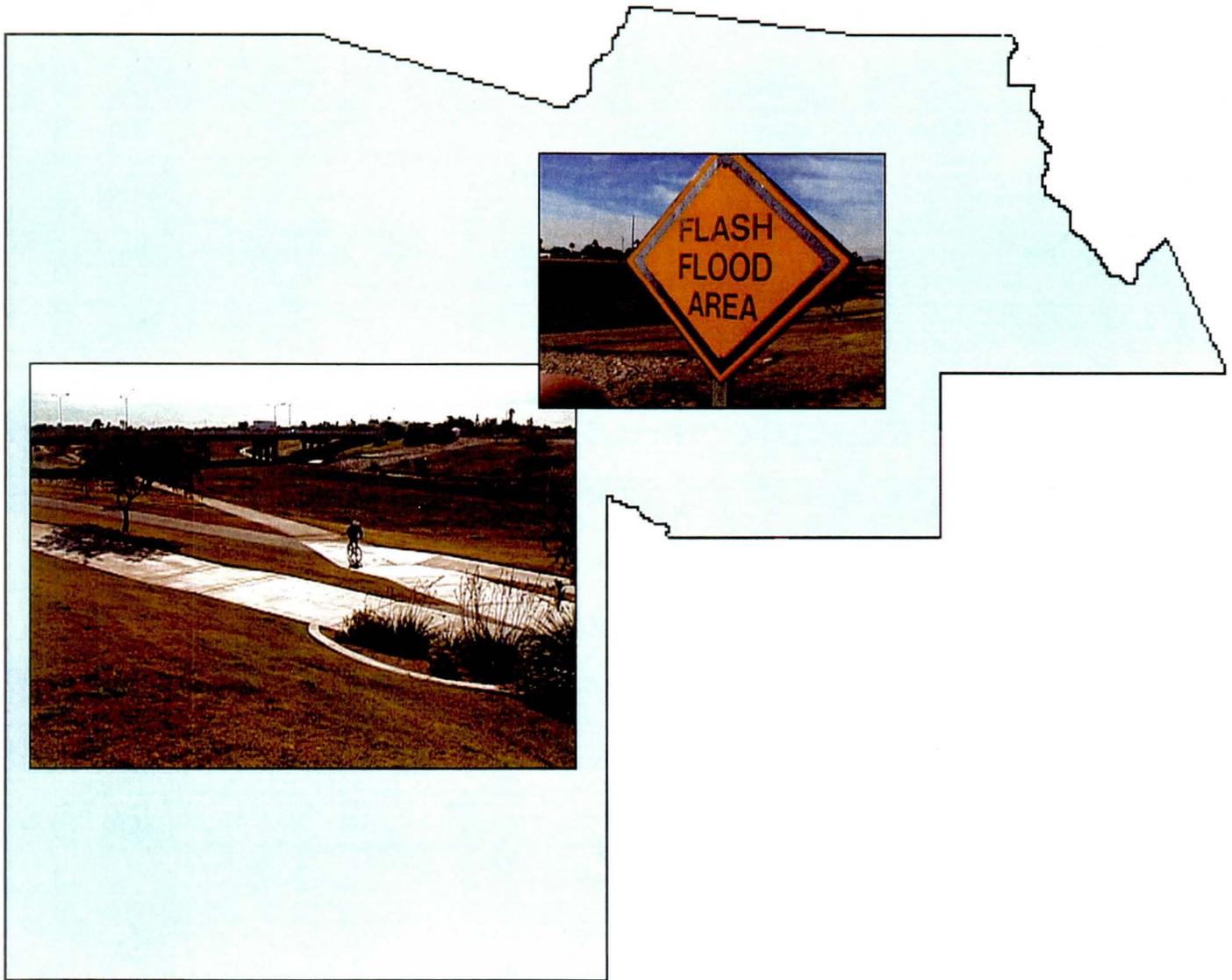


BUILDING A SUSTAINABLE COMMUNITY

MARICOPA COUNTY, ARIZONA MODEL



Severe Storms and Flooding
FEMA-1347-DR-AZ
October 22, 2000



TABLE OF CONTENTS

Table of Contents 1

Introduction 2

Non-Structural Mitigation 4

Legislative Action 4

Tax Levy 6

Flood Control District of Maricopa County 7

Structural Mitigation 9

Phoenix and Vicinity Project 9

Scottsdale-Indian Bend Wash 11

Wickenburg-Cassandro Wash Dam 14

Conclusion 16

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Introduction

Natural disasters can occur anywhere, at any time and in many forms. The devastation created by these disasters extracts a human toll and economic loss on communities, frequently in the billions of dollars, that often times is never recovered. Lives are lost, injuries occur, property is destroyed and business is interrupted. Additionally, the perception that the community is an unsafe or undesirable place in which to live or work is long lasting and stifles growth.

