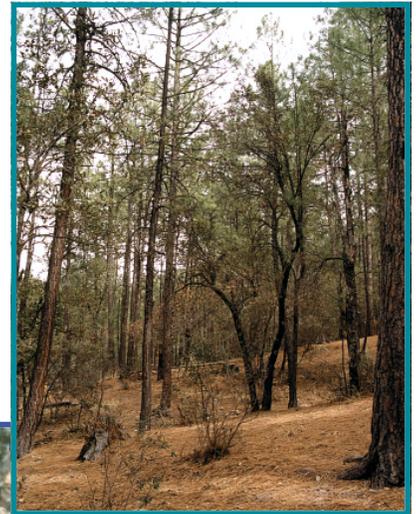
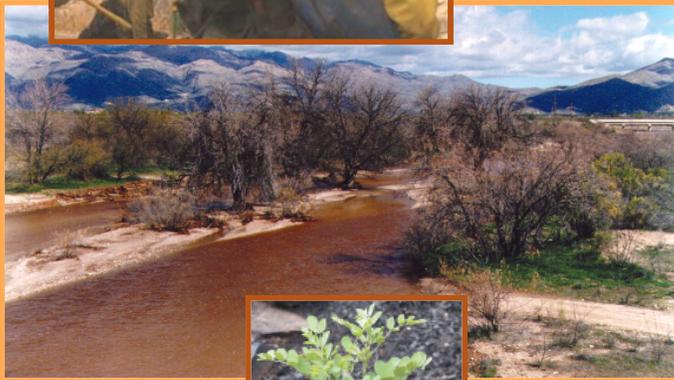


Pima County, Arizona
**FLOOD CONTROL
DISTRICT**
2003/2004 Annual Report



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PIMA COUNTY FLOOD CONTROL DISTRICT

Vision

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

Mission

Pima County 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.

Value Statement

The District is committed to the fair treatment of the general public and our employees, an open decision-making process, fostering the opportunity for employee contributions, improved quality of work through working in partnership, and consideration of environmental values along with economic benefits in our programs.



ADMINISTRATION 2003/2004

BOARD OF DIRECTORS (BOARD OF SUPERVISORS)

Ann Day, District 1

Dan Eckstrom, District 2

Sharon Bronson, Chairperson, District 3

Raymond J. Carroll, District 4

Richard Elías, District 5

FLOOD CONTROL DISTRICT ADVISORY COMMITTEE

Nick Bokaie, Oro Valley

Paul Cella, District 4

Farhad Moghimi, Marana

Mike Zeller, Chair, City of Tucson

Antonio Figueroa, City of Tucson

Vacant, District 3

Linwood Smith, City of Tucson

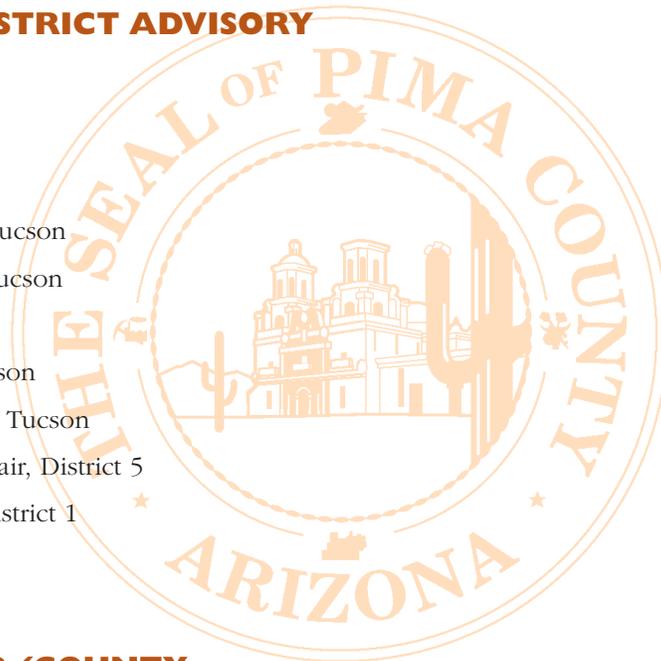
Richard Salaz, City of South Tucson

Phil Pearthree, 2nd Vice Chair, District 5

Doug Shakel, Vice Chair, District 1

Vacant, District 2

Martin Roush, Sahuarita



GENERAL MANAGER (COUNTY ADMINISTRATOR)

C. H. Huckelberry

PUBLIC WORKS DIRECTOR

John M. Bernal

CHIEF ENGINEER (DIRECTOR) TRANSPORTATION AND FLOOD CONTROL DISTRICT

Kurt Weinrich

DEPUTY DIRECTOR, FLOOD CONTROL DISTRICT

Suzanne Shields

MESSAGE FROM THE CHIEF ENGINEER



On behalf of the Board of Directors of the Pima County Flood Control District, I am pleased to present the District's Annual Report for fiscal year 2003/2004.

In the past year, the District has continued in the best tradition of serving the community by providing comprehensive flood protection programs, floodplain management services and riparian habitat preservation programs. A few highlights of the District's activities in FY 2003/2004 include:

- In participation with the Pima Association of Governments, the District secured 3,272 square miles of digital orthophotographic color imagery, and 360 square miles of topographic mapping, which will be used to further develop more accurate floodplain maps and basin master plans.
- The Water Resources Division is assisting in the implementation of the Sonoran Desert Conservation Plan. As an example, they supported the continuing activities of the Science Technical Advisory Team, which is responsible for development of the biological monitoring component of the plan. In addition, they updated the inventory of surface water resources in Pima County and conducted new investigations to understand and protect existing streams and springs.
- In August 2003, following the Aspen Fire, a redevelopment outreach symposium was held for Mt. Lemmon residents at the Tucson Community Center. Additionally, a significant rainfall event occurred in August, resulting in flows of approximately 7,000 cfs—a 25-year flow in the downstream community of Catalina. Immediately following the flood, the District began assisting the residents by accepting applications to the Floodprone Land Acquisition Program from residents who wanted Pima County to appraise their properties for possible acquisition.
- The District completed the design phase of the Ajo Detention Basin to make improvements to the Ed Pastor Environmental Restoration Project in response to safety related concerns noted by Pima County Risk Management. Construction began January 2004 and will be completed in July 2004.
- Improvements to Casa Adobes Wash were provided via the River Road project and via adjacent land developers. The District designed a pedestrian ramp on the north side of River Road to allow for equestrians and pedestrians access to a multicell box culvert under River Road as an underpass.
- The District completed improvements to reduce the flooding and erosion hazards with three major washes traversing Green Valley's Continental Vista subdivision. In addition, a new pedestrian bridge was provided at the Green Valley Recreation Center.
- Each month, staff assisted an average of 476 counter customers, issued an average of 54 Floodplain Use Permits, and investigated an average of 26 drainage complaints. In addition, an average of 541 Flood Hazard Information Sheets were completed.

