FLOOD CONTROL DISTRICT ADMINISTRATION, 2000/2001

Board of Directors (Board of Supervisors)
- Ann Day, District 1
- Dan Eckstrom, District 2
- Sharon Bronson, Chairperson, District 3
- Raymond J. Carroll, District 4
- Raúl M. Grijalva, District 5

Flood Control District Advisory Committee
- Nick Bokaie, Oro Valley
- Paul Cella, District 4
- Robert Condit, Marana
- Mike Zeller, Chair, City of Tucson
- Antonio Figueroa, City of Tucson
- Vacant, District 3
- Herb Osborn, 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
- Vacant, Sahuarita

General Manager (County Administrator)
- C. H. Huckelberry

Chief Engineer
- Dorothy Chavez-Dolan

Deputy Director
- Benjamin H. Goff

Flood Control Division Managers
- Zbigniew Osmolski, Flood Control Engineering
- Leo R. Smith, Floodplain Management
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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. Approximately one-half of the annual levy revenue is devoted to the Capital Improvement Program, with the remainder allocated to operating expenses.

Information on the District levy rate and revenues is shown in the table at right.

Expenditures

The table on the following page provides information on capital project expenditures for FY 00/01. Project numbers shown in the table correspond to the projects shown on the map on pages 6 and 7. 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 pages 8 and 9.

<table>
<thead>
<tr>
<th>Fiscal Year Ending</th>
<th>Levy Rate *</th>
<th>Tax Revenue **</th>
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<tr>
<td>1981</td>
<td>0.5143</td>
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<td>1988</td>
<td>0.7630</td>
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</tr>
<tr>
<td>1989</td>
<td>0.5592</td>
<td>$13,730,000</td>
</tr>
<tr>
<td>1990</td>
<td>0.5985</td>
<td>$14,663,000</td>
</tr>
<tr>
<td>1991</td>
<td>0.5985</td>
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<td>1992</td>
<td>0.5871</td>
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<tr>
<td>1994</td>
<td>0.5398</td>
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<td>1995</td>
<td>0.4623</td>
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<tr>
<td>1996</td>
<td>0.3596</td>
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</tr>
<tr>
<td>1997</td>
<td>0.3596</td>
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<tr>
<td>1998</td>
<td>0.3296</td>
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<tr>
<td>1999</td>
<td>0.3246</td>
<td>$10,411,000</td>
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<tr>
<td>2000</td>
<td>0.3046</td>
<td>$10,327,151</td>
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<td>2001</td>
<td>0.3046</td>
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* Per $100 assessed valuation
** Unaudited
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<tr>
<th>Project Description</th>
<th>Planning</th>
<th>Design</th>
<th>ROW Acquisition</th>
<th>Construction Cost</th>
<th>Other</th>
<th>Project Total</th>
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<tr>
<td>1 Santa Cruz River Study (COE)</td>
<td>$0</td>
<td>$47,250</td>
<td>$0</td>
<td>$0</td>
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<td>2 Rillito Creek Bank Stabilization (River Park)</td>
<td>$66,487</td>
<td>$6,699</td>
<td>$6,783</td>
<td>$17,637</td>
<td>$19,728</td>
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<td>3 Santa Cruz River Bank Stabilization, Grant Rd. to Fort Lowell Rd.</td>
<td>$6,384</td>
<td>$148,149</td>
<td>$33,533</td>
<td>$3,660</td>
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<tr>
<td>4 City of South Tucson</td>
<td>$1,230</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>5 Arroyo Chico Detention Basin</td>
<td>$4,110</td>
<td>$73,665</td>
<td>$79,114</td>
<td>$56,000</td>
<td>$17,693</td>
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<td>6 Tanque Verde Creek at Castle Rock</td>
<td>$3,458</td>
<td>$448</td>
<td>$0</td>
<td>$4,014</td>
<td>$739</td>
<td>$8,660</td>
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<td>7 Ajo Detention Basin Expansion</td>
<td>$0</td>
<td>$91</td>
<td>$0</td>
<td>$1,638</td>
<td>$4,893</td>
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<td>8 Tanque Verde Creek, Craycroft Rd. to Sabino Canyon Rd.</td>
<td>$1,826</td>
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<td>$0</td>
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<td>9 Northwest Replenishment Project</td>
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<td>$77,156</td>
<td>$38,976</td>
<td>$388,967</td>
<td>$777</td>
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<td>10 Lower Santa Cruz Flood Control Levee</td>
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<td>$8,082</td>
<td>$524,048</td>
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<td>11 Green Valley Drainageway #9</td>
<td>$6,342</td>
<td>$60,061</td>
<td>$54,517</td>
<td>$211,140</td>
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<td>12 Shannon Road: Palmdale Subdivision</td>
<td>$0</td>
<td>$932</td>
<td>$0</td>
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<td>$958</td>
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<td>13 Tucson Diversion Channel</td>
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<td>$6,250</td>
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<td>14 Continental Vista Erosion Protection</td>
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<td>$20,379</td>
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<td>$0</td>
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<td>16 Holladay/Forrest Drainage</td>
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<td>$0</td>
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<td>$135</td>
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<tr>
<td>17 Ajo Detention Basin-Wetlands</td>
<td>$0</td>
<td>$3,694</td>
<td>$0</td>
<td>$14,409</td>
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<td>18 Rillito Creek/Swan Wetlands</td>
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<td>$12,976</td>
<td>$0</td>
<td>$0</td>
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<td>19 Rillito Creek Environmental Restoration</td>
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<td>$511</td>
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<td>20 Rillito Creek Linear Park at Casas Adobes Wash</td>
<td>$0</td>
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<td>21 Cortaro Mesquite Bosque</td>
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<td>23 Tres Rios del Norte</td>
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<td>$584</td>
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<td>24 City of Tucson Drainage Improvements</td>
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<td>$272,598</td>
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<td>25 Agua Caliente Park Restoration</td>
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<td>26 McClelland River Park</td>
<td>$1,849</td>
<td>$32,651</td>
<td>$0</td>
<td>$506,297</td>
<td>$1,029</td>
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<td>27 Paseo de Las Iglesias</td>
<td>$5,239</td>
<td>$278,842</td>
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<td>Floodprone Land Acquisition</td>
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<td>$7,284</td>
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<td><strong>TOTAL</strong></td>
<td><strong>$204,006</strong></td>
<td><strong>$1,114,998</strong></td>
<td><strong>$1,978,623</strong></td>
<td><strong>$1,728,394</strong></td>
<td><strong>$120,158</strong></td>
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<td><strong>ROUNDED</strong></td>
<td><strong>$204,000</strong></td>
<td><strong>$1,115,000</strong></td>
<td><strong>$1,979,000</strong></td>
<td><strong>$1,728,000</strong></td>
<td><strong>$120,000</strong></td>
<td><strong>$5,146,000</strong></td>
</tr>
</tbody>
</table>
See table on page 5 for project descriptions.
FINANCIAL HIGHLIGHTS FOR FISCAL YEAR 2000/2001

