

FLOOD RISK

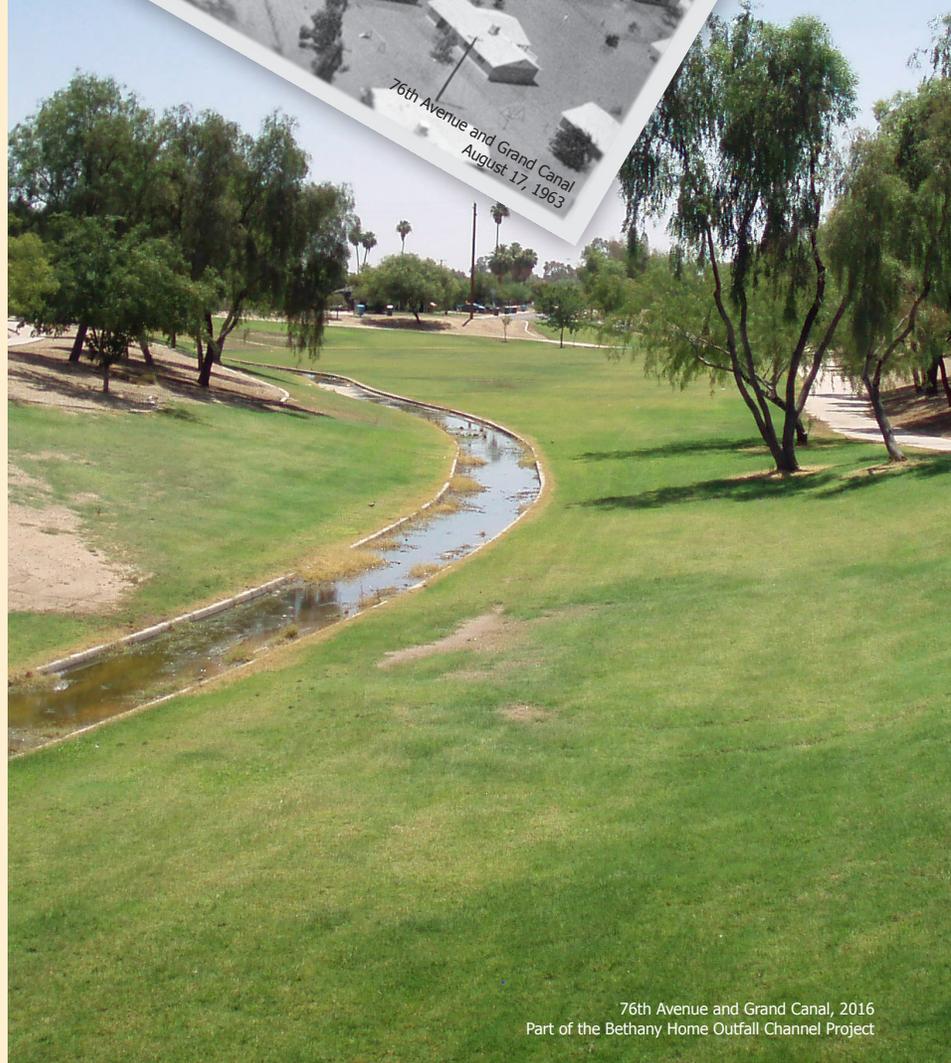
Heavy rains can happen throughout the year, putting people and property at risk. Flooded rivers and washes, backed-up storm drains, and saturated ground, all contribute to significant flooding when there is an excessive amount of rainfall.

The most common type of flooding in Arizona is called a "flash flood" which is the rapid flooding of low-lying areas in typically less than six hours. Flash floods are known to roll boulders, tear-out trees, cause erosion, destroy buildings and bridges, and make crossings through washes dangerous.

Since 1959, the Flood Control District of Maricopa County has reduced the risk of flooding to people and property. Floods have caused millions of dollars worth of damage to homes, businesses, and farmland. Today in Maricopa County, rapid population growth has expanded beyond the urban area protected by dams, levees, and other flood control projects. Continued collaboration with citizens, municipalities, agencies, and developers is vital to ensure that people and property remain safe from floods as Maricopa County continues to grow.



