



Riverbank before repair.



Repaired levee to prevent further erosion.

Repairing Riverbank Erosion

During routine levee inspections, American River Flood Control District staff discovered undercutting along a section of the bank on the Sacramento River, caused primarily by boat wake damage. The damage became increasingly worse and in December 2010 high river flows caused a significant portion of this bank and levee slope to wash away.

The District began planning an “in-water” repair project. In-water work requires rock and levee fill to be placed directly in the river. Because this action may affect habitat and associated life forms, in-water work projects require numerous permits and environmental reviews from many agencies.

PLANNING AND PERMITTING

During the planning and permitting phase for this project, the District informed interested agencies of the intended repair, including the state Central Valley Flood Protection Board, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Department of Fish and Game and the Regional Water Quality Control Board. The District solicited input about minimizing habitat impacts while making the necessary repairs.

The District developed a repair design that would replace the missing levee material without removing any of the existing trees. This repair design used a rock bench, or buttress, as a foundation for the new levee fill. This buttress was also situated to protect against future boat-wake damage.

While the planning and permitting phase was underway, another high river flow caused the site to be underwater from March through May 2011 – and damage to the levee became much worse. By mid-August, the District had acquired all necessary permits so work could begin.

PREVENTING FURTHER DAMAGE

On September 2, 2011, the District began building a construction access ramp from the top of the levee down to the river’s

edge, and then built a 400 ft. rock bench along the water’s edge. The bench allowed construction equipment access to the portion of the levee that had washed away. We then brought in premium clay levee fill material and compacted it into place to fill up the large scour cuts.

District staff conducted all of the construction work. To conclude the project, our crew placed native grass seed along the repaired bank, covered exposed earth with straw and installed straw wattles to prevent erosion of the newly constructed site. All work was completed just in time, as a large storm occurred the following week. Our crews returned to the site in early November to plant small shrubs at the water’s edge.

How We Prepare for Emergencies

Emergencies can happen at any time and the key to safety is being prepared in advance. Here is what we do to prepare:

- Clear and remove vegetation so we can see storm damage when it happens;
- Make sure levee roads are drivable for patrols in bad weather;
- Stockpile flood fight materials like sandbags, erosion protection supplies and riprap (angular chunks of rock);
- Prepare personal protective equipment such as rain gear, radios, GPS system, flashlights and personal flotation devices;
- Attend annual flood fight training;
- Inspect levees during the pre-season;
- Prepare Mutual Aid Agreements and Staff Resource Sharing Agreements and update contact lists; and
- Update flood emergency response plan.

To learn how you can be prepared for potential flood conditions, see the attached Emergency Supply Checklist.



Flood Risk

What Are the Chances?

Large-scale storms tend to hit the Sacramento Valley every 10 years or so. Our most recent large storm occurred in 1997, so another one is due soon. What is a “large storm” from a flood protection perspective?

Here are some key concepts regarding 100-year flood protection:

- **100-year storm** is a storm with a one-in-one hundred (or 1 percent) chance of occurring in any given year.
- **100-year flow** is the amount of water in a river that would result from a 100-year storm centered over the upstream watershed.
- **100-year flood protection** is a levee system that is likely to contain and withstand the 100-year flow in the river.

A significant amount of improvements to our levees has occurred since 1997. In 2004, the U.S. Army Corps of Engineers certified that the American River levees could withstand a 100-year flow. A 100-year flow in the American River is 145,000 cubic feet of water every second (cfs). There are 7.5 gallons of water in 1 cubic foot. A 100-year flow would therefore result in more than 1 million gallons of water flowing downstream *every second* in the American River. A break in the levee would be disastrous.

More work remains to be done to our flood protection system. Protection from a 100-year storm is not enough and our goal is to have protection from a 200-year storm. A 200-year flow in the American River is 160,000 cfs. To achieve this goal, work is being done to further strengthen our levees and to improve Folsom Dam.

The U.S. Army Corps of Engineers is currently modifying the Folsom Dam by installing a new spillway. The Folsom Dam spillway will allow the dam to release water earlier in a storm event, helping to lower the water elevation in the reservoir, and thus increase storage capacity for the water flowing from the Sierra Nevada Mountains. The new spillway is expected to be completed in 2015 at a total cost of \$1.3 billion.

