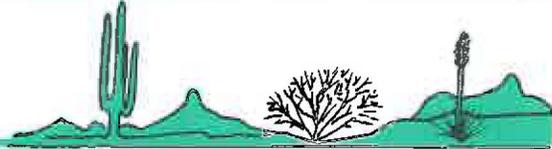
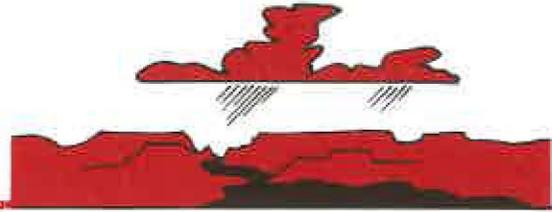


Property of  
Flood Control District of MC Library  
Please Return to  
2801 W. Durango  
Phoenix, AZ 85009



# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

COMPREHENSIVE FLOOD CONTROL PROGRAM, STATUS REPORT  
INTERIM UPDATE 1963 - 1989



899.005

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

COMPREHENSIVE FLOOD CONTROL PROGRAM, STATUS REPORT  
INTERIM UPDATE 1963 - 1989  
The Flood Control District of Maricopa County

COMPREHENSIVE PLAN  
STEERING COMMITTEE

Dan Sagramoso, P.E.  
Stanley Smith, P.E.  
John Rodriguez, P.E.  
David Johnson  
Lionel C. Lewis, P.E.  
Joe Tram  
Doug Plasencia

COMPREHENSIVE FLOOD CONTROL PROGRAM, STATUS REPORT  
INTERIM UPDATE 1963 - 1989

Table of Contents

Introduction.....1  
Figure 1 (FCD Projects and location).....2  
Status of 1963 Recommendations.....3  
Project Recommendations 1989.....4  
Future Efforts.....5  
Figure 2 (Watersheds).....6  
Appendix A.....A1-A13  
Appendix B.....Bi-B4

COMPREHENSIVE FLOOD CONTROL PROGRAM REPORT  
INTERIM UPDATE 1963 - 1989  
The Flood Control District of Maricopa County

INTRODUCTION

The Comprehensive Flood Control Program Report of 1963 was the culmination of several general area studies that identified flooding problems in Maricopa County. At that time 35 watersheds were identified on which flooding problems were defined and potential structural solutions identified. The plan identified 40 flood control projects. The comprehensive plan was the cornerstone for most works performed by The Flood Control District of Maricopa County to date.

Based on engineering economics the plan further identified which of the 40 projects were considered viable at that time and which should be deferred for future consideration. Likewise the plan identified potential federal funding mechanisms that could be used in conjunction with local funds to build the projects.

At that time the District operated under the authorities in ARS, Article 5, Secs. 45-2351 to 45-2371, and was charged with the responsibility of building, operating, and maintaining the projects recommended in the 1963 report. It was further recognized that the District would ultimately construct, and/or operate and maintain other projects not identified in the plan or projects built by others such as McMicken Dam, and that with time the expenditure of operation funds would increase.