Fund Balances

Beginning Fund Balance as of 7-1-2000 $ (269,000)*
Total Revenues 18,783,000
Total Expenditures 11,872,000

Ending Fund Balance as of 6-30-2001 $ 6,642,000

Revenues

Property Tax, Flood Control District $10,835,000 58%
Federal Participation 215,000 1%
Interest Income 605,000 3%
City of Tucson 2,000 0%
State Participation 329,000 2%
Bond Proceeds 6,251,000 33%
Miscellaneous 546,000 3%

Total Revenue $18,783,000 100%

Expenditures

Capital Improvements $5,146,000 43%
Operating Budget 5,269,000 44%
PAG 35,000 1%
GL Adjustment 243,000 2%
Debt Services 1,179,000 10%

Total Expenditures $11,872,000 100%

* Negative beginning fund balance due to delay in bond allocation.

Note: FY 98/99 preliminary and unaudited amounts rounded to the nearest thousand.
Breakdown of Expenditures

Capital Improvements

| Planning       | $204,000 | 4%   |
| Design         | 1,115,000 | 22%  |
| ROW Acquisition & Improvements | 1,979,000 | 38%  |
| Construction   | 1,728,000 | 34%  |
| Other          | 120,000   | 2%   |
| **Total Capital Improvements** | **$5,146,000** | **100%** |

Operating Budget

| Planning & Development | $2,213,000 | 42%   |
| Drainage & Structure Maintenance | 687,000 | 13%   |
| Engineering            | (137,000)  | -3%   |
| Management & Administration | 2,506,000 | 48%   |
| **Total Operating Expenses** | **$5,269,000** | **100%** |

Debt Services

| Annual Payment         | $1,179,000 | 100% |
| **Total Expenditures** | **$12,357,000** | **100%** |
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 on June 5, 1978. The District first became operational on July 1, 1978.

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.

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 two main divisions based on the major functions of each group: 1) the Floodplain Management Division; and 2) the Flood Control Engineering Division. The District receives substantial support from other divisions within the Pima County Department of Transportation and Flood Control District (PCDOT/FCD). 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, Department of Environmental Quality and the Pima County Attorney's Office. The District pays for services rendered by PCDOT 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 43 full-time equivalent (FTE) staff positions in FY 00/01.

As noted, the Pima County Board of Supervisors, sitting as the Flood Control District Board of Directors, 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.

District Organizational Chart
FLOODPLAIN MANAGEMENT DIVISION

Work of the Floodplain Management Division generally falls into two main areas of responsibility corresponding to its two sections: the Floodplain Management Section and the Flood Control Planning Section. Major activities for these two sections are highlighted below.

Floodplain Management Section

The main responsibility of the Floodplain Management Section is to enforce provisions of the Pima County Floodplain and Erosion Hazard Management Ordinance (FPMO). This ordinance, prepared in accordance with the National Flood Insurance Program, includes regulations and requirements designed to minimize flood damage and losses throughout the community. This important goal is accomplished largely through review and issuance of Floodplain Use Permits and the dissemination of floodplain-related information through the District's public service counter. Section staff also respond to drainage and flood-related complaints and prepare updates and revisions to the FEMA Flood Insurance Rate Maps (FIRMs). Public education and awareness programs are also an important part of this program. Section accomplishments during FY 00/01 are highlighted below.

Floodplain Use Permits

Virtually every development or other improvement made in floodplains or erosion hazard areas requires issuance of a Floodplain Use Permit by the District prior to beginning construction. The permit process is designed to ensure compliance with the District’s FPMO and allow for development in flood prone areas in as safe a manner as possible. In FY 00/01, the District received 796 permit applications and issued 542 Floodplain Use Permits. Information on these and other floodplain management activities is summarized in the following table:

<table>
<thead>
<tr>
<th>Floodplain Use Permit (FPUP) Activities</th>
<th>FY 97/98</th>
<th>FY 98/99</th>
<th>FY 99/2000</th>
<th>FY 2000/01</th>
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<tr>
<td>FPUP Applications Received</td>
<td>836</td>
<td>794</td>
<td>696</td>
<td>796</td>
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<tr>
<td>FPUPs Issued</td>
<td>609</td>
<td>603</td>
<td>521</td>
<td>542</td>
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<tr>
<td>Drainage Complaints Received</td>
<td>559</td>
<td>498</td>
<td>551</td>
<td>391</td>
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<tr>
<td>Floodplain Status Letters Written</td>
<td>8,240</td>
<td>8,905</td>
<td>8,073</td>
<td>8,534</td>
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<td>Counter Service</td>
<td>5,436</td>
<td>5,885</td>
<td>5,790</td>
<td>5,904</td>
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<td>Central Permit Reviews</td>
<td>11,989</td>
<td>14,135</td>
<td>14,831</td>
<td>14,994</td>
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<tr>
<td>Site Reviews</td>
<td>132</td>
<td>142</td>
<td>97</td>
<td>76</td>
</tr>
</tbody>
</table>

Site Reviews and Floodplain Status Requests

Floodplain Management staff is involved in a variety of activities that assist new home buyers and land purchasers in understanding the hydrologic conditions that affect their property. Staff provides detailed site reviews to identify potential flood hazards and any floodplain restrictions that may be associated with the parcels. In FY 00/01, District staff completed 76 detailed site reviews and responded to 8,534 requests for the floodplain status of individual properties. The floodplain status of each parcel, as indicated on the FEMA FIRMs, is provided to each requestor.

Drainage Complaints, Violations and Maintenance Requests

Drainage complaints, which may involve floodplain use violations, are thoroughly investigated by the District. Investigation of drainage complaints allows the District to identify potential problems that may warrant further attention or possible mitigation. If it is determined that a violation has occurred, the property owner is notified and corrective actions are requested. Staff also evaluates conditions on drainageways that are either owned or maintained by Pima County. The District coordinates with DOT's Maintenance Operations Division to ensure that any needed maintenance, such as clearing of debris or excessive vegetation in a channel, is performed. During this past fiscal year, 391 drainage complaints were processed.

Flood Insurance Studies and FIRM Revisions

The District works in conjunction with FEMA under the Flood Insurance Study Program (FIS) to identify flood prone areas and set insurance rates in flood hazard areas within the county. A key work product of this effort is a set of official maps called Flood Insurance...
Rate Maps. These maps show flood hazard zones and other relevant hydrological information. Federal, state, and local floodplain management regulations apply to development and other activities that take place in 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 updated periodically when structural improvements are implemented or when floodplain characteristics are altered due to modifications to channel geometry, etc. The Floodplain Management Division is the local map repository for the FIRMs.

During FY 00/01, the District performed studies and assisted several property owners that resulted in map revisions or corrections to the FIRMs issued by FEMA. The work performed by District staff:

• Three Letters of Map Revision (LOMRs) for the Soledad Wash, the Mission Ridge Washes, and portions of Arroyo Chico and Citation Wash. These LOMRs removed 373 properties/residences from the Special Flood Hazard Area (SFHA).

• Five additional development related LOMRs.

• Assisted 10 property owners with Letters of Map Amendment (LOMAs) to remove their residences from the SFHA.

The District and the City of Tucson updated the local FEMA map repositories to include a major map revision by FEMA covering 25 map panels and 13 watercourses. These watercourses included the Tanque Verde Creek, Greasewood Wash, Robb Wash, Camino de Oeste Wash, San Juan Wash, Ajo Wash, West Branch Wash, Arcadia Wash, El Vado Wash, Rodeo Wash, Hidden Hills Wash, Mission Wash and Santa Clara Wash.

The District is working towards placing the Flood Insurance Rate Map (FIRM) information on the Pima County Web site.

Community Rating System Program

For the past ten years, the District has participated in FEMA’s Community Rating System (CRS), a program that recognizes and rewards floodplain management activities undertaken by local jurisdictions.

The program emphasizes floodplain management activities that serve to:

• Reduce flood damages to existing buildings
• Manage development in hazard areas not mapped by the National Flood Insurance Program (NFIP)
• Institute a greater level of flood protection than the minimum required by NFIP
• Facilitate residents and other agencies in obtaining information about area flooding conditions and flood insurance

The District’s involvement in the CRS program has resulted in reduced insurance premiums that county residents pay every year. This past year the county was awarded a Class 6 designation from FEMA. Under this designation, properties in Zones A, AE, and AO of the Special Flood Hazard Area (SFHA) will receive a 20 percent reduction in flood insurance premiums and properties outside SFHAs (Zone X) will receive a 10 percent reduction. These are increases to the SFHA 15 percent reduction of past years. District-sponsored CRS activities saved property owners in unincorporated portions of Pima County a total of $123,233. Pima County ranks in the top three percent of 926 communities across the country that are involved in this program.

Aerial Photo Mosaic

The Floodplain Management Section obtained a custom printing of a new color aerial photo mosaic. The mosaic is displayed in the 4th floor conference room of the Public Works Building, mounted on two wall-sized panels. Landiscore Incorporated created the “Tucson Mural” image from aerial photography taken by them in April 2001. Photographic coverage includes all of the metro area surrounding Tucson, from Township 11S, Range 10E to Township 17S, Range 15E. The scale of image is 1”=2000’, which is the same as the U.S.G.S. 7.5 minute quadrangle maps.

Major Watercourse Flood Control Infrastructure Inspection Program

The Floodplain Management Division is currently developing a new inspection program and conducting the physical field inspection of the Pima County Flood Control District’s drainage structures for all major water courses and regional detention/retention basins. As part of this program, a consolidated resource base of all construction plans for bank protection, levees, grade control structures and detention/retention basins is
being compiled within the Floodplain Management Division. In addition, a cross-referenced filing system for inspection documentation is being created with digital photographs for monitoring potential structural failure. Maintenance service requests will be prepared for the Pima County Operations Division, including appropriate permits from the ACOE and notification to the U. S. Fish and Wildlife Service, for necessary structural maintenance as determined by this inspection program.