I believe that the District's efforts in this fiscal year made a significant contribution toward minimizing flood and erosion hazards for Pima County residents and their property. I hope you'll take a close look at this year's annual report for more details on the District's many flood control activities. This and previous annual reports are available at: www.dot.pima.gov/flood

A handwritten signature in black ink, appearing to read 'K. Weinrich'.

Kurt Weinrich, P.E.

Director, Department of Transportation
and 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 the 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 views 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 twelve specific policy goals and objectives have been adopted by the Board as part of the District's Floodplain and Erosion Hazard Management Ordinance:

- To minimize flood and erosion damages.
- To meet or exceed state and federal requirements relating to floodplain management—thereby enabling Pima County residents to purchase low-cost flood insurance to receive disaster relief, should the need arise, and to seek residential and commercial real estate loans.

- To establish minimum flood protection elevations and damage protection requirements for structures and other types of development, which may be vulnerable to flood and erosion damage.
- To regulate encroachment and building development within areas subject to flooding or erosion, and to ensure that the flood-carrying capacity within the altered and/or relocated portion of any watercourse is maintained.
- To encourage the most effective expenditures of public money for flood control projects.
- To protect, preserve, and enhance groundwater recharge.
- To minimize the need for rescue and relief efforts associated with flooding and erosion, usually undertaken at the expense of the general public.
- To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, and streets located in regulatory floodplain and erosion hazard areas.
- To help maintain a stable tax base by providing for the protection of regulatory floodplain and erosion hazard areas.
- To inform the public when property is in a regulatory floodplain or erosion hazard area.
- To ensure that those who occupy the areas within a regulatory floodplain and erosion hazard area assume responsibility for their actions.
- To encourage the preservation of natural washes and enhance the riverine environment.

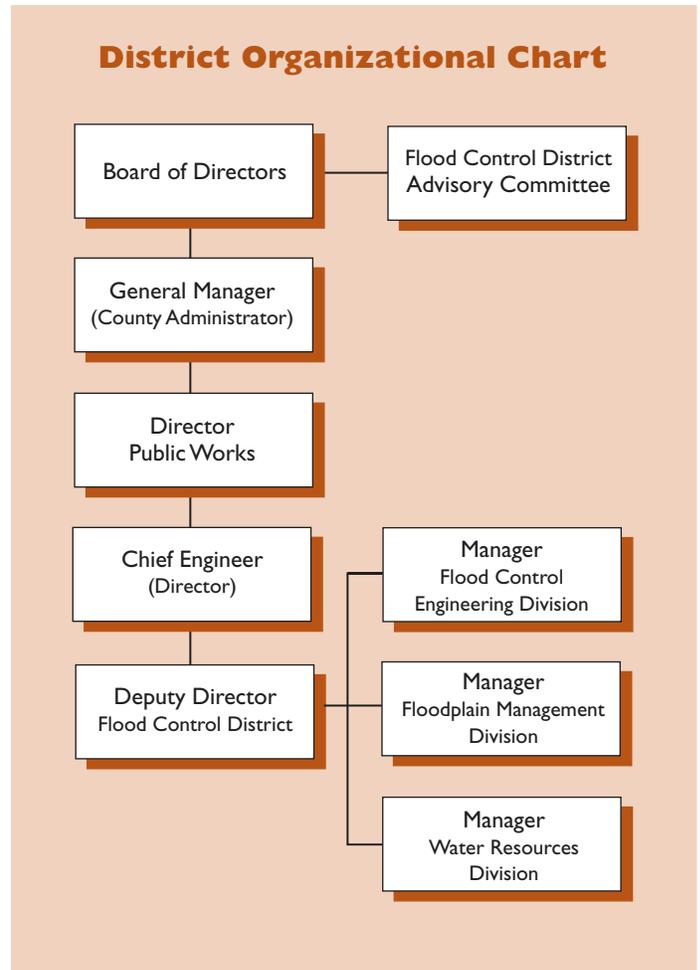
District Organization

The District is organized into three main divisions based on the major functions of each group: 1) the Floodplain Management Division; 2) the Flood Control Engineering Division; and 3) the Water Resources Division. The District receives substantial support from other divisions within the Pima County Department of Transportation and Flood Control District. These include Administrative Support Services, Maintenance Operations, Field Engineering, Real Property, and Technical Services. Further assistance is received from other 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

Department of Transportation and Flood Control District and other departments through interdepartmental fund transfers from the District to Pima County.

Although District employees are part of the Pima County Department of Transportation and Flood Control District, their positions are funded entirely from District revenues. The District funded 56 full-time equivalent staff positions in FY 2002/03.

As noted, the Board governs the Flood Control District. The Board also hears requests for variances and appeals to the Floodplain and Erosion Hazard Management Ordinance (FPMO). In 1988, the Board formed the Flood Control District Advisory Committee (FCDAC) to advise on flood-related matters and to increase public participation in the decision-making process. The 12-member FCDAC includes five members appointed by the Board (one for each Board member), three representatives from the City of Tucson, and one representative each from the City of South Tucson, the towns of Marana, Oro Valley and Sahuarita. One position, in an ex-officio capacity, is available for appointment by the Tohono O’odham Nation.



