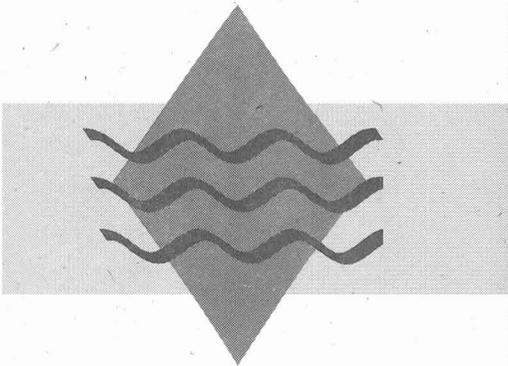


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***Flood Control District  
of Maricopa County***

***Annual Report  
1989/1990***

*On the cover:* Dwarf Oleanders frame this view of a District maintenance vehicle sweeping debris out of the Arizona Canal Diversion Channel west of 28th Drive, north of Dunlap Avenue.

### Financial Highlights

Fiscal Year 1989/1990  
Preliminary and Unaudited

|  | Dollars                  | Percent    |
|--|--------------------------|------------|
| <b>Revenues</b>  |                          |            |
| Flood Control Tax  | \$46,408,000             | 82         |
| Rental Income  | 167,000                  | —          |
| Interest   | 3,326,000                | 6          |
| State Assistance – Local Projects                            | 0                        | —          |
| County and Local Participation                               | 6,566,000                | 12         |
| Sale of Excess Land  | 0                        | —          |
| Miscellaneous  | 247,000                  | —          |
| <b>Total Revenues</b>  | <u>56,714,000</u>        | <u>100</u> |
| <b>Expenditures</b>  |                          |            |
| Administration and Maintenance                               | 11,426,000               | 17         |
| Flood Control Capital Improvements                           | 54,784,000               | 83         |
| <b>Total Expenditures</b>                                    | <u>66,210,000</u>        | <u>100</u> |
| <b>Excess (Deficiency) of Revenues<br/>Over Expenditures</b> | <u>&lt;9,496,000&gt;</u> |            |
| <b>Fund Balance at Beginning of Year</b>                     | 41,552,000               |            |
| <b>Fund Balance at End of Year</b>                           | <u>\$32,056,000</u>      |            |
| <b>Expenditures by Task</b>                                  |                          |            |
| Administration   | \$ 8,608,000             | 13         |
| Land Acquisition   | 19,896,000               | 30         |
| Relocation of Utilities, Bridges and Other Facilities        | 6,962,000                | 10         |
| Construction   | 26,974,000               | 41         |
| Maintenance  | 3,770,000                | 6          |
| <b>Total</b>   | <u>\$66,210,000</u>      | <u>100</u> |

### Flood Control District Tax Levy Rate

1961 to 1990

| Fiscal Year<br>Ending | Levy<br>Rate* | Tax<br>Revenue, \$ |
|-----------------------|---------------|--------------------|
| 1961                  | 0.05          | 253,000            |
| 1962                  | 0.05          | 288,000            |
| 1963                  | 0.02          | 126,000            |
| 1964                  | 0.02          | 135,000            |
| 1965                  | 0.02          | 145,000            |
| 1966                  | 0.02          | 153,000            |
| 1967                  | 0.02          | 158,000            |
| 1968                  | 0.02          | 164,000            |
| 1969                  | 0.05          | 446,000            |
| 1970                  | 0.05          | 454,000            |
| 1971                  | 0.05          | 480,000            |
| 1972                  | 0.04          | 425,000            |
| 1973                  | 0.05          | 645,000            |
| 1974                  | 0.20          | 3,428,000          |
| 1975                  | 0.20          | 3,747,000          |
| 1976                  | 0.20          | 4,154,000          |
| 1977                  | 0.20          | 4,395,000          |
| 1978                  | 0.20          | 4,675,000          |
| 1979                  | 0.20          | 5,026,000          |
| 1980                  | 0.20          | 5,342,000          |
| 1981                  | 0.43          | 11,825,000         |
| 1982                  | 0.34          | 13,720,000         |
| 1983                  | 0.50          | 21,779,000         |
| 1984                  | 0.48          | 25,780,000         |
| 1985                  | 0.50          | 28,697,000         |
| 1986                  | 0.50          | 33,644,000         |
| 1987                  | 0.50          | 41,566,000         |
| 1988                  | 0.50          | 46,059,000         |
| 1989                  | 0.50          | 51,345,000         |
| 1990                  | 0.43          | 46,408,000         |

\*Per \$100 assessed value

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## Mission: Flood Control

Many people are puzzled to learn there is a Flood Control District in Maricopa County. "What floods?" they ask. But it takes just one heavy storm to alter this low profile.

Flood control is not a promise, however, despite what our name implies. It is a task with which we are charged. This report is an overview of our activities during the past year to accomplish our mission of protecting the people of Maricopa County from injury, loss of life and damages caused by flooding.

Our mission encompasses seven primary activities:

◆ **Planning:** In 1963, the four-year-old District developed a blueprint for flood control projects that has kept it busy for the past 26 years. This year, we updated the Comprehensive Plan to report on progress and propose new projects. We have developed an instrument that will guide us in planning future projects, the Area Drainage Master Study. This helps us achieve our goal of identifying flooding and regional drainage problems, and to develop alternative solutions to protect life and property.

◆ **Capital Improvement:** Once a plan is developed, and approved by our Board of Directors, we implement approved structural projects to resolve these flooding and drainage problems. We fund and oversee design and construction of the approved projects.

◆ **Maintenance:** About 38 percent of our personnel resources are devoted to maintaining the 56 flood control facilities already constructed. This includes tasks from monitoring the quality of water discharges to clearing vegetation to maintaining access roads.

◆ **Flood Warning:** No agency can fully control natural events, so we must develop another facet of prevention by the design, implementation and maintenance of an accurate, reliable flood warning system. We are implementing a network of telemetered rain and stream gauges that allow us to receive and evaluate information as the gauges register activity that is relayed electronically to computers in our office. We share this information with other agencies and jurisdictions as part of a network that alerts the public to possible danger.

◆ **Floodplain Administration:** We identify and map areas that may be inundated by 100-year floods. These are floods that have a 1 percent chance of happening in any year. Floodplain delineations are reflected on the National Flood Insurance Program maps. We also regulate development in these areas, to reduce potential damages.

◆ **Drainage Administration:** To enforce drainage building regulations in the unincorporated area, we review new development site plans, issue drainage clearances, inspect building sites, and investigate flooding reports.

◆ **Property Management:** Land acquired by the District for projects must be kept secure and free from hazard. The District also may sell or lease buildings on its land, issue licenses and enter intergovernmental agreements for use.

Our mission is best served when we work with other jurisdictions—cities, counties, state and federal agencies. This cooperation results in greater service to the public—in a regional approach, project effectiveness, overall expertise and cost-sharing that results in the best project for the money.

This report reflects the cooperation that is our hallmark, and the diverse activities required to accomplish our mission.



### Comprehensive Plan

The District updated its 26-year-old Comprehensive Plan, to report progress toward implementing the plan, and to identify potential projects from more recent sources.

The Draft 1989 Comprehensive Flood Control Report was sent to all cities in the County and to State agencies such as Transportation and Water Resources for information and input. A key reason for advising them of the District's plans was to afford them the opportunity to identify joint projects in areas where other agencies plan work. For example, Transportation identified 19 drainage projects in conjunction with its planned freeways, in which it might share costs with the District. These were included in the report.

In all, 15 of the original 1963 plan's 40 projects have been completed or are in progress; 5 have been incorporated into other projects or eliminated; and 20 have not been constructed. Some of the projects that have not been constructed are environmentally controversial or infeasible, such as Orme Dam. A few are in areas that have been or will be the subject of an Area Drainage Master Study (ADMS), which uses a problem-solving approach uniquely suited to a particular watershed or watershed cluster to identify prospective projects.

The draft also includes projects the District has completed that were not listed in the 1963 report.



**Above:** This photo, taken in 1965, shows the area that will be channelized under an agreement between the District, ADOT, and the City of Tempe. When completed, the Salt River will be channelized from McClintock Avenue to Mill Avenue, providing flood protection for the Papago Freeway and enabling Tempe to reclaim land for development and recreation facilities. (Photo: Don Keller)

### Legislation to Restrict Landfills

District personnel and counsel were instrumental in the passage of House Bill 2571, which prevents landfills from being placed within one-half mile of a river or stream with a 100-year discharge of 25,000 cubic feet per second (cfs) or more.

Keeping landfills away from sizeable streams protects the landfill as well as groundwater. According to staff studies on the "meandering" nature of rivers, a landfill built on or near a riverbed is threatened by the possibility that the river could shift and erode the landfill, displacing some of its waste.

Also, even though there may be no water in the streambed, groundwater may be "perched" on a nearby underground shelf. This bill is already threatened, however, by a ballot initiative that would effectively overturn it, backed by a waste management firm.

