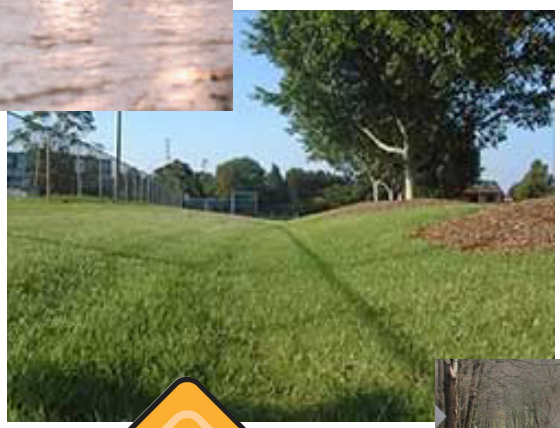
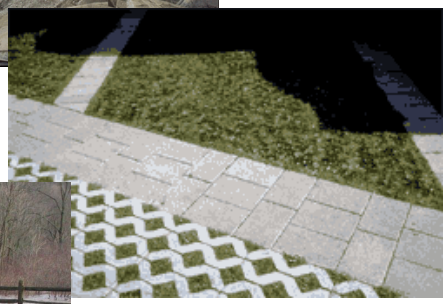
Ready for the Flood

an awareness & preparation manual for Solano County residents

compiled by the Solano Resource Conservation District





SOLANO COUNTY FLOOD AWARENESS

Funded by the Solano County Water Agency

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Living in a Flood Plain 101

an Introduction to Solano County flooding issues

Flooding is a fact of life

Solano County, with it's vast network of year-round and seasonal creeks and drainage canals, is a natural flood plain. Dealing with large amounts of water is something that the folks who live here have to get used to. In some parts of the County, this means regular flooding, property damage and risk of life. The suggestions and practices described in this manual are applicable everywhere in the County, but they are especially important for residents in flood prone areas.

No person or organization can absolutely prevent flooding, especially in very wet years or in times of extremely heavy rainfall. People *can* mitigate for flooding and its consequences, lessoning damages and threats to life and property.

Living in flood prone areas is a constant learning experience. No two years are ever the same, and escaping serious flooding one year is no guarantee you will be so lucky a second time. What will protect you is developing a solid understanding of the systems that impact local and regional flooding, implementing land management practices and home design to reduce your flooding risks, and plugging yourself into local weather service information so you can be proactive rather than reactive when the rains come.

Flooding facts to keep in mind:

- About 30 percent of all flood claims come from outside of the 100-year floodplain.
- Floods are the most frequently occuring natural disasters – equalling 40 percent of all natural disasters in the world and 90 percent in the U.S. Flooding is the biggest weather related killer.
- Financial losses and deaths in the U.S from floods averaged $3.7 billion, and 110 deaths annually before last year's hurricane season.
- Floods can result in ten to twenty foot walls of water coming out of what seems like nowhere, leaving you little time to prepare or escape.
- Just an inch of water can cause costly damages to your property.
- A car and its passengers can be easily carried away by just two feet of water.
- New land development can increase flood risk, especially if the construction changes natural runoff flowpaths and reduces the amount of surface area that can absorb water, either by paving it or covering it with buildings. This means that construction up in the hills can have big impacts down in the flats.
- We don't know as much about flooding and weather as you might think: 100-year floods don't always happen just once every hundred years, and many of our flood maps are not current or accurate. Storms in recent years have approached or exceeded the 100-year flood level in Solano County, resulting in some of the wettest rainy seasons on record, with some of the largest storm and flooding events in memory.

So what's your risk?

Your chances of being flooded are much greater than many other risks you face. Living in a 100-year floodplain (most of Solano County), you have a 1 in 4 chance of being flooded during the period of a 30-year mortgage, a risk 27 times greater than your risk of fire.

This manual can help you lower your potential for harm from flooding

Local Agencies and Flooding

Flood control is the resposibility of many entities in Solano County. The Vallejo Sanitation & Flood Control District and the Fairfield-Suisun Sewer Districts are independent special districts of the State of California to serve the Cities of Vallejo and Fairfield and Suisun, repsectively. They collect and treat wastewater, and seek to protect their communities from flooding and storm water damage. The seven Solano County cities (Dixon, Vacaville, Fairfield, Suisun City, Rio Vista, Vallejo and Benecia) all have flood responsibilities as well. All of these organizations try to work together to minimize flooding and the damages it causes.

Solano County Water Agency

The Solano County Water Agency was formed in 1951. SCWA's boundaries include the entire County of Solano and the property of the University of California at Davis in Yolo County. SCWA provides wholesale, untreated water supply to cities, districts and state agencies. Additionally, SCWA leads efforts to protect rights to existing sources of water and participates in efforts to secure new sources of water for future growth in the County.

SCWA is also responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project and has authority to deal with all flood control matters within its boundaries. SCWA prepared a Flood Control Master Plan to address countywide flooding and drainage problems and developed multiple watershed studies to address flooding problems on a watershed basis. Several projects resulting from these studies are being considered for implementation.

SCWA Flood Control Objectives

- Manage the Ulatis Flood Control Project to provide the 10-year recurrence level of flood protection for which the project was designed and work with interested agencies, and determine responsibility, for provision of greater levels of flood protection.
- Manage the Green Valley Flood Control Project to provide the 40-year recurrence level of flood protection for which the project was designed and work with interested agencies, and determine responsibility, for provision of greater levels of flood protection.
- Facilitate communication and coordination of flood control projects in Solano County so that projects and developments within a watershed mitigate their runoff impacts on existing and planned flood control, control facilities.
- Actively pursue adequate protection for Solano County from flooding from the Sacramento River and tributaries by advocating adequate flood protection along the west side of the Yolo Bypass to protect agricultural land.
- Keep abreast of new regulations and technology in flood control management.
- Prepare to be able to respond to flooding situations.
- Monitor and assist in planning for flood protection for areas served by unimproved channels.

What SCWA can do for you

Landowners with flooding or drainage problems on their property can contact SCWA to report the situation. If the problem is reoccurring and affects more than one landowner then SCWA may be able to provide funds through their Flood Control Small Grant Program to help alleviate the issue. For more information about this program see the **PREPARE** section of this manual, go the SCWA's website or contact SCWA staff :

Solano County Water Agency
P.O. Box 349
Elmira, CA 95625
(707) 451-6090
http:www.scwa2.com

Solano County Sheriff, Office of Emergency Services

The Solano County Office of Emergency Services is dedicated to the development, establishment and maintenance of programs and procedures that protect the lives and property of Solano County residents from natural or man-made disasters including the following: floods, earthquakes, major fires, storms, radiological or hazardous material incidents, aircraft accidents, and any other mass casualty incidents.

The Office of Emergency Services works closely with law enforcement, fire agencies and also the Governors Office of Emergency Services and operates out of a new Emergency Operations Center that can be immediately activated during an emergency and will house those people responsible for the coordination, control, communications and function of all emergency preparedness and response.

Solano County Sheriff's Office
Office of Emergency Services
Phone: (707) 784-1600
Fax: (707) 421-6383
OES@SolanoCounty.com
530 Clay Street
Fairfield CA 94533-6306

Other County Help

Other agencies, while not responsible for flood control, can help you to assess your risks and plan your landscape accordingly. They can also provide recommendations and assistance in implementing flood control/mitigation practices on your property.

Solano Resource Conservation District

The Mission of the Solano Resource Conservation District is to protect, promote and enhance the soil, water, wildlife, plant-life and air quality resources within Solano County. SRCD staff members are available to assist District landowners in applying for any necessary permits or grants that will allow them to implement flood control projects on their property. SRCD staff members are also available to help District landowners with any other conservation planning needs such as designing floodwise landscaping, reducing erosion, or improving water quality on their property. For more information see the SRCD website at: http://www.solanorcd.org

Dixon Resource Conservation District

One of the many tasks of the Dixon Resource Conservation District is to manage the drainage system within their District. If you are a landowner within DRCD boundaries and are experiencing flooding problems, or if you have a ditch maintenance problem to report, please contact the DRCD as soon as possible.

Natural Resources Conservation Service

Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has helped America's private land owners and managers conserve their soil, water, and other natural resources. NRCS staff members are available to provide conservation planning and engineering assistance on a variety of projects such as designing floodwater retention basins, swales, vegetated ditches or other waterways. NRCS also has funding available to help agricultural producers implement a variety of best management practices, which will reduce erosion, improve water quality and enhance wildlife habitat on their property.

Contact Information for all three organizations

1170 N Lincoln St. Suite 110
Dixon CA 95620
Phone: (707) 678-1655 x 3
Fax: (707) 678-5001

Assessing your risk of flooding

The Basics

Though almost everywhere in Solano County has some flooding risk, some areas are at much greater risk. Some places practically never flood, and some flood almost every year. Keeping yourself and your property safe involves figuring out what your flood risks are, and then doing what you can to mitigate those risks.

Your chances of being flooded are much greater than many other risks. In a 100-year floodplain (which includes several parts of Solano County), you have a 1 in 4 chance of being flooded during the period of your 30-year mortgage. If you live near a creek or stream, you are likely at a higher risk of flooding. One way to assess your risk is to compare the elevation of your home with that of the street. The higher your home is above the street, the safer you are. Newer developments are usually built four to five feet above the street to better protect against flood; older tracts and homes may not be so safely constructed.

Do you live in a flood plain?

If you don't know whether or not you live in a flood plain, or whether or not your property is at risk of being flooded, you can call one the following agencies:

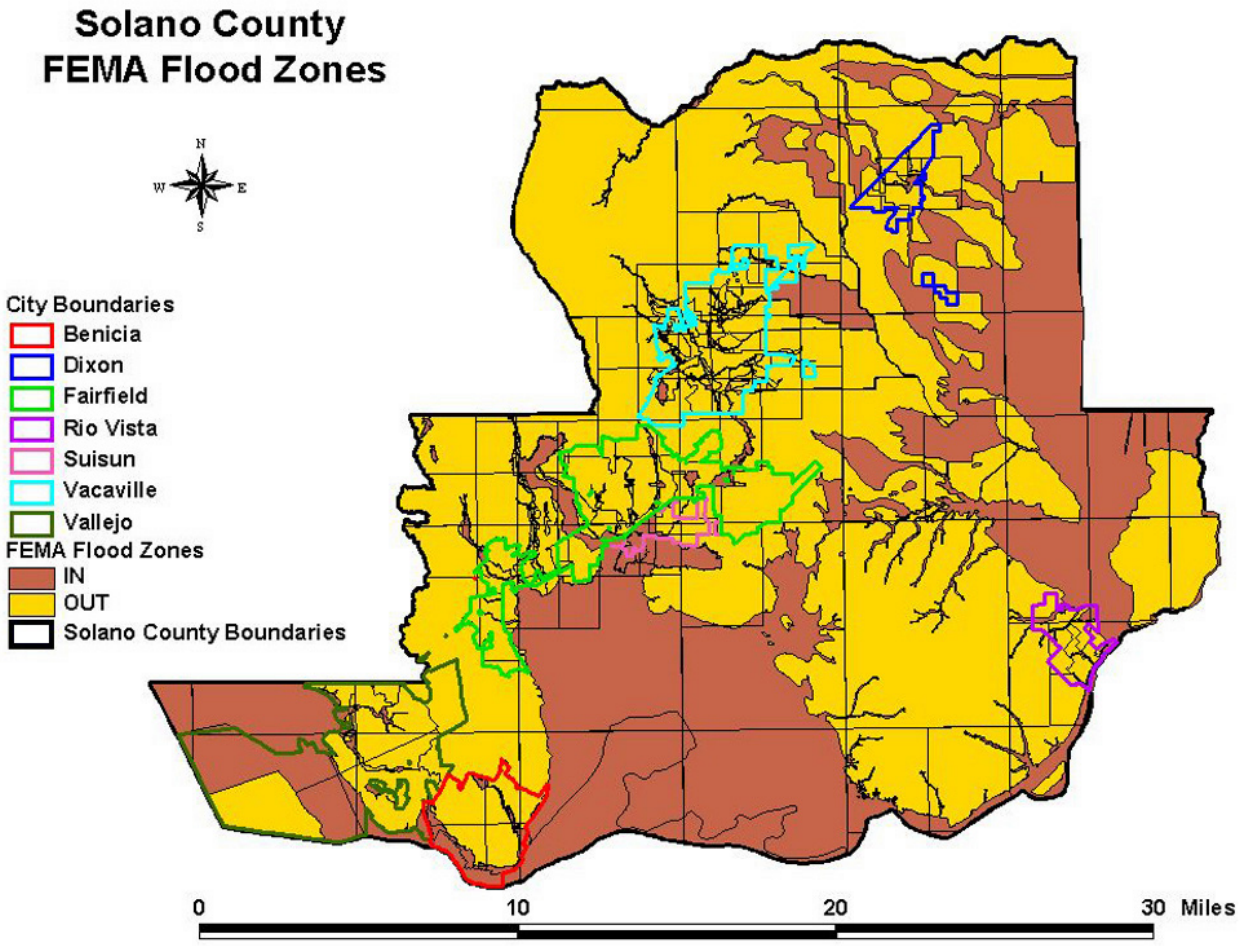
Benicia	Dept. of Public Works	(707) 746 – 4240	(All areas)
Dixon	Dept. of Public Works	(707) 678 – 7000	(If you live outside the floodplain)
	Planning Dept.	(707) 678 – 7053	(If you live in the floodplain)
Fairfield	Dept. of Public Works	(707) 428 – 7471	(If you live in the floodplain)
		(707) 428 – 7407	(If you live outside the floodplain)
Rio Vista	Dept. of Public Works	(707) 374 – 6747	(If you live outside the floodplain)
	Community Development	(707) 374 – 2205	(If you live in the floodplain)
Suisun	Engineering Dept.	(707) 421 – 7341	(All areas)
Vacaville	Engineering Dept.	(707) 449 – 5140	(If you live outside the floodplain)
	Dept. of Public Works	(707) 469 – 6500	(If you live outside the floodplain)
Vallejo	Dept. of Public Works	(707) 648 – 5229	(All areas)

If you live outside city limits you can call the County's Department of Resource Management for the same information:

Solano County Resource Management (707) 784 – 6765

How sure can I be about my risk?

We don't know enough about flooding patterns to make sure predictions about safe locations. Much of the flooding in Solano County has occurred outside the designated floodplain, and different places flood at different times. Because of this, you'll have to look for information from more than one source. Investigate what has happened in the past. Talk to neighbors, the County; look at your land for clues. If there is a risk of flooding on your property, use this manual to take steps to lesson the risks to your life and property.