**Flood Control Planning Section**

This section is involved with medium and long-term planning activities that help decrease flood and erosion damages in the community. Some of the major activities of the section include conducting river and basin management studies, operating the District's flood warning system, researching and acquiring floodprone land, groundwater recharge and replenishment programs, riparian habitat protection, habitat enhancement efforts and preparation of the District's Capital Improvement Program. Other special projects are undertaken as resources allow. Major activities during FY 00/01 include the following:

**Floodprone Land Acquisition Program**

The Floodprone Land Acquisition Program (FLAP) began in 1984, funded by bond monies authorized by Pima County voters and by an annual allocation from the District's tax levy. FLAP is an effective nonstructural floodplain management tool that yields a number of community benefits. Some of these include removing residences and structures from vulnerable areas, preserving natural floodplain characteristics (and attenuation of downstream flood peaks), providing recreational opportunities, maintaining open space, and protecting groundwater quality and riparian habitat resources. The District administers FLAP solely on a voluntary basis without utilizing its land condemnation authority. Floodprone parcels have been acquired along the Tanque Verde, Rillito, Cienega, and Agua Verde Creeks, the Canada del Oro, Pantano, Pegler and Black Washes, and along the Santa Cruz River. During FY 00/01, the District purchased 13 parcels of land totaling approximately 325 acres at a cost of $577,600.

**Pima County Flood Warning Program**

The Flood Warning Program encompasses the District's Automated Local Evaluation in Real Time Warning System (ALERT), along with the District's Flood Response Plan and Flood Hazard Mitigation efforts. The ALERT System consists of approximately 67 automatic self-reporting precipitation gauges, 24 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 evaluate incoming data to monitor changing flood conditions. The NWS also uses the information when issuing flash flood warnings and advisories. Finally, Pima County Department of Transportation, Maintenance Operations Division relies on District ALERT data to determine storm-related road closures. Over the past year, there were several significant storm events that prompted issuance of NWS advisories, road closures and intensive ALERT system monitoring by District staff.

In cooperation with Pima County Department of Environmental Quality, three precipitation gauges were added to the system. Data generated by these gauges help support Pima County's National Pollution Discharge Elimination System permit.

Staff made presentations on the July 1999 Sabino Creek flooding at the NWS Southwest Weather Symposium and the Arizona Floodplain Management Association meeting.

**Flood Preparedness Activities**

Over the past fiscal year, district staff continued its work with the US Army Corps of Engineers, Arizona Department of Water Resources (ADWR), and other state and local agencies in developing a state-wide flood warning...
system. An intergovernmental agreement (IGA) with ADWR was signed in FY 00/01. This IGA provides for 10 additional precipitation sensors and four additional stream sensors which will be incorporated into the ALERT system. Construction is expected to begin in the fall of 2001.

Staff participated in a flood exercise for emergency response agencies. This effort, in conjunction with other elements of the District’s Flood Warning Program, resulted in improved flood emergency preparedness for the community and allows credits to be applied toward the District’s rating in the National Community Rating System (CRS) Program. CRS activities by the District have produced significant reductions in flood insurance premiums paid by Pima County property owners.

Public Awareness, Education and Outreach

District staff has developed a variety of brochures, presentations and displays that help educate the public and raise awareness of flood hazards within Pima County. Numerous free publications on flood and erosion hazards, floodplain regulations and information on how to safely develop property in flood prone areas are available in the lobby area of the District offices. This past year, District staff researched and prepared a new brochure on how residents can incorporate water harvesting concepts on their property.

A series of exhibits documenting historical flood events and highlighting flood safety information are on display in the customer service counter area of the Floodplain Management Division offices.

This same display, along with video presentations, computer demonstrations and other flood-related exhibits is featured every year at the District’s information booth during the ten-day Pima County Fair. The exhibit features over 70 feet of colorful, informative displays and includes a hands-on computer demonstration showcasing the District’s World Wide Web site. Free brochures, fliers, and other information on flooding hazards within Pima County is provided to fair goers, along with information on a variety of flood-related topics.

This past year, District staff participated in the annual Students Against Drunk Driving Conference and Earth Day for Kids. Flood awareness, flood preparedness, and safety are major themes of these presentations. Groundwater recharge information, water quality and watershed protection topics are covered. The District continued its annual contract with local meteorologist Dr. Richard Wood, to provide presentations at area elementary schools. Since its inception in 1992, the program has introduced thousands of students and their parents to flooding and erosion issues, and provided information on various flood safety topics.

A recent addition to its public outreach and education program, the District worked with local television stations during last year’s summer monsoon season to air three 30-second public service announcements (PSAs) dealing with flash flooding. Prepared by the National Weather Service, Office of Hydrology, the PSAs were made available to eight television stations in the Tucson area.

Basin and River Management Studies

Cañada del Oro Flood Hazard Analysis - Staff have completed an analysis of the reach between Catalina State Park and the Pima County line to determine the
impacts of nonregulatory flood flows. Results of the study will be correlated with real-time stream flow data, generated by the ALEKT system, to provide information for emergency response coordinators during flooding.

**Flood Control District Advisory Committee**

During FY 00/01 the Advisory Committee reviewed and made recommendations on a number of policy issues relevant to the District’s operation and the flood control needs within the community.