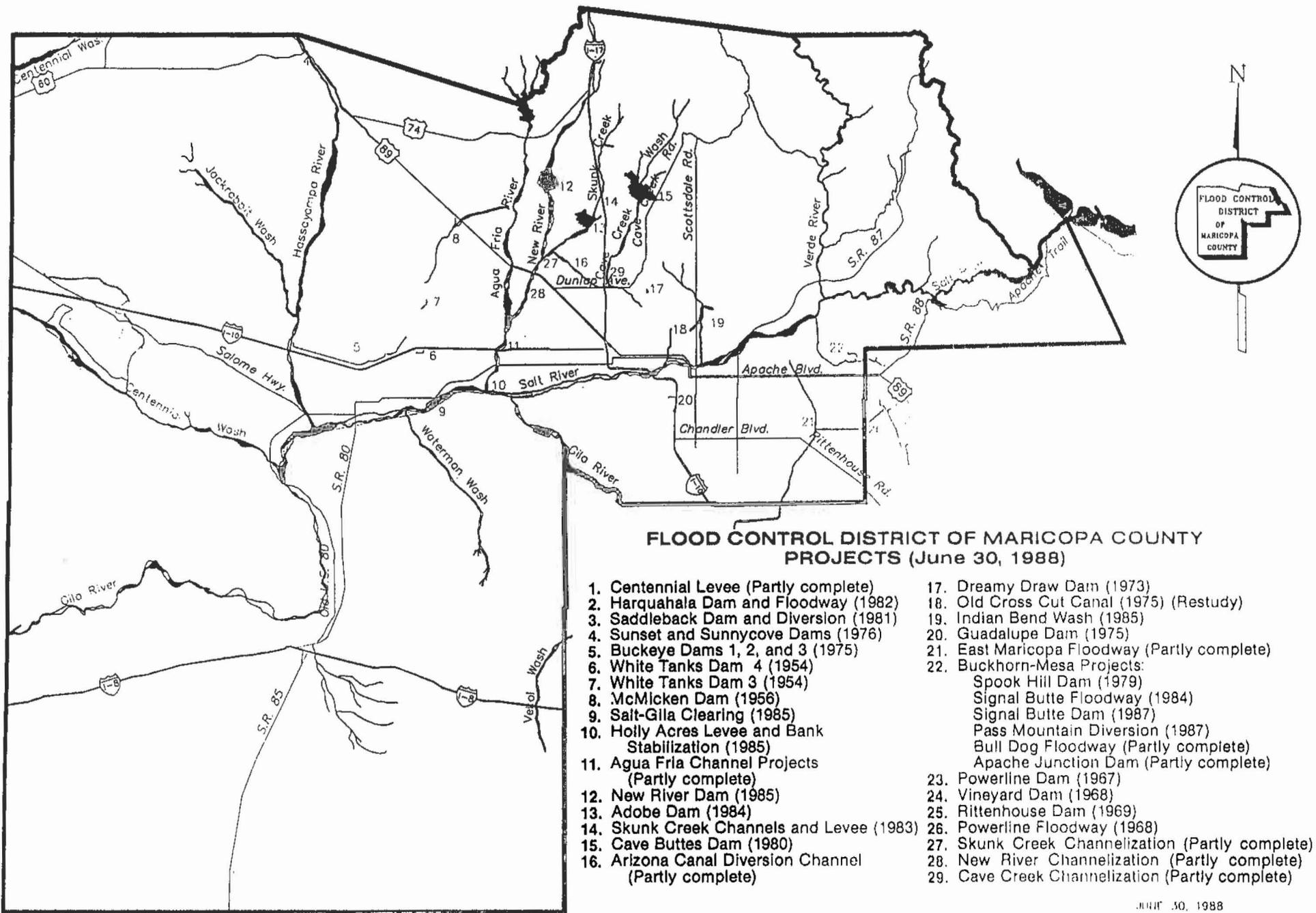
Since 1963 the character of Maricopa County and the District has changed considerably. Presently the population is 2,069,000 versus 614,000. The District's authority is now vested in ARS 48, Chapter 21. Non-structural flood control programs are used in conjunction with structural solutions. The District operates and maintains over 40 flood control facilities (see Figure 1). Annual tax revenues have increased from \$250,000 in 1961 to \$45,000,000 in 1989. The District has constructed entirely or in part 15 of the 40 projects identified in 1963, 5 projects have been incorporated into other projects or eliminated, and 20 other projects have not been constructed.

However two things have not changed. Maricopa County will continue to see rapid long term growth resulting in future flooding potential. Second a number of flooding problems identified in 1963 have not been resolved.

The objectives of this report are:

1. Update and review the Comprehensive Flood Control Program Report of 1963.
2. Provide a prioritized grouping of projects identified in 1963 that warrant consideration.
3. Define the mechanisms that will allow this report to grow leading to a 1991 comprehensive plan that will include structural and non-structural projects for the District.