## Area Drainage Master Study (ADMS)

One of the District's chief planning functions is the development of solutions for the drainage system of entire watersheds. This year, the District initiated four regional studies, called Area Drainage Master Studies (ADMS). Contracts were awarded for the White Tanks-Agua Fria and Laveen studies, a consultant was selected for the Wickenburg study and a scope of work was developed for a study in the City of Phoenix north of the Arizona Canal Diversion Channel (ACDC). Additionally, the District's Advisory Board approved in February a five-year priority schedule for future studies. Conceived in 1983, the ADMS program is designed to analyze watersheds, and, in areas prone to frequent

flooding, identify homes and businesses that are subject to damages and to recommend alternative solutions.

It takes about two years for a team to study an area and develop a preferred Area Drainage Master Plan (ADMP), based on the particular geographic, hydrologic and development characteristics of the region, including input from residents and other property owners.

Because watersheds often encompass two or more municipalities, as well as unincorporated county land, one city's attempt to solve its drainage problems may worsen matters for its downstream neighbors. With its technical expertise and funding capability,

the District's ADMS program can be the instrument for bringing together all the affected jurisdictions within a watershed to develop an overall stormwater management solution.

### Area Drainage Master Plan (ADMP)

When the basic hydrology and hydraulics of an ADMS are completed—identifying, defining and quantifying the extent of drainage and flooding problems—the next step is to develop options to address these issues and test the options through computer programs. This process results in an Area Drainage Master Plan (ADMP).

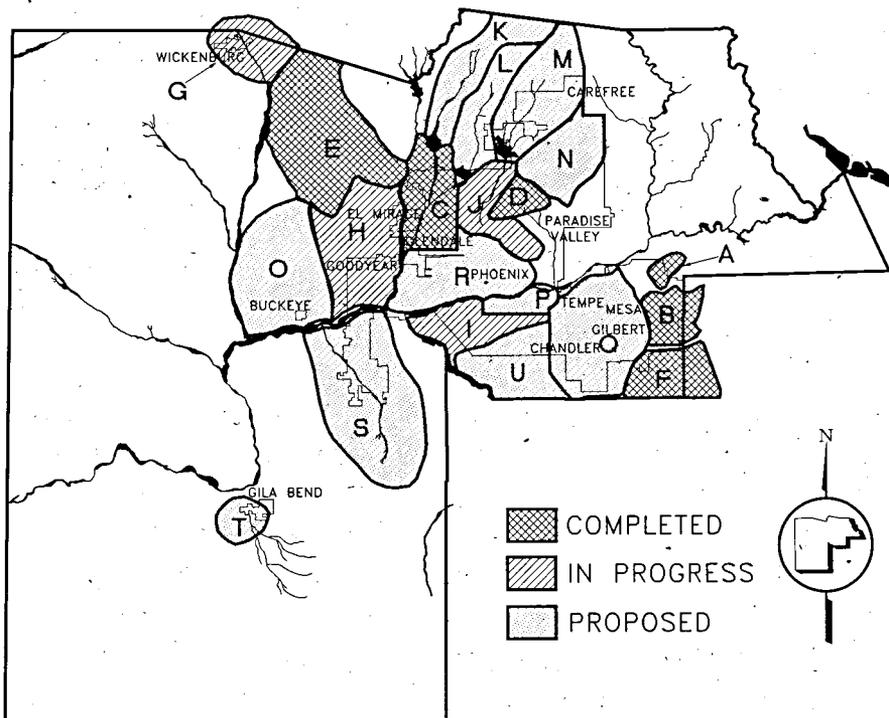
During the past year, several tasks were completed in the ongoing effort toward producing a Queen Creek ADMP:

- ◆ finalized hydrology for existing and future conditions
- ◆ finalized hydraulics for existing conditions
- ◆ initiated the development of selected alternatives
- ◆ developed and evaluated an alternative drainage system
- ◆ developed preliminary cost estimates for the alternative

### Land Acquisition and Utility Relocation

As the planning phase transitions into the project phase, much work has to be done before construction begins. Engineering design must be completed, rights-of-way must be acquired, and utilities must be relocated.

One project in the pre-construction phase is the channelization of the Salt River between Mill Avenue and McClintock Road. This year, the District has been working on an agreement with Tempe and the Arizona Department of Transportation (ADOT). Tempe will obtain all permits and rights-of-way, and the District and ADOT will share construction costs. The end result will be a more scenic transportation facility and an efficient river channel that also provides development and recreation opportunities.



**Area Drainage Master Studies  
As of June, 1990**

- |                          |                                     |
|--------------------------|-------------------------------------|
| A. Spook Hill            | L. Adobe Dam                        |
| B. East Maricopa County  | M. Cave Creek/Carefree              |
| C. Glendale/Peoria       | N. Pinnacle Peak                    |
| D. East Fork Cave Creek  | O. Buckeye/Sun Valley               |
| E. Wittmann              | P. 48th Street Drain                |
| F. Queen Creek           | Q. Mesa/Gilbert/Chandler            |
| G. Wickenburg            | R. Maryvale                         |
| H. White Tanks/Agua Fria | S. Rainbow Valley/<br>Waterman Wash |
| I. Laveen                | T. Gila Bend                        |
| J. ACDC                  | U. Foothills                        |
| K. New River             |                                     |



## Mission: Capital Improvement

Regional projects, some shared with other jurisdictions, form the backbone of the District's role in flood control. Projects go through many phases from conception to completion: a need is identified, study parameters are established, an engineering consultant is hired, other agencies, cities or counties may be involved, options are developed.

Then begins the work of evaluating the options, again with input from other agencies, cities or counties, and often the public. An option is selected,

another consultant hired for design; plans are reviewed and accepted, a construction contract is awarded.

Even before construction begins, however, rights-of-way must be acquired and cleared, utilities relocated, people and businesses relocated.

In any given year, District projects progress through the various stages of this process. In this portion of the report, the major projects will be tracked through the portions of the process they underwent this year.

### Design

Projects that entered the design phase this year included:

The Guadalupe Channel, along Guadalupe Road from Sossaman to Power Road; plans and specifications were completed and advertisement for a construction contractor took place.

East Fork Cave Creek Channel, from Beardsley Road to Union Hills Drive, and Basin 4, on the campus of Paradise Valley Community College; the design contract was awarded and work is underway. This is a joint project with Phoenix that resulted from an Area Drainage Master Plan.

The bridge at Northern Avenue in conjunction with the channelization of New River; a design contract was awarded. This is a joint project with the County Highway Department.

91st Avenue storm drain, another joint effort with County Highway, is part of the Bell Road improvement project; plans are being finalized.

Union Hills storm drain, from Skunk Creek to I-17, a joint project with Phoenix and Glendale, is being designed by the City of Phoenix.

32nd Street Bridge, part of the preparation for construction of Reach 4 of the Arizona Canal Diversion Channel (ACDC), had the design of its first phase completed.

### Land Acquisition

Some or all of the rights-of-way (ROW) were acquired for several projects:

East Fork Cave Creek channel ROW acquisition began in the area from Beardsley to Union Hills.

ACDC Reach 4 ROW was nearly all completed. Major efforts this year focused on negotiations with the Arizona Biltmore, which were concluded satisfactorily; negotiations with Western Savings are ongoing.

Flowage easements, giving the District the right to divert water onto privately owned property in floodplains, were



### New Building Under Construction

March brought the groundbreaking of the District's new administration building, a 72,000 square-foot structure that will accommodate personnel requirements projected through the year 2008. The building was designed by Lescher and Mahoney, Inc., and is being constructed by Meineke-Johnson Company. The facility will be located at approximately 28th Avenue and Durango Street, just east of our current location. The staff is looking forward to occupying the new building in May of next year, when they will be able to enjoy less cramped work areas. The staff is currently packed into a 15,000 square foot building, two leased triple-wide trailers and a leased office.

The new building mirrors the neighboring County Highway Department building in shape and exterior. The major features of the building are its dark brick trimmed by copper patina (copper flashing treated with acid). The building also has a zig-zag design that gives plenty of window space offering natural light to as many offices as reasonably possible.

In addition to the administration building, the District is also in the process of building a new operations facility. This facility, currently in design, will house the District Operations and Maintenance staff and also the Hydrometeorologic staff. The facility includes a workshop, a tool and equipment storage area, and a training/meeting room. This facility is now planned to be available within one month of the completion of the administration building.

obtained for the Agua Fria and New River, completing the acquisition for this particular project.

All the necessary Guadalupe Channel easements were acquired, as well as those for the Signal Butte outlet structures. State lands were acquired for the Trilby Wash-McMicken Dam structure.

Acquisition took place for the Salt-Gila River Control Works low-flow channel in the 1,000-foot corridor from Gillespie Dam to 91st Avenue. This project is about 60 percent complete.

## Construction

As property is acquired and designs are completed, construction and relocation of utilities can begin. Several projects started construction this year:

In preparation for the ACDC Reach 4 construction, work began on bridges at 12th Street, 32nd Street and Maryland Avenue. Work is nearly complete on the 16th Avenue bridge. The bridge and utility relocation at Glendale was started and finished this year.

