

# **FLOOD CONTROL DISTRICT of MARICOPA COUNTY**

Property of  
Flood Control District of MC Library  
Please Return to  
2801 W. Durango  
Phoenix, AZ 85009



# **ANNUAL REPORT**

**JULY 1, 1986 to JUNE 30, 1987**

003.106

## BACKGROUND

The District, founded in 1959, is a municipal corporation and political subdivision of the State of Arizona. 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 the elimination or minimizing of 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 for the unincorporated area of Maricopa County.
3. Studies flooding and drainage problems and plans and constructs projects alone or in cooperation with others.

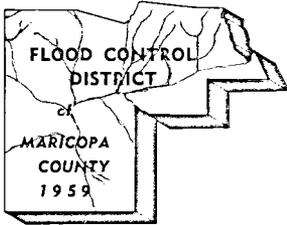
4. Acts as the local sponsor of federal flood control projects designed and constructed by the U.S. Army Corps of Engineers and the Soil Conservation Service. The District acquires the necessary rights-of-way and relocates facilities and people affected by the projects.
5. Operates and maintains completed 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.

## CONTENTS

Background .....	inside front cover
Letter from the Management .....	1
Financial Highlights .....	2
Activities .....	3
Completed Projects .....	3
Projects in Progress .....	6
Other District Activities .....	9
Boards and Officers .....	15
Project Map .....	16
Organization Chart .....	inside back cover
	Financial Report .....
	11
	Revenues and Expenditures .....
	11
	Expenditures by Activities .....
	12
	Expenditures on Land .....
	12
	Income of Rental Program .....
	14
	Tax Rate History .....
	14

*COVER PHOTO — This vehicle washed down Cudia City Wash from Stanford Drive during a severe thunderstorm in August 1986. Thirty houses below the Arizona Canal were flooded as a result of this storm. When completed, Reach 4 of the ACDC will prevent similar flooding.*



**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

Property of  
Flood Control District of MC Library  
Please Return to  
2801 W. Durango  
Phoenix, AZ 85009

BOARD of DIRECTORS  
Fred Koory, Jr., Chairman  
George L. Campbell  
Carole Carpenter  
Tom Freestone  
Ed Pastor

LETTER FROM THE MANAGEMENT

The District was proud this year to receive several awards for our work from the National Association of Counties (NACo) and the Valley Forward Association. We were delighted when the Valley Forward Association, which recognizes significant projects of environmental benefit each year, selected Adobe Dam as a finalist in its Environmental Action category. In designing and building Adobe Dam, the Corps of Engineers made every effort to blend it into the surrounding landscape, to preserve the petroglyphs in the area, and to revegetate the area in a thorough and realistic manner.

One of our NACo awards was for the Clearing of Right-of-Way Through the Sale of Improvements project, in which the District sold options to purchase houses for relocation from the Arizona Canal Diversion Channel property. This gave buyers time to arrange for the removal and salvage of the houses, allowed the District to continue to receive rental on the properties until the last minute, and guaranteed that the neighborhood would remain intact as long as possible. The District received a net of \$36,000 from the project instead of spending \$100,000.

NACo also recognized three of our environmental projects. The Protected Native Plant Salvage Operation gave thousands of native cacti, trees, and shrubs, which might otherwise have been destroyed, to educational and scientific organizations and to the general public. The Dormant Stub Mitigation Plantings and Erosion Control project took stubs from dormant healthy willow, cottonwood, and athel tamarisk and planted them at a site adjacent to the Salt/Gila River Clearing. The new trees replaced poor quality wildlife habitat lost during clearing with less common, but very valuable, native trees and provided erosion control protection to the banks of the Gila River at minimal cost. The Flood Control District also shared a NACo award with the Maricopa County Landfill Department for the Excavation, Relocation and Redisposal of the Avondale Landfill.

We are especially proud of the original thinking and hard work that went into these projects, and look forward to continuing challenges and progress in the coming year.

D. E. Sagramoso, P. E.



*Board of Directors: George Campbell, Fred Koory, Jr., Tom Freestone, Carole Carpenter, Ed Pastor.*

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY  
 FINANCIAL HIGHLIGHTS FOR THE YEAR ENDED JUNE 30, 1987  
 (Preliminary and Unaudited)

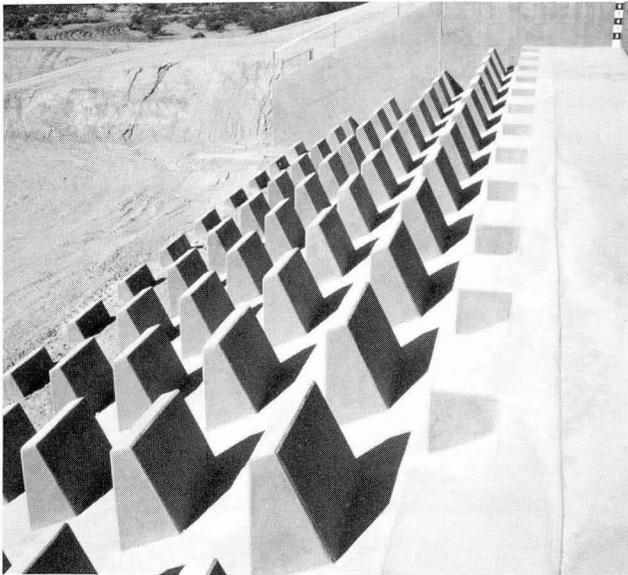
REVENUES	DOLLARS	PERCENT
Flood Control Tax	\$41,566,000	90%
Rental Income	711,000	2%
Interest	2,061,000	4%
State Assistance - Local Projects	637,000	1%
County and Local Participation	718,000	2%
Miscellaneous	<u>461,000</u>	<u>1%</u>
Total Revenues	<u>46,154,000</u>	<u>100%</u>
EXPENDITURES		
Administration and Maintenance	5,676,000	13%
Flood Control Capital Improvements	<u>38,516,000</u>	<u>87%</u>
Total Expenditures	<u>44,192,000</u>	<u>100%</u>
Excess (Deficiency) of Revenues Over Expenditures	1,962,000	
Fund Balance at Beginning of Year	<u>24,645,000</u>	
Fund Balance at End of Year	<u>\$26,607,000</u>	
EXPENDITURES BY TASK		
Administration	\$ 3,945,000	9%
Land Acquisition	19,785,000	44%
Relocation of Utilities, Bridges and Other Facilities	6,275,000	14%
Construction	7,464,000	17%
Maintenance	2,451,000	6%
Cost Sharing in Projects Managed by Others	<u>4,272,000</u>	<u>10%</u>
Total	<u>\$44,192,000</u>	<u>100%</u>

## COMPLETED PROJECTS

**ARIZONA CANAL DIVERSION CHANNEL (ACDC) REACH 1** — The ACDC is the last feature of the "Phoenix, Arizona and Vicinity (Including New River) Flood Control Project" to be constructed by the Corps of Engineers. The Channel is being constructed north of the Arizona Canal between approximately 75th Avenue and 40th Street. It will divert floodwaters from Cudia City Wash, Dreamy Draw, Cave Creek and other washes into Skunk Creek, eliminating breakouts in the Arizona Canal. The ACDC will provide 100-year flood protection to large parts of the Phoenix Metropolitan Area. Reach 1 of ACDC, which extends from Skunk Creek to Cactus Road, was completed in April of 1987 at a cost of approximately \$52,190,000. The construction contractor was Kiewit Western Company of Peoria.



