

2005/2006 ANNUAL REPORT

# REGIONAL FLOOD CONTROL DISTRICT

PIMA COUNTY, ARIZONA



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## Vision

The District will continue to be a leader in providing quality flood protection and floodplain management services within Pima County.

## Mission

The Pima County Regional Flood Control District is a regional agency whose mission is to protect the health, safety, and welfare of Pima County residents by providing comprehensive flood protection programs and floodplain management services. These services emphasize fiscal responsibility, protection of natural resources, and a balanced multi-objective approach to managing regional watercourses, floodplains, and stormwater resources.

# ADMINISTRATION 2005/2006

## *Board of Directors (Board of Supervisors)*

Richard Elías, Chairman, District 5  
Ann Day, District 1  
Ramón Valadez, District 2  
Sharon Bronson, District 3  
Raymond J. Carroll, District 4

## *General Manager (County Administrator)*

C.H. Huckelberry

## *Public Works Director*

John M. Bernal

## *Director and Chief Engineer*

Suzanne Shields

## *Deputy Director*

Chris Cawein

## *Flood Control District Advisory Committee*

Ralph Stein, Town of Oro Valley  
Paul Cella, District 4  
Jennifer Christelman, Town of Marana  
Mike Zeller, Chair, City of Tucson  
Andy Dinauer, City of Tucson  
Scott Altherr, District 3  
Linwood Smith, City of Tucson  
Richard Salaz, City of South Tucson  
Phil Pearthree, 2nd Vice Chair, District 5  
Doug Shakel, Vice Chair, District 1  
Vacant, District 2  
Martin Roush, Town of Sahuarita

# MESSAGE

FROM THE

# CHIEF ENGINEER

Our constituents are often surprised to learn that our dry, desert region holds the potential for major flooding events that can cause widespread inundation and damage. As we have all witnessed, our normally dry rivers and wash channels can become raging rivers literally overnight, and sometimes, even within minutes.

More than 130 miles of major watercourses and a vast network of smaller, tributary watercourses traverse eastern Pima County. Adjacent to these waterways are over 230,000 acres of federally mapped flood hazard areas or 100-year floodplains. These areas have a significantly higher probability of flooding.

The Pima County Regional Flood Control District's job is to minimize and ultimately eliminate the danger of flood and erosion hazards throughout Pima County. The District strives to find cost-effective and practical flood control solutions that will benefit the entire community.

Fiscal Year 2005/06 was a very dry year. In fact, the period between September 2005 and May 2006 was the driest nine month period on record for the Tucson area with only 0.78 inches of rain reported at the Tucson International Airport. The start of the monsoon season typically coincides with the beginning of the fiscal year. However, in 2005 the monsoons did not officially begin until July 18, 2005, which was the second latest start date in recorded history. Tucson received only spotty rain in July and August. The monsoons then hit hard with two major events, one on August 14th and the other on August 23rd. These two events led to localized flooding in the southwest area of Tucson impacting the Brawley Wash, and the southeast area impacting the Lee Moore Wash. These storms formed a part of the Regional Flood Control District's agenda for the remaining fiscal year.

In spite of the floods, projects in our Capital Improvement Program continued to move forward on schedule, resulting in the completion of large flood safety projects such as Earp Wash as well as 13 other significant projects as described later in this report.

I hope you'll take some time to read this year's annual report, which details the August floods, our CIP projects and other multifaceted activities. This year's report and all previous annual reports are available at: [www.rfcd.pima.gov](http://www.rfcd.pima.gov).



Suzanne Shields, P.E.

Director and Chief Engineer  
Regional Flood Control District



# OVERVIEW OF THE DISTRICT

## Establishment of the District

To comply with federal law, the State of Arizona passed the Floodplain Management Act of 1973. This act authorized Arizona counties to adopt rules and regulations concerning management of floodplain areas. The Arizona State Legislature subsequently authorized flood control districts to levy taxes on real property to finance district operating expenses. The Pima County Board of Supervisors, which sits as the Pima County Flood Control District Board of Directors (Board), organized the Pima County Flood Control District (District) on June 5, 1978. The District first became operational on July 1, 1978.

Provisions of state legislation also allow incorporated cities and towns within Pima County to undertake their own floodplain management duties and regulatory functions. In Pima County, the incorporated areas of the City of Tucson, the Town of Oro Valley and the Town of Marana have elected to assume floodplain management duties in their respective jurisdictions. The District is responsible for floodplain management activities for the remainder of unincorporated Pima County (with the exception of national forests, parks, monuments, and Indian Nations) and for the City of South Tucson and the Town of Sahuarita.

# Goals and Objectives

The goals and objectives of the District represent both flood control and resource protection and vary from traditional flood control approaches because of a multi-benefit public philosophy. The District recognizes that it is necessary and desirable to maintain a balanced relationship between human communities and the land and resources that sustain them. To that end, the following policy goals and objectives have been adopted by the Board as part of the District's Floodplain and Erosion Hazard Management Ordinance:

- Minimize flood and erosion damages.
- Meet or exceed state and federal requirements relating to floodplain management.
- Establish minimum flood protection elevations and damage protection requirements for structures and other types of development.
- Regulate encroachment and building development within areas subject to flooding or erosion.
- Encourage the most effective expenditures of public money for flood control projects.
- Minimize damage to public facilities, utilities and streets located in regulatory floodplain and erosion hazard areas.
- Help maintain a stable tax base by providing for the protection of regulatory floodplain and erosion hazard areas.
- Inform the public when property is in a regulatory floodplain or erosion hazard area.
- Encourage the preservation of natural washes and enhancement of the riverine environment.
- Regulate controls for floodplain management that emphasize overall watershed management.
- Protect, preserve and enhance groundwater recharge.