Committee efforts included deliberations on a number of structural flood control projects, the District’s flood prone land acquisition efforts and its Capital Improvement Program. The Committee also evaluated various natural resource and environmental concerns, a set of issues of increasing importance in recent years. Some of these included review and recommendations on relevant elements of the county’s Sonoran Desert Conservation Plan, endangered species and riparian habitat issues, ground water recharge endeavors and several proposed ACOE-sponsored restoration projects.

The Advisory Committee continues to play a crucial role in shaping these and other important policy issues facing the District.

**Riparian Habitat Ordinance**

During FY 00/01, 24 Hydro/Mesoriparian mitigation plans were approved by the Board of Supervisors. Two xeroriparian mitigation plans were approved by District staff. The ordinance as currently written is accomplishing the goals set by the Board of Supervisors and community at the time of adoption by encouraging avoidance of habitat.

**Photographic and Topographic Mapping**

The Flood Control Planning Section is presently involved in the definition of mapping limits for phase three of the mapping program for eastern Pima County being coordinated by the Pima Association of Governments. Tentatively, this next project will encompass over 300 square miles of orthophotography and topographic mapping. Delivery of orthophotography and topographic mapping has begun from phase two of this cooperative mapping project. On the request of the Floodplain Management Section, topographic mapping in the rapidly growing Avra Valley area west of metropolitan Tucson is being completed first. This mapping product will eventually be used to revise outdated floodplain mapping in a flood prone area of the county.

The section has received two complete sets of 1” = 1000’ stereo aerial photography of eastern Pima County flown in the latter half of the year 2000. This much needed photography is now being used for review of building permit applications at the public service counters of both the Development Services Division and the Floodplain Management Section.

The topographic mapping product of the Town of Catalina requested by the Floodplain Management Section last year is completed and is being integrated into the Geographic Information System database by the Technical Services Division. It will soon be made available as an overlay to the orthophotographic mapping already available on the Pima County “MapGuide” Web site.

**Northwest Replenishment Program/Lower Santa Cruz Replenishment Project**

The Lower Santa Cruz Replenishment Project is a joint effort between the Pima County Flood Control District, the Central Arizona Water Conservation District (CAWCD) and the Town of Marana. The project consists of three groundwater recharge basins, located south of the main channel of the Santa Cruz River, that will be used to recharge Central Arizona Project (CAP) water. Due to their proximity, earthen materials excavated to construct the basins have been put to use in constructing the Lower Santa Cruz River Levee Project. The levee will extend approximately 7.3 miles along the north-east bank of the Santa Cruz River from just south of Avra Valley Road to Sanders Road. Construction of the basins was completed in May 2000 and CAWCD began recharging CAP water in June 2000. CAWCD is operating and maintaining the recharge facility.

**Northwest Replenishment Program/Marana High Plains Effluent Recharge Project**

The Marana High Plains Effluent Recharge project is a two-year pilot project to investigate the feasibility of using treated effluent to enhance riparian habitat while recharging the groundwater aquifer. The project will draw treated effluent from the Santa Cruz River, approximately ten miles downstream from two wastewater treatment plants, and recharge it in a series of constructed basins. The pilot project will evaluate issues such as the rate of recharge, groundwater quality ef-
ects, enhancing the value of riparian habitat and vector control concerns.

Located near Sanders Road and the Santa Cruz River, the project has received all of the necessary permits, and design has been completed. Construction began in spring 2001 with completion anticipated for late fall 2001. The project is funded by the Pima County Flood Control District, the Town of Marana, Cortaro Marana Irrigation District, Arizona Water Protection Fund and the U.S. Bureau of Reclamation.

Grant Programs

This past fiscal year, the District continued working with agency grants for multi-objective projects located within the county. The grants included:

**Partners for Wildlife Grant** – In FY 97/98, the U.S. Fish and Wildlife Service (USFWS) and the Arizona Game and Fish Department (AGFD) granted $20,000 to revegetate abandoned agricultural fields in the Cienega Creek Natural Preserve. The purpose of this effort was twofold: 1) to help reduce erosion; and 2) to enhance wildlife habitat. The revegetation work was completed in November 1997. Efforts now focus on site maintenance activities and monitoring revegetated areas.

**Arizona Water Protection Fund** – The District, in partnership with The Nature Conservancy and other volunteers, continued work on restoring riparian vegetation at the Bingham Cienega Natural Preserve located adjacent to the San Pedro River. Funds from a three-year award in 1998 of $84,679 from the Arizona Water Protection Fund were used this year to plant Sacaton grass and riparian trees on retired farmland, restoring historical habitat and preserving a rare spring-fed wetland.

The District continues work on the grant to restore 80 acres of riparian habitat on the 100-year floodplain terrace of the lower Santa Cruz River. The 3-year project, Cortaro Mesquite Bosque, is located adjacent to the Continental Ranch residential community within the Town of Marana. It will include restoration of approximately 73 acres of mesquite bosque and 7 acres of subsurface marsh. The Arizona Water Protection fund is providing $486,650. A design and planting plan was completed during FY 00/01 and planting is scheduled to occur during 01/02.

**Environmental Restoration Projects**

In recent years, the District, the ACOE, and others have increasingly emphasized design and construction of multi-objective flood control projects. In this vein, the District and the ACOE have embarked on a number of flood control facilities that also entail environmental restoration, mitigation and recreation components. Major projects include:

**Santa Cruz River Park: Paseo de las Iglesias Restoration** – Working in cooperation with the City of Tucson and the ACOE, the District has started a feasibility study to evaluate the possibility of restoring the Santa Cruz River in an area from the San Xavier Mission to downtown Tucson. This $40 million environmental restoration and mitigation project will be partially funded under the Challenge XXI Initiative for Flood Hazard Mitigation and Riverine Ecosystem Restoration. Design is scheduled to begin in fiscal year 00/01 with construction expected to begin in fiscal year 2002/2003.