Among the Bell Road Drainage Improvement projects, 59th Avenue storm drain is about 60 percent complete; 51st and 67th Avenue drains are completed. These works drain water from Bell Road to the ACDC.

Construction started this year and is 90 percent complete on the Guadalupe Road Box Culvert inlet to the East Maricopa Floodway near Power Road.

On the Salt-Gila Control Works, one fill area was completed and two more got underway. The low-flow channel from Miller to Rainbow Roads contract was awarded and completed. The contract was advertised for low-flow channel from Tuthill to Sarival Roads.

## Joint Projects

The District has undertaken many projects with other cities or agencies. This cooperative effort yields a high return to the taxpayer in terms of project effectiveness.

Channelization of the Salt River for the Tempe Rio Salado project is about 50 percent complete, from 40th Street to

Mill Avenue, and primary utility relocations are complete.

When channelization is completed to McClintock Road, as planned in the second phase, hundreds of acres will be taken out of the floodplain. The Department of Transportation will build the East Papago Freeway on reclaimed land on the north side of the river, saving considerable money on rights-of-way. Tempe will use the land taken out of the floodplain for recreation and development. These three entities will share the cost of the project.

Another three-way effort is the Old Cross Cut Canal. ADOT awarded two contracts this year for construction of the Hohokam Freeway from Salt River to McDowell Road on the canal alignment. These contracts include relocating and widening of the canal, for which the District will share costs with Phoenix and ADOT.

Price Road Drain, from Carriage Lane to the Salt River, is a District-ADOT-Chandler-Mesa partnership. This year, an 18-foot diameter tunnel was completed and inspected.

Glendale and Peoria will share costs with the District on the Olive Avenue Storm Drain, Outer Loop to 67th Avenue, which is 96 percent complete after its construction contract was awarded this year. All underground utility work is complete.

Construction is underway for the Scottsdale Airport Basin, among the last of the works in a project cost-shared with Phoenix, Scottsdale and Paradise Valley.

## Ongoing Projects

As may be seen, it can take several years for a project to be completed. Many projects already were underway when this fiscal year began, and a progress report is in order.

Much work was accomplished on the ACDC. In Reach 1, which is an earthen channel from 53rd Avenue to Skunk Creek, a low-flow channel is now 75 percent complete. The landscaping, recreation and erosion control contract was awarded and work is 18 percent complete. Work began on waterline trenching, catch basins and other erosion control features.



*The Salt-Gila Control Works help keep the rivers within their banks. (Above: Gila River at 319th Avenue)*

On Reach 2B, from 43rd to 27th Avenues, the U. S. Army Corps of Engineers is negotiating with a contractor to implement aesthetic changes residents requested. Landscaping work has been completed.

On Reach 2C, from 27th Avenue to Cave Creek Wash, the Cave Creek Channel is now complete, and landscaping and fencing are nearly finished.

On Reach 3, from Cave Creek Wash to 12th Street, a contract was awarded and construction well underway; utility relocations are nearly complete.

Reach 4, from 12th to 40th Streets, the channel design has been completed and the construction contract advertisement scheduled. Landscape plans also were completed.

In the New River project, from Grand Avenue to Olive Road, channelization is 99 percent complete and the irrigation system is 36 percent finished.

To comply with the Clean Water Act on the Olive Road to Bethany Home Road portion of the New River project, the District applied for a 404 permit from the Corps of Engineers and received the 401 permit from Arizona Department of Environmental Quality.

Work on Skunk Creek, downstream of the confluence with the ACDC, is 78 percent complete. The old 83rd Avenue bridge has been removed and the substructure concrete and girders for new bridge are in place. The soil cement bank protection is near completion.



# Mission: Maintenance

## Personnel and Equipment Needs Increase

Five new areas were assumed as part of the District's Maintenance mission during the past fiscal year:

- ◆ New River channelization from Grand Avenue to Olive Road;
- ◆ Skunk Creek from New River to the Arizona Canal Diversion Channel (ACDC);
- ◆ Indian School Road drain from 105th Avenue to the New River;
- ◆ Salt-Gila River low-flow channel from Miller to Rainbow Roads;
- ◆ Reach 6 of the East Maricopa Floodway.

These are added to the already extensive maintenance responsibilities of the Division: 56 flood control facilities, including 21 dams, 480 miles of roads, 14,000 feet of underground pipe, plus bridges, fences and hundreds of mis-

cellaneous floodway features such as 65,000 landscaping plants.

This mission accounts for 7 percent of the District's budget and 38 percent of its personnel. Maintenance staff increased 8 percent during the year.

These projects require much labor-intensive maintenance, including weed and brush control, and the removal of rubbish and debris. To help meet this need, the District uses Department of Correction (DOC) prisoner crews from ASPEN and Perryville correction facilities. This year, however, the District has "topped out" on the number of ASPEN crews that DOC can support, using 30 Perryville and 45 ASPEN inmates to perform 63,186 hours of work at 50 cents an hour. The DOC crews were augmented this fiscal year,

for the first time, by a regular District crew of laborers.

Equipment needs also increase with responsibilities. A streetsweeping vehicle was added this year to the fleet for maintenance of the Arizona Canal Diversion Channel, as well as the paved service roads (many of which double as bicycle trails) the District maintains.

A 10-yard dumptruck replaced a smaller vehicle; a 3,500 gallon water truck replaced a 1,500 gallon truck; a larger backhoe was acquired to accommodate work on the Salt/Gila River clearing. Other fleet additions were four pickups, a four-wheel-drive crew cab; a three-quarter-ton four-wheel-drive and a Blazer.

**Hours Worked by  
Department of  
Corrections' Prisoners  
Fiscal Year 89/90**

| Project                    | Annual Hours  |
|----------------------------|---------------|
| ACDC                       | 14,140        |
| Adobe Dam                  | 1,466         |
| Agua Fria River            | 2,333         |
| Buckeye Dams               | 1,974         |
| Centennial Levee           | 1,404         |
| El Mirage Drain            | 543           |
| EMF                        | 4,693         |
| Harquahala FRS             | 576           |
| Indian Bend Wash           | 2,499         |
| McMicken Dam & Outlet      | 2,052         |
| New River                  | 1,699         |
| Saddleback FRS & Diversion | 1,796         |
| Salt/Gila Control Works    | 589           |
| Salt/Gila River Clearing   | 21,840        |
| Signal Butte Floodway      | 629           |
| Spook Hill FRS             | 913           |
| Other                      | 4,040         |
| <b>Total</b>               | <b>63,186</b> |

**Maintenance Responsibilities**

| Item                               | Inventory as of 6/89 | Inventory Added FY 89/90 | Total Inventory |
|------------------------------------|----------------------|--------------------------|-----------------|
| Access Ladder                      | 16                   | 2                        | 18 each         |
| Bank Protection—Rip Rap            | 472,363              | —                        | 472,363 sq yd   |
| Bank Protection—Grouted Rip Rap    | 128,180              | 5,615                    | 133,795 sq yd   |
| Bank Protection—Soil Cement        | 8,850                | 8,526                    | 17,376 sq yd    |
| Bank Protection—Shot Crete         | 4,987                | —                        | 4,987 sq yd     |
| Bridges                            | 23                   | 1                        | 24 each         |
| Culverts                           | 93                   | 8                        | 101 each        |
| Curb & Gutter—Concrete             | 24,815               | 6,435                    | 31,250 feet     |
| Dip Crossings—Asphalt              | 4                    | —                        | 4 each          |
| Drainage Channel—Lined             | 84,109               | 7,414                    | 91,523 feet     |
| Drainage Channel—Unlined           | 20.3                 | 0.5                      | 20.8 miles      |
| Drop Structure                     | 61                   | 2                        | 63 each         |
| Embankment                         | 1201.0               | 24.4                     | 1,225.4 acres   |
| Energy Dissipator                  | 37                   | —                        | 37 each         |
| Erosion Protection—Concrete Paving | 8,000                | 31,600                   | 39,600 sq yd    |
| Fencing                            | 1,149,839            | 127,000                  | 1,276,839 feet  |
| Floodway—Lined                     | 42,125               | 15,010                   | 57,135 feet     |
| Floodway—Unlined                   | 1,747                | 37                       | 1,784 acres     |
| Gabions                            | 17,333               | —                        | 17,333 sq yd    |
| Gated Outlet                       | 20                   | —                        | 20 each         |
| Gates                              | 403                  | 41                       | 444 each        |
| Gila River Pilot Channel           | 22,724               | 20,000                   | 42,724 feet     |
| Grade Control Structures           | 20                   | 1                        | 21 each         |
| Guardrail                          | 2,420                | 100                      | 2,520 feet      |
| High Flow                          | 599                  | —                        | 599 acres       |

## Response to EPA Pollution Control Proposal

During the past year, the District has responded to the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) proposed permit application requirements for stormwater discharge. These requirements would require that any city with a population over 100,000 establish a permit program for entities that discharge water into its stormwater conveyances, in order to monitor and reduce pollutants entering these structures.

The District is taking an early interest in NPDES because it is expected that, by 1992, the requirements will be expanded to include entities besides cities that own and operate stormwater conveyances, such as flood control districts and state departments of transportation.