*July 26, 2005—The Cañada del Oro Wash as seen from Golder Ranch Bridge.*

# District Organization

In FY 05/06, the District expanded the base divisional structure from three divisions, consisting of the Floodplain Management Division, the Flood Control Engineering Division, and the Water Resources Division, to five divisions. In order to accomplish this expansion, which was to address burgeoning urban growth and development as well as expanding infrastructure inventory, the former functions of the Floodplain Management Division were divided into the following three divisions:

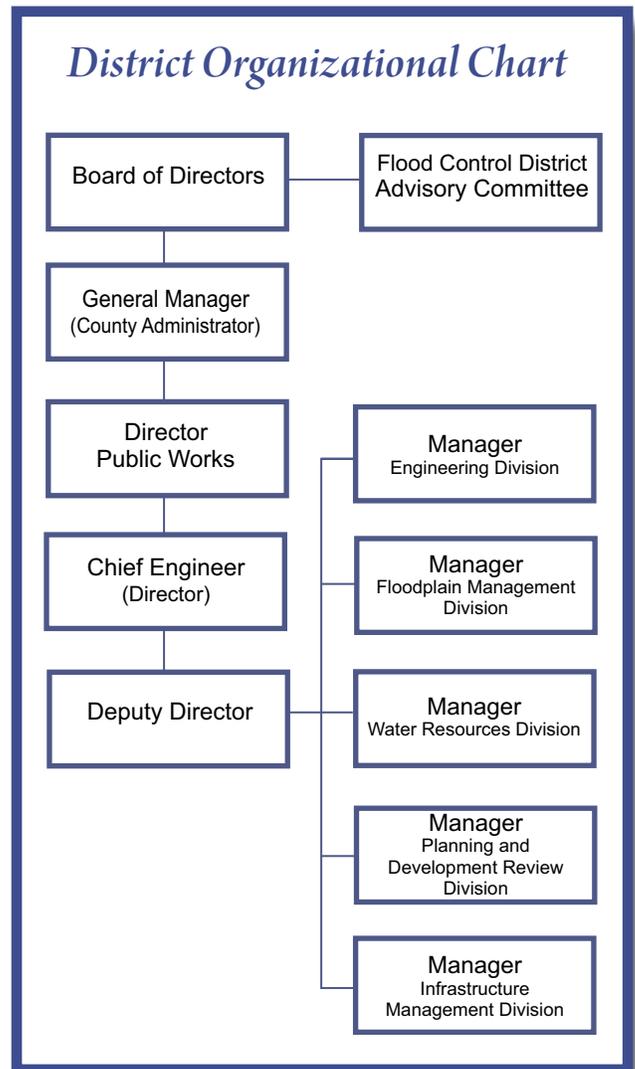
- The Planning and Development Review Division whose primary objectives are to progressively plan and ensure flood safety for developing areas throughout Pima County by conducting detailed studies of drainage basins to determine appropriate flood protection strategies and ensuring comprehensive review of all proposed land development projects.
- The Infrastructure Management Division whose primary objectives are to ensure regular inspections and proper maintenance of all District-owned flood control infrastructure and to lead the District's information management efforts so that all reports, permits and other data can be stored electronically and be readily accessible to all staff to improve efficiency of retrieval.
- The remaining Floodplain Management Division's focus is on individual lot development and high quality customer service for flood protection, drainage complaint response, and overall enforcement of the Floodplain and Erosion Hazard Management Ordinance.

*In a matter of seconds, a dry wash turned into a muddy river while the sun was shining overhead.*



The strategy behind this reorganization was to better focus on current and future needs of the District in order to enhance customer service and improve flood safety for residents of Pima County.

The District receives substantial support from the Pima County Department of Transportation, which includes Administrative Support Services, Maintenance Operations, Field Engineering, Real Property, and Technical Services. Further assistance is received from other Pima County departments including Development Services, Environmental Quality, Graphic Services, and the Pima County Attorney's Office. The District pays for services rendered by Pima County departments through interdepartmental fund transfers from the District to Pima County.



# DISTRICT ACTIVITIES

## Service Programs

### *Customer Service*

The District encourages residents to become familiar with flood related hazards that impact their properties or properties they are considering for purchase. In order to assist in this research, the District maintains an abundant amount of information at our customer service counter which includes detailed hydrologic and hydraulic studies, historic and current aerial photos, and topographic information.



*The District assists residents in researching flood-related hazards that impact their properties.*

whether the property is located in or out of a federal floodplain and/or floodway and whether the structure is in or out of the floodplain. This form can be completed at our customer service counter or submitted via fax.

Residents may discuss any of this information with a hydrologist who can provide additional information regarding any limitations on the property or requirements that may apply for proposed improvements due to the extent of flooding or erosion hazards.

Floodplain Management also provides an efficient Special Flood Hazard Identification service. This information is conveniently provided in writing via a Flood Hazard Information Sheet. This form identifies

Another customer service component provided by Floodplain Management includes performing field investigations in response to constituent complaints and concerns. Through these field investigations, Floodplain Management is able to ensure that property owners are not being adversely affected by improvements that they or their neighbors construct, and can provide advice regarding improvements that can be made in order to minimize the potential of flood damage. If non-compliant improvements are observed, Floodplain Management personnel will proceed with compliance enforcement actions.