Figure 1



STATUS OF 1963 RECOMMENDATIONS

The following are the project groups identified in 1963, with the current status of each project. Project summaries 1963 - 1989, and costs are contained in Appendix A.

1963 RECOMMENDATION

Group No. I - Projects Recommended for Immediate Construction

PROJECT	STRUCTURE TYPE	89' STATUS	PROJECT	STRUCTURE TYPE	89' STATUS
Gillespie Dam to 107th Ave.	Channel Clearing	complete	Dam NW of Adobe (Adobe dam)	Earth Dam	complete
Lower Indian Bend	Floodway Channel	complete	Dreamy Draw	Earth Dam	complete
Agua Fria, New River, & Skunk Cr (replaced by channels, levees & easmnts.)	Channel Clearing	complete	Arizona Canal-Cave Cr. to Skunk Cr. (ACDC reach 1 & 2)	Channel	complete
North Mt.-Arizona Canal (replaced by ACDC 3-4)	Channel	complete	Glendale-Peoria Drain	Lined Channel	not complete
New River NW of Glendale (New River Dam)	Earth Dam	complete	Bender & Sand Tanks Washes Gila Bend	Levees	not complete
Cassandro Wash	Earth Dam	not complete	Buckhorn-Mesa	Levees & Channels	complete
Lower Cave Cr. Dam (Cave Buttes Dam)	Earth Dam	complete	Union Hills Diversion	Lined Channel	not complete
Maryvale-Glendale Drain	Lined Channel	not complete	Sunset & Sunny Cove Washes	Earth Dams	complete

1963 RECOMMENDATION

Recommended Projects Group II - Subject to Availability of Funds

PROJECT	STRUCTURE TYPE	89' STATUS	PROJECT	STRUCTURE TYPE	89' STATUS
Apache Junction-Gilbert (Powerline FRS, EMF reach 5-6)	Levees & Channels	complete	Buckeye-Palo Verde (Buckeye #1-#3)	Levees & Channels	complete
Mesa-Chandler-Gilbert (Replaced by Price Drain)	Channel	complete	Williams-Chandler (Ritten House, Vineyard, EMF)	Levees & Channels	complete
W. Phoenix-Maryvale	Channel	not complete	North Phx.Mt.-Old Cross-Cut Canal	Channel	not complete

1963 RECOMMENDATIONS

Recommended Projects Group III - Subject to Availability of Funds

PROJECT	STRUCTURE TYPE	89' STATUS	PROJECT	STRUCTURE TYPE	89' STATUS
Sols Wash	Channel Alignment Bank Stabilization	not complete	Salt River, Granite Reef to 107th Ave.	Lined Channel	not complete
Cave Creek Town	Earth Levee	not complete	Powder House Wash	Earth Dam	not complete
Maxwell Dam (Flood Control)	Earth Dam	not complete	Queen Creek Fldwy. (Replaced by EMF 1-2)	Channel	complete
Old Cave Creek Dam (Replaced by Cave Buttes Dam)	Levee	complete			

1963 RECOMMENDATION

Group IV - Projects Deferred as not Feasible at that time

PROJECT	STRUCTURE TYPE	89' STATUS	PROJECT	STRUCTURE TYPE	89' STATUS
Flying "E" Wash Wickenburg	Earth Dam	not complete	Santan Watershed	Levees & Channels	not complete
Guadalupe Wtrshed	Levees & Channels	complete	Harquahala Valley	Levees & Channels	complete
South Mountain, 40th St. to 75th Ave.	Levees & Channels	not complete	Tonopah & Winters Valleys	Levees & Channels	not complete
Indian Bend Wash Above Ariz Canal	Channels	complete	Sols Wash (Matthia Dam)	Earth Dam	not complete
Eagle Tail Mt.	Levees & Channels	not complete	Box Canyon	Earth Dam	not complete
Upper New River	Dam	not complete			

