

# Flood Control District of Maricopa County

## Annual Report 1988-1989

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2801 W. Durango  
Phoenix, AZ 85009



# Annual Report

July 1, 1988 to June 30, 1989

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## Financial Highlights

Fiscal Year 1988-1989  
Preliminary and Unaudited

	Dollars	Percent
<b>Revenues</b>		
Flood Control Tax	\$ 51,345,000	88
Rental Income	219,000	-
Interest	2,564,000	4
State Assistance - Local Projects	0	-
County and Local Participation	3,987,000	7
Sale of Excess Land	0	-
Miscellaneous	343,000	1
<b>Total Revenues</b>	<b>58,458,000</b>	<b>100</b>
<b>Expenditures</b>		
Administration and Maintenance	7,681,000	19
Flood Control Capital Improvements	33,797,000	81
<b>Total Expenditures</b>	<b>41,478,000</b>	<b>100</b>
Excess (Deficiency) of Revenues Over Expenditures	16,980,000	
Fund Balance at Beginning of Year	23,451,000	
Fund Balance at End of Year	\$ 40,431,000	
<b>Expenditures by Task</b>		
Administration	\$ 5,065,000	12
Land Acquisition	11,279,000	27
Relocation of Utilities, Bridges and Other Facilities	9,181,000	22
Construction	12,688,000	31
Maintenance	3,265,000	8
<b>Total</b>	<b>\$ 41,478,000</b>	<b>100</b>

Published by:

Flood Control District  
of Maricopa County  
3335 West Durango Street  
Phoenix, Arizona 85009

Editor: Helen Hayes

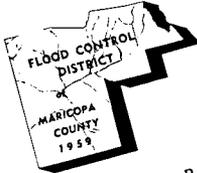
Layout & Design: Tina Barnett

On the cover: *Hot air balloons floating near Cave Buttes Dam.*

Photo by: Ed Karnafel

# Thirty Years and Counting...

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## FLOOD CONTROL DISTRICT of Maricopa County

3335 West Durango Street • Phoenix, Arizona 85009  
Telephone (602) 262-1501

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

BOARD of DIRECTORS  
James D. Bruner  
Carole Carpenter  
Tom Freestone  
Fred Koory, Jr.  
Ed Pastor

Memorandum from the  
Chief Engineer and General Manager

The thirtieth birthday is a notorious one; a time for acknowledging the passage of youth and embracing adulthood. Inevitably, it is a time of assessment. For the Flood Control District, this year marked the mid-point in completion of the Arizona Canal Diversion Channel, the largest federally-funded project in the District's history. It is a milestone in many respects, marking a period in which we are seeing the construction and the District's task of maintaining those projects grow by leaps and bounds.

We are now beginning to focus on how to solve remaining drainage and flooding problems without federal help, as well as preparing and implementing master plans that will help avoid those kinds of problems in the future. We are working not only on developing the necessary engineering information, but "team building" with cities and other agencies and dealing with the legal issues associated with such a large scale effort.

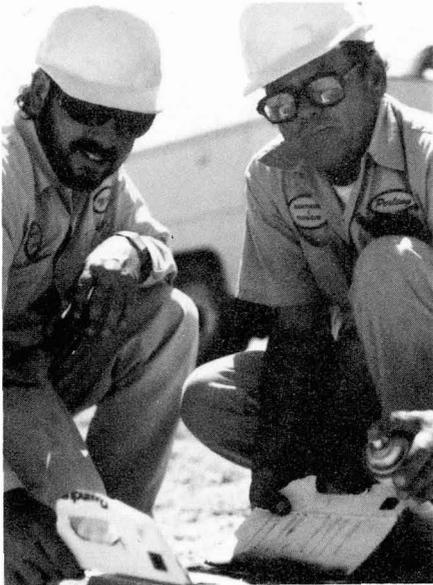
This change in focus clearly must involve both structural and regulatory measures, along with an increased awareness of environmental concerns by local government.

Many things have changed in the last thirty years, but the essential business of flood control remains: we look forward to another thirty years of serving the people of Maricopa County.

  
D. E. Sagramoso, P.E.

## Operations and Maintenance

*Below: Tom Mirto and Bob Perling, Maintenance Technicians.*



## Maintenance Activities

The District maintains 22 flood retarding structures and is responsible for over 50 different facilities throughout Maricopa County. Approximately 40% of our staff is involved in these activities.

The amount of maintenance work has grown dramatically in recent years (see the chart on the next page), with new structures coming on line each year as projects are completed.

The District has been able to maintain these structures without a proportional increase in staff through the extensive use of Department of Corrections prisoners. This year we used 62,246 hours of prisoner labor to perform hand-intensive maintenance such as clearing vegetation and trash removal. The labor of each prisoner costs the District 50 cents per hour, saving taxpayers over three-quarters of a million dollars annually. This year, the District is adding two five-man crews to bring our daily use to 105 prisoners. This is the maximum number that Corrections can provide regularly.

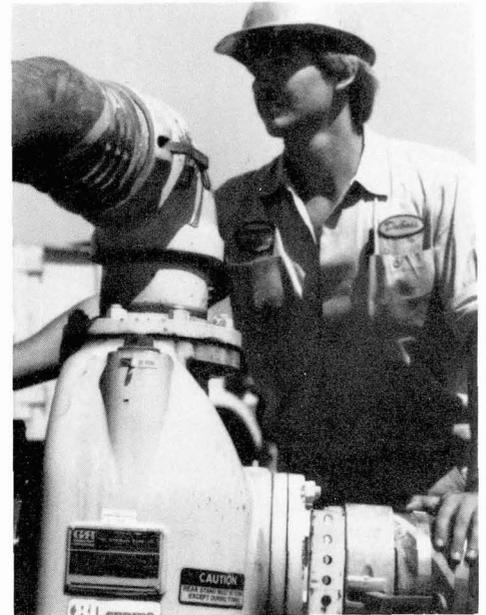
## Environmental Concerns

The District has created an Environmental Branch as a result of the developing awareness and emphasis on environmental issues and the ensuing federal and state laws. The Flood Control District is one of thousands of agencies nationwide that will be affected by the National Pollutant Discharge Elimination System (NPDES). This recent proposal by the Environmental Protection Agency (EPA) focuses on controlling urban runoff to promote better water quality. The Branch is working with other concerned agencies to develop guidelines to be used by the EPA in implementing its proposed program.

## Photo Point Program

The arid climate of the southwest poses many problems in the management of vegetative resources. A simple, yet effective monitoring program to qualitatively measure the success of revegetation programs along our many structures has been implemented to photographically inventory and document the plants growing on District structures and monitor changes in vegetative cover over time. Brass tags indicating photo number, aspect, structure, photo point and compass bearing have been attached to steel posts set into the ground at each photo location. These locations, as well as the information marked on the tags, are recorded on detailed maps kept in a master Photo Point Notebook.

