20	whole bank failure		none	No	2006 - Erosion along outer bank of a meandering bend that is getting close to the projection of the levee toe. Trees are leaning out into the channel and ready to fall. Whole bank in reach is actively eroding. 2011 - New erosion pocket caused by an eddy. The Deer Creek Watershed Conservation Group is planning a reach-wide repair for Deer Creek.	Site is part of the extended inventory, last inspected 2011.
ELC_1-4_L	Elder Creek	0.0	1.4	L	Tehama County (Unit 4)	None	eroding	2006	331	20	fluvial		none	No	2006 - High vertical bank due to mass failures. Thalweg meandering and erosion of bank. Banks are cohesive with non-cohesive gravel horizons. 2011 - Foundation is silty-sand with gravel. New slumping at the toe, mass failure continues.	Site is part of the extended inventory, last inspected 2011.
ELC_3-0_R	Elder Creek	0.0	3.0	R	Tehama County (Unit 5)	None	eroding	2006	129	20	fluvial		none	No	2006 - Mass failure of this bank due to being along the outside of a bend where erosion and undercutting are the greatest. Low flow is being forced into the toe of this bank by point bar on the opposite side of the creek. 2011 - Toe of the bank continues to be undercut.	Site is part of the extended inventory, last inspected 2011.
ELK_0-2_L	Elk Slough	0.2	0.0	L	RD 150 (Unit 3)	Merritt Island	eroding	1997	49631	0	Whole Bank Failure	Tree Pop-Outs	quarry stone in sections in good condition	Multiple pipes through levee, boat docks, and bridge	1997 - Most of lower Elk Slough contains high near vertical banks, with erosion into the levee slope. Channel almost appears incised. 2002 - Sites where the levee slope is near vertical and severely eroding. It could fail catastrophically. 2004 - Looks bad in terms of vertical slopes and fallen trees. 2005 - Banks are still over steepened in most places and potentially susceptible to geotechnical failures. 2006 - Both banks are still over steepened in most places and potentially susceptible to geotechnical failures. 2010 - The entire reach is in poor condition, with severely eroding near vertical slopes, needs a regional repair. 2011 - Channel banks are still oversteepened with erosion continuing.	New cracks and animal holes observed.
ELK_0-2_R	Elk Slough	0.2	0.0	R	RD 999 (Unit 5)	Clarksburg	eroding	1997	49983	0	Whole Bank Failure	Tree Pop-Outs	none	Multiple pipes through levee, boat docks, and bridge	1997 - Most of lower Elk Slough contains high near vertical banks, with erosion into the levee slope. Channel almost appears incised. 2002 - Sites where the levee slope is near vertical and severely eroding. It could fail catastrophically. 2004 - Looks bad in terms of vertical slopes and fallen trees. 2005 - Banks are still over steepened in most places and potentially susceptible to geotechnical failures. 2006 - Both banks are still over steepened in most places and potentially susceptible to geotechnical failures. 2010 - The entire reach is in poor condition, with severely eroding near vertical slopes, needs a regional repair. 2011 - Channel banks are still oversteepened with erosion continuing.	New cracks and animal holes observed.
FHR_0-6_L	Feather River	0.6	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	1997	901	15	Toe Scour	Fluvial	cobbles at toe is sections in poor condition	No	1997- Deposits over top of cobble on the upper slope. 2000 - Old cobble site in poor shape; some toe retreat, but little change; steep bank. 2010 - Site extended upstream due to new toe erosion.	Minor new erosion at toe, new slumping, animals holes and cracks observed.
FHR_1-0_L	Feather River	1.0	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	2000	1054	15	Toe Scour	Fluvial	none	Pump structure in middle of site with failed sheet pile wall and power pole	2000 - Site is relatively stable except for some toe erosion at the upstream end, recommend monitoring the upstream end. 2004 - Some new block failures (10ft deep) at the toe of the upstream end. 2007 - Some minor new slumping at the waterline.	No observed change.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
FHR_3-8_L	Feather River	3.8	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	2006	2094	25	Fluvial	Whole Bank Failure	none	Pump structure near downstream end	2006 - Sandy, silty bank with intermittent pockets of erosion. Rotational failure and tree pop outs are most of the problem. Some upper slope fluvial erosion. 2010 - Site extended upstream. The lower Feather may benefit from a regional repair. 2011 - Site combined with 3.6. Minimal new erosion.	No observed change.
FHR_5-0_L	Feather River	5.0	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	2000	1666	40	Whole Bank Failure	Fluvial	none	No	2000 - Steep bank off berm with some slumps and fallen trees, continued erosion. 2002 - Site lengthened upstream and downstream due to vertical bank along most of the reach. 2010 - Site extended upstream. 2011 - Minimal new erosion.	Site extended on the upstream end, new tree pop-out, and bank erosion continues to worsen.
FHR_5-8_L	Feather River	5.8	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	2011	1030	0	Whole Bank Failure	Fluvial	small cobbles at toe in poor condition	Pipe through levee and pump structure at downstream end	2011 - Large slumped sections on the lower bank.	New cracks observed.
FHR_6-0_L	Feather River	6.0	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	2011	487	20	Whole Bank Failure	Fluvial	none	No	2011 - Tall slumping sections. Scour around trees has exposed most of the roots.	No observed change.
FHR_6-6_L	Feather River	6.6	0.0	L	RD 1001 (Unit 4)	Rio Oso	eroding	2011	710	5	Tree Pop-Outs	Fluvial	cobbles at toe in poor condition	Pipe through levee, pump at upstream end, and power pole	2011 - Erosion pockets from tree popouts. Sections of the lower bank have slumped off.	No observed change.
FHR_17-8_L	Feather River	17.8	0.0	L	RD 784 (Unit 2)	Arboga	eroding	2010	1858	35	Fluvial	Tree Pop-Outs	none	Pump structure and pipes through levee	2003 - Bank is near vertical. Identified as a Potentially Critical site. 2004 - Eddy flow off downstream end of Modesto formation eroding the fluvial sediments. 2005 - Some new slumping. Actively eroding but berm width is greater than 50 ft. 2006 - Downgraded to regular erosion site. Still actively eroding. Large old rotational failures in high bank on the downstream end. 2008 - Removed from inventory due to wide berm width does not meet criteria for an erosion site. 2010 - Added back to the inventory after 10 ft of bank erosion in the winter 2009 storm. Steep vertical face. 2011 - Bank has retreated an additional 2.5 ft from last year. New tree popouts and erosion throughout the site.	Site continues to worsen with new tree popouts and many areas of new erosion.
FHR_47-5_R	Feather River	47.5	0.0	R	DWR M.A. 7 (Unit 1)	Live Oak	eroding	2011	842	100	toe scour		large quarry stone at upstream end	Pipes through levee and canal on landside slope	2011 - The toe of the levee has been excavated by the land owner. Small holes throughout the site have been filled with a plaster like substance. Large canal on landside slope and over the levee toe.	Site is part of the extended inventory, last inspected 2011.
FHR_50-9_R	Feather River	50.9	0.0	R	DWR M.A. 7 (Unit 1)	Live Oak	eroding new	2012	371	15	Whole Bank Failure		quary stone in fair condition	Old bridge piers and canal on landside slope.		Oversteepened slope with failing rock (from repair completed in 1954). Likely slope stability issues.
GEO_0-3_L	Georgiana Slough	0.3	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	1907	0	Erosion Pockets	Whole Bank Failure	quarry stone in sections in good condition	Pipe	1997 - Erosion pockets into the levee toe. 1999 - Some small pockets fixed with rock riprap. 2002 - New "brush boxes" along the bank toe. 2005 - Brush boxes are empty. Some pockets are filled with new stone. 2006 - Some new rock at the downstream end (~100 ft long). Several small pockets of new rock in scallops. Brush boxes in poor to fair condition. 2010 - Site looks a little worse, some toe rock but still has erosion scars at lower to mid slope. 2011 - Site upgraded to CRITICAL. Significant new erosion. Erosion scallops are vertical and almost the height of the levee.	Rock has been placed in some of the erosion scallops and therefore the site is no longer critical.
GEO_1-7_L	Georgiana Slough	1.7	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	1528	5	Erosion Pockets	Wave Wash	quarry stone in sections in good condition	No	1997 - Old damaged rock riprap along the toe. 1999 - Downstream end (400 ft) repaired with rock. 2002 - New rock/concrete rubble section on the downstream end. 2004 - Small pocket repairs at the downstream end. 2005 - Some new bundles in the brush boxes.	Some rock has been placed in last year.
GEO_2-0_L	Georgiana Slough	2.0	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	2009	652	0	Erosion Pockets	Wave Wash	quarry stone in sections, ranging from poor to good condition	No	2009 - Upgraded to full erosion site. Small scour pockets and mid slope wave wash. 2010 - New rock and freshly fallen trees. 2011 - Site upgraded to CRITICAL. Significant new erosion. Rotational failures for the full height of the levee.	Some rock has been placed in last year, however the site remains critical.
GEO_2-5_L	Georgiana Slough	2.5	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	992	0	Erosion Pockets	Wave Wash	none	No	1997 - Erosion pockets into the toe of the levee. 2001 - Staked low fascine walls at the bankline. 2004 - Numerous "Brush Boxes." 2005 - Some new bundles in the brush boxes.	Site extended downstream to account for new bank sloughing.
GEO_3-8_L	Georgiana Slough	3.8	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	1997	2589	0	Erosion Pockets	Wave Wash	quarry stone in sections in poor to fair condition	Pipe through levee	1997 - Pockets of erosion into the levee at the water line. Alders are being undercut and rotating out into the channel. Damaged rock at upstream end. 2000 - New minor erosion. 2001 - Staked low fascine walls at bankline. 2002 - New "Brush Boxes" along the bank toe. 2003 - New erosion pockets in the middle of the site. 2005 - Some new bundles in the brush boxes. 2011 - Site upgraded to CRITICAL. Significant new erosion. Sites 3.6, 3.7, 3.71, and 4.0 were combined.	Rock has been placed in some of the erosion pockets since last year, however site remains critical.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
GEO_4-3_L	Georgiana Slough	4.3	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	1052	0	Erosion Pockets	Wave Wash	quarry stone in sections in fair condition	PG&E pipeline crossing	1997 - Pockets of erosion into the levee toe. 1999 - Minor rock riprap and willow bundles place in a couple of spots. 2001 - Staked, low fascine walls at bankline. 2003 - Small unprotected pockets still eroding. 2004 - Numerous brush boxes, some falling apart, some with new bundles. 2005 - Some new brush boxes installed; some boxes are empty. Levee slope and banks still look bad with pocket scallops into the levee slopes. 2011 - Erosion continues and the number of pockets is increasing.	No observed change.
GEO_4-5_L	Georgiana Slough	4.5	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	1997	1396	0	Erosion Pockets	Wave Wash	none	Bridge, underground telephone crossing, and pipe	1997 - Pocket erosion at upstream end and into the levee toe under the Alder trees. 2003 - New brush boxes with wattles on bank. 2004 - No brush boxes. 2005 - Site extended from the downstream side of the bridge. Whole bank is vertical. 2010 - Some minor new erosion. 2011 - Site upgraded to CRITICAL. New erosion pockets throughout the site. Sites 4.5, and 4.6 were combined.	No observed change.
GEO_5-3_L	Georgiana Slough	5.3	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	3389	0	Erosion Pockets	Wave Wash	quarry stone in sections in fair condition	Pipes	1997 - Pocket erosion into the toe of the levee. 2000 - Scallops in banks with small colored flags, biotech rolls present. 2001 - Staked, low fascine walls at bankline. 2003 - Still have visibly bad spots, especially at the upstream end. 2005 - Some new brush bundles in the brush boxes; some with missing bundles. Some boxes too low relative to high tide. 2010 - Site extended upstream. 2011 - Minor new erosion.	No observed change.
GEO_6-3_L	Georgiana Slough	6.3	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	4152	0	Erosion Pockets	Wave Wash	quarry stone and rubble at the toe in poor condition	Pipes and PG&E crossing	1997 - Deep pockets of erosion and narrow berm. Reach is characterized by lots of pockets into the existing berm and/or levee slope. 1999 - Some pockets filled with rock riprap. 2000 - Exposed fabric. 2001 - Staked, low fascine walls at bankline. 2002 - New spot of rock at upstream end. Some new brush boxes. 2005 - Some stone sliding off the underlying geotextile fabric. Some new brush bundles in the brush boxes; some with missing bundles. Some boxes too low relative to high tide. 2009 - Minimal new erosion, site length extended. 2010 - New erosion on downstream end, site extended downstream. 2011 - Sites 6.1. 6.4 and 6.6 were combined. New erosion pockets, site extended to include the erosion in between the old sites.	Rock has been placed in portions of the bank since last year.
GEO_6-8_L	Georgiana Slough	6.8	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	1997	1251	0	Wave Wash	none	some quarry stone in fair condition	No	1997 - Deep pockets of erosion into a narrow berm just downstream of the rock. 2000 - Scallops in banks with small colored flags, some new biotech rolls in with older rolls in the scallops. 2001 - Staked , low fascine walls at the bankline. 2011 - Site upgraded to CRITICAL. Site extended upstream due to new erosion pocket. New tree popouts and new erosion.	No observed change.
GEO_7-0_R	Georgiana Slough	7.0	0.0	R	RD 556 (Unit 1)	Brannan Andrus Islands	eroding	1997	774	5	Toe Scour	Wave Wash	sections of quarry stone in poor condition	Pipe through levee	1997 - Toe damaged rock. 1999 - One pocket filled with gravel. 2000 - Eroding beach with some biotech rolls and stakes; some gravel on slope. 2001 - Staked, low fascine walls at bankline. 2005 - Stone revetment in between pockets. 2006 - New rock on upper slope behind brush boxes at the upstream end, Stone is sliding off the hard toe.	No observed change.
GEO_7-2_L	Georgiana Slough	7.2	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	2009	332	0	Wave Wash	Toe Scour	sections of quarry stone in poor condition	No	2009 - Small scallops of erosion into the levee toe behind brush boxes. 2011 - Minor new erosion.	Site extended upstream to account for addition erosion pockets.
GEO_8-3_L	Georgiana Slough	8.3	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	565	0	Fluvial	Wave Wash	sections of quarry stone, ranging from poor to fair condition	No	1997 - Narrow eroding berm upstream of existing rock. 2001 Staked, low fascine walls at bankline. 2011 - Minor new erosion. Site extended downstream.	Rock repair failing in one erosion pocket.
GEO_9-3_L	Georgiana Slough	9.3	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	1997	1117	0	Toe Scour	Whole Bank Failure	quarry stone, sections at toe in poor condtions and sections on entire bank in good condition	Pipes through levee	1997 - Loss of rock at toe; pockets of upper berm erosion; very narrow berm width; toe rock problem; erosion pockets in rock. 2002 - New brush boxes at toe of the worst spots. 2005 - Upstream 200 ft removed because of the wide berm. 2006 - Some rock repair pockets behind the brush boxes at the upstream end. 2010 - Some new erosion.	No observed change.
GEO_11-0_L	Georgiana Slough	11.0	0.0	L	RD 563 (Unit 1)	Tyler Island	eroding	2011	449	0	Wave Wash	none	none	No	2011 - Short sections of eroding bank at the waterline and holes in toe of levee.	Site extended upstream.
HAS_7-9_L	Haas Slough	0.0	7.9	L	RD 2098 (Unit 3)	Moore Tract	eroding	2011	2150	0	wave wash	toe scour	none	Pump and walkway	2011 - Large vertical erosion pockets and bank slumping.	Site is part of the extended inventory, last inspected 2011.
HAS_9-7_L	Haas Slough	0.0	9.7	L	RD 2098 (Unit 4)	Moore Tract	eroding	2011	1595	0	whole bank failure	other	none	No	2011 - Several scallops of erosion. Erosion primarily due to the weight of cattle on the slope.	Site is part of the extended inventory, last inspected 2011.