PROJECT RECOMMENDATIONS 1989

The 20 projects that were not built were evaluated by five criteria: 1) 1963 B/C ratio, 2) urban pressures, 3) ADOT activity, 4) flooding problems, and 5) is a solution still possible or needed. A detailed breakdown of project specific ratings is in Appendix B. Based upon this evaluation the projects were grouped as follows:

Priority 1 Project Recommendations

Union Hills Diversion	San Tan Watershed
Glendale-Peoria Drain	Cassandro Wash
Maryvale-Glendale Drain	West Phoenix Maryvale
South Mountain Diversion	Powder House Wash Dam
Salt River channelization	North Phoenix- Old Crosscut

### Priority 2 Project Recommendations

---

Bender and Sand Tank Washes		Eagle Tail Mountain
Box Canyon		Flying E Wash
Sols Wash Channel Stabilization		Cave Creek Town Dike

### Projects Recommended for deletion

---

Tonapah-Wintersburg Valley		Upper New River Dam
Matthie Dam		Maxwell Dam (Orme Dam)

### FUTURE EFFORTS

The projects identified in this status report will be analyzed by the District's Planning and Project Management Division. The Project Planning Branch is responsible for an in depth feasibility study for each of the projects identified as a "priority 1" project.

For each of the projects that are favorably evaluated, Planning and Project Management will proceed with project implementation through the Project Planning Branch and Project Management Branch. Implementation will include but not be limited to preliminary benefit/cost ratios developed for each alternative that warrants further consideration, identification of potential partners interested in project participation, the management of project and design studies, incorporation of these projects into the five year capital improvement budget, the development of land acquisition schedules, and coordination of all project activities. The Planning and Project Management Division will be assisted as required by all other divisions of the District.

The Watershed Management Branch, of the Hydrology Division, will prepare a list of known flooding problems for each of the 35 watersheds (see Figure 2). These watershed boundaries with some modification follow the boundaries used in the 1963 Comprehensive Plan. From their analysis they will suggest alternative structural and non-structural solutions for each problem. The problem definition phase will include the development and/or use of watershed hydrology, floodplain mapping, flood damage reports, and other sources from which to assess potential flood damages.

The final draft of this updated Comprehensive Plan will be ready by the summer of 1991. The Comprehensive Plan will be updated every 5 years.



APPENDIX A.

TABLE OF CONTENTS

<u>PROJECT</u>	<u>Page</u>
Salt River Channel.....	A-1
Sols Wash Channel.....	A-1
Powder House Wash.....	A-2
Casandro Wash Dam.....	A-2
Sunset and Sunny Cove Dams.....	A-2
Buckeye Retarding Structure and Floodway.....	A-3
Bender and Sand Tanks Improvements.....	A-3
Deer Valley Group.....	A-4
North Phoenix Mountains Diversion.....	A-4
Arizona Canal Diversion.....	A-4
Union Hills Diversion.....	A-4
New River Dam.....	A-4
Adobe Dam.....	A-5
Lower Cave Creek Dam (Cave Buttes Dam).....	A-5
Channel Clearing: Agua Fria, New River and Skunk Creek.....	A-5
West Phoenix Floodways.....	A-6
Glendale-Peoria Drain.....	A-6
Maryvale-Glendale Drain.....	A-6
West Phoenix-Maryvale Drain.....	A-6
Old Cave Creek Dam.....	A-6
Cave Creek Town Dike.....	A-7
Lower Indian Bend Channel.....	A-7
Maxwell Dam.....	A-7
Apache Junction-Gilbert Structures.....	A-8
Buckhorn-Mesa Structures.....	A-8
Mesa-Chandler-Gilbert Floodways.....	A-9
Williams-Chandler Structure.....	A-9
Queen Creek Floodway.....	A-9
Harquahala Valley Structures.....	A-10
Tonopah Structures.....	A-10
Eagle Tail Mountain Structures.....	A-10
Matthie Dam.....	A-11
Flying "E" Wash Dam.....	A-11
South Mountain Structures.....	A-11
Upper Indian Bend Channel.....	A-11
Guadalupe Retarding Structure and Floodways.....	A-12
Box Canyon Dam.....	A-12
Santan Structures.....	A-12

APPENDIX A.