By referring to either the notebook or the photo point marked in the field, future photographers will capture the identical area. The points are used on a continuing basis to monitor vegetation and to allow for qualitative and quantitative documentation. As a result, the District has a comprehensive, long-term reference tool to facilitate its work. We can monitor changes and respond to assessed needs such as declines in plant population. Because District structures are situated throughout the county, the photo data collected can also be used by numerous agencies to study and monitor our fragile desert environment.



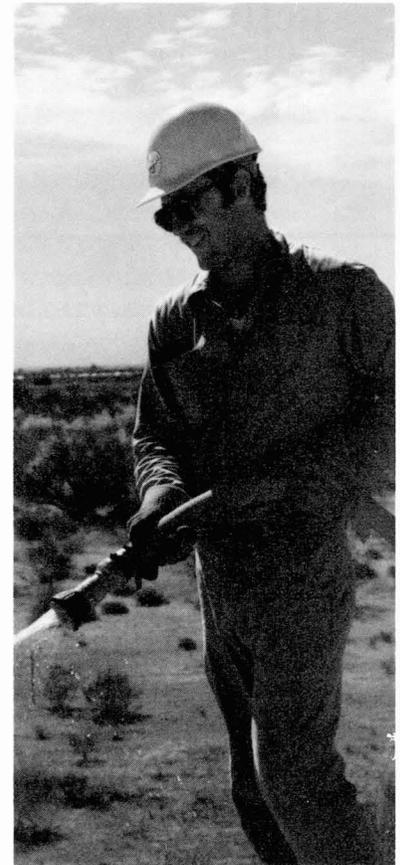
*Above top: Art Dubois, Maintenance Technician. Bottom: Dick DeLaMare, Equipment Operator.*

## Growth of Maintenance Responsibilities

	Inventory as of Jan 1 1980	Added 1/1980 to 1/1984	Added 1/1984 to 7/1987	Added 7/1987 to 7/1989	Total	Increase 1/1980 to 7/1989, %
Access Ladder			10	6	16 ea	
Bank Protection (R)	45,025	271,124	122,057	34,157	472,363 sq yd	949
Bank Protection (GR)	50	29,671	64,429	47,283	141,433 sq yd	282,766
Bridges	11	10	1	1	23 ea	109
Culverts	19	37	35	4	95 ea	400
Drainage Channel	48,068	14,866	7,198	14,981	85,113 ft	77
Drainage Channel—Unlined	12.4	6.4	1.5	0.3	20.6 miles	66
Drop Structure	15	32	11	3	61 ea	307
Embankment	501	399.2	219.8	84.7	1,204.7 acres	140
Energy Dissipator	11	6	16	4	37 ea	236
Erosion Protection—Concrete Paving			8,000		8,000 sq ft	
Fencing	401,021	452,012	172,544	133,427	1,159,004 ft	189
Floodway—Lined		14,300	650	27,175	42,125 ft	
Floodway—Unlined	802	397	422	126	1,747 acres	118
Gabions	1,200		16,133		17,333 sq yd	1,344
Gated Outlet	15	4	1		20 ea	33
Gates	137	126	84	63	410 ea	199
Grade Control Structures	8	8	3	1	20 ea	150
Guardrail	327	1,593	420	80	2,420 ft	640
Gutters—Concrete	130	3,940	6,100		10,170 ft	7,723
High Flow	586	13			599 acres	2
Landscape—Erosion Control	351	1,879	327	101.5	26,58.5 acres	657
Irrigation Heads		147		207	354 ea	
Irrigation Controls		2		62	64 ea	
Irrigation Lines		2,676		102,701	105,377 ft	
Plantings	927	3,666	2,202	38,993	45,788 ea	4,839
Low Flow—Structures	990	112	13		1,115 acres	13
Manholes	18	12			30 ea	67
Meter Houses	5	2	1	1	9 ea	80
Outlet Structures	3	4	1	1	9 ea	200
Pilot Channel—Gila River		5,300	17,424		22,724 ft	
Pool Area	8,879	45,474	5,504	100	59,957 acres	575
Principal Outlet	11	5	2	1	19 ea	73
Principal Outlet—Pipe	11,230	1,458	580	137	13,405 ft	19
Railing—Pipe		358	486	11,205	12,049	
Ramps	3,032	14,102	11,136	4,763	33,033 ft	989
Right-of-way	8,547	15,460	7,272	1,350	32,629 acres	282
River Clearing		2,480	1,815		4,295 acres	
Roads	154.6	154.3	59	39.9	407.8 miles	163
Sediment Basins	13	17	7	2	39 ea	200
Side Inlet	81	180	85	140	486 ea	500
Spillway—Earth	484	27	1		512 acres	6
Spillway—Lined	944	260	53	218	1,475 ft	56
Stormdrain Pipe	8,186	18,179	505		26,870 ft	228
Trash Racks	44	40	22	22	128 ea	191
Vegetative Drains	16	31	12		59 ea	269

(R) = Riprap  
(GR) = Grouted Riprap

*Below: Greg Watts, Maintenance Technician.*



### Hours Worked by Department of Corrections' prisoners

Project	Annual Hours
ACDC	7,188
Adobe Dam	2,181
Agua Fria River	1,697
Buckeye Dams	2,252
Buckhorn-Mesa	2,420
Cave Buttes Dam	1,704
EMF	4,253
Indian Bend Wash	1,385
McMicken Dam	16,433
Powerline Dam	633
Rittenhouse Dam	695
Saddleback Dam	1,488
Salt/Gila River	14,352
Skunk Creek/New River	3,288
Other	2,277
<b>Total</b>	<b>62,246</b>

# Development of Flood Control Structures

## Phoenix, Arizona and Vicinity (Including New River)

The Phoenix, Arizona and Vicinity (Including New River) Flood Control Project is a project with a scope that lives up to its lengthy title. It protects parts of Phoenix, Glendale, and Peoria. That's not easy to do

with a single flood control project, but this is actually a series of smaller projects, linked to provide comprehensive flood protection. This project will provide protection from the mountain and desert drainage area north of Phoenix. The year's progress on several elements of this project is described below.

40th Street), is scheduled to begin in the Summer of 1990.

Because this project is in the metropolitan area, it required 25 road bridges, seven pedestrian bridges, and a special sensitivity to urban aesthetics. The design of Reach 4 has been slowed by the need to respond to such concerns by local residents and businesses. A citizens' Aesthetics Committee presented its assessment of concerns to the City of Phoenix at the end of the year. The District is working with the City of Phoenix and its Aesthetics Committee to find mutually acceptable solutions.