**Rio Antiguo (formerly Rillito Creek Environmental Restoration)** – Working in cooperation with the ACOE, the District has begun a feasibility study to evaluate the possibility of restoring the Rillito Creek between Campbell Avenue and Craycroft Road. This $18 million project will be partially funded under the Challenge XXI Initiative for Flood Hazard Mitigation and Riverine Ecosystem Restoration. The project will incorporate nonstructural flood control and environmental restoration, such as, water harvesting, mitigation and restoration of riparian habitat, recreational enhancement, and possibly ground water recharge.

**Rillito/Swan Wetlands** – In conjunction with the ACOE, the District is preparing a feasibility study to determine the costs and benefits of developing wetlands and enhancing riparian habitat along Rillito Creek. This project will be partially funded by the Corps’ Section 1135, Ecosystem Restoration Program.

**Santa Cruz River: Tres Rios del Norte Restoration** – Working in cooperation with the City of Tucson, the Town of Marana and the ACOE, the District has begun a feasibility study to evaluate the possibility of restoring the Santa Cruz River from Prince Road to Sanders Road. This study, estimated to cost $5.8 million will involve ecosystem restoration, groundwater recharge, flood control improvements and river park trail development. The ACOE has obligated funds in the amount of 50 percent of the total cost for the study; and the City, Town,
and District, working as local co-sponsors, will collectively apply matching funds in both cash and in-kind services. Design is scheduled to begin in fiscal year 2004/2005 with construction expected to begin in fiscal year 2006/2007.

**Sonoran Desert Conservation Plan**

The Sonoran Desert Conservation Plan (SDCP) is a large scale initiative that seeks to address conservation of both cultural and natural resources in eastern Pima County. The plan contains six major elements: 1) ranch conservation; 2) historic and cultural preservation; 3) riparian restoration; 4) mountain parks; 5) conservation of habitat, biological resources and ecological corridors; and 6) critical and sensitive habitat preservation. Since December 1998, District staff has been closely involved with the riparian restoration element of the plan and has supported the work of the Science and Technical Advisory Team (STAT) and biological consultants hired to work on the SDCP. Collaboration between these entities has resulted in the following reports and mapping endeavors:

**SDCP reports, July 2000 through June 2001**

- Priority Vulnerable Species Habitat Data Analysis
- Aquatic Vertebrate Conservation in Pima County, Concepts and Planning Development
- Water Usage Along Selected Streams in Pima County
- Importance of Conserving Resources in the Clenega Creek Watershed
- Riparian Protection, Management and Restoration
- Preliminary Sonoran Desert Conservation Plan
- Draft Reserve Design: Guidelines, Goals, Opportunities, and Constraints
- Historical Occurrence of Native Fish in Pima County
- Potentially Problematic Species in Pima County: Ecological Effects and Management Strategies
- Riparian Vegetation Mapping and Classification, Final Report
- Native Plant Program Report
- Groundwater Level Changes in the Tanque Verde Valley
- Bingham Clenega Source Water Study
- The Role of Adaptive Management
- Reclassification of Vegetation Mapping Units
- Pima County Reserves: A Summary of Existing Master and Management Plans
- Clenega Creek Storm Flow Frequency Analysis
- Recreation Impacts in Pima County
- Aquatic Species Threats in Pima County
- Priority Conservation Areas
- Floodplain Primer

**SDCP mapping endeavors, July 2000 through June 2001**

- Distribution of wells along selected streams in Pima County
- Land form and vegetation maps derived from PAG 208 maps: Ironwood communities, Saltbush communities, limestone deposits, talus slopes
- Climate data (seasonal precipitation and temperatures) for Pima County
- Riparian vegetation mapping for Pima County
- Updated mapping of perennial streams, intermittent streams and shallow groundwater areas in Pima County
- Habitat suitability maps, including outlines of priority conservation areas, for each of the 56 Priority Vulnerable Species proposed for protection under the SDCP
- Native grasslands in Pima County
- Unincised, grassy floodplains and contributing watersheds in Pima County
- Draft reserve design maps for the SDCP
- Landform map for the Tucson area, derived from the Arizona Geological Survey

Further details about the SDCP project, including the draft preliminary SDCP riparian habitat restoration activities, STAT meeting minutes, and other information is available from the SDCP Web site at [www.co.pima.az.us/cmo/sdcp/index.html](http://www.co.pima.az.us/cmo/sdcp/index.html).
Flood Control Engineering Division

The Flood Control Engineering Division oversees design and construction of flood control and drainage improvement projects within Pima County. Projects are completed by in-house staff or through outside consultants, with staff administering the contracts. Major projects in FY 00/01 are outlined below.

**Bank Stabilization Projects**

The District constructs bank stabilization along major watercourses within the county where flood and erosion hazards threatened public or private development and infrastructure. Bank stabilization designs are tailored to meet the needs of each specific project. Bank stabilization projects along major watercourses typically employ soil cement, which is a mixture of cement and local soil materials. Soil cement is a cost-effective flood and erosion control solution that has many of the strength characteristics of concrete. It also retains much of the appearance and textural quality of a natural riverbank. Bank stabilization projects undertaken in FY 00/01 include:

**Tanque Verde Creek at Castle Rock** – The Flood Control District developed plans to place approximately 500 linear feet of erosion protection along Tanque Verde Creek near Lakes of Castle Rock subdivision. The project is awaiting final permits, and construction is expected to begin in September 2001.