Policy goals and objectives adopted by the Board of Supervisors strive to inform the public when property is in an erosion hazard area and to ensure that those who occupy areas within a regulatory floodplain assume responsibilities for their actions.

DISTRICT ACTIVITIES

Service Programs

Customer Service

Dynamic public outreach activities build upon the wealth of information created and gathered by District staff throughout the years. Flood awareness, flood preparedness, and safety are major themes along with groundwater recharge, watershed protection and riparian habitat conservation.

Public Information and Education

In July and August 2003, following the massive destruction from the Aspen Fire, District staff along with many other volunteers went to Mt. Lemmon several days a week and every weekend to assist residents with the delivery of seed, bales of hay and sandbags. The District worked closely with the Natural Resources Conservation Services (NRCS) to help control or stop potential erosion problems. On August 26th, a redevelopment outreach symposium was held for Mt. Lemmon property owners at the Tucson Community Center.

Pima County Natural Resources, Parks and Recreation and Old Tucson Studios sponsored the 14th Annual Ted Walker Youth Day on January 13, 2004. It marked the first time the District participated in this event. Approximately 3,000 elementary school students, their teachers and chaperones visited Old Tucson. The Rolling River Flood Safety Trailer was once again a huge success.

In July 2004 220,000 Flood Safety Flyers were sent out with Tucson Water utility bills throughout Pima County.

Public Works Week May 17-21, 2004

On Thursday, May 20, 2004, department staff along with other Public Works departments, the City of Tucson, the Town of Marana, the City of South Tucson, and Pima Association of Governments participated in the 2nd Southern Arizona Annual Public Works Week Fair. This event is an annual reminder of the many ways public works professionals maintain and improve our quality of life. Each jurisdiction provided displays and information on the services and facilities they provide to the public. This year's event was held at the Joel Valdez–Main Library in the outdoor plaza.

District World Wide Web Site

Over the past year, the District continued to develop its Worldwide Website, which provides public information on a variety of flood control and floodplain management topics. New content areas were developed including information on area river parks, capital improvement projects, water resources and stream restoration activities.

The District's website is used by real estate agents, insurance and engineering firms, and the general public, and has seen a steady increase in its use and requests for information resulting in 26% increase in viewer activity over the previous year.

Customer Service Training and Satisfaction Surveys

In 2003/04, new Flood Control District employees were encouraged to attend a two-day customer service training class. All counter customers were asked to complete a survey to rate flood control personnel in customer service during a period of two weeks (June 21 - July 2, 2004). The District received an overall customer service satisfaction score of 96%.

Employee Training

As part of the ongoing effort to expand the base floodplain management knowledge of all Flood Control District employees, a series of seven training modules was developed. These modules are taught onsite, which makes it convenient for employees to attend, eliminates travel expenses, allows for increased training opportunities, and greatly reduces the time that staff is away from the office. Registered Professional Civil Engineers taught the first three modules—Geomorphology, Pima County Hydrology Method, and Floodplain Hydraulics—by the end of June 2004.

Invitations to attend each of these training modules were extended to flood control and drainage review staffs from the City of Tucson, Oro Valley, Marana, Sahuarita, and the Tohono O'odham Nation. The invitations were readily accepted and appreciated.

Internal Business Processes

Providing prompt, high quality service to external and internal customers is the goal of the Floodplain Management Section. In order to achieve this goal, the section's staff meets twice each month to discuss process improvements.

In 2003, work began on reviewing and updating several standard operating procedures to better serve the public. Several improvements were implemented such as placing additional layers of resource material on the geographic information system to advance project reviews and processing times; creating databases for elevation certificates; improving and adopting updated record keeping processes; using efficient digital cameras saving time and public funds; and improving and adopting the Vehicle Preventive Maintenance Program.

Drainage Maintenance Process Improvement

The Maintenance Operations and Floodplain Management divisions work together to resolve drainage problems affecting public safety. There are many causes for drainage

problems that staff diligently works toward understanding, correcting, and ultimately preventing future problems.

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

Orthophotography/Topography Project

In participation with the Pima Association of Governments, the District secured 3,272 square miles of digital orthophotographic color imagery, and 360 square miles of topographic mapping. These products will be used to further develop more accurate floodplain maps and basin master plans.

Computer Design Innovation

The District has developed a computer aided drafting design standard (CADD) for the Department of Transportation and Flood Control District. The Flood Control Engineering Division has utilized this standard on several new projects.



A Roadrunner takes a break along the lower Santa Cruz basin north of Tucson.

Management Programs

Water Resources and Riparian Habitat Management Program

This program consists of activities intended to: 1) prevent existing flooding, erosion and riparian habitat loss from getting worse and 2) prevent the creation of new flooding, erosion, and 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.

Sonoran Desert Conservation Plan

The Water Resources Division is assisting in the implementation of the Sonoran Desert Conservation Plan (SDCP). Following is a list of key steps in fiscal year 2003/04:

- Improvements to the stewardship of lands acquired by the District including updating caretaker agreements, maintaining and installing fences, and conducting resource inventories.
- Proposed revisions to the riparian habitat mitigation ordinance, including the maps.
- Evaluating the biological and water resources of potential new acquisitions.
- Participating in the implementation of the conservation (open space) bonds.
- Staffing the Science Commission which has oversight for the development of monitoring the overall progress of the SDCP.
- Supported the continuing activities of the Science Technical Advisory Team which is responsible for development of the biological monitoring component of the SDCP.
- Developing studies and plans necessary for the USACOE's restoration projects.
- Updated the inventory of surface water resources in Pima County and conducting new investigations to understand and protect existing streams and springs.

Floodprone Land Acquisition Program

Floodprone parcels continue to be evaluated along many of the washes and rivers located in Pima County. The Flood Control District increased its holdings in Avra Valley during 2003/2004 along the Black Wash through two purchases and one purchase along the Brawley Wash. The non-Catalina acquisitions totaled 56 acres for \$344,900. The bulk of the FLAP acquisitions handled by the Water Resources team were concentrated in the Cañada del Oro area of Catalina following the Aspen Fire. By the end of fiscal year 2003-2004, the District had acquired 148.34 acres of property along this watercourse. Additional details can be found in the Aspen Fire section of this report.