*Proposed property improvements may be required due to the extent of flooding or erosion hazards.*

## *Floodplain Management*

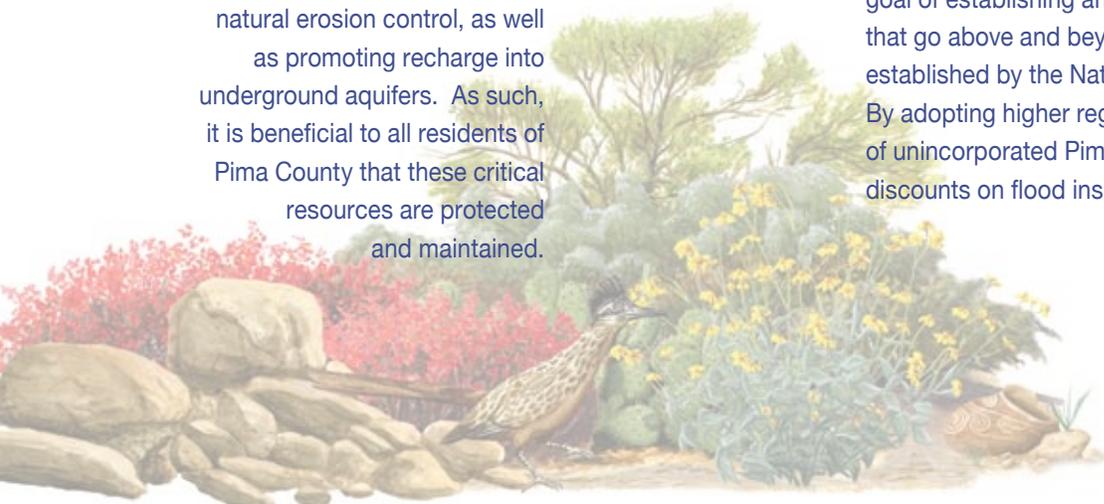
The goal of Floodplain Management is to provide floodplain information, establish development requirements and provide assistance to Pima County residents with drainage questions or concerns in order to minimize the threat to life and property from flooding and erosion hazards. This includes ensuring that any new development within the floodplain is safe from flooding and erosion hazards, does not adversely impact adjacent properties, and maintains the integrity of the floodplain.

Another important goal is protecting natural resources within floodprone areas. Floodplains typically support important riparian ecosystems and associated wildlife. These riparian areas are also important for their role in mitigating flood hazards by maintaining stable flood flow conditions, providing natural erosion control, as well as promoting recharge into underground aquifers. As such, it is beneficial to all residents of Pima County that these critical resources are protected and maintained.

One of the ways Floodplain Management accomplishes these goals is by implementing floodplain regulations contained in the Pima County Floodplain and Erosion Hazard Management Ordinance. The Ordinance was developed to conform to the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA), which allows residents of Pima County to receive flood insurance. In addition, the Ordinance includes provisions regarding the construction of buildings and other manmade structures within regulatory floodplains. The Ordinance applies only to those areas prone to flooding where the peak discharge is 100 cubic feet per second or greater or prone to sheet flooding. In other areas, the Ordinance does not apply; however, other ordinances may apply, such as the Grading Ordinance administered by the Development Services Department.

## *Floodplain and Erosion Hazard Management Ordinance Revisions*

The Board of Supervisors adopted the revisions to the Floodplain and Erosion Hazard Management Ordinance, which includes updates to the riparian classification maps, expanding the area of regulated habitat from 26,250 acres to 87,270 acres, adding a chapter requiring the maintenance of private detention basins, and extending the Ordinance's applicability to cover sheet flooding areas including FEMA Shaded Zone X floodplains. These revisions further the District's goal of establishing and implementing regulations that go above and beyond the minimum requirements established by the National Flood Insurance Program. By adopting higher regulatory standards the residents of unincorporated Pima County ensure significant discounts on flood insurance.



## ALERT

One of our most used services is the District's Automated Local Evaluation in Real Time (ALERT) system, which has been providing precipitation and stream flow data from a series of gauges located throughout Pima County since 1981. The ALERT system was established as part of a three-way agreement with the National Weather Service (NWS), the Arizona Department of Water Resources and the District. The ALERT system was initially installed to provide advanced warning of potential flood flows on the upper Cañada del Oro watershed as a result of the of the Golder Dam breach. Federal and state financial assistance combined with the District's budget has allowed us to expand the ALERT system—the system of gauges now covers most of the large watersheds in eastern Pima County and currently includes 85 precipitation gauges, 31 stream gauges, and four weather sites.

The precipitation gauges relay rainfall or snowfall amounts and intensities, stream gauges measure the depth of flow in streams, and weather stations provide precipitation information plus wind speed, temperature, relative humidity and barometric pressure. This network of automated gauges transmits data, in "real time" using radio telemetry transmitted directly to the District, NWS, and the Arizona Department of Water Resources office in Phoenix. The NWS uses this data to produce flash flood watches and warnings and to ground-truth radar estimates of precipitation. District personnel utilize the information to assist emergency response agencies including the Pima County Department of Transportation's Maintenance Operations staff during storm events. Data generated by these sites may be viewed at the District's website: <http://159.233.69.3/perl/Pima.pl>.

In fiscal year 2005/06, large rainfall events resulted in flooding of residential areas. This required close communication with the Pima County Office of Emergency Management, the Pima County Department of Transportation and the NWS.