### *New River Channelization*

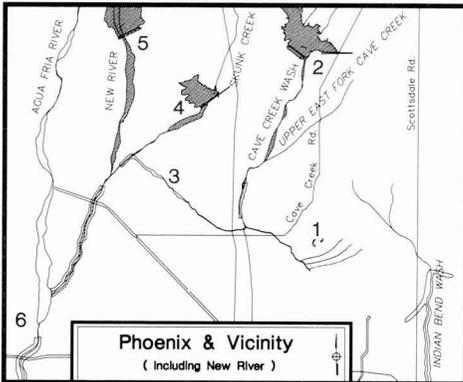
The Corps of Engineers is performing design and construction from Grand Avenue to Olive Avenue. This section is being built by Maya Construction Company for \$15.8 million. This section was 42% complete at the end of the year. The District is responsible for design and construction from Olive Avenue to Bethany Home Road. This section is currently being designed. When completed, channelization will remove about 1,000 acres from the floodplain.

### *Skunk Creek Channelization from ACDC to the New River*

The Corps of Engineers completed bank stabilization on the southeast bank of Skunk Creek. The District is responsible for a bridge at 83rd Avenue and two drop structures, design of which is nearly completed. Approximately 90% of the channel is being excavated by the Arizona Department of Transportation in conjunction with its work on the Outer Loop.

### **East Maricopa Floodway**

The most important flood control structure on the east side of the valley, East Maricopa Floodway, was completed this year at a cost of approximately \$17,361,000 to the District. It was constructed along the upslope (east) side of the Roosevelt Water Conservation District (RWCD) Canal in eastern Maricopa County. The 27.6-mile long



Dreamy Draw (1) and Cave Buttes (2) Dams release floodwaters slowly into creek beds to the ACDC. The ACDC (3) takes water to Skunk Creek. Adobe (4) and New River (5) Dams release water down Skunk Creek and New River so that peak flows, after the introduction of the ACDC water, will not be increased. The water will flow into the Agua Fria (6) and then into the Gila River, safely past the homes and citizens of the Phoenix Metropolitan Area to its natural destination southwest of the city, protecting approximately 50,500 acres, much of it urban.

### *Arizona Canal Diversion Channel*

The Arizona Canal Diversion Channel is the principal component of the Phoenix, Arizona and Vicinity (Including New River) project and the largest flood control project in the District's history. It will be 16.5 miles long, aligned parallel to the Arizona Canal on its northern side from approximately 40th Street and Camelback Road to 75th Avenue and Greenway Road. It has been divided into several reaches to facilitate planning and construction.

The Flood Control District is sponsoring this project for the U.S. Army Corps of Engineers. About 40% of its overall cost will be paid by the District, and we will maintain the completed structure.

Reach 1 (75th Avenue to 53rd Avenue) is complete except for landscaping. During the past year, the Corps of Engineers designed landscaping and will award a contract this fall. Reach 2A (53rd Avenue to 47th Avenue) is complete. Reach 2B (47th Avenue to 29th Avenue) and Reach 2C (29th Avenue to 23rd Avenue) and Cave Creek Channelization began construction this year. By the end of the year, nearly all of the channel excavation was done. Construction is about to begin on Reach 3 (23rd Avenue to 12th Street). The Corps of Engineers' \$29.1 million construction contract is with Pulice Construction. The District expects to spend about \$24 million for land acquisition and relocations in this reach. Construction is planned to begin by the end of July with completion planned for the Spring of 1991. Construction on the final segment, Reach 4 (12th Street to



Above: Jim Sutton, Oscar Lozano, and Bob Panasewicz installing a spillway at ACDC.



Floodway extends from the Gila River to a little north of Brown Road in Mesa.

Reaches 5 and 6 of the Floodway were completed this year to finish the project. The Soil Conservation Service's construction contractor for Reach 5 was R.E. Monks, and for Reach 6, A/A Construction. Part of the Floodway also serves as a golf course for Leisure World, which constructed the course along with three miles of Reach 5 at substantial savings to taxpayers.

This year, as a part of its Greenfield Road Drain Project, the City of Mesa also constructed an extension of Reach 6, which lengthened the Floodway by 350 feet. The District shared the cost of the extension with Mesa at a cost of \$218,500. The City of Mesa Parks Department is working with the District to explore recreational uses for this right-of-way that would not interfere with flood control functions of the floodway.

## Buckhorn-Mesa Watershed Project

This project was completed in October 1988 at a cost of approximately \$14,835,000 to the District. A dedication ceremony was held that month with Board of Directors member Tom Freestone as Master of Ceremonies. Honored guests included Congressman Jay Rhodes and former Congressman John Rhodes.

The Buckhorn-Mesa Watershed Project is a system of interrelated structures built by the Soil Conservation Service to provide flood protection to rural



*Above: Some of the recreational uses within floodways include a runway for radio-controlled planes in the Buckhorn-Mesa project, left, and a golf course in the Eastern Maricopa Floodway, right.*

## ACDC Landscaping

Landscaping on the ACDC represents a significant change in the District's responsibilities. When the District was first formed, landscaping was really not a consideration. The main idea was to plant vegetation to keep the structure slopes from eroding. In the 1970s, the District, through Federal projects, began including landscaping as an identifiable step in design and construction. Here, the main purpose was to return the surroundings to as near the original desert environment as possible. The ACDC presents a new and demanding landscaping concept. Because it runs through the metropolitan area, extraordinary landscape efforts were required to promote safety, maintenance, and visual aesthetics. As a result, wrought iron type fencing was installed and various types of desert vegetation were planted (nearly 60,000 plants will grow along Reach 1 and 2).

The ACDC has received our full landscaping attention and will continue to do so. Landscaping along the ACDC features:

- low maintenance requirements,
- drought and heat tolerant plants,
- mitigation of adverse environmental impacts,
- attractive design, and
- trails that combine the needs of walkers, joggers, horse riders, bikers, and the District's own maintenance vehicles.

and urban lands in the eastern Maricopa County area south of Brown Road from about Bush Highway to Idaho Road. The District has accepted maintenance responsibility and plans for landscaping the project are underway.

## Upper East Fork/Cave Creek

In 1986, the District was called upon to provide flood relief for an area experiencing drainage problems. The Upper East Fork Cave Creek area was having drainage problems just about every time it rained.



This area had developed very rapidly, and much of this had occurred before development in the wash area had been appropriately regulated. By 1986, there wasn't even a definite channel in some places. To get a handle on the problem, the District commissioned an Area Drainage Master Study, published in 1987.

The resulting Area Drainage Master Plan, prepared for the 100-year flood event, has now been approved by the City of Phoenix, and a cost-sharing agreement has been made between the City and the District. The features of the plan are six detention basins, and an open channel along the historical path of East Fork Cave Creek, with underground channeling in the remaining areas. In developed areas, the District will drain the detention basins through the City's two-year storm drains. Preliminary design of the drainage basins is underway; the City of Phoenix and the District are pursuing right-of-way acquisition for the proposed channel.

Recreational uses, funded by the City of Phoenix, will include areas for City parks and trails.

Right: Hydrologists Joe Tram and Doug Plasencia advise consultants on road design.



## Nonstructural Flood Protection Activities

By regulating the use of floodplains and by reviewing residential, commercial, and industrial development plans, the District sees that new developments will not have or cause drainage problems.