District staff have met regularly with representatives from the Arizona Department of Environmental Quality and cities that will be impacted by the new regulations, to discuss the implications and to develop a handbook for implementing Best Management Practices for improving the quality of urban stormwater.

The District also participated in the formation of the Coalition of Arid and Semi-Arid Entities (CASE), to petition the EPA to incorporate sufficient flexibility into the regulations to allow arid regions to meet minimum permit requirements. The coalition consists of five county agencies and thirteen cities from states throughout the west.

### Clean Water Act—404 Permits

A 404 permit application made this fiscal year is still pending with the Corps

of Engineers for the New River channelization from Olive to Bethany Home Roads.

The participation of the District's Environmental Branch in analysis and planning on the East Fork Cave Creek project, on which the District and Phoenix are cooperating for a flood control project of basins and a channel, helped to maintain the rural desert environment of the area and meet the criteria for a Nationwide 404 permit.

### Surveying the Landscape

Among the Branch's tasks are taking inventory and surveys of vegetation at District projects. An inventory catalogues the number, type and size of all the vegetation in the area.

An inventory was completed on Reach 4 of the Arizona Canal Diversion Channel (ACDC) as part of the District's response to concern about the fate of hundreds of mature trees there, which might have been cleared for construction.

The Flood Control Advisory Board voted this year to recommend to the Board of Directors that an auction of the trees be conducted, at which commercial tree harvesters could bid for the opportunity to salvage trees from the rights-of-way and sell them.

In this way, the harvested trees retain their beauty and function even though they must be relocated. When completed, Reach 4 will be replanted with hundreds of fast-growing arid-climate young trees that, in a few years, will shade the popular recreation area along the canal bank.

Another inventory was conducted at the New River, in conjunction with the 404 permit application.

Vegetation surveys address such issues as species diversity, trends, general health and density. The vegetation is important in preventing soil erosion, thereby reducing maintenance requirements.

Surveys were conducted this year at Harquahala Dam, Saddleback Dam, Dreamy Draw Dam, Cave Buttes Dam, and Centennial Levee.

| Maintenance Responsibilities |                      |                          |                 |
|------------------------------|----------------------|--------------------------|-----------------|
| Item                         | Inventory as of 6/89 | Inventory Added FY 89/90 | Total Inventory |
| Landscape—Erosion Control    | 2,581                | 37                       | 2,618 acres     |
| Irrigation Heads             | 305                  | 1,082                    | 1,387 each      |
| Irrigation Controls          | 4                    | 6                        | 10 each         |
| Irrigation Lines             | 83,012               | 92,428                   | 175,440 feet    |
| Plantings                    | 44,608               | 20,724                   | 65,332 each     |
| Low Flow—Structures          | 1,115                | —                        | 1,115 acres     |
| Manholes                     | 30                   | 1                        | 31 each         |
| Meter Houses                 | 9                    | 1                        | 10 each         |
| Outlet Structures            | 9                    | —                        | 9 each          |
| Pool Area                    | 59,957               | —                        | 59,957 acres    |
| Principal Outlet             | 19                   | 1                        | 20 each         |
| Principal Outlet—Pipe        | 13,405               | 728                      | 14,133 feet     |
| Railing—Pipe                 | 844                  | 36,081                   | 36,925 feet     |
| Ramps                        | 32,592               | 3,688                    | 36,280 feet     |
| Retaining Wall               | 2,822                | 466                      | 3,288 feet      |
| Right-of-Way                 | 32,527               | 852                      | 33,379 acres    |
| River Clearing               | 4,295                | 459                      | 4,754 acres     |
| Roads                        | 404.4                | 23                       | 427.4 miles     |
| Sediment Basins              | 39                   | 1                        | 40 each         |
| Side Inlet                   | 510                  | 150                      | 660 each        |
| Spillway—Earth               | 512                  | —                        | 512 acres       |
| Spillway—Lined               | 1,475                | —                        | 1,475 feet      |
| Stormdrain Pipe              | 26,870               | —                        | 26,870 feet     |
| Trash Racks                  | 125                  | 70                       | 195 each        |
| Underpass—Pedestrian         | 1                    | 1                        | 2 each          |
| Vegetative Drains            | 59                   | —                        | 59 each         |



# Mission: Property Management

## Clearing the Way

During the past year, Property Management has battled bees, demolished a cock-fighting arena, and arranged to auction some trees and to raze a church in order to clear rights-of-way for project construction.

The District must maintain property it acquires for capital improvement projects. The Property Management branch keeps District land secure and free from hazard, issues use permits, leases, sells or demolishes buildings, and generally makes the best use of the property for the District.

This year's activities include clearing rights-of-way for the Arizona Canal Diversion Channel (ACDC) Reaches 3 and 4 and beginning to clear property for the Upper East Fork Cave Creek (EFCC) project. Forty-seven mobile homes were cleared from the EFCC rights-of-way, 26 of which were leased to other government agencies. Preparations were started for a public auction to dispose of the 21 remaining mobile home units.

Homes acquired may be leased until it is time to demolish them for construction. Property Management leased all of its 52 properties during the fiscal year, earning the District \$167,000. This program is phasing out as the ACDC nears completion, since most of the properties leased were in the ACDC rights-of-way.

An intergovernmental agreement was concluded with Tempe for a nine-hole golf course on District land in the Indian Bend Wash Outlet. Work began on a similar agreement with Phoenix for an 18-hole golf course at Cave Buttes Dam.

There were 53 licenses issued to those who desired access to District property, such as

utility companies that want to install poles.

The District also worked with a developer on activities that affect the Guadalupe Dam.

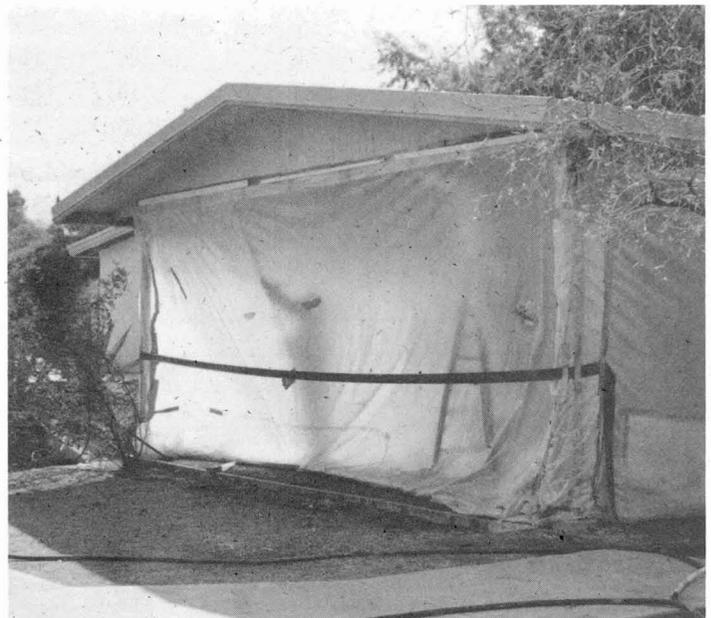
**Expenditures on Land (Breakdown by Project)**  
Fiscal Year 1989/1990  
(Preliminary and Unaudited)

| Project                   | Parcels Acquired | Total Land Acquisition Costs | Land Acquired to Date, % |
|---------------------------|------------------|------------------------------|--------------------------|
| ACDC                      | 37               | \$ 6,770,000                 | 99                       |
| Agua Fria                 | 31               | 3,421,000                    | 99                       |
| EMF                       | 1                | 129,000                      | 100                      |
| New River/<br>Skunk Creek | 7                | 1,204,000                    | 100                      |
| Salt/Gila                 | 19               | 2,051,000                    | 85                       |
| Reed Landfill             | 3                | 102,000                      | 100                      |
| Sossaman Road             | 3                | 20,000                       | 100                      |
| EFCC                      | 49               | 6,093,000                    | 60                       |
| Other                     | N/A              | 18,000                       | N/A                      |
| <b>Total</b>              | <b>150</b>       | <b>\$19,808,000</b>          |                          |

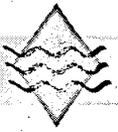
**Rental Program**  
Fiscal Year 1989/1990  
(Preliminary and Unaudited)

| Project  | Leasable Properties* | Leased*   | Rents Received   |
|--|----------------------|-----------|------------------|
| ACDC   | 17                   | 17        | \$ 92,000        |
| EMF  | 3                    | 3         | 39,000           |
| Signal Buttes  | 2                    | 2         | 11,000           |
| Apache Junction FRS  | 2                    | 2         | 9,000            |
| Agua Fria River  | 1                    | 1         | 4,000            |
| East Fork/Cave Creek   | 1                    | 1         | 9,000            |
| Mobile Homes Leased to<br>County Agencies for<br>nominal fee | 23                   | 23        | N/A              |
| Other  | 3                    | 3         | 3,000            |
| <b>Total</b>   | <b>52</b>            | <b>52</b> | <b>\$167,000</b> |

\*Average of beginning and end of fiscal year 89/90.