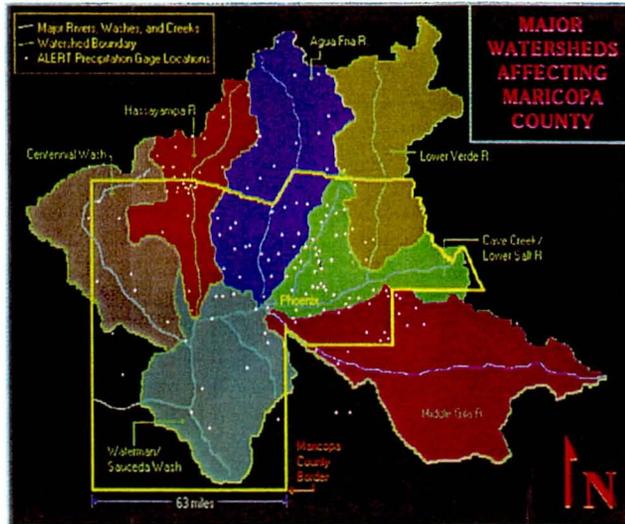
Maricopa County has been no stranger to disaster. Historically, flash floods and flooding are a frequent occurrence due to the topography and arid lands. Less than thirty years ago major storms in Phoenix caused flooding in the state capitol. Less than 20 years ago there was flooding in the downtown district. The airport had been closed at times due to flooding. Luke Air Force Base had experienced flooding. Ironically, the very conditions that allow flooding have attracted an influx of hi-tech companies bringing increased population and new construction. This new migration creates on-going challenges for residents, businesses and public officials of Maricopa County.

MAJOR FLOODS AND DAMAGE ESTIMATES IN MARICOPA COUNTY 1965 - 1993

YEAR	MONTH	DAMAGE ESTIMATE (in million's)
1993	January	\$38
1980	February	\$63.7
1978	December	\$51.8
1978	March	\$37
1972	June	\$10.6
1970	September	\$590,000 k
1963	August	\$2.9
1965-66	Winter	\$6

Source: Flood Control District of Maricopa County
The Arizona Republic, August 13, 1999

Once again, the County experienced flooding during October of 2000. A severe weather disturbance dumped four to six inches of rain in western Maricopa County and eastern La Paz County causing flash flooding in the upper part of the Centennial Wash watershed between the Harcuvar and Harquahala mountain ranges. The Wenden Area reported close to nine inches of rain during the same period. Heavy rains flowed into the northeast part of the wash, producing a flash flood that surged through one unincorporated town in La Paz County and one unincorporated town and the City of Wickenburg in Maricopa County.



This display map is a critical component of the Flood Alert Warning System, which monitors potential flood levels of the county watersheds.

Flood control measures, both non-structural and structural, within Maricopa County proved their worth during this storm. "If the Adobe Dam, completed in 1982, had not been in place, the City of Phoenix would have had water again", states Joe Munoz, Flood Control District of Maricopa County (FCDMC) Public Information Officer. The Cassandro Wash Dam, completed in 1996 to protect North Wickenburg, "functioned as designed and the homes were protected from flooding", states Skip Blunt, Flood Plain Manager for the City of Wickenburg. The unincorporated community of Aguila was not so fortunate. Water flowing from the washes affected two counties and the flood damages impacted communities in both La Paz and Maricopa Counties. The FCDMC has entered into a cooperative project plan with La Paz and Yavapai Counties for flood control of the watersheds above all three counties that will effectively reduce their flood hazards.

This storm proved the value of the unique approaches to flood control that are in place within Maricopa County. It also served as a reminder of the need to continue to work toward reducing vulnerability to flood disasters. Flood control in the desert is not a simple task. The hazards and risks to both incorporated and unincorporated communities are clear. The combined efforts of local, state and federal agencies continue to be needed to minimize flood damage. Results of their activities and the effectiveness of mitigation projects will be described in this report and will illustrate how Maricopa County has worked toward minimizing the risks; in effect, *Building A Sustainable Community*.

Non-Structural Mitigation

Legislative Action

On August 3, 1984, the Arizona State Legislature, with the Arizona Revised Statutes (ARS 48-3609), enacted legislation requiring builders and developers to comply with strict standards for flood control and storm water management of their projects. The statute includes residential (built or mobile home), commercial and industrial properties. Specifically, section B., 4. states, "Regulations that require any residential structure built in a floodplain to be constructed so as to place the lowest floor elevation of the structure at or above the regulatory flood elevation, that require commercial or industrial structures to be flood proofed or elevated to or above the regulatory flood elevation and that prohibit any activity in a designated floodway, including fill, that would increase the water surface elevation during a base flood." All buildings are required to be built one foot above the base flood elevation. The statute also includes compliance language for failing to adopt the regulations.