**Salt River Channel**

1963 -- was to be studied by the Corps of Engineers

- a. Construct short levees along Salt River between 40th Street in Phoenix, and to Tempe Butte in Tempe. Includes channel clearance along Gila and Salt River from Gillespie Dam to Granite Reef Dam.
- b. As an alternate to the plan above, the Flood Control District recommends the following: channel clearing from Gillespie Dam to 107th Avenue and a lined channel from this point up the river to Country Club Drive in Mesa, then clearing on to Granite Reef Dam.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
1	Gillespie Dam to 107th Ave.	Channel Clearing	250,000	1,000,000	1,250,000	141,600	80,800	1.75/1.00
31	Salt River, Granite Reef to 107th Ave.	Lined Channel	2,679,000	30,261,000	32,940,000	1,800,000	1,300,000	1.38/1.00

1989 -- The clearing project has been implemented and a maintenance program has been established. The concrete lined channel has not been constructed. Major bank stabilization has occurred or is proposed in the reach from I-10 to Mill Avenue. The City of Tempe is planning the Tempe Rio Salado project which would modify plans to stabilize the banks. The Salt River Indian Community has developed plans to channel the Salt between Granite Reef and Tempe. The Corps is analyzing the feasibility of developing a river master plan.

**Sols Wash Channel**

1963 -- was to be studied by FCD.

- a. Plan calls for channel clearing and excavation beginning at Highway U.S. 89 and extending west to Flying "E" Wash; thence up Flying "E" Wash to a point above the country club.
- b. Channel clearing will consist of removal of all brush, trees and debris.
- c. Excavation will consist of digging a pilot channel for the total length of clearing.
- d. Total planned channel work will cover approximately 2 miles.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7	Sols Wash	Channel Alignment & Protection	40,000	-0-	40,000	2,500	2,000	1.25/1

1989 -- There has been no action taken on this project. Vegetative growth has taken place in the channel as well as development along the banks. Lower portions of Sols Wash has had bank stabilization that has failed during past flow events. A recent flood insurance study identified several areas where Sols Wash would break out of the main channel into developed areas. Local officials should be contacted.

**Powder House Wash**

1963 -- Studied by COE

- a. Construction of an earth-fill dam on the wash northeast of Wickenburg. Dam will be approximately 35 feet high and store 150 acre feet of flood water.
- b. Related outlet works and emergency spillway.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7	Powder House Wash	Earth Dam	50,000	82,000	132,000	10,000	5,600	1.79/1.00

1989 -- No action has been taken. Development has occurred in the floodplain. Wash has a very high sediment load and is unstable. Existing development is at risk.

**Casandro Wash Dam**

1963 -- FCD Project

- a. Construction of an earth-fill dam across the wash north of U.S. Highway 60-70 and just west of the city of Wickenburg. Maximum height of the dam will be 34 feet and planned flood water storage is 90 acre feet.
- b. Related outlet works and emergency spillway.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7	Casandro Wash	Earth Dam	60,000	-0-	60,000	4,500	2,500	1.80/1.00

1989 -- No action has been taken. In 1980 the Community Development Agency for the County conducted a study recommending construction of the dam. Wash is heavily developed. Streets form the channel for the wash. Extensive flooding does occur.

**Sunset and Sunny Cove Dams**

1963 -- FCD Project

- a. Construction of an earth-fill dam on each of these two small washes. Height of these dams are approximately 20 ft. and total storage of both reservoirs is 137 acre feet.
- b. Related outlet works and emergency spillway.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7	Sunset & Sunny Cove Washes	Earth Dams	79,000	-0-	79,000	6,200	3,500	1.77/1.00

1989 -- Both Dams have been constructed.  
 Date of Final Acceptance: September 15, 1976 (Sunny Cove)  
 Date of Final Acceptance: September 15, 1976 (Sunset)  
 Development is ongoing upstream and downstream of the dams. Need to maintain the conveyance corridors into and out of the structures. Currently proposed flood plain delineations will maintain 100 year floodplains.  
 Discharges from spillways need to be studied.