The total fiscal year 2003/04 FLAP acquisitions was 204 acres for \$9,346,084.

Riparian Habitat Ordinance

In fiscal year 2003/04, 22 hydro/mesoriparian mitigation plans were approved by the Board of Supervisors. District staff reviewed 25 subdivision plans and 5 private property xeroriparian mitigation plans.

Fiscal Year Statistics

A total of 30,400 customers were served in 2003/04 for an average of 2,500 customers per month. The services provided included:

- Issued an average of 54 Floodplain Use Permits per month.
- Investigated an average of 26 drainage complaints per month.
- Processed approximately 541 Flood Hazard Information Sheets per month.
- Assisted an average of 476 customers at the counter per month.
- Reviewed an average of 1,430 permits per month.

Flood Warning and Emergency Preparedness

The Flood Warning Program encompasses the District's Automated Local Evaluation in Real Time (ALERT) System, which consists of approximately 85 automatic self-reporting precipitation gauges, 32 stream gauges, 4 weather stations, and 4 radio repeater stations. The system automatically transmits hydrometeorological data via radio telemetry to the District's base station and to the Tucson office of the National Weather Service (NWS). During storm events, District staff evaluated incoming data to monitor changing flood conditions. The NWS also uses the information when issuing flash flood warnings and advisories. In addition to annual maintenance on all sites, the following highlights occurred during 2003/04:

- Four precipitation gauges and two streamflow gauges were installed in the Santa Catalina Mountains to provide enhanced early-warning information on storms in the Aspen Fire burn areas.
- Non-submersible streamflow sensors were installed at two critical ALERT system sites on the Cañada del Oro Wash, where ash-contaminated runoff affected the accuracy of standard streamflow measurement devices.

Floodplain Management Program

The main responsibility of District staff in the Floodplain Management Program is to enforce provisions of the Pima County Floodplain and Erosion Hazard Management Ordinance. This ordinance, prepared in accordance with the National Flood Insurance Program (NFIP), includes regulations and requirements designed to minimize flood damage and losses throughout the community. This important goal is accomplished largely through review and the issuance of Floodplain Use Permits, detailed site reviews for potential development, and investigation of drainage and flood-related complaints. Flood Hazard Information Sheets provide a succinct listing of a parcel's floodplain status. Customers are assisted by phone, fax or in person.

Flood Insurance Program

The District works in conjunction with the Federal Emergency Management Agency (FEMA) under the Flood Insurance Study Program (FIS) to identify floodprone areas, which are used to set insurance rates for flood hazard areas within Pima County. An essential effect resulting from this effort is a set of official maps called Flood Insurance Rates Maps (FIRMs). These maps display flood hazard zones and other relevant hydrological information. Federal, state, and local floodplain management regulations apply to development and other activities that take place within designated flood hazard zones.

FIRMs have been prepared for most of the major watercourses and many of the smaller watercourses within Pima County. These maps are revised periodically when structural improvements are implemented or when floodplain characteristics are altered; a modification to channel geometry is one example. The Floodplain Management Division is the local map repository for these FIRMs.

In fiscal year 2003/04, District staff performed the following activities:

- The District remapped the Rillito Creek, Lower Pegler Wash, and the Lower Finger Rock Wash.
- The District continued to improve and update digital floodplain data into the GIS system.
- Work continued on the remapping of the Lower Santa Cruz River.
- FEMA and the District began the process of entering into a Cooperative Technical Partnership to improve the accuracy of the floodplain mapping.



*Illustrations on pages 9 and 13
by Bill Singleton, Pima County Graphic
Services Department.*

EMERGENCY PREPAREDNESS

Aspen Fire

The Aspen Fire consumed 85,000 acres of land and 335 structures between June 17, 2003 and July 17, 2003. The incendiary point was located near Marshall Peak on the Aspen Trail. By nightfall of June 19th, the community of Summerhaven was engulfed in flames.

One of the principal dangers resulting from significant fires is increased flooding; erosion and debris flow due to the destruction of large quantities of vegetation. A mountain fire, such as the Aspen Fire, increases the magnitude of this danger, due to large topographic relief and flow concentration into more urbanized areas. Early estimates from the United States Forest Service indicated that watersheds in areas severely burned could produce up to five times the quantity of runoff from a given area.

In order to address these dangers and other related issues, District staff launched a comprehensive and multifaceted program to provide an enhanced early flood warning system, mitigate the newly developed hazards, and to better characterize the nature of the hazards.

As a first step, the Pima County ALERT Flood Warning System damaged by the fire was quickly repaired and supplemented with additional weather and stream gauge monitoring sites in order to provide enhanced early warning, if potential post-fire flood dangers became imminent threats to urbanized areas downstream. ALERT System repairs and enhancements costs were \$47,000. Second, Pima County worked with the Natural Resource Conservation Service to quickly develop and implement a multi-phased program under the Emergency Watershed Protection Program to reduce the potential damages that

could be caused by increased flood and debris flows through containment of ash from burned structures, revegetation and structural erosion control efforts. Third, the District launched a total of four hydrologic studies to evaluate, in more detail, the hydrologic conditions within the different watersheds in the post-fire era.

Emergency Watershed Protection Revegetation and Erosion Control Program costs were \$727,061. Several emergency contracts and agreements were required to implement the elements of this Flood Control District program. The total contract amount to successfully complete this three-tiered effort was approximately \$944,000.

Hydrologic Studies are estimated at \$170,000 to study the front-range watersheds of Ventana, Sabino, and Molino, the Upper Cañada del Oro Watershed, and agreement with the United States Army Corps of Engineers to study Carter Canyon.