The National Flood Insurance Program, (NFIP), was established in 1968. The intent was to reduce future flood damage through community floodplain management ordinances, provide flood hazard mapping and provide protection for property owners against potential losses through an insurance mechanism. NFIP, administered by the Federal Insurance Administration (FIA), is a compliance based program whose standards provide balance between the need for building restrictions to minimize potential loss of life and property and the economic benefits to be derived from floodplain development.

Enforcement of both the ARS and the NFIP on developers in Maricopa County has worked well to reduce disaster costs to the communities. A model is Manistee Ranch Housing Development in Glendale. This project consists of 410 lots, including a large park area and several retention basins. The system of storm drainpipes, headwalls, detention basins, grading work and landscaping installed during construction was "tested" during the October 2000 storms and all performed as planned. There was standing water in the detention basin, the ground saturated and the dry wells saturated indicating the large amount of water that was prevented from flooding the homes. This water percolates down and eventually adds to valuable ground water resources. The residential community was protected.

Example: Avg. value of homes - \$110,900 x 410 homes = \$45,469,000 property value protected by \$292,000 builders cost of compliance with statute. (source: Richmond American Homes)

The actual dollar benefit is difficult to quantify, however, **cost avoidance** is evident. Storm water management in the newer housing developments has avoided the cost of:

- Displacement of residents due to flooding
- Temporary housing
- Repair and rebuilding of residences
- Loss of business
- Damage to infrastructure such as roads and access
- Search & rescue and emergency response
- Unemployment

The October 2000 storm resulted in a state and federal disaster declaration. It is estimated that the federal cost will meet or exceed \$8.8mil. There will also be an additional 25% share spent by the state and counties. This brings the **total estimated cost to over \$10 million**. Houses, developments and larger incorporated communities that have built to and above the language of the statute had zero impact from this storm. The City of Peoria did experience some flooding but not in any of the planned elements. Clearly, pro-active planning and compliance is making a difference.

To illustrate the effectiveness:

Estimated number of homes protected	150,000
Average cost of assistance for this event	\$20,000 (per structure)
Potential damages	\$3 billion
Estimated cost of this storm	\$10 million
Cost avoided due to mitigation	\$2.9 billion

It is a fact of nature that storms will recur; however, the cost of damages as a result of the storms will continue to decline.



(Example of detention basin, Manistee Ranch Housing Development, Glendale, Arizona)

Examples of compliance with this statute are very evident in the cities of Glendale, Avondale and Peoria. Code enforcement is what makes the difference. Housing developers plan their projects to provide for controlling storm water runoff. Attention has been paid to keeping the required flood control measures, such as detention basins and storm drains, attractive as well as functional. Many have parks and athletic fields that are multi-use, providing new recreation areas and serving as catchment basins during flood conditions.

Tax Levy

In 1959 the Arizona State Legislature realized that something needed to be done to control flooding. The Legislature approved the creation of the Flood Control District of Maricopa County and gave it the authority to place a levy on property taxes. The rate now is 29 cents per \$100 of assessed valuation, or about \$29 annually on a home assessed at \$100,000. When the district began operating, the county had a population of only 630,000 and \$600 million in taxable property. Now the population is 2.9 million and the district must protect taxable property estimated at \$161 billion as well as public facilities worth billions more.

By establishing the FCDMC, the legislature created an operating entity charged with keeping county residents safe from flood hazard and established an independent funding source for the projects necessary to meet the charge. The tax levy, as an on-going funding source, is considered non-structural mitigation.

Of the many projects completed by the FCDMC using tax levy and community cost sharing funds, three are good examples of providing protection during the October 2000 severe storm. The channelization and bank erosion projects of Skunk Creek brought property out of the flood plain in parts of Peoria; Adobe Dam, completed in 1982, kept the flood waters from the City of Phoenix and Cassandro Wash Dam functioned as designed in keeping floodwaters from North Wickenburg.

Cost/Benefit of Tax Levy (*small sample/estimated*)

Project	Cost	Benefit
Adobe Dam	\$23.2mil (1982\$'s)	Protected Phoenix, Glendale, Peoria and the State Capitol complex; several billion dollars in property value
Skunk Creek		
Cassandro Wash Dam	\$5mil (1996\$'s)	Protected North Wickenburg- 3:1 c/b ratio based on current property values

Flood Control District of Maricopa County

Established as a result of action taken by the Arizona State Legislature in 1959, the FCDMC today has a staff of 200 and an annual operating budget of approximately \$60mil. Over 70% of the districts operating revenue comes from the state levied flood control tax. During the districts 40 years of operation, more than 80 major projects have been completed. These projects, combined with non-structural approaches to flood control, are tangibly reducing disaster risks to residents and businesses as well as reducing the cost of disasters.