KLR_3-0_L	Knights Landing Ridge Cut	0.0	3.0	L	Knights Landing Ridge Drainage District (Unit 2)	Knights Landing	eroding	2006	1113	0	wave wash		none	No	2006 - The whole levee toe area is slowly slumping into the channel (creep) due to dewatering and poor slope soils. Occasional piping in the levee slope evident as well. Pistol-butted trees at the levee toe indicate slow retreat. 2011 - Multiple scallops throughout the site and slumping of the toe.	Site is part of the extended inventory, last inspected 2011.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
KLR_3-1_L	Knights Landing Ridge Cut	0.0	3.1	L	Knights Landing Ridge Drainage District (Unit 2)	Knights Landing	eroding	2006	658	0	fluvial		none	No	2006 - The whole levee toe area is slowly slumping into the channel (creep) due to dewatering and poor slope soils. Occasional piping in the levee slope evident as well. Pistol-butted trees at the levee toe indicate slow retreat. 2011 - Slumping of the levee toe.	Site is part of the extended inventory, last inspected 2011.
KLR_3-5_R	Knights Landing Ridge Cut	0.0	3.5	R	Knights Landing Ridge Drainage District (Unit 1)	Yolo	eroding	2011	418	0	toe scour		none	Pipe through levee	2011 - Toe scour and bank slumping.	Site is part of the extended inventory, last inspected 2011.
KLR_3-7_L	Knights Landing Ridge Cut	0.0	3.7	L	Knights Landing Ridge Drainage District (Unit 2)	Knights Landing	eroding	2011	678	0	tree pop-outs	whole bank failure	none	Abandoned pipe and concrete box	2011 - The toe has eroded away and there are a few scallops from bank slumping.	Site is part of the extended inventory, last inspected 2011.
KLR_3-9_R	Knights Landing Ridge Cut	0.0	3.9	R	Knights Landing Ridge Drainage District (Unit 1)	Yolo	eroding	2011	366	0	tree pop-outs		none	No	2011 - Toe erosion and erosion pockets from tree popouts. More tree popouts are expected due to the eroding toe.	Site is part of the extended inventory, last inspected 2011.
KLR_4-7_L	Knights Landing Ridge Cut	0.0	4.7	L	Knights Landing Ridge Drainage District (Unit 2)	Knights Landing	eroding	2011	1266	0	fluvial		none	No	2011 - This site is the downstream section of the old KLR 5.3L site. Levee toe is slowly retreating. Cracking on top of the levee may indicate potential mass movement.	Site is part of the extended inventory, last inspected 2011.
KLR_5-8_L	Knights Landing Ridge Cut	0.0	5.8	L	Knights Landing Ridge Drainage District (Unit 2)	Knights Landing	eroding	2011	2986	0	fluvial		none	Pipes through levee and concrete structure	2011 - This site is the upstream section of the old KLR 5.3L site. Levee toe is slowly retreating. Cracking on top of the levee may indicate potential mass movement.	Site is part of the extended inventory, last inspected 2011.
LDS_0-6_R	Lindsey Slough	0.0	0.6	R	RD 536 (Unit 1)	Lindsey	eroding	2011	1620	0	toe scour		none	No	2011 - Multiple sections of slumping bank.	Site is part of the extended inventory, last inspected 2011.
LDS_0-7_R	Lindsey Slough	0.7	0.0	R	RD 536 (Unit 1)	Lindsey	eroding	2011	280	0	Tree Pop-Outs	Fluvial	none	No	2011 - Levee toe is unraveling with large slumping sections. This site is downstream of old bank rock.	Erosion pocket appears larger than previous year.
LDS_0-8_R	Lindsey Slough	0.8	0.0	R	RD 536 (Unit 1)	Lindsey	eroding	2011	86	0	Tree Pop-Outs	Fluvial	quarry stone in sections in fair condition	Pipe through levee and pump just downstream	2011 - Multiple erosion pockets from tree popouts. A smaller erosion pocket in the middle of a failing bank repair. Pump structure at the downstream end may be contributing to the erosion.	No observed change.
LDS_1-9_L	Lindsey Slough	1.9	0.0	L	RD 2060 (Unit 1)	Hastings Tract	eroding	2011	358	0	wave wash	fluvial	none	No	2011 - Multiple erosion pockets. Deep cracks throughout site could lead to further bank failure.	Site is part of the extended inventory, last inspected 2011.
LDS_2-4_L	Lindsey Slough	2.4	0.0	L	RD 2060 (Unit 1)	Hastings Tract	eroding	2011	139	0	wave wash	fluvial	none	No	2011 - Two erosion pockets from rotational failures. Very soft soil.	Site is part of the extended inventory, last inspected 2011.
LAR_1-8_L	Lower American River	1.8	0.0	L	American River Flood Control District (Unit 4)	Sacramento	eroding new	2012	190	15	Fluvial	Eddy Scour	quarry stone at toe in poor condition	No		New erosion site. Located just downstream of older repair. Failing rock at the upstream end. Erosion of the bank has exposed large tree roots.
MUD_4-4_R	Mud Creek	0.0	4.4	R	Butte County (Unit 1)	None	eroding	2011	300	20	fluvial		none	No	2011 - Two large erosion scallops at the toe from a rotational failure. Deep cracks along the slope indicate the potential for further failures.	Site is part of the extended inventory, last inspected 2011.
NCC_3-0_R	Natomas Cross Canal	0.0	3.0	R	RD 1001 (Unit 5)	Rio Oso	eroding	2006	191	40	fluvial		none	No	2006 - Noted old saturation slumping of upper levee slope that is into the levee core (near high water line). 2011 - Erosion is into the top of the levee. This site is actually located at LM 2.5.	Site is part of the extended inventory, last inspected 2011.
PUC_0-1_L	Putah Creek	0.0	0.1	L	DWR Putah Creek (Unit 1)	Davis	eroding	2011	423	0	wave wash		cobbles at toe in fair condition	PG&E utility poles	2011 - Old cobble site is unraveling, likely causing the toe of the bank to become unstable.	Site is part of the extended inventory, last inspected 2011.
PUC_7-2_L	Putah Creek	0.0	7.2	L	DWR Putah Creek (Unit 1)	Davis	eroding	2011	305	0	whole bank failure	tree pop-outs	none	Storm drain through levee	2011 - The toe to mid-bank is slumping. Large tree pop-outs have furthered the erosion. Slope is slightly steeper than 1:1.	Site is part of the extended inventory, last inspected 2011.
SAC_7-3_L	Sacramento River	7.3	0.0	L	RD 341 (Unit 2)	Sherman Island	critical	2011	619	0	Other	Whole Bank Failure	none	Fish release system, pipes, pillings, conduit, netting, and power poles.	2011 - Large slump at downstream end. Gully formed from surface runoff from the road. Shallow slumping throughout site.	The gully at upstream end has increased in size and site continues to worsen.
SAC_7-9_L	Sacramento River	7.9	0.0	L	RD 341 (Unit 2)	Sherman Island	critical	2011	481	0	Whole Bank Failure	Wave Wash	scattered rock	Pipe through levee	2011 - Large slump section	Site extended downstream, upgrade to critical, severe windwave. Slope is very steep and may be effecting the highway on top of the levee.
SAC_8-0_L	Sacramento River	8.0	0.0	L	RD 341 (Unit 2)	Sherman Island	critical	1999	758	0	Wave Wash	Whole Bank Failure	quarry stone on part of the toe in poor condition	No	1999 - New small slump in eroded bank. 2005 - Reach extended because of vertical bank along the roadway upstream. 2011 - More slumping since last year.	Site upgraded to critical. Very steep slope which may be effecting the highway on top of the levee.
SAC_8-2_L	Sacramento River	8.2	0.0	L	RD 341 (Unit 2)	Sherman Island	eroding	2011	203	0	Whole Bank Failure	Wave Wash	small quarry stone at toe in fair condition	No	2011 - Large new erosion pocket probably hidden by vegetation in the past.	No observed change.
SAC_10-8_L	Sacramento River	10.8	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	eroding	2004	820	10	Whole Bank Failure	none	cobbles at the toe in fair condition, quarry stone on the outboard berm in good condition	Pipe	2004 - Wave wash pockets approximately 100 ft long with new full bank rock between the pockets. 2005 - Spot repairs, but toe is still eroding in several places. 2006 - Low vertical bank along roadway. 2007 - A PL 84-99 repair was constructed, it cover the majority of the site with the exception of the upstream 150 to 200 ft and the downstream 250 ft, therefore it is being kept in the inventory. 2009 - Minimal new erosion. 2010 - Outboard berm looks good, but the banks are still very steep. 2011 - While the outboard berm is protecting against wave wash, bank still has slumping issues.	No observed change.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_11-2_L	Sacramento River	11.2	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	critical	2008	1229	0	Wave Wash	Whole Bank Failure	quarry stone at toe in fair condition	Pipe through levee	2008 - Erosion causing vertical bank at the highway on top of levee. The whole bank along the highway should be repaired. 2009 - Minimal new erosion. 2011 - Bank continues to slowly erode.	Upgrade to critical, new erosion since lat year and steeper slopes in sections.
SAC_12-1_L	Sacramento River	12.1	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	eroding	2010	1165	0	Whole Bank Failure	Tree Pop-Outs	none	Pipe through levee, gas line, ramp, dock, boat launch, and utility poles	2010 - Small inlet area behind a man-built spit. Bank is slumping and could possibly be fixed with maintenance. 2011 - Site continues to worsen.	No observed change.
SAC_13-6_L	Sacramento River	13.6	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	eroding	2011	303	0	Whole Bank Failure	Wave Wash	quarry stone at toe in fair condition	Marina at upstream end	2011 - Large section of bank slumped off.	No observed change.
SAC_15-0_L	Sacramento River	15.0	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	eroding	2009	203	0	Other	Fluvial	quarry stone at toe in fair condition	No	2009 - Tension cracks on road on top of levee. Erosion into the levee slope with large mass failure scallop. 2010 - Site extended further upstream to account for additional erosion. Very steep slope with slumping.	No observed change.
SAC_16-8_L	Sacramento River	16.8	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	critical	2008	591	0	Fluvial	Wave Wash	quarry stone and rubble at the toe in poor condition	Pump intake	2008 - Overstepped levee section with pocket erosion. Plans for repair currently in the design phase. 2010 - Very steep slope with slumps, longitudinal cracking, and overturned trees. 2011 - Upgraded to CRITICAL. Sections of vertical slope with highway on top. Heavy vegetation in front of most of the erosion pockets.	No observed change.
SAC_17-2_L	Sacramento River	17.2	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	critical	2009	1001	0	Fluvial	Whole Bank Failure	concrete rubble and some quarry stone in poor condition	Boat dock, pipe, pump, building, and dolphin	2009 - Fluvial erosion, into the levee slope, close to vertical bank with roadway on top. Pilings that were once at the bankline are now 30 ft out. 2010 - Very steep slope with slumps and overturned trees. 2011 - Upgraded to CRITICAL. Sections of vertical slope with highway on top. Heavy vegetation in front of most of the erosion pockets. Structures built into the levee on the upstream end.	Site continues to worsen.
SAC_18-0_L	Sacramento River	18.0	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	eroding	2009	444	0	Fluvial	Whole Bank Failure	quarry stone at toe in fair condition	No	2009 - Large scallop from rotational failure. One fallen tree and one large tree with half of its root structure exposed.	No observed change.
SAC_18-1_L	Sacramento River	18.1	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	eroding	2009	267	0	Fluvial	Other	quarry stone and rubble at toe in fair condition	No	2009 - Short reach of vertical bank at the toe. 2010 - Large tree is getting ready to fall in.	No observed change.
SAC_21-5_L	Sacramento River	21.5	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	159	5	Wave Wash	none	none	No	1999 - Downstream 140 ft repaired with rock. 2010 - Lots of woody debris, but no changes to site.	No observed change.
SAC_22-5_L	Sacramento River	22.5	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	900	10	Fluvial	Wave Wash	quarry stone in sections in poor fair condition	Pipe and pump structure	2002 - Spot rock along berm, but not in the erosion pockets. 2005 - Some new minor stone revetment at the upstream end. Brush boxes present. 2006 - Currently installing new brush in downstream brush boxes. 2007 - Rock in middle portion for about 150 ft. 2010 - Some attempt at repairs but still has pockets of erosion.	More erosion at the toe.
SAC_22-7_L	Sacramento River	22.7	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	311	0	Tree Pop-Outs	Wave Wash	none	No	1997 - Scallops into berm and very close to levee toe. 2005 - Brush boxes present. 2011 - New toe scour and freshly fallen tree.	New tree popout has taken significant portion of soil out of the levee
SAC_23-2_L	Sacramento River	23.2	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	589	10	Fluvial	Wave Wash	none	No	2000 - Recently fallen cottonwood at the downstream end. 2005 - Empty brush boxes. 2011 - A few trees have fallen since last year.	Potential new tree popout since last year.
SAC_23-3_L	Sacramento River	23.3	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	584	30	Fluvial	Wave Wash	scattered rock in poor condition	No	1997 - Few scallops in berm, some getting close to levee toe. 2005 - Brush boxes present.	More erosion of the toe since last year.
SAC_24-8_L	Sacramento River	24.8	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	783	10	Fluvial	Wave Wash	none	No	1997 - Slow erosion of the berm at the waterline; bench below water. 2005 - Brush boxes present. 2010 - Minor new erosion.	No observed change.
SAC_25-2_L	Sacramento River	25.2	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	326	5	Fluvial	Wave Wash	none	No	1997 - Rock is in poor condition and has failed in many places. Scallops in berm with remnants of old rock in the toe area. 2005 - Brush boxes present.	No observed change.
SAC_26-0_L	Sacramento River	26.0	0.0	L	RD 556 (Unit 2)	Brannan Andrus Islands	eroding	1997	1547	0	Fluvial	Wave Wash	small section of quarry stone in good condition	Pump and USGS gage station	2002 - Two rocked sections (150 ft long) at the downstream end. 2005 - Lots of old brush boxes, some with established vegetation in the area behind the boxes. 2006 - Some small spots fixed with stone. 2009 - Minimal new erosion, rock in the middle of the reach may be new. 2011 - Minor new erosion at the toe.	No observed change.
SAC_26-3_R	Sacramento River	26.3	0.0	R	RD 3 (Unit 2)	Grand Island	eroding	2008	472	0	Fluvial	Wave Wash	none	Boad dock	2009 - Hole left in levee toe from a fallen tree. Could be repaired under maintenance. 2010 - Minor new erosion.	No observed change.
SAC_27-0_L	Sacramento River	27.0	0.0	L	RD 554 (Unit 1)	Tyler Island	eroding	2009	504	0	Whole Bank Failure	none	quarry stone at toe in fair to poor condition	No	2009 - Tension cracks on road on top of levee. Erosion into the levee slope and mass failure.	No observed change.
SAC_31-6_R	Sacramento River	31.6	0.0	R	RD 3 (Unit 2)	Grand Island	eroding	1997	442	0	Fluvial	none	small quarry stone at toe in fair condition	Pipes and pump house	1997 - Erosion of supper sandy levee material above the water line, straight reach. 1999 - Small pocket repaired with rock. 2005 - Downstream 400 ft have been repaired. 2011 - Site is overgrown with vegetation.	No observed change.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_35-4_L	Sacramento River	35.4	0.0	L	RD 755 (Unit 1)	Courtland	eroding	2003	484	5	Wave Wash	Other	quarry stone at lower bank at toe, bank rock unraveling, toe rock in fair condition	No	2003 - Toe and lower slope eroding, rock in water and a few pieces on the slope; rock at upstream and downstream ends. 2005 - Looks a little worse. Two major holes with vertical banks and smaller intermittent pockets in between. Stone is present upstream, downstream, and at toe. 2008 - Repaired at both ends (50 ft of new stone) but middle remains unrepaired. 2011 - Site extended downstream to include new scour.	No observed change.
SAC_38-5_R	Sacramento River	38.5	0.0	R	RD 150 (Unit 2)	Merritt Island	eroding	1997	364	0	Fluvial	Whole Bank Failure	small quarry stone at toe in fair to poor condition	No	1999 - Downstream end (300 ft) repaired with rock. 2010 - Toe erosion, some vertical slopes lower down. 2011 - Failing rock repair. Slumping of the lower bank. Minor new erosion.	No observed change.