www.fcd.maricopa.gov



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LOCAL FLOOD HAZARD & RISK

Know Your Terms

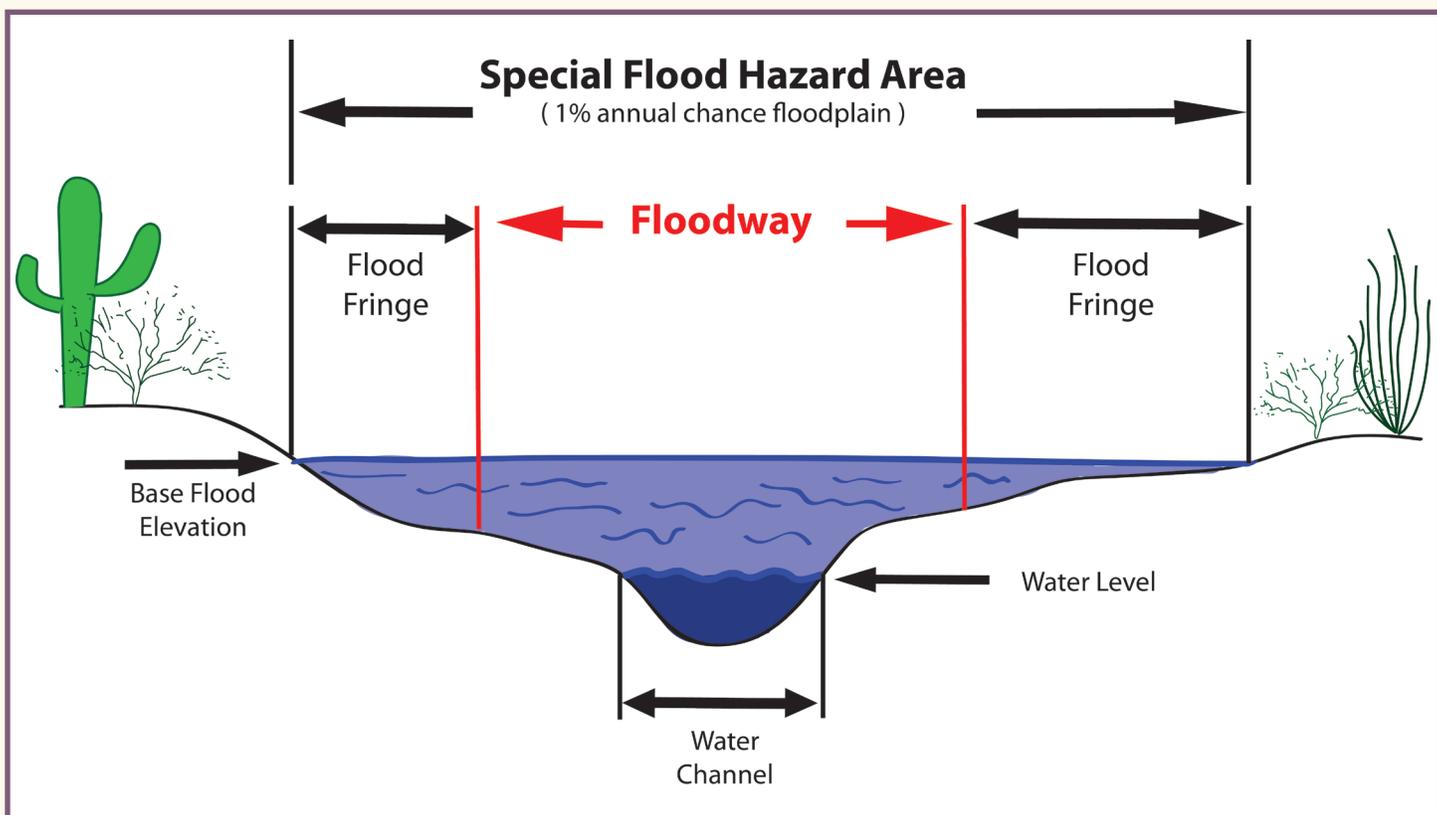
To better understand flood hazards, use the floodplain graphics below to learn where and how these terms are used.

Floodplain (FP)—Any land area vulnerable to water inundation by water from any source.

Floodway (FW)—The channel of a watercourse and portion of adjacent floodplain that needs to be reserved in order to prevent the base flood elevation from being increased by more than one foot of water. Floodwater depths and velocities are usually greatest in the floodway.

Special Flood Hazard Area (SFHA)—Land that is designated by zones and covered by the base flood elevation. The SFHA is the area where the Floodplain Regulations are enforced and mandatory purchase of flood insurance can apply.

Base Flood Elevation—The flood that has a 1 percent chance of being equaled or exceeded in any year. This area is also referred to as the “100-year floodplain.”



Flood Hazard

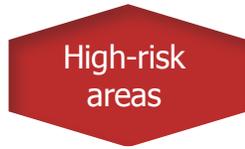
Before you buy property, take the time to ask the real estate agent...

- ...if the property is in a Special Flood Hazard Area (SFHA).
- ...if it has ever been flooded.
- ...if it is subject to any hazards.
- ...what building or zoning regulations apply.

If the property is located in a SFHA, you will be required to purchase flood insurance by most federally-backed lenders.

Flood Risk

To identify a community's flood risk, the Federal Emergency Management Agency (FEMA) conducts a **Flood Insurance Study (FIS)** summarizing the flood hazards in a community. The map that shows the flood hazard areas in a community is called the Flood Insurance Rate Map (FIRM).



There is at least a 1-in-4 chance of flooding on a property during a 30-year mortgage. These areas are labeled on the FEMA flood maps as zones with the letters "A" or "V" where flood insurance is federally required.



The risk of being flooded is reduced, but not completely removed. These areas are labeled on the FEMA flood maps as zones with letters "B," "C," or "X." Flood insurance is not federally required in these zones. However, over 20 percent of National Flood Insurance Program (NFIP) claims take place in these zones.



No flood hazard analysis has been conducted in these areas, but flood risk still exists. These areas are labeled on the FEMA flood maps as zones with the letter "D." Flood insurance rates depend on the area of flood risk.



Flood hazard maps, also known as Flood Insurance Rate Maps (FIRMs), are used to identify a property's flood risk.

When Flood Maps Change

It is important to check these maps regularly because they are updated using newer technology, or when construction projects may affect the floodplains, new floodplains can be added or revised.