*ADC Reach 1.*



*Signal Butte Floodway energy dissipators.*

**AVONDALE LANDFILL** — This landfill, which was last used in 1980, was in the way of our Agua Fria Channel/Levee Project. There was also a risk that it would contaminate the groundwater or be exposed to river floods. As a result, the Maricopa County Landfill Department, the Flood Control District and the City of Avondale relocated the landfill to a vacant adjacent site, and the District provided \$500,000 to the City of Avondale to develop a new City park on the 11.2 acre site. This project was completed in November 1986, ahead of schedule and under budget. The relocated landfill is double lined and has a leachate collection system, groundwater monitoring wells and a passive gas venting system. It is protected from the Standard Project Flood by soil cement levees. The City and County will coordinate the maintenance responsibilities and park development plans. The total cost of this project was \$3,331,500.

**PASS MOUNTAIN DIVERSION/SIGNAL BUTTE DAM** — Construction of the Pass Mountain Diversion and Signal Butte Dam was completed in January 1987. These two sections of the Buckhorn-Mesa Watershed project are north of Brown Road from the Crismon Road area to Meridian Drive. The combined Federal and District cost was approximately \$4,622,000, of which the District paid \$65,000.

The contractor, Pulice Construction Company, had some difficulties in the placement of a moisture barrier curtain on the Signal Butte Dam and took longer than expected. This impervious membrane, the first to be used on any of our Soil Conservation Service structures, extends from the base of the cut-off trench to above the high water line of the Dam. The curtain was installed in lieu of the gravel center drain system used in other structures. Extreme heat during the day prompted the contractor to work on this curtain in a midnight to 8 a.m. shift.



*Avondale Landfill*

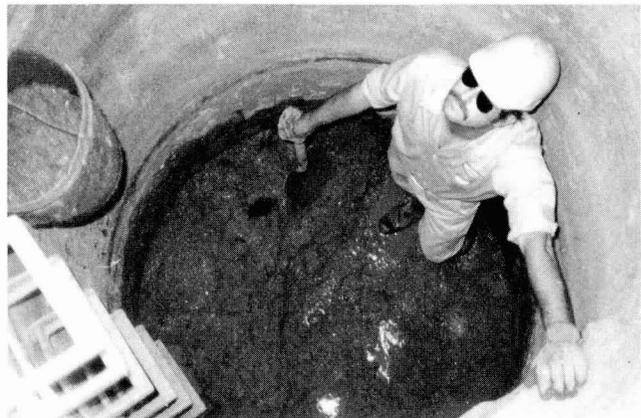
**SR 85 BRIDGE CHANNEL MAINTENANCE PROJECT/GILA RIVER** — The SR 85 Bridge Channel Maintenance Project, located on the Gila River south of Buckeye, was completed in December 1986 as a part of the Salt/Gila River Control Works. This \$290,000 project excavated approximately 250,000 cubic yards from the river channel upstream of the bridge and restored the bank to improve the conveyance capacity of the channel. Incorporated within this mile long excavation was the first segment of our low flow channel project. Low flow channels will be excavated in the Salt/Gila River Clearing to redirect existing river meanders into the clearing and away from the river banks. Additional low flow segments will be excavated next year.



*Low flow channel at the State Route 85 Bridge on the Gila River.*

## OPERATIONS AND MAINTENANCE ACTIVITIES

The Operations and Maintenance Branch maintains 45 completed structures such as dams, channels and levee systems, and approximately 25% of our staff is involved in this activity. The amount of maintenance work has increased dramatically over the last several 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 47,349 man-hours of prisoner labor to perform hand-intensive maintenance such as clearing vegetation and trash removal. The labor of each prisoner cost the District 50 cents per hour.



*Greg Long removing sludge from the Sunset/Sunnycove Pipeline.*



*David McClain, Aspen Crew Leader*

The Department of Corrections' prisoners were used on the following projects:

PROJECT	HOURS
ACDC	5,527
Adobe Dam	1,598
Buckeye	1,433
Cave Buttes Dam	2,765
Harquahala	21,085
Indian Bend Wash	1,739
McMicken Dam	815
New River Dam	1,427
East Maricopa Floodway	1,722
Salt/Gila Projects	964
Sossaman Road	720
Spook Hill	4,233
White Tanks	662
Wickenburg	248
Other	2,411