The mission of the FCDMC is, in part, "To reduce flood risks for the people of Maricopa County by providing comprehensive flood and storm water management services. These activities are provided through regulatory activities, master planning, regional coordination, technical assistance and implementation and maintenance of non-structural and structural projects."

There are many illustrations of this mission in action throughout Maricopa County:

- The Arizona Canal Diversion Channel (ACDC) and systems that support it to divert water around the city protect the City of Phoenix.
- Floodplain Management through the district seeks insurance discounts for residents by actively participating in FEMA's Community Rating System. Maricopa County has a current CRS of 6, which is among the highest CRS ratings in FEMA Region IX.
- Drainage Administration coordinates closely with other agencies to insure that new development does not increase runoff, divert flows or back water onto other properties.
- Participation in master plans for flood control with counties that border Maricopa County.
- Partnering with construction firms to insure compliance with the ARS.
- The Flood Alert Warning System (ALERT)
- Community enhancement through multi-use corridors, i.e., parks, golf courses, equestrian, biking and hiking trails.
- Public Information Outreach Program
- Partnerships with federal, state, county, city and local agencies for cost sharing of funding and maintenance of flood control projects.
- Planned return of water into the underground water table.

"A kinder, gentler approach to flood control," is how Joe Munoz, Public Information Officer, describes the district. Their efforts towards this principle were acknowledged in March 2000 when the district won a national award for the Skunk Creek Channel project. The coveted award is given to innovative construction projects which best demonstrate the true spirit of partnering. In this instance, the district worked with the City of Glendale and the contractor. Completion of this project removed several hundred homes from flood danger, saving residents money and providing them peace of mind. The project combined flood safety, environmental consciousness and multi-use elements.

A little known "watch dog system" working for the safety and peace of mind of Maricopa County residents is the Flood ALERT System which is operated by the FCDMC. ALERT is a sophisticated network of rain, stream, and weather gages that provide current or "real time" information about rainfall, storm water runoff, and weather conditions in the county. This network operates in the National Weather Service (NWS) ALERT format, which stands for "Automated Local Evaluation in Real Time", and is commonly referred to as an ALERT system.

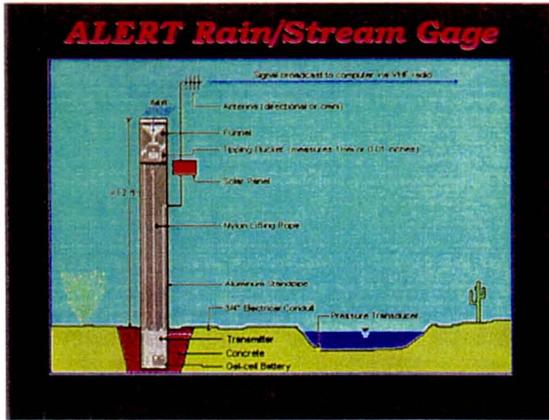
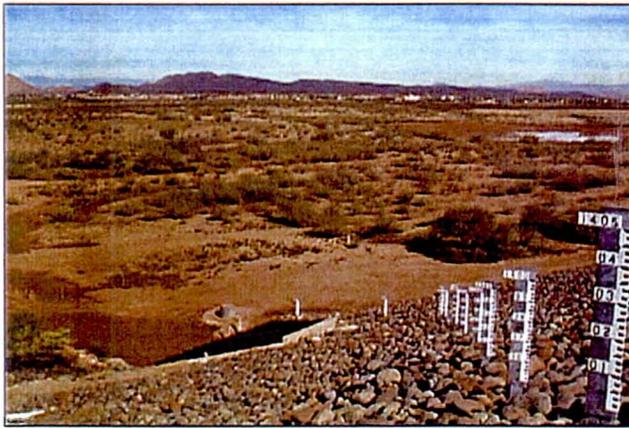
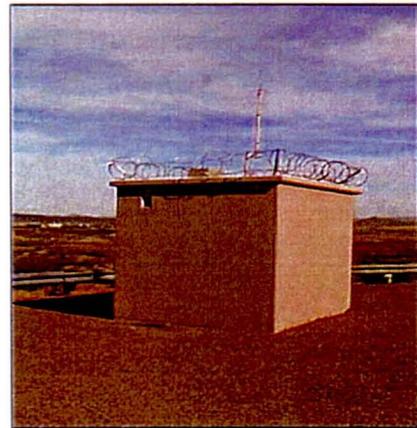


Diagram of an ALERT Rain/Stream Gage. These "automatic" telemetry gages transmit their information via VHF radio to a base computer that compiles the information and displays it on video screens.