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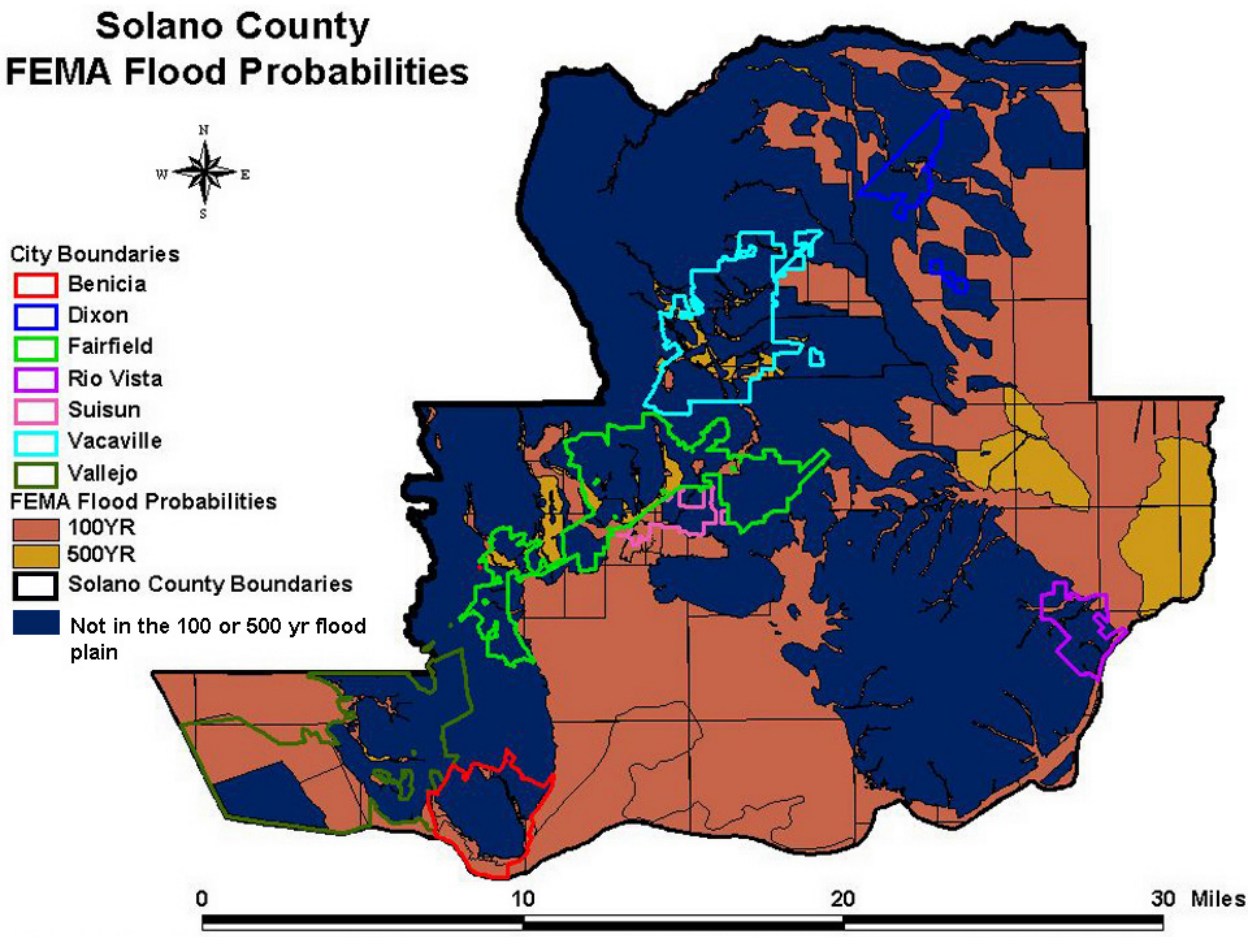

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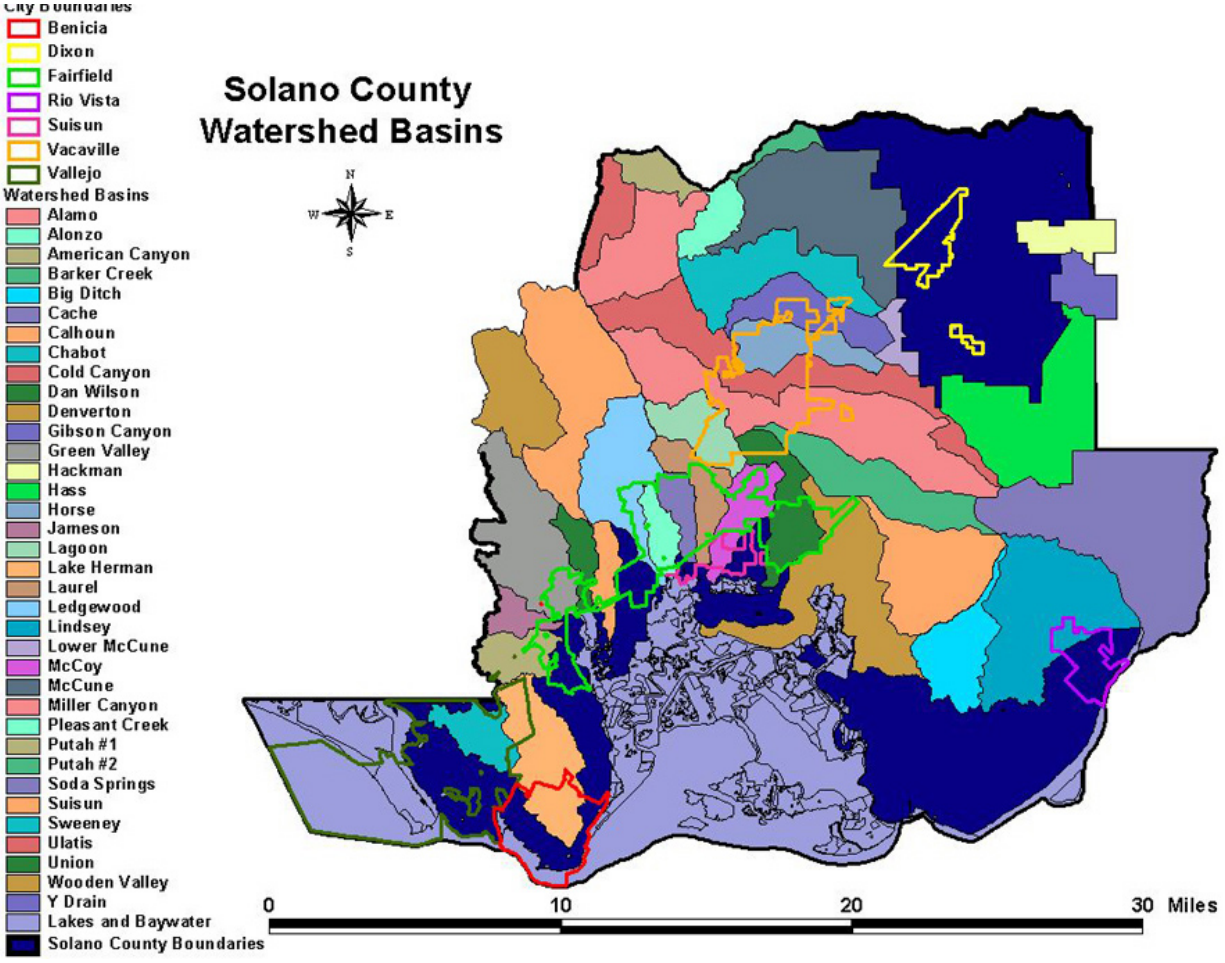
City Boundaries
Benicia
Dixon
Fairfield
Rio Vista
Suisun
Vacaville
Vallejo
Watershed Basins
Alamo
Alonzo
American Canyon
Barker Creek
Big Ditch
Cache
Calhoun
Chabot
Cold Canyon
Dan Wilson
Denverton
Gibson Canyon
Green Valley
Hackman
Hass
Horse
Jameson
Lagoon
Lake Herman
Laurel
Ledgewood
Lindsey
Lower McCune
McCoy
McCune
Miller Canyon
Pleasant Creek
Putah #1
Putah #2
Soda Springs
Suisun
Sweeney
Ulatis
Union
Wooden Valley
Y Drain
Lakes and Baywater
Solano County Boundaries
Solano County
Watershed Basins
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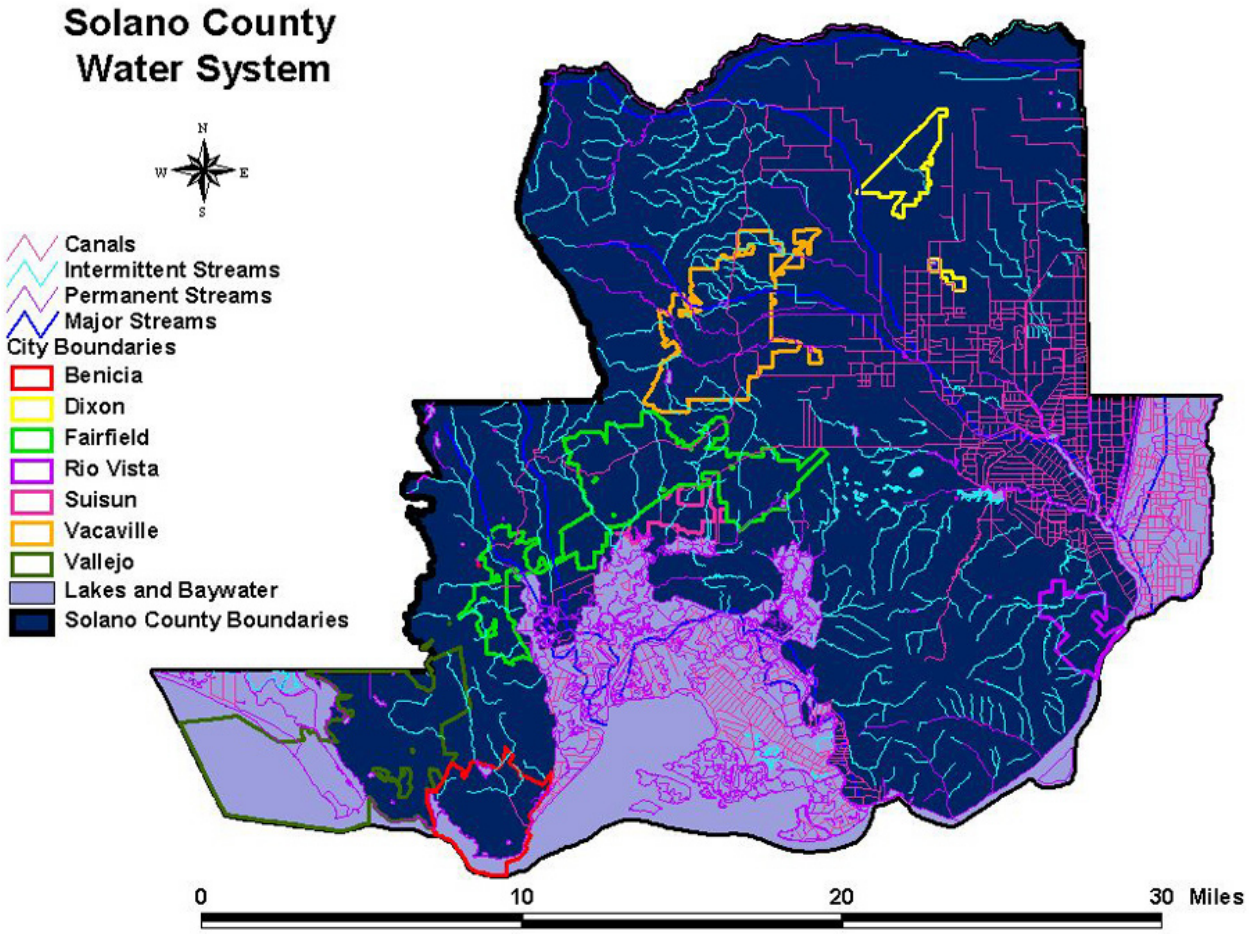
30 Miles


Solano County
Water System
N
W
E
S
Canals
Intermittent Streams
Permanent Streams
Major Streams
City Boundaries
Benicia
Dixon
Fairfield
Rio Vista
Suisun
Vacaville
Vallejo
Lakes and Baywater
Solano County Boundaries
0
10
20
30 Miles

Reduce you risks before flooding: PREPARE

Steps to keep your family safe

Flood insurance- Do you need it?

The Assessor Parcel Number (APN) on your property tax statement will allow you to find out if your property lies in a flood prone area designated by FEMA. The County Planning Department can help you make this determination. Property owners in FEMA flood Zones should seriously consider getting flood insurance. Flood damage is not usually covered by homeowner's insurance policies and Federal disaster assistance is only available if the President formally declares a disaster. Often times the Federal disaster assistance programs only offer loans that will have to be repaid, with interest, in addition to any mortgage payments that are still owed on the damaged property. If disaster assistance isn't offered, property owners have to take care of any costs on their own.

You should also determine if your property is in a FEMA-designated Special Flood Hazard Area (SFHA). The properties in this flood-prone area have the greatest risk of flooding and sustaining damage in the event of a significant flood. Flood insurance is required if you live in a SFHA and have a federally-backed mortgage or home equity loan. If you do not know if your property lies within a SFHA you should contact FEMA for more information at 1-800-621-FEMA (3362) or visit http://www.fema.gov/hazard/flood/fl_before.shtm. Solano County and all of its cities will also have this information. To access it, call your local or County planning department for help.

Where to get Insurance

Flood insurance is available through the National Flood Insurance Program, and can be purchased through most insurance agents or companies. Flood insurance policyholders claims are paid whether or not a disaster is Federally declared. Policyholders will be reimbursed for all covered losses, and the funds will not have to be repaid. Homeowners can insure their home up to $250,000 and its contents up to $100,000. Renters can cover their belongings up to $100,000 and non-residential property owners can insure building and contents up to $500,000.

Timing matters

In general, a policy does not take effect until 30 days after you purchase flood insurance. Therefore, if the weather forecast announces a flood alert for your area and you decide to purchase coverage, it's already too late. You will not be insured if you buy a policy a few days before a flood.

Be sure to keep insurance policies and documents in a safe-deposit box and to inventory your property and belongings on paper, videotape or with photographs so that you will be able to prove your losses and get reimbursed.

Create a Home Inventory

Your family should create a room-by-room inventory of your personal possessions. Having an up-to-date home inventory will help you:

- Purchase enough insurance to replace the things you own.
- Get your insurance claims settled faster.
- Substantiate losses for your income tax return.

This can be as simple as making a list in a notebook and saving receipts and photos in a file, or you can invest in specialized software (http://www.knowyourstuff.org/index.htm will take you to a company FEMA references for personal inventory help) to help you. However you create your inventory, it is important that you keep it updated as you buy or eliminate personal possessions.

Getting Started

If you have been setting up a household, starting a home inventory can be relatively simple. You could even attach recent wedding registries to substantiate new possessions. But, if you have been living in a house for many years, this task may seem daunting. If you set aside an afternoon and get your entire household involved, it can be an enjoyable experience. It is much easier to document your possessions before you suffer a loss from a fire, hurricane, burglary or other disaster.

Big Ticket Items

Make note of expensive items, such as jewelry, furs, and collectibles. Valuable items may need separate insurance. But, don't forget more commonplace items such as toys, CD's and clothing.

Taking Photographs

Along with the written information, consider adding photographs of your possessions, which can be done easily with a digital camera. Those with film cameras can scan print photographs or have their film developer save the images to a disk. You can always simply store your print photographs with a copy of your inventory.

Videotape It

Walk through your house or apartment videotaping the contents. Remember to open draws and closets. One advantage of videotape is that you can narrate what you are filming.

File the inventory

Once your inventory is complete, file it and all supporting documentation (photos, videos, etc) with your other important home papers. Schedule a regular review, and remember to update whenever you purchase new personal items, or get rid of something on the list.