The only waste materials generated during the implementation of the post-fire Flood Control Program were from activities associated with the removal of debris from major drainage channels within the Summerhaven area. This activity was necessary to prevent the formation of large and potentially hazardous debris dams (mostly vegetative waste) within the watercourses. A breach in these unstable debris dams, due to hydrostatic and hydrodynamic forces, could have exacerbated downstream flash flooding. These removal activities are one of the most significant efforts in the Revegetation and Erosion Control Program requiring repeated efforts to remove debris from vegetation and felled trees that continued to appear within



President George W. Bush surveyed the damage on Mt. Lemmon before speaking about his Healthy Forests Initiative.

the drainage courses. Vegetative debris measuring less than 12 inches in diameter was chipped and taken to the landfill to be used as daily cover, whereas larger debris was cut up and removed from the channels.

The District worked closely with the United States Forest Service to secure access, as necessary, for the installation of additional monitoring stations, as well as the staging areas required for aerial revegetation.

The District worked closely with the Natural Resource Conservation Service and local conservation districts throughout the course of the revegetation and erosion control program including co-staffing the “yellow tent” located within Summerhaven for the first six weeks after resident reentry in order to answer questions pertaining to erosion hazards and revegetation methods, among others during the post-fire healing process.

Hydrologic work was coordinated with the USACOE for the Carter Canyon watershed. The program was implemented by the District, which successfully addressed the immediate needs of providing enhanced warning for downstream residents of the potential for increased flood flows due to the fire, provided erosion protection and flow attenuation through revegetation processes and other constructed measures, and provided protection for the remaining facilities and water quality. Additionally, the hydrologic studies provided information necessary to determine the design criteria needed to provide appropriate future protective measures.

It is expected that most of the structural treatments completed under this project will remain viable and functional for several years until the natural recovery processes returns the hydrologic conditions back to pre-fire conditions.



Cañada del Oro Watershed - Catalina, Arizona

The Aspen Fire changed the hydrologic characteristics within the Cañada del Oro watershed. Moderate to high burn severity through much of the watershed denuded the drainage basin, greatly increasing the chances of flooding during the summer monsoon season.

On August 25, 2003, a significant rainfall event occurred resulting in flows of approximately 7,000 cfs—a 25-year flow. Sheriff’s deputies evacuated the area and most of the homes within low-lying areas both east and west of the channel. Immediately following the flood, the District began efforts to assist the residents by accepting applications to the Floodprone Land Acquisition Program from residents who wanted Pima County to appraise their properties for possible acquisition.

The acreage consisted of 75 parcels totaling almost 200 acres of land. As of July 2004, 151 acres of land or approximately one-third of the total acreage within the Cañada del Oro floodplain was acquired.

The cost to the District has been substantial—\$7,880,641 for real property and \$1,120,524 paid out for relocation benefits to displaced property owners. The District, however, garnered a federal grant of \$3,000,000 to contribute to the enormous costs generated by this project.

The acquisition of continuous parcels of property containing rural characteristics created an interest, particularly with the Pima County Natural Resources, Parks and Recreation Department. The community of Catalina, Oro Valley, and the area residents welcomed an opportunity to create a rustic, equestrian-oriented recreational space for this northwest cluster of communities, which could evolve into a well-planned, multiuse facility for area residents as well as in surrounding developments.

You may view a more comprehensive report on the Aspen Fire, entitled *Fire on the Mountain*, at www.aspenfirerecovery.org



A 25-year flow during the monsoon season resulted in increased flooding within the denuded watershed.

CAPITAL IMPROVEMENT PROGRAMS

STRUCTURAL IMPROVEMENTS

Structural capital improvement projects are intended to reduce flooding and erosion by designing and constructing improvements to safely convey floodwater and protect channel banks from erosion.

Structural projects are typically a solution in areas that have already been built-out or when protecting important infrastructure.

Ajo Detention Basin Safety Improvements

The District completed the design phase to make improvements to the Ed Pastor Environmental Restoration Project in response to safety related concerns noted by Pima County Risk Management. Construction began in January 2004 and will be completed in July 2004.

Arroyo Chico Detention Basins

This \$27.5 million flood control project will protect residents and businesses in downtown Tucson by removing 220 residences from the 100-year floodplain. The USACOE has started the final construction plans and specifications to begin construction in March 2005.

Avra Valley Road Flood Control Improvements

The District designed and constructed a flood control berm and wall along the north side of Avra Valley Road to remove the Happy Acres subdivision from the regulatory floodplain. Construction began in November 2003 and was summarily completed within one month.

Continental Vista Erosion Protection

The District completed improvements to reduce the flooding and erosion hazards within three major washes traversing Green Valley's Continental Vista subdivision. In addition, a new pedestrian bridge was provided at the Green Valley Recreation Center. Construction began in December 2003 and the project was completed in April 2004.

Gibson Arroyo Ajo, Arizona

Ajo, Arizona, is an unincorporated community located within Pima County, Arizona, and lies approximately 160 miles west of Tucson. On July 29, 2003, the community of Ajo experienced a severe thunderstorm producing significant rainfall—approximately 1.3 inches of rain in just over one hour. Flooding occurred primarily along the Gibson Arroyo and tributaries located south of the arroyo.

The Flood Control District quickly responded by providing immediate assistance with clean up and maintenance of streets, bridges, and portions of the Gibson Arroyo. In addition, the District immediately requested and received approval to enter a portion of the Gibson Arroyo owned by Phelps Dodge in order to dredge along an extensive stretch of the channel to provide increased hydraulic capacity.

As part of the District's response, a consultant was hired to provide an emergency evaluation and report on the flooding including new aerial-topographic mapping, a field review of the flooding, data collection, and preparation of preliminary hydrologic and hydraulic analyses. Accordingly, a Master Drainage Plan was developed to recommend specific



At left and center, Ajo Detention Basin. On the right, new concrete drainageway next to Shannon Road has alleviated the ponding problems.

approaches to address these floodprone areas including the Second Avenue Bridge and southern tributary flooding.

Second Avenue Bridge Replacement

Eyewitness accounts of the July 29, 2003 flood provide ample evidence that debris and sediment effectively blocked the conveyance area of the bridge and increased flooding conditions during the flood event.