Information provided by the ALERT system warns personnel when heavy rainfall generates stream flows, which significantly impact flood control facilities such as dams and channels. The information is also received by the NWS and used in conjunction with other data to issue flash flood warnings and other weather advisories. This system alerted the Emergency Management office of the City of Wickenburg during the October storms and provided time for evacuation and property protection.



(A "Parade of Rain Gages" installed at Adobe Dam)



(Weather Station atop Adobe Dam)

The district has installed and maintains 230 automatic rain gages, 105 automatic stream gages, and 15 automatic weather stations throughout Maricopa and neighboring counties. Volunteers play an important role with reporting data as well. The district actively recruits volunteers to report rainfall at their homes and oftentimes supplies the homeowners with rain gages. Volunteers then mail monthly rainfall information to the district office. Incorporating volunteers into the program effectively increases the monitoring system while keeping costs down.

Structural Mitigation

Phoenix and Vicinity Project

This project is part of a five-phase flood control plan for the metropolitan Phoenix area. The plan was developed between 1959 and 1963 with Congress authorizing federal funding in 1965.

An integral part of the Phoenix and Vicinity Flood Control Project is the Arizona Canal Diversion Channel (ACDC). The ACDC is a 16.5-mile channel designed to intercept stormwater runoff that occurs north of the Arizona Canal from large urban washes as well as city stormdrains. The ACDC is designed to protect developed areas, including parts of Phoenix, Glendale, Peoria, and the state Capitol complex up to the 100-year flood level. In the metropolitan Phoenix area, a 100-year flood would inundate 31,540 acres and cause billions of dollars in damages.

The ACDC was started in 1983 and completed in 1995 at a cost of nearly \$300 million. A major challenge facing the contractors was to provide flood protection to an existing large commercial site, the Arizona Biltmore Hotel area. The channel was built under the area thus preserving the business community while providing a shield for older parts of the valley.

Today, the ACDC is one of the major reasons older portions of Phoenix no longer flood.

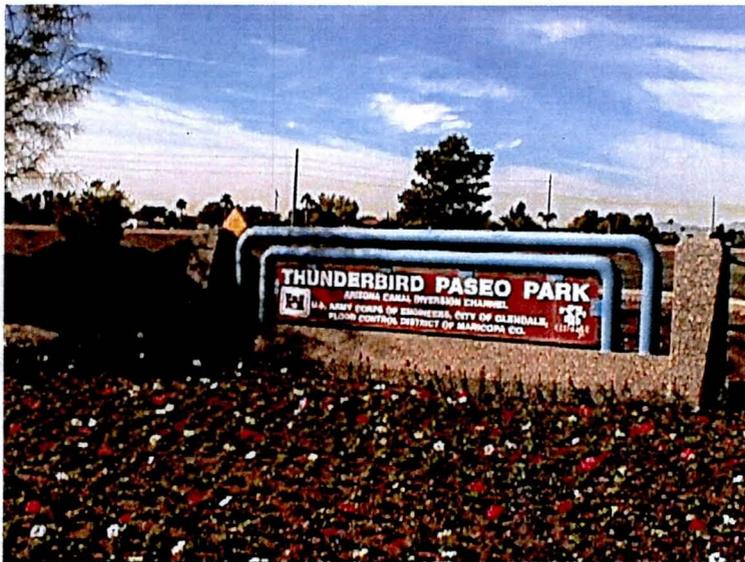
Municipalities within the Phoenix and vicinity boundaries adopted a "get tough" policy with developers. They enforced the requirement for developers to include flood control plans, encouraging the creation of greenbelts and retention basins to hold as much water on site as possible. An example of this responsible approach of new development to include flood control is the Maryvale Baseball Stadium. The stadium is surrounded by large grassy areas that act as a sponge for heavy runoff from West Phoenix.

There are other elements of the overall project, namely, dams on Dreamy Draw, Cave Creek, Skunk Creek and New River; channelization of Cave Creek; and bank stabilization and acquisition of flowage easements on Skunk Creek, New River, and Agua Fria. All of these structures work together with the ACDC to provide substantial flood relief for residents in Phoenix, Glendale and Peoria.

Funding, construction and continued maintenance of the ACDC is shared by federal, county and city entities. Federal money, through the USACE, was used for the overall design and construction. The FCDMC is the local sponsor and is responsible for acquiring land, building bridges, and relocating utilities. The Flood Control District is funded by a secondary tax levy on all real property in Maricopa County. Cities along the ACDC's path, Paradise Valley, Phoenix, Glendale, and Peoria, studied and approved the project through their city limits, Glendale and Phoenix share the maintenance responsibilities in areas where there are recreation features. This partnership works well to create and sustain a more livable community.