GIS/GPS Aids Levee Work

Many agencies and engineering firms use geographic information system (GIS) software and global positioning system (GPS) technology to locate and document specific items.

A GIS application enables the user to capture, store, present and share all types of geographically referenced data and GPS identifies the precise location of a feature for easy inclusion on a GIS layer or map. **The District has used GPS for a number of years** and is now able to share this data with others. Using handheld and truck-mounted laptop GPS, the District staff can:

- Locate features and track ongoing areas of concern such as erosion sites, rodent burrows and dying trees;
- Locate encroachments such as fences, stairs and pipelines;
- Communicate precise locations with state and federal levee agencies;
- Map locations on aerial photo software while onsite;
- Map boundaries of damaged sites; and
- Send and receive coordinates via e-mail to/from neighboring landowners.

As part of ongoing efforts to improve, the District is investigating using this technology for other applications.



Meet District Superintendent, Richard Marck

If you spend any time on the levee, there is a good chance you have met Richard – he is our friendly superintendent who administers the Operations and Maintenance program for the District. His roll-up-your-sleeves approach, depth of knowledge and great communication skills have enabled him to make many contacts and friendships with our neighbors and residents living near the levees.

In 1991, Richard joined the District at the entry level, and over time learned to operate all of the tractors, vehicles and construction equipment used in our operations. He steadily progressed to his current position as Superintendent and is now responsible for managing the maintenance staff needs and the fleet of equipment. Richard also keeps track of our regulatory obligations for conducting all maintenance activities.

Thanks, Richard, for 20 years of service – you are the backbone of the District and a great asset to our operations, our levees and our organization.

Levee Patrol



When the water in the river starts to rise due to weather or other events, the District initiates ongoing patrols to check the levee status and identify and document any problem areas. Patrols often occur at night and during bad weather, when finding a potential problem area is most difficult. Problems can include boils, seepage, sloughing, cracking, erosion or fallen trees.

Two-man crews in trucks patrol at specified intervals depending on river flows, with patrols increasing in frequency as water levels rise. These patrol routes, usually traversed under hazardous driving conditions, are set to observe a specified region two to four times per each four-hour interval.

Trucks are fully equipped and ready to report to our headquarters or to the appropriate authorities.

Regardless of weather conditions or season, we always want to hear if you notice any changes in the appearance of a levee. Communication benefits us all and we look forward to talking with you or answering any questions you may have. You can reach us at (916) 929-4006.

Our Mission: Keeping the Levees Safe

WHO WE ARE

In 1927, the state Legislature established the American River Flood Control District as a California Special District to protect citizens by maintaining the 40 miles of levees along the American River and portions of the Sacramento River and Steelhead, Arcade, Dry and Magpie creeks. The District boundary is the area protected from flood inundation by District levees. (See map below) Without the levees, this area would be routinely inundated by floodwater.

As part of the federally authorized Sacramento River Flood Control System, **the American River levees are the primary line of defense against flooding.** Levees require continual maintenance to be kept in a like-new condition and yield design

strength and durability against flood flows. **The levees are routinely inspected four times a year to ensure that any deficiencies are identified and corrected prior to the winter flood season.** Two of these inspections are conducted yearly by the District, and two are conducted by the State of California Department of Water Resources. The State's fall inspection is the basis for each District's official inspection rating. The American River Flood Control District has received the highest ratings possible since the inspection rating system began in the early 1980s.

YOUR TAXES AT WORK

The American River Flood Control District is funded by property tax assessments based on parcel size, land use, and one of

three geographic zones within the District, A B or C. (For example your tax bill may show: "American River Flood Zone C," which indicates your property is in the area south of the American River.) Your property tax dollars are used to fund the day-to-day maintenance of the levees and first response during a flood emergency. **For more information on these geographic zones and the tax assessment, visit www.arfcd.org and click FAQ (Frequently Asked Questions).**

In addition to routine maintenance and flood response operations, the District also conducts small capital improvement projects that restore damaged levees, improve maintenance and emergency response access and remove unwanted encroachments.