SAC_41-9_R	Sacramento River	41.9	0.0	R	RD 999 (Unit 4)	Clarksburg	eroding	1997	1360	0	Fluvial	Wave Wash	none	Gas pipeline at downstream end and power poles	1997 - Structural problem rather than erosional, failed cobble at downstream end. 2005 - New brush boxes at waterline for several hundred feet downstream, No toe or bank protection present. 2006 - Some minor new erosion. Brush boxes not working well; most of the brush has floated out. 2007 - Brush boxes have recently been repaired.	New erosion at the toe.
SAC_43-1_R	Sacramento River	43.1	0.0	R	RD 307 (Unit 1)	Borges	eroding	2011	646	0	Tree Pop-Outs	Whole Bank Failure	cobbles at toe in poor condition	Large discharge pipes	2011 - Erosion pockets likely from tree popouts. This site has been in the inventory before and been fixed with emergency bank rock but continues to fail.	No observed change.
SAC_43-2_R	Sacramento River	43.2	0.0	R	RD 307 (Unit 1)	Borges	eroding	2008	992	0	Tree Pop-Outs	Whole Bank Failure	quarry stone at toe, good in some sections and poor in other sections	Pipe through levee	2008 - Large rotational failure in bank and well into the levee slope. Could be a significant problem in the next high flow event. 2009 - Minimal new erosion, site extended upstream. 2010 - Minor new erosion. 2011 - Tree popout has left a large hole. Large slump area. Rock on the bank is failing in some locations.	The toe appears to be scouring out.
SAC_46-7_L	Sacramento River	46.7	0.0	L	DWR MA 9 (Unit 1)	Sacramento	under construction	2010	162	0	Wave Wash	Other	cobbles on part of the bank in poor condition	Railroad on top of levee	Site identified by DWR MA and flood fought following the 2010 storm events. 2010 - Railroad on levee, may be an encroachment; DWR flood fought in January 2010. Eroding of the upper and middle bank, lots from people. 2011 - Site continues to worsen. More erosion at the toe.	Site is currently being repaired by the state.
SAC_48-6_R	Sacramento River	48.6	0.0	R	RD 307 (Unit 1)	Borges	eroding new	2012	581	0	Whole Bank Failure	Tree Pop-Outs	quarry stone at toe in fair condition	No		Bank is slowly eroding, old rock protection starting to unravel.
SAC_50-3_L	Sacramento River	50.3	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	2011	89	0	Tree Pop-Outs	none	cobbles at toe in fair condition	No	2011 - Tree popout at the toe has taken out the rock toe protection.	No observed change.
SAC_52-4_L	Sacramento River	52.4	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	2010	117	0	Eddy Scour	Whole Bank Failure	none	Wooden steps	2004 - A large tree cave was identified. 2005 - Site repaired. 2010 - At the downstream end of the repair at 52.5, bad transition is inducing further erosion. 2011 - Minor new erosion on bank.	No observed change.
SAC_52-7_L	Sacramento River	52.7	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	2010	158	0	Fluvial	Tree Pop-Outs	scattered rock at toe in poor condition	No	2010 - Small section of slumping, can be fixed with maintenance. 2011 - Freshly fallen tree and minor new toe erosion.	No observed change.
SAC_53-8_L	Sacramento River	53.8	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	2011	155	15	Fluvial	Wave Wash	none	Caltrans pipeline	2011 - Erosion into upper and lower slope. There has been significant scour around the tree roots.	No observed change.
SAC_54-8_L	Sacramento River	54.8	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	2011	49	0	Tree Pop-Outs	Wave Wash	scattered rock at toe in poor condition	No	2011 - A large tree has fallen behind a larger tree, putting stress on an already compromised tree. Toe erosion due to wave wash.	No observed change.
SAC_55-2_L	Sacramento River	55.2	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	2003	866	5	Fluvial	Wave Wash	areas of cobbles and rock at toe in poor condition	Pump, pipes, boat docks, and fences	Site previously named 55.1. 2003 - Pockets of toe erosion at low flow waterline. 2005 - Site renamed 55.2. Still have pockets of erosion but rock bench at waterline is still present. 2010 - Site extended upstream due to new erosion. 2011 - Some of the toe rock has failed. The upper levee slope seems to be slumping.	Minor new slumping.
SAC_55-5_L	Sacramento River	55.5	0.0	L	DWR MA 9 (Unit 1)	Sacramento	eroding	1997	384	15	Whole Bank Failure	Wave Wash	quarry stone at toe in some sections in fair condition	Large marina and parking lot on waterside berm	1997 - Large cottonwoods on slope. 2003 - Some minor sloughing. 2004 - New sediment deposition on the downstream end. 2007 - New dock was installed without notification to USACE and halted the planned repair due to ROW issues.	No observed change.
SAC_55-7_R	Sacramento River	55.7	0.0	R	RD 900 (Unit 1)	Southport	eroding	2008	1150	0	Whole Bank Failure	Wave Wash	sections of quarry stone on bank in fair condition	Boat dock, pipes, power poles, and dolphins	2008 - Erosion into levee toe. Over steepened levee slope, worst at the upstream end. 2009 - Near vertical banks from rotational slumping, hidden by vegetation. 2010 - Boat sinking more, may be causing eddy scour around it. Difficult to see the vertical slumps due to dense vegetation. 2011 - Minor new erosion at the toe. The paddleboat that was sitting at this site for years has been removed.	Site extended upstream due to additional erosion.
SAC_56-5_R	Sacramento River	56.5	0.0	R	RD 900 (Unit 1)	Southport	eroding	1997	465	10	Fluvial	Wave Wash	none	No	1997 - Low berm is contributing to erosion. Old timber pile dikes above water parallel to bank. The upstream mitigation low berm causes a flow separation at the site. 1999 - Some new localized erosion with less thank one foot of bank retreat. 2000 - Some new erosion at the upstream end. Fat toe deposits at toe. 2003 - Some new erosion upstream, but have a wide berm. 2011 - Minor new erosion at toe.	No observed change.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_56-6_L	Sacramento River	56.6	0.0	L	City of Sacramento (Unit1)	Sacramento	eroding	1997	262	0	Fluvial	Whole Bank Failure	rubble on bank in poor condition	SMUD structure and pipe	1997 - Erosion at pump station, concrete debris and plastic showing. 2000 - Separation scour of bank due to poor transition. 2004 - New large tree pop out; city dumped fill dirt/rock into hole. 2006 - Minor new erosion at top of bank. 2010 - Some new rock placed in tree pop-out. 2011 - A large tree has fallen and flood fighting was performed by the city on the upper levee slope.	Small rock placed in hole from tree popout.
SAC_56-7_R	Sacramento River	56.7	0.0	R	RD 900 (Unit 1)	Southport	eroding	2007	662	10	Fluvial	Wave Wash	none	Power poles	2007 - Have good berm width with minor toe erosion. Close to the levee toe protection, but levee slope is steep. 2011 - New large erosion pocket.	minor new erosion at the toe
SAC_57-0_R	Sacramento River	57.0	0.0	R	RD 900 (Unit 1)	Southport	under construction	1997	184	0	Fluvial	Eddy Scour	none	No	1997 - Old timber pile dikes remnant approximately 30 ft out into the channel. Oversized levee section. 1999 - Some additional erosion at water line. 2008 - Plans for setback levee repair (along with 57.2) currently in the design phase. 2011 - Setback levee under construction.	Site is still under construction and will be removed along with 57.2.
SAC_57-2_R	Sacramento River	57.2	0.0	R	RD 900 (Unit 1)	Southport	under construction	2007	647	0	Fluvial		cobbles at toe in poor condition	No	2007 - Steep levee slope with cobble revetment rolling off the bank and a silty clay toe. 2008 - Plans for setback levee repair currently in the design phase. 2011 - Setback levee under construction.	Site is still under construction and will be removed along with 57.0.
SAC_58-5_L	Sacramento River	58.5	0.0	L	City of Sacramento (Unit1)	Sacramento	eroding	2008	386	0	Fluvial	Whole Bank Failure	concrete rubble at toe in poor condition	Pipe through levee, railroad and bikepath on top of levee, and monitoring wells	2008 - Oversized levee, should be repaired under maintenance. 2009 - Shallow slumps at the mid bank. 2010 - Some minor erosion at the toe, likely from wave wash. Some new shallow slumps. 2011 - One new tree has fallen.	No observed change.
SAC_62-9_R	Sacramento River	62.9	0.0	R	RD 537 (Unit 1)	West Sacramento	eroding	1997	215	10	Erosion Pockets	Wave Wash	concrete rubble at toe in poor condition	Ramp and structure on top of levee	1997 - This may have been a cobble rehabilitation site to the 1957 cobble that was place all the way to the I-80 Bridge. 2003 - Site is still very close to the levee and into the levee toe. 2011 - One new tree has fallen.	No observed change.
SAC_63-0_R	Sacramento River	63.0	0.0	R	RD 537 (Unit 1)	West Sacramento	eroding	1997	168	15	Erosion Pockets	none	quarry stone at toe in fair condition	Structure on levee	1997 - Erosion near the downstream corner of the Sacramento Weir. 2000 - Local damage induced by human use.	No observed change.
SAC_71-3_R	Sacramento River	71.3	0.0	R	RD 1600 (Unit 1)	Elkhorn	eroding	1997	522	25	Erosion Pockets	Wave Wash	none	No	2000 - Very cohesive vertical bank. 2003 - Some minor new erosion. 2006 - Some minor erosion in old pockets. 2009 - Minimal new erosion. 2011 - Multiple new erosion pockets and a few new tree popouts.	No observed change.
SAC_74-4_R	Sacramento River	74.4	0.0	R	RD 1600 (Unit 1)	Elkhorn	eroding	1997	1343	25	Toe Scour	Tree Pop-Outs	none	No	1997 - Steep high bank. 2005 - Some small pockets in the low toe near the waterline. 2006 - Minor slope clearing. 2010 - Minor new erosion. 2011 - Multiple trees have fallen since last year. Some other trees look ready to fall. Significant new erosion since last year.	Minor new erosion.
SAC_75-3_R	Sacramento River	75.3	0.0	R	RD 1600 (Unit 1)	Elkhorn	eroding	1997	2753	30	Toe Scour	Whole Bank Failure	none	Pump and pipe through levee	1997 - Very steep bank. 2005 - Lots of small trees down along the bank at the upstream end. 2006 - Minor new erosion, but slow. 2010 - Almost all of the roots are exposed on the trees, appears ready to fall. 2011 - New erosion and tree popouts.	No observed change, however site is overgrown and hard to observe.
SAC_77-0_R	Sacramento River	77.0	0.0	R	RD 1600 (Unit 1)	Elkhorn	eroding	2011	347	15	Fluvial	none	cobbles at toe in fair condition	No	2011 - Large vertical eroded face from a rotational failure just below pump.	No observed change.
SAC_77-7_R	Sacramento River	77.7	0.0	R	RD 1600 (Unit 1)	Elkhorn	eroding	2006	156	10	Eddy Scour	Tree Pop-Outs	none	USACE wing dam	2006 - Eddy scour off end of rock causing erosion and scour hole near levee. Sandy silt bank with rock on upstream end. 2010 - Trees are leaning more, minor new erosion. 2011 - Many of the tree roots have scoured out and trees look ready to fall.	No observed change.
SAC_78-3_L	Sacramento River	78.3	0.0	L	RD 1000 (Unit 1)	Natomas	eroding	1997	654	15	Fluvial	Wave Wash	none	Pipes, PG&E power poles	1997 - Very cohesive toe. 2005 - Site was staked and rock was stockpiled along the top of the bank. 2010 - New adjacent levee under construction. 2011 - New animal burrow.	No observed change.
SAC_83-9_R	Sacramento River	83.9	0.0	R	Yolo County Service Area 6 (Unit 1)	Knights Landing	eroding	2006	565	35	Tree Pop-Outs	Whole Bank Failure	none	Gage station	2006 - Approximately 18 to 20 ft of bank near levee at the corner of the levee and the Freemont Weir. Vertical bank with undercutting/mass failure. 2007 - Staked at top of bank for monitoring. 2011 - Site has become significantly worse with more of the toe and lower bank eroded. Many trees have fallen since last year.	Site looks worse with more ersion around trees.
SAC_85-4_R	Sacramento River	85.4	0.0	R	Yolo County Service Area 6 (Unit 1)	Knights Landing	eroding	2009	1025	5	Fluvial	none	cobbles at toe in fair condition	Pipe	2009 - Erosion into the levee toe. Some cobbles have been dumped into the erosion pockets. 2010 - Old cobble site starting to unravel.	Slope continues to steepen and new animal holes.
SAC_86-3_L	Sacramento River	86.3	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	2006	3035	30	Fluvial	Whole Bank Failure	cobbles at toe in fair to poor condition	Pipe and electrical conduit through levee	2006 - New erosion upstream, new bank failures near levee but still fairly wide berm in most places. 2008 - Large berm, questionable as to if it should remain in the inventory. 2010 - Minor new erosion, old cobble starting to fail. 2011 - Cobble continues to unravel and additional slumping.	Minor new erosion at bank mid point.
SAC_86-9_R	Sacramento River	86.9	0.0	R	Yolo County Service Area 6 (Unit 1)	Knights Landing	eroding	2006	517	25	Toe Scour	Wave Wash	none	Pump and conduit through levee	2006 - Short section is into the levee toe, rest is near the levee toe. Mass failure and fluvial erosion of depositional material. Rock at the upstream and downstream ends. 2011 Minor new erosion.	Slope continues to steepen, tree roots have become exposed, and new eddy formed.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_87-1_L	Sacramento River	87.1	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	2010	1239	40	Fluvial	Wave Wash	none	Pipe and PG&E pipeline	2010 - The upstream end of the repair site at 87.0. Repair did not extend far enough upstream. 2011 - New erosion pockets.	Minor new erosion at toe.
SAC_92-8_L	Sacramento River	92.8	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	1283	0	Fluvial	Toe Scour	cobbles at toe in fair condition	Pipe	1997 - Damage to cobble revetment on top left bank and toe damage. 2004 - Site is pretty minor. 2010 - Cobbles continue to deteriorate. 2011 - Minor new erosion at the toe.	No observed change.
SAC_95-8_L	Sacramento River	95.8	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	912	15	Fluvial	none	rubble on sections of bank in poor condition	Pipes and concrete pad	1997 - No toe on the large upstream rubble (mix of broken concrete, bricks, rock, and steal) - should be replaced. Oversized bank. 2001 - New slump at the downstream end. 2003 - Some minor bank retreat at the downstream end. 2004 - Some new retreat at the downstream end. 2006 - Some new erosion, mainly on the steep slope and scarps. (Pumping station is not part of the erosion site.) 2010 - Minor new erosion. 2011 - Minor new erosion at the toe.	No observed change.
SAC_96-2_L	Sacramento River	96.2	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	1489	15	Fluvial	Toe Scour	scattered rock in poor condition	Pipes through levee, pump house, debris catcher, and old foundation	2000 - Vertical Modesto Formation bank with mass failure. 2003 - Upstream end has some new bank retreat. 2004 - Upstream end is worse. 2006 - Some new erosion, mainly on the steep slope and scarps. (Pumping station is not part of the erosion site.) 2010 - Some new erosion and deposition at upstream end, definite encroachments. 2011 - Minor new erosion at the toe.	No observed change.
SAC_99-0_L	Sacramento River	99.0	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	1745	10	Fluvial	none	hand-placed stone in fair condition	Pipe and pump structure	1997 - Intermittent toe failure of the hand placed riprap; failure of toe materials.	No observed change.
SAC_101-3_R	Sacramento River	101.3	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	1997	188	25	Toe Scour	Fluvial	cobbles in sections at toe in poor condition	No	1997 - Toe damage and loss of cobble revetment and small patch of local damage to the cobble revetment. 2000 - Cohesive vertical toe; revegetation site.	No observed change.