**Green Valley Drainageway #9** – Funded through the May 1997 bond issuance, the District is currently constructing improvements that will reduce flood and erosion hazards along this drainageway. The project features additional cells for the box culverts at Camino Portillo and Camino Holgado, as well as various types of bank protection based on adjacent improvements. Construction began in May 2001.

**Tanque Verde Creek, Sabino Canyon to Craycroft** – The District is continuing to work with Pima County Wastewater Management and the ACOE to design and construct soil cement bank protection along portions of Tanque Verde Creek. Phase I of the project will protect the sanitary sewer facilities constructed by Pima County Wastewater Management along the south bank near Tucson Country Club. Phase 2 will involve bank protection extending along the south bank to the confluence of Pantano Wash and improvements on the north bank adjacent to Craycroft Road Bridge. The project also includes preservation of riparian habitat along the north bank.

**Continental Vista Erosion Protection** – The District is designing improvements that will reduce the flooding and erosion hazards in several areas for the three major washes that cross Green Valley’s Continental Vista Subdivision. These improvements, funded through the May 1997 bond, will protect residents in this subdivision from flooding and erosion hazards.

**Santa Cruz River: Grant to Ft. Lowell** – Pima County Flood Control District, in cooperation with the Natural Resources Conservation Service (NRCS, formerly SCS), have combined efforts to accelerate this project and begin construction before the end of calendar year 2001. This area is subject to extensive lateral bank erosion and threatens the I-10/Miracle Mile interchange, ADOT maintenance yard, the University of Arizona Agricultural Research Center, Tucson Electric (TEP) transmission line, Tucson Water mainlines, two petroleum pipelines, two Southwest Gas pipelines, and commercial radio towers. The project will provide for 1 1/2 miles of soil cement bank protection along both banks, and sufficient freeboard will be provided above the 100-year water surface to satisfy FEMA requirements.

**Levee Projects**

When bank stabilization is constrained due to inadequate channel size, shape, or alignment, levees can be constructed to minimize flood and erosion hazards.

**Lower Santa Cruz River Levee** – During the October 1983 event, extensive flooding resulted in three fatalities and catastrophic damages to residences, busi-
nesses, agricultural fields, transportation facilities, and other public infrastructures within northern Pima County and Marana. The same area also sustained damage during the 1990 and 1993 flood events.

In seeking to resolve flood and erosion hazards in this area, in March 1999 the District began construction of a 7.3-mile long earthen levee armored with soil cement. Designed to provide protection from a 100-year flood event, the levee project was completed in August 2000.

**Detention Basins**

Another structural flood control strategy used by the District is construction of detention basins. Detention basins allow for the temporary storage and metered release of flood waters. Control of flows exiting a detention basin during a storm event significantly decreases downstream flood peaks and, in turn, minimizes the potential for downstream inundation. Detention basin projects currently underway include:

**Arroyo Chico/Tucson Arroyo Project** – Working in conjunction with the City of Tucson and the ACOE, the District continued planning work on a series of detention basins located near Park Avenue and Arroyo Chico. Phase 1 of this $27.5 million project involved the planning and construction of the Randolph South Detention Basin, which was completed in March 1996. Phase II of this project will entail a series of linked detention basins and other improvements near Park Avenue/Arroyo Chico. The project also calls for the replacement of existing sections of storm drains near the High School Wash and the Tucson Arroyo confluence. Design of Phase II began in March 2001 and is scheduled to be completed in August 2002.

**Ajo Detention Basin** – The Ajo Detention Basin was constructed by the ACOE in the early 1960s to address a number of urban flooding problems. Using Federal Environmental Restoration funds, the Flood Control District, Pima County Wastewater Management and the ACOE will reconstruct the basin to incorporate environmental habitat restoration and flood control features. The restoration element of the project will involve 20 acres of wetlands and construction of a seven-acre lake. The lake will support wildlife habitat and supply water for irrigation needs at Kino Sports Park. Construction began in October 2000 and should be completed in one year.

**Earp Wash** – Flood Control Engineering is currently reviewing alternatives to relieve flooding by Earp Wash west of Alvernon Way. This watershed includes residential, mobile homes, businesses and Chaparral Middle School, which were flooded by an unusually heavy localized storm in the summer of 1999. Two detention basins are proposed to reduce the peak discharges from Earp Wash and mitigate downstream flooding. This project will be funded from the May 1997 Bond.

**Mission View Wash** – Few drainage facilities exist in the portion of the City of Tucson and City of South Tucson located west of Park Avenue and South of 22nd Street. Most flows in this area are conveyed in the streets which have insufficient capacity to contain all but the smallest flows resulting in repeated flooding of adjacent commercial and residential properties. This project will include design and construction of a regional detention basin east of Park Avenue and south of 36th Street in order to mitigate downstream flooding. Preliminary design of the facility has begun, and funds for this project were authorized under the May 1997 Bond.

**Other Projects**

**Rillito Creek Bank Stabilization/River Park** – Following completion of the bank stabilization portion of this $39 million multiphase effort, the District and the ACOE began construction of the final phase of this project. Sixteen pedestrian bridges and various linear park improvements, extending from the Santa Cruz River to La Cholla Boulevard and from Alvernon Way to Craycroft Road were constructed. This phase of the project was completed in June 2000, providing a continuous river park pathway along Rillito Creek from the Santa Cruz River to Craycroft Road.