It reviews development plans in unincorporated areas outside the floodplains to be sure the development will not adversely affect adjoining property by diverting or increasing runoff or drainage and flooding problems within the development itself. The District's regulatory tasks include specifying the areas in which development can take place, the types of development to be permitted in each area, and the permitting and insurance requirements for different uses of the land within a floodplain.

### Floodplain Management

The Floodplain Board of Review (the same members as the Flood Control Advisory Board—see page 14) is responsible for approving or denying floodplain variances as well as making interpretations of regulations. The District evaluates area hydrology and directs various studies that result in the delineation of floodplains. This information culminates in Federal Emergency Management Agency (FEMA) approved insurance rate maps which define areas subject to flooding. The staff also reviews proposed new construction and structural repair to ensure these activities do not impact the conveyance of water or violate federal, state, and local rules for such construction.

### Drainage Administration

The District has taken action to establish a County drainage standard through development of a County Drainage Regulation. This regulation was adopted for use within the unincorporated areas of the County this year. The document imposed somewhat more stringent requirements and consolidated all the drainage "rules" into one document.

The District reviews and inspects drainage facilities of the unincorporated areas of the County to ensure that no development alters the course or capacity of drainage downstream of its own property. District guidelines require that developers plan to retain all surface runoff water originating in their own property. The District staff then review development plans to see that drainage requirements are met in the design, and later inspect the site to ensure that the design is constructed according to the approved plans.

### Floodplain Management Work Load

	1986-87	1987-88	1988-89
Floodplain Use Permits	49	57	53
Floodplain Variances	13	6	2
Appeals	0	1	0
New Delineations	7	14	5
FCD Clearances	55	31	10
Violation Cases	10	6	8
Referrals to County Attorney	3	2	0

### Drainage Management Work Load

	1986-87	1987-88	1988-89
Zoning Cases Reviewed (including Resubmittals)	370	357	250
Subdivision Cases Reviewed	94	94	68
Master Plans Reviewed	11	2	16
Board of Adjustment Cases Reviewed	106	128	160
Drainage Inspections	916	579	1117

## Watershed Management\*

Historically, urbanization has resulted in increased runoff along with decreases in the storage and conveyance capacities of existing washes. The result is typically an increase in flooding downstream. An extreme example of urbanization causing increased flooding in Maricopa County is the development in the floodplain that has obliterated the channel in the Cave Creek floodplain downstream of the Arizona Canal.

The degree to which stormwater runoff impacts floodplains is directly related to the degree of development. Increased urbanization, especially in arid environments, blocks the infiltration of stormwater into the soil resulting in an increase in overland runoff and erosion problems. Many problem watersheds cross jurisdictional boundaries, and some cross through three or even four.

Learning from past mistakes, the concept of the drainage master studies and plans applies a concerted approach to stormwater and floodplain management by considering the cumulative effect of development along a river system or within a specific subbasin for a watershed. The program was originally conceived in 1983 as a series of watershed analyses for areas experiencing street flooding and damage to yards and homes. It is now successfully underway.

Area Drainage Master Studies (ADMSs) develop standardized hydrology for watersheds, which define water conveyance corridors and develop flood mitigation options for existing drainage problems. In addition, the studies help in providing sound floodplain management by identifying areas that will be subject to flooding before new development or reconstruction occurs. In contrast to previous studies which did not consider future conditions and focused on areas where development had already occurred, the ADMS studies the effects that future floodplain encroachment and channelization would have on stormwater runoff and how it would affect the study area. The concern is for development that might be safe under existing conditions but could be subject to flooding in the future due to unwise watershed management and floodplain development practices.

The product of an ADMS is a unique Area Drainage Master Plan (ADMP), adopted by the Flood Control District and by the municipalities within the studied watershed. The ADMP provides guidelines for stormwater management as development in each area progresses.

The ADMS/ADMP program provides a tool to manage watersheds by maintaining natural predevelopment runoff characteristics and flow paths. A steady state watershed can be accomplished by not allowing modifications to the floodplain that would adversely change travel time, velocities, peak discharges, and volumes that presently exist for each subwatershed and concentration point.

This planning reduces overall public and private costs, including long and short term costs of new development, while providing a drainage infrastructure that will allow for the implementation of long-term development goals. ADMSs and ADMPs are proving to be a vital tool for effective stormwater management and an important part of a comprehensive flood hazard mitigation program for Maricopa County.

*\*This information taken from a paper entitled Management of Urbanizing Arid Watersheds by Jan Farmer, Flood Control District of Maricopa County, and Jeff Erickson and Mark Gavan, The WLB Group, Inc.*

*Below: Volunteer Clark Mutschler preparing to send a rain gauge reading to the District.*

Photo by: Len Keso.



## Flood Warning System

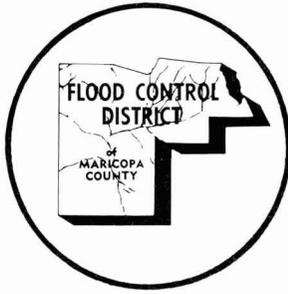
One of the most important elements of nonstructural flood protection in the District is the Flood Warning System, which provides current, or "real time," information about rainfall and runoff across Maricopa County.

The system is a network of telemetered rain and stream gauges linked to send information via radio waves to computers at the Flood Control District and the National Weather Service.

The National Weather Service uses this information to put out its flash flood warnings and advisories. The District uses the information to monitor the conditions at its dams and channels to provide for their safe operation. The data is also used to calibrate computer models of watershed and floodplain delineation studies.

By the end of 1990, the District expects to have 123 telemetered rain gauges and 47 telemetered stream gauges in Maricopa and neighboring counties.

# 30 Years of Flood Control



Don't Look Now —

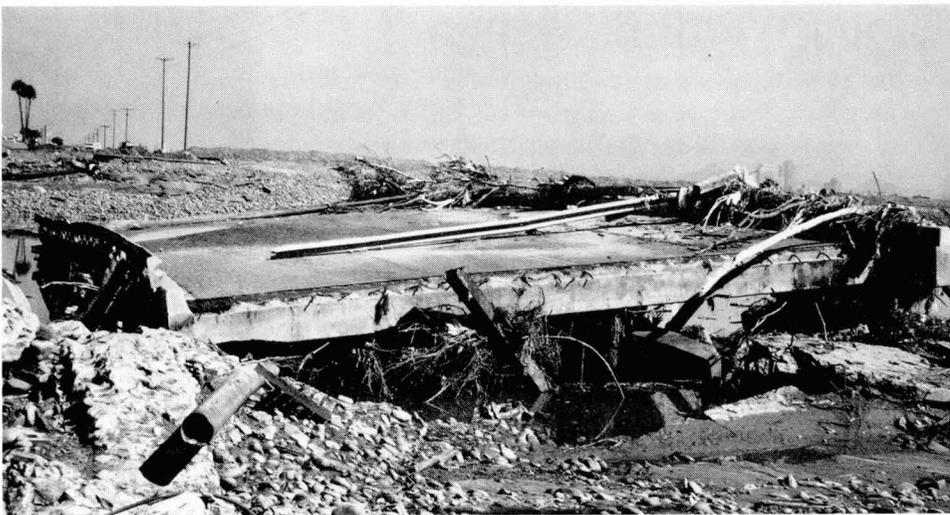


The first priority of the newly created Flood Control District in 1959 was the Salt River through Phoenix. Thirty years later, the Salt River is still untamed, but much progress has been made. Many proposals to provide the needed flood protection through channeling or upstream control have been advanced. Some have come to naught, but several are near fruition.