*Residential property the day after the August 14 rainfall event.*

One of those rainfall events occurred on the morning of August 14, 2005. A large storm system moved from east to west over the Sierrita Mountains, south of Tucson. Brawley Wash (located west of Tucson downstream of Three Points) and many small washes in the Diamond Bell area exceeded their capacity—resulting in flooding of residential areas and roads throughout Avra Valley. Many families were stranded for days due to high water and damaged roads. Rain gauges and Doppler radar indicated a large area of the Brawley Wash watershed received between two and four inches of rainfall during a six-hour period. The highest rainfall intensity measured by an ALERT gauge was 2.32 inches in one hour. Stream flow on the Brawley

Wash at Highway 286 was the highest flow measured at this location since 1984. Maximum depth was approximately 10 feet with a discharge of 11,800 cubic feet per second.

During these storm events, information provided by the ALERT system aided the NWS and emergency teams with their decisions to warn the public of potential flooding and their response to emergency situations where people and infrastructure were in danger from the rising floodwaters.

# Internal Business Processes

## *Drainage Maintenance Process Improvement*

The Department of Transportation Maintenance Operations and the newly formed District Infrastructure Management divisions work together to resolve drainage problems affecting public infrastructure and safety. There are many causes for drainage problems that staff diligently works toward understanding and correcting to ultimately prevent future problems.

Process improvements enables better communication between staff. Meetings are held to resolve large watershed or development problems; to improve drainage design and construction methods for development projects, and to reduce maintenance needs and costs. These ongoing discussions integrate small projects, in order to remedy the smaller problems, with capital improvement projects.

## *Unified Hydrology*

In January of 2005, the District began holding monthly meetings with all local jurisdictions to promote a Unified Hydrologic Model for eastern Pima County. The long-term goal is to produce a seamless county and municipal-wide drainage strategy that could be incorporated into each agency's GIS system. The results will provide data to allow proper drainage infrastructure sizing that will meet any jurisdictions' requirements and eliminate the current practice of re-analyzing infrastructure design for each jurisdiction. The use of NOAA14 rainfall values as well as the HEC HMS hydrologic software will ultimately allow users to obtain watershed data via the District's web site.

# Management Programs

## *Water Resources and Riparian Habitat Management*

This program consists of activities intended to prevent flooding, erosion and riparian habitat loss by means other than constructing structural flood control improvements. The District promotes and supports regional riparian restoration with the intent that it will result in some level of recovery of natural functions within riverine systems.



# National Flood Insurance Program

## *Map Modernization Process Improvement*

The national response to flood disasters prior to 1968 was to install dams, levees, and seawalls; however, this approach failed to reduce flood losses. Flood victims were often left destitute as homeowners and business owners could not purchase flood insurance seeing that premiums for private flood insurance was too costly—consequently flood disaster costs and the number of flood victims continued to increase over time.

In 1968, Congress created the National Flood Insurance Program (NFIP). The three basic goals of the program are to: 1) Promote floodplain management to reduce future flood losses, 2) Provide flood insurance, and 3) Identify flood hazards and create floodplain mapping. The Federal Emergency Management Agency (FEMA) identifies flood hazard areas by publishing Flood Insurance Rate Maps (FIRMs). Creating and correcting the FIRMs to reflect flood hazards is a never ending process. Watercourses move and watersheds change over time so the maps are continually being updated.



*Flood map corrections for Flowing Wells Wash*

In fiscal year 2005/06, the District took aggressive steps to improve the flood hazard information on the FIRMs. In a cooperative effort with FEMA, the cities of Tucson, South Tucson and the towns of Marana, Oro Valley and Sahuarita, floodplain map corrections were made on 59 floodplains. The image above is an example of one floodplain correction.

Over the years, digital technology has greatly improved the accuracy of the floodplain maps. During the transition from paper product to digital map data, District staff became aware of inconsistencies in the accuracy of local and federal maps.

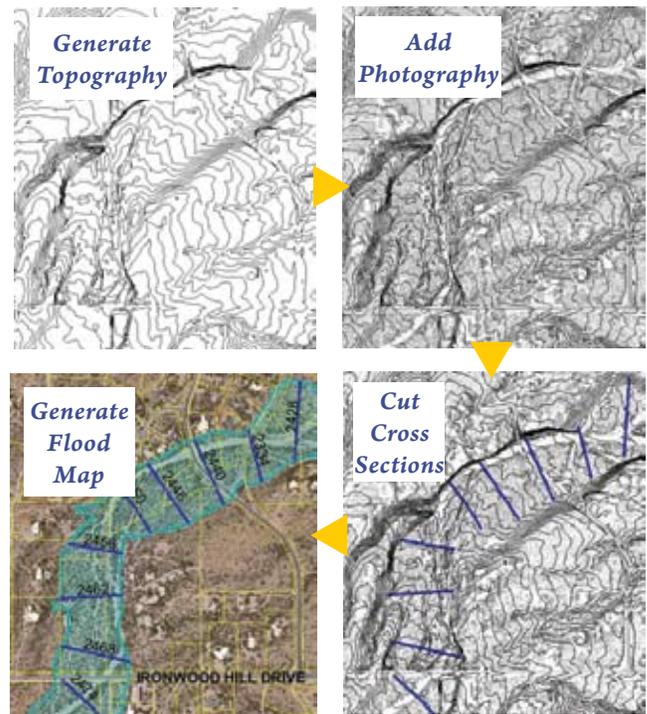
Digital map data that is prepared for Graphical Information Systems (GIS) uses controls (or projections) that link multiple sets of information together. The controls for the GIS data layers created in Pima County are different from the projections that FEMA uses in creating flood maps. Many communities have GIS data with unique projection controls.