MAINTENANCE RESPONSIBILITIES

	Inventory as of Jan 1 1980	Added 1/1980 to 1/1984	Added 1/1984 to 7/1986	Added 7/1986 to 7/1987	Total		Percent Increase 1/80-7/87
Bank Protection - Riprap	43076	43221.2	327184	3328152	3741633.2	sq yd	8586.0
Bank Protection - Grouted Riprap	-	-	-	65340	65340	sq yd	-
Bank Protection - Soil Cement	-	-	-	22273	22273	sq yd	-
Bridges - Pedestrian	2	4	1	1	8	each	300.0
Bridges - Vehicle	6	12	1	1	20	each	233.0
Culverts, Box	4	5	-	-	9	each	125.0
Culverts, Pipe	5	5	4	-	13	each	160.0
Dip Crossings (Asphalt)	3	2	1	1	7	each	133.0
Drainage Channel - Lined	48576	19500	926	-	69002	feet	042.0
Drainage Channel - Unlined	7.7	14.5	2.75	-	24.95	miles	224.0
Drop Structure	20	38	14	3	75	each	275.0
Embankment	531.4	588.3	214.4	19	1353.10	acres	154.0
Embankment, Soil Cement	-	7.6	5.1	-	12.70	acres	-
Energy Dissipator	-	-	-	-	-	each	-
Erosion Protection (Concrete Block)	-	-	-	8000	8000	sq ft	-
Fencing	424663	469281	233677	99300	1226921	feet	188.0
Fencing - Wrought Iron	-	-	-	10470	10470	feet	-
Flap Gates	1	13	18	-	32	each	3100.0
Floodway - Lined	-	4561	863	12.550	179.74	feet	-
Floodway - Unlined	92.6	951.2	1261.1	15.452	2320.35	acres	2405.0
Gabions	-	6192	18250	6192	30634	sq yd	-
Gated Outlet	19	6	1	-	26	each	037.0
Gates	129	182	74	59	444	each	244.0
Gates - Wrought Iron	-	-	4	1	5	each	-
Gates - Pipe	-	-	-	-	-	each	-
Grade Control Structure	1	3	2	1	7	each	600.0
Gutters, Concrete	430	920	4800	200	6350	feet	1376.7
High Flow	782.5	79	445	-	1306.50	feet	67.0
Landscaping							
Landscaping/Erosion control	174.5	1787.6	422.4	25	2409.5	acres	1281.0
Seeding							
Heads	-	1694	-	-	-	each	-
Irrigation Controls	-	5	-	-	5	each	-
Irrigation Lines	-	62960	-	350000	97960	feet	-
Plantings	1889	4116	1159	99480	106644	each	5545.5
Low Flow	563.7	371	264.2	7.0	1205.9	acres	114.0
Low Flow - SG	-	-	-	-	-	feet	-
Manholes	12	22	-	-	34	each	183.0
Meter Houses	5	5	2	-	12	each	140.0
Outlet Structure	12	9	3	-	24	each	100.0
Pilot Channel	-	-	23760	-	23760	feet	-
Pool Area	6970.6	5555	5868.8	-	18394.40	acres	164.0
Principal Outlet	13	5	3	-	21	each	62.0
Principal Outlet - Pipe	2486	1459	761	-	4706	feet	89.0
Railing - Pipe	240	240	240	60	780	feet	225.0
Ramps, Asphalt	-	100	-	113	213	feet	-
Ramps, Concrete	360	2480	960	790	4590	feet	1175
Ramps, Earth	1900	1450	2180	1105	6635	feet	249.0
Ramps, Grouted Riprap	-	-	1260	985	2245	feet	-
Ramps, Soil Cement	-	-	1800	1870	3670	feet	-
Retaining Wall	-	-	3554	780	4334	feet	-
Right-of-Way	3.5	745	86	169	1003.5	acres	28571.4
River Clearing	-	4365	-	-	4365	acres	-
Roads - Asphalt	0.2	10.9	5.7	5.7	22.5	miles	11150.0
Roads - Dirt	105.3	147.7	68.8	27.6	349.4	miles	232.0
Settlement Basins	-	-	-	1	1	acres	-
Side Inlet - Concrete	6	-	2	40	48	each	700.0
Side Inlet - Drop	5	26	28	-	59	each	1080.0
Side inlet - flap gate	1	13	18	-	32	each	3100.0
Side Inlet - Grouted	-	44	44	51	139	each	-
Side Inlet - Pipe	1	15	6	-	22	each	2100.0
Spillway - Earth	241.4	37.2	183.5	-	462.1	acres	091.0
Spillway - Lined	40	410	4813	-	5263	feet	13058.0
Stilling Basins	26	28	5	5	64	each	146.0
Stormdrain Pipe	13588	22163	3212	1008	39971	feet	194.0
Trash Racks	20	55	15	36	126	each	530.0
Vegetative Drains	9	14	6	1	30	each	233.0



## PROJECTS IN PROGRESS

**ARIZONA CANAL DIVERSION CHANNEL (ACDC)** — Because Reach 1 was completed well ahead of schedule, the Corps sectioned Reach 2 into three reaches and began construction on Reach 2A in November 1986. Reach 2A extends from 53rd Avenue to 47th Avenue. The Corps of Engineers awarded a construction contract for Reach 2A to CS Construction for \$4,663,450. Construction was approximately 88% complete at the end of the fiscal year.

From 53rd Avenue west, the channel has an earth-lined trapezoidal section, and from 47th Avenue east it will have a rectangular concrete section. A concrete trapezoidal length will form the transition between the east and west ends. The width of the channel will vary from 36 feet to 500 feet and the channel will be covered from Central to Dunlap, from 30th Street to 24th Street, and along Stanford Drive east of 32nd Street. Eight of ACDC's 25 required bridges have been completed and three are under construction. Five bridges are currently being designed.

The Task Force appointed by the Phoenix City Council to study Reach 4 completed its work in April 1986. The "Citizens Against Reach 4" continued their active opposition to the project, and the City Council considered Reach 4 on a number of occasions during the year. The engineering firm hired by the "Citizens Against Reach 4" reported less runoff at Cudia City Wash than the Corps of Engineers indicated, so the Council ordered two separate engineering studies of the problem. Both consultants confirmed the Corps' figures, and the Phoenix City Council voted to support Reach 4 on June 23, 1987.

The City Council has appointed an Aesthetics Committee to review the landscaping and aesthetics features for the ACDC and make recommendations to the Council. The Corps of Engineers and the District are assisting the Aesthetics Committee and attending its meetings. The Committee's report is expected within the coming year.

**BUCKHORN-MESA WATERSHED** — The Buckhorn-Mesa Watershed Project is a system of interrelated structures being built by the Soil Conservation Service to provide flood protection to rural and urban lands in the Eastern Maricopa County area, generally south of Brown Road from about Bush Highway to Idaho Road.

The first structures, the Spook Hill Dam and Floodway, the Signal Butte Dam and Floodway, and the Pass Mountain Diversion, have been completed; and the Soil Conservation Service awarded a construction contract to the Ashton Construction Company in May 1987 in the amount of \$7,063,600 for the Apache Junction Dam and Bulldog Floodway. They are now under construction.

**AGUA FRIA RIVER** — The Agua Fria Channelization Project was developed to resolve flooding problems along the lower Agua Fria River that became evident during the flooding of 1978 to 1980. It is designed to contain and convey the Standard Project Flood, which is 142,000 cfs. The total project is expected to cost approximately \$40 million, a portion of which is being shared by others. This project is, by far, the largest and most expensive local project of the District.

Reaches 1 and 2, which run from Indian School Road to 500 feet south of I-10, were completed in 1986. Soil cement is being used on this project for erosion protection and stability of levees, riverbeds, and other features. It has not been used extensively in Maricopa County before and is a new engineering application for the District.

The District awarded a construction contract for Reach 3 to Pulice Construction, Inc. for \$6,781,234 in May, and construction was 7% complete as of June 1987.