Phoenix and Vicinity Project Benefits (ACDC)

Direct	In-Direct
Overall project cost in million's \$422. Benefits \$10 billion (in 1981 \$'s) of development - 4:100 cost benefit.	Removed properties out of the floodplain thus reduced cost of flood insurance to homeowners.
Population growth of 45% since project completion increases tax dollars.	Reduced human stress.
New recreation areas; bicycle and equestrian paths.	Reduced cost of search & rescue operations.
Increased economic base for Phoenix and environs.	Less public health issues.



Attractive signage greets visitors to the Thunderbird Paseo Park section of the ACDC channel. This park is built in a 4 mile long, 500 feet wide and 20 feet deep earthen channel within the cities of Glendale and Peoria.

The Thunderbird Paseo Park is one example of innovative use of land dedicated to flood control. This park has multi-uses, as a recreational site and as a serious hazard reduction solution to protect the community. Among the many amenities are pathways for cyclists and walkers as well as play equipment for children. The recreational amenities were funded by the City of Glendale.



(Cyclists enjoy the recreation paths in the ACDC flood control channel.)

Scottsdale

The City of Scottsdale is rich in history unique to the American Southwest. Among the early settlers were the Native American tribe Hohokam who made their home there, farmed the land and were the original architects of Scottsdale's canal system. This sophisticated waterway network is still in use today. Army Chaplain Winfield Scott and his wife became Scottsdale's founders in 1888 on land that they purchased for \$2.50 an acre. The Town of Scottsdale incorporated as a City in 1951 and this proud new city created the city slogan, "The West's Most Western Town". At the time, Scottsdale consisted of one square mile and a population of 2,000.

Scottsdale is no stranger to severe storms and flooding and the devastation they can bring. Indian Bend Wash runs through the city and has historically rampaged through the community. Two major floods in the early seventies, one in June of 1972, caused a fatality and left seventeen families homeless. City workers used helicopters and ropes across the flooded Wash to rescue residents. The need for flood control in Scottsdale was dramatically evident. Following this event, city government and residents agreed to approve the Indian Bend Wash project. The City Council called a special flood control bond election in April, 1973 and voters were asked to approve the sale of \$10mil in general obligation bonds to finance flood control and storm drain projects. The bonds were approved by a margin of seven to one. The project began in 1971 and was completed in 1999.

Three agencies, the U.S. Army Corps of Engineers (USACE), the City of Scottsdale and the Flood Control District of Maricopa County (FCDMC), provided the funding for the project. The cost and sponsoring of the project is shared with the Flood Control District as the local flood control sponsor and the City of Scottsdale as the recreation sponsor. The sharing of the project cost, construction and maintenance by these agencies exemplifies how federal, county and city interests can join together to make a community more livable and sustainable.

Cost Sharing for the Indian Bend Wash Project

USACE	\$29mil	Design and construction
City of Scottsdale	\$14mil	Greenbelt development
FCDMC	\$12.5	Purchase of land rights, building bridges and relocating utilities
Total	\$55.5mil	

Cost Savings and Economic Benefits of Indian Bend Wash

Cost Savings Due to Flood Protection

The project protects an extensively developed residential area along Indian Bend Wash in and adjacent to Scottsdale and Tempe, and an area zoned mainly for light industrial development in Tempe. The project provides protection against floods up to the size of the design flood of 30,000 cubic feet per second (100-year event). The flood of record is 22,000 feet per second, which occurred in June 1972. **According to the USACE, the project will prevent damages estimated at about \$21.3 million (1988) if a project design flood should occur. This amount of prevention is equivalent to \$30.3 million in 1999 dollars.**

Floods hit Scottsdale again in March 1978. Although the inlet structure was not complete at that time, **the existing components of the project limited flood damages to \$321,000 (USACE, 1988).** The USACE estimates that a recurrence of the flood of August 1963, which occurred about 16 miles from the Wash project, would cause damages at \$18.6 million (1988) if the storm that triggered that flood was centered over the Indian Bend Wash area. The current project would prevent most of those damages.

The average annual flood damages prevented are \$4.7 million (USACE, 1989). This is equivalent to \$6.42 million in 1999 dollars.