**Buckeye Retarding Structure and Floodway**

1963 -- Were to be studied by SCS

- a. Plan calls for construction of a system of channels, retarding structures and a diversion to carry flood water to the Hassayampa River.
- b. There will be two retarding structures approximately 12 miles long. Maximum height of the dams will be 25 feet and total storage will be 5560 acre feet.
- c. In conjunction with the retarding structures, two floodways and one diversion will be constructed.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
9	Buckeye-Palo Verde	Levees & Channels	776,000	2,986,000	3,762,000	175,000	128,000	1.40/1.00

1989 -- structures have been constructed  
 Final Acceptance Date 1974 (Buckeye FRS #1)  
 Final Acceptance Date March 28, 1975 (Buckeye FRS #2)  
 Final Acceptance Date March 1975 (Buckeye FRS #3)  
 Hydrology needs to be generated for these structures. Structures should be analyzed for compliance with state dam safety hydrology criteria.

**Bender and Sand Tanks Improvements**

1963 -- Were to be studied by the COE

- a. Construction of approximately 2.5 miles of dikes along each side of each wash to guide flood water into the proposed channels.
- b. Channelization of Bender & Sand Tank Washes to make their capacity adequate to carry designed flows. Total length of channel: 1.5 miles. Design capacity: 6,000 cfs.
- c. Relocation of present siphon in Bender Wash. Redesign will allow irrigation water to pass under the wash.

Drnge Area	Location	Job description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
12	Bender & Sand Tanks Washes							
	Gila Bend	Levees	152,000	114,000	266,000	12,500	10,700	1.16/1.00

1989 -- No action has taken place. I-8 has been constructed. Major floodplains have been delineated that are in question. Hydrology and hydraulics need to be restudied before project can be evaluated.

**Deer Valley Group**

1963 -- Deer Valley Group

- a. **North Phoenix Mountains Diversion** - Construction of a channel from 20th St. to Cave Creek, parallel to the Arizona Canal Diversion and eventually into Skunk Creek. Construction of a lined channel with inlet and outlet structures, from 38th St. to 48th St., parallel to Arizona Canal for disposal of flood waters to the Salt River through the old Cross-Cut Canal. Cost planning is based on the U.S. Corps of Engineers contributing in the total cost. If they do not, then the Flood Control District will either have to support the complete project or build it jointly with the city of Phoenix.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
22	North Mt.-Arizona Canal, 20th St. to 23rd Ave.	Construct Channel	1,400,000	1,926,000	3,326,000			

- b. **Arizona Canal Diversion** - construction of a channel parallel to Arizona Canal from Cave Creek west to Skunk Creek. Channel will be lined with an inlet structure at Cave Creek about .5 mile west of 19th Ave.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
22	Arizona Canal-Cave Cr. to Skunk Cr.	Divert flood water North of Canal	944,000	7,060,000	8,004,000			

1989 -- Date of Final Acceptance: Anticipated project completion 1992. Channel is constructed for 100 year capacity. Areas along the channel need to be modified to accept sheetflow from a 100 year event. Hydrology should be modified to assess the impacts of channelization, storm drains and increased urbanization on channel performance.

- c. **Union Hills Diversion** - construction of a lined channel beginning at 36th St. between Bell Rd. and Union Hills Dr. running generally west to empty into Skunk Creek. Channel to be concrete-lined, and have inlet structures.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
22	Union Hills Diversion	Lined Channel	500,000	1,500,000	2,000,000			

1989 -- No action taken. ADOT is planning outer loop 1 mile to the north. Phoenix is proposing master drainage plan for Scatter Wash east of I-10. Benefits can be derived for all through unified drainage system in this area.