*Connie Bailey, Word Processing Operator*

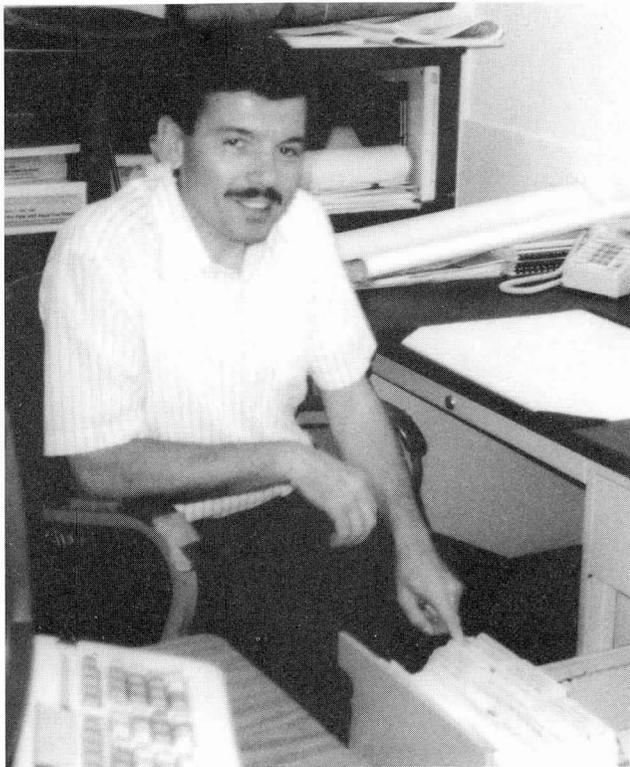
**EAST MARICOPA FLOODWAY (Formerly RWCD Floodway)** — The East Maricopa Floodway is being constructed by the Soil Conservation Service on the upslope (east) side of the Roosevelt Water Conservation District Canal in eastern Maricopa County. The 27.6 mile long Floodway is being built in six reaches and will extend from the Gila River to a little north of Brown Road in Mesa. Reach 1 was completed in 1981, Reach 2 in 1983, and Reach 3 in 1985.

Because it lies parallel to the RWCD Canal, there was confusion among residents as to the agency responsible for the RWCD Floodway. This confusion would have increased as eastern Maricopa County became more urbanized, so the District had the name changed to East Maricopa Floodway.

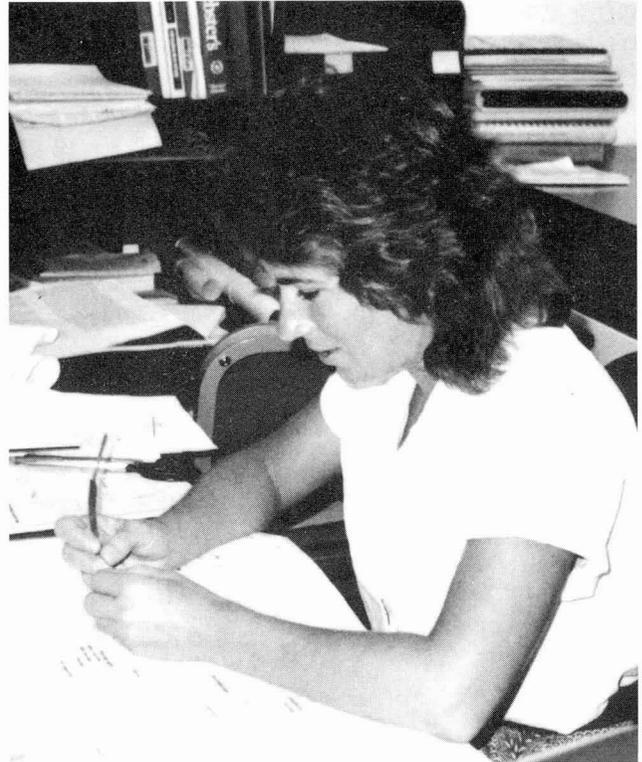
At the end of Fiscal Year 86-87, Reach 4 was approximately 85% complete, and the contractor, Kiewit Western, expected to complete contract work early in the new fiscal year. The total cost of their work will be approximately \$4,755,000.

The Soil Conservation Service advertised for bids for Reach 5 early in June. Three miles of Reach 5 were constructed in 1985 by Leisure World at substantial savings to the District and the Soil Conservation Service.

Construction of a box culvert at Apache Boulevard and Higley Road in Reach 6 was completed by the JWJ Contracting Company in April of 1987 at a cost of approximately \$1,468,898.



*Don Rerick, Civil Engineer Technician*



*Jan Farmer, Hydrologist*

**SKUNK CREEK/NEW RIVER/AGUA FRIA** — A flowage easement guarantees the right to run water through the land the easement is on while protecting the bearer from liability for any damages caused by the water. As part of the Corps of Engineers' Phoenix, Arizona and Vicinity (Including New River) Flood Control Project, the District is acquiring flowage easements for the 100-year floodplains of Skunk Creek, New River and the Agua Fria as well as performing some bank stabilization on New River and Skunk Creek.

The District must acquire these flowage easements to protect itself from liability for flood damages since the ACDC will divert floodwaters from the northern metropolitan drainage area to Skunk Creek, New River and the Agua Fria. Through the flowage easements, the District can also insure that development is limited in the floodway even if present laws governing floodplain management are changed. The flowage easements will also preserve open space, which is an authorized purpose of the Project.

**GUADALUPE DAM** — The Flood Control District is working with the Soil Conservation Service and the Gosnell Development Co., which is building a golf course and other recreation facilities in Guadalupe Dam reservoir. Currently, Gosnell is excavating the lakes in and around the reservoir and building the golf course. This development will not interfere with the flood control purposes of Guadalupe Dam.

**GILA DRAIN PROJECTS** — This project has been separated into several major elements to provide storm-water outlets for portions of Chandler, Gilbert, Mesa, Phoenix and Tempe. The District has entered into intergovernmental agreements for cost sharing on all the elements except for the Price Drain, which is in the planning stage.

PROJECT	PARTIES	DISTRICT CONTRIBUTION	CONSTRUCTION DATE
48th Street Storm Drain	Gilbert Phoenix Tempe	\$300,000	Complete Phase I Spring 1987
Gila Drain Storm Drain	Tempe	\$2,758,700	Completion Fall 1987
ADOT Pit and Diversion	Tempe	\$1,293,076	Complete Spring 1987
Gilbert Downtown Retention Basin	Gilbert	\$287,500	Complete Summer 1987
Lindsay Road Regional Basin	Gilbert	\$976,900	Completion Fall 1987
Price Drain	ADOT Chandler Gilbert Mesa	\$7,000,000 (estimated)	Start Fall 1987

**OLIVE DRAIN** — The Olive Avenue Storm Drain developed from the Glendale/Peoria Area Drainage Master Studies and will be along Olive Avenue from 67th Avenue to 91st Avenue, outletting into New River. It is proposed that it be a regional storm drain, composed of a pipe conduit and detention basins to handle flows from both Glendale and Peoria. The design is being accomplished with the two cities and the District contributing funds. The agencies are now working out cost sharing arrangements for construction of the Drain.