Economic Benefits Due to Recreational Facilities and Area Development

Scottsdale has made the greenbelt an integral part of its outdoor lifestyle. Due to the City's linear shape, about 80 percent of Scottsdale's citizens are within walking distance of the Wash. Estimates are that one million people make use of the greenbelt annually. The Wash has attracted high-ticket homes, condominiums and apartments, as well as businesses that thrive on the traffic generated around and through the area. **The Wash has added to the tax base rather than continuing as a liability.**

Census records for the years from the beginning of the project to completion in 1985 show an increase in the population of 22%. Property values of randomly chosen parcels adjacent to and within several city blocks of Indian Bend Wash were obtained from tax records at the Maricopa County Assessor's office. Tax records of 120 parcels representing 18 residential developments were reviewed in December 2000. This analysis showed that the full cash value (FCV) for every one of the 120 parcels increased from the time before a component of the Wash was built to after the component of Wash was built. The FCV is the current market value of the land and any improvements.

The average annual benefits from area redevelopment are about \$820,000 (1989). This is equivalent to \$1.12 million in 1999 dollars. The USACE estimates average annual benefits from recreational facilities at \$4.2 million. This is equivalent to \$5.74 million in 1999 dollars. Another economic value of the park system is the annual events held on the park grounds. Local festivals such as the Festival of Nations draw people and tax dollars from tourists and surrounding cities.

This data confirms that the Indian Bend Wash flood control project is environmentally, aesthetically, functionally, and financially an unqualified success.

Direct and Indirect Benefits of Indian Bend Wash

Direct	Indirect
1978 flood damages limited due to existing components of flood project.	Increase in tax base rather than a liability.
\$30.0mil (1999 \$'s) damage prevention in the event of a recurrence of a project design flood.	Improvement of quality of life has attracted high-end housing developments.
\$6.42mil (1999 \$'s) average annual flood damages prevented.	Large and small businesses benefit from traffic generated through area.
\$1.12mil (1999 \$'s) average annual benefits from area redevelopment.	Continuing increase of property values.
\$5.74mil (1999 \$'s) average annual benefits from recreational facilities.	Attractive recreational area due to multi-use of land and surroundings.

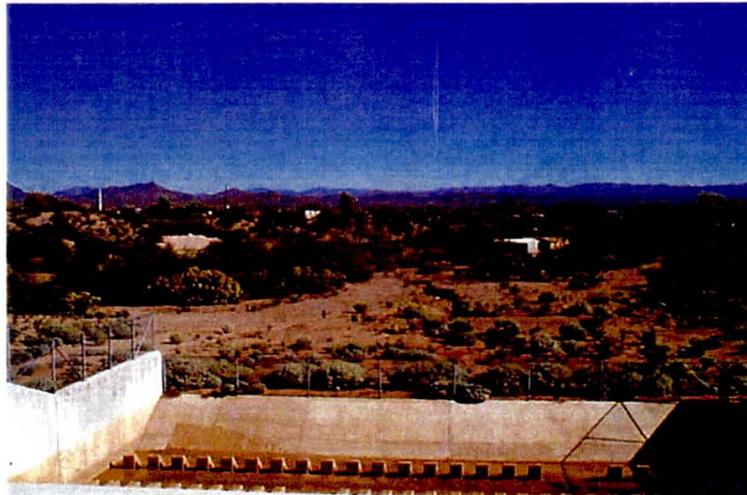
Today, the City of Scottsdale encompasses 184.5 square miles and enjoys a population of over 208,000 residents. The vision of the planners for a linear park in the wash rather than a concrete channel paved the way for the development that Scottsdale currently enjoys. The Indian Bend Wash Greenbelt runs the length of the city, 7.5 miles long, and is a system of parks, lakes and golf courses. High-end apartment complexes, attractive shopping centers and resorts line the slopes of the once dangerous wash. City figures show more than a million people use the recreational facilities each year. "Indian Bend Wash is what people point to when they talk about quality of life in Scottsdale, " says Dave Roderique, economic developer for the City. "We can't put a dollar value on the impact it's had, but Indian Bend Wash is one reason we attract the higher and higher end businesses and homes. "

Wickenburg

The City of Wickenburg lies perilously close to two major washes, Sol's Wash and Cassandro Wash. North Wickenburg is home to close to 100 families that are in the middle to low income group. These residences were in the floodway of Cassandro Wash which is the oldest part of the city. The wash actually outfalled onto two residential streets before ending at Sol's Wash. The community experienced severe flooding many times and one time, water was so deep in the streets that emergency vehicles could not pass through.