Protecting your Family

If you live in a flood zone, you will need to take some precautions to assure the safety of your family and friends. The following steps should be planned and prepared in advance, and practiced, so that everyone in your family or home will know what to do when an emergency strikes.

- Keep emergency numbers by all phones.
- Know safe routes from your home or office to high ground.
- Develop and practice an evacuation plan. Your plan should consider anyone with special needs or movement limitations. During times when flooding is a possibility, make sure everyone in your house or office knows about the plan and is prepared to follow it.
- Keep your car's gas tank full.
- Store emergency supplies at home, at work and in your car in easily accessible locations. Theses supplies should allow you to be self-sufficient for 72 hours and should be stored in a sturdy, easy-to-carry container such as a backpack, duffle bag, or covered trash container.

Emergency Supplies

The following items are basics to stock as emergency supplies.

1) First Aid Kit and Manual: Assemble first aid kits with the following items:

- (20) Adhesive bandages various sizes.
- 5" x 9" sterile dressing.
- (1) Conforming roller gauze bandage.
- (2) Triangular bandages.
- (2) 3 x 3 and (2) 4 x 4 sterile gauze pads.
- (1) Roll 3" cohesive bandage.
- (2) Germicidal hand wipes or waterless alcohol-based hand sanitizer.
- (6) Antiseptic wipes.
- (2) A pair large medical grade non-latex gloves.
- Adhesive tape, 2" width.
- Anti-bacterial ointment.
- Cold pack.
- Scissors (small, personal).
- Tweezers.
- CPR breathing barrier, such as a face shield.
- Essential and prescribed medications as well as a list of such and other important family medical information.
- Important non-prescription drugs:
- Aspirin or non-aspirin pain reliever
- Anti-diarrhea medication

- Antacid (for stomach upset)
- Syrup of Ipecac (use to induce vomiting if advised by the Poison Control Center)
- Laxative
- Activated charcoal (for use when advised by the Poison Control Center)

Maintain your first aid kit on a regular basis, replacing medicines as their potency expires. Ask your physician or pharmacist about storing prescription medications.

2) **Water:** Store a three-day supply of water for drinking, food preparation and sanitation. A normally active person needs to drink at least two quarts of water each day, but needs vary by circumstances. Replace the water every six months if not using commercially bottled water.
3) **Food:** Store at least a three-day supply of non-perishable packaged or canned foods, which will not spoil. Also be sure to have a manual (non-electric) can opener or utility knife available.
4) **Sanitation:** Items such as toilet paper, towelettes, soap, feminine supplies, plastic bags and household chlorine bleach will be very valuable if bathroom facilities are not available.
5) **Clothing and Bedding:** You should be prepared to have at least one change of clothing, sturdy shoes or work boots, and one blanket or sleeping bag per person.
6) **Special Needs Items:** Remember family members with special needs, such as infants, elderly or disabled.
7) **Other Important Tools and Supplies:**
   - Good flashlight and its batteries in a ready state
   - Cell phone, charger and batteries
   - A portable, battery-operated radio tuned to a local station that provides emergency instructions
   - Cash and credit cards or traveler's checks
   - An extra set of house and car keys
   - Sandbags and other emergency building materials handy for waterproofing.
   - Mess kits, or paper cups, plates, and plastic utensils
   - Emergency Preparedness Manual
   - Fire extinguisher: small canister ABC type
   - Whistle
   - Plastic sheeting
   - Map of the area

Protect your pets

If you are like millions of animal owners nationwide, your pet is an important member of your household. The likelihood that you and your animals will survive an emergency such as a fire or flood, depends largely on emergency planning done today. Some of the things you can do to prepare for the unexpected, such as assembling an animal emergency supply kit and developing a pet care buddy system, are the same for any emergency. Whether you decide to stay put in an emergency or evacuate to a safer location, you will need to make plans in advance for your pets. Keep in mind that what's best for you is typically what's best for your animals.

If you must evacuate, take your pets with you if possible. However, if you are going to a public shelter, it is important to understand that animals may not be allowed inside. Plan in advance for shelter alternatives that will work for both you and your pets.

Make a back-up emergency plan in case you can't care for your animals yourself. Develop a buddy system with neighbors, friends and relatives to make sure that someone is available to care for or evacuate your pets if you are unable to do so. Be prepared to improvise and use what you have on hand to make it on your own for at least three days, maybe longer.

Emergency Preparedness List for Pet Owners

Prepare- Make a Pet Emergency Kit

Actually, you should make two kits. In one, put everything you and your pets will need to stay where you are. The other should be a lightweight, smaller version you can take with you if you and your pets have to get away. Be sure to review your kits regularly to ensure that their contents, especially foods and medicines, are fresh.

The following list includes the basic emergency kit items for any pet:

1) **Food-** at least three days of food in and airtight, waterproof container
2) **Water-** Store at least three days of water specifically for your pets in addition to the water you need for yourself and your family.
3) **Medicines and medical records-** keep an extra supply of medicines your pet takes on a regular basis in a waterproof container
4) **First Aid Kit-** Most kits should include cotton bandage rolls, bandage tape and scissors; antibiotic ointment; flea and tick prevention; latex gloves; isopropyl alcohol and saline solution. Also include a pet first aid reference book.
5) **Collar with ID tag, harness or leash.** Your pet should wear a collar with its rabies tag and identification at all times. Include a back-up leash, collar and ID tag in your pet's emergency supply kit. Place copies of your pet's registration information, adoption papers, vaccination documents and medical records in a clean plastic zipper bag or waterproof container and add to your kit. Talk to your vet about permanent ID such as microchipping, and enrolling your pet in a recovery database.

6) **Crate or other pet carrier.** If you need to evacuate in an emergency situation, take your pets and animals with you if it is a practical thing to do. This will be much easier if you have a sturdy, safe, comfortable crate or carrier ready for your pet. The carrier should be large enough for your pet to stand, turn around and lie down.

7) **Sanitation.** Include pet litter and litter box if appropriate, newspapers, paper towels, plastic trash bags and household chlorine bleach to provide for your pet's sanitation needs. The bleach will serve as a disinfectant (dilute nine parts water to one part bleach), or in an emergency you can use it to purify water (16 drops of regular household liquid bleach per gallon of water. DO NOT use scented or color safe bleaches, or those with added cleaners)

8) **A picture of you and your pet together.** If you become separated from your pet during an emergency, a picture of you and your pet together will help you document ownership and allow others to assist you in identifying your pet. Include detailed information about species, breed age, sex, color and distinguishing characteristics.

9) **Familiar items.** Favorite toys, treats or bedding in your kit will help reduce stress for your pet.

Plan

1) **Be prepared to assess the situation.** Use whatever you have on hand to take care of yourself and ensure your pet's safety during an emergency. The first important decision you'll likely need to make is whether you stay put or get away. Understand and plan for both possibilities. Watch TV, listen to the radio and check the internet for instructions.

2) **Create a plan to get away.** Plan how you will assemble your pets and anticipate where you will go. Find out before an emergency happens where the best places for you and your pet to go will be.

3) **Develop a Buddy system.** Plan with neighbors, friends or relatives to make sure that someone is available to care for or evacuate your pets if you are unable to do so. Make sure this person understands your plans and knows where your emergency kit is. Designate specific locations – one in your immediate neighborhood and another farther away where you will meet in an emergency.

4) **Gather contact information for emergency animal treatment.** Make a list of contact information and addresses of area animal control agencies and emergency veterinary hospitals. Keep one copy of these phone numbers with you and one in your pet's emergency kit. Obtain "Pets Inside" stickers and place them on your doors or windows, including information on the number and types of pets in your home to alert rescue workers.

Stay informed.

Know what types of emergencies are likely to affect your region as well as emergency plans that have been established by your state and local government. You can find more information about emergency preparedness at www.ready.gov.

Create a Flood Emergency Plan

Planning today can get you safely through an emergency tomorrow. Once of the most effective tools a household in flood prone areas can have is a flood emergency plan. You can use the information below to develop a plan for your family. Make sure that everyone knows the plan, knows when the plan goes into effect, and knows what their responsibility is. Review your plan together before every flood season, and make revisions as necessary.

- Meet with household members to plan a strategy for family safety during a flood.
- Decide upon a trigger for home evacuation- flood warnings on the radio, water sighted at a specific level, or some other non-subjective event. Make sure everyone knows and agrees that when the trigger is reached, evacuation begins.
- Draw a floor plan of your home. Mark the gathering point when the evacutation trigger is reached, and the exit route all family member will take.
- Decide where you will evacuate to. It should be on high ground that will never flood.
- Show family members how to turn off the water, gas and electricity at main switches when necessary.
- Post emergency telephone numbers near telephones.
- Teach children how and when to call 911, police and fire.
- Instruct household members to turn on the radio for emergency information.
- Pick one out-of-state and one local friend or relative for family members to call if separated during a flood (it is often easier to call out-of-state than within the affected area).
- Teach children your out-of-state contact's phone numbers.
- Pick an emergency meeting place on high ground that never floods to meet if you will need to regroup after evacuating.
- Take a basic first aid and CPR class.
- Keep family records and insurance documents in a water and fire-proof container, and make sure everyone in the family knows where the container is kept.
- Practice evacuating for a flood. Make sure all family members can answer the following questions:
    - Which route will you take to get to high ground?
    - Where is the meeting place on high ground?
    - Who grabs the important document container?
    - Where is are the important documents kept?
    - Who are the local and out of state contact people?

What to do before the storm season

The following list of tips will help prevent flooding on your property and reduce damages if flooding does occur. The calendar on page 19 will help you to schedule these activities to get them all accomplished before flood season

Things you can (and should) do on your own or without permits

Inside your house and garage

- Make sure electrical wiring is above the elevation of a masonry base floor. Appliances such as washers, dryers, water heaters, and furnaces should be elevated above your base flood elevation (the elevation associated with the “100-year flood,” or a flood with a 1% chance of occurrence in any given year.) The “100-year flood” patterns form the basis for the National Flood Insurance Program rates and regulatory floodplain management. If you are unable to raise your appliances, anchor them and protect them with a flood wall or shield.
- If your home has a basement, install floor shields or built-up barriers for windows and doors. The tops of these barriers should extend above the base floor elevation.
- If you have below-grade floors, (below the 100-year flood base elevation) install and maintain a sump pump system.
- Secure motor oil, antifreeze and household chemicals on high shelves in an enclosed space.
- If you live in a frequently flooded area, take preventive measures and stockpile emergency building materials, such as plywood, plastic sheeting, lumber, nails, hammer and saw, pry bar, shovels and sandbags.
- Have check-valves installed in building sewer traps to prevent floodwaters from backing up in sewer drains.
- As a last resort, use large corks or stoppers to plug showers, tubs or basins.

Outside

- Clean out downspouts and gutters and rake leaves to prevent storm drain clogging.
- Install backflow valves or standpipes to prevent sewer lines from backing up.
- Landscape with native vegetation that prevents soil erosion.
- If you are a rural property owner, keep your entire drainage system clear of debris, especially just before the rainy season.
- Clear dead trees from your property. Dead vegetation can block drainages, and removal is the property owner’s responsibility and doesn’t require a permit.

You can do a lot of flood prevention practices on your own, but some will have long-term impacts on neighbors, community safety or wildlife habitat and species. For these practices, you will need a permit

Do your homework so you'll be prepared

Permitting takes time. Begin the permit application process at least six months prior to the time you wish to begin your project. Once approved, the work must be done between April 15th and October 15th. More detailed information about permitting can be found on pages 34 and 35..

Flood Control Calendar

The calendar below includes basic monthly activities and reminders for sucessful flood control and safety. You can add your own more detailed lists of flood preparation chores, notes about things to look for in specific months, etc. to help you develop your flood control strategy.

January	February	March	April
Keep drains clean Begin planning for flood BMPs (best management practices-projects you can undertake to reduce flooding risks) Talk to agencies about permits Check the Solano County Flood Hazard Warning System frequently during storm events	Submit permit applications Keep drains clean Check the Solano County Flood Hazard Warning System frequently during storm events	Keep drains clean Prepare SCWA Small Grant Flood Control Applications Check the Solano County Flood Hazard Warning System frequently during storm events	Flood season ends! Assess flood damage and problems and make plans to mitigate Submit SCWA small grant applications
May	**June**	**July**	**August**
			Begin BMP installation
September	**October**	**November**	**December**
Begin pre-season flood mitigation jobs	Begin erosion control planting Clean gutters and drainages of fall debris	Flood Season begins Update emergency plans and supplies Keep drains clean Post the Solano CountyFlood Hazard Warning System information **(www.scwa2.com 455-1115)** in a prominent place	Keep drains clean Check the Solano County Flood Hazard Warning System frequently during storm events

Flooding and Storm Water Pollution

Everyday pollutants such as oil, gasoline, fertilizers, pesticides and litter collect on streets and other hard, impervious surfaces. During heavy rains or floods, these materials flow from storm drains, streets and yards into the local creeks and drainages, reducing water quality for drinking, swimming, fishing and wildlife. Storm waters can also cause severe erosion and carry large amounts of sediment, which further clogs drains and waterways. Severe disease outbreaks can occur if bacteria and other pathogens from septic tanks or animal wastes are carried in the flood waters that flow through people's homes and into drinking water sources.

As you protect your family and property, you can also address the problems of storm and flood water contamination, especially since some of the most common pollutants come from household hazardous wastes like paint, solvents, cleaning supplies, and pool chemicals.

Things you can do to reduce storm and flood water contamination:

- Store household chemicals in a secure, dry container that is raised off the ground
- Select less toxic alternatives for common household chemicals, and non-toxic substitutes wherever possible.
- Buy chemicals only in amounts you expect to use, and apply only as directed.
- Take unwanted household chemicals to hazardous waste collection centers; do not pour them down the drain or onto the ground. Soil cannot purify most chemicals.
- Use low-phosphate or phosphate-free detergents.
- Recycle used oil, antifreeze, paints, etc.
- Use water-based products whenever possible.
- Inspect vehicles for leaks regularly and repair immediately those you find.
- Drain pools and spas into a sanitary sewer outlet; never into a street.
- Select plants with low requirements for water, fertilizers, and pesticides.
- Apply lawn and garden chemicals sparingly and according to directions.
- Install vegetated filter strips using native grasses and plants along roadways or streams. The vegetation traps pollutants storm water picks up as it flows across driveways and streets, acting as a natural filter.
- Preserve existing trees and shrubs, and plant additional trees and shrubs to help prevent erosion and promote infiltration of water into the soil.
- Do not apply pesticides or fertilizers before or during a rain event due to the strong likelihood of runoff.
- Have your septic system inspected annually and pumped regularly; at a minimum of every 3-5 years.
- Do not use septic system additives. Do not divert storm drains or basement pumps into septic systems.
- Don't use toilets as trash cans.
- Never pour anything into a gutter or storm drain. Report illegal storm drain dumping.

Floodwise Landscaping

Using plants and practices to protect your property

There are many things you can do around your home to reduce your flood risks and protect your watershed from runoff pollution.