Flood risks can also change over time due to changes in water courses. In addition redirected flood run-off can change a floodplain. This is accomplished through the use of channels, culverts, basins, and floodwalls. To ensure all flood maps are as accurate as possible and reflect the true flood risk, FEMA continually updates flood hazard maps across the country. Learn more about how map changes affect flood insurance.

Determining the Risk

To identify a community's flood risk, the Federal Emergency Management Agency (FEMA) conducts a Flood Insurance Study. The study includes statistical information for rainfall, river flow, hydrologic/hydraulic analyses, and topographic surveys. FEMA uses this data to create the Flood Insurance Rate Maps (FIRMs) that show your community's flood risk areas. Changing weather patterns, erosion, and development can alter floodplain boundaries, so FEMA updates the FIRMs periodically.

To help you make informed decisions about protecting your property, visit the FEMA map Web site at www.floodsmart.gov, or the Flood Control District Web site at www.fcd.maricopa.gov. The map applications are designed to inform you if your property is in a floodplain and is not an official document to be used for floodplain determination. Note that new studies, erosion setbacks, and other factors may also affect the floodplain status of your property. To get an official floodplain determination, call the Flood Control District at (602) 506-2419.

FLOOD INSURANCE

Protect Yourself and Your Family

Flood insurance is available to homeowners, condo owners, commercial owners, and renters—whether you live in a FEMA designated Special Flood Hazard Area (SFHA) or not. Costs vary depending on how much insurance is purchased, what it covers, and your property's flood risk.

Maricopa County is a member of the National Flood Insurance Program (NFIP), which allows residents to obtain federally-backed mortgages. In addition, participation in the NFIP allows the County to receive disaster assistance in case of an emergency.

The County also participates in the NFIP's Community Rating System (CRS) program. County residents and businesses in the SFHA currently receive up to a 30 percent discount and a 10 percent discount if outside a SFHA. This discount is due to the FCD's Class 4 rating in the CRS.

The Cost of Flood Damage

Federal disaster assistance will pay for flood damage if the President declares a region a "disaster area." Usually, these monies are given as a loan and must be repaid.

Just an inch of water can cause costly damage to your property. Visit www.floodsmart.gov to calculate potential flood damage costs.

Approximately 25 percent of all flood damage claims occur in lower-risk zones.

\$39,000

\$34,000

\$29,000



Wickenburg, July 2015

For more information about the County's participation in the CRS program please visit: <http://www.fcd.maricopa.gov/flooding/insurance.aspx>.

KEY CHANGES TO FLOOD INSURANCE

Effective April 1, 2016

Yearly Premium Increases

Increases will vary by policy based on variables such as flood zone, coverage, elevation, CRS credit.

Surcharge at Renewal

A flat fee will be applied to all policies based on the occupancy type (primary residence, non-primary, non-residential).

Non-residential business properties

Implementation of a 25 percent annual premium rate increase for policies covering Pre-FIRM.

What's New

On March 2, 2016 the House Financial Services Committee approved H.R. 2901, the Flood Insurance Market Parity and Modernization Act. This Act clarifies that private insurance is to be treated the same as federal flood insurance in cases where homeowners with federally-backed mortgages are required to buy coverage.

The bill is intended to foster more competition in the flood insurance market providing an alternative for 5 million property owners nationwide who rely on the National Flood Insurance Program (NFIP).

Legislators are optimistic that the bill will bring down the price of flood insurance for consumers. The insurance industry supports the bill, claiming that it allows state insurance regulators to determine acceptable flood insurance policies for their specific conditions.



South Mountain, August 2014

Federal Disaster Assistance

Federal disaster assistance typically is received in the form of a low interest loan to help cover flood damage. The loans are not meant to compensate for losses. Even so, loans are only available if the President formally declares a disaster, and they must be repaid along with any existing mortgage. FEMA provides federal assistance and how to apply information through media and community outreach. Please consider taking these steps to help avoid financial hardships and damages:

- Consider purchasing flood insurance even if you are in moderate-to-low-risk areas. Insurance costs are lower than those in SFHAs. These areas submit more than 20 percent of NFIP claims and receive one-third of Federal Disaster Assistance for flooding.
- You can use the Flood Risk Profile tool at the FloodSmart Web site www.floodsmart.gov to find an insurance agent, gauge the flood risk to your property, and learn the financial cost of flooding.

For more information, contact your insurance agent, or visit the FloodSmart Web site at www.floodsmart.gov, or The National Flood Insurance Program: <http://www.fema.gov/national-flood-insurance-program>.

Newly Mapped into the Floodplain

Certain properties newly mapped into flood zones for the first policy year, will be a "Preferred Risk Premium."

Elimination of insurance subsidy for certain Pre-FIRM policies that lapse and are reinstated.

Clear Communications

FEMA is required to clearly communicate full flood risk, the risk of flood damage, and how flood insurance premiums relate to the risk.

FLOOD SAFETY

Understand Your Personal Risk

Consider the following when preparing for the flood season:

Buy flood insurance now; it takes 30 days for a policy to take effect. A standard insurance policy will not cover flood damage. A separate flood insurance policy is required for property and content damage. Contact your insurance agent or visit www.floodsmart.gov.

Make an emergency kit, plan evacuation routes, and keep important papers in a safe place.