In 1958, the Flood Protection Improvement Committee, which evolved into the Flood Control District in 1959, established three other goals: a “north

side floodway, perhaps paralleling the Arizona Canal;” “utilize the Old Cross Cut Wasteway;” and “establish the Indian Bend Wash drainage.” These three goals have been met by the District with, respectively, the ACDC, the Old Cross Cut Canal, and Indian Bend Wash projects.

In recent years, Phoenix has witnessed a rapid increase in commercial movement to the area followed by a rapid population increase. A build-up of multiple-unit dwellings has moved single-family units to outlying areas



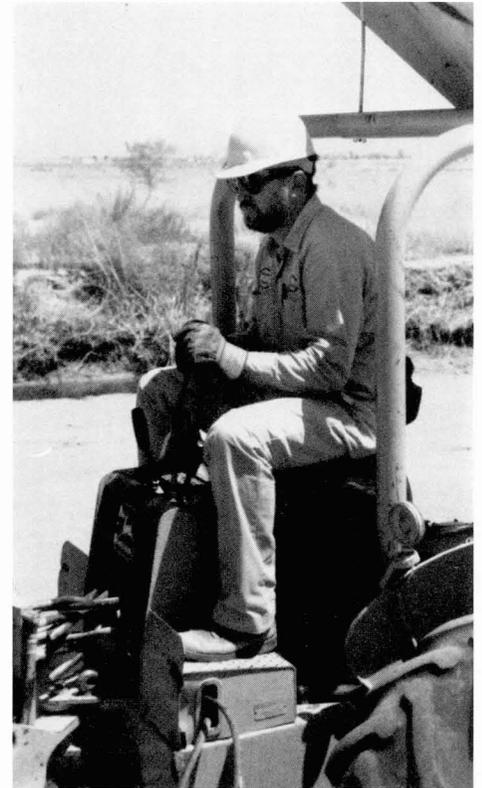
*Clockwise, from top: Flooding in Central Phoenix, 1972; Rural Flooding, 1951; Salt River Flood Damage, 1978; and a 1967 cartoon by Reg Manning.*

where land and prices are lower. This trend has been accentuated by the existence of large privately-owned tracts of land in the outlying areas that are increasingly attractive to the planned community developer. This trend has thrust the District into areas of concern unheard of thirty years ago: floodplain, drainage, and environmental regulations are just a few of the issues which must now be considered.

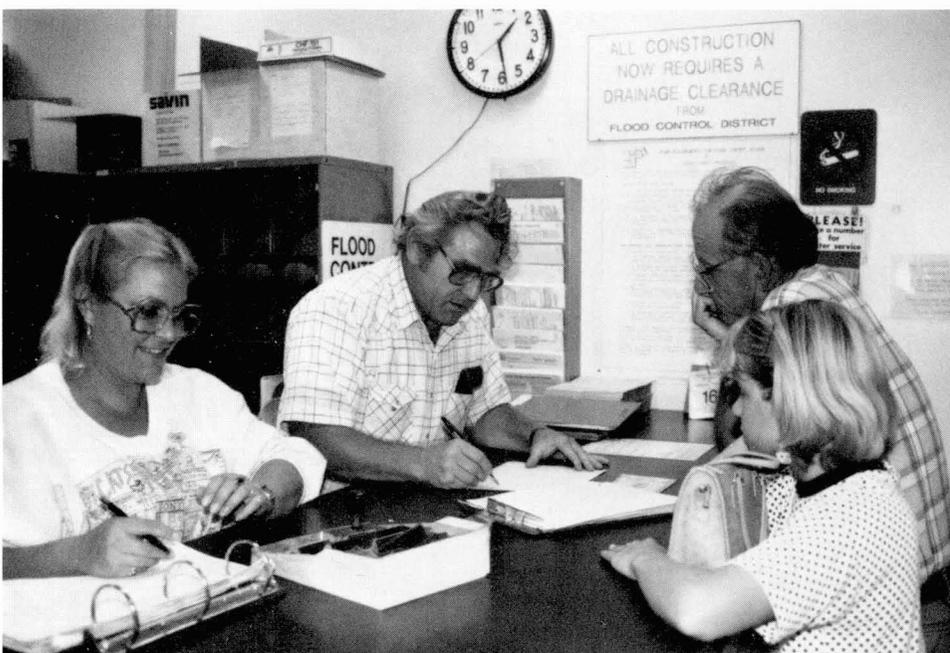
Along with the rest of the nation, the Flood Control District has taken advantage of the many opportunities

provided by computerization. It's certainly a switch from the days of lengthy mechanical calculations and pencil-drawn maps.

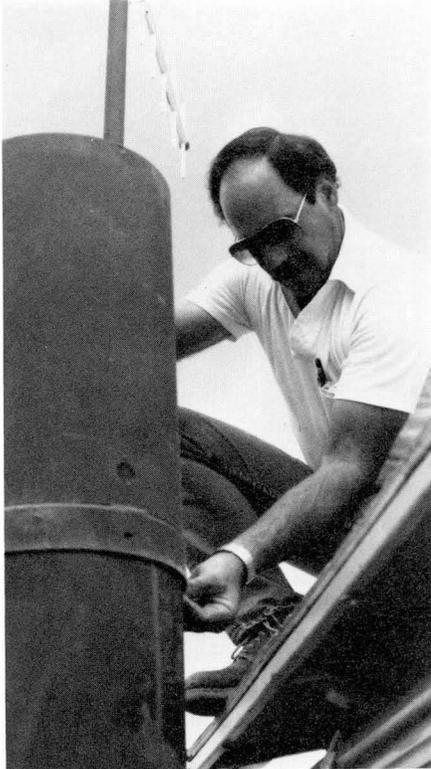
Starting this year, for the first time, we'll have enough infrastructure to prevent the kind of flooding problems we experienced along the Arizona Canal west of Cave Creek and downstream of the Canal on Cave Creek. We can now intercept Cave Creek and have a channel system to divert flows around the greater Phoenix area.



*Above: Mike Welch, Equipment Operator, digging test holes for a future box culvert within the East Maricopa Floodway. Top left: Pete Martinez, Team Leader, monitoring computer-controlled landscape irrigation system. Bottom left: Drainage Administrative Coordinator Linda Goertz and Civil Engineering Technician II John Lang conduct a drainage review.*



Right: Connie Yanez at the Land Management Satellite Office. Below: Randy Elson repairing a rain gauge.