- Reduce the amount of impervious surfaces (hard surfaces water can't flow through) in your yard.
- Consider installing water permeable driveways and walkways. There are many commercial products available such as porous asphalt, porous concrete, plastic grid systems and block pavers that are highly durable and functional but still allow water to pass through to the soil below where it will be filtered and recharge the groundwater system.
- Slope lawns, flower beds, walkways and other landscape features away from your home.
- Install a system of grassy swales or vegetated ditches to drain water away from your home and yard to a more appropriate location.
- Consider installing a wet or dry retention basin that can reduce runoff velocity and temporarily store excess runoff.
- Create or protect buffers of native plants along streams, rivers, creeks, ponds and wetlands to reduce erosion, protect banks and provide valuable fish and wildlife habitat.
- Create or protect wetlands; they act as a natural retention basin which temporarily stores and filters runoff water.
- Keep streams, creeks and drainage systems clear of large debris and trash.
- Plant deep-rooted, perennial native plant species in and around your yard; they are better adapted to withstanding flood conditions and will prevent erosion better than shallow rooted annual species.
- Keep your gutters clean and be sure to connect them to an efficient drain system.
- Protect your septic system/field from excess water.

Flood Protection Best Management Practices

Flood protection Best Mangement Practices, or BMPs, are systems or maintenance practices that have been field-tested to be the most effective and doable means of achieving resource management goals. The following BMPs have been widely implemented to prevent or lessen the impacts of flooding damage to property and the environment.

Grassed Swales
Filter Strips and Buffer Zones
Wet Detention Basins
Dry Dentention Basins
Rain Gardens
Rain Barrels
Pervious Surfaces
Underground Storage

Each BMP is described in a format that explains what it is, what it does, and what circumstances make it a good fit for your land. Depending on your situation, you may find one or many of these BMPs to be appropriate responses to your flood problems.

Full fact sheets about each practice are included in the resource section of this manual, and further assistance and advice about selecting and installing Flood Protection BMPs is available from the Dixon NRCS office, Solano RCD and Dixon RCD

Grassed Swales

What they are: a linear, shallow, open channel that is vegetated with flood tolerant, erosion resistant plants.

What they do: convey storm water at a slower, more controlled rate and filter out sediment and pollutants from the water. Grassed swales also provide a site for storm water infiltration, which reduces runoff. When properly designed, grassed swales transport and clean water far more effectively than traditional drainage ditches.

Within the grassed swale, storm water is slowed by the strategic placement of check-dams, which encourage ponding. These ponds provide a site for sediment to drop out of the water column, for pollutants to be absorbed by the vegetation and for the water to infiltrate the soil. Collected storm water is expected to drain away through the soil within several hours or a few days, depending on the specific design.

When to use them: where storm water needs to be transported from impervious surfaces, slowed down and allowed to infiltrate into soils. They are most commonly used along highways, residential roadways, along property boundaries, around parking lots, and in common areas in residential sub-divisions.

Generally grassed swales are used to treat relatively small drainage areas of five acres or less. In highly urbanized areas grass swales are not recommended unless they function as pretreatment for other storm water management practices.

Advantages of correctly designed grassed swales:

- Improve water quality by trapping and removing sediments
- Reduce peak runoff velocity and promote infiltration
- Reduce erosion
- Provide for some groundwater recharge
- Are less expensive to build and maintain than a traditional curb and gutter system
- Are easy to design and can be built in relatively impervious soils or in seasonally saturated soils
- Create visually appealing and beneficial habitat between uplands and surface waters
- Provide effective pretreatment of storm water passing through for further processing by additional storm water management practices

Who Can Help?

Natural Resources Conservation Service
1170 N Lincoln St. Suite 110
Dixon CA 95620
(707) 678-1655 x 3

Filter Strips & Buffer Zones

What are they: **Filter strips** are sections of vegetation designed to reduce sediment and pollutants carried in storm water runoff. Filter strips are generally constructed on relatively flat, level land and are planted with grasses, shrubs or trees. To be effective they also require a method to spread the storm water runoff into a thin sheet before it crosses the filter strip. One type of level spreader is a stone-filled shallow trench with a lower bank that is level with the filter strip. A concrete berm may also be used as a level spreader.

Filter strips are often located between upstream developments and streams or ponds, primarily in residential areas where the development density is low. They can also be used along farm edges, before vegetated ditches or adjacent to wet or dry detention ponds to further improve runoff water quality.

A **buffer zone** is a strip of vegetation that has not been disturbed during development or that was planted along a stream, river, wetland or other area that requires protection from pollution and erosion. Buffer zones are not always located on level land and they do not contain a system to spread the runoff into a thin sheet flow.

What they do: The vegetation growing within filter strips and buffer zones filters the pollutants from the runoff and provides a location for infiltration and sediment deposition to occur. Effectiveness of these practices in improving water quality depends on runoff velocity, soil permeability, vegetation type, flow length and slope of the strip or streambank.

When to use them: Filter strips can be used to mitigate for large paved surfaces or drainage areas. Site topography is important: to avoid standing water and encourage treatment, grassed filter strips must have a slight slope of between two and six percent. Steeper slopes will encourage water flows with too great of a velocity.

Channel or gullies can form if the filter strip or buffer zone is improperly designed or located, or if the vegetative cover is too sparse. Filter strips and buffer zones are not designed to provide runoff storage or withstand high velocity flows. It is important that they are properly maintained and used in conjunction with other storm water management practices. Maintenance generally includes sediment removal, mowing, reseeding and removing debris.

Contact your local Natural Resources Conservation Service office for more information on designing filter strips or buffer zones for your property.

Who Can Help?

Natural Resources Conservation Service
1170 N Lincoln St. Suite 110
Dixon CA 95620
(707) 678-1655 x 3

Wet Detention Basins

What are they: Wet detention basins are ponds that are sized and configured to remove pollutants from incoming storm water runoff.

What they do: They maintain a permanent pool of water that is designed according to the size of the contributing watershed and the amount of impervious surfaces in the surrounding region. Above this permanent pool of water a temporary water quality pool is constructed to hold the runoff that results from a 1 inch rain event and release this water over a period of two to five days. This allows the majority of the suspended sediment, and pollutants (such as heavy metals and nutrients) attached to the sediment, to settle out of the water instead of being carried downstream. This design also reduces erosion within the watershed by slowing the rate at which the water is released.

When to use one: Wet dentention basins are effective means of holding storm water to prevent flooding downstream. They also work well when there is need to drain large areas of impervious surfaces.

To install a properly designed wet detention basin you should consult an engineer to determine the minimum surface area of the permanent pond and the temporary storage volume of the water quality storage pond. Your local Natural Resources Conservation Service office can help you obtain these design specifications. You will also need an engineer to design a principal outlet and emergency spillway that are sized for flood and downstream erosion control. Typically the storage system allocated to flood control is located above the water quality storage pond. The wetted perimeter of the basin should be planted with aquatic vegetation to enhance pollutant removal, prevent shoreline erosion and provide valuable wildlife habitat.

The basin must be routinely maintained to satisfy long-term water quality and flood control goals. Maintenance often consists of removing accumulated sediment, controlling weeds, disposing of trash and preventing aquatic vegetation from clogging up channels and small pools.

Who Can Help?

Natural Resources Conservation Service
1170 N. Lincoln St. Suite 110
Dixon CA 95620
Phone: (707) 678-1655 x 3

Dry Detention Basins

What are they: Dry detention basins are commonly used to control storm water peak flows, though they are less effective at improving water quality than wet detention basins and grassy swales. Dry detention basins are typically designed to hold storm water for a short interval of time, at least 24 hours, to reduce the peak flows in the receiving water. If properly constructed, the basin should dry out between storms.

When combined with other storm water control practices, such as filter strips or permanent pools, dry detention basins can provide excellent streambank erosion protection and can vastly improve water quality in storm water runoff. But if dry detention basins are not well vegetated or properly maintained they can create nuisance odors, breed insects, be unattractive to look at and collect trash.

What do they do: Extended dry detention basins are generally designed to capture the runoff from a typical 1-year 24-hour storm and release it over a period of 48 hours, or they capture the runoff from a 1 inch storm and allow it draw down over a period of 2 to 5 days. The basin should be designed with a drain that will completely empty the basin for cleanout, which includes removing accumulated sediments, trash or vegetation that is clogging the system.

When to use one: when you need to hold storm water for a short period to reduce the peak flows in the receiving water.The most effective dry detention basins have either a plunge pool or rip rap at the basin inlet to disperse incoming runoff energy. They also have a small permanent pool at the outlet to reduce clogging. The basin outlet should be vegetated, and constructed with shallow enough side slopes that it can be mowed regularly. You can contact the Solano County Water Agency or your local Natural Resources Conservation Service office to get more information about constructing a dry detention basin, or to obtain engineering assistance.

Who Can Help?

Natural Resources Conservation Service
1170 N. Lincoln St. Suite 110
Dixon CA 95620
Phone: (707) 678-1655 x 3

Rain Gardens

What are they: Rain Gardens are gardens containing flowering plants and grasses (preferably native species of both) that can survive in soil soaked with water from rain storms. However they are not gardens that have standing water.

These attractive gardens help reduce the rapid flow of stormwater from homes and businesses to storm drains and thus protect streams and lakes from pollutants that are washed from house roofs and paved areas.

What do they do: Rain Gardens collect and slow stormwater run off and increase its infiltration into the soil.

When to use one: Rain gardens are appropriate when you want to:

- Provide a low maintenance, attractively landscaped property with minimum cost
- Reduce the amount of household or business stormwater and associated pollutants to area streams and lakes-improve local water quality
- Reduce potential of basement flooding
- Improve or eliminate wet spots in yard
- Increase habitat for beneficial insects, butterflies and birds.“Habitat” means the area with all the resources that critters need to survive

Who Can Help?

Solano Resource Conservation District
1170 N. Lincoln St. Suite 110
Dixon CA 95620
Phone: (707) 678-1655 x 3

Natural Resources Conservation Service
1170 N. Lincoln St. Suite 110
Dixon CA 95620
Phone: (707) 678-1655 x 3

Rain Barrels

What are they: Rain barrels, sometimes called cisterns, are aboveground water storage vessels. A typical house has a roof area of 1,200 square feet and four downspouts that will each drain about 300 square feet of roof. That means a rainfall of 0.3 inches will fill a 55-gallon rain barrel placed under each downspout.

Rain barrels with a drainage valve can store water for use between rain events. When the valve is opened, the water empties out slowly, thus reducing runoff and increasing infiltration.

Rain barrels are a type of Best Management Practice (BMP) also referred to as Rainwater Harvesting that also includes cisterns, irrigation storage, and evaporative controls.

What do they do: Rain barrels capture rain runoff from a building's roof using the gutter and downspout system.

When to use one: Rain barrels help:

- Divert water from storm drain systems and thus reduce pollutants and the velocity of water entering local rivers and streams
- Store high quality water for gardens
- Direct overflow water away from building foundations to more desired locations
- Reduce water and sewer bills, as well as electrical bills from sump pump usage

Who Can Help?

There are lots of online resoures for finding or making your own rainbarrels and learning how to effectively use them

http://www.gardensimply.com/howto/rainbarrel.shtml

http://www.rain-water.org/result.php?Keywords=rain+barrel&host=www.rain-water.org&cat=1

http://www.rainbarrelguide.com/

Pervious Surfaces

What is it: Pervious surfaces are paving systems designed to allow percolation or infiltration of stormwater through the surface into the soil below where the water is naturally filtered and pollutants are removed. In contrast, normal pavement is an impervious surface that sheds rainfall and associated surface pollutants, forcing the water to run off paved surfaces and iand contribute to flood volume.

What does it do: The use of pervious pavement has been found to:

- Reduce storm water runoff. (Even when pervious pavement structure is saturated, its rough surface texture continues to slow surface flow of stormwater)
- Replenish groundwater
- Reduce flooding which may over-load combined sewer sewage treatment plants
- Require less land set aside and cost for development of retention basins
- Reduce pollutants in run-off
- Reduce irrigation of area plantings based on the seepage of rain into the sub-soil surfaces
- Reduce thermal pollution
- Lessen evaporative emissions from parked cars
- Reduce glare and automobile hydroplaning (skidding) accidents

When to use them: Pervious pavements are a recognized runoff reducing substitute for normal pavements in development or redevelopment of:

Driveways, including residential driveways, low-traffic roads, fire lanes and emergency access roads; Parking areas; especially over-flow parking and those associated with office buildings, shopping centers and recreational facilities: Sidewalks; Road shoulders and vehicle cross-overs on divided highways; Boat launching ramps; Others, including pool decks and patios.

heavy clay soils, can limit the usefulness of pervious pavement. These soils are impervious and thwart expected water quality improvements. The use of a graveled water storage area built on top of clay soils is often not an acceptable solution because storage capacity is quickly overcome. Coupling drainage of graveled storage with additional stormwater management practices is possible but the expense of their design and development may be cost prohibitive. Other issues that may be necessary to address include problems for wheelchairs and other disabled individuals, and effects of parking lot sweepings.

Who can help?

More information about pervious pavements can be found at the following web sites:

http://www.fhwa.dot.gov/environment/ultraurb/3fs15.htm

http://www.epa.gov/owm/mtb/porouspa.pdf

Underground Storage

What are they: On-site, underground stormwater retention /detention accomplishes the capture and storage of stormwater collected from surrounding impervious areas. Riser pipes or curb cuts lead surface storm water to subsurface vaults or systems of large diameter interconnected storage pipes or chambers. Stored water is then released directly through an outlet pipe back into natural waters at rates designed to reduce peak water flows during storms to mimic pre-development conditions. In some cases stored water can be allowed to infiltrate to recharge groundwater (if soil types are suitable and the groundwater table is located sufficiently below the water storage units).

Underground stormwater storage provides minimal stormwater quality benefits, but can be a successful segment to a development's overall stormwater management plan, when coupled in-line with other stormwater BMPs. The addition of pretreatment features at the system's inlet can facilitate improvements to water quality by removing floatables, skimming of oils and grease and trap some level of sediments through deposition. Pretreatment is most important if stored water is to be allowed to infiltrate into the soil, otherwise rapid clogging of the system could occur. Pretreatment features can be designed and built into the system or there are commercially available, prefabricated units that can be incorporated within the system during initial planning and design.

What do they do: Underground storage systems help to remove flood waters from the system at the peak of a storm, releasing them when flooding potential is lower, at a rate designed to mimic the natural drainage system.

When to use one: Underground storage is most often used in developments where land availability, shape and land costs predicate against the development of surface stormwater Best Management Practices (BMPs).

On-site storage attenuates peak stormwater flows from surrounding impervious surfaces and provides storage for future controlled release into surface waters. These systems should not be expected to substantially improve water quality unless coupled in-line with additional stormwater BMPs.

On site stormwater storage is ideal for use under parking lots, roadways and paved areas associated with commercial, industrial and residential developments.

Who can help?

More information about underground storage can be found at the following web sites: Installation of an underground storage system would require permitting and neighbor cooperation.

http://www.epa.gov/owm/mtb/runoff.pdf

http://www.contech-cpi.com/assets/bro_swdr.pdfP.O. Box 349

Watershed Groups

If you do everything listed on the previous pages, your property may still flood. That's because flooding is not isolated to any one property but part of a larger regional drainage system or watershed. Because of this, most of the time you will be more successful in reducing flooding on your property if you work with your neighbors. Flood reduction requires changes across the watershed. If everyone did their part to increase infiltration, slow runoff and retain water where appropriate on their properties the effects could be felt on a landscape level, by all who live in the affected area.