Monitor area news, social media, and Web sites for information when severe weather is predicted. Listen for alerts about evacuation routes, monitor local road conditions, and obey closure signs.

Follow the regulations when building in floodplains, including elevating machinery and utilities in your home.

Minimize flood damage by properly disposing of hazardous chemicals (such as lawn and gardening herbicides), to help reduce harmful contaminants from getting into flood waters.

Avoid building in the floodplain. Flooding can happen anywhere, but certain areas are especially prone to serious flooding.

Itemize and take pictures of possessions. Store furniture, valuables, and electronics to upper floors before flood waters rise. Raise items stored in garages.

Do not drive around barricades, cross a flooded road, or walk through moving water. Use designated evacuation routes where possible.



32nd Street and Thomas Road, July 2016



Wickenburg, August 2014

Visit FloodSmart.gov to learn more about preparing for flood season. For more information regarding a flood insurance policy, please call your insurance agent or call 1- 800- 427-2419 to find a local agent.

DRAINAGE

Helping to Protect You

While the FCD owns and maintains numerous regional flood control structures throughout Maricopa County, the majority of smaller drainage facilities—such as culverts, ditches and retention basins—are owned by others. Some of these are publicly-owned within a city, county, or state right-of-way (such as along a roadway or freeway). Other smaller drainage facilities are privately owned by homeowners associations (such as community greenbelts used as retention basins) or individual property owners.

These drainage facilities serve an important function in protecting properties against flooding. They also retain or convey stormwater throughout a watershed. If drainage structures are not properly maintained, they can actually cause flooding. Dumping trash/debris in ditches, gutters, storm drains, local channels, private easements and washes is prohibited.

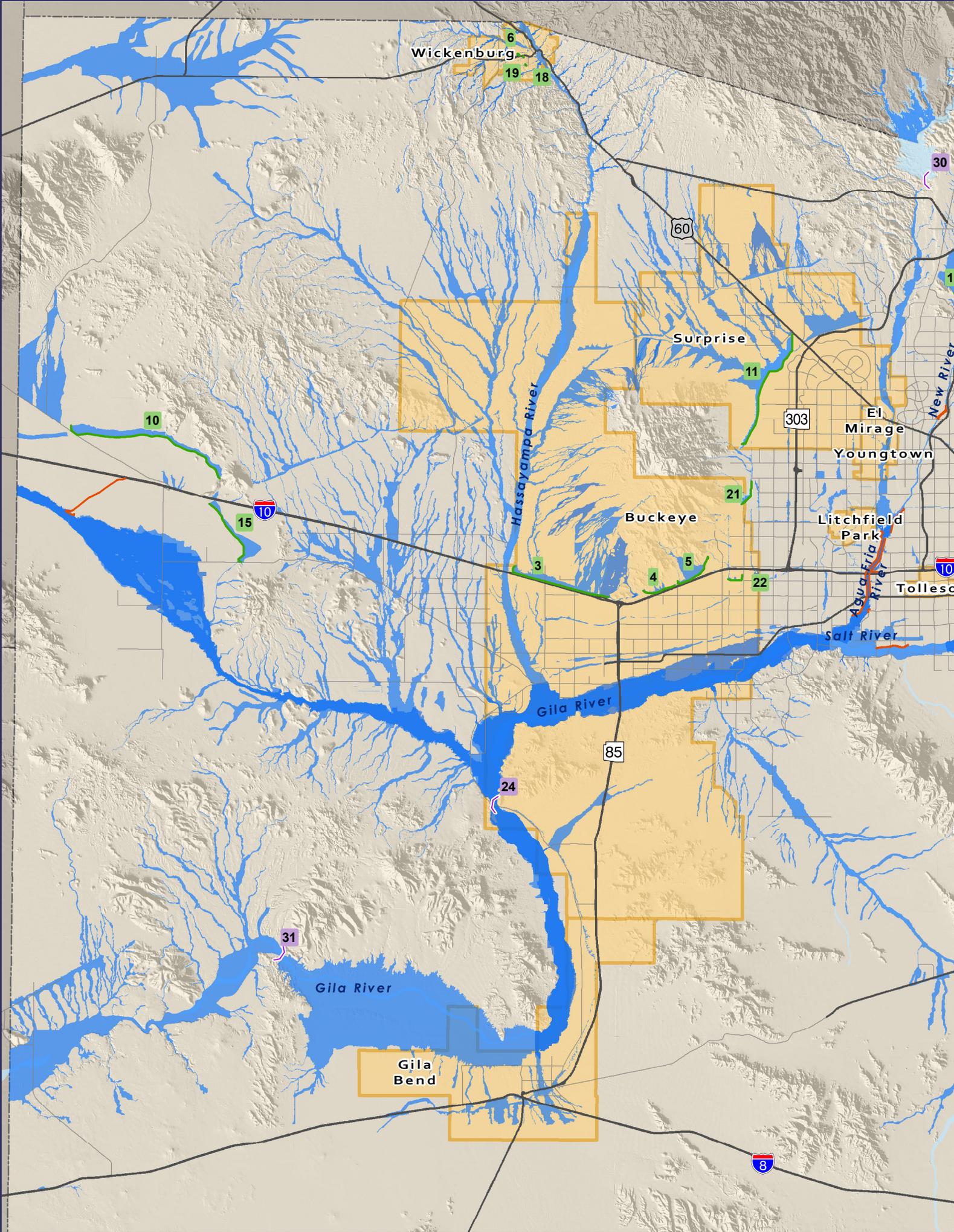
Site visits are conducted for floodplain and drainage issues to assure that these systems are maintained and are functioning correctly. For more information regarding Maricopa County Drainage Regulations, drainage, violations, sewer systems, and site visits; or if you have questions about drainage maintenance, please contact the Maricopa County Planning and Development Department at (602) 506-3301 or visit www.maricopa.gov/planning/Resources/Regulations.