The floodplain mapping inaccuracies were in part due to mistakes made in transposing the digital data from one set of projections to another.



***Floodplain Generated Using GIS Data from the District***

The District resolved this problem by creating a process that provides the basic FEMA mapping components to engineering firms in both the local and federal projection schemes. This allows engineers to “plug” their digital maps into data sets that have the correct projections built in. As a result of this process, local reviews have become more accurate and FEMA’s map processing time has been reduced. The District does not know of any other community at the state or national level that provides a similar service. The image above is an example of a floodplain that was created through this process.



***The District is also utilizing the latest tools in creating more accurate floodplain maps. This includes the use of digital terrain models, digital photography and GIS hydraulic modeling programs such as the Corps’ GEO-RAS Program. The diagram above illustrates the floodplain mapping process.***

# COMMUNITY RATING SYSTEM

## Pima County— A Class 6 Community

The Community Rating System (CRS) is a voluntary incentive program that rates local communities participating in the National Flood Insurance Program. Participating communities receive discounted flood insurance premium rates in increments of 5%. For example, a Class 1 community would receive a 45% premium discount, while a Class 9 community would receive a 5% discount. A Class 10 community is a non-participating community, which in turn would not receive a discount for their constituents.

The CRS classes for local communities are based on 18 credible activities and are organized under four categories: 1) Public Information, 2) Mapping and Regulations, 3) Flood Damage Reduction, and 4) Flood Preparedness.

Pima County is a Class 6 Community, which calculates to a 20% discount in flood insurance premiums for our constituents. Pima County ranks in the top 5% of all participating communities nationwide.

*FLAP provides relocation assistance to property owners and purchases flood damaged land.*



# Floodprone Land Acquisition Program

In October 1983, Pima County received three days of heavy rains resulting in a 100-year event in some locations. Many bridges across Pima County were closed, damaged or swept away. Travel throughout the community became extremely difficult, countless residents in the northwest portion of the city were inundated and entire subdivisions were flooded. As a result, a new program was developed—the Floodprone Land Acquisition Program (FLAP).

FLAP provides relocation assistance to property owners and purchases flood damaged land, whether it is improved property or vacant land. Specific criteria used to rank FLAP applications and determine eligibility include the extent of flood damage or severity of flood potential and erosion hazard next to the specific watercourses. The highest priority was given to improved properties that suffered significant damage as a result of the flooding.

This program is completely voluntary and is designed to assist property owners who experience flooding resulting in severe damage and flood hazards. The community also is provided a myriad of benefits such as open space for overbank storage, enhanced groundwater recharge, riparian habitat preservation, wildlife corridors, passive recreation opportunities and protects cultural resources.

Additional grant monies became available after subsequent disasters to purchase additional floodprone and damaged property because Pima County had an established floodprone land acquisition program.



*Floodprone land acquisition also helps create recreational opportunities, maintain urban open space, preserve riparian habitat and enhance ground water quality. Perennial flows in the 2000-acre Cienga Creek Natural Preserve support lush hydroriparian habitat areas. The habitat was purchased in 1987.*

In 1986, after voters approved general obligation bond sales of \$20 million for floodprone land acquisition, a land acquisition plan was adopted by the Pima County Board of Supervisors outlining criteria to guide the District's overall acquisition efforts and allowed the dedication of tax levy revenues to be used for acquisition of floodprone lands. This newly adopted plan aided in the expansion of the program to include purchasing undeveloped land to prevent future floodplain development in sensitive riparian areas and to meet the open space goals of the community. Presently, the program maintains an annual budget of approximately \$3 million per fiscal year.

Currently, there are approximately 8,000 acres of District-owned property that were acquired through FLAP. Significant holdings can be identified along all major watercourses in the Tucson basin as well as in less well-defined floodplains. FLAP has proven to be very successful in protecting the public's safety and minimizing future flood losses.

# Old Nogales Highway Colonia Flooding

In late August 2005, a heavy rainstorm produced two to six inches of precipitation impacting the area near Old Nogales Highway south of the Tucson International Airport also known as the Old Nogales Highway Colonia. This area predominately contains older mobile homes on one-acre lots that do not have the benefit of infrastructure such as sewer lines, streets, sidewalks, street lights, etc.

Many of these one-acre parcels were the result of lot splitting in early 2000—most were not financed by traditional lenders who would have required flood insurance.



*Erosion downstream of culverts under Nogales Highway near 10300 S. Nogales Highway.*

This storm, estimated to be a 25 to 50-year event, left many residents with extensive flood damage to their homes. FLAP purchased one parcel in this area. Additionally, in an effort to improve existing living conditions for other damaged properties, the District made a contribution of \$200,000 to assist the

Pima County Community Development and Neighborhood Conservation Department with rehabilitation efforts. The District also replaced five mobile homes using mobile homes acquired from other FLAP acquisitions, replaced damaged roofs, provided new doors, windows, electrical appliances, and new cooling and heating systems. Overall, forty families benefited from these outreach activities.