SAC_104-0_L	Sacramento River	104.0	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	3443	40	Fluvial	none	cobbles at toe in fair condition	Pumping plant and discharge pipe	1997 - Pocket failures of cobble revetment toe; scallops of rock loss along the bank; irregular bankline developing. 2001 - Small scallops in the toe of the berm. 2005 - Still multiple erosion pockets in the toe. 2006 - Two new small slumps. 2011 - Old cobble continue to fail causing minor slumping.	Portions of site appears to be stabilizing.
SAC_104-5_L	Sacramento River	104.5	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	1424	25	Whole Bank Failure	Fluvial	cobbles on some of the toe in poor condition	Pump and pipes through levee	1997 - Cobbles eroded off the clay materials; not much evidence of erosion on the toe; cobble loss on the toe. 2011 - Some minor new erosion.	No observed change.
SAC_111-0_R	Sacramento River	111.0	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	2009	110	20	Toe Scour	Whole Bank Failure	scattered rock at toe in poor condition	No	2009 - Minor erosion, should be repaired under maintenance. 2011 - Some new minor erosion at the toe.	No observed change.
SAC_115-9_R	Sacramento River	115.9	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	2008	540	30	Fluvial	Toe Scour	cobbles at toe in fair condition	No	2008 - Slippage of cobbles off hard underlying toe material. 2011 - Minor slumping site.	Failing cobble site, site extended upstream.
SAC_116-0_L	Sacramento River	116.0	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	2000	831	30	Fluvial	none	concrete rubble on parts of bank in poor condition	Pipe through levee	2000 - Eroding, vertical berm slope over a vertical cohesive toe; slow erosion but getting close to the toe. 2002 - Erosion is getting close to the levee, still eroding with some new small slumps. 2004 - Some minor new erosion. 2006 - Some new erosion, cleaned off older scars and slump faces. 2008 - New, small, partial rotational failure. 2011 - Some new minor erosion.	No observed change.
SAC_116-5_L	Sacramento River	116.5	0.0	L	RD 1500 (Unit 1)	South Sutter	eroding	1997	3393	10	Whole Bank Failure	Fluvial	none	Pipe through levee and pump	2003 - New sedimentation and some new small toe scallops at the upstream end; downstream end has some new erosion. 2004 - Some new erosion at the toe and upper bank and some small new rotational failures (mainly minor, except at the downstream end). 2007 - Some new slumps. 2009 - Some new scallops and site was extended upstream. 2010 - New deposition along upstream end of site, however there is also new erosion throughout the site. Site seems to be worsening, and eroding fast. Large habitat for bank swallows. 2011 - Some new minor erosion.	Minor new erosion.
SAC_118-0_R	Sacramento River	118.0	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	2008	837	10	Fluvial	Whole Bank Failure	none	No	2008 - Whole bank is eroding, nearly vertical slope with cohesive toe. Bed is very deep along the toe (greater than 30 ft deep at 20 ft from the shore). 2011 - Some new minor erosion.	No observed change.
SAC_120-6_L	Sacramento River	120.6	0.0	L	RD 1660 (Unit 1)	North Sutter	eroding	2011	190	20	Fluvial	Tree Pop-Outs	none	No	2009 - Erosion on levee toe where an old cobble site is failing. 2011 - Some new minor erosion.	Site extended downstream, bank is negatively being impacted from the weight of the trees.
SAC_122-0_R	Sacramento River	122.0	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	1997	311	40	Whole Bank Failure	Eddy Scour	none	No	1997 - Mass failure of the lower cohesive bank and toe. 2000 - Still eroding, steeply dipping foresets in the toe are falling off. 2010 - Some new erosion and some new deposition. Eddy current off the upstream rock. 2011 - Still plenty of berm left.	No observed change.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_122-3_R	Sacramento River	122.3	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	2002	236	40	Fluvial	Whole Bank Failure	none	No	2002 - Upstream end has recent slope failure and exposure of tree roots. 2003 - Some new minor slope erosion with new snags on the bank. 2004 - Appears a little worse. 2005 - Scallop in bank at the upstream end looks worse. 2009 - Minimal new erosion, Berm width is still large, but one large event or one fallen tree and it could go fast. 2010 - New erosion, bank is nearly all vertical from slumping. Site looks bad. 2011 - Site continues to look bad.	Minor new erosion since last year.
SAC_123-3_L	Sacramento River	123.3	0.0	L	RD 70 (Unit 2)	North Sutter	eroding	2006	679	30	Fluvial	Whole Bank Failure	none	No	2006 - Erosion into the levee toe. Rock at upstream end has poor transition causing eddy scour. 2010 - Minor new erosion. 2011 - Some fresh erosion.	Additional slumping on the already slumped bank, site extended downstream.
SAC_123-7_R	Sacramento River	123.7	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	1997	122	15	Fluvial	none	concrete rubble in poor condition	No	1997 - Erosion into the levee section; old concrete rubble loss at toe; transition between the rock upstream and the cobble downstream. 2000 - Cohesive bench with concrete slabs on top; 25 ft deep scour hole on the downstream end.	No observed change.
SAC_125-6_R	Sacramento River	125.6	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	2008	415	15	Fluvial	none	cobbles at toe in poor condition	No	2008 - Slow erosion of the hard toe. 2010 - Cobble rubble is failing, erosion is into the toe of the levee, with vertical slumping.	Site appears to be relatively stable.
SAC_125-8_L	Sacramento River	125.8	0.0	L	RD 70 (Unit 2)	North Sutter	eroding	2008	115	5	Fluvial	none	cobbles at toe in fair condition	Pipe	2005 - Site was repaired. 2009 - Site is at upstream end of the repair site. 2011 - Still minor erosion.	Site shortened to remove non-erosding section, minor erosion with failing cobbles.
SAC_127-9_R	Sacramento River	127.9	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	1997	562	35	Eddy Scour	Whole Bank Failure	none	No	1997 - Major scour off the downstream end of existing rock, creating a scour pocket where the levee starts diverging from the bankline. 2000 - Some minor erosion, 20 ft deep hole at downstream end. 2004 - Small amount of new erosion. 2010 - Bad transition off downstream end of rock revetment, some new erosion.	Site extended downstream, minor new erosion.
SAC_130-0_L	Sacramento River	130.0	0.0	L	RD 70 (Unit 2)	North Sutter	eroding	1997	712	10	Fluvial	none	cobbles at toe in fair condition	Pump and PG&E power pole	1997 - Critical Site - Erosion of cobble site on outside of a bend. Failure caused by erosion of a material from behind the cobbles and cobbles rolling down the slope. Failure is just above the toe levee. Some repairs had been done at the upstream end. 2004 - Some minor new erosion at the top of the berm. 2005 - Trees look okay and the downstream end has some new rock repair. Site is no longer critical. 2006 - No longer critical, some repairs.	No observed change.
SAC_131-8_L	Sacramento River	131.8	0.0	L	RD 70 (Unit 2)	North Sutter	eroding	2005	665	25	Toe Scour	Fluvial	none	Pipe	2005 - (known as 132) On inside of bend. Erosion of berm toe. Levee slope is steep. Erosion probably due to eddy scour off upstream cobble. 2009 - Groins may be a good option for repair. 2010 - Scour off the upstream rock, some new erosion. 2011 - Site extended downstream.	Minor new erosion since last year and new animal holes.
SAC_136-6_L	Sacramento River	136.6	0.0	L	RD 70 (Unit 2)	North Sutter	eroding	1997	616	15	Fluvial	none	cobbles at toe in fair condition	Pipe and pump	1997 - Toe erosion on a cobble revetment on the outside of a low receding bend.	Toe appears pretty stable with old cobbles.
SAC_136-6_R	Sacramento River	136.6	0.0	R	Sacramento River West Side Levee District (Unit 1)	Grimes	eroding	2010	725	35	Toe Scour	Fluvial	none	No	2010 - Lower portion of 136.7 that did not extend far enough. Abrupt transition from upstream site.	Site extended upstream, minor new erosion.
SAC_138-1_L	Sacramento River	138.1	0.0	L	RD 70 (Unit 2)	North Sutter	eroding	1997	1308	10	Toe Scour	Fluvial	cobbles at toe in fair condition	Pipe through levee	1997 - Loss of cobble revetment in levee section. 2004 - New fresh erosion in a short section of the downstream end. 2010 - New deposition on cobbles.	No observed change.
SAC_141-5_R	Sacramento River	141.5	0.0	R	Sacramento River West Side Levee District (Unit 1)	Colusa Basin	eroding	2010	641	35	Fluvial	Tree Pop-Outs	cobbles at toe in fair condition	Power pole	2010 - Old cobble site starting to unravel at toe. 2011 - Cobbles continue to unravel.	No observed change.
SAC_143-5_R	Sacramento River	143.5	0.0	R	Sacramento River West Side Levee District (Unit 1)	Colusa Basin	eroding	2011	602	5	Fluvial	Tree Pop-Outs	cobbles at toe in fair condition	No	2011 - Multiple scallops, one tree pop out. Old cobble site starting to unravel at midbank.	Mid bank slumping continues to worsen but cobble at the toe appears stable.
SAC_151-0_R	Sacramento River	151.0	0.0	R	DWR East Levee Sacramento River (Unit 1)	Colusa Basin	eroding	2009	1748	10	Fluvial	none	cobbles at toe in fair condition	Pipe	2009 - Slump in the middle of the section has left a vertical section on the bank. 2010 - Old cobble site unraveling, site extended downstream.	No observed change.
SAC_152-6_L	Sacramento River	152.6	0.0	L	DWR East Levee Sacramento River (Unit 1)	Butte Basin	eroding	2008	1555	30	Whole Bank Failure	Fluvial	none	No	2008 - Large rotational/mass failure in the bank with tree slump. 2009 - Minimal new erosion, the tree is leaning further into the river. 2011 - Site extended downstream.	Minor new erosion and tree roots are further exposed.
SAC_152-8_L	Sacramento River	152.8	0.0	L	DWR East Levee Sacramento River (Unit 1)	Butte Basin	eroding	2006	299	30	Tree Pop-Outs	Fluvial	none	Utility pole, pipes, and pump	2006 - Large rotational/mass failure in the bank with tree slump. Tough clayey toe material. 2007 - Site is between stone revetments with a pump station at the downstream end. 2010 - Erosion is into the levee toe. 2011 - Minor new erosion.	Minor new erosion.
SAC_157-7_R	Sacramento River	157.7	0.0	R	DWR East Levee Sacramento River (Unit 1)	Colusa Basin	eroding	2004	484	30	Toe Scour	Fluvial	none	No	2004 - Slowly eroding but near vertical with no vegetation to hold it. 2005 - Erosion is close to levee toe but not into the levee section yet. 2010 - Some new toe scour.	No observed change.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_163-0_L	Sacramento River	163.0	0.0	L	L.D. 3 (Unit 1)	Butte Basin	eroding	1997	1482	30	Fluvial	Whole Bank Failure	none	No	2000 - Snags along toe at downstream end; slow erosion. 2001 - A couple of small fresh slumps in the lower bank section. 2006 - Some minor new erosion at the downstream end. 2009 - Some new erosion. 2010 - New toe erosion. 2011 - Minor new erosion.	Minor new erosion at the toe.
SAC_164-3_R	Sacramento River	164.3	0.0	R	DWR East Levee Sacramento River (Unit 1)	Colusa Basin	eroding	2009	1200	10	Whole Bank Failure	Toe Scour	none	PG&E gas line through levee	Erosion site added in 1997 and removed in 2005. 2009 - Site added back in, hard toe with slow moving erosion. Potential geotechnical failure. 2011 - Site extended downstream.	No observed change.
SAC_164-7_R	Sacramento River	164.7	0.0	R	L.D. 2 (Unit 1)	Colusa Basin	eroding	2009	1117	20	Toe Scour	Whole Bank Failure	none	No	2009 - Very slow retreat, hard toe, encroaching into the levee projection. 2010 - Slowly eroding. 2011 - Site extended downstream.	No observed change.
SAC_168-3_L	Sacramento River	168.3	0.0	L	L.D. 3 (Unit 1)	Butte Basin	eroding	1997	149	30	Toe Scour	Eddy Scour	none	No	1997 - Erosion of top left bank; eroding downstream of rock section where levee is closest to the bank, approximately 40 to 50 ft of bank retreat, some berm left. 1999 - Some new beach sedimentation at toe. 2000 - Snags in eddy area could induce bank erosion at higher flows. 2002 - Small bar is gone. 2003 - Bar is present and higher. 2004 - Some new deposition on the bank at the upstream end. 2006 - New sand on bar and bank. 2007 - New sand deposition with vegetation colonizing bars between dikes. 2008 - More eddy sedimentation and vegetation on bar along bank. Bank is healing due to retreat of right bank. 2009 - Additional bar sedimentation. 2010 - some deposition at toe, new erosion on opposite bank. Site continues to heal.	Majority of site healed but upstream end still needs toe rock.
SAC_172-0_L	Sacramento River	172.0	0.0	L	L.D. 3 (Unit 1)	Butte Basin	eroding	2007	1546	15	Toe Scour	Fluvial	none	No	2007 - Getting close to the levee. Bank is clayey silt with clayey/silty toe. 2008 - Looks a little worse at the upstream end. 2009 - Some new erosion and slumping. 2010 - Some new erosion upstream of site, actively eroding at low flow. New bank swallow colony noted. 2011 - Significant erosion since last year, with an estimated 10 to 15 feet of berm lost. Large sections of the bank have slumped off.	Part of the site appears to be stabilizing, but still minor slumping in other locations.
STM_15-7_R	Steamboat Slough	15.7	0.0	R	RD 501 (Unit 1)	Ryer Island	eroding	2008	338	0	Whole Bank Failure		rubble at toe in poor condition	No	2008 - Overstepped levee section with multiple small pockets of erosion 10 - 20 ft wide.	No observed change.
STM_18-8_R	Steamboat Slough	18.8	0.0	R	RD 501 (Unit 1)	Ryer Island	eroding	1999	359	0	Fluvial	Wave Wash	none	Pipe	2000 - Slow erosion of lower and mid-slope with rock bench at the low water line.	No observed change.
STM_18-9_R	Steamboat Slough	18.9	0.0	R	RD 501 (Unit 1)	Ryer Island	eroding	2009	330	0	Fluvial	Wave Wash	rock at toe in fair condition	Pipe	2009 - Rock is starting to unravel, probably from a tree pop-out, hard toe.	No observed change.
STM_22-8_R	Steamboat Slough	22.8	0.0	R	RD 349 (Unit 2)	Sutter Island	eroding	2010	643	0	Fluvial	Wave Wash	none	No	2010 - Slumping sections on the lower bank, appears to be scouring around the trees. 2011 - Soil beach at toe.	No observed change.
STM_23-6_R	Steamboat Slough	23.6	0.0	R	RD 349 (Unit 2)	Sutter Island	eroding	2011	768	0	Wave Wash	Tree Pop-Outs	quarry stone at end in fair condition	No	2011 - Toe scour at the tidal zone.	No observed change.
STM_23-9_R	Steamboat Slough	23.9	5.0	R	RD 349 (Unit 2)	Sutter Island	eroding	1997	168	0	Fluvial	Wave Wash	none	Pipe and pump house	1997 - Top right bank has retreated into the levee. Site is between two rock sites. 1999 - Downstream half of the reach repaired with rock. 2000 - Trees leaning into the water. 2010 - Site appears worse. 2011 - New erosion at the toe.	No observed change.
STM_24-1_R	Steamboat Slough	24.1	0.0	R	RD 349 (Unit 2)	Sutter Island	eroding	2011	55	0	Erosion Pockets	Wave Wash	quarry stone in fair condition	No	2011 - Small scallop caused by erosion and wave wash.	No observed change.