99th Ave and Pinnacle Peak Basin, Peoria



44th Street and Dynamite Downstream



Wickenburg

6
19
18

Surprise

11

Buckeye

21

El
Mirage
Youngtown

Litchfield
Park

Tolleson

Hassayampa River

Gila River

Salt River

New River

Gila River

Gila
Bend

10

15

3

4

5

22

24

31

60

303

85

8

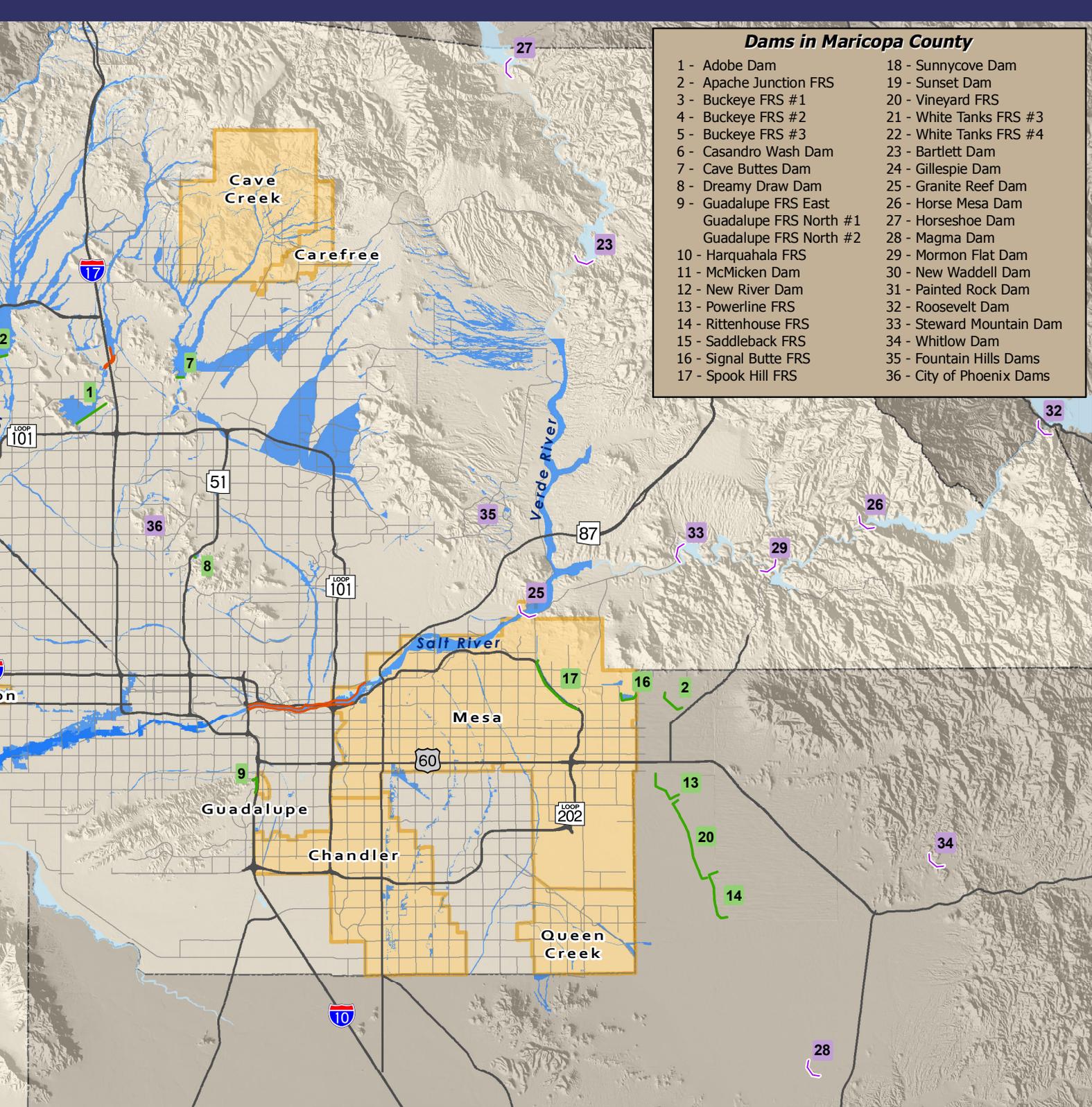
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1