Contracts Awarded (Preliminary and Unaudited)		
Type of Contract	No.	Contract Amount
Appraisal	11	\$ 173,000
Construction	8	2,986,000
Engineering Services	15	2,495,000
Title & Escrow	1	100,000
Rental Property Maintenance	7	31,000
Flood Insurance Studies	3	679,000
<b>Total</b>	<b>45</b>	<b>\$6,464,000</b>



Rental Program (Preliminary and Unaudited)					
Project	Leasable Properties*	Leased*	Vacancy Rate	Gross	Net
ACDC	25	25	0	\$160,300	\$ <600>
EMF	3	3	0	33,500	33,300
Signal Buttes	2	2	0	8,800	8,700
Apache Junction FRS & Bulldog Floodway	2	2	0	9,800	9,000
Skunk Creek/New River	1	1	0	400	300
Agua Fria River	1	1	0	4,000	4,000
Cave Buttes Dam	1	1	0	1,500	<200>
Indian Bend Wash Outlet	1	1	0	700	400
<b>Total</b>	<b>36</b>	<b>36</b>	<b>0</b>	<b>\$219,000</b>	<b>\$54,900</b>

\*Average of beginning and end of fiscal year 88/89



Above: Marta Dent, Drafting Supervisor.

Expenditures on Land Breakdown by Project (Preliminary and Unaudited)			
Project	Parcels Acquired	Total Land Acquisition Costs	Land Acquired to Date, %
ACDC	36	\$ 2,229,000	93
Agua Fria	17	2,465,000	90
EMF	—	197,000	99
New River/ Skunk Creek	36	1,268,000	80
Salt Gila	—	146,000	80
Sossaman Road	4	242,000	80
Upper East Fork	5	2,474,000	10
Apache Jct. FRS, Floodway, Outlet & Bulldog Floodway	—	25,000	100
Glendale-Peoria ADMS	2	2,280,000	100
Others	N/A	15,000	N/A
<b>Total</b>	<b>100</b>	<b>\$11,341,000</b>	

**Flood Control District of Maricopa County**  
**Statement of Revenues, Expenditures and Changes in Fund Balance**  
 Budget and Actual  
 Fiscal Year Ending June 30, 1989  
 (Preliminary and Unaudited)

	Budget	Actual	Variance Favorable <Unfavorable>
<b>Revenues</b>			
Flood Control District Tax Levy	\$52,500,000	\$51,345,000	\$<1,155,000>
State Share of Costs			
Federal Projects	148,000	0	<148,000>
Local Projects	206,000	0	<206,000>
County Reimbursement	328,000	210,000	<118,000>
Local Participation	2,816,000	3,777,000	961,000
Rental	156,000	219,000	63,000
Interest Earnings	1,500,000	2,564,000	1,064,000
Sale of Excess Land	13,000,000	0	<13,000,000>
Miscellaneous	121,000	343,000	222,000
<b>Total Revenues</b>	<b>70,775,000</b>	<b>58,458,000</b>	<b>&lt;12,317,000&gt;</b>
<b>Expenditures</b>			
Personnel Services			
Salaries and Wages	6,251,000	5,533,000	718,000
Overtime	56,000	3,000	53,000
<b>Total</b>	<b>6,307,000</b>	<b>5,536,000</b>	<b>771,000</b>
Supplies and Services			
Professional Services Contracts	4,310,000	1,008,000	3,302,000
Maintenance Contracts	611,000	667,000	<56,000>
Maintenance Supplies	507,000	216,000	291,000
Insurance	30,000	44,000	<14,000>
Other Supplies and Services	942,000	565,000	377,000
<b>Total</b>	<b>6,400,000</b>	<b>2,500,000</b>	<b>3,900,000</b>
Capital Outlay			
Real Estate	22,894,000	10,943,000	11,951,000
Engineering	5,070,000	1,875,000	3,195,000
Motor Vehicles and Equipment	850,000	607,000	243,000
Construction and Other Capital Outlay	44,804,000	20,017,000	24,787,000
<b>Total</b>	<b>73,618,000</b>	<b>33,442,000</b>	<b>40,176,000</b>
<b>Total Expenditures</b>	<b>86,325,000</b>	<b>41,478,000</b>	<b>44,847,000</b>
Excess <Deficiency> of Revenues over Expenditures	<15,550,000>	16,980,000	32,530,000
Fund Balance at Beginning of Year	23,116,000	23,451,000	335,000
Fund Balance at End of Year	\$ 7,566,000	\$40,431,000	\$32,865,000



**Flood Control District of Maricopa County**  
**Expenditures by Activities and Functions\***  
Fiscal Year 1988-1989  
(Preliminary and Unaudited)

Activity	Operations Expenditures		Capital Improvements Program		
	Administrative	Maintenance	Engineering	Lands	Relocation & Construction
Administrative Overhead/Facility	\$ 2,726,000	\$ 12,000	\$ 84,000	\$ 3,000	\$ 43,000
Maintenance Overhead	3,000	1,302,000			
FCD Yard Maintenance	1,000	144,000			
USGS Service Work	25,000				
Enforcement of Floodplain Regulations	38,000				
Work done for Planning and Development	344,000				
Watershed Hydrology	313,000				
Work done for County Highway Department	8,000				
Floodplain Delineation	259,000				
Flood Insurance	78,000				
Hydrologic Data Collection	10,000	11,000			
Flood Warning System	87,000	68,000			129,000
Flood Emergency Operations	2,000	1,000			
Floodplain Administration	277,000				
Computer Systems	99,000				
City of Mesa	2,000				
City of Tempe					187,000
Town of Cave Creek	1,000				
Dysart Road-Agua Fria Drain	2,000	13,000			
48th Street Drain	3,000	22,000			
Alma School Drain		7,000			
Old Cross Cut Canal	8,000	38,000	43,000		
Broadway Road Bank Stabilization			27,000		
Salt/Gila Clearing and Channelization	3,000	177,000			
Salt/Gila Control Works	2,000	12,000	41,000	146,000	4,000
Sossaman Road	3,000	99,000	15,000	242,000	1,000
Agua Fria River	2,000	79,000			
Agua Fria River (ADOT Agreement)			4,000		121,000
Indian Bend Wash Outlet	1,000	5,000			
Indian Bend Wash Inlet	2,000	32,000		1,000	8,000
Indian Bend Wash Greenbelt		2,000			
Indian Bend Wash Interceptor and Side Channels	1,000	15,000			
Gila Drain	1,000		19,000		6,994,000
ACDC	17,000	383,000	904,000	2,229,000	7,916,000
Paradise Valley-Scottsdale-Phoenix					37,000
EMF-Williams/Chandler	6,000	142,000		72,000	33,000
EMF-Apache Jct./Gilbert	2,000	1,000	8,000	16,000	30,000
EMF-Buckhorn/Mesa	2,000		19,000	109,000	229,000
Salt River Channel-ADOT	14,000				
Salt/Gila River Planning	8,000				
White Tanks Dam #3		9,000			
White Tanks Dam #4		9,000			
McMicken Dam	2,000	59,000			
Dreamy Draw Dam		12,000			