STM_24-7_R	Steamboat Slough	24.7	0.0	R	RD 349 (Unit 2)	Sutter Island	critical	1997	949	0	Fluvial	Wave Wash	occassional quarry stone in poor condition	Pipe	1997 - Erosion of very sandy levee behind large stand of riparian vegetation on top right bank. Dry ravel of sand. 1999 - Quarry waste rock was dumped down the levee slope; poor repair job; still eroding in places. Eroding at midslope off fabric. 2005 - Length revised, only the middle 150 - 200 ft are eroding. 2006 - Some rock/small material dumped down the bank but it is slowly unraveling. Upstream end is unraveling faster. Steep slope with poor gradation so fines are washing out. 2010 - Lots of overhanging trees and erosion pockets. 2011 - This site is upgraded to CRITICAL. Near vertical bank at the downstream end. New erosion at various locations throughout the site.	No observed change.
STM_24-8_L	Steamboat Slough	24.8	0.0	L	RD 3 (Unit 1)	Grand Island	eroding	2008	773	0	Whole Bank Failure	Tree Pop-Outs	none	No	2008 - Area closed sign on bank. Newly fallen trees at both ends and pop outs along the bank. 2010 - Site extended downstream. 2011 - New erosion at the toe. More trees popouts.	No observed change.
STM_25-0_L	Steamboat Slough	25.0	0.0	L	RD 3 (Unit 1)	Grand Island	eroding	1997	264	0	Fluvial	Tree Pop-Outs	none	Pipe through levee	1997 - Erosion of sandy levee on top left bank. Site is downstream of a rock section. Large riparian trees on the bank. 1999 - Upstream half of the reach repaired with rock, except for a 30 ft reach at the upstream end. 2001 - Rock repair on the upstream and downstream ends; no revetment at the trees. 2002 - Rock repair is starting to slide off the geotextile at the upstream end. 2005 - One new small tree has fallen. 2006 - 50 ft pocket at the downstream end and at the upstream end with new rock in between. 2007 - Upstream end has been repaired. 2010 - Some minor new erosion. 2011 - Minor new erosion.	Minor new erosion at the toe.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
STM_25-5_R	Steamboat Slough	25.5	0.0	R	RD 349 (Unit 2)	Sutter Island	eroding	2010	580	3	Fluvial	Wave Wash	none	No	2010 - Small maintenance, erosion into the toe. 2011 - Minor new erosion at toe.	No observed change.
STM_25-8_R	Steamboat Slough	25.8	0.0	R	RD 349 (Unit 2)	Sutter Island	eroding	2007	243	0	Wave Wash	Fluvial	none	No	2007 - Slow erosion, probably due to wave wash and fluvial erosion. Site has likely been here for awhile but was unseen due to boats parked in front.	No observed change.
STM_26-0_L	Steamboat Slough	26.0	0.0	L	RD 3 (Unit 1)	Grand Island	eroding	1997	312	8	Whole Bank Failure	Wave Wash	none	No	1997 - Mass failure of berm slope and wave wash erosion. Large trees on top of berm, some failed trees. New area of low rock to on the upstream end. 2000 - Some minor erosion near the downstream end. 2005 - One new small tree has fallen. 2009 - Minimal new erosion. 2010 - Minor new erosion.	No observed change.
SBP_11-1_L	Sutter Bypass	0.0	11.1	L	East Levee Sutter Bypass (Unit 1)	Yuba City	eroding	2011	162	15	wind wave		none	No	2011 - Small section of the mid levee slope has eroded from wind wave.	Site is part of the extended inventory, last inspected 2011.
STR_24-7_R	Sutter Slough	24.7	0.0	R	RD 999 (Unit 3)	Clarksburg	eroding	1997	2180	0	Toe Scour	Tree Pop-Outs	quarry stone on part of the bank in poor condition	Pipe	1997 - Intermittent over-steepened sections. Large riparian vegetation along the length of the entire reach. Attempts to repair with rock on bank have failed. 1999 - New rock repair at the downstream end. 2002 - Some minor spot repairs. 2009 - Minimal new erosion. 2010 - Appears that fresh rock placed on downstream portion of site. Toe scour and overhanging trees with some overturned.	Minor new erosion at the toe.
STR_25-2_R	Sutter Slough	25.2	0.0	R	RD 999 (Unit 3)	Clarksburg	eroding	2008	694	0	Toe Scour	Tree Pop-Outs	none	No	2008 - Over steepened levee section. 2009 - Significant new erosion. 2010 - Minor new erosion.	No observed change.
STR_25-7_R	Sutter Slough	25.7	0.0	R	RD 999 (Unit 3)	Clarksburg	eroding	2011	709	5	Toe Scour	Whole Bank Failure	none	No	2011 - Toe scour along length of site and erosion pockets.	Site extended slighty upstream due to new erosion pocket.
STR_26-5_L	Sutter Slough	26.5	0.0	L	RD 999 (Unit 3)	Sutter Island	eroding	2002	621	0	Toe Scour	Erosion Pockets	some quarry stone at toe in poor condtion	No	2002 - Original rock over geotextile is sliding off and the end is coming unraveled. 2003 - Some minor new erosion on the downstream end. 2004 - Site has gotten worse. Underlined geofabric is exposed. 2005 - Still looks bad with exposed geotextile fabric. 2006 - Still have some new unraveling and exposed fabric. Site lengthened upstream. 2009 - Minimal new erosion. 2010 - geotextile fabric placed since last year, possible flood fight.	Exposed geotech style fabric, assume rock on top slid off.
STR_27-1_R	Sutter Slough	27.1	0.0	R	RD 999 (Unit 3)	Clarksburg	eroding new	2012	255	0	Whole Bank Failure		some quarry stone at toe in fair condition	No		Slumping of upper levee slope.
STR_27-3_R	Sutter Slough	27.3	0.0	R	RD 999 (Unit 3)	Clarksburg	eroding	2011	1023	0	Whole Bank Failure	Erosion Pockets	quarry stone in section in poor condition	Pipe	2011 - Multiple erosion pockets. Some likely from tree popouts.	No observed change.
SYC_9-3_L	Sycamore Slough	0.0	9.3	L	DWR MA 12 (Unit 1)	Grimes	eroding	2011	98	0	eddy scour	overtopping scour	cobbles on upper slope in poor condtion	Culvert	2011 - Erosion occurring upstream and downstream of an irrigation diversion structure.	Site is part of the extended inventory, last inspected 2011.
WAD_2-1_L	Wadsworth Canal	0.0	2.1	L	DWR Wadsworth Canal (Unit 1)	Yuba City	eroding	2011	3422	5	Whole Bank Failure		none	Pipes through levee and utility poles	2011 - Whole bank is starting to unravel, with failure from poor soils.	Site is part of the extended inventory, last inspected 2011.
WAD_2-1_R	Wadsworth Canal	0.0	2.1	R	DWR Wadsworth Canal (Unit 2)	Sutter Town	eroding	2011	3376	5	whole bank failure		none	Pipes through levee and utility poles	2011 - Whole bank is starting to unravel, with failure from poor soils.	Site is part of the extended inventory, last inspected 2011.
WAD_2-4_L	Wadsworth Canal	0.0	2.4	L	DWR Wadsworth Canal (Unit 1)	Yuba City	eroding	2010	4603	10	whole bank failure		none	PG&E gas line, bridge, and power poles	2010 - Over steepened levees, some slumping, reach-wide problem. 2011 - Still a reach-wide problem.	Site is part of the extended inventory, last inspected 2011.
WAD_2-4_R	Wadsworth Canal	0.0	2.4	R	DWR Wadsworth Canal (Unit 2)	Sutter Town	eroding	2010	4617	5	whole bank failure		none	Pipe, bridge, and power poles	2010 - Over steepened levees, some slumping, reach-wide problem. 2011 - Still a reach-wide problem.	Site is part of the extended inventory, last inspected 2011.
WAD_4-3_R	Wadsworth Canal	0.0	4.3	R	DWR Wadsworth Canal (Unit 2)	Sutter Town	eroding	2011	106	0	fluvial		none	No	2011 - Small erosion pocket.	Site is part of the extended inventory, last inspected 2011.
YAS_1-7_L	Yankee Slough	0.0	1.7	L	RD 1001 (Unit 2)	Rio Oso	eroding	2011	147	3	fluvial		none	Pipe through levee	2011 - New erosion site. Steep eroding slope. Fairly old scarp with vegetation growth.	Site is part of the extended inventory, last inspected 2011.
YOL_0-1_R	Yolo Bypass	0.0	0.1	R	RD 2035 (Unit 2)	Woodland	eroding	2006	427	0	wave wash	fluvial	none	No	2006 - Wave wash erosion and some saturation slumping occurring. Tension/separation cracks evident in fine grained levee slope materials. 2011 - Slumping of the lower toe. New slumped section on downstream end.	Site is part of the extended inventory, last inspected 2011.
YOL_1-2_R	Yolo Bypass	0.0	1.2	R	RD 2035 (Unit 2)	Woodland	eroding	2011	215	0			none	AT&T fiberoptic cable under levee	2011 - Small sections of slumping, likely from wind wave.	Site is part of the extended inventory, last inspected 2011.
YOL_2-0_R	Yolo Bypass	0.0	2.0	R	RD 2035 (Unit 2)	Woodland	eroding	2006	267	0	wave wash	fluvial	cobbles	No	2006 - Wave wash erosion and some saturation slumping occurring. Tension/separation cracks evident in fine grained levee slope materials. 2011 - Small sections of slumping lower bank, just downstream of bank rock.	Site is part of the extended inventory, last inspected 2011.
YOL_2-3_R	Yolo Bypass	0.0	2.3	R	RD 2035 (Unit 2)	Woodland	eroding	2011	1822	0			none	No	2011 - Erosion from wind waves along entire length of the levee toe. Several sections of slumping bank along the toe.	Site is part of the extended inventory, last inspected 2011.

Table A-1. 2012 SRBPP Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
YOL_2-6_R	Yolo Bypass	0.0	2.6	R	DWR West Levee Yolo Bypass (Unit 1)	Knights Landing	eroding	2006	827	0	wave wash		none	No	2006 - Slow wave wash and general fluvial erosion of the toe area under river cobbles. Erosion is creating a scarp and cobble covered wave-cut bench. 2011 - Site appears better than it looked in 2006, but still eroding.	Site is part of the extended inventory, last inspected 2011.
YOL_2-8_R	Yolo Bypass	0.0	2.8	R	RD 2035 (Unit 2)	Woodland	eroding	2011	2502	0			none	No	2011 - Wave wash erosion and several sections of slumming bank along the toe.	Site is part of the extended inventory, last inspected 2011.
YOL_4-2_R	Yolo Bypass	0.0	4.2	R	RD 2035 (Unit 2)	Woodland	eroding	2006	1652	0	wave wash		none	No	2006 - Wave wash erosion and some saturation slumping occurring. Several small scallops present in lower levee slope/toe due to saturation slumping. Tension/separation cracks evident in fine-grained levee slope materials. 2011 - Small pockets of erosion throughout the site. Site formerly called 3.8.	Site is part of the extended inventory, last inspected 2011.
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Table A-2. 2012 SRBPP Critical Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
CHC_2-4_L	Cache Creek	0.0	2.4	L	DWR Cache Creek (Unit 1)	Yolo	critical	2002	218	15	Toe Scour	Whole Bank Failure	none	No	Site identified as CRITICAL in 2002. 2006 - Currently constructing a setback levee. New failures present and extensive. Downstream end of the setback levee did not extend far enough. Upstream end was repaired. 2007 - DWR repaired with a setback levee, but the levee did not go far enough downstream.	New cracks observed.
CHC_3-9_L	Cache Creek	0.0	3.9	L	DWR Cache Creek (Unit 1)	Yolo	critical	2002	429	10	Toe Scour	Whole Bank Failure	none	No	Site identified as CRITICAL in 2006. 2006 - Some significant new erosion, especially fresh upper bank slumping. Also have a small piping failure due to recent overbank flows. 2007 - Some new minor upper bank slumps. 2010 - Planned setback levee by CA DWR, 100% design complete, construction planned for 2011. 2011 - Minor new erosion, construction delayed to 2012.	Minimal new erosion. Construction planned for 2013 - 2014.
CHC_4-2_L	Cache Creek	0.0	4.2	L	DWR Cache Creek (Unit 1)	Yolo	critical	2002	728	10	Toe Scour	Whole Bank Failure	none	No	Site identified as CRITICAL in 2006. 2006 - Some significant new erosion, especially fresh upper bank slumping. Also have a small piping failure due to recent overbank flows. 2010 - New erosion, flood fought in early 2010. Planned setback levee by CA DWR, 100% designs complete, construction planned for 2011. 2011 - Large sections of bank have slumped since the previous year.	Significant new erosion along top of bank. Construction planned for 2013 - 2014.
GEO_2-0_L	Georgiana Slough	2.0	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	2009	652	0	Erosion Pockets	Wave Wash	quarry stone in sections, ranging from poor to good condition	No	2009 - Upgraded to full erosion site. Small scour pockets and mid slope wave wash. 2010 - New rock and freshly fallen trees. 2011 - Site upgraded to CRITICAL. Significant new erosion. Rotational failures for the full height of the levee.	Some rock has been placed in last year, however the site remains critical.
GEO_3-8_L	Georgiana Slough	3.8	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	1997	2589	0	Erosion Pockets	Wave Wash	quarry stone in sections in poor to fair condition	Pipe through levee	1997 - Pockets of erosion into the levee at the water line. Alders are being undercut and rotating out into the channel. Damaged rock at upstream end. 2000 - New minor erosion. 2001 - Staked low fascine walls at bankline. 2002 - New "Brush Boxes" along the bank toe. 2003 - New erosion pockets in the middle of the site. 2005 - Some new bundles in the brush boxes. 2011 - Site upgraded to CRITICAL. Significant new erosion. Sites 3.6, 3.7, 3.71, and 4.0 were combined.	Rock has been placed in some of the erosion pockets since last year, however site remains critical.
GEO_4-5_L	Georgiana Slough	4.5	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	1997	1396	0	Erosion Pockets	Wave Wash	none	Bridge, underground telephone crossing, and pipe	1997 - Pocket erosion at upstream end and into the levee toe under the Alder trees. 2003 - New brush boxes with wattles on bank. 2004 - No brush boxes. 2005 - Site extended from the downstream side of the bridge. Whole bank is vertical. 2010 - Some minor new erosion. 2011 - Site upgraded to CRITICAL. New erosion pockets throughout the site. Sites 4.5, and 4.6 were combined.	No observed change.
GEO_6-8_L	Georgiana Slough	6.8	0.0	L	RD 563 (Unit 1)	Tyler Island	critical	1997	1251	0	Wave Wash	none	some quarry stone in fair condition	No	1997 - Deep pockets of erosion into a narrow berm just downstream of the rock. 2000 - Scallops in banks with small colored flags, some new biotech rolls in with older rolls in the scallops. 2001 - Staked , low fascine walls at the bankline. 2011 - Site upgraded to CRITICAL. Site extended upstream due to new erosion pocket. New tree popouts and new erosion.	No observed change.
SAC_7-3_L	Sacramento River	7.3	0.0	L	RD 341 (Unit 2)	Sherman Island	critical	2011	619	0	Other	Whole Bank Failure	none	Fish release system, pipes, pillings, conduit, netting, and power poles.	2011 - Large slump at downstream end. Gully formed from surface runoff from the road. Shallow slumping throughout site.	The gully at upstream end has increased in size and site continues to worsen.
SAC_7-9_L	Sacramento River	7.9	0.0	L	RD 341 (Unit 2)	Sherman Island	critical	2011	481	0	Whole Bank Failure	Wave Wash	scattered rock	Pipe through levee	2011 - Large slump section	Site extended downstream, upgraded to CRITICAL, severe windwave. Slope is very steep and may be effecting the highway on top of the levee.
SAC_8-0_L	Sacramento River	8.0	0.0	L	RD 341 (Unit 2)	Sherman Island	critical	1999	758	0	Wave Wash	Whole Bank Failure	quarry stone on part of the toe in poor condition	No	1999 - New small slump in eroded bank. 2005 - Reach extended because of vertical bank along the roadway upstream. 2011 - More slumping since last year.	Site upgraded to CRITICAL. Very steep slope which may be effecting the highway on top of the levee.