*Silhouetted against a plastic shroud, a worker removes asbestos before the demolition of a building in the path of the Arizona Canal Diversion Channel.*



## Mission: Floodplain Management

### Studies Result in New Floodplain Delineations

Floodplain delineation involves the study of an area's hydrology (how much rain and runoff occurs) and hydraulics (how the water flows). This complicated process includes ground and aerial surveys to produce topographical maps, analyzing hydrology and hydraulics, soil characteristics and historic data. All this information is processed with a computer to develop a model of the floodplain, which is checked at the site for "ground truth," physical characteristics to verify what the model indicates.

Determining the floodplains helps identify developments that may need protection, updates and expands flood insurance maps, and minimizes potential flood damages that may accrue as

a result of allowing development near defined watercourses.

Delineations completed during the past year include: Waterman Wash, Morgan City, Rodgers, and Cline Washes (tributaries to Skunk Creek), Wittmann, upstream of Rittenhouse Road in the East Valley, and the Gila River between Painted Rock and Gillespie dams.

Delineations started and/or still in progress are: Upper Cave Creek (Cave Creek-Carefree area), Middle Cave Creek (between Cave Buttes Dam and the Arizona Canal), Aguila Farms Channel, Upper Centennial Wash/Grass Wash (all in the far northwest corner of the county), Apache Wash, Skunk Creek, and Little San Domingo Wash (near Wickenburg).

When a floodplain is delineated, the District sends a request for a Letter of Map Revision (LOMR) to the Federal Emergency Management Agency (FEMA), and notifies the Arizona Department of Water Resources that the flood insurance map will be revised.

This fiscal year, the District requested LOMRs on the Little San Domingo Wash, Lower Gila River, Wittmann, Cave Creek-Carefree, Morgan City, Rodgers, and Cline Washes, Aguila Farms Channel, Lower Gila River, Skunk Creek-ACDC-New River, Queen Creek, and Lower Waterman Wash.

### Activities Lower Insurance Rates

The creek may rise but flood insurance won't—at least, not as quickly—because of the District's participation in the National Flood Insurance Program's new Community Rating System (CRS).

This system was developed to rectify inequities in rates among communities that meet only minimum regulatory standards of flood protection and those that exceed the minimum.

Through the credit incentive, CRS aims to increase activities that reduce flood losses, facilitate accurate insurance rating and promote awareness of flood insurance. Several categories of activity are examined: public information, mapping and regulation, flood damage reduction and flood preparedness.

During this year, the District started examining its procedures to determine and document in what ways it already meets guidelines in the 18 subdivisions of these categories.

The District could accumulate credits qualifying policy-holders for reductions of up to 45 percent of the flood insurance premium. An initial estimate indicates that the District's current activities may qualify for at least partial credit in 16 of the categories, amounting to 20 percent already. The program is set up to recognize only 5 percent reductions the first year, which begins in October 1991.

As a frame of reference, there are:

- ◆ 700 linear miles (295,253 acres) of delineated floodplains\* in the county, 200 (34,554 acres) of them in incorporated areas.
- ◆ 15,000 flood insurance policies issued throughout the County, 630 of them in the unincorporated area.
- ◆ 1,782 insurable buildings in the unincorporated area in floodplains, 228 of them residential.
- ◆ 866 residents in the unincorporated area living in floodplains.

\*A floodplain is the area likely to be inundated in the 100-year event.

### Watercourse Master Plan Legislation Enacted

A bill has been signed into law that provides the tools to stop damages from occurring downstream of new development or other encroachment. District staff and counsel researched and lobbied to pass Senate Bill 1277, which amends the District's enabling legislation.

When delineating floodplains, the District now may take into consideration the cumulative impact of future as well as existing development. The hydraulic information obtained during the delineation will be incorporated into a watercourse master plan, and will establish technical criteria for future development.

The District's Board of Directors may adopt the watercourse master plan, which will guide development of the floodplain to minimize potential flood damages.



## Mission: Drainage Administration

### Manual Offers Standardization

One of the District's major nonstructural projects is the development of a drainage design manual, for use by jurisdictions and developers countywide. The manual is comprised of two volumes—one on hydrology and one on hydraulic design.

The hydrology volume provides technical procedures, developed especially for Maricopa County, for the estimation of rainfall and resulting flood and runoff amounts. Using information obtained by these techniques, the hydraulics design volume, still in the draft stage, provides a convenient source of technical information for designing structures to handle runoff events.

The drainage design manual had its roots in the county's Uniform Drainage Standards, effective for unincorporated areas of the county. Input

from cities and towns was used to formulate the standards, and the District anticipates that process will enhance the prospects of other jurisdictions adopting the drainage design manual.

Criteria for the design manual are based on best available data that is specifically tailored to the unique hydrologic, environmental and social character of Maricopa County.

Drainage Administration staff review development master plans, subdivision plans and other zoning cases to ensure that development will not affect adversely the residents who live downstream. Three major concerns are addressed:

- ◆ Increased runoff as a result of building and

paving must be accommodated by detention or retention basins to prevent flooding downstream.

- ◆ Off-site flows must continue to enter and exit the property in the same place.
- ◆ Buildings must be floodproofed by putting the floors above the 100-year event level.

| Activity                                       | Drainage Management Work Load |       |       |
|--|-------------------------------|-------|-------|
|  | Fiscal Year                   |       |       |
|  | 87/88                         | 88/89 | 89/90 |
| Zoning Cases Reviewed (including resubmittals) | 357                           | 250   | 259   |
| Subdivision Cases Reviewed                     | 94                            | 68    | 50    |
| Master Plans Reviewed                          | 2                             | 16    | 4     |
| Board of Adjustment Cases Reviewed             | 128                           | 160   | 190   |
| Drainage Inspections                           | 579                           | 1177  | 3679* |

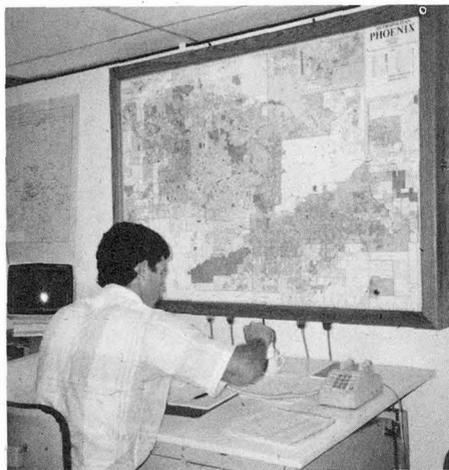
\* New drainage regulations implemented in 10/88.



## Mission: Flood Warning

### Gauging the weather

During the past year, 24 telemetered rain gauges were installed, for a total of 102. Additionally, 16 stream gauges were installed, for a total of 39. These gauges are located throughout the



County and adjacent watersheds. Some of the gauge program is implemented through intergovernmental agreements with Phoenix, Mesa and the U.S. Geological Survey (USGS) and the Arizona Department of Water Resources (ADWR). Agreements are underway with Phoenix and Mesa to install more rain gauges.

These telemetered gauges transmit information electronically to the District, which shares information with the National Weather Service. As of this year, the District has installed about three-quarters of the rain gauges it plans as part of an overall flood warning system. Pima County, ADWR and the USGS have requested the District's technicians to service their rain and stream gauges because of the District staff's expertise.

### Survey Planned

The District hired a consultant this year to develop a survey of cities and agencies in the county regarding their perceptions about flooding and flood

warning. The purpose is to gather information and evaluate their level of knowledge and needs about the subjects so that the District can develop an effective flood warning program.

### Dam-Break Analyses

Dam break analyses are conducted to comply with structure licensing requirements of ADWR.

During the past year, analyses were completed on Guadalupe Dam, Buckeye Flood Retention Structures 1, 2, and 3, Powerline Dam, Rittenhouse Dam and Vineyard Dam.

Inundation maps were developed as a result of these analyses, and used by the County's Department of Civil Defense and Emergency Services to develop warning and evacuation plans.

Analyses were initiated last year of Cave Buttes Dam, Harquahala Dam, Saddleback Dam, Spookhill Dam, and White Tanks Dams 3 and 4.