10

Dams in Maricopa County

- | | |
|-------------------------|---------------------------|
| 1 - Adobe Dam | 18 - Sunnycove Dam |
| 2 - Apache Junction FRS | 19 - Sunset Dam |
| 3 - Buckeye FRS #1 | 20 - Vineyard FRS |
| 4 - Buckeye FRS #2 | 21 - White Tanks FRS #3 |
| 5 - Buckeye FRS #3 | 22 - White Tanks FRS #4 |
| 6 - Casandro Wash Dam | 23 - Bartlett Dam |
| 7 - Cave Buttes Dam | 24 - Gillespie Dam |
| 8 - Dreamy Draw Dam | 25 - Granite Reef Dam |
| 9 - Guadalupe FRS East | 26 - Horse Mesa Dam |
| Guadalupe FRS North #1 | 27 - Horseshoe Dam |
| Guadalupe FRS North #2 | 28 - Magma Dam |
| 10 - Harquahala FRS | 29 - Mormon Flat Dam |
| 11 - McMicken Dam | 30 - New Waddell Dam |
| 12 - New River Dam | 31 - Painted Rock Dam |
| 13 - Powerline FRS | 32 - Roosevelt Dam |
| 14 - Rittenhouse FRS | 33 - Steward Mountain Dam |
| 15 - Saddleback FRS | 34 - Whitlow Dam |
| 16 - Signal Butte FRS | 35 - Fountain Hills Dams |
| 17 - Spook Hill FRS | 36 - City of Phoenix Dams |

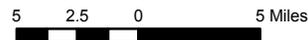


Floodplains of Maricopa County

- | | | |
|-----------|------------|-----------------|
| FCD Dam | Floodplain | Other County |
| Other Dam | Lake | Maricopa County |
| Levee | Community | Highway |
| | Arterial | |

The Flood Control District of Maricopa County conducts floodplain management for the unincorporated areas of Maricopa County and the 14 incorporated communities listed:

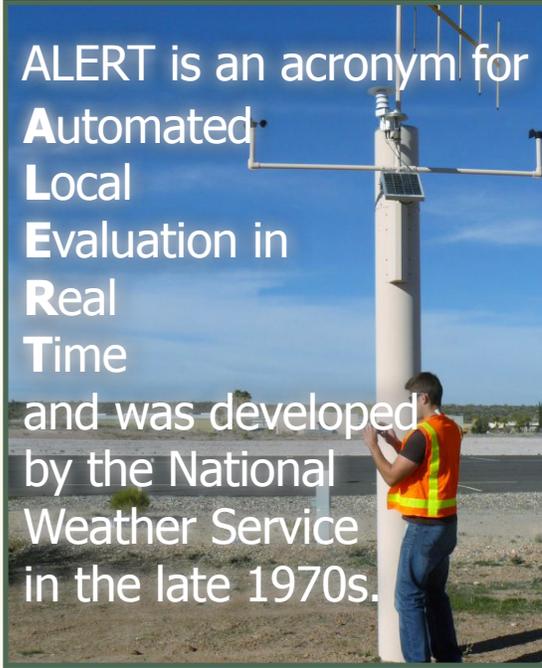
Buckeye, Carefree, Cave Creek, Chandler, El Mirage, Gila Bend, Guadalupe, Litchfield Park, Mesa, Queen Creek, Surprise, Tolleson, Wickenburg and Youngtown



FLOOD WARNING SYSTEM

Information Available 24-Hours

The Flood Control District of Maricopa County operates a 24-hour rain, stream, and weather gage network known as the ALERT system. The system provides real-time information to the County and many other agencies about rainfall, floods, and weather conditions in Maricopa County.



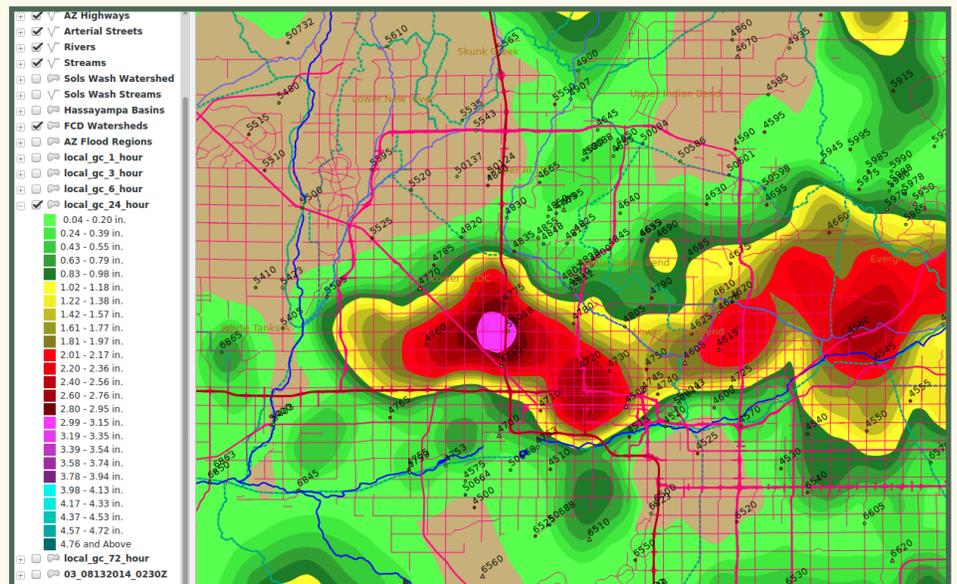
An ALERT station may contain several gages or sensors at a single location to measure different weather factors.