# CAPITAL IMPROVEMENTS PROGRAM

## Fiscal Year

July 1, 2005 - June 30, 2006

<i>CIP No.</i>	<i>PROJECT NAME</i>	<i>COMPLETION DATE</i>	<i>* TOTAL COST</i>
<i>FC-04-501</i>	<i>Dybvig Acquisition for Environmental Restoration</i>	<i>February 15, 2006</i>	<i>\$ 714,162</i>
<i>FC-97-025</i>	<i>Earp Wash Detention Basin – City of Tucson</i>	<i>May 19, 2006</i>	<i>\$ 2,432,020</i>
<i>FC-97-013</i>	<i>La Canada Drive: Duval Mine Road to El Toro – Sahuarita Drainage Improvements</i>	<i>July 5, 2005</i>	<i>\$ 501,624</i>
<i>FC-97-015</i>	<i>Holladay/Forrest Drainage Improvements</i>	<i>July 16, 2005</i>	<i>\$ 1,330,658</i>
<i>FC-04-501</i>	<i>Granite Construction Company Sand and Gravel Pit – Acquisition</i>	<i>March 30, 2006</i>	<i>\$ 215,950</i>
<i>FC-04-507</i>	<i>Silvercroft Wash Pedestrian Bridge</i>	<i>November 22, 2005</i>	<i>\$ 274,954</i>
<i>FC-03-002</i>	<i>Cortaro Farms Road Flood Mitigation Report</i>	<i>June 30, 2006</i>	<i>\$ 51,951</i>
<i>FC-03-002</i>	<i>Green Valley Erosion Control Study</i>	<i>November 30, 2005</i>	<i>\$ 64,102</i>
<i>FC-03-002</i>	<i>Juvenile Detention Center Drainage Improvements</i>	<i>November 18, 2005</i>	<i>\$ 138,079</i>
<i>FC-03-002</i>	<i>North Alvernon Road Drainage Improvements</i>	<i>December 14, 2005</i>	<i>\$ 79,085</i>
<i>FC-03-004</i>	<i>Massingale Detention Basin Spillway Repair</i>	<i>September 9, 2005</i>	<i>\$ 577,418</i>
<i>FC-03-008</i>	<i>South Tucson Library Drainage Improvements</i>	<i>August 26, 2005</i>	<i>\$ 638,120</i>
<i>FC-05-004</i>	<i>Canoa Ranch Flood Berm</i>	<i>April 17, 2006</i>	<i>\$ 420,853</i>
<i>FC-87-001</i>	<i>Agua Caliente Wash at Tanque Verde Flood Study</i>	<i>July 1, 2005</i>	<i>\$ 354,091</i>
<b>TOTAL</b>			<b>\$ 7,793,067</b>

*\* Lifetime Project Costs*

# Structural Improvements



*Deep fertile soils and flowing water created a lush riparian habitat attractive to Hohokam and Tohono O'odham Native Americans.*

## *Dybvig Acquisition*

One of the District's more unique floodprone land purchases during fiscal year 2005/06 was the acquisition of a 98-acre property along the west bank of the Santa Cruz River near its confluence with the Cañada del Oro Wash. This property was purchased for \$708,000 for inclusion into the Tres Rios del Norte Ecosystem Restoration Project. Deep fertile soils and flowing water created a lush riparian habitat that attracted first the Hohokam and later Tohono O'odham Native Americans to this site. The remnants of their farms and settlements on the landscape make this property and the surrounding area a highly sensitive archeological treasure. The property was also crossed twice by Juan Bautista de Anza on his historic 1770's expeditions to California. To honor his travels, the Juan Bautista de Anza National Historic Trail, which will be part of the communities' regional multi-use river park trail system, is slated to traverse this site.



*Ponds and adjacent riparian vegetation attract many wildlife species, creating a popular bird viewing spot.*

Closer to present day (1940-1960), a portion of this property was used for sand and gravel excavations. Sand and gravel was mined from onsite pits to provide building material for the ever growing community. Once operations ceased, effluent flow from the Santa Cruz River started to enter the abandoned pits. Over the last 25 years, this flow established a large open water body with lush riparian habitat along the banks. The ponds and adjacent riparian vegetation attracted many wildlife species and the site became a popular bird viewing spot recognized by the Audubon Society. Flood flows deposited sediment that partially filled in sections of the pond and plugged the connection between the old gravel pits and the Santa Cruz River effluent flow. As a result, the ponds have recently dried up. District staff is currently working with the U.S. Army Corps of Engineers, the Tucson Audubon Society and others to determine how to best protect the property and possibly restore flow back into the site to restore its riparian habitat legacy, create passive recreational opportunities, and promote valuable environmental and cultural education.

## *Earp Wash Detention Basin*

Earp Wash is located in the southeast portion of the City of Tucson and unincorporated Pima County. Historically, the wash creates nuisance flooding even during the smallest of storm events in the residential and business neighborhoods between Palo Verde and Alvernon Way. Localized summer monsoon storms in July 1999 created flow depths of 1.5 to 3.0 feet. Residents and businesses between Alvernon Way and Palo Verde Road suffered extensive damage especially from the July 26, 1999 event. This storm produced 1.5 inches of rain, which represented a 25-year storm for this watershed. Flood damage to manufactured homes, storage buildings, heating and cooling systems, loss of access to residents and businesses, and disruption of electrical power resulted in approximately 50 residents requiring emergency shelter.

Recent subdivision developments upstream of Alvord Road have increased the level of flooding downstream along Earp Wash. The District designed and constructed a detention basin east of Alvernon Way to attenuate peak flows downstream of Alvord Road.