SAC_11-2_L	Sacramento River	11.2	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	critical	2008	1229	0	Wave Wash	Whole Bank Failure	quarry stone at toe in fair condition	Pipe through levee	2008 - Erosion causing vertical bank at the highway on top of levee. The whole bank along the highway should be repaired. 2009 - Minimal new erosion. 2011 - Bank continues to slowly erode.	Upgrade to CRITICAL, new erosion since lat year and steeper slopes in sections.
SAC_16-8_L	Sacramento River	16.8	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	critical	2008	591	0	Fluvial	Wave Wash	quarry stone and rubble at the toe in poor condition	Pump intake	2008 - Overstepped levee section with pocket erosion. Plans for repair currently in the design phase. 2010 - Very steep slope with slumps, longitudinal cracking, and overturned trees. 2011 - Upgraded to CRITICAL. Sections of vertical slope with highway on top. Heavy vegetation in front of most of the erosion pockets.	No observed change.

Table A-2. 2012 SRBPP Critical Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_17-2_L	Sacramento River	17.2	0.0	L	Brannan-Andrus Levee District (Unit 2)	Brannan Andrus Islands	critical	2009	1001	0	Fluvial	Whole Bank Failure	concrete rubble and some quarry stone in poor condition	Boat dock, pipe, pump, building, and dolphin	2009 - Fluvial erosion, into the levee slope, close to vertical bank with roadway on top. Pilings that were once at the bankline are now 30 ft out. 2010 - Very steep slope with slumps and overturned trees. 2011 - Upgraded to CRITICAL. Sections of vertical slope with highway on top. Heavy vegetation in front of most of the erosion pockets. Structures built into the levee on the upstream end.	Site continues to worsen.
STM_24-7_R	Steamboat Slough	24.7	0.0	R	RD 349 (Unit 2)	Sutter Island	critical	1997	949	0	Fluvial	Wave Wash	occassional quarry stone in poor condition	Pipe	1997 - Erosion of very sandy levee behind large stand of riparian vegetation on top right bank. Dry ravel of sand. 1999 - Quarry waste rock was dumped down the levee slope; poor repair job; still eroding in places. Eroding at midslope off fabric. 2005 - Length revised, only the middle 150 - 200 ft are eroding. 2006 - Some rock/small material dumped down the bank but it is slowly unraveling. Upstream end is unraveling faster. Steep slope with poor gradation so fines are washing out. 2010 - Lots of overhanging trees and erosion pockets. 2011 - This site is upgraded to CRITICAL. Near vertical bank at the downstream end. New erosion at various locations throughout the site.	No observed change.
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Table A-3. 2012 SRBPP New Erosion Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
FHR_50-9_R	Feather River	50.9	0.0	R	DWR M.A. 7 (Unit 1)	Live Oak	eroding new	2012	371	15	Whole Bank Failure		quary stone in fair condition	Old bridge piers and canal on landside slope.		Oversteepened slope with failing rock (from repair completed in 1954). Likely slope stability issues.
LAR_1-8_L	Lower American River	1.8	0.0	L	American River Flood Control District (Unit 4)	Sacramento	eroding new	2012	190	15	Fluvial	Eddy Scour	quarry stone at toe in poor condition	No		New erosion site. Located just downstream of older repair. Failing rock at the upstream end. Erosion of the bank has exposed large tree roots.
SAC_48-6_R	Sacramento River	48.6	0.0	R	RD 307 (Unit 1)	Borges	eroding new	2012	581	0	Whole Bank Failure	Tree Pop-Outs	quarry stone at toe in fair condition	No		Bank is slowly eroding, old rock protection starting to unravel.
STR_27-1_R	Sutter Slough	27.1	0.0	R	RD 999 (Unit 3)	Clarksburg	eroding new	2012	255	0	Whole Bank Failure		some quarry stone at toe in fair condition	No		Slumping of upper levee slope.
									1397							

Table A-4. 2012 SRBPP Erosion Sites Under Construction

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
SAC_46-7_L	Sacramento River	46.7	0.0	L	DWR MA 9 (Unit 1)	Sacramento	under construction	2010	162	0	Wave Wash	Other	cobbles on part of the bank in poor condition	Railroad on top of levee	Site identified by DWR MA and flood fought following the 2010 storm events. 2010 - Railroad on levee, may be an encroachment; DWR flood fought in January 2010. Eroding of the upper and middle bank, lots from people. 2011 - Site continues to worsen. More erosion at the toe.	Site is currently being repaired by the state.
SAC_57-0_R	Sacramento River	57.0	0.0	R	RD 900 (Unit 1)	Southport	under construction	1997	184	0	Fluvial	Eddy Scour	none	No	1997 - Old timber pile dikes remnant approximately 30 ft out into the channel. Oversized levee section. 1999 - Some additional erosion at water line. 2008 - Plans for setback levee repair (along with 57.2) currently in the design phase. 2011 - Setback levee under construction.	Site is still under construction and will be removed along with 57.2.
SAC_57-2_R	Sacramento River	57.2	0.0	R	RD 900 (Unit 1)	Southport	under construction	2007	647	0	Fluvial		cobbles at toe in poor condition	No	2007 - Steep levee slope with cobble revetment rolling off the bank and a silty clay toe. 2008 - Plans for setback levee repair currently in the design phase. 2011 - Setback levee under construction.	Site is still under construction and will be removed along with 57.0.
									994							

Table A-5. 2012 SRBPP Removed and Repaired Sites

Site Identification	Waterway	River Mile	Levee Mile	Bank	Maintaining Agency	Damage Basin	Status	Year Added	Erosion Length (ft)	Berm Width (ft)	Erosion Mecanism (Primary)	Erosion Mecanism (Secondary)	Revetment Details	Encroachment at Site	Site History	2012 Field Notes
BTC_2-5_R	Butte Creek	0.0	2.5	R	DWR M.A. 5 (Unit 2)	Butte Basin	removed	2008	142	20	Whole Bank Failure	none	none	Pipe through levee	2008 - Sandy non-cohesive bank with rotational/slab failure.	Site removed from the inventory, the erosion is not in projection of levee slope.
SAC_103-4_L	Sacramento River	103.4	0.0	L	RD 1500 (Unit 1)	South Sutter	removed	2006	87	35	Overtopping Scour	none	none	No	2006 - Eddy flow and overtopping flow collide on the inside of a tight bend. Scour caused by converging flows created large scallop on the inside of a bend. 2007 - Site still looks bad. Would be a good candidate for a setback levee. 2008 - Some new deposition of sand on eddy bar. 2009 - Much of the site has filled in with sand deposition. Continuing to heal. 2010 - New deposition. 2011 - There has been some deposition as well as erosion since last year.	Sediment has been depositing in the eroded area for a few years now, and the site no longer qualifies as an erosion site. Site removed.
SAC_133-0_L	Sacramento River	133.0	0.0	L	RD 70 (Unit 2)	North Sutter	removed	1997	1106	30	Fluvial	none	cobbles at toe and lower bank in fair condition	No	1997 - Cobble toe failures. 2000 - Erosion into the levee toe at the downstream end. 2002 - Some fresh erosion at the upstream and downstream end. 2010 - Cobble appears to be at the end of its design life, 1 - 2 ft slump in mid-bank of the cobble, upper cobble is failing. 2011 - Some new minor erosion. Cobbles continue fail.	The erosion at this site appears to be in the depositional material, not the actual levee, so site removed.
SAC_133-8_L	Sacramento River	133.8	0.0	L	RD 70 (Unit 2)	North Sutter	removed	1997	196	30	Toe Scour	none	cobbles at toe and lower bank in fair condition	Cables through and over levee	1997 - Local toe scour of cobble site, eroded into the levee section. Outside of a moderate receding bend. Some rock rehabilitation performed. 2010 - Failing cobble site. 2011 - Cobble site starting to unravel.	Site removed after inspection of berm width and landside toe indicates that it does not qualify as an erosion site.
SAC_150-2_L	Sacramento River	150.2	0.0	L	DWR East Levee Sacramento River (Unit 1)	Butte Basin	removed	2008	89	10	Toe Scour	Fluvial	cobbles at toe in fair condition	No	2009 - Toe erosion and sliding cobbles.	Old cobbles failed but bank is stable, site removed.
SAC_154-0_R	Sacramento River	154.0	0.0	R	DWR East Levee Sacramento River (Unit 1)	Colusa Basin	repaired	2010	114	30	Eddy Scour	Fluvial	cobbles at toe in fair condition	No	2010 - Downstream end of repair site at 154.5, needs maintenance, small amount to erosion into the levee toe. 2011 - Old cobble site starting to unravel. Some new minor erosion since last year.	Local Maintaining Agency has placed cobble in transition area, site is considered repaired.
STM_23-8_L	Steamboat Slough	23.8	0.0	L	RD 3 (Unit 1)	Grand Island	repaired	2009	144	0	Fluvial	Wave Wash	quarry stone on bank in good condition	No	2009 - Slumping at the levee toe , cobbles at the downstream end. 2010 - Very steep new vertical slump, short site, but looked bad. 2011 - This site is upgraded to CRITICAL. A section of rock has failed. Significant new erosion, bank is vertical almost to the top of the levee. Levee has a road on top that is used by trucks and heavy farm equipment.	Repaired with rock by local Reclaimation District.
YUB_2-3_L	Yuba River	0.0	2.3	L	RD 784 (Unit 7)	Linda	repaired	2006	1534	0	toe scour		none	No	2006 - Land owner has removed levee toe and lower slope during plowing and cultivation activities resulting in high, near vertical face at levee toe and exposure of levee core. 2007 - Levee is set back a ways from the channel. 2011 - Site currently being repaired under the Upper Yuba Levee Improvement Project by the Three Levees District.	Site Repaired.
									3412							

Table A-6. 2012 SRBPP Erosion Site Coordinates

Site Identification	WATERWAY	River Mile	Levee Mile	Bank	Midpoint Longitude	Midpoint Latitude	Upstream Longitude	Upstream Latitude	Downstream Longitude	Downstream Latitude
BER_0-8_L	Bear River	0.8	0.0	L	-121.56374200300	38.94703404310	-121.56339039000	38.94759112760	-121.56409361100	38.94647695840
BER_1-9_L	Bear River	1.9	0.0	L	-121.55008642900	38.95467140210	-121.54952812200	38.95506985670	-121.55059151200	38.95422748420
BER_2-5_L	Bear River	2.5	0.0	L	-121.54510927100	38.96430021670	-121.54496677700	38.96458304820	-121.54522754500	38.96400994920
BER_4-9_R	Bear River	4.9	0.0	R	-121.51592367500	38.98133537790	-121.51584805700	38.98139958170	-121.51599929400	38.98127117400
BER_5-7_L	Bear River	5.7	0.0	L	-121.50197071900	38.98265489560	-121.50114443800	38.98273746330	-121.50279700000	38.98257232210
BTC_2-5_R	Butte Creek	0.0	2.5	R	-121.84648037800	39.54420111420	-121.84636610200	39.54437412750	-121.84659465300	39.54402809990
CHC_2-4_L	Cache Creek	0.0	2.4	L	-121.79752385300	38.73276046640	-121.79789339100	38.73283619620	-121.79715431600	38.73268473450
CHC_2-8_L	Cache Creek	0.0	2.8	L	-121.79335226600	38.73411914470	-121.79371301700	38.73406748430	-121.79299151500	38.73417080390
CHC_3-4_L	Cache Creek	0.0	3.4	L	-121.78515700300	38.73229012920	-121.78496540300	38.73294167470	-121.78523062000	38.73162645900
CHC_3-5_R	Cache Creek	0.0	3.5	R	-121.75985840300	38.72271267970	-121.75973587800	38.72213787610	-121.75958780100	38.72329384020
CHC_3-9_L	Cache Creek	0.0	3.9	L	-121.78099491700	38.72791509880	-121.78167297700	38.72816546630	-121.78035868600	38.72759959620
CHC_4-2_L	Cache Creek	0.0	4.2	L	-121.77565423000	38.72719698650	-121.77692114300	38.72726106860	-121.77443539300	38.72690281740
CHC_5-4_L	Cache Creek	0.0	5.4	L	-121.76049886100	38.72320004310	-121.76056135100	38.72293298990	-121.76043637100	38.72346709620
CHS_15-9_L	Cache Slough	15.9	0.0	L	-121.65575962900	38.19963692980	-121.65563822400	38.20014624260	-121.65588103400	38.19912761780
CHS_21-1_R	Cache Slough	21.1	0.0	R	-121.69814148900	38.26310193920	-121.69886772000	38.26458539750	-121.69742278800	38.26161619360
CHS_22-6_R	Cache Slough	22.6	0.0	R	-121.71367719200	38.27934154830	-121.71463266300	38.28037703970	-121.71272174900	38.27830604820
CHS_22-8_R	Cache Slough	22.8	0.0	R	-121.71656830400	38.28180486020	-121.71681723200	38.28210010370	-121.71631937900	38.28150961530
CHS_23-0_R	Cache Slough	23.0	0.0	R	-121.71814261000	38.28370380110	-121.71847113200	38.28410517540	-121.71781409300	38.28330242500
CHS_23-6_R	Cache Slough	23.6	0.0	R	-121.72398703100	38.28730501900	-121.72480629800	38.28819210430	-121.72316778600	38.28641792710
CHK_11-7_R	Cherokee Canal	0.0	11.7	R	-121.75987970700	39.44277955000	-121.75985114500	39.44282108360	-121.75990826900	39.44273801550
CBD_0-5_L	Colusa Basin Drainage Canal	0.0	0.5	L	-121.73153693300	38.79551556290	-121.73256636100	38.79526831350	-121.73062748600	38.79593052750
CBD_0-9_L	Colusa Basin Drainage Canal	0.0	0.9	L	-121.73729426000	38.79580933950	-121.73890198500	38.79622503420	-121.73564734600	38.79548648110
CBD_19-2_L	Colusa Basin Drainage Canal	0.0	19.2	L	-121.98589252400	39.01712160530	-121.98637399000	39.01751621640	-121.98541106400	39.01672699130
DWS_5-0_L	Deep Water Ship Channel	0.0	5.0	L	-121.59775507400	38.43740112330	-121.59770722100	38.43750589070	-121.59780292600	38.43729635590