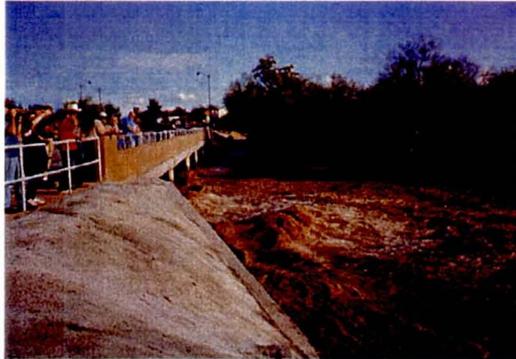
The City of Wickenburg worked with the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program (NFIP) to examine solutions for removing the homes of North Wickenburg from the floodplain. As a result, the city teamed with the Flood Control District of Maricopa County (FCDMC) to build the Cassandro Wash Dam. The dam was built to alleviate flooding homes on the Cassandro Wash and to allow future development of the property. The Cassandro Wash Dam was the first dam where the FCDMC was the owner; the district provided design, ownership and continued operation. Maintenance of the wash and dam is the responsibility of the flood control district.

Shortly after completion of the construction of the dam, Wickenburg experienced a major storm event. The dam impound area contained water that previously would have flowed through the streets, filling to 20% capacity, preventing a major deluge. The dam proved effective again during Hurricane Nora in 1997 and the severe storms of October 2000. No flooding problems occurred to North Wickenburg because the dam functioned as designed.



(View of North Wickenburg homes protected by the Cassandro Wash Dam)

An immediate benefit from the dam project is that the area, which was referred to as "blighted" has now become livable. Roads made impassable by floods and causing dust when dry have now been paved thus eliminating the daily dust control problems that comes with dirt roads. Construction of the dam also removed homes from the 100year floodplain and map revision has since occurred. A future benefit to the town includes plans for a community park in the area behind the dam. The town has designated the area downstream of the dam within the banks of the natural wash a no build area so that homes will not be built in the path of the outfall.



Residents of Wickenburg watch the floodwaters of Sol's Wash at US Highways 98/93 during the October storm.

As recently as October 2000, The City of Wickenburg benefited directly from planning and mitigation. On October 21, 2000, while severe storms lashed the region, the Flood Alert System of the county flood control district was active and monitoring the degree of rainfall for the county. The alarm for the City of Wickenburg alerted the Wickenburg Police Department warning of expected flooding from Sol's Wash. This advance warning provided 40minutes notice, which was enough to prepare the local residents to evacuate as instructed.

Cassandro Wash Dam Project Benefits

Direct	Indirect
Project cost \$5mil-benefit 3:1 based on current land values of 100 homes.	Removed 100 homes from flood plain and reduced cost of flood insurance to homeowners.
Increased livability of area.	Less health risks because of dust control.
Proven reduced vulnerability to flooding and flash flood.	Reduced cost of search and rescue, rebuilding and repetitive loss.
No build area designation within the banks of the natural wash.	Property available for redevelopment into recreation area.
Flood Alert Warning System	

"Visitors to Wickenburg wonder why there is a dam there", states Skip Blunt, City of Wickenburg Flood Plain Manager. "All they see is the dry desert land. I tell them, If you're standing in a dry wash and look up and see clouds, you better get out. A flash flood is very likely and you'll be washed away".

The City of Wickenburg has proven the ability of a smaller community to work effectively with county, state and federal agencies toward making their city livable and sustainable. The success of the partnership between the city and the flood control district resulted in continued direct benefits to residents, businesses and visitors.

Conclusion

Maricopa County is experiencing rapid population and new business growth. Community leaders have recognized the importance of a collaborative effort of public agencies, the private sector and key community leaders for comprehensive land use planning and regional coordination for flood control and storm water management.

The mitigation projects presented in this report are a representative sample of the total work completed or in progress in Maricopa County. Sustainable principles and practices have been integrated into the day to day decision making process for the communities. Commitment to these principles is evident in the results achieved that continue to enhance the quality of life and economic stability and growth of the county.

Maricopa County *is Building A Sustainable Community*. Mitigation solutions have been implemented that meld environmental, economic and societal values to ensure that the needs of the present are met without compromising the needs of future generations. Maricopa County's mitigation solutions will improve quality of life and promote a strong economic base.

Several critical elements have come together for the success of Maricopa County. A key element for success is the *integration* of non-structural and structural mitigation efforts. Specifically, action by the Arizona State Legislature created the authority for a tax levy which established the Flood Control District of Maricopa County (FCDMC). The FCDMC partners with community leadership, local, state and federal agencies for the construction and maintenance of such projects as dams, flood control channels, storm water management systems and land re-development. Additionally, on-going code enforcement of the Arizona Revised Statutes and compliance with the National Flood Insurance Program standards combine to ensure continued flood hazard reduction. The effectiveness of this integrated approach is evidenced in the Manistee Ranch Housing Development in Glendale. Compliance with building codes, flood plain standards and community involvement has resulted in quantifiable cost benefit, community enhancement with multi-use open space, peace of mind of residents and improved property values.