The detention basin is situated on a 9.2-acre site located approximately one-half mile north of Valencia Road along the east side of Alvernon Way. The detention basin has reduced the peak flow from 415 cfs to 32.4 cfs and stores approximately 32.5 acre-feet of storm water.

## Environmental & Water Resources

### *Watercourse and Riparian Habitat Protection and Mitigation Requirements Ordinance*

Riparian habitat protection regulations were first included in the Floodplain and Erosion Hazard Management Ordinance 1999-FC1 in 1994 when the Board of Supervisors adopted the Watercourse and Riparian Habitat Protection and Mitigation Requirements Ordinance 1994-FC2 (Ordinance). The Ordinance was structured to encourage avoidance of riparian areas, but does not prohibit development within those areas. If a developer or property owner demonstrates that avoidance of riparian habitat is not feasible, then mitigation of disturbed habitat areas is required. Onsite mitigation to provide continuity of habitat is preferred, but offsite mitigation and mitigation banking options are available as alternative approaches to habitat conservation.

Mitigation banking is a tool for preservation, restoration, or creation of habitat to compensate for unavoidable impacts to habitat at a location other than the area that is being impacted. A mitigation bank can consist of many different options ranging from a financial contribution based on the value of the disturbed habitat that will be used to purchase healthy habitat or restore degraded habitat, purchasing "credits" in an



### *Earp Wash Before*

*Wildcat dumping of roofing materials and tires along small wash, facing southwest.*



## *Earp Wash After*

*The project's construction costs were \$1,601,111 with a total project cost of \$2,400,000. Funding for the project was obtained from the 1997 General Obligation Bonds (FC05), and the District's Tax Levy. Construction of the project began in January 2006 and was completed in May of the same year.*

established mitigation bank property, to actual contributions of land that will be managed for habitat conservation as compensation for the disturbed habitat area. The end result of a mitigation bank is to ensure that there is no "net loss" of valuable habitat acres within Pima County.

In 1998, four years after adoption of the riparian protection regulations, the community and the Board of Supervisors called for stronger all-around environmental regulations within Pima County. As part of that effort, the Ordinance was amended on July 14, 1998 so that the mitigation requirements applied to all properties within unincorporated Pima County not just those entering the rezoning or subdivision process.

In fiscal year 2005/06, the District amended the Riparian Habitat Protection and Mitigation sections of the Ordinance and developed more detailed Riparian Classification Maps. The amendments became effective on October 21, 2005 (Ordinance 1995-FC2).

The current Ordinance further strengthens riparian protection by incorporating the riparian elements of the Conservation Lands System (CLS). The CLS categorizes and identifies locations of priority biological resources within Pima County and provides policy guidelines for the conservation of these resources.

In developing the technical portion of the Sonoran Desert Conservation Plan (SDCP), more detailed riparian

classification maps were produced to provide more precise habitat boundaries and classifications. The new maps also incorporate the riparian elements of the Conservation Lands System and provide a framework for linkage and landscape connections via "Important Riparian Areas" (IRA). IRAs protect the connectivity of habitat areas through protection of the natural functions of washes and flow patterns necessary for survival of riparian vegetation. IRA is a separate classification shown on the updated maps and requires mitigation for disturbance.

*More information is available at: [rfcd.pima.gov/rord.html](http://rfcd.pima.gov/rord.html).*

# District Financial Overview

## Revenues

Although the District receives assistance from state and federal agencies to construct major capital facilities, most of the District's funding is generated from the property tax levy along with general obligation bond sales authorized by the electorate. Information on the District tax levy rate is shown in the table below.

### *Flood Control District Tax Levy Rate 1981 to 2006*

FISCAL YEAR ENDING	LEVY RATE*	TAX
1981	0.5143	\$4,637,000
1982	0.4683	\$5,342,000
1983	0.5072	\$6,882,000
1984	0.4739	\$7,652,000
1985	0.5269	\$9,243,000
1986	0.5102	\$9,969,000
1987	0.5346	\$11,713,000
1988	0.7630	\$17,272,000
1989	0.5592	\$13,730,000
1990	0.5985	\$14,663,000
1991	0.5985	\$14,058,000
1992	0.5871	\$13,689,000
1993	0.5871	\$13,767,000
1994	0.5398	\$12,678,000
1995	0.4623	\$11,379,000
1996	0.3596	\$9,368,000
1997	0.3596	\$9,467,000
1998	0.3296	\$10,392,000
1999	0.3246	\$10,411,000
2000	0.3046	\$10,327,151
2001	0.3046	\$10,414,427
2002	0.3546	\$13,713,102
2003	0.3546	\$14,467,389
2004	0.3546	\$14,467,389
2005	0.3546	\$14,467,389
2006	0.3746	\$19,720,839

\*Per \$100 assessed value

## United States Army Corps of Engineers (USACOE)

In addition to direct cash received from the federal government, the District received monies for in-kind services from the USACOE. Some projects under our cost sharing financial agreement are as follows:

- El Rio Medio \$65,000
- Arroyo Chico \$862,000
- Paseo de las Iglesias \$252,000
- El Rio Antiguo \$386,000
- Tres Rios del Norte \$650,000

TOTAL \$2,215,000

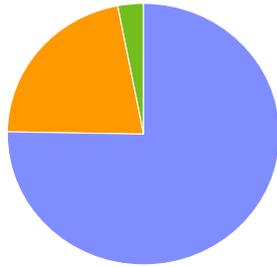
## Expenditures

The table on Page 18 provides information on capital project expenditures for projects completed during FY 2005/06. The remainder of District expenditures goes toward debt service and operating expenses, which include funds allocated for maintenance of flood control structures, floodplain management, planning, and administration activities.