The Solano Resource Conservation District is actively working to form watershed groups and partnerships in Pleasants Valley, around Lake Berryessa and along Alamo Creek. Participating neighbors are working together to remove weeds, reestablish native grasses, replant riparian corridors, construct detention ponds and restore valuable fish and wildlife habitat. This work results in not only a more scenic landscape to call home, but also a safer, less flood prone environment.

If you are interested in joining one of these watershed groups, or starting a new group in your area and would like assistance please contact the Solano Resource Conservation District.

Solano Resource Conservation District
1170 N. Lincoln St. Suite 110
Dixon CA 95620

Phone: (707) 678-1655 x 3

Maintaining Creeks & Natural Drains

Maintenance you can do on your own

Here are some things you can do on your property, without a permit, to help keep runoff, irrigation and floodwaters flowing smoothly.

- Remove trash, especially large items such as fence materials, tires and appliances, from streams, creeks and ditches on your property.
- Remove dead vegetation, large logs and downed trees that are causing blockages in streams, creeks and ditches on your property.
- Mow your grassy swales, filter strips and vegetated ditches so that water flows through them smoothly and easily.
- Remove sediment that has built up in your retention ponds, grassy swales, filter strips and vegetated ditches (*unless* the ditch or pond has been determined to be wetlands or waters under the jurisdiction of some agency, or protected species habitat by a jurisdictional agency. It's important to know who "owns" the water.)
- Remove any trash or debris that are blocking the inflow or outflow channels to and from your retention ponds.
- Protect native vegetation growing along your stream and creek channels; it will stabilize banks and prevent channel clogging erosion and sedimentation.

Permitting

What you need to know so your work is legal and effective

All projects, even those of private lands, which affect any type of water source (stream, river, creek, spring, lake, wetland, marsh, bog, etc.) usually require that permits from some or all of the following agencies be obtained BEFORE any construction begins:

- California Department of Fish and Game - Stream Alteration Permit
- U.S. Army Corps of Engineers – Section 404 Permit
- California Regional Water Quality Control Board – Section 401 Permit
- California Environmental Quality Act – CEQA Review Document
- Solano County – Grading Permit

There are serious fines and penalties for completing an eligible project without obtaining the proper permits. Landowners should contact these agencies before beginning any eligible project several months before they plan to begin any on-the-ground work, as the application review process for all of these permits can take 90 days or more.

The purpose of the permitting process is to protect valuable fish, wildlife and clean water resources and to prevent negative downstream impacts on other landowners.

The Solano Resource Conservation District has staff members available to help landowners plan their projects and apply for each of these permits. For more information about permitting requirements, or for conservation planning assistance, please contact us at (707) 678-1655 x 3

Do I Need A Permit?

County Permits - Solano County Department of Resource Management

Solano County Grading Ordinance, Chapter 31, states that changing the existing off-site drainage pattern above or below a grading site requires a permit. However, the County encourages creek maintenance.

The County ***does not*** require a permit for small projects. If the planned excavation is less than the movement of 100 cubic yards of soil (approximately 10 dump truck loads worth) or disrupts less than 10,000 square feet of property, the work does not require a County permit.

Work may be performed within a creek channel only between April 15 and October 15.

Solano County Department of Resource Management Contact info:

(707) 784-6765

http://www.co.solano.ca.us/Department/Department.asp?NavID=84

(click on 'permits' and then on 'grading' for a copy of grading permit standards to learn how to file for a permit.)

Federal Permits -US Army Corps of Engineers (ACOE)

Section 404 of the Federal Clean Water Act requires authorization from the Secretary of the Army, acting through the ACOE, for the discharge of dredged or fill material into all waters of the United States (U.S.). Waters of the U.S. include traditionally navigable waters, interstate waters, their tributaries, and adjacent wetlands. These categories include most wetlands, intermittent and ephemeral streams where there is an established ordinary high water mark, and areas subject to the ebb and flow of the tide.

Discharges of fill material generally include, without limitation: placement of fill that is necessary for the construction of any structure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; dams and dikes; artificial islands; property protection or reclamation devices such as rip-rap, groins, seawalls, breakwaters, and revetments; beach nourishment; levees; fill for intake and outfall pipes and subaqueous utility lines; fill associated with the creation of ponds; excavation or dredging where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water; and any other work involving the discharge of fill or dredged material. An ACOE permit is required whether the work is permanent or temporary. More information about ACOE permits can be found at the web sites listed below. See the map to determine what ACOE office to contact.

Sacramento Office ACOE contact information

916-557-5250 phone
http://www.spk.usace.army.mil/organizations/cespk-co/regulatory/permitting.html

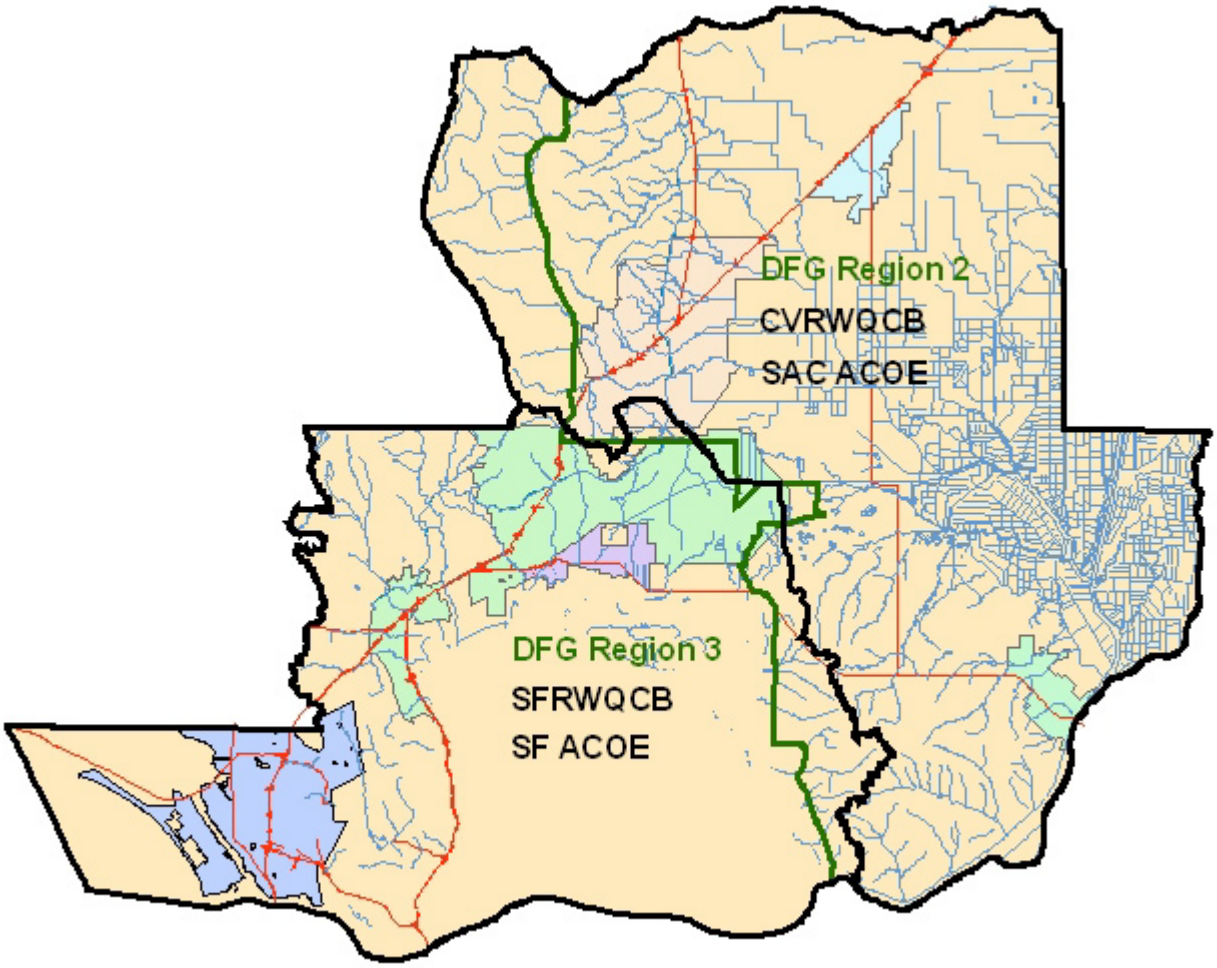
San Francisco Office ACOE contact information

(415) 977-8436
http://www.spn.usace.army.mil/regulatory/nwp.html

State Permits -California Department of Fish and Game (DFG)

Streambed Alteration Agreements

Section 1602 of the DFG Game Code requires any person, governmental agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel or bank of any river, stream, or lake, or proposing to use any material from a streambed, to first notify DFG of such proposed activity (see map below to determine which DFG region you are located in). Based on the information contained in the notification form and a possible field inspection, DFG may propose reasonable modifications in the proposed construction as would allow for the protection of fish and wildlife resources. Upon request, the parties may meet to discuss these modifications. If the parties cannot agree and execute a Lake or Streambed Alteration Agreement, then the matter may be referred to arbitration. You will find extensive information about Streambed Alteration Agreements at the web address below. See the map on the previous page to determine what DFG office to contact.



California Department of Fish and Game Contact info:

Sacramento Valley and Central Sierra - Region 2 (916) 358-2929

Central Coast - Region 3 (707) 944-5520

http://www.dfg.ca.gov/1600/index.html

State Permits -California State Water Quality Control Board (SWQCB)

Pursuant to Section 401 of the Clean Water Act, projects that require a ACOE permit for discharge of dredge or fill material must obtain water quality certification or waiver that confirms a project complies with state water quality standards before the ACOE permit is valid. State water quality is regulated/administered by the State Water Resources Control Board and its nine branches of the RWQCB. The state also maintains independent regulatory authority over the placement of waste, including fill, into waters of the State under the Porter-Cologne Act. The web addresses below will lead you to more information about permitting requirements. See the map on the previous page to determine which RWQCB to contact.

California Regional Water Quality Control Board Contact info:

Central Valley Regional Water Quality Control Board (916) 464-3291

http://www.swrcb.ca.gov/%7Erwqcb5/available_documents/index.html#anchor105692

San Francisco Regional Water Quality Control Board (510) 622-2300

http://www.waterboards.ca.gov/sanfranciscobay/certs.htm

Flood Control Small Grant Program

Each year the Solano County Water Agency (SCWA) designates funds to prevent or reduce flooding on private lands. Any Solano County landowner is eligible to apply for these funds to implement the following types of projects:

- Creek vegetation removal
- Debris removal
- Erosion control (limited)
- Sediment retention
- Water retention (flood basin construction)

The following are criteria and requirements that will be used to judge project eligibility:

- Landowners must waive liability claims against the SCWA
- The project must benefit more than one landowner
- There must be no significant adverse downstream impact
- The landowners must agree to perform ongoing maintenance
- Projects in which the landowner provides a monetary or in-kind (service) contribution to the project are preferred

SCWA works to complete all projects before the start of the following rainy season, therefore application are generally due by the end of May each year. Applications will be accepted after the close date, but they will be given a lower priority for funding.

SCWA staff members are available to help you propose your project and prepare your application. They can also provide maps and lists of property owners. SCWA staff will visit the project site with you and help you determine the potential downstream impacts. They can also tell you what type of work the regulatory agencies may allow in your particular situation.

For assistance or an application please contact Alex Rabidoux at (707) 455-1106.

SOLANO COUNTY WATER AGENCY

MEMORANDUM

TO: **Landowners with Flooding and Drainage Problems**

FROM: **Solano County Water Agency**

DATE: **April 28, 2006**

SUBJECT: **Application for Assistance in Flood Control/Drainage Projects**

Introduction

The Solano County Water Agency is expected to allocate funding in July for eligible small flood control/drainage projects such as creek vegetation removal, debris removal, and limited erosion control and sediment retention. The purpose of this memorandum is to explain the process of how you can obtain assistance from the Water Agency.

Project Eligibility

The following are criteria and requirements that will be used to judge project eligibility.

1. Landowner Permission/Waive Liability. Landowners will be required to sign an agreement (example attached) with the Water Agency, which grants permission for the work to be performed and to waive any liability claims against the Agency.

2. Benefit More Than One Landowner. A problem to be solved must impact more than just one property owner or is caused by something beyond the single property owner's control. For example, a clogged ditch overflows into more than one property or runoff from upstream properties runs into another property and causes drainage problems. The intent of this criteria is that the projects will benefit more than just one property owner. In most cases, a creek-cleaning project will benefit more than just one property owner.

P.O. Box 349 6040 Vaca Station Road, Building 84
Elmira, California 95625-0349
Phone (707) 451-6090 FAX (707) 451-6099
www.scwa2.com

SOLANO WATER
WASTE NOT • WANT NOT

3. No Significant Adverse Downstream Impact. This is a key criteria. Any work done with these funds must not adversely impact others downstream (or upstream). We do not simply want to transfer a flooding or drainage problem from one area to another. If there are downstream impacts, then the area impacted downstream perhaps needs to be included as part of the overall project. If downstream impacts cannot be resolved by inclusion of these properties, a study of the watershed may be needed to determine a coordinated course of action. The Water Agency staff will be making engineering judgments on whether there are downstream impacts.

4. Landowners to Perform Ongoing Maintenance. As part of the agreement mentioned in criteria 1 above, the agreement will call for the landowner to continue regular normal maintenance of the creek after the initial cleaning is done. The intent of this provision is not to impose an open-ended responsibility on landowners. The responsibility is only to perform maintenance to upkeep the work that has already been done. For example, if large amounts of debris should accumulate on the property from upstream sources, the landowner would not be required to remove that debris as part of the agreement. Since these projects are generally on private property, we are assuming that the property owners will continue their responsibility for maintaining the creeks. For larger projects, you and your neighbors can form an assessment district where affected property owners fund ongoing maintenance. The Water Agency staff can provide technical assistance to you to set up such assessment districts.

5. No Maximum Cost Limit. Landowner contributions, in-kind or cash, are encouraged and **projects where there is landowner contributions will be given a higher priority**. Examples of in-kind contributions include landowner labor and provisions of materials. Water Agency staff will work with you to estimate the cost of your proposed project. When developing a project, applicants need to be aware that there are limited funds available (last years program was funded at $100,000).

6. Studies and Project Design. Studies and project design are eligible for funding.

7. Levee Repairs, Erosion Control and Sediment Retention Projects. If your project involves levee repairs, an erosion control or sediment retention project, the following criteria also apply:

   A. Large levee repairs may not be eligible under the small grant program.

   B. The project must be on a stream that is an identified source of sediment.

   C. The erosion or sediment problem must have a direct impact on downstream flooding, for example a sediment from a gully plugging a road culvert and causing flooding.

   D. The original cause of the erosion problem must be beyond the landowners control to correct. For example, development in the upstream watershed has increased the flows to a channel which result in bank erosion; or channel downcutting below the property causing over-steep banks and bank erosion.

   E. The sole benefit of the project cannot be to protect the landowner home or property, while not reducing sediment production.

F. Sediment retention projects meeting the above criteria are considered eligible for funding.

Submission of Information

Attached is the application to be used. Describe the extent of the flooding and the frequency of the occurrence of flooding. Any historical information about the past flooding would also be helpful. Provide information about past or potential property damage from flooding.