**Flood Control District of Maricopa County**  
**Expenditures by Activities and Functions\***  
 Fiscal Year 1988-1989  
 (Preliminary and Unaudited)

Activity	Operations Expenditures		Capital Improvements Program		
	Administrative	Maintenance	Engineering	Lands	Relocation & Construction
McMicken Dam Outlet Channel	2,000	59,000			
Guadalupe Dam	7,000	6,000			
Buckeye #1		10,000			
Buckeye #2		9,000			
Buckeye #3		9,000			
El Mirage Road Drain Channel		19,000			
Spook Hill FRS & Outlet	3,000	52,000			
Signal Butte Floodway		9,000			
Pass Mountain FRS and Outlet		6,000			
Apache Jct. FRS, Floodway, Outlet and Bulldog Floodway		11,000	3,000	25,000	1,429,000
Signal Butte FRS		11,000			
Powerline Dam		46,000			
Powerline Floodway		22,000	3,000		
Vineyard Road FRS	1,000	13,000			
Rittenhouse FRS		36,000			
Harquahala FRS & Floodway		15,000			
Saddleback FRS		14,000			
Saddleback Diversion Channel	1,000	11,000			
Centennial Levee	1,000	9,000			
Harquahala Floodway		4,000			
Sunset FRS		6,000			
Sunnycove FRS		7,000			
Sunset/Sunnycove Pipeline		4,000			
Wittmann ADMS	4,000		24,000		
Cave Buttes Dam	2,000	54,000			
Adobe Dam	2,000	94,000		3,000	
Skunk Creek Channel at I-17		20,000			
New River Dam	1,000	38,000			
Skunk Creek and New River Flowage Easements	8,000	15,000	363,000	1,268,000	774,000
Agua Fria River Flowage Easements	11,000	1,000	51,000	2,465,000	544,000
East Maricopa ADMS				8,000	
Glendale-Peoria ADMS	3,000		59,000	2,280,000	2,000
East Fork Cave Creek ADMS	1,000	1,000	88,000	2,474,000	
White Tanks—Agua Fria ADMS	3,000				
Queen Creek ADMS	7,000		41,000		
Bell Road Expansion	2,000		250,000		83,000
Plan VI Funding	2,000				1,786,000
Groundwater Recharge			13,000		
Reed Landfill	3,000		2,000		45,000
<b>Total</b>	<b>\$ 4,416,000</b>	<b>\$ 3,265,000</b>	<b>\$ 2,061,000</b>	<b>\$11,341,000</b>	<b>\$20,395,000</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.

# Board of Directors

The Flood Control District of Maricopa County is a municipal corporation and political subdivision of the State of Arizona, founded in 1959. The District is governed by a Board of Directors which is also

the Board of Supervisors of Maricopa County. A Flood Control Advisory Board advises the Board of Directors.

The purpose of the District is to prevent loss of life or injury to residents of Maricopa County and to eliminate or minimize flood damages to real and personal property. In fulfilling its purpose, the District:

1. Provides floodplain management for Maricopa County and certain municipalities within the County.
2. Provides stormwater drainage review of the unincorporated area of Maricopa County.
3. Studies flooding and drainage problems and plans and constructs projects alone or in cooperation with others.
4. Acts as the local sponsor of federal flood control projects designed and constructed by the U.S. Army Corps of Engineers and the Soil Conservation Service. The District acquires the necessary rights-of-way and relocates facilities and people affected by the projects.
5. Operates and maintains completed flood control structures.
6. Assists in providing early warning of potential floods and provides technical leadership during flood emergencies. Collects and distributes hydrometeorological

data from the District's rain and stream gauge network.

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 Board of Directors consists of five elected representatives, one from each of the Supervisorial Districts of the County. Under the Board's supervision, 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.

## Members

**James D. Bruner**, District 2, January 4, 1989 to June 30, 1989

**George Campbell**, District 2, July 1, 1988 to January 4, 1989

**Carole Carpenter**, District 4

**Tom Freestone**, District 1 (Chairman, June 30, 1989 to January 4, 1989)

**Fred Koory, Jr.**, District 3 (Chairman, January 4, 1989 to June 30, 1989)

**Ed Pastor**, District 5

History of the Tax Levy Rate for the Flood Control District		
Fiscal year ending:	Levy Rate*	Tax 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

\*Per \$100 assessed value

*Board of Directors: Carole Carpenter, Tom Freestone, Fred Koory, Jr., Ed Pastor, and James D. Bruner.*





*Flood Control Advisory Board Members: Charles A. Sykes, William LoPiano, John E. Miller, Jr., Ramon Miguez, and H. Lynn Anderson.*



## Flood Control Advisory Board

The Flood Control Advisory Board 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.