**Flood Control District of Maricopa County  
Board of Directors**

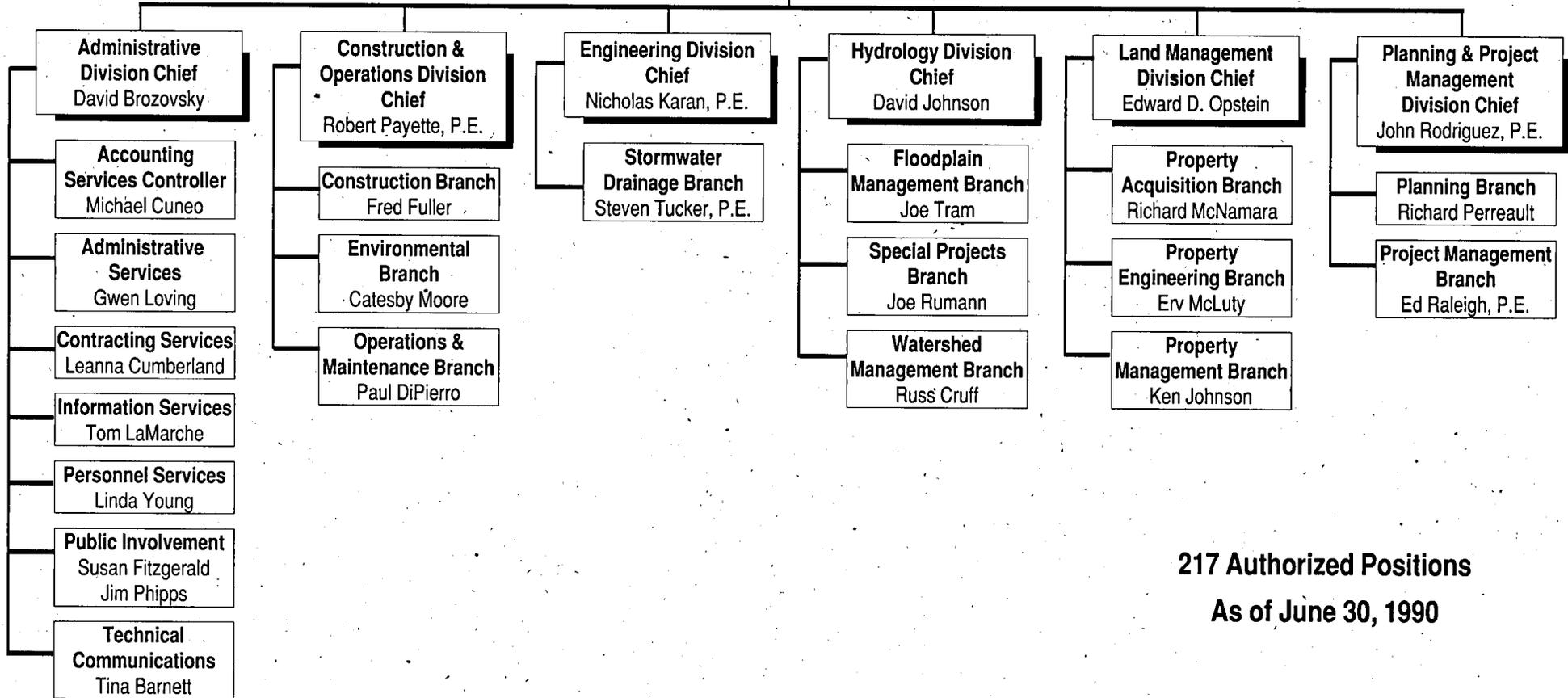
**Flood Control Advisory Board  
Advisory Group/Consulting Group**

**Office of the County Manager**  
Roy Pederson

**Assistant County Manager  
Public Works Director/County Engineer**  
A.W. Collins, P.E.

**Chief Engineer and General Manager**  
D.E. Sagramoso, P.E.

**Deputy Chief Flood Control Engineer**  
Stanley L. Smith, Jr., P.E.



**217 Authorized Positions  
As of June 30, 1990**

◆ 11 ◆



## Board of Directors



**Tom Freestone**  
District 1



**James D. Bruner**  
District 2  
Chair



**Betsey Bayless**  
District 3



**Carole Carpenter**  
District 4



**Ed Pastor**  
District 5

The Flood Control District of Maricopa County, founded in 1959, is a municipal corporation and political subdivision of the State of Arizona. The District is governed by a five-member Board of Directors which consists of the elected Supervisors for the County.

The District has all the powers, privileges and immunities granted generally to municipal corporations. The Board of Directors exercises all powers and duties in the acquisition and operation of District properties, contracting, and in carrying out regulatory functions as ordinarily exercised by governing bodies. The activities of the District are funded by a flood control tax levy assessed on all real property within Maricopa County and a variety of cost sharing arrangements with the State, Maricopa County, and local governments. The tax levy rate for Fiscal Year 89/90 was \$0.4303 per \$100 assessed value of the property. For a history of the flood control tax levy, see the table on the inside of the front cover.



## Flood Control Advisory Board

The Flood Control Advisory Board (FCAB) advises the Board of Directors on flood control, water conservation, floodplain management, drainage, and related matters. It reviews planning, operations, and maintenance of flood control facilities, and recommends an annual budget to the Board of Directors.

The Advisory Board consists of seven members, appointed by the Board of Supervisors to five-year terms. At least one member must be a resident of the City of Phoenix. The Phoenix City Engineer and the General Manager of the Salt River Project, or their representatives, are ex-officio members of the Advisory Board.

Charles A. Sykes (not pictured) represented District 3 during fiscal year 1989/90. Kenny Harris (not pictured) is currently the ex-officio member on the FCAB for the City of Phoenix.