Water Agency staff can help you determine the type of work that is appropriate for the creek and the type of work that can be approved by regulatory agencies. Include a cost estimate of the work. Water Agency staff can also help you with the cost estimate.

Attached is an example of the standard agreement property owners will be required to sign if your project is approved. Do not send this in with your application. Unless all property owners where the project will be done sign the agreement, the project will not be authorized for funding (an exception is made for studies and engineering). By submitting an application to us we assume that property owners will sign such an agreement.

Review Process

The criteria with which projects will be evaluated have been described above. If a project is rejected for not meeting one of the criteria, a written explanation will be provided to the contact person. A panel of reviewers may rank and prioritize projects. The Water Agency's General Manager will have final authority regarding which project will get funded. After the project is authorized, and the agreements are executed by all landowners, work can be scheduled and permits acquired.

Timing

The goal is to complete projects prior to the upcoming rainy season. The ability to complete the work depends on many factors including landowner cooperation, and availability of labor to perform the work and the permitting. It also depends upon when the rainy season starts.

The deadline is Friday, May 26, 2006 at noon. All applications must be received at the Solano County Water Agency by that date. Applications will be accepted after this date, but will be given a lower priority for funding.

Help

Water Agency staff can help you propose your project and prepare your application. We can provide maps and lists of property owners. We can visit sites with you and review the potential of downstream impacts. We can also tell you the type of work that regulatory agencies may allow in your particular situation. For assistance please contact Alex Rabidoux at (707) 455-1106.

If your project does not receive funding there are other options. As described previously, you and your neighbors can form an assessment district where property owners fund improvement and ongoing maintenance. The Water Agency staff can provide technical assistance to you to set up such assessment districts. These districts can be operated under the authority of the Water Agency. Additionally, if you choose to solve your problems without any funding from the Water Agency, we can also provide technical assistance to you and help you get the necessary permits.

If you have any questions about this program or need assistance please contact Alex Rabidoux (707) 455-1106.

SOLANO COUNTY WATER AGENCY

FLOOD CONTROL – SMALL GRANT APPLICATION

I.) Contact Information:

Name _____

Date _____

Address _____

_____

_____

Telephone _____

II.) Description of the Flood Problem:
(What is happening, when does it happen, who is affected?)

_____

_____

_____

_____

III.) Identification and Solution to the Flood Problem:
(Where it is occurring and what is the solution?)

_____

_____

_____

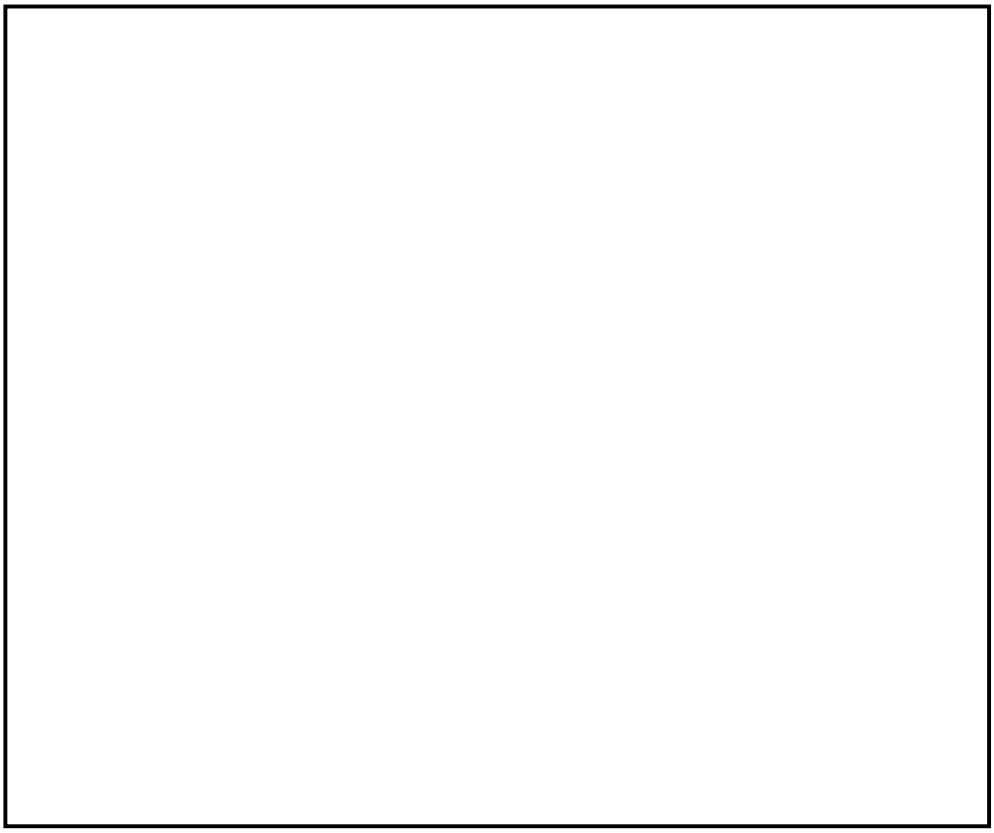
_____

P.O. Box 349 6040 Vaca Station Road, Building 84
Elmira, California 95625-0349
Phone (707) 451-6090 FAX (707) 451-6099
www.scwa2.com

FLOOD CONTROL – SMALL GRANT APPLICATION

IV.) Map:

(General overview map showing creek, culverts, and roads. Photos can also be attached to the end of the application)



V.) Additional Comments:

(Any other details you want to mention or describe about the project.)

Example of a Successful Proposal for a SCWA Flood Control Small Grant Project

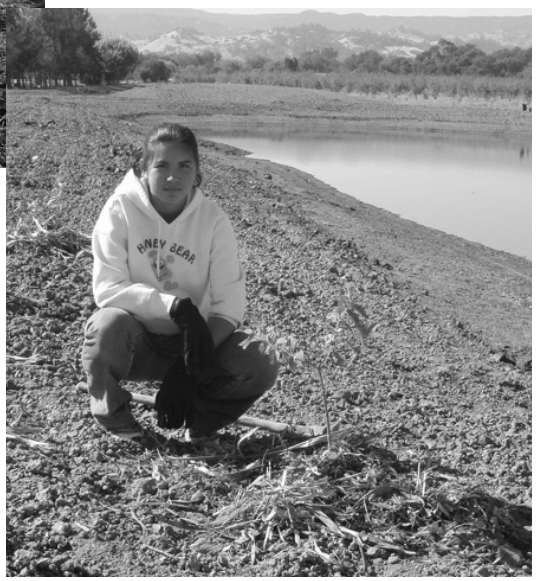
Project: Excavated pond on property adjacent to Sweeney Creek

Problem:

Flooding occurs on Sweeney Creek downstream of the project site. Flood water leaving subject property flows through a channel under Putah South Canal, a canal which carries drinking water to Vacaville. In the past, flood flows have been so large they have overtopped the outlet channel and entered Putah South Canal, impairing the quality of the drinking water. There is a low area on the subject property that is too wet to be productively farmed, and which provides an opportunity to install a pond to retain some winter storm runoff to reduce downstream flooding. The pond, in conjunction with the water held temporarily behind the flashboard riser, will reduce winter storm flows for 2 to 5-year storm events . The pond will also detain summer irrigation runoff and improve water quality to Sweeney Creek

Solution:

Install an off-channel excavated pond to detain summer irrigation runoff; improve summer water quality in conjunction with an upstream sediment basin; and provide wildlife habitat. In conjunction with the pond, a berm will be installed along the low areas of the property, and runoff will leave the property through a flashboard riser installed at the location of the concrete channel that goes under the Putah Creek flume. The detention storage behind the flashboard riser is 10 acre-feet. 3⁄4” slots will be installed between each board of the property outlet flashboard riser to drain the runoff water in 24 hours. As an alternative, a 12” pipe can be installed directly into the riser, bypassing the boards. A grassed waterway will be installed upstream of the pond. A sediment basin, installed through a different grant program will be installed upstream of the grassed waterway. A wildlife planting area will be



installed close to the pond, and the pond will be revegetated with native grasses.

Completion of this project will improve water quality to Sweeney Creek, reduce downstream flooding and provide wildlife habitat.

Project Maintenance Requirements:

1. Inspect the project after every large storm event and repair eroded areas and remove debris as necessary.
2. Revegetate scoured areas.

Funding Partners:

- Natural Resources Conservation Service (technical expertise and EQIP funding)
- Solano County Water Agency Flood Control Small Grant Program (project funding)
- Solano RCD Yolo-Solano AG Water Quality Program (technical expertise and project funding)

Reduce you risks during a flood: STAY SAFE

Your safety is most important

Solano County Flood Hazard Warning Program

Solano County Water Agency has developed a Flood Hazard Warning Program to help ensure County residents living in areas with a high probability of flooding have time to prepare and evacutate if needed.

When it's raining hard, check these resources:

www.scwa2.com

(707) 455-1115

How the Program works

The Solano County Flood Hazard Warning Program is composed of a data collection element and a forcasting element. The first part involves a system of strategically located stream and rain gages to provide information on potential flooding to populated areas of Solano County. Data from these gages is sent by radio telemetry to the SCWA office.

This data is combined with data from other regional gages, commercial and National Weather Service forecasts, and Doppler radar and satellite images from the internet to provide flood forecasting information.

SCWA staff closely monitors any storm predicted to produce one-inch of rainfall in a 24 hour period. In such events, monitoring occurs on a 24 hour per day, 7 day a week basis, with monitoring intervals determined by storm conditions.

The SCWA web page (www.scwa2.com) is the main outlet for flood monitoring and forecasting information.

The following level indicators characterize the risk of flooding in Solano County and indicate the level of monitoring/warning to be done by SCWA staff.

Solano County Flood Warning Levels

Level 1: In place June through October. Not the rainy season. SCWA will watch daily forecasts for unusual events. It is possible that flooding can occur, but not likely.

Level 2: In place November through May (when not Level 3 or 4). This is the season where flooding is most likely to occur. At Level 2, everyone should be prepared for flooding and watch for reports of impending large storms that would trigger level 3 or 4.

Level 3: Activated when a storm is predicted to drop 1 inch of rain in 24 or fewer hours. Storms that produce over 1 inch of rain in a 24 hour period have a potential for local flooding, especially if the 1 inch falls in a period of 3-6 hours (or less).

Generally if 1 inch of rain is spread evenly over 24 hours and the ground is not already saturated, there is no flooding. SCWA monitors storm patterns regularly (several times a day) during Level 3 events to update the short-term forecast and to determine if Level 4 should be activated.

Level 4: Activated when a storm is predicted to drop 2 inches of rain in a 24 hour period. Storms predicted to drop over 3 inches of rain will result in a general warning to public agencies and the public at large.

Forecasting- an inexact science

Using all the tools available, Water Agency staff will analyze data to predict possible flooding, but relating rainfall data to flooding is not a precise process. Flooding forecasts will be conservative and reflect the limits inherent in predicting actual flooding.

Experience over the last several years has helped SCWA develop a sense of what types of storms cause flooding in certain locations. Over time with new, better data sources, SCWA will be able to better document what amounts of rain can cause flooding in specific areas in the County, including consideration of antecedent conditions, but predicting flood events will never be a precise, 100% accurate science.

Unlike other parts of California and the rest of the U.S., Solano County has a short warning period before floods. The streams coming out of the foothills from the western part of the County are extremely close to populated areas. In other places there can be days of warning of an upcoming flood. In Solano County, flood warnings can only be predicted in terms of hours and minutes. Because of this, SCWA provides both longer term and shorter term forecasting. Longer term forecasting can provide a general level of warning one to two days in advance. Short term forecasting can provide warnings several hours in advance of a flooding event. Short term forecasting can be updated as frequently as every15 minutes in a major storm, to provide those at risk of serious flooding the most accurate warning information possible.

Information is power (and safety)- make sure you get it

If you do not have access to the internet, SCWA provides a 24-hour a day recorded telephone message about flood probabilities.

Additionally, SCWA puts out press releases in coordination with the County Office of Emergency Services in anticipation of a major storm (Level 4) and at the beginning of the rainy season as a general warning. In a level 4 situation, SCWA makes recommendations to the County Office of Emergency Services about advising people who live in high flood-risk areas, when appropriate, using the County's "reverse 911"system of warnings, which allow a recorded message to be sent out to a specified, geographical area via the telephone system. Individual cities decide when to use this "911 reverse" system.

www.scwa2.com

(707) 455-1115

During the Flood

As the Water is Rising

Before rising waters reach you there are still things you can do to protect yourself and property. You should do the following, as time permits, during a flood as the waters are rising:

- Evacuate if it appears necessary, or if you are so instructed.
- Lock your home when you leave.
- Turn of all utilities at the main power switch and close the main gas valve.
- Move all valuables to upper floors of your home or to higher elevations.
- Move your vehicles to high ground less likely to flood.
- Screw plywood over windows or use tape to reduce shattering. (Note: Taping windows to prevent flying glass is not a recommended practice.)
- Move items away from windows
- Wrap shelves, cabinets, and other storage units in heavy plastic sealed with waterproof tape.
- Move outdoor objects indoors or to a more secure place.
- Stay informed: listen to your battery-powered radio for news and instructions, watch your local cable network television stations or use the internet to get updated weather information. Check out this information sources:
    - KUIC 95.3 AM
    - The Solano County Flood Hazard Warning Program, with current flooding information, available at the Solano County Water Agency website (www.scwa2.com) or by dialing (707) 455-1115 from any phone.
    - The National Weather Service on your local cable network or at their website at www.crh.noaa.gov
    - The Weather Channel on the internet at www.weather.com
    - Weather information can also be found at commercial internet sites, such as www.accuweather.com

Don't Go it alone

Meet with your neighbors to plan ways to work together until help arrives. If you're a member of a neighborhood organization, such as a home association or crime watch group, introduce disaster preparedness as a new activity. Know your neighbors' special skills, such as medical or technical skills, and consider how you could help neighbors who have special needs, such as disabled and elderly persons. Make plans for childcare in case parents can't get home.

Once the Flood Waters Have Reached You

When the flood waters have reached your home, try to stay calm, there are still many things you can do to ensure your family's safety:

- If flood waters reach your door, call 911.
- Do not drive walk or swim through rushing waters or flood areas. Six inches of water can knock you off your feet.
- Do not park your car along city streets. In a flood, two feet of water car could carry a car away, putting people and structures downstream at risk. Your car may also block emergency access to rescue workers.
- Stay away form downed power lines; since electricity passes easily through water electrocution is a major cause of death during floods events.
- If the water rises and enters your home before you have time to evacuate, go upstairs and to the attic or roof if necessary.
- If you are outdoors when the water arrives, or you have evacuated your home already or abandoned your car, get to higher ground.
- Keep your prepared emergency supplies with you. If you can only carry a few things take what is most essential: drinkable water, dry clothing, a flashlight, a portable radio and extra batteries.
- Once you have reached a safe area, stay there and wait for rescuers.
- Use travel routes specified by local authorities; don't use shortcuts because certain areas may be impassable or dangerous.

If you're sure you have time:

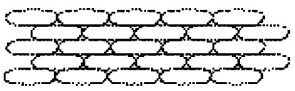
- Shut off water, gas, and electricity before evacuating, or if you suspect the lines are damaged. If you turn the gas off, you will need a professional to turn it back on.
- Make arrangements for your pets. Confine or secure them with enough food and water for several days.
- Call your family contact and do not use the telephone again except for life threatening emergencies.
- Check on your neighbors, especially elderly or disabled persons.