A detailed breakdown of the District's finances is provided on Page 23.

# District Financial Highlights

for Fiscal Year 2005-2006

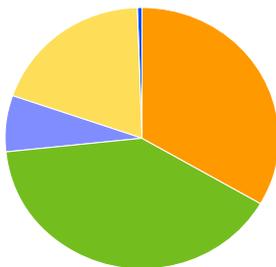


Property Tax RFCD .....	75.5%
Bond Proceeds .....	21.6%
Interest and Other .....	2.9%
Total Revenue .....	100.0%

## Revenues

The primary source of revenue is the District's secondary property tax levy of \$0.37456 per \$100 of real property assessed valuation. In 2005/06, the District received approximately \$19.8

million dollars in tax levy revenue. Other local sources of revenue include revenue for capital improvements from the sale of general obligation (GO) bonds (\$5.7 million) and reimbursements for other funds (\$0.8 million). The total revenue from all sources in FY 2005/06 was \$26.3 million.



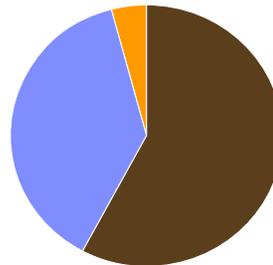
ROW .....	33.5%
Construction .....	40.0%
Planning .....	7.0%
Design .....	19.0%
Other .....	0.5%
Expenses .....	100.0%

## Expenditures

The total expenditures for the District in FY 2005/06 were approximately \$24.0 million. The Capital Improvement Program expenditures of \$13.9 million were direct capital expenses. The annual operating budget for the District was approximately \$9.0 million. The other

significant expenditure was \$1.0 million in debt service for flood control bonds.

## Breakdown of Expenditures



Capital Improvements .....	57.8%
Operating Budget .....	38.3%
Debt Services, PAG .....	3.9%
Expenses .....	100.0%

## Capital Improvements

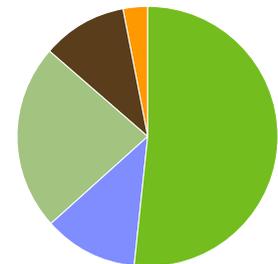
The expenditures for capital improvements include engineering service costs for planning and design; construction costs; right-of-way acquisition costs; and other costs such as

preparing new FEMA Flood Insurance Rate Maps once a capital project is completed. The Corps also provided in-kind assistance in the amount of \$1,450,000 for various CIP projects.

## Operating Budget

The District's operating budget includes administrative, personnel, supplies and service costs associated with Flood Control Support, Flood Prevention and Riparian Protection. Flood Control Support Services include programs such as customer service, permits, public education, and financial management. Flood Prevention Services include maintenance, flood warning, emergency preparedness, and enforcement activities.

Riparian Protection Services include the environmental restoration, water resources and riparian habitat management programs.



FC Support Services .....	51.7%
Infrastructure .....	11.7%
Regulatory .....	23.2%
Riparian Protection .....	10.6%
Capital Equipment .....	2.8%
Expenses .....	100.0%

# COORDINATION WITH OTHER AGENCIES

## *Pima County Department of Transportation*

**The District contracts with Pima County for services from divisions within the Department of Transportation:**

- Field Engineering Division
- Maintenance Operations Division
- Real Property Division
- Technical Services Division
- Administrative Services Division

## *Other Pima County Departments*

**The District cooperates with other Pima County Departments on various projects and exchanges information as needed:**

- Pima County Attorney's Office
- Development Services Department
- Department of Environmental Quality
- Health Department
- Natural Resources, Parks and Recreation Department
- Tucson-Pima County Office of Emergency Management
- Wastewater Management Department (WWM)

## *Local Governments*

**The District has entered into intergovernmental agreements (IGAs) to provide specific flood control or floodplain management services to, or to jointly fund flood control activities with, the following:**

- City of Tucson
- City of South Tucson
- Town of Oro Valley
- Town of Marana
- Town of Sahuarita

## *Pima Association of Governments (PAG)*

**PAG facilitates coordination among local government agencies, including the District, on environmental matters affecting the community.**

## *State Agencies*

**The District coordinates activities with the following state agencies:**

- Arizona Department of Water Resources (ADWR)
- Arizona Department of Environmental Quality (ADEQ)
- Arizona Game and Fish (AGFD)
- Arizona State Land Department

## *Federal Government*

**Several federal agencies participate in local flood control projects, as listed below:**

- U. S. Army Corps of Engineers (USACE)
- Federal Emergency Management Agency (FEMA)
- Federal Highway Administration (FHWA)
- U. S. Bureau of Reclamation (USBR)
- U. S. Natural Resource Conservation Service (NRCS)
- National Weather Service (NWS)
- U. S. Geological Survey (USGS)
- U. S. Fish and Wildlife Service (USFWS)

## *Nongovernment Organizations*

**Other nongovernmental agencies that the District works with include:**

- The Nature Conservancy (TNC)
- Cortaro-Marana Irrigation District (CMID)
- Central Arizona Water Conservation District (CAWCD)
- Metropolitan Domestic Water Improvement District (MDWID)
- University of Arizona (UA)

Pima County Regional  
**FLOOD CONTROL**  
DISTRICT



PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT  
97 EAST CONGRESS STREET • 3<sup>RD</sup> FLOOR  
TUCSON, ARIZONA 85701-1797