**William LoPiano**  
District 1



**John E. Miller, Jr.**  
District 2



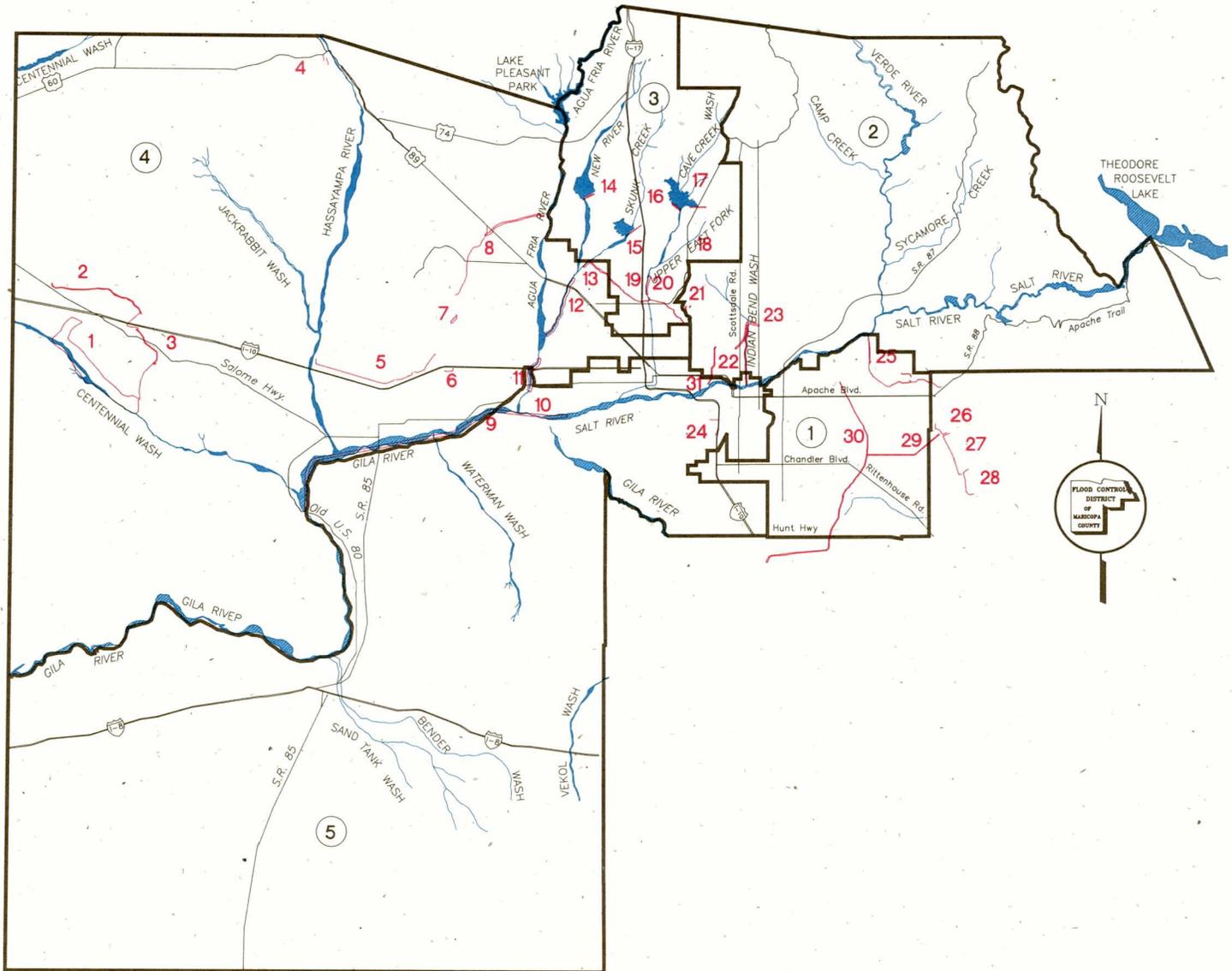
**Lynn Anderson**  
District 4



**Marcela Peters**  
District 5



**Paul Cherrington**  
Salt River Project



**Flood Control District of Maricopa County Projects  
(As of June 30, 1990)**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Centennial Levee (Partly complete)</li> <li>2. Harquahala Dam and Floodway (1982)</li> <li>3. Saddleback Dam and Diversion (1981)</li> <li>4. Sunset and Sunnycove Dams (1976)</li> <li>5. Buckeye Dams 1, 2, and 3 (1975)</li> <li>6. White Tanks Dam 4 (1954)</li> <li>7. White Tanks Dam 3 (1954)</li> <li>8. McMicken Dam (1956)</li> <li>9. Salt-Gila Clearing (1985)</li> <li>10. Holly Acres Levee and Bank Stabilization (1985)</li> <li>11. Agua Fria Channel Projects (1988)</li> <li>12. New River Channelization (Partly complete)</li> <li>13. Skunk Creek Channelization (Partly complete)</li> <li>14. New River Dam (1985)</li> <li>15. Adobe Dam (1984)</li> <li>16. Skunk Creek Channels and Levee (1983)</li> <li>17. Cave Buttes Dam (1980)</li> <li>18. East Fork Cave Creek (Study)</li> <li>19. Arizona Canal Diversion Channel (Partly complete)</li> </ul> | <ul style="list-style-type: none"> <li>20. Cave Creek Channelization (Partly complete)</li> <li>21. Dreamy Draw Dam (1973)</li> <li>22. Old Cross Cut Canal (1975)</li> <li>23. Indian Bend Wash (1985)</li> <li>24. Guadalupe Dam (1975)</li> <li>25. Buckhorn-Mesa Projects <ul style="list-style-type: none"> <li>Spook Hill Dam (1979)</li> <li>Signal Butte Floodway (1984)</li> <li>Signal Butte Dam (1987)</li> <li>Pass Mountain Diversion (1987)</li> <li>Bull Dog Floodway (1988)</li> <li>Apache Junction Dam (1988)</li> </ul> </li> <li>26. Powerline Dam (1967)</li> <li>27. Vineyard Dam (1968)</li> <li>28. Rittenhouse Dam (1969)</li> <li>29. Powerline Floodway (1968)</li> <li>30. East Maricopa Floodway (1989)</li> <li>31. Salt River Channel (Partly complete)</li> </ul> |
|---|---|



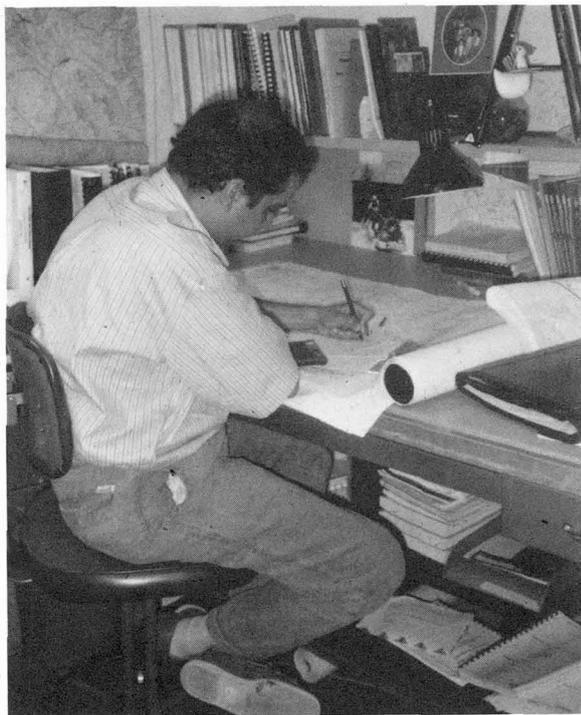
## District Personnel



*Every Tuesday morning, the District's Chief Engineer and General Manager, Deputy Chief Engineer, and Division Chiefs meet to address District-wide concerns.*

### Principal District Staff

D.E. Sagramoso, P.E., Chief Engineer and General Manager  
Stanley L. Smith, Jr., P.E., Deputy Chief Engineer  
David A. Brozovsky, Flood Control Administrator  
Robert C. Payette, P.E., Chief, Construction and Operations Division  
Nicholas P. Karan, P.E., Chief, Engineering Division  
David R. Johnson, Chief, Hydrology Division  
Edward D. Opstein, Chief, Land Management Division  
John E. Rodriguez, P.E., Chief, Planning and Project Management Division



*Hydrologist Afshin Ahouraiyan works in the Watershed Management Branch of the District.*

### NACo Awards

Two award-winning programs were developed during the past year, winning recognition from the National Association of Counties (NACo) for four staff members. The organization recognizes significant, innovative activities that improve organization, management or services.

The East Maricopa County High Resolution Hydrologic Model was developed by Hydrologist Besian Khatiblou based on information developed in an Area Drainage Master Study (ADMS). This model will help the District to simulate various rainfall events in order to assess the degree of protection provided by existing structures and by proposed structures. Furthermore, it can locate critical areas that may be damaged during severe flooding and test the effects of future development (such as freeways, housing and businesses) on current drainage facilities and make certain that proposed structures will not create an adverse impact on the overall drainage system.

Water Resources Planner Greg Rodzenko, and Hydrologists Russ Cruff and Joe Tram collaborated to create a manual that would be used to standardize the means of determining roughness coefficients (or "friction factors") for stream channels in the County. While national and regional roughness coefficient manuals had been compiled previously, there was no single document that specifically addressed this issue for Maricopa County. The District contracted with the U.S. Geological Survey to create a technical document that would standardize the calculation of the roughness coefficient from a technical standpoint with pictorial representations of appropriate values. Standardization of the roughness coefficients will ensure that floodplain delineations throughout the County are consistently and uniformly performed.



*Flood Control Operations Specialist I David Pettijohn operates a backhoe near the Guadalupe Box Culvert to clear the channel after a summer monsoon.*

**Flood Control District of Maricopa County**  
**Statement of Revenues, Expenditures and Changes in Fund Balance**  
 Budget and Actual  
 Fiscal Year Ending June 30, 1990  
 (Preliminary and Unaudited)

|  | Budget               | Actual               | Variance<br>Favorable<br><Unfavorable> |
|--|----------------------|----------------------|--|
| <b>Revenues</b>                                      |                      |                      |  |
| Flood Control District Tax Levy                      | \$ 51,155,000        | \$ 46,408,000        | \$ <4,747,000>                         |
| State Share of Costs                                 |                      |                      |  |
| Federal Projects                                     | 0                    | 0                    |  |
| Local Projects                                       | 0                    | 0                    |  |
| County Reimbursement                                 | 60,000               | 87,000               | 27,000                                 |
| Local Participation                                  | 9,026,000            | 6,479,000            | <2,547,000>                            |
| Rental   | 250,000              | 167,000              | <83,000>                               |
| Interest Earnings                                    | 2,000,000            | 3,326,000            | 1,326,000                              |
| Sale of Excess Land                                  | 1,190,000            | 0                    | <1,190,000>                            |
| Miscellaneous  | 60,000               | 247,000              | 187,000                                |
| Total Revenues                                       | <u>63,741,000</u>    | <u>56,714,000</u>    | <u>&lt;7,027,000&gt;</u>               |
| <b>Expenditures</b>                                  |                      |                      |  |
| Personnel Services                                   |                      |                      |  |
| Salaries and Wages                                   | 7,614,000            | 6,375,000            | 1,239,000                              |
| Overtime   | 56,000               | 1,000                | 55,000                                 |
| Total  | <u>7,670,000</u>     | <u>6,376,000</u>     | <u>1,294,000</u>                       |
| Supplies and Services                                |                      |                      |  |
| Professional Services Contracts                      | 3,201,000            | 2,833,000            | 368,000                                |
| Maintenance Contracts                                | 1,312,000            | 826,000              | 486,000                                |
| Maintenance Supplies                                 | 560,000              | 214,000              | 346,000                                |
| Insurance  | 40,000               | 69,000               | <29,000>                               |
| Other Supplies and Services                          | 718,000              | 810,000              | <92,000>                               |
| Total  | <u>5,831,000</u>     | <u>4,752,000</u>     | <u>1,079,000</u>                       |
| Capital Outlay                                       |                      |                      |  |
| Real Estate  | 14,791,000           | 19,464,000           | <4,673,000>                            |
| Engineering  | 5,523,000            | 3,019,000            | 2,504,000                              |
| Motor Vehicles and Equipment                         | 2,020,000            | 1,283,000            | 737,000                                |
| Construction and Other Capital Outlay                | 44,396,000           | 31,316,000           | 13,080,000                             |
| Total  | <u>66,730,000</u>    | <u>55,082,000</u>    | <u>11,648,000</u>                      |
| Total Expenditures                                   | <u>80,231,000</u>    | <u>66,210,000</u>    | <u>14,021,000</u>                      |
| Excess <Deficiency> of Revenues<br>over Expenditures | <16,490,000>         | <9,496,000>          | 6,994,000                              |
| Fund Balance at Beginning of Year                    | 40,431,000           | 41,552,000           | 1,121,000                              |
| Fund Balance at End of Year                          | <u>\$ 23,941,000</u> | <u>\$ 32,056,000</u> | <u>\$ 8,115,000</u>                    |