Sandbagging

- Listen to Public Announcements from the County Office of Emergency Services to find out where you can get sand bags.
- Construct the sandbag dike on high ground, close to your home or building. Fewer sandbags will be needed and the dike will be less exposed to the stream.
- Dig a trench one bag in depth and two bags wide as a foundation for the dike structure.
- To be effective, a dike must be three times as wide at its base as it is high.
- Sandbags should be turned right side out and filled half full. They need not be tied shut, just laid overlapping each other.
- The open ends of the sandbags should be facing upstream and/or uphill so that the moving water will not remove the sand from the bags as readily.
- Alternate direction of sandbags with bottom layer, i.e. bottom layer lengthwise with dike, next layer crosswise.
- As individual bags are put in place, walk on bags to tamp them into place to ensure maximum strength. Take care to avoid puncturing the bags.
- The butt ends of the bags should be placed facing the stream, for rows that are perpendicular to the stream.
- Each successive layer should be set back one-half sandbag width on both sides in each additional layer so a completed dike has a triangular cross-section
- The number of sandbags needed to protect a home or building varies depending on the local topography and the anticipated depth of water. For instance, a home on sloping ground that needs a sandbag dike on the frontage for about 2 feet of water, might need about 2,000 sandbags to protect it.

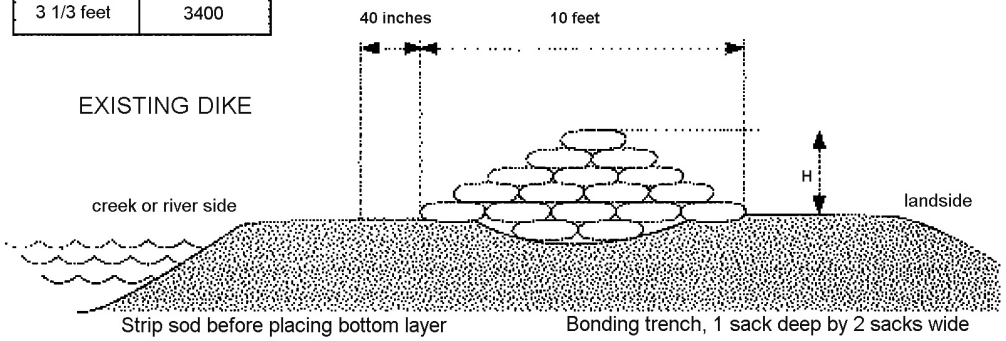
Recommended Method for Sandbag Diking

Bags Required for 100 Linear Feet of Dike	
Height Above Dyke	Bags Required
1 foot	600
2 feet	2000
3 1/3 feet	3400



PLAN OF BOTTOM LAYER

METHOD OF LAPPING SACKS



Strip sod before placing bottom layer

Bonding trench, 1 sack deep by 2 sacks wide

1. Alternate direction of sacks with bottom layer, i.e., bottom layer lengthwise with dyke, next layer crosswise
2. Lap unfilled portion under next sack.
3. Tying or sewing of sacks is not necessary.
4. Sacks should be approximately one-half full of clay, silt or sand.
5. Tamp thoroughly in place.

Outdoor Safety During Flood Season

During the rainy season, certain parts of Solano County can flood very quickly. If you are hiking or working away from your home, stay safe and take the following precautions:

- **Consult the Solano County Water Agency Flood Hazard Warning Program (www.scwa2.com or 707-455-1115)** and local news media for information and announcements regarding the flood potential in the area you are in or going to, and stay alert for changing conditions.
- Monitor water levels and talk to your children about potential hazards around waterways near your home, their school or local playground.
- Plan your outings and understand the risks associated with the terrain, changing weather conditions and wildlife.
- Always tell someone where you are going, or leave a note in your home, trailer, tent or car, providing the date, time of departure, number of people in your party, destination, and expected return time.
- Parents of small children should ensure that children are never left unattended near fast flowing streams.
- If you have pets, ensure they are safe from any potential hazards around waterways.
- Forego any recreational on-stream activities such as canoeing, kayaking, rafting and “inner tubing” as fast-flowing, debris-carrying water could make these activities extremly hazardous.
- Ensure you have waterproof clothing and footwear and an emergency kit readily available. The kit should contain enough water and food to last a minimum of three days, as well as warm clothing, blankets, a battery-powered radio, flashlight, extra batteries, a first aid kit, extra prescriptions, matches, water purifier tablets, toilet paper, cooking utensils, a good knife, a can opener, and anything else the family deems necessary. It should be stored in a place that is easily accessible. A smaller kit should also be kept in the family vehicle.
- Orange garbage bags should also be included in your kit. They are compact, easily carried and can protect you from hypothermia as well as help searchers see you better in dense bush and on the water should you become stranded.
- Do not try to clear blocked culverts or log jams. Instead, contact your local government that has the proper equipment and trained personnel.

Driving During a Flood

Don't drive into flood waters! It's just not worth the risk. Driving into flood waters may be the most dangerous thing you might ever try. Consider the following facts:

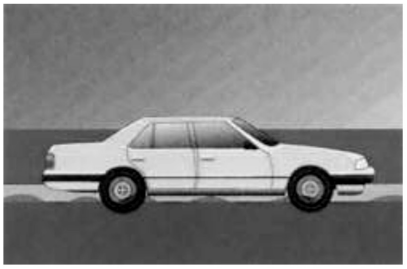
- Most cars will be swept away in 18-24 inches of moving water. Trucks and SUVs are also at risk. Creeks and rivers can rise very rapidly and roadbeds can wash away making the water much deeper than it appears.
- Most flood fatalities are caused by people attempting to drive through water, or people playing in high water.
- Cars swept downstream often roll to their sides or flip over entirely, leaving the driver just a few precious seconds to escape the vehicle. Many drivers panic as soon as the vehicle submerges and are found later with their seat belt intact.

If there is no alternative to driving

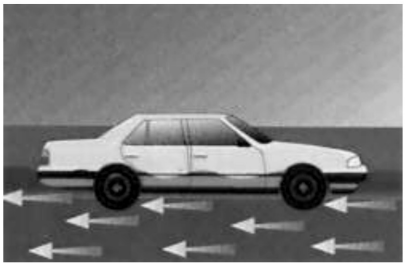
Use extreme care and take the following precautions :

- Avoid flooded areas, and areas subject to sudden flooding.
- Do not attempt to cross flowing streams. You could be stranded or trapped. Look out for flooding at highway dips, bridges, and low areas.
- If you come upon rapidly rising waters, turn around and keeping looking for another route not blocked by flood waters or barricades.
- Barricades and flood signs are put up by local officials to protect people from unsafe roads. Ignoring these signs can pose a serious risk.
- If your vehicle becomes surrounded by water or your engine stalls, abandon your vehicle immediately and head for to higher ground as safely as possible.

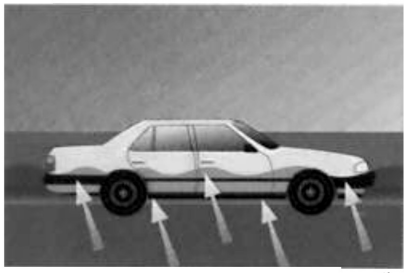
Never drive into moving water, especially if you can not tell how deep the water is.



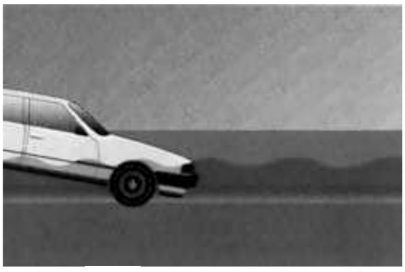
Water weighs 62.4 lbs per cubic foot and typically flows downstream at a rate of 6 to 12 miles per hour.



When a vehicle stalls in the water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force' is applied to the automobile.



But the biggest factor is bouyancy. For each foot the water rises up the side of the car, the displaces 1500 lbs. of water. In effect the automobile weighs 1500 lbs. less for each food the water rises



Two feet of water will carry away most automobiles!

Reduce your risks for the next flood: CLEAN UP

After the Flood

When flood waters begin to recede the dangers do not end. Keep yourself and your family safe by remaining cautious and alert

Returning to your house

- Listen to a radio or television where you are. Do not try to return home until authorities tell you it is safe to do so.
- Ensure access to your house is safe, and that there are no downed power lines, road washouts or debris posing a travel danger
- Complete a perimeter check of your house and note any structural or other damage. If serious, contact the local building inspector or structural engineer before entering any buildings.
- Stay out of buildings if floodwaters remain around or in the building.
- When re-entering your home do not use any device with an open flame, such as matches or lighters, because gas may be trapped inside. Use flashlights. Do not turn on electrical switches.
- If you smell volatile fumes such as gasoline, natural gas or propane, leave the property immediately and call you local gas company or fire department.
- Do not attempt to turn on your power until an electrician has inspected your system and determined that it is safe.
- Ensure that all heating systems and large appliances have been thoroughly inspected by a qualified technician before using them again.
- If your home has been flooded protect your family's health by cleaning up as soon as possible. Clean up spilled medicines, bleaches, gasoline, and other flammable liquids immediately. Throw out medicines and food that came into contact with flood waters as they might be contaminated.
- Find a safe place to stay; do not stay at your home until you determine that the building is structurally safe, completely clean and free of molds and bacteria. Until then stay with friends, relatives or at a temporary shelter for flood victims.
- If your well has been flooded, assume that the water in your home is not safe to drink. You will probably have to disinfect your well before using it again. Check with your local environmental health officer to find out how to do this. If you are on a public water system, listen to your local media for news from the public health authorities about whether or not your water is safe to drink. Boil questionable water for a minimum of five minutes before drinking to be sure its fully disinfected.
- Do not use your septic system until you are confident that the floodwaters have dropped below the distribution trenches in your septic tank.
- Have flood drains and sump pumps flushed and disinfected.

Document and report your losses

If you have suffered property damage, call your flood insurance agent as soon as possible to file a claim. Take photographs of all damages. Save receipts from all repair purchases and keep track of the amount of time that your family and friends spend cleaning up your property.

It will be helpful if you have already done some kind of personal belongings inventory. (See page 13)

Forms to help with this are available online or from your insurance company.

Assess your damages

As you begin to reclaim your property you will discover ways you can do better in the next flood event. Note what flood control tactics worked and which didn't. Mark where flows were greatest and look for places water might be diverted to.

Cleaning Up

Guidelines for Response to Clean Water Damage within 24-48 Hours	
Water-Damaged Material	**Actions**
Books & papers	For non-valuable items, discard books and papers Photocopy valuable/important items, discard originals Freeze (in frost-free freezer or meat locker) or freeze-dry If the piece is valuable, you may wish to consult a restoration/water damage professional
Carpet & backing – dry w/in 24-48 hours	Remove water with water extraction vacuum Reduce ambient humidity levels with dehumidifier Accelerate drying process with fans
Ceiling tiles	Discard and replace
Cellulose insulation	Discard and replace
Concrete or cinder block surfaces	Remove water with water extraction vacuum Accelerate drying process with dehumidifiers, fans and/or heaters
Fiberglass insulation	Discard and replace
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary Check to make sure underflooring is dry; dry underflooring if necessary
Non-porous, hard surfaces (plastic, metals)	Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary
Upholstered furniture	Remove water with water extraction vacuum Accelerate drying process with dehumidifiers, fans and/or heaters May be difficult to completely dry within 48 hours. If the piece is valuable, you may wish to consult a restoration/water damage professional
Window drapes	Follow laundering or cleaning instructions recommended by the manufacturer
Wood surfaces	Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying - use caution when applying heat to hardwood floors Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry Wet paneling should be pried away from wall for drying

Water Damage

Depending on the severity of the flood, professional clean-up efforts may be required. There are several water damage emergency service providers in Solano County; check your local Yellow Pages for listings. The table above, provided by the US Environmental Protection Agency, lists water damage cleanup and mold prevention procedures.

These guidelines are for damage caused by clean water. If you know or suspect that the water source is contaminated with sewage, or chemical or biological pollutants, then Personal Protective Equipment and containment are required by OSHA. An experienced

professional should be consulted if you and/or your remediators do not have expertise remediating in contaminated water situations. Do not use fans before determining that the water is clean or sanitary.

Basic Clean up of washable surfaces

Walls, hard-surfaced floors, and many other household surfaces should be cleaned with soap and water and disinfected with a solution of 1 cup of bleach to five gallons of water. Be particularly careful to thoroughly disinfect surfaces that may come in contact with food, such as counter tops, pantry shelves, refrigerators, etc. Areas where small children play should also be carefully cleaned. Wash all linens and clothing in hot water, or dry clean them. For items that cannot be washed or dry cleaned, such as mattresses and upholstered furniture, air dry them in the sun and then spray them thoroughly with a disinfectant. Steam clean all carpeting. If there has been a backflow of sewage into the house, wear rubber boots and waterproof gloves during cleanup. Remove and discard contaminated household materials that cannot be disinfected, such as wallcoverings, cloth, rugs, and drywall.

Mold

The warm, wet conditions the flood created within your home are the perfect environment to support the growth and proliferation of many mold species. Molds are a kind of microscopic fungus that spreads by distributing millions of tiny cells known as spores. Molds are always present throughout the environment, both indoors and out and most species do not present a health hazard. But, certain species, especially black molds, can trigger allergies or cause the following allergy-like symptoms:

- coughing
- wheezing/breathing difficulties
- sore throat
- skin and eye irritation
- upper respiratory infections (including sinus infections)

The effect of mold on different people can vary widely and more serious problems may occur if people are exposed to very high levels of mold or moderate levels for an extended period of time. Infants, children, elderly, and individuals with respiratory conditions or weakened immune systems may have a greater risk of developing symptoms or experiencing more serious health problems.

Mold also damages building materials, goods, or furnishings when it grows on them; and mold growth and moisture may eventually compromise a building's structural integrity. It is important to investigate your home for mold problems regularly and clean all contaminated areas thoroughly.

When investigating your home for mold search for the following conditions:

- Visible mold growth (may appear cottony, velvety, granular, or leathery and have varied colors of white, gray, brown, black, yellow, green) - mold often appears as discoloration, staining, or fuzzy growth on the surface of building materials or furnishings
- Areas with noticeable mold odors (generally an earthy/organic smell)

- Signs of excess moisture or water damage - look for water leaks, standing water, water stains, and condensation problems

Be sure to search behind and underneath materials such as the carpet and pad, wallpaper, vinyl flooring, sink cabinets, furniture, or stored items.

If you discover moldy conditions in your residence it is important to address the situation immediately. There are several professional mold testing and mold remediation companies that operate in Solano County. Check your local Yellow Pages for listings.

Cleaning up your yard after a flood- General Guidelines

Along with the muddied bushes and downed tree limbs, you may encounter other, more dangerous things when you begin the clean-up of your yard.

Be aware of potential chemical hazards you may come across during flood recovery. Flood waters may have buried or moved hazardous chemical containers of solvents or other industrial chemicals from their normal storage places.

If any propane tanks (whether 20-lb. tanks from a gas grill or household propane tanks) are discovered, do not attempt to move them yourself. These represent a very real danger of fire or explosion, and if any are found, police or fire departments or your State Fire Marshal's office should be contacted immediately.