The information provided by the ALERT system is important because occasional heavy rainfall can flood facilities and roads. Each gage is programmed with an alarm setting. When measurements reach a certain threshold, an alarm sounds and sets the following in motion:



Storm Central
ALERT data (rainfall, streamflow & weather), radar and National Weather Service warnings

- An on-call hydrologist evaluates and monitors the situation.
- Flood warnings are provided to State and County departments, city emergency management departments and the National Weather Service.
- The National Weather Service issues public flood warnings and other weather advisories.
- Emergencies are declared by the Maricopa County Department of Emergency Management.



ALERT's History



The FCD started installing ALERT stations in 1980 after floods occurred in the late-1970s. Gages were first placed to monitor the major rivers, and then later installed on FCD dams and flood control structures. After the 1993 floods, more gages were placed in smaller washes and upstream of unbridged road crossings. In addition to operating the ALERT system, FCD also provides information for several local Flood Response and Emergency Action Plans, and provides information to the Maricopa County Department of Transportation Flooded Roadway Response Program.

ALERT system data is also useful after a storm. The stored data is used to reconstruct storm events in order to show the origin of flooding problems and to provide information for use in floodplain studies, computer modeling of watersheds, and design of future flood control structures.



Crown King rain station, 1998



Whitlow Ranch Dam rain/
stage station, 2000

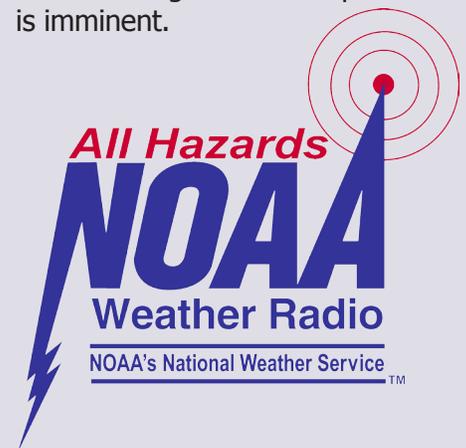
For further information on rainfall, weather, or ALERT system visit:
www.fcd.maricopa.gov/Weather/Rainfall/rainfall.aspx.

Flash Flood Watch

The National Weather Service will issue a Flash Flood Watch when weather conditions suggest that flash flooding is possible within a designated area.

Flash Flood Warning

The National Weather Service will issue a Flash Flood Warning when flash flooding has been reported or is imminent.



Tune into local news, social media or the local NOAA Weather Radio in the Phoenix area at KEC94 at 162.550 for flood watch notices and warnings.

You may also visit the following Web sites:

Arizona Flood Warning System
www.afws2.org

National Weather Service
www.nws.noaa.gov

Maricopa County Department of Emergency Management
www.maricopa.gov/emerg_mgt

Flood Control District of Maricopa County
www.fcd.maricopa.gov

FLOODPLAIN DEVELOPMENT & PERMIT REQUIREMENTS

If you want to build in a floodplain, you must first get a permit. The floodplain permit requirement aims to minimize flood damage potential to your land without increasing the flood risk to your neighbors' property. If your property is located within a floodplain and you want to make changes to land located within a 100-year flood hazard area, local regulations require you to obtain a Floodplain Use Permit. Obtain this permit before you build, add, grade, or install walls or fencing. To review

the Floodplain Regulations and Steps to Obtain a Floodplain Use Permit visit www.fcd.maricopa.gov.

If you are not sure if your property is in the floodplain, use the map application found at www.fcd.maricopa.gov/GIS/maps.aspx and search by any of the following criteria:

- Assessor's Parcel Number
- Address Street/Intersection
- Township/Range



Unpermitted Fence

Maricopa County conducts floodplain permitting for unincorporated areas of Maricopa County. FCD does the floodplain permitting for the following incorporated cities and towns:

- | | |
|------------|-----------------|
| Buckeye | Litchfield Park |
| Carefree | Mesa |
| Cave Creek | Queen Creek |
| Chandler | Surprise |
| El Mirage | Tolleson |
| Gila Bend | Wickenburg |
| Guadalupe | Youngtown |

The following cities conduct their own floodplain management and floodplain permitting:

- | | |
|----------------|-----------------|
| Avondale | Paradise Valley |
| Fountain Hills | Peoria |
| Gilbert | Phoenix |
| Glendale | Scottsdale |
| Goodyear | Tempe |

Other Sources of Information:

Federal Emergency Management Agency (FEMA)
www.fema.gov

Flood Control District of Maricopa County
www.fcd.maricopa.gov

Maricopa County Planning & Development
www.maricopa.gov/planning Substantial Damage/Improvement

SUBSTANTIVE IMPROVEMENT/SUBSTANTIVE DAMAGE

Structures built before December 31, 1974 are considered PreFIRM. Any building that is to be remodeled, renovated or improved—when the project cost is 50 percent or more of the building value has to be brought into compliance with NFIP and local regulations. The terms used are:

“Substantial Improvement” means the cost to rebuild/improve a structure in the floodplain equals more than 50 percent OF MARKET VALUE before work.

“Substantial Damage” means damage to a structure where the repair cost of restoring the structure to its “before damaged” condition is equal to—or exceeds—50 percent OF PRE-MARKET VALUE before the damage occurred. The structure also needs to be brought into compliance with NFIP and local regulations.

The substantial damage and improvement regulations protect lives and ensures the investment in the structure will prevent future flooding. For more information refer to the Floodplain Regulations for Maricopa County at www.fcd.maricopa.gov.