DEC_0-9_R	Deer Creek	0.0	0.9	R	-122.02422422000	39.96796532020	-122.02382818700	39.96816479610	-122.02462025000	39.96776584220
DEC_2-4_L	Deer Creek	0.0	2.4	L	-122.03154541600	39.96281711470	-122.03142052600	39.96290989410	-122.03167030600	39.96272433420
ELC_1-4_L	Elder Creek	0.0	1.4	L	-122.16364253300	40.05178706530	-122.16417878600	40.05159550920	-122.16310627700	40.05197861900
ELC_3-0_R	Elder Creek	0.0	3.0	R	-122.14040780100	40.05484967310	-122.14057769700	40.05472971840	-122.14023790400	40.05496962760
ELK_0-2_L	Elk Slough	0.2	0.0	L	-121.55094444000	38.37327473260	-121.52289574100	38.41389258960	-121.58362505200	38.33273502970
ELK_0-2_R	Elk Slough	0.2	0.0	R	-121.55175868600	38.37348793450	-121.52315558200	38.41415662000	-121.58444930600	38.33264290820
FHR_0-6_L	Feather River	0.6	0.0	L	-121.62902965600	38.79442444440	-121.62990320900	38.79545470870	-121.62815613000	38.79339417260
FHR_1-0_L	Feather River	1.0	0.0	L	-121.63258617800	38.79951574240	-121.63305034700	38.80092030170	-121.63193912000	38.79816483000
FHR_3-8_L	Feather River	3.8	0.0	L	-121.63512180000	38.83419523670	-121.63412768400	38.83696626120	-121.63637096200	38.83149774200
FHR_5-0_L	Feather River	5.0	0.0	L	-121.63005190900	38.85019884830	-121.62923097700	38.85239369740	-121.63087279100	38.84800399290
FHR_5-8_L	Feather River	5.8	0.0	L	-121.62227630300	38.86271483090	-121.62138799200	38.86394568930	-121.62331578100	38.86155816530
FHR_6-0_L	Feather River	6.0	0.0	L	-121.62037461400	38.86528078880	-121.61998328700	38.86587469610	-121.62081273800	38.86470572860
FHR_6-6_L	Feather River	6.6	0.0	L	-121.61595021200	38.87324589410	-121.61538036900	38.87411308580	-121.61650444000	38.87237264740
FHR_17-8_L	Feather River	17.8	0.0	L	-121.57864921500	39.00709440790	-121.57976600700	39.00936641450	-121.57914343000	39.00454904170
FHR_47-5_R	Feather River	47.5	0.0	R	-121.63354327400	39.33311999060	-121.63390827000	39.33423997970	-121.63317829000	39.33200000000
FHR_50-9_R	Feather River	50.9	0.0	R	-121.64761000000	39.36715400000	-121.64786600000	39.36761200000	-121.64721700000	39.36673600000
GEO_0-3_L	Georgiana Slough	0.3	0.0	L	-121.58534119600	38.12994149310	-121.58833702800	38.13112560540	-121.58226568100	38.13036822450
GEO_1-7_L	Georgiana Slough	1.7	0.0	L	-121.59817484400	38.14180363760	-121.59967662200	38.14351877480	-121.59698568800	38.13991779250
GEO_2-0_L	Georgiana Slough	2.0	0.0	L	-121.60000742300	38.14676544600	-121.59943345700	38.14753669310	-121.60058137600	38.14599419530
GEO_2-5_L	Georgiana Slough	2.5	0.0	L	-121.59533780600	38.15115797260	-121.59365029200	38.15082034290	-121.59685772300	38.15064670830
GEO_3-8_L	Georgiana Slough	3.8	0.0	L	-121.59180498000	38.15478382200	-121.58742733500	38.15698739730	-121.59112927000	38.15291884130
GEO_4-3_L	Georgiana Slough	4.3	0.0	L	-121.58573764700	38.15892044780	-121.58505613700	38.16026051070	-121.58654324400	38.15762467080
GEO_4-5_L	Georgiana Slough	4.5	0.0	L	-121.58390823600	38.16265948870	-121.58309192600	38.16446155640	-121.58480713600	38.16088822530
GEO_5-3_L	Georgiana Slough	5.3	0.0	L	-121.57977809000	38.17239983760	-121.57974711500	38.17686095660	-121.58161593200	38.16795901880
GEO_6-3_L	Georgiana Slough	6.3	0.0	L	-121.56907332400	38.18255251640	-121.56329595300	38.18547864520	-121.57629174200	38.18135919430
GEO_6-8_L	Georgiana Slough	6.8	0.0	L	-121.55987508900	38.18693471360	-121.55844157500	38.18821640230	-121.56166676500	38.18596802760
GEO_7-0_R	Georgiana Slough	7.0	0.0	R	-121.55861746100	38.18897492200	-121.55772910800	38.18977489720	-121.55941251800	38.18812085210
GEO_7-2_L	Georgiana Slough	7.2	0.0	L	-121.55676702300	38.18979813230	-121.55630672000	38.19007274200	-121.55722732000	38.18952352080
GEO_8-3_L	Georgiana Slough	8.3	0.0	L	-121.54341302700	38.20033269010	-121.54257102900	38.20073274680	-121.54424943200	38.19992548550
GEO_9-3_L	Georgiana Slough	9.3	0.0	L	-121.53677175400	38.21284536180	-121.53777838100	38.21413297420	-121.53543591300	38.21173704010
GEO_11-0_L	Georgiana Slough	11.0	0.0	L	-121.52976338500	38.22683947100	-121.52909439300	38.22652174180	-121.53043238200	38.22715719630
HAS_7-9_L	Haas Slough	0.0	7.9	L	-121.72782408100	38.29681851500	-121.72862092300	38.29960556260	-121.72543272800	38.29485846200
HAS_9-7_L	Haas Slough	0.0	9.7	L	-121.74030887900	38.32241399040	-121.74025393400	38.32458670530	-121.74018331400	38.32023966760
KLR_3-0_L	Knights Landing Ridge Cut	0.0	3.0	L	-121.69273276000	38.75641574060	-121.69304758600	38.75792498850	-121.69265303400	38.75489891550

Table A-6. 2012 SRBPP Erosion Site Coordinates

Site Identification	WATERWAY	River Mile	Levee Mile	Bank	Midpoint Longitude	Midpoint Latitude	Upstream Longitude	Upstream Latitude	Downstream Longitude	Downstream Latitude
KLR_3-1_L	Knights Landing Ridge Cut	0.0	3.1	L	-121.69393918700	38.75937651050	-121.69468646100	38.76005318910	-121.69335890900	38.75858677910
KLR_3-5_R	Knights Landing Ridge Cut	0.0	3.5	R	-121.69558032200	38.75890066190	-121.69606286600	38.75933205710	-121.69515807400	38.75843230230
KLR_3-7_L	Knights Landing Ridge Cut	0.0	3.7	L	-121.70096871800	38.76642325320	-121.70102252200	38.76733570770	-121.70060841600	38.76552187480
KLR_3-9_R	Knights Landing Ridge Cut	0.0	3.9	R	-121.70179159000	38.76445666940	-121.70207351900	38.76490536550	-121.70143449000	38.76403692440
KLR_4-7_L	Knights Landing Ridge Cut	0.0	4.7	L	-121.70480459700	38.77676968510	-121.70619547200	38.77811503660	-121.70368540400	38.77527090970
KLR_5-8_L	Knights Landing Ridge Cut	0.0	5.8	L	-121.72040749600	38.78948089760	-121.72409089600	38.79239529300	-121.71672439700	38.78656638390
LDS_0-6_R	Lindsey Slough	0.0	0.6	R	-121.75907175000	38.25166619800	-121.76016491800	38.24961522260	-121.75797852000	38.25371716250
LDS_0-7_R	Lindsey Slough	0.7	0.0	R	-121.70717291200	38.24615329840	-121.70760908100	38.24598106000	-121.70673674100	38.24632553520
LDS_0-8_R	Lindsey Slough	0.8	0.0	R	-121.70846576600	38.24562388760	-121.70860485500	38.24558071080	-121.70832667700	38.24566706430
LDS_1-9_L	Lindsey Slough	1.9	0.0	L	-121.72478805300	38.25702631010	-121.72482262100	38.25751748640	-121.72475348600	38.25653513300
LDS_2-4_L	Lindsey Slough	2.4	0.0	L	-121.73218784600	38.25727161760	-121.73242288500	38.25731946140	-121.73195280600	38.25722377420
LAR_1-8_L	Lower American River	1.8	0.0	L	-121.48006251000	38.59895082370	-121.47979886100	38.59879070710	-121.48033728700	38.59909457800
MUD_4-4_R	Mud Creek	0.0	4.4	R	-121.89534791800	39.77361306910	-121.89507769200	39.77396883730	-121.89561814400	39.77325729930
NCC_3-0_R	Natomas Cross Canal	0.0	3.0	R	-121.57479094100	38.80404127660	-121.57452892100	38.80420576030	-121.57505296100	38.80387679140
PUC_0-1_L	Putah Creek	0.0	0.1	L	-121.63139238700	38.52253881020	-121.63151885700	38.52196843610	-121.63135583600	38.52311876890
PUC_7-2_L	Putah Creek	0.0	7.2	L	-121.75230131300	38.51739610010	-121.75282360700	38.51735486040	-121.75177783800	38.51736162450
SAC_7-3_L	Sacramento River	7.3	0.0	L	-121.72941220000	38.08044815720	-121.72834116100	38.08036986370	-121.73048324300	38.08052644070
SAC_7-9_L	Sacramento River	7.9	0.0	L	-121.70816702600	38.08601606330	-121.70778613100	38.08660259680	-121.70860677400	38.08545852880
SAC_8-0_L	Sacramento River	8.0	0.0	L	-121.70682939300	38.08958953820	-121.70668360500	38.09062012450	-121.70712716800	38.08857238190
SAC_8-2_L	Sacramento River	8.2	0.0	L	-121.70637998000	38.09486898160	-121.70636663100	38.09514783850	-121.70639332900	38.09459012370
SAC_10-8_L	Sacramento River	10.8	0.0	L	-121.68805806800	38.12869720570	-121.68746766000	38.12972197540	-121.68864604800	38.12767157070
SAC_11-2_L	Sacramento River	11.2	0.0	L	-121.68593862800	38.13977861030	-121.68534603100	38.14139942110	-121.68653119800	38.13815779680
SAC_12-1_L	Sacramento River	12.1	0.0	L	-121.68260467100	38.15030087480	-121.68220054700	38.15186681850	-121.68278998900	38.14871128010
SAC_13-6_L	Sacramento River	13.6	0.0	L	-121.67084908800	38.16618820140	-121.67068369700	38.16658280670	-121.67101447800	38.16579359590
SAC_15-0_L	Sacramento River	15.0	0.0	L	-121.65216011700	38.17265625620	-121.65182099900	38.17257958200	-121.65249923600	38.17273292850
SAC_16-8_L	Sacramento River	16.8	0.0	L	-121.61833047900	38.16309353120	-121.61732257200	38.16295867060	-121.61931211400	38.16333362440
SAC_17-2_L	Sacramento River	17.2	0.0	L	-121.61453714700	38.16266598660	-121.61280039900	38.16264058500	-121.61626298600	38.16282758010
SAC_18-0_L	Sacramento River	18.0	0.0	L	-121.60114070400	38.16499274040	-121.60047696500	38.16530334560	-121.60180443700	38.16468213130
SAC_18-1_L	Sacramento River	18.1	0.0	L	-121.59971270400	38.16572154300	-121.59934492400	38.16594534520	-121.60008048100	38.16549773970
SAC_21-5_L	Sacramento River	21.5	0.0	L	-121.55767705800	38.20043551170	-121.55760558100	38.20064611510	-121.55774853400	38.20022490830
SAC_22-5_L	Sacramento River	22.5	0.0	L	-121.55711949800	38.21234666750	-121.55719704900	38.21358141480	-121.55704195100	38.21111192020
SAC_22-7_L	Sacramento River	22.7	0.0	L	-121.55675406500	38.21852750450	-121.55668907500	38.21895100920	-121.55681905400	38.21810399890
SAC_23-2_L	Sacramento River	23.2	0.0	L	-121.55566430600	38.22404154940	-121.55564146100	38.22485021730	-121.55568715300	38.22323288080
SAC_23-3_L	Sacramento River	23.3	0.0	L	-121.55556808800	38.22740210780	-121.55550212600	38.22820220520	-121.55560528300	38.22660053470
SAC_24-8_L	Sacramento River	24.8	0.0	L	-121.54544868600	38.24058613000	-121.54410591800	38.24040070690	-121.54679146300	38.24077153740
SAC_25-2_L	Sacramento River	25.2	0.0	L	-121.53829419600	38.23915640360	-121.53776543600	38.23900559360	-121.53884539900	38.23926504950
SAC_26-0_L	Sacramento River	26.0	0.0	L	-121.52655973000	38.23832312900	-121.52393161500	38.23878437200	-121.52918781100	38.23786182520
SAC_26-3_R	Sacramento River	26.3	0.0	R	-121.52017022300	38.23986727170	-121.51936100200	38.23998269790	-121.52098928400	38.23986988680
SAC_27-0_L	Sacramento River	27.0	0.0	L	-121.51130898500	38.24561914720	-121.51087751900	38.24622157320	-121.51174044400	38.24501671970
SAC_31-6_R	Sacramento River	31.6	0.0	R	-121.56583530500	38.29524353720	-121.56629457100	38.29573006660	-121.56537604500	38.29475700590
SAC_35-4_L	Sacramento River	35.4	0.0	L	-121.55848746800	38.34280672680	-121.55770616800	38.34307135020	-121.55916288300	38.34242568980
SAC_38-5_R	Sacramento River	38.5	0.0	R	-121.52319231500	38.37141835100	-121.52331563900	38.37190918990	-121.52306899400	38.37092751200
SAC_41-9_R	Sacramento River	41.9	0.0	R	-121.52397703600	38.41603920610	-121.52508279500	38.41769150510	-121.52287132900	38.41438689570
SAC_43-1_R	Sacramento River	43.1	0.0	R	-121.53311729900	38.43084176120	-121.53319965700	38.43172635100	-121.53303494300	38.42995717150
SAC_43-2_R	Sacramento River	43.2	0.0	R	-121.53227572200	38.43353706930	-121.53115898600	38.43456000800	-121.53297811200	38.43228714030
SAC_46-7_L	Sacramento River	46.7	0.0	L	-121.50340923700	38.46466391240	-121.50344831000	38.46488463490	-121.50337016300	38.46444318990
SAC_48-6_R	Sacramento River	48.6	0.0	R	-121.52945114900	38.47306736330	-121.53046516800	38.47305310360	-121.52843713000	38.47308161400
SAC_50-3_L	Sacramento River	50.3	0.0	L	-121.55344592000	38.49098910800	-121.55354028600	38.49108614820	-121.55335155500	38.49089206680
SAC_52-4_L	Sacramento River	52.4	0.0	L	-121.54294561100	38.51524199050	-121.54275548100	38.51529969360	-121.54313574000	38.51518428620
SAC_52-7_L	Sacramento River	52.7	0.0	L	-121.54044336600	38.51584065720	-121.54017414500	38.51588742390	-121.54071258800	38.51579388910
SAC_53-8_L	Sacramento River	53.8	0.0	L	-121.52312352300	38.52079423240	-121.52307196100	38.52099590140	-121.52326068900	38.52060607190
SAC_54-8_L	Sacramento River	54.8	0.0	L	-121.52751691100	38.53145285430	-121.52744530400	38.53148870310	-121.52758851800	38.53141700550
SAC_55-2_L	Sacramento River	55.2	0.0	L	-121.52163725100	38.53364448560	-121.52026302100	38.53414414030	-121.52301035400	38.53314294620
SAC_55-5_L	Sacramento River	55.5	0.0	L	-121.51659675200	38.53639612900	-121.51610679100	38.53675633470	-121.51708708800	38.53603592040
SAC_55-7_R	Sacramento River	55.7	0.0	R	-121.51473884900	38.53996759140	-121.51356122900	38.54124645270	-121.51591642800	38.53868871800
SAC_56-5_R	Sacramento River	56.5	0.0	R	-121.51420282100	38.55070460460	-121.51442308300	38.55131893980	-121.51398256400	38.55009026990
SAC_56-6_L	Sacramento River	56.6	0.0	L	-121.51246307700	38.55192285150	-121.51259039500	38.55226804260	-121.51233576000	38.55157766120
SAC_56-7_R	Sacramento River	56.7	0.0	R	-121.51500772700	38.55339092500	-121.51526332800	38.55427743740	-121.51475213400	38.55250441200

Table A-6. 2012 SRBPP Erosion Site Coordinates

Site Identification	WATERWAY	River Mile	Levee Mile	Bank	Midpoint Longitude	Midpoint Latitude	Upstream Longitude	Upstream Latitude	Downstream Longitude	Downstream Latitude