*The eastern entryway of the Flood Control Building, torn down prior to construction of the new wing and roof.*



*The new wing of the Flood Control Building*

**CONTRACTS AWARDED THIS YEAR**

<u>Type of Contract</u>	<u>Number</u>	<u>Contract Amount Including Contingencies</u>
Appraisal	16	\$ 41,050
Engineering Services	27	3,905,626
Construction	8	12,276,000
Maintenance of Structures	1	175,000
Rental Property Maintenance	34	97,895
Relocation Assistance	1	8,650
Title and Escrow Services	1	25,000
Total	88	\$16,529,221

# OTHER DISTRICT ACTIVITIES

## FLOODPLAIN AND DRAINAGE MANAGEMENT

— One of the main responsibilities of the District is to protect people and property before an emergency arises by regulating the use of floodplains and by reviewing residential, commercial, and industrial development plans so that new developments will not have or cause drainage problems. In regulating the floodplains, the District delineates floodplains and determines what uses are compatible with the floodplain and whether the proposed uses are adequately protected from flood flows. The District 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 cause drainage and flooding problems within the development itself.

The charts below show the work load during the last three years.

### Floodplain Management

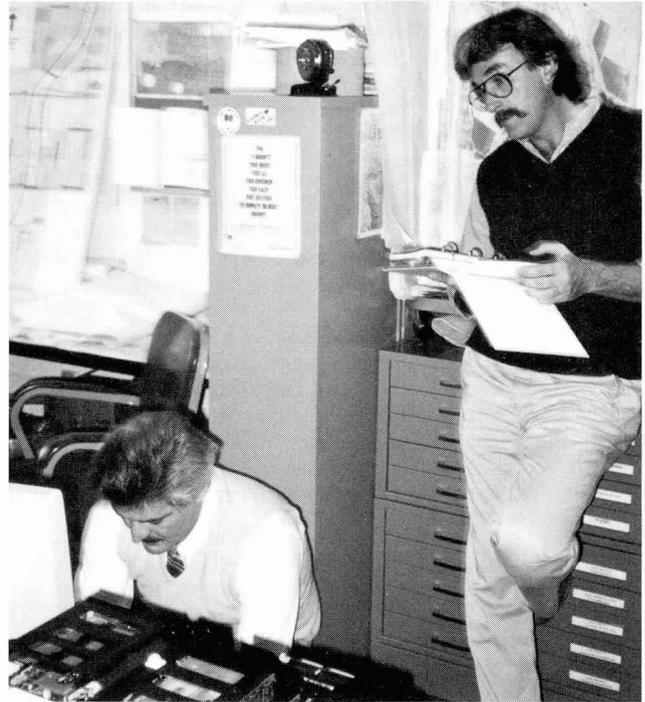
	FY 84-85	FY 85-86	FY 86-87
Floodplain Use Permits	16	20	49
Floodplain Variances	23	20	13
Appeals	3	4	0
New Delineations	2	10	7
FCD Clearances	64	78	55
Violation Cases	14	11	10
Referrals to County Attorney	2	0	3

### Drainage Management

	FY 84-85	FY 85-86	FY 86-87
Zoning Cases Reviewed (Including Resubmittals)	212	259	370
Subdivision Cases Reviewed	55	55	94
Master Plans Reviewed	5	10	11
Board of Adjustment Cases Reviewed	14	21	106
Drainage Inspections	NA	462	916



Mark Williams and Elroy Stone demolishing an ACDC house on Carol Ave.



Tom LaMarche, Water Resources Planner, and Tim Sutko, Hydrologist.

**UNIFORM DRAINAGE STANDARDS FOR MARICOPA COUNTY** — In response to a need for more uniform drainage requirements for the various jurisdictions in Maricopa County, the District facilitated a task force on Uniform Drainage Standards. This group planned a set of standards for all cities, towns and the County. This information is being compiled in the following three phases:

*Phase 1: The Uniform Drainage Policies and Standards for Maricopa County, Arizona* is a policies and standards report on various agencies' common approach to drainage management. It was approved by the Maricopa County Board of Supervisors and Flood Control District Board of Directors on April 20, 1987. The Policies advocate master drainage planning, a central library for drainage reports, multiple uses of drainage works, and common storage facilities rather than on-lot retention. The standards are primarily modifications of existing criteria for storage, drainage of storage facilities and street conveyance.

*Phase 2:* This two-part design manual will outline the application of the policies and standards. One part presents methods for calculating peak discharges and volumes of water for which the drainage engineers must design. The other outlines the criteria and methods for these designs. Both parts are currently being prepared.

*Phase 3:* Reviews and updates Maricopa County area rainfall maps to insure that the best available precipitation data is used as a basis for drainage design.

**OLD CROSS CUT CANAL STUDY** — The Flood Control District is working with the Corps of Engineers on a study of flooding in the Arcadia and Old Cross Cut Canal areas. The preliminary study results show that it may be possible to incorporate the Arizona Canal into an interceptor/collection system to convey the stormwater to the Salt River using the Old Cross Cut Canal.

The Old Cross Cut Canal will be affected by the location of the East Papago and Hohokam Freeways as well as the proposed widening of 48th Street. The effect of these issues on the Old Cross Cut Canal is still being studied.

**AREA DRAINAGE MASTER STUDIES** — The District has been conducting several Area Drainage Master Studies (ADMS's) in various parts of the County. Each ADMS takes a certain area of the County and studies the past and potential stormwater drainage problems on a watershed basis and proposes solutions. The costs of the studies are often shared with municipalities and other governmental agencies.

**Eastern Maricopa County ADMS** — The study boundaries extend from approximately Brown Road on the north to Ray Road on the south and from the RWCD Canal on the west to beyond the County line on the east. Other agencies involved in the study are the City of Mesa and the County Highway Department. The original study was for 100-year flood protection but, because of the high cost of \$80 million, we asked the engineering consultant to study lower levels of protection. During the year, the District worked with ADOT sharing hydrology information and studying the possibility of early implementation of joint projects in critical areas.

**Queen Creek ADMS** — An engineering consultant was hired and the study is expected to continue through the end of 1987. The study is in the stage of watershed delineation and development of the hydrology.

