# ANNUAL RECONAISSANCE ATLAS **SACRAMENTO RIVER BANK PROTECTION PROJECT**







**Appendix B to the 2017 Annual Erosion Reconnaissance Field Report** 



October 2017 **Published December 2018** 

# 2017 ANNUAL RECONAISSANCE ATLAS

### **SACRAMENTO RIVER BANK PROTECTION PROJECT** Appendix B to the 2017 Annual Erosion Reconnaisance Field Report

October 2017 Pubulished December 2018

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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, and Title II. It is currently authorized by the Water Resource Development Act of 2007. Under the current authorization (Phase II) there is about 2,280 linear feet (LF) available for repairs out of the original 405,000 LF. An additional 80,000 linear feet should 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.

#### 2.0 Purpose

This report summarizes and documents the annual erosion reconnaissance of the Sacramento River Flood Control System (SRFCS). The erosion inventory is conducted every year2 and consists of a visual inspection of the levees and banks of the Sacramento River Flood Control System by the Engineering Division. 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. 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 assist with the site selection process of this project. A site is deemed an erosion site if the erosion is into the projection of the levee slope.

#### 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. Since this time, environmental impact concerns resulted in a jeopardy opinion being issued by the resource agencies and have limited the repair work by the SRBPP3. Following the jeopardy opinion, repairs were primarily performed under emergency work (PL84-99) or through local maintenance efforts because most of the SRBPP work was found to have potential impacts to critical habitat.

Under the SRBPP, one site on the Sacramento River and five sites on the American River were repaired between 1997 and 2005. In February 2006, after high flows in the rivers of the Sacramento Valley, the Governor of California, Arnold Schwarzenegger, 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. 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). The Local Maintaining Agencies (LMA) who are responsible for maintenance of the levees have also been doing repairs throughout the system.

The rate of repair has dropped since the competition of the emergency work. Since 2010, 9 sites have been repaired by USACE under this program, and 5 sites have been repaired by CA DWR. However the work by the local maintaining agencies has increased, with 96 erosion sites repaired in the last 2 years, to the point where they can be removed from the inventory. Due to the limited repairs, the data collected in this report will be used in the Site Selection Process to determine the next sites for repair to the point where they can be removed from the inventory. Due to the limited repairs, the data collected in this report will be used in the site Selection Process to determine the next sites for repair to the point where they can be removed from the inventory. Due to the limited repairs, the data collected in this selection Process to determine the next sites for repair.

#### 4.0 2017 Flood Event

The 2017 water year for the Sacramento River was the wettest winter on record, breaking the previous record set in 1982-83. Prior to this flood season, the State of California was in a drought that lasted roughly six years. Due to the drought, the flood levels in the reservoirs were low, which allowed for more storage capacity and reduced the peak flows of the water sent down the highly regulated Sacramento River system. Following the 2017 Storm event, 68 sites in the Sacramento System applied for assistance through the PL84-99 Program. Of these sites, 17 were immediately eliminated due to an inactive status in the program. From the remaining sites, 8 sites received no action (sites were either repaired by the LMA or eliminated because there was no threat to the levee). The remaining sites have either been repaired or are in the process of being repaired.

#### 5.0 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. However, any critical site that is in the extended inventory will be checked annually.

The 2017 reconnaissance included the annual inventory and the extended inventory, due to the large storm event which sent water into the bypasses and loaded the majority of the levees in the system. The annual inventory was conducted September 2017 and the extended inventory was conduction over multiple field days in October and November. Field work was done after the storm events passed and when the water levels were at their lowest for optimal viewing of erosion. The inspection was conducted by the USACE Engineering Division, and included team members from Hydraulic Analysis, GIS, Environmental Design, Soil Design, Civil Design, and Levee Safety. Team members from Environmental, Planning, Cultural Resources, and Project Management were also in attendance on many of the sites.

#### 6.0 Data Collection and Methodologies

The erosion data was captured using Trimble GeoXH with ArcPAD 10.x. Data from the previous annual survey was loaded onto the units as well as some other background information such as levee centerlines, river miles and previous revetments.

For existing erosion sites, identified in previous years, the team would check the site limits of the erosion for comparison with the previously identified site limits. If the erosion had extended upstream or downstream, the site geometry would be extended to reflect the length of current erosion and a field note would be added. A complete listing of site attributes, refer to Appendix A. Some sites had status changes, such as an erosion site that changed into a critical erosion site.

For newly observed erosion sites, a GPS data point was collected at the approximate start of the erosion site and a second GPS data point was collected at the downstream limit. Alternatively, the GPS data collector would draw a line on the GPS using background data as an approximation of start and stop points. The latter collection method was used only when the boat could not get close to the erosion site in question or when the GPS data collector could not physically walk to the start/stop points for the sites that were inventoried by vehicle. All of the data attributes were filled in by the GPS operator with advisement from the accompanying PDT members.

Once the data was collected, the data was exported to a geodatabase that serves as the master erosion database for the SRBPP Project. The primary purposes of the dataset are to tentatively select sites for bank protection and monitor previously identified erosion sites. As the sites fall out of the erosion inventory by being repaired, they are moved into a revetment database (shown as repaired sites within this inventory atlas) for a running inventory of system revetments for mapping and query analysis. The database is not a complete inventory of all revetments to the system but is expanding as new-old data is discovered and added to the database.

#### 7.0 LEGEND



River Miles: This dataset came from USGS markers on 1:24K TOPO Quads. Note: Some river markers do not follow the current channel but are still used in this report to maintain consistency with how river markers have been reported throughout the life of the SRBPP project.

Levee Miles: A subset of levee miles from the National Levee Database. These markers are to be used to identify erosion where River Miles do not exist. This is a secondary system for marking locations of levee data.

**Critical Erosion**: A site that is an imminent threat to the integrity of the flood control system and of highest priority for repair.

Erosion: A site that is at risk of an erosional failure during flood and/or normal flow conditions.

New Erosion: A site identified this year as at risk of an erosional failure during flood and/or normal flow conditions.

**Removed**: A site that has been removed from the inventory due to self repair or site was determined to not be threatening to the structure of the levee based on new information.

**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.

**Repaired:** A site that was previously an erosion site that has since been repaired and is listed in the revetment inventory. The numbers at the end of the site name indicated year of repair.

SRBPP Levees: The SRBPP Levees come from the National Levee Database levee centerlines and represent all project levees within the Sacramento River Bank Protection Project extent.

Reclamation District: Areas shown to represent the Bureau of Reclamation Districts that are responsible reclaiming and/ or maintaining land that is threatened by permanent or temporary flooding for agricultural, residential, commercial, or industrial use.

Maintenance Areas: Areas shown to represent DWR maintenance areas. These areas were organized in the interest with complying with Federal requirements and are maintained by DWR maintenance yards.

Levee Districts: Areas shown to represent Levee Districts, which are like Reclamation Districts but are only concerned with flood protection, not water supply as well.

#### 8.0 River Location Naming Convention

Erosion and repaired sites are identified and labeled with the abbreviated waterway and river mile (or levee mile when river mile does not exist) and bank designation. This is known as the River Code. An example of the naming convention would be: SAC 50.6 R. This translates to: Sacramento River, River Mile 50.6, Right Bank. River codes for all streams within this project is located in Section 8.0 and is listed after the stream name.

Some streams/waterways do not have river miles and will use levee miles. This mapbook shows the levee miles when applicable.



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#### 2017





































































































































































































































































































































## 12.0 Notes

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