### Members

**H. Lynn Anderson**, District 4  
(Chairman, July 1988 to June 1989)

**William LoPiano**, District 1

**Ramon Miguez**, City of Phoenix  
ex-officio member

**John E. Miller, Jr.**, District 2  
(Chairman, November 1988 to June 1989)

**Tim Phillips**, Salt River Project  
ex-officio member

**Charles A. Sykes**, District 3

**Robert Towner**, District 5

### 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

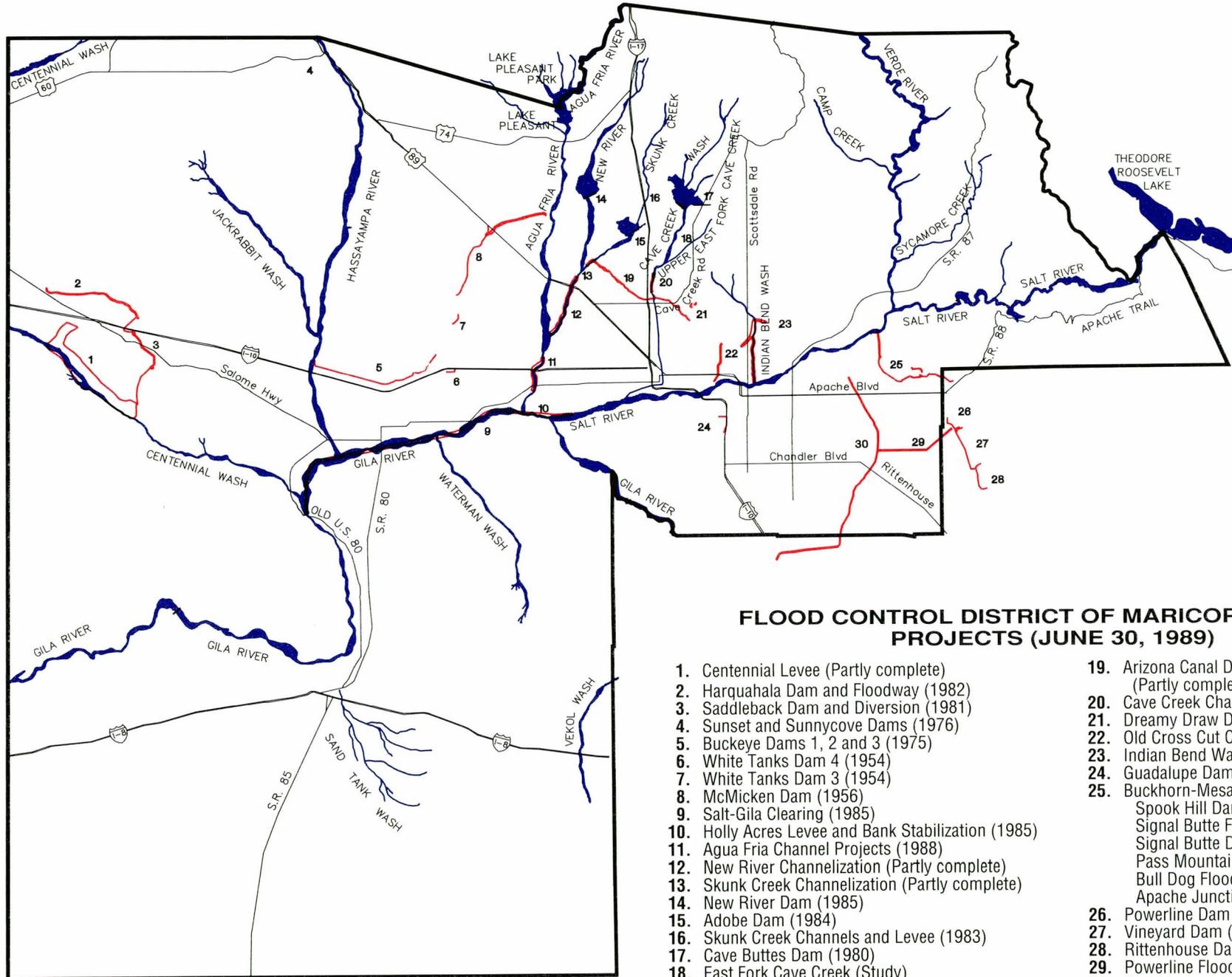
**Robert C. Payette, P.E.**, Chief, Construction and Operations Division

**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 Projects Management Division

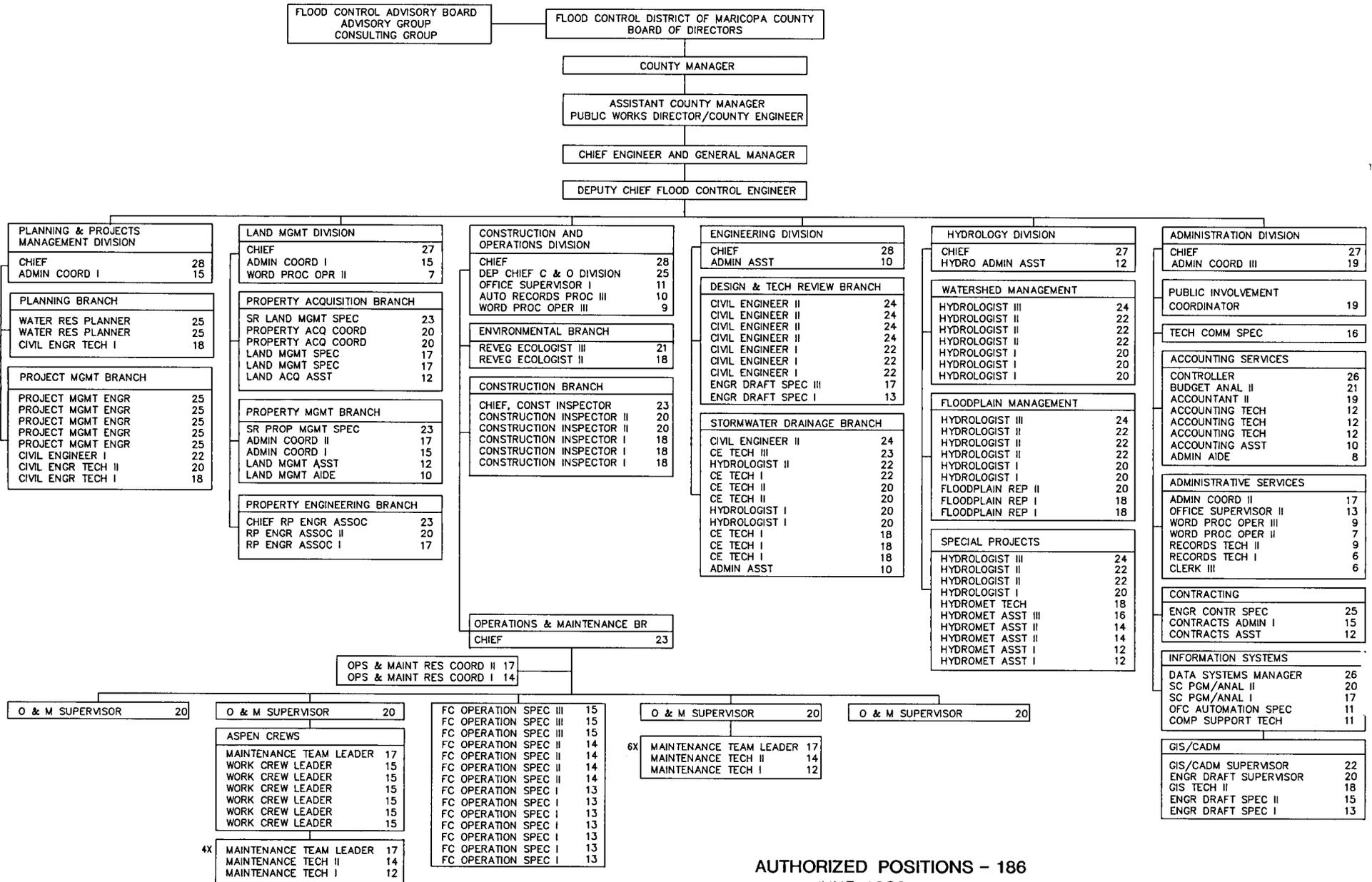


### FLOOD CONTROL DISTRICT OF MARICOPA COUNTY PROJECTS (JUNE 30, 1989)

- |   |  |
|---|--|
| <ol 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> </ol> | <ol style="list-style-type: none"> <li>19. Arizona Canal Diversion Channel (Partly complete)</li> <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<br/>Spook Hill Dam (1979)<br/>Signal Butte Floodway (1984)<br/>Signal Butte Dam (1987)<br/>Pass Mountain Diversion (1987)<br/>Bull Dog Floodway (1988)<br/>Apache Junction Dam (1988)</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> </ol> |
|---|--|

# ORGANIZATIONAL CHART

POSITIONS AND PAY GRADES



AUTHORIZED POSITIONS - 186

JUNE 1989