**Spook Hill ADMS** — The study area is north of the Buckhorn-Mesa Watershed Projects to the National Forest boundary. Other agencies involved in the study are the City of Mesa, the County Highway Department, and the Soil Conservation Service. In response to the public's concern about preserving the natural desert environment and their lifestyles, the District is having the engineering consultant investigate lower levels of protection. The alignment of ADOT's Red Mountain Freeway will have an impact on the ADMS. ADOT has proposed moving our Spook Hill Dam in about eight years for the construction of the Freeway.

**Wittmann ADMS** — Our engineering consultant is working in the watersheds around Wittmann, located northwest of Metropolitan Phoenix. New topographic mapping of the area has been produced, a verified hydrology model has been developed, and potential flooding and drainage problems are being analyzed. Preliminary results of the study have been incorporated into the design of the Sun Valley Parkway crossing of McMicken Dam and the development of the Northwest Landfill. The study will be completed during the next fiscal year.

**East Fork Cave Creek** — The study area is generally between the CAP Aqueduct to Greenway Road and between 7th Street to 32nd Street. Other involved agencies are the Maricopa County Highway Department and the City of Phoenix. The engineering consultant completed the hydrology and developed alternatives for stormwater management within the watershed. Public meetings were held in November and the people attending the meetings were supportive of the study and expressed the desire to have the open channels and detention basins used for recreation as well as flood control. Cost estimates for implementation of the plan are approximately \$50 million. The study was for 100-year flood protection; however, project planning in some areas other than the 100-year floodplain of East Fork Cave Creek will be for a reduced level of protection. The hydrology developed in the study is being used to develop a new floodplain delineation for submittal to the Federal Emergency Management Agency.



*Shon Wu, Engineering Drafting Specialist*

**PLAN 6** — Plan 6 is a part of the Central Arizona Project (CAP), a program of the Bureau of Reclamation. The purposes of Plan 6 are to provide flood control, to provide regulatory storage of excess Colorado River water, and to provide for the structural safety of existing Salt and Verde River Dams. The features of the Plan most important to the District were a new Waddell Dam on the Agua Fria, Cliff Dam on the Verde, and a modified Roosevelt Dam on the Salt River. The Flood Control District has committed itself to provide upfront funding for up to 20 percent of the flood control costs.

In June 1987, to the intense disappointment of flood control and other interests, Cliff Dam on the Verde River was removed from the Plan by agreement with a coalition of environmental groups. The U.S. Army Corps of Engineers has been requested to further investigate alternatives to provide flood protection on the Verde River.

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY**  
**STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE**  
**BUDGET AND ACTUAL**  
**YEAR ENDED JUNE 30, 1987**  
(Preliminary & Unaudited)

<u>REVENUES</u>	<u>BUDGET</u>	<u>ACTUAL</u>	<u>VARIANCE FAVORABLE (UNFAVORABLE)</u>
Flood Control District Tax Levy	\$44,850,000	\$41,566,000	\$(3,284,000)
State Assistance			
Federal Projects	525,000	0	(525,000)
Local Projects	2,750,000	637,000	(2,113,000)
County Reimbursement	5,580,000	506,000	(5,074,000)
Local Participation	876,000	212,000	(664,000)
Rental	725,000	711,000	(14,000)
Interest Earnings	3,000,000	2,061,000	(939,000)
Sale of Excess Land	15,147,000	0	(15,147,000)
Miscellaneous	<u>116,000</u>	<u>461,000</u>	<u>345,000</u>
 Total Revenues	 <u>73,569,000</u>	 <u>46,154,000</u>	 <u>(27,415,000)</u>
 <u>EXPENDITURES</u>			
Personnel Services			
Salaries and Wages	4,170,000	3,367,000	803,000
Overtime	<u>50,000</u>	<u>2,000</u>	<u>48,000</u>
 Total	 <u>4,220,000</u>	 <u>3,369,000</u>	 <u>851,000</u>
Supplies and Services			
Professional Services Contracts	1,735,000	1,038,000	697,000
Maintenance Contracts	511,000	427,000	84,000
Maintenance Supplies	292,000	148,000	144,000
Insurance	16,000	16,000	0
Other Supplies and Services	<u>661,000</u>	<u>538,000</u>	<u>123,000</u>
 Total	 <u>3,215,000</u>	 <u>2,167,000</u>	 <u>1,048,000</u>
Capital Outlay			
Real Estate	33,981,000	19,200,000	14,781,000
Engineering & Scientific Equip.	6,150,000	1,754,000	4,396,000
Motor Vehicles & Equipment	1,128,000	618,000	510,000
Const. & Other Capital Outlay	<u>36,761,000</u>	<u>17,084,000</u>	<u>19,677,000</u>
 Total	 <u>78,020,000</u>	 <u>38,656,000</u>	 <u>39,364,000</u>
 Total Expenditures	 <u>85,455,000</u>	 <u>44,192,000</u>	 <u>41,263,000</u>
 Excess (Deficiency) of Revenues over Expenditures	 (11,886,000)	 1,962,000	 13,848,000
Fund Balance at Beginning of Year	<u>24,645,000</u>	<u>24,645,000</u>	<u>                    </u>
Fund Balance at End of Year	<u>\$12,759,000</u>	<u>\$26,607,000</u>	<u>\$13,848,000</u>

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY  
 EXPENDITURES BY ACTIVITIES AND FUNCTIONS \*  
 FY 86/87  
 (Preliminary & Unaudited)

ACTIVITY	OPERATIONS EXPENDITURES		CAPITAL IMPROVEMENTS PROGRAM		
	Administrative	Maintenance	Engineering	Lands	Relocation & Construction
Administrative Overhead	\$1,847,000	\$ 3,000	\$ 12,000	\$	\$ 165,000
Maintenance Overhead	2,000	1,096,000			
FCD Yard Maintenance		14,000			
USGS Service Work	59,000				
Enforcement of Flood- plain Regulations	22,000				
Work done for Planning & Development	250,000				
Watershed Hydrology	84,000				
Work done for County Highway Department	3,000				
Floodplain Delineation	70,000				
Flood Insurance	28,000				
Hydrologic Data Collection	23,000	20,000			
Flood Warning System	44,000	46,000			117,000
Floodplain Administration	340,000				
Computer Systems	31,000	2,000			
City of Chandler	1,000				
City of Mesa					550,000
City of Phoenix	24,000				
City of Scottsdale	1,000				72,000
City of Tempe					3,809,000
Town of El Mirage	1,000				
Dysart Road - Agua Fria Drain		5,000			
48th Street Drain	2,000	10,000			
Alma School Drain		11,000			
Old Cross Cut Canal	36,000	49,000			
Broadway Rd. Bank Stabilization			1,000		
Salt/Gila Clearing & Channelization		100,000			
Salt/Gila Control Works		56,000	27,000	12,000	228,000
Sossaman Road	3,000	26,000			
Agua Fria River	1,000	15,000			
Agua Fria River (ADOT Agreement)	8,000		254,000	2,000	2,493,000
Indian Bend Wash Outlet	5,000	9,000			
Indian Bend Wash Inlet	2,000	6,000			
Indian Bend Wash Greenbelt		1,000			
Indian Bend Wash Interceptor and Side Channels		15,000			
Gila Drain	4,000		80,000		
ACDC	21,000	368,000	347,000	5,081,000	5,351,000
EMF-Williams/Chandler	9,000	166,000	12,000	15,000	93,000
EMF-Apache Junc./Gilbert	3,000	4,000	10,000	19,000	1,772,000
EMF-Buckhorn/Mesa	3,000	2,000	5,000	1,000	584,000