The bridge is a 3-cell structure with a relatively low profile with two pier walls between the cells, which restrict the amount of debris and sediment that can freely pass downstream. Hydraulic modeling of the existing bridge reveals that if the opening were not clogged by debris and sediment the 100-year flow depth at the bridge would be reduced by about 1.3 feet. A new bridge can be designed to accommodate debris and sediment, thereby reducing flooding.

Curley School Site Detention Basin

The southern portion of Ajo contains several tributaries to the Gibson Arroyo. This area maintains poor drainage infrastructure such as private culvert systems that run under residential structures.

The most effective way to alleviate the flooding problem is to reduce the peak discharge by storing the flood volume in a flood control basin. The former football field at Curley School is a prime location for the detention basin as this is a sizeable piece of property capable of sustaining a detention basin. Therefore, the planning has been initiated in concert with the renovation planned for Curley School.



Holladay/Forrest Drainage Improvements

Drainage improvements are needed to eliminate the repeated flooding of homes located northwest of the Mission and Drexel roads intersection. The District is continuing the design, which includes a storm drain to convey flows to an existing drainageway along Mission Road.

Lower Santa Cruz Recharge Project

The Lower Santa Cruz Recharge Project is a State Demonstration Recharge Project developed jointly by the Pima County Flood Control District, Central Arizona Water Conservation District, and the Town of Marana. The facility consists of approximately 30 acres of spreading basins that are used to recharge up to 30,000 acre-feet of Central Arizona Project water into the underlying aquifer. Approximately 37,758 acre-feet were recharged during the 2003/2004 fiscal year.

Mission View Wash

Design continues on this project to mitigate downstream flooding including the construction of a regional detention basin east of Park Avenue and south of 36th Street.

Shannon Road Drainage Improvements

The Palmdale subdivision was constructed in 1962. This subdivision has sustained long-standing drainage and ponding issues along Shannon Road creating a myriad of safety hazards, and in general is a nuisance to the residents. The District constructed a new concrete drainageway next to Shannon Road, which has alleviated the ponding problems. Construction began in October 2003, and the project was completed in February 2004.



Pima County is considering revisions to its existing floodplain ordinance to strengthen the protection of streamside vegetation.

ENVIRONMENTAL RESTORATION

Environmental restoration capital improvement projects are intended to protect and/or enhance riparian habitat and promote groundwater recharge utilizing a combination of constructing structural improvements and planting native habitat.

El Rio Antiguo

El Rio Antiguo is an ecosystem restoration study being conducted in cooperation with the USACOE. Goals of the project include habitat restoration, restoration of natural river functions, stormwater harvesting, and providing passive recreational opportunities along the Rillito River between Craycroft Road and Campbell Avenue. The Feasibility Study phase began with a public meeting held in November 2001. The Feasibility Study report was completed in December 2003, which was then sent to Corps headquarters for final review. The project design is expected to begin in 2005 with construction beginning in 2008.

El Rio Medio

This study is a cooperative effort by the USACOE, the District and the City of Tucson to provide ecosystem restoration, flood control improvements, river park trail development and water recharge development along the Santa Cruz River between Congress and Prince Road. This study in conjunction with the Paseo de las Iglesias and Tres Rio del Norte studies completes an environmental,

hydrological and economic cost and benefit review of the Santa Cruz River within the Tucson metropolitan area.

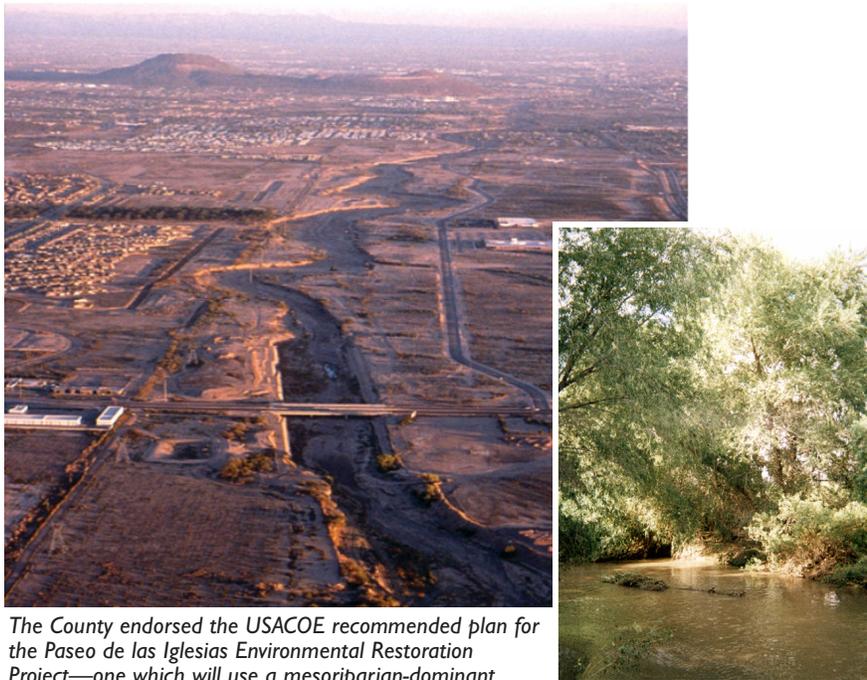
Methods being considered for possible implementation of the project include a variety of water harvesting features, irrigation, river bank terracing, and reestablishment of native trees, shrubs, and riparian communities.

Marana High Plains Effluent Recharge Project

The Marana High Plains Effluent Recharge Project is a multipurpose facility that is used to recharge surface water diverted from the effluent-dominated reach of the Santa Cruz River while enhancing wildlife habitat through the planting and establishment of native trees and shrubs adjacent to the recharge basins. Stormwater harvesting is also used on the site, along with fencing to restrict cattle. A total of 364 acre-feet has been recharged at the facility since operations began in February 2003. Biological studies have noted significant habitat improvement to the site due to the successful establishment and recruitment of native plants and shrubs. The District is looking at opportunities to expand the facility in cooperation with the Town of Marana.