SAC_57-0_R	Sacramento River	57.0	0.0	R	-121.51675303200	38.55795550000	-121.51685893500	38.55819436140	-121.51664713100	38.55771663850
SAC_57-2_R	Sacramento River	57.2	0.0	R	-121.51778360900	38.55975506480	-121.51837583300	38.56051207100	-121.51719139700	38.55899805550
SAC_58-5_L	Sacramento River	58.5	0.0	L	-121.51261470800	38.57267331020	-121.51216598700	38.57306917090	-121.51306342400	38.57227744790
SAC_62-9_R	Sacramento River	62.9	0.0	R	-121.55303263400	38.60114766160	-121.55325029100	38.60138784620	-121.55281498000	38.60090747580
SAC_63-0_R	Sacramento River	63.0	0.0	R	-121.55375619100	38.60190428570	-121.55390929800	38.60210099540	-121.55360308600	38.60170757580
SAC_71-3_R	Sacramento River	71.3	0.0	R	-121.63402477600	38.68340671360	-121.63421907500	38.68410637580	-121.63383048100	38.68270705090
SAC_74-4_R	Sacramento River	74.4	0.0	R	-121.60673438700	38.71952233590	-121.60641388600	38.72135114790	-121.60742254400	38.71776953240
SAC_75-3_R	Sacramento River	75.3	0.0	R	-121.60518897100	38.73241439250	-121.60415347500	38.73610979280	-121.60584416200	38.72868411690
SAC_77-0_R	Sacramento River	77.0	0.0	R	-121.59408826700	38.75571392880	-121.59402431700	38.75618601080	-121.59420642400	38.75524634890
SAC_77-7_R	Sacramento River	77.7	0.0	R	-121.59498726800	38.76500988950	-121.59504880600	38.76521922180	-121.59492573200	38.76480055630
SAC_78-3_L	Sacramento River	78.3	0.0	L	-121.59832649500	38.77371425840	-121.59886516500	38.77450704190	-121.59778783600	38.77292147320
SAC_83-9_R	Sacramento River	83.9	0.0	R	-121.66841707000	38.75909594400	-121.66936492800	38.75887742590	-121.66750012300	38.75939003230
SAC_85-4_R	Sacramento River	85.4	0.0	R	-121.68582906600	38.76317540750	-121.68756699700	38.76348637510	-121.68403773900	38.76331250040
SAC_86-3_L	Sacramento River	86.3	0.0	L	-121.68695806600	38.77304888930	-121.68584059200	38.77728215150	-121.69055259100	38.77039039490
SAC_86-9_R	Sacramento River	86.9	0.0	R	-121.68783487300	38.77977165150	-121.68823818600	38.78040664310	-121.68743156800	38.77913665850
SAC_87-1_L	Sacramento River	87.1	0.0	L	-121.68896089700	38.78345973040	-121.69003318600	38.78493555050	-121.68803323400	38.78196167140
SAC_92-8_L	Sacramento River	92.8	0.0	L	-121.72876230300	38.83985066360	-121.72685706500	38.84034688770	-121.73020463500	38.83846392420
SAC_95-8_L	Sacramento River	95.8	0.0	L	-121.75073455900	38.87126431620	-121.75205901400	38.87058108620	-121.74933017800	38.87185287110
SAC_96-2_L	Sacramento River	96.2	0.0	L	-121.75460252100	38.86965636720	-121.75710834300	38.86913854560	-121.75223651100	38.87047377020
SAC_99-0_L	Sacramento River	99.0	0.0	L	-121.78352498300	38.85954586650	-121.78405701900	38.86189920000	-121.78377064900	38.85723890750
SAC_101-3_R	Sacramento River	101.3	0.0	R	-121.81330483800	38.87498148470	-121.81359176300	38.87510869180	-121.81301791500	38.87485427700
SAC_103-4_L	Sacramento River	103.4	0.0	L	-121.80330369900	38.90109601970	-121.80322532700	38.90119885600	-121.80338207300	38.90099318250
SAC_104-0_L	Sacramento River	104.0	0.0	L	-121.79612992000	38.90030451090	-121.79067691700	38.90272067120	-121.80117518100	38.90133701580
SAC_104-5_L	Sacramento River	104.5	0.0	L	-121.79075974500	38.90574357510	-121.79279637300	38.90669726400	-121.79029802100	38.90404072610
SAC_111-0_R	Sacramento River	111.0	0.0	R	-121.84066689400	38.95418588040	-121.84077406300	38.95431187690	-121.84055972600	38.95405988280
SAC_115-9_R	Sacramento River	115.9	0.0	R	-121.79844088800	38.99801592690	-121.79929756500	38.99833605820	-121.79758422000	38.99769578940
SAC_116-0_L	Sacramento River	116.0	0.0	L	-121.80188391600	39.00058645460	-121.80288859100	39.00141325160	-121.80089814000	38.99974481520
SAC_116-5_L	Sacramento River	116.5	0.0	L	-121.81010496700	39.00541794820	-121.81592589800	39.00607194380	-121.80502409000	39.00330077380
SAC_118-0_R	Sacramento River	118.0	0.0	R	-121.82505513300	39.01545025590	-121.82422988400	39.01640126230	-121.82588036000	39.01449924340
SAC_120-6_L	Sacramento River	120.6	0.0	L	-121.83747943200	39.04413841910	-121.83765382100	39.04436068750	-121.83730504600	39.04391615050
SAC_122-0_R	Sacramento River	122.0	0.0	R	-121.83909275700	39.06361653370	-121.83933513000	39.06399743660	-121.83892730500	39.06320850230
SAC_122-3_R	Sacramento River	122.3	0.0	R	-121.84327594600	39.06608619270	-121.84360222700	39.06628657040	-121.84294966800	39.06588581420
SAC_123-3_L	Sacramento River	123.3	0.0	L	-121.85696171800	39.06963551200	-121.85799467300	39.06916591250	-121.85592875000	39.07010510220
SAC_123-7_R	Sacramento River	123.7	0.0	R	-121.86711739800	39.06695228240	-121.86732152300	39.06690103990	-121.86691327200	39.06700352370
SAC_125-6_R	Sacramento River	125.6	0.0	R	-121.89503593000	39.07882935300	-121.89531721800	39.07935124930	-121.89465566700	39.07833986450
SAC_125-8_L	Sacramento River	125.8	0.0	L	-121.89136581300	39.08065167320	-121.89116376500	39.08066909620	-121.89156430800	39.08062101590
SAC_127-9_R	Sacramento River	127.9	0.0	R	-121.90398395500	39.10010009330	-121.90432041600	39.10083607980	-121.90343042700	39.09948216730
SAC_130-0_L	Sacramento River	130.0	0.0	L	-121.90948258900	39.12162208590	-121.91012136100	39.12245858560	-121.90915217700	39.12068445130
SAC_131-8_L	Sacramento River	131.8	0.0	L	-121.93560560000	39.13146983070	-121.93652105800	39.13203955790	-121.93469015800	39.13090009530
SAC_133-0_L	Sacramento River	133.0	0.0	L	-121.93444149700	39.14301295710	-121.93265227400	39.14240326470	-121.93611914900	39.14377504620
SAC_133-8_L	Sacramento River	133.8	0.0	L	-121.91846522000	39.14242853670	-121.91833271100	39.14267632270	-121.91859772900	39.14218075050
SAC_136-6_L	Sacramento River	136.6	0.0	L	-121.93831642400	39.17313353470	-121.93874507000	39.17391150070	-121.93792501400	39.17234438070
SAC_136-6_R	Sacramento River	136.6	0.0	R	-121.94006054600	39.17410464540	-121.94073740800	39.17494896140	-121.93941872600	39.17324460880
SAC_138-1_L	Sacramento River	138.1	0.0	L	-121.93441669000	39.19177331180	-121.93578285000	39.19321902020	-121.93419912900	39.19003825000
SAC_141-5_R	Sacramento River	141.5	0.0	R	-121.98832693500	39.19474291360	-121.98862141600	39.19559482860	-121.98790547100	39.19393090910
SAC_143-5_R	Sacramento River	143.5	0.0	R	-121.99859177400	39.21373867410	-121.99964066500	39.21386923650	-121.99754288700	39.21360810230
SAC_150-2_L	Sacramento River	150.2	0.0	L	-122.00339564000	39.27140082180	-122.00349658100	39.27149429260	-122.00329469800	39.27130735080
SAC_151-0_R	Sacramento River	151.0	0.0	R	-122.01794538100	39.26536395440	-122.02068188400	39.26631538180	-122.01492493900	39.26573036590
SAC_152-6_L	Sacramento River	152.6	0.0	L	-122.01718171600	39.28188604540	-122.01611298900	39.28385312960	-122.01822103000	39.27990962640
SAC_152-8_L	Sacramento River	152.8	0.0	L	-122.01544871700	39.28493319690	-122.01520775800	39.28529799940	-122.01568967500	39.28456839290
SAC_154-0_R	Sacramento River	154.0	0.0	R	-122.02352287000	39.29773635900	-122.02372814700	39.29771421920	-122.02335391100	39.29781050350
SAC_157-7_R	Sacramento River	157.7	0.0	R	-122.02969631100	39.33208161010	-122.02995281000	39.33271606910	-122.02943981900	39.33144715040
SAC_163-0_L	Sacramento River	163.0	0.0	L	-122.00284665900	39.39798973190	-122.00352204500	39.39995912770	-122.00245061300	39.39598245520
SAC_164-3_R	Sacramento River	164.3	0.0	R	-122.00900080000	39.40947429610	-122.00923825800	39.41111111280	-122.00876335200	39.40783747820
SAC_164-7_R	Sacramento River	164.7	0.0	R	-122.01011101300	39.41616917760	-122.01036878800	39.41768925620	-122.00985325000	39.41464909780
SAC_168-3_L	Sacramento River	168.3	0.0	L	-121.99416200000	39.45489600000	-121.99421700000	39.45509600000	-121.99389600000	39.45393000000
SAC_172-0_L	Sacramento River	172.0	0.0	L	-121.98504694700	39.50636814970	-121.98656195200	39.50811709130	-121.98530090300	39.50438815150
STM_15-7_R	Steamboat Slough	15.7	0.0	R	-121.64360762100	38.18970118010	-121.64315972200	38.19000094730	-121.64391653000	38.18931131270

Table A-6. 2012 SRBPP Erosion Site Coordinates

Site Identification	WATERWAY	River Mile	Levee Mile	Bank	Midpoint Longitude	Midpoint Latitude	Upstream Longitude	Upstream Latitude	Downstream Longitude	Downstream Latitude
STM_18-8_R	Steamboat Slough	18.8	0.0	R	-121.60984373100	38.21208471220	-121.60975972600	38.21257344690	-121.60992773700	38.21159597640
STM_18-9_R	Steamboat Slough	18.9	0.0	R	-121.60843941600	38.21445613110	-121.60812874300	38.21483771390	-121.60875008700	38.21407454670
STM_22-8_R	Steamboat Slough	22.8	0.0	R	-121.59059456400	38.26241057640	-121.58948071300	38.26250965500	-121.59169017800	38.26253308480
STM_23-6_R	Steamboat Slough	23.6	0.0	R	-121.58879209600	38.27285185530	-121.58874491600	38.27385412580	-121.58942361200	38.27199778010
STM_23-8_L	Steamboat Slough	23.8	0.0	L	-121.58990625600	38.27742791690	-121.58977330300	38.27759495340	-121.59003921000	38.27726087940
STM_23-9_R	Steamboat Slough	23.9	5.0	R	-121.58973406900	38.27880660940	-121.58961455700	38.27901654050	-121.58985358200	38.27859667820
STM_24-1_R	Steamboat Slough	24.1	0.0	R	-121.58944035400	38.27999396990	-121.58944256400	38.28006909710	-121.58943814400	38.27991884170
STM_24-7_R	Steamboat Slough	24.7	0.0	R	-121.58392692900	38.28750574370	-121.58382271000	38.28872687320	-121.58502606700	38.28647481950
STM_24-8_L	Steamboat Slough	24.8	0.0	L	-121.58305332100	38.29063501180	-121.58299590500	38.29169457720	-121.58309191000	38.28957450490
STM_25-0_L	Steamboat Slough	25.0	0.0	L	-121.58264746600	38.29303065460	-121.58255405400	38.29338615630	-121.58274087700	38.29267515190
STM_25-5_R	Steamboat Slough	25.5	0.0	R	-121.58193583000	38.29815572870	-121.58157063800	38.29889694950	-121.58217637500	38.29738431800
STM_25-8_R	Steamboat Slough	25.8	0.0	R	-121.57994907800	38.30208599900	-121.57970734500	38.30235756700	-121.58009304000	38.30177232300
STM_26-0_L	Steamboat Slough	26.0	0.0	L	-121.57777652300	38.30276587770	-121.57735709500	38.30303543790	-121.57824084900	38.30254432540
SBP_11-1_L	Sutter Bypass	0.0	11.1	L	-121.72686864600	39.02461699960	-121.72692892800	39.02483461200	-121.72680836600	39.02439938640
STR_24-7_R	Sutter Slough	24.7	0.0	R	-121.60472751900	38.29260946650	-121.60564791900	38.29550515090	-121.60434331300	38.28963422940
STR_25-2_R	Sutter Slough	25.2	0.0	R	-121.60206888100	38.29995198380	-121.60111774500	38.30054221090	-121.60305576700	38.29940157220
STR_25-7_R	Sutter Slough	25.7	0.0	R	-121.59909983000	38.30594797880	-121.59826618800	38.30666692870	-121.59993345400	38.30522902280
STR_26-5_L	Sutter Slough	26.5	0.0	L	-121.59178871600	38.31460969830	-121.59143306300	38.31540731450	-121.59225919400	38.31383565880
STR_27-1_R	Sutter Slough	27.1	0.0	R	-121.59047444500	38.32276347320	-121.59020874900	38.32304190640	-121.59069272400	38.32245696080
STR_27-3_R	Sutter Slough	27.3	0.0	R	-121.58669235800	38.32439102340	-121.58592462600	38.32559222850	-121.58822568600	38.32366742070
SYC_9-3_L	Sycamore Slough	0.0	9.3	L	-122.02195041000	39.15809145680	-122.02195045700	39.15822631510	-122.02195036300	39.15795659760
WAD_2-1_L	Wadsworth Canal	0.0	2.1	L	-121.74618712000	39.13779885200	-121.74293940000	39.14175669740	-121.74952644900	39.13388668030
WAD_2-1_R	Wadsworth Canal	0.0	2.1	R	-121.74647396100	39.13791609300	-121.74325982800	39.14181433460	-121.74978072400	39.13406397500
WAD_2-4_L	Wadsworth Canal	0.0	2.4	L	-121.73824341300	39.14753740690	-121.73439040900	39.15309546040	-121.74260886200	39.14223536080
WAD_2-4_R	Wadsworth Canal	0.0	2.4	R	-121.73845364900	39.14756133770	-121.73461054600	39.15315049480	-121.74284734500	39.14225370500
WAD_4-3_R	Wadsworth Canal	0.0	4.3	R	-121.72796077100	39.16879767290	-121.72790543800	39.16893653650	-121.72801610400	39.16865880840
YAS_1-7_L	Yankee Slough	0.0	1.7	L	-121.49457795600	38.96968985750	-121.49432684900	38.96973996070	-121.49482906300	38.96963975280
YOL_0-1_R	Yolo Bypass	0.0	0.1	R	-121.67162435400	38.67264925540	-121.67173246600	38.67322901830	-121.67151624300	38.67206949140
YOL_1-2_R	Yolo Bypass	0.0	1.2	R	-121.66898421600	38.65975757910	-121.66902821600	38.66005016480	-121.66894021600	38.65946499340
YOL_2-0_R	Yolo Bypass	0.0	2.0	R	-121.66651885500	38.64852988620	-121.66665260800	38.64888138160	-121.66638510300	38.64817838960
YOL_2-3_R	Yolo Bypass	0.0	2.3	R	-121.66348328400	38.64315834440	-121.66508888900	38.64531944440	-121.66187777800	38.64099722200
YOL_2-6_R	Yolo Bypass	0.0	2.6	R	-121.66330269000	38.72494496610	-121.66204103800	38.72550510900	-121.66456432200	38.72438480860
YOL_2-8_R	Yolo Bypass	0.0	2.8	R	-121.65805546400	38.63575696550	-121.66024722300	38.63873055560	-121.65586388800	38.63278333370
YOL_4-2_R	Yolo Bypass	0.0	4.2	R	-121.64674835500	38.62026274860	-121.64820123800	38.62222385680	-121.64529555200	38.61830162210
YUB_2-3_L	Yuba River	0.0	2.3	L	-121.51570006400	39.15202770730	-121.51391954600	39.15361293720	-121.51748050300	39.15044244990