BOARD OF TRUSTEES

Karolyn W. Simon
Brian F. Holloway
Virginia G. Moose
Derek W. Minnema, P.E.
William J. Pavão

GENERAL MANAGER/ENGINEER

Timothy R. Kerr, P.E.

SUPERINTENDENT

Richard Marck

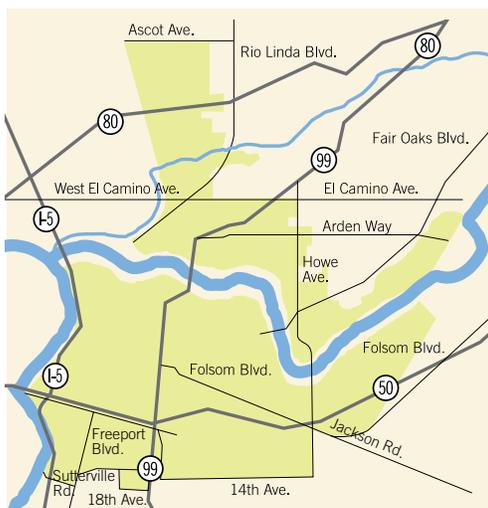
OFFICE MANAGER

Michelle M. Wilder

BOARD OF TRUSTEES' MEETING

Second Friday of every month
at 11:00 a.m.

Open to the public
165 Commerce Circle, Suite D
Sacramento CA 95815
(916) 929-4006



American River Flood Control District Boundary

American River Flood Control District
165 Commerce Circle, Suite D
Sacramento, CA 95815

PRST STD
U.S. Postage
PAID
Permit No. 604
Sacramento, CA

EMERGENCY SUPPLY CHECKLIST

Essentials

- ▶ **Water:** 1 gallon per person per day
(a week's supply of water is recommended)
- ▶ **Food:** Ready to eat canned meats, fruits & vegetables, canned juices, milk, soup (if powdered, store extra water)
- ▶ Non-electric can opener
- ▶ Portable radio, flashlight, spare batteries
- ▶ Essential medications
- ▶ Candles, matches
- ▶ Cash and change
- ▶ **Baby supplies:** formula, bottle, pacifier, soap and baby powder, clothing, blankets, baby wipes, disposable diapers, canned food and juices
- ▶ **Important papers:** insurance policies, copies of social security cards, birth certificates in a waterproof container
- ▶ **Pet supplies:** food, carrier, leash

Cooking

- ▶ Eating utensils
- ▶ Disposable plates and cups
- ▶ Paper towels
- ▶ Heavy duty aluminum foil
- ▶ Camping stove and fuel for outdoor cooking
- ▶ Pots, pans, knife

Sanitation Supplies

- ▶ Household bleach
- ▶ Toilet paper
- ▶ Bar soap
- ▶ Large garbage bags

Safety and Comfort

- ▶ Change of clothing
- ▶ Sturdy shoes
- ▶ Blankets, sleeping bags, rain gear

Tools and Supplies

- ▶ Shovel, ax, broom
- ▶ Tool kit including screwdriver, pliers, hammer
- ▶ Plastic and/or duct tape

INFORMATION & EMERGENCY CONTACTS

American River Flood Control District (ARFCD)

(916) 929-4006

www.arfcd.org

The Sacramento Area Flood Control Agency (SAFCA)

(916) 874-7606

www.safca.org

County of Sacramento

(916) 875-7246

(Emergencies, Evenings, Weekends & Holidays)

www.saccounty.net

or

www.sacflood.org

(River, Creek, Stream Levels and Rainfall Amounts)

City of Sacramento

(916) 264-5011

(Emergencies, Evenings, Weekends & Holidays)

www.cityofsacramento.org

or

www.cityofsacramento.org/utilities

California Data Exchange Center (CDEC)

<http://cdec.water.ca.gov>

The Federal Emergency Management Agency (FEMA)

www.fema.gov

National Weather Service-Sacramento

www.wrh.noaa.gov/Sacramento

U.S. Army Corps of Engineers

www.spk.usace.army.mil

U.S. Bureau of Reclamation

www.usbr.gov/mp



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