Paseo de las Iglesias Environmental Restoration Feasibility Study

The Paseo de las Iglesias Environmental Restoration Feasibility Study is being conducted by the USACOE and the District with input from the City of Tucson and other stakeholders. The study purpose is to evaluate ecosystem



The County endorsed the USACOE recommended plan for the Paseo de las Iglesias Environmental Restoration Project—one which will use a mesoriparian-dominant approach along riverbanks and terraces.

restoration, flood control improvements, and river park trail development along seven miles of the Santa Cruz River historic floodplain upstream from Congress Street. Methods being considered to implement this project include water harvesting features, irrigation, riverbank terracing, and reestablishment of native tree, shrub, and emergent wetland communities. Analyses for biologic, hydrologic, and economic costs and benefits were used to rank the restoration alternatives.

After soliciting public input, the County endorsed the USACOE's recommended plan, which will use a mesoriparian-dominant approach for environmental restoration along the riverbanks and terraces. The recommended alternative includes restored and irrigated mesquite-hackberry bosques on river terraces and floodplain. Watercourse areas will be bordered by mesquite and palo verde woodland and Sonoran desertscrub species. Riverbanks will be laid-back and/or terraced and planted. Water harvesting features will be incorporated. Vegetation will provide improved habitat for native wildlife and a pleasant setting for passive recreation. Numerous viable water sources are under consideration—1.7 MGD (1,900 acft/yr) of irrigation will be needed to accomplish draft design goals. Recreational elements including the Juan Bautista National Historical Trail and other amenities are being planned.

Rillito/Swan Wetlands

The Rillito/Swan Wetlands is an ecosystem restoration project being conducted in partnership with the USACOE. The USACOE completed a Feasibility Study to determine the costs and benefits of enhancing approximately 60 acres of riparian habitat between Craycroft and Columbus roads along the Rillito River. Staff conducted a public workshop in an effort to obtain input into the selection of the final design alternative.

Tres Rio del Norte

The Tres Rios del Norte project is an Environmental Restoration Study being conducted in cooperation with the USACOE, the Town of Marana, and the City of Tucson. The project area covers 18 miles of the Santa Cruz River from Prince Road to Sanders Road in northern Pima County. Proposed restoration efforts in this reach focus on capitalizing on available resources such as stormwater runoff and effluent discharged from the Ina Road and Roger Road wastewater treatment facilities to enhance riparian habitat. Other features include channel stabilization projects, grade control structures to increase infiltration and widen the extent of the shallow groundwater table, a trail system, and ecoducts beneath I-10 and Silverbell Road to provide habitat connectivity between the Tucson Mountains, the Santa Cruz River and the Tortolita Fan area. The project is currently in the end phases of the feasibility stage.



Returning vegetation such as the morning glory enhances a pleasant setting for passive recreation.

CAPITAL IMPROVEMENTS PROGRAM
Project Specific Expenditures
Fiscal Year July 1, 2003 – June 30, 2004

| Project | Planning | Design | ROW Acquisition | Construction Cost | Other | Project Total |
|--|----------|---------|-----------------|-------------------|--------|---------------|
| 1 El Rio Medio | 0 | 171,332 | 0 | 6,515 | 149 | 177,996 |
| 2 Rillito Creek Bank Stabilization (River Park) | 58,909 | 0 | 1,145 | 0 | 1,086 | 61,140 |
| 3 Santa Cruz River Bank Stabilization, Grant Road to Ft. Lowell Road | 18,243 | 20,142 | 56,483 | 2,822 | 7,521 | 105,211 |
| 4 Santa Cruz River, Valencia to Irvington | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 Arroyo Chico Detention Basin | 107 | 263,051 | 9,879 | 1,824 | 31,415 | 306,277 |
| 6 Ajo Detention Basin Safety | 0 | 43,056 | 0 | 495,955 | 23,667 | 562,678 |
| 7 Tanque Verde Creek, Craycroft to Sabino Canyon Road | 106 | 20,972 | 7,364 | 1,916 | 207 | 30,565 |
| 8 Northwest Replenishment Project (High Plains) | 15,653 | 0 | 0 | 10,964 | 4,058 | 30,675 |
| 9 Lower Santa Cruz Flood Control Levee | 15,660 | 13,898 | 7,054 | 106,846 | 22,061 | 165,520 |
| 10 Green Valley Drainageway #9 | 177 | 23,031 | 0 | 555 | 551 | 24,314 |
| 11 Shannon Road, Palmdale Subdivision | 71 | 18,153 | 0 | 461,905 | 4,434 | 484,562 |
| 12 Massingale Detention Basin | 0 | 111,895 | 0 | 6,862 | 519 | 119,276 |
| 13 Continental Vistas Erosion Protection | 987 | 23,843 | 4,012 | 451,765 | 3,426 | 484,033 |
| 14 Mission View Wash | 0 | 47,155 | 0 | 0 | 0 | 47,155 |
| 15 Holladay/Forrest Drainage | 2,601 | 125,552 | 8,886 | 346 | 760 | 138,146 |
| 16 Ajo Detention Basin-Wetlands (Completed) | 132,268 | 0 | 0 | 0 | 0 | 132,268 |
| 17 Rillito Creek/Swan Wetlands | 7,219 | 2,857 | 0 | 400 | 437 | 10,912 |
| 18 Rillito Creek Environmental Restoration (El Rio Antiguo) | 11,276 | 56,351 | 39,332 | 5,446 | 4,845 | 117,250 |
| 19 Rillito Creek Linear Park at Casas Adobes Wash | 53 | 7,114 | 526 | 2,750 | 0 | 10,443 |
| 20 Cortaro Mesquite Bosque | 24,310 | 63,556 | 0 | 529 | 3,035 | 91,426 |
| 21 Fairview Limberlost Drainage Improvements (Completed) | 0 | 0 | 0 | 692 | 0 | 692 |
| 22 Tres Rio del Norte | 157,985 | 732 | 4,613 | 0 | 31,940 | 195,270 |
| 23 City of Tucson Drainage Improvements Earp Wash | 887 | 32,552 | 6,337 | 0 | 0 | 39,776 |
| 24 McClelland River Park (Completed) | 0 | 158 | 0 | 69 | 0 | 227 |
| 25 Paseo de las Iglesias | 68,037 | 13,380 | 34,893 | 3,431 | 2,376 | 122,118 |
| 26 Agua Caliente Wash at Tanque Verde Road | 5,208 | 13,470 | 0 | 0 | 22,719 | 41,397 |
| 27 Calle de Samuel Cutout | 18 | 0 | 0 | 0 | 0 | 18 |
| 28 South Tucson Library | 28,850 | 27,150 | 0 | 0 | 0 | 55,999 |
| 29 Columbus Wash | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 Sahuarita La Cañada Drainage Improvements | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 Urban Drainage | 0 | 2,868 | 0 | 0 | 846 | 3,714 |
| 32 River Road/Camino Real Wash | 5,410 | 7,062 | 0 | 0 | 0 | 12,471 |
| 33 Camino Verde/Valencia Box Culvert | 6,658 | 5,155 | 1,324 | 0 | 0 | 13,137 |
| 34 River Road: Campbell Ave. to Alvernon Way | 0 | 464 | 0 | 5,783 | 0 | 6,247 |
| Floodprone Land Acquisition (Non-bond) | 65,094 | 48,414 | 10,758,044 | 90,395 | 33,469 | 10,995,416 |