Car batteries, even those in flood water, may still contain an electrical charge and should be removed with extreme caution by using insulated gloves. Avoid coming in contact with any acid that may have spilled from a damaged car battery.

If you have a septic system, it can also pose a threat of contamination. You should have it inspected by a professional before using your system again. The EPA fact sheet on the page 58 provides good information for dealing with your septic system after a flood or exceptionally high water table event.

Landscape and Yard Clean-up

Debris
Pick up any debris, such as wood, glass, stones, nails and other metal objects deposited on lawn areas. This debris is a safety hazard and can damage power mowers. Remove leaves or any other material which would smother grass.

Silted Lawns—1 Inch or Less
Lawns submerged for less than 4 days and covered with an inch or less of silt have a good chance of recovery. To assist recovery:

If water use is unrestricted in your area, wash as much silt as possible from the lawn using a garden hose.

- To encourage root development, keep the remaining silt crust broken throughout the growing season, or until grass has become well-established. Use a steel tooth garden rake, a mechanical aerator, or spiking equipment to break up the silt crust.
- Apply a nitrogen fertilizer to the lawn. Use whatever grade fertilizer you can obtain, applied at a rate of 1 pound nitrogen per 1000 square feet of lawn area.
- Have a soil sample tested as soon as possible to determine lime, phosphorous and potassium requirements of soil. Follow the recommendations given with test report.
- If lawn recovery is spotty or generally thin, mechanically aerate the lawn four to six times in late summer or early spring. Then overseed with a desirable permanent seed mixture.

Silted Lawns—More Than 1 Inch
Lawns covered with more than 1 inch of silt may be heavily damaged, with only a slight chance of recovery. Degree of recovery will vary with grass species and depth of silt. Re-establish the lawn as follows:

- Remove as much silt as possible, especially if silt accumulation exceeds 3 inches.
- If silt is less than 3 inches, or has been removed to this depth, till the area, making sure the silt is mixed thoroughly and uniformly through the top 4 inches of the original soil.
- Reseed or vegetatively replant the area as you would to establish a new lawn. Vegetative plantings of warm season grasses may be made any time during the growing season. Seedings, especially of cool season grasses, should be made in early spring or late summer.

Flooded Lawns
Degree of injury will depend on duration of submergence, water depth, temperature, grass species, light intensity and the condition of grass prior to flooding. Grass will survive much longer at water temperature below 60F than at higher water temperature.

Loss of Topsoil—Eroded Areas
Where topsoil has been greatly eroded, replace it to a depth of 4 to 6 inches late in the growing season.

If topsoil is unavailable or too expensive, improve existing soil by adding organic matter such as peat, rotted sawdust, manure or other materials. Apply these materials at a rate of 3 cubic yards per 1000 square feet of lawn area, and work materials into the top 4 inches of subsoil. A temporary lawn, established immediately and later worked into the subsoil, can also be a source of organic matter.

Landscape and Yard Clean-up, continued

Oil and Chemical Spills
Soils may have been saturated with oil, herbicides, or other toxic material. Petroleum will eventually decompose, but nothing can be done in the meantime to counteract its harmful effects. On small areas, remove petroleum-soaked soil to a depth of 6 inches, and replace with new topsoil. Reseed or vegetatively plant at the appropriate time.

Damaged Shade, Ornamental, and Fruit Trees
The type of care you give damaged trees should depend on their age, the extent and type of damage, and the time required for surrounding soil to reach normal moisture levels.

A tree's age will largely determine its ability to recover. A young, vigorous tree will be more likely to survive than an older one. Damage to trees may include fallen trees, broken and torn limbs, wounds, split branches, uprooting, weakening and exposed roots.

Silting
Silting presents the greatest threat to ornamentals during spring flooding. Silting occurs when rapidly moving water carries soil and dumps it into sluggish streams, where it is deposited on flooded land adjacent to waterways. Silt deposits may vary in depths up to several inches.

Trees and shrubs are usually not harmed by silt deposits. Silt damage results in crown and root disorders in iris, peonies and chrysanthemums and may cause damage or death. The degree of injury depends on how long water remains on the ground and the depth of silt deposited. To reduce silt injury to plants:

- Wash silt from crowns of plants with a garden hose. If the plants are on well-drained soil, wash the silt away from the plants. On evergreens, a mild detergent will aid in removing silt.
- Wait until the silt dries, then rake the excess soil away from the plants. A small amount of silt can be raked into grass without any harm.

Erosion
If much soil has eroded, replace it with good topsoil around the base of plants. Its depth should equal original soil depth. To prevent runoff, apply new mulch to topsoil. Fertilize as recommended.

Soil Deposits
If excess soil has been deposited around the base of plants, causing a change in grade, remove excess soil so that the level is as close to the original grade as possible.

Septic Systems—What to Do after the Flood

Where can I find information on my septic system?

Please contact your local health department for additional advice and assistance. For more information on onsite/decentralized wastewater systems, call the National Environmental Services Center at (800) 624-8301 or visit their website at www.nesc.wvu.edu.

Do I pump my tank during flooded or saturated drainfield conditions?

No! At best, pumping the tank is only a temporary solution. Under worst conditions, pumping it out could cause the tank to try to float out of the ground and may damage the inlet and outlet pipes. The best solution is to plug all drains in the basement and drastically reduce water use in the house.

What if my septic system has been used to dispose wastewater from my business (either a home–based or small business)?

In addition to raw sewage, small businesses may use their septic system to dispose of wastewater containing chemicals. If your septic system that receives chemicals backs up into a basement or drain field take extra precautions to prevent skin, eye and inhalation contact. The proper clean-up depends of what chemicals are found in the wastewater. Contact your State or EPA for specific clean-up information.

What do I do with my septic system after the flood?

Once floodwaters have receded, there are several things homeowners should remember:

- Do not drink well water until it is tested. Contact your local health department.
- Do not use the sewage system until water in the soil absorption field is lower than the water level around the house.
- Have your septic tank professionally inspected and serviced if you suspect damage. Signs of damage include settling or an inability to accept water. Most septic tanks are not damaged by flooding since they are below ground and completely covered. However, septic tanks and pump chambers can fill with silt and debris, and must be professionally cleaned. If the soil absorption field is clogged with silt, a new system may have to be installed.
- Only trained specialists should clean or repair septic tanks because tanks may contain dangerous gases. Contact your health department for a list of septic system contractors who work in your area.
- If sewage has backed up into the basement, clean the area and disinfect the floor. Use a chlorine solution of a half cup of chlorine bleach to each gallon of water to disinfect the area thoroughly.

Resources

More information about flood prevention and recovery

FEMA Certification and Disaster Declaration

In a disaster or local emergency, the primary responsibility for responding to, recovering from, and mitigating against the effects of disaster rests with local government. State and/or federal assistance are provided only when the effects of the emergency are beyond the capability of local resources to mitigate effectively.

The process of requesting state and/or federal assistance after a disaster or emergency is initiated when the local governing body or Governor submits a formal request to the appropriate state or federal office.

The Natural Disaster Assistance Act (NDAA) provides financial aid to local agencies to assist in the permanent restoration of real property (real estate), other than facilities used solely for recreational purposes, when such real property has been damaged or destroyed by a natural disaster.

What is a Disaster?

A major disaster is defined as "any natural catastrophe (including any hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the U.S. which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby."

An emergency is defined as "any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the U.S."

How Does FEMA decide how to help?

After a natural disaster or emergency occurs, FEMA considers factors such as:

- amount and type of damages
- availability of state and local resources
- the extent and type of insurance in effect
- recent disaster history
- past hazard mitigation history, etc.

With this information, FEMA decides how and when to mobilize resources to the disaster/emergency areas. Program and financial assistance is dependant on:

- The type of declaration or proclamation declared,
- Whether the situation constitutes an emergency or a disaster, and
- The assistance required.

More information about this process can be found at http://www.whitehouse.gov/omb/circulars/a133_compliance/83516.html; www.whitehouse.gov/omb/circulars/a133_compliance/04/dhs.doc and http://www.fema.gov

Agencies who help flood victims

FEMA

On March 1, 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security (DHS). FEMA's continuing mission within the new department is to lead the effort to prepare the nation for all hazards and effectively manage federal response and recovery efforts following any national incident. FEMA also initiates proactive mitigation activities, trains first responders, and manages the National Flood Insurance Program.

Often FEMA works in partnership with other organizations that are part of the nation's emergency management system. These partners include state and local emergency management agencies, 27 federal agencies and the American Red Cross.

FEMA assistance programs:

- Disaster Assistance: Provides money or direct assistance to individuals, families and businesses in an area whose property has been damaged or destroyed and whose losses are not covered by insurance.
- Crisis Counseling: Provides supplemental funding to States for short-term crisis counseling services to people affected in Presidentially declared disasters.
- Disaster Legal Services: Provides free legal assistance to disaster victims.
- Disaster Unemployment Assistance Program: Provides unemployment benefits and re-employment services to individuals who have become unemployed because of major disasters.
- National Flood Insurance Program: Enables property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages.
- Housing Assistance Program: Provides temporary housing and/or funds to rebuild or replace your damaged home.

FEMA's website, http://www.fema.gov/, provides the following information:

- Ways to protect your property
- Flood insurance advice & flood insurance maps
- Flood advisory maps
- Tips for what to do before, during and after a flood

Contact Information

500 C Street S.W.
Washington, D.C. 20472
1-800-621-FEMA (3362)
1-800-462-7585 (TTY)

Red Cross Disaster Services

Each year, the American Red Cross responds immediately to more than 70,000 disasters, including house or apartment fires (the majority of disaster responses), hurricanes, floods, earthquakes, tornadoes, hazardous materials spills, transportation accidents, explosions, and other natural and man-made disasters.

Red Cross disaster relief focuses on meeting people's immediate emergency disaster-caused needs. When a disaster threatens or strikes, they provide shelter, food, medical and mental health services to address basic human needs. Listen to your radio or watch local media for the location of the nearest volunteer agency facility.

The Red Cross also feeds emergency workers, handles inquiries from concerned family members outside the disaster area, provides blood and blood products to disaster victims, and helps those affected by disaster to access other available resources.

If your need to find your family, you can check a database maintained by the American Red Cross, or contact them and have them check if you have no access to the database yourself. For information contact the local chapter where you are staying, not the chapter in the disaster area.

For more information: www.redcross.org/services/disaster

Solano County Red Cross Chapter
American Red Cross Bay Area
Address: American Red Cross
American Red Cross Bay Area
85 Second Street
San Francisco, CA 94105
E-mail: arcbainfo@usa.redcross.org
Phone: 415-427-8000
Fax: 415-427-8104
Web site: http://www.bayarea-redcross.org

Finding a Place to Stay

For immediate housing needs, the American Red Cross and other volunteer agencies set up shelters for people who cannot return to their homes. Listen to your radio or watch local media for the location of the nearest volunteer agency facility.

For health and space reasons, pets are not permitted in public emergency shelters. Contact the emergency management office or your local animal shelter or humane society to see if there is a shelter set-up to take pets in an emergency.

Agency Contact List

FEMA-Disaster Recovery Center Locations and Information

As of March 18, 2006 both Solano County Disaster recovery centers located in Fairfield and Vacaville are CLOSED. If you need to register with FEMA please do so by contacting FEMA directly:

You may register online at www.fema.gov or by phone by calling 1-800-621-FEMA (3362).

Police Departments

Benicia	(707) 745 - 3412
Dixon	(707) 678 - 7080
Fairfield	(707) 428 - 7300
Rio Vista	(707) 374 - 2300
Suisun	(707) 421 - 7373
Vacaville	(707) 449 - 5200
Vallejo	(707) 648 - 4321

Solano County Sheriff

(707) 421-7090

Solano County Office of Emergency Services:

Phone: (707) 748-1600
Fax: (707) 421-6368
E-mail: OES@SolanoCounty.com
530 Clay Street,
Fairfield, CA 94533-6306

Solano County Water Agency

Phone: (707) 451 6090
Fax: (707) 451 6099
Flood Hazard Warning Number: (707) 455-1115
web site: www.scwa2.com
P. O. Box 349,
Elmira, CA 95625

Solano Resource Conservation District & Dixon Resource Conservation District

Phone: (707) 678 – 1655 x 3
Fax: (707) 678 – 5001
1170 N. Lincoln Ave., Suite 110
Dixon, CA 95620

Solano County City Departments

Benicia	Dept. of Public Works	(707) 746 – 4240
Dixon	Dept. of Public Works	(707) 678 – 7000
	Planning Dept.	(707) 678 – 7053
Fairfield	Dept. of Public Works	(707) 428 – 7471
Rio Vista	Dept. of Public Works	(707) 374 – 6747
	Community Development	(707) 374 – 2205
Suisun	Engineering Dept.	(707) 421 – 7341
Vacaville	Engineering Dept.	(707) 449 – 5140
	Dept. of Public Works	(707) 469 – 6500
Vallejo	Dept. of Public Works	(707) 648 – 5229

Solano County Resources

Solano County Department of Resource Management (707) 784-6765

California Department of Fish and Game

Region 1: Northern California and North Coast
601 Locust Street
Redding, CA 96001
Phone: (530) 225-2300

Region 2: Sacramento Valley-Central Sierra Region
1701 Nimbus Road
Rancho Cordova, CA 95670
Phone: (916) 358-2900

Regional Water Quality Control Boards

Region 2: San Francisco Bay
Phone: (510) 622-2300
1515 Clay St. Suite 1400
Oakland, CA 94612

Region 5: Central Valley
Phone: (916) 464-3291
11020 Sun Center Drive #200
Rancho Cordova, CA 95670-6114

U.S. Army Corps of Engineers

Phone: (916) 557-5100
1325 J Street
Sacramento CA 95814-2922

World Wide Web Resources

American Red Cross http://www.redcross.org

Association of State Flood Pain Administrators http://www.floods.org/

California Department of Fish and Game (DFG) http://www.dfg.ca.gov/

California Department of Health Services (DHS) http://www.dhs.ca.gov/

California Department of Water Resources (DWR) http://www.water.ca.gov

California State Water Resources Control Board (SWRCB) http://www.swrcb.ca.gov

Disaster Preparedness http://www.disastercenter.com/

Federal Alliance for Safe Homes (FLASH) http://www.flash.org/

Federal Emergency Management Agency (FEMA) http://www.fema.gov

Floodplain Management Association http://www.floodplain.org/index.htm

Flood Safety Website http://www.floodsaftey.com/

National Flood Insurance http://www.floodsmart.gov/

National Severe Storms Laboratory http://www.nssl.noaa.gov

National Weather Service http://www.crh.noaa.gov

Natural Resources Conseration Service (NRCS) http://www.nrcs.usda.gov/

Office of Homeland Security http://www.ready.gov/

Office of Management & Budget http://www.whitehouse.gov/omb/circulars/

Solano County Department of Resource Management http://www.co.solano.ca.us/

Solano County Office of Emergency Services http://www.solanocounty.com/oes

Solano County Water Agency (SCWA) http://www.scwa2.com

United States Army Corps of Engineers http://www.usace.army.mil/

United States Environmental Protection Agency (USEPA) http://www.epa.gov/

United States Geological Survey (USGS) http://www.usgs.gov/