Wickenburg, July 2015

PROPERTY PROTECTION

What You Can Do

Flooding is the most common and costly natural disaster in the United States. Unfortunately, not everyone is aware of their flood risk and how to prepare for a flood. Once you know your flood risk, one way to prepare is to flood proof your building to help reduce the potential for flood damage to the structure and contents. Contact your local flood control official or a floodplain representative for the correct building codes and permit requirements before construction. Proper grading and landscaping can improve drainage to prevent flooding. Consider elevating structures and utilities, purchase flood insurance, and use materials that are “flood resistant.”



Wickenburg, July 2015

DAM & LEVEE SAFETY

Dams are an important resource in the United States and provide many functions including recreation, flood control, irrigation, water supply, and hydroelectric power. Dams can also be breached with little warning. A dam built for flood protection is usually designed to lower the amount of water going downstream during a flood by containing excess water and releasing it slowly over time. Dams range from massive concrete structures to earthen structures.



Harquahala Flood Retarding Structure (FRS) Gated Outlet



Harquahala FRS Outlet

FCD operates and maintains 22 flood control dams and has a Dam Safety Program. Dams are inspected on a yearly basis for various conditions such as earth fissures, land subsidence, outlet pipe conditions, and embankment and foundation settlement. Emergency Action Plans (EAP's) which would be executed during an emergency, are also developed and updated during this process.

A levee is built parallel to a body of water (most often a river) in order to protect lives and properties behind it, from some level of flooding. Levees can also be over-topped or breached, during large floods or can decay over time if not maintained. Currently, FCD is responsible for 21 levees in Maricopa County, 14 have been certified by FEMA and the United States Army Corp of Engineers has certified 7 additional levees.

The risk for dam or levee failure and the potential catastrophic damage failure can cause, is not addressed on FEMA flood maps. So, while property owners may be aware that they live downstream from a dam or next to a levee, they may not be aware of their true risk. Property owners should consider financially protecting their home, business and/or building contents with flood insurance.



Scatter Wash Levee



Tres Rios North Levee



Scatter Wash Levee

For more information regarding dams or levees visit www.fcd.maricopa.gov or www.floodsmart.gov. More dam information is available at www.damsafety.org and levees at <http://content.asce.org/files/pdf/SoYouLiveBehindLevee.pdf>.

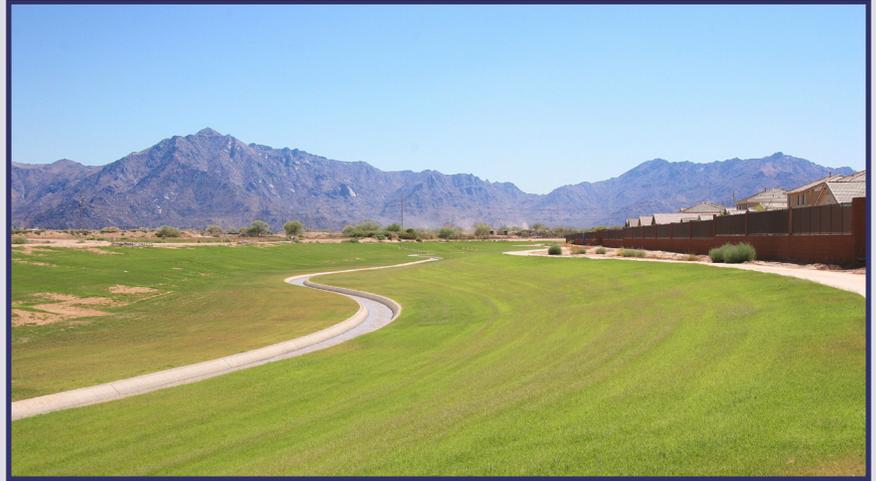
NATURAL AND BENEFICIAL FUNCTIONS

Benefits for the Community

Floodplains often contain wetlands and other important ecological areas that improve the quality of the local environment. These ecological areas include wetlands, rare and endangered plants and animals, and archaeological sites. Floodplains have been shaped—and continue to be shaped, by climate, the hydrologic cycle, erosion and deposition, extreme natural events, and other factors. Surface water, ground water, floodplains, wetlands and other features function as a single, integrated natural system.

Disruption of any one part of this system can have long-term and far-reaching consequences on the entire system.

Part of the FCD's commitment is to plan and design flood control facilities as "places for people" and the environment. Non-structural management activities such as the Floodplain Regulations for Maricopa County, define the rules for usage/development in floodplains and keep floodplains able to handle the flows year-round. In many cases, open space and natural floodplains are the best options to meet this mandate. FCD works in partnership with other municipalities to ensure safety, and to complete projects that benefit the residents of Maricopa County.



Laveen, July 2016



Burrowing Owl



Mitigation along the Agua Fria River

LEARN ABOUT YOUR FLOOD RISK

Depending where you live, flooding may or may not be a problem that could impact you and your home. If you are buying a home, it is worth checking FEMA maps, at FloodSmart.gov or County records to know your potential flood risk. If you find out your home is in a flood zone after you already own a home, look into flood insurance. Knowing what to do in case of a flood in advance is important for the safety of your family and your home.



To find out the flood risk to your property in Maricopa County go to <http://gis.fcd.maricopa.gov/apps/floodplainviewer>.

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009