ACTIVITY	OPERATIONS EXPENDITURES		CAPITAL IMPROVEMENTS PROGRAM		
	Administrative	Maintenance	Engineering	Lands	Relocation & Construction
White Tanks Dam #3	3,000	2,000		890,000	
White Tanks Dam #4	2,000	9,000		2,229,000	
McMicken Dam	1,000	33,000		8,185,000	
Dreamy Draw Dam		5,000			
McMicken Dam Outlet					
Channel		3,000			
Guadalupe Dam	5,000	7,000			
Buckeye #2		5,000			
Buckeye #3		6,000			
Spook Hill FRS & Outlet	1,000	54,000			
Signal Butte Floodway		6,000			1,000
Pass Mountain FRS & Outlet		1,000			
Apache Jct. FRS, Floodway, Outlet and Bulldog Floodway	9,000	3,000	22,000	279,000	149,000
Signal Butte FRS		11,000	3,000		
Powerline Dam		7,000			
Powerline Floodway		26,000			
Vineyard Road FRS		11,000			
Rittenhouse FRS		13,000			
Harquahala FRS & Floodway		30,000			
Saddleback FRS		36,000			
Saddleback Diversion					
Channel		6,000		2,000	
Centennial Levee		11,000		28,000	1,000
Harquahala Floodway		6,000			
Sunset FRS		2,000			
Sunnycove FRS		5,000			
Sunset/Sunnycove Pipeline		1,000			
Wittmann ADMS	11,000		262,000		
Cave Buttes Dam		47,000			
Adobe Dam	6,000	33,000	1,000	38,000	
Skunk Creek Channel at I-17		6,000			
New River Dam		22,000			
New River Area Drainage Master Study		2,000			
Skunk Creek and New River Flowage Easements	1,000	14,000	20,000	2,595,000	39,000
Agua Fria River Flowage Easements	6,000		428,000	263,000	1,593,000
Spook Hill Watershed ADMS	11,000				
East Maricopa ADMS	12,000		20,000		75,000
Glendale-Peoria ADMS	17,000		56,000		
East Fork Cave Creek ADMS	55,000		71,000		
Queen Creek ADMS	2,000		148,000		
Bell Road Expansion	160,000		6,000		
<b>Total</b>	<b><u>\$3,229,000</u></b>	<b><u>\$2,447,000</u></b>	<b><u>\$1,785,000</u></b>	<b><u>\$19,639,000</u></b>	<b><u>\$17,092,000</u></b>

\* Expenditures by Activities and Function will not always agree with Expenditures by Task on page 2 except in total.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY  
RENTAL PROGRAM FY 86/87  
(Preliminary & Unaudited)

Project Name	# of Leasible Properties	# Leased	Vacancy Rate	Gross	Net
Arizona Canal					
Diversion Channel	87	83	4.6%	\$658,000	\$373,000
Indian Bend Wash	2	2	0.0%	1,000	0
East Maricopa Floodway	3	3	0.0%	26,000	20,000
Apache Junction FRS					
& Bulldog Floodway	2	2	0.0%	5,000	4,000
Cave Buttes Dam	1	1	0.0%	2,000	0
New River Dam	1	1	0.0%	1,000	1,000
Agua Fria River	1	1	0.0%	4,000	5,000
Signal Butte FRS	2	2	0.0%	10,000	9,000
Adobe Dam	1	1	0.0%	4,000	0
<b>Total</b>	<b>100</b>	<b>96</b>	<b>4.0%</b>	<b>\$711,000</b>	<b>\$412,000</b>

\* Data as of June 30, 1987.



Helen Ortiz, Land Management Assistant;  
Kay Stevens, Senior Property Management Specialist;  
and Hedy Hall, Land Management Specialist.

HISTORY OF THE TAX LEVY RATE  
FOR THE FLOOD CONTROL DISTRICT  
OF MARICOPA COUNTY

For fiscal year ending	Levy Rate per \$100 assessed value	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



Dick Bryce, Bob Mauney, and Stan Smith at the dedication of Signal Butte Dam.

EXPENDITURES ON LAND  
Breakdown by Project  
(Preliminary and Unaudited)

Project	Number of Parcels Bought This Year	FY 86/87 Total Land Acquisition Costs	% of Land Acquired To Date
Adobe Dam	0	\$ 38,000	99%
Arizona Canal Diversion Channel	22	5,081,000	87%
Agua Fria River	5	265,000	11%
Apache Junction/Bulldog Floodway	10	279,000	44%
Centennial Levee	3	28,000	100%
East Maricopa Floodway	7	35,000	94%
Skunk Creek/New River Flowage Easements	24	2,595,000	19%
McMicken Dam	10	8,185,000	100%
Saddleback Diversion	0	2,000	100%
Salt/Gila Control Works	2	12,000	75%
White Tanks #3	1	890,000	100%
White Tanks #4	1	2,229,000	100%
<b>Total</b>	<b>85</b>	<b>\$19,639,000</b>	



Dick McNamara, Property Acquisition Manager



*Flood Control Advisory Board — Donald E. Womack, John E. Miller, Jr., William LoPiano, H. Lynn Anderson, Charles A. Sykes, Ross Blakely, Jr. Robert Towner not in picture.*

**FLOOD CONTROL ADVISORY BOARD**

- H. LYNN ANDERSON
- JAMES ATTEBERY, ex officio member, City of Phoenix
- WILLIAM LOPIANO, Chairman, July 1, 1986 to October 30, 1986
- JOHN E. MILLER, JR.
- CHARLES A. SYKES, Chairman, November 1, 1986 to June 30, 1987
- ROBERT TOWNER
- DON WOMACK, ex officio member, Salt River Project