**Flood Control District of Maricopa County**  
**Expenditures by Activities and Functions\***  
 Fiscal Year 1989/1990  
 (Preliminary and Unaudited)

| Activity   | Operations Expenditures |             | Capital Improvements Program |              |                           |
|--|-------------------------|-------------|------------------------------|--------------|---------------------------|
|  | Administrative          | Maintenance | Engineering                  | Lands        | Relocation & Construction |
| ACDC   | \$ 32,000               | \$ 619,000  | \$ 1,216,000                 | \$ 6,770,000 | \$ 6,524,000              |
| Administrative Overhead/Facility                       | 3,611,000               | 28,000      | 7,000                        |              | 973,000                   |
| Adobe Dam  | 2,000                   | 54,000      |                              |              |                           |
| Agua Fria River Flowage Easements                      | 60,000                  | 4,000       | 6,000                        | 3,421,000    | 261,000                   |
| Agua Fria River  | 3,000                   | 116,000     |                              |              |                           |
| Agua Fria River (ADOT Agreement)                       |                         | 3,000       |                              |              |                           |
| Alma School Drain                                      | 1,000                   | 10,000      |                              |              |                           |
| Apache Jct. FRS, Floodway, Outlet and Bulldog Floodway | 1,000                   | 27,000      |                              |              | 136,000                   |
| Bell Road Expansion                                    |                         |             | 191,000                      |              | 2,135,000                 |
| Buckeye #1   |                         | 27,000      |                              |              |                           |
| Buckeye #2   |                         | 11,000      |                              |              |                           |
| Buckeye #3   |                         | 12,000      |                              |              |                           |
| Cave Buttes Dam  | 78,000                  | 38,000      |                              |              |                           |
| Centennial Levee                                       |                         | 16,000      |                              |              |                           |
| City of Mesa   | 1,000                   |             |                              |              |                           |
| City of Phoenix  |                         |             | 122,000                      |              |                           |
| City of Scottsdale                                     | 2,000                   |             |                              |              |                           |
| City of Tempe  |                         |             |                              |              | 1,016,000                 |
| Computer Systems                                       | 157,000                 |             |                              |              |                           |
| Dreamy Draw Dam  |                         | 8,000       |                              |              |                           |
| Dysart Road-Agua Fria Drain                            |                         | 6,000       |                              |              |                           |
| East Maricopa ADMS                                     | 1,000                   |             |                              |              |                           |
| East Fork Cave Creek ADMP                              | 1,000                   | 35,000      | 199,000                      | 6,093,000    | 3,000                     |
| El Mirage Road Drain Channel                           |                         | 3,000       |                              |              |                           |
| EMF-Apache Jct./Gilbert                                |                         |             | 4,000                        |              | 4,000                     |
| EMF-Buckhorn/Mesa                                      | 6,000                   |             | 11,000                       | 129,000      | 13,000                    |
| EMF-Williams/Chandler                                  | 2,000                   | 188,000     | 1,000                        |              | 127,000                   |
| Enforcement of Floodplain Regulations                  | 44,000                  |             |                              |              |                           |
| FCD Yard Maintenance                                   |                         | 154,000     |                              |              |                           |
| Flood Insurance  | 1,380,000               |             |                              |              |                           |
| Flood Warning System                                   | 118,000                 | 78,000      |                              |              | 174,000                   |
| Floodplain Administration                              | 202,000                 |             |                              |              |                           |
| Floodplain Delineation                                 | 363,000                 |             |                              |              |                           |
| 48th Street Drain                                      | 1,000                   | 27,000      |                              |              |                           |
| Glendale-Peoria ADMP                                   | 2,000                   |             | 357,000                      |              | 6,232,000                 |
| Guadalupe Dam  | 115,000                 | 8,000       |                              |              |                           |
| Harquahala FRS   | 4,000                   | 25,000      |                              |              |                           |
| Harquahala Floodway                                    | 2,000                   | 4,000       |                              |              |                           |
| Hydrologic Data Collection                             | 182,000                 | 10,000      |                              |              |                           |
| Indian Bend Wash Greenbelt                             | 1,000                   | 3,000       |                              |              |                           |
| Indian Bend Wash Inlet                                 | 1,000                   | 15,000      |                              |              |                           |
| Indian Bend Wash Interceptor and Side Channels         | 5,000                   | 25,000      |                              |              |                           |
| Indian Bend Wash Outlet                                | 4,000                   | 14,000      |                              |              |                           |
| Laveen Area Drainage Master Study                      | 35,000                  |             |                              |              |                           |
| Maintenance Overhead                                   | 19,000                  | 1,536,000   |                              |              |                           |

**Flood Control District of Maricopa County**  
**Expenditures by Activities and Functions\***  
 Fiscal Year 1989/1990  
 (Preliminary and Unaudited)

| Activity                                    | Operations Expenditures |                     | Capital Improvements Program |                     |                           |
|---|-------------------------|---------------------|------------------------------|---------------------|---------------------------|
|   | Administrative          | Maintenance         | Engineering                  | Lands               | Relocation & Construction |
| McMicken Dam                                | 9,000                   | 23,000              |                              |                     |                           |
| McMicken Dam Outlet Channel                 | 3,000                   | 36,000              |                              | 17,000              |                           |
| New River Dam                               | 1,000                   | 44,000              |                              |                     |                           |
| New River ADMS                              | 4,000                   |                     |                              |                     |                           |
| Old Cross Cut Canal                         | 10,000                  | 15,000              | 3,000                        |                     | 2,282,000                 |
| Paradise Valley-Scottsdale-Phoenix          |                         |                     |                              |                     | 309,000                   |
| Pass Mountain FRS and Outlet                |                         | 5,000               |                              |                     | 27,000                    |
| Plan VI Funding                             | 1,000                   |                     | 1,000                        |                     | 3,103,000                 |
| Powerline Dam                               | 1,000                   | 19,000              |                              |                     |                           |
| Powerline Floodway                          |                         | 18,000              |                              |                     |                           |
| Price Drain                                 | 1,000                   |                     | 77,000                       |                     | 2,999,000                 |
| Queen Creek ADMP                            | 7,000                   |                     | 122,000                      |                     |                           |
| Reed Landfill                               |                         | 2,000               | 122,000                      | 102,000             | 731,000                   |
| Rittenhouse FRS                             |                         | 38,000              |                              |                     |                           |
| Saddleback Diversion Channel                |                         | 32,000              |                              |                     |                           |
| Saddleback FRS                              |                         | 52,000              |                              |                     |                           |
| Salt/Gila Clearing and Channelization       | 2,000                   | 218,000             |                              |                     |                           |
| Salt/Gila Control Works                     | 7,000                   | 19,000              | 61,000                       | 2,051,000           | 632,000                   |
| Salt/Gila River Planning                    | 8,000                   |                     |                              |                     |                           |
| Salt River Channel-ADOT                     | 43,000                  |                     |                              |                     | 232,000                   |
| Signal Butte Floodway                       | 2,000                   | 11,000              |                              |                     |                           |
| Signal Butte FRS                            |                         | 12,000              |                              | 1,000               | 123,000                   |
| Skunk Creek Channel at I-17                 |                         | 7,000               |                              |                     |                           |
| Skunk Creek and New River Flowage Easements | 30,000                  | 18,000              | 435,000                      | 1,204,000           | 3,209,000                 |
| Sossaman Road                               | 28,000                  | 15,000              | 29,000                       | 20,000              | 480,000                   |
| Spook Hill FRS & Outlet                     | 1,000                   | 17,000              |                              |                     |                           |
| Spook Hill Watershed ADMS                   | 1,000                   |                     |                              |                     |                           |
| Sunnycove FRS                               | 1,000                   | 4,000               |                              |                     |                           |
| Sunset FRS                                  | 3,000                   | 5,000               |                              |                     |                           |
| Sunset/Sunnycove Pipeline                   | 4,000                   | 6,000               |                              |                     |                           |
| Town of Cave Creek                          | 1,000                   |                     |                              |                     |                           |
| Town of El Mirage                           | 1,000                   |                     |                              |                     |                           |
| USGS Service Work                           | 227,000                 |                     |                              |                     |                           |
| Vineyard Road FRS                           |                         | 33,000              |                              |                     |                           |
| Watershed Hydrology                         | 371,000                 |                     |                              |                     |                           |
| White Tanks Dam #3                          | 5,000                   | 9,000               |                              |                     |                           |
| White Tanks Dam #4                          | 4,000                   | 8,000               |                              |                     |                           |
| White Tanks-Agua Fria ADMP                  | 12,000                  |                     | 287,000                      |                     |                           |
| Wickenburg ADMS                             | 9,000                   |                     |                              |                     |                           |
| Work done for County Highway Department     | 3,000                   |                     |                              |                     |                           |
| Work done for Planning and Development      | 420,000                 |                     |                              |                     |                           |
| <b>Total</b>                                | <b>\$ 7,656,000</b>     | <b>\$ 3,770,000</b> | <b>\$ 3,251,000</b>          | <b>\$19,808,000</b> | <b>\$31,725,000</b>       |

\*Expenditures by Activities and Function will not always agree with Expenditures by Task in the Financial Highlights chart (inside front cover) except in total.