**Santa Cruz River Watershed Study** – The Flood Control Engineering Division is participating with the ACOE.
the City of Tucson, and Pima County Wastewater Management in a $2.4 million Santa Cruz River Basin Study. The study area includes the entire main stem of the Santa Cruz River within Pima County. The intent of the study is to identify flood and erosion hazards, evaluate hydrologic, hydraulic and geologic processes, identify potential development pressures, assess physical and cultural resources or constraints, evaluate flood and erosion control alternatives and establish recommended floodplain management policies. Final report for this study is under preparation and will be completed by the end of 2001.

**Rillito/La Cholla River Park (former McClelland property)** – The District started construction of this project which includes river park improvements in an area east of La Cholla Boulevard in December 2001. The project will also include new parking and staging areas.

**Fairview Limberlost Drainage Improvements** – The District is currently designing a storm drain system that will reduce the flooding of single family residences and manufactured homes west of Fairview Avenue and south of Wetmore Road. Additionally, travel on Fairview and Limberlost will be safer during rainfall events. This project is composed of an 1,100 linear foot extension of a two-cell 4-foot by 8-foot reinforced concrete box storm drain that will carry the 100-year flood to the Rillito Creek. The May 1997 bond will fund this project. Construction is expected to begin in October 2001.

**Holladay/Forrest Drainage Improvement** – Drainage improvements are needed to eliminate repeated flooding of homes in this neighborhood, located northwest of the intersection of Mission and Drexel Roads. The District has begun design of this project which will require berms along Westover Avenue to collect runoff, a drainageway between parcels, and street drainage improvements along Holladay Street and Forrest Avenue to carry flows to a logical point of discharge. Funding for this project is from the May 1997 bond election.
Other Divisions

The District works cooperatively with other divisions within the Department of Transportation and Flood Control District. These divisions make important contributions to the District's overall work product.

**Administrative Services Division**

The Administration Services Division staff plays a key role in helping prepare and monitor the District's annual budget and its Capital Improvement Program. The division also provides various accounting services, personnel and employee support work, procurement activities and contract administration for goods and services required by the District.

**Field Engineering Division**

The Field Engineering Division administers construction of all District Capital Improvement Projects to ensure that flood control facilities are constructed in accordance with contract specifications and that they are completed within specified time and budget allocations. Typical activities include field inspection, materials testing and compliance, and resolving any construction-related discrepancies that may arise. The division's Survey Section provides surveying and technical land information to the District for right-of-way determinations, drainageway alignments and flood control improvements.

**Maintenance Operations Division**

The Maintenance Operations Division staff inspects, maintains and repairs publicly-owned watercourses and related improvements within unincorporated Pima County. The division also maintains major watercourses and certain improvements located within the City of Tucson, and towns of Oro Valley, Marana and Sahuarita.

Maintenance operations include repairing constructed improvements, removing sediment buildup, clearing vegetation and debris, regrading channels and maintaining drainageway access roads. When flooding occurs, staff responds promptly, prioritizes repair and maintenance needs and works diligently to ensure that any damage is repaired as soon as possible.

**Real Property Division**

The Real Property Division assists the District with an array of real property appraisal, acquisition and inventory management needs. Major activities of the division include helping to negotiate acquisition of parcels under the District's Floodprone Land Acquisition Program, right-of-way dedications and abandonments for capital facilities, and maintaining property inventory records for District-owned parcels.

**Technical Services Division**

The Technical Services Division provides an array of services for the District. The division's Graphic Design Section provides illustration and graphic design services for numerous printed and electronic publications that the District develops. The GIS Database Services Section maintains various public works information using ArcInfo and AutoCad computer software. This section performs geographic information system analyses and produces maps and supporting data for many District projects. The Engineering Information Management Section houses, catalogues and disseminates engineering information, such as maps and records of street rights-of-way, easements, subdivision plats, construction plans, etc. Finally, the Network Operations Section provides computer technical support to ensure that all hardware and software systems are operational and support the computer needs of the District.
COORDINATION WITH OTHER AGENCIES

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

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

Other Pima County Departments
The District cooperates with several other Pima County Departments on various projects and exchanges information as needed.

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

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 (ACOE)
- 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)

Non Government Organizations
Other non-governmental 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 (U of A)
Office Locations

**Pima County Flood Control District**

Public Works Building  
201 North Stone Avenue, 4th Floor  
Tucson, Arizona  85701-1215

Deputy Director's Office  
(520) 740-6458

Floodplain Management Division  
(520) 740-6350

Flood Control Engineering Division  
(520) 740-6371

**Pima County Department of Transportation**

Public Works Building  
201 North Stone Avenue  
Tucson, Arizona  85701-1215

Director's Office  
(520) 740-6437

Administrative Services Division  
(520) 740-6433

Real Property Division  
(520) 740-6313

Technical Services Division  
(520) 740-6670

Transportation Systems Division  
(520) 740-6458

Mission Road Office  
1313 South Mission Road  
Tucson, Arizona  85713

Field Engineering Division  
(520) 740-2635

Operations Division  
(520) 740-2639
Pima County Board of Supervisors

Ann Day • District 1
Dan Eckstrom • District 2
Sharon Bronson • District 3
Raymond J. Carroll • District 4
Richard Elias • District 5

County Administrator
C. H. Huckelberry

Flood Control District Advisory Committee

Nick Bokaie, Oro Valley
Paul Celli, District 4
Robert Condit, Marana
Mike Zeller, Chair, City of Tucson
Antonio Figueroa, City of Tucson
Vacant, District 3
Vacant, City of Tucson
Richard Salaz, City of South Tucson
Phil Peartree, 2nd Vice Chair, District 5
Doug Shakes, Vice Chair, District 1
Vacant, District 2
Martin Roush, Sahuarita