**PRINCIPAL STAFF MEMBERS**

- DANIEL E. SAGRAMOSO, Chief Engineer and General Manager
- STANLEY L. SMITH, JR., Deputy Chief Engineer
- DAVID A. BROZOVSKY, Flood Control Administrator
- ROBERT C. PAYETTE, Chief, Construction and Operations Division
- NICHOLAS P. KARAN, Chief, Engineering Division
- DAVID R. JOHNSON, Chief, Hydrology Division
- EDWARD D. OPSTEIN, Chief, Land Management Division
- JOHN E. RODRIGUEZ, Chief, Planning and Projects Management Division

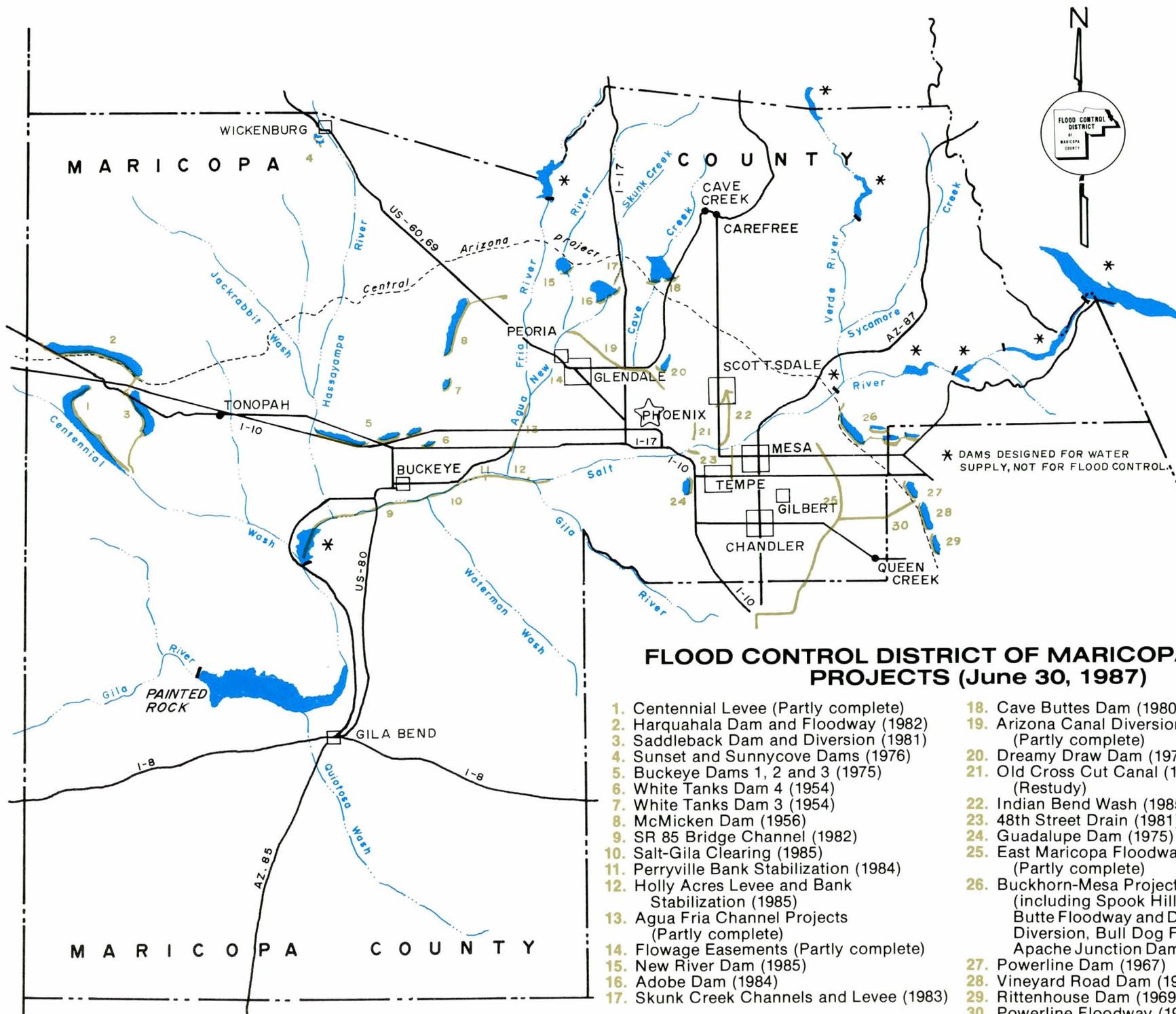
**BOARD OF DIRECTORS**

- GEORGE CAMPBELL, District 2\*, Chairman, July 1, 1986 to January 5, 1987
- CAROLE CARPENTER, District 4\*
- TOM FREESTONE, District 1\*
- FRED KOORY, JR., District 3\*, Chairman, January 5 to June 30, 1987
- ED PASTOR, District 5\*

\*Supervisory Districts (Directors are also Supervisors of Maricopa County)



*Roberta Combs, Secretary*



### FLOOD CONTROL DISTRICT OF MARICOPA COUNTY PROJECTS (June 30, 1987)

- |  |  |
|--|--|
| <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. SR 85 Bridge Channel (1982)</li> <li>10. Salt-Gila Clearing (1985)</li> <li>11. Perryville Bank Stabilization (1984)</li> <li>12. Holly Acres Levee and Bank Stabilization (1985)</li> <li>13. Agua Fria Channel Projects (Partly complete)</li> <li>14. Flowage Easements (Partly complete)</li> <li>15. New River Dam (1985)</li> <li>16. Adobe Dam (1984)</li> <li>17. Skunk Creek Channels and Levee (1983)</li> </ul> | <ul style="list-style-type: none"> <li>18. Cave Buttes Dam (1980)</li> <li>19. Arizona Canal Diversion Channel (Partly complete)</li> <li>20. Dreamy Draw Dam (1973)</li> <li>21. Old Cross Cut Canal (1975) (Restudy)</li> <li>22. Indian Bend Wash (1985)</li> <li>23. 48th Street Drain (1981)</li> <li>24. Guadalupe Dam (1975)</li> <li>25. East Maricopa Floodway (Partly complete)</li> <li>26. Buckhorn-Mesa Projects (including Spook Hill Dam, Signal Butte Floodway and Dam, Pass Mountain Diversion, Bull Dog Floodway, and Apache Junction Dam) (Partly complete)</li> <li>27. Powerline Dam (1967)</li> <li>28. Vineyard Road Dam (1968)</li> <li>29. Rittenhouse Dam (1969)</li> <li>30. Powerline Floodway (1968)</li> </ul> |
|--|--|

# ORGANIZATIONAL CHART

## POSITIONS AND PAY GRADES