DISTRICT FINANCES

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 at right.

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 share financial agreement are as follows:

| | |
|-----------------------|------------------|
| El Rio Medio | \$400,000 |
| Arroyo Chico | 50,000 |
| Paseo de las Iglesias | 134,000 |
| El Rio Antiguo | 50,000 |
| Tres Rios del Norte | 125,000 |
| TOTAL | \$759,000 |

Expenditures

The table on page 16 provides information on capital project expenditures for FY 2003/04. Project numbers shown in the table correspond to the projects shown on the map on page 17. The remainder of District expenditures goes toward debt services 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 19.



Riparian Protection Services include riparian habitat management programs.

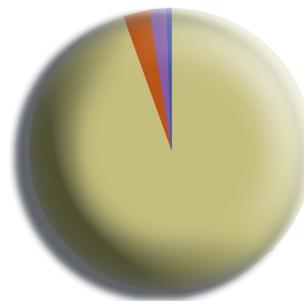
| Flood Control District Tax Levy Rate 1981 to 2003 | | |
|--|------------|---------------|
| Fiscal Year Ending | Levy Rate* | Tax Revenue** |
| 1981 | 0.5143 | \$4,637,000 |
| 1982 | 0.4683 | \$5,342,000 |
| 1983 | 0.5072 | \$6,882,000 |
| 1984 | 0.4739 | \$7,652,000 |
| 1985 | 0.5269 | \$9,243,000 |
| 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 |

*Per \$100 assessed value
**Unaudited

Financial Highlights for Fiscal Year 2003/2004

Revenues

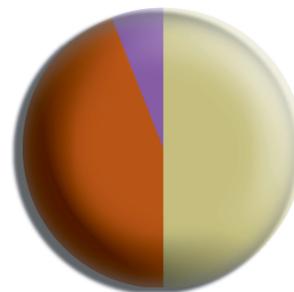
The primary source of revenue is the District's secondary property tax levy of \$0.3546 per \$100 of real property assessed valuation. In 2003/04, the District received approximately \$16.5 million dollars in tax levy revenue. Other local sources of revenue include revenue for capital improvements from the sale of general obligation (GO) bonds (\$0.3 million) and reimbursements for other funds (\$0.1 million). Federal aid and state grants are an additional potential source of revenue, with the District receiving \$0.5 million in state and federal aid in FY 2003/04. The total revenue reserved in FY 2003/04 was \$17.4 million.



Property Tax, Flood Control District..... 94.5%
 Federal Participation..... 3%
 Bond Proceeds..... 2%
 Other Funds..... .5%
Total Revenue..... 100%

Expenditures

The total expenditures for the District in FY 2003/04 were approximately \$16.5 million. The Capital Improvement Program expenditures of \$8.2 million were direct capital expenses. The annual operating budget for the District was approximately \$7.2 million. The other significant expenditure was \$1.0 million in debt service for flood control bonds.



Capital Improvements..... 50%
 Operating Budget..... 44%
 Debt Service..... 6%
Expenses..... 100%

Fiscal year 2003/04 unaudited amounts. Annual audits conducted by State Auditor General.

Breakdown of Expenditures

Capital Improvements

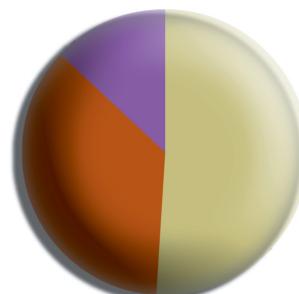
The expenditures for capital improvements include engineering service costs for planning and design; construction costs; right-of-way acquisition costs; and other costs such as costs to prepare new FEMA Flood Insurance Maps once a capital project is completed.



ROW Acquisitions & Improvements..... 98%
 Construction..... .8%
 Planning..... .6%
 Design..... .4%
 Other..... .3%
Expenses..... 100%

Operating Budget

The District's operating budget includes administrative, personnel, supplies and services 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.



Flood Control Support Services..... 51%
 Flood Prevention Services 36%
 Riparian Protection..... 13%
Expenses..... 100%

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:

- County Attorney's Office
- Development Services Department
- Department of Environmental Quality
- Health Department
- Natural Resources, Parks and Recreation Department
- Real Property
- 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 Department (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 (USACOE)
- Federal Emergency Management Agency (FEMA)
- Federal Highway Administration (FHWA)
- U. S. Bureau of Reclamation (USBR)
- U. S. Natural Resources 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)



The Aspen Fire devastated the Mt. Lemmon community of Summerhaven.



Pima County Flood Control District
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Tucson, Arizona 85701-1207