- d. **New River Dam** - an earth-fill dam located on New River in Sec. 26, T5N, R1E, approximately 8 miles northwest of Adobe. Dam will contain 1,300,000 cu. yds. of fill and store 33,500 acre feet of water. Related outlet and emergency spillway included.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
8	Upper New River	Earth Dam Channel	50,000	450,000	500,000			

1989 -- Date of Final Acceptance: February 1985

- e. Adobe Dam - an earth-fill dam located in T5N, R2E, Secs. 27 and 34. Reservoir will store approx. 13,000 ac.ft. of flood water and dam will contain 1,600,000 cu. yds. of fill. Outlet works and emergency spillway will be included.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
22	NW of Adobe	Earth Dam	832,000	2,301,000	3,133,000			

1989 -- Date of Final Acceptance: May 6, 1982. Major channelization is taking place adjacent to the Skunk Creek Landfill to the North. Possible project would be to channel to the reservoir.

- f. Lower Cave Creek Dam (Cave Buttes Dam)-An earth-fill dam on Cave Creek in Sec. 15, T4N, R3E, approx. 4 miles north of Bell Rd., will contain approx. 4,000,000 cu. yds. of fill and store 22,000 ac. ft. of water at spillway crest. Total surface area: approx. 700 acres. Outlet and emergency spillway will be included.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
22	Lower Cave Cr. Dam Site	Earth Dam	871,000	5,824,000	6,695,000			

1989 -- Structure complete. Phoenix is in process of master planning Phoenix Area C & D upstream of the reservoir. Subtle watershed divides on the east boundary should be monitored to assure that new development is not diverting additional flows to the structure. Watershed conditions will change rapidly.

- g. Channel Clearing: Agua Fria, New River and Skunk Creek - will consist of clearing brush and alignment of channels where needed in order to have them ready to receive flood waters introduced from Cave Creek and North Phoenix areas. All necessary structural works will be included.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
19	Agua Fria, New							
23	River, & Skunk Cr.	Channel Clearing	250,000	1,000,000	1,250,000			
22	64th St. to New River	Total Deer Valley	7,717,000	21,913,000	29,630,000	2,232,000	1,296,000	1.72/1.00

1989 -- Project has been modified due to the purchase of flowage easement for the Phoenix and Vicinity Including New River Project, or due to channelization or the construction of levees.

**Dreamy Draw**

1963 -- was not included specifically in any study area

Drnge Area	Location	Job Description	COSTS			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
25	Dreamy Draw	Earth Dam	150,000	300,000	450,000			

1989 -- Current hydrologic and hydraulic model for the facility is not available. Corps is investigating channelization downstream of the Dam.

**West Phoenix Floodways**

1963 -- A series of channels on the west side. Cost planning is based upon participation by the Corps.

- a. **Glendale-Peoria Drain:** Plan consists of a lined channel, trapezoidal in shape, with 2:1 side slopes, from 35th Ave. and 1/4 mile south of Olive Ave. running westerly for 3 3/4 mi. then southerly 1 mi., then westerly about 4 1/2 mi. to New River.
- b. **Maryvale-Glendale Drain:** A lined channel running from Grand Canal 1/2 mi. west of 67th Ave. southerly approx. 7 1/2 mi. to the Salt River.
- c. **West Phoenix-Maryvale Drain:** Planned to run from 47th Ave. at Grand Canal south to Thomas Rd., then southerly 5.3 miles to the Salt River.

Drnge Area	Location	Job Description	COSTS			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
22	Glendale-Peoria Drain	Lined Channel	426,000	2,552,000	2,978,000	166,000	113,000	1.46/1.00
22	W. Phoenix-Maryvale	Channel	337,000	2,205,000	2,542,000	141,000	97,000	1.46/1.00
22	Maryvale-Glendale Drain (1963 Flood)	Lined Channel	320,000	1,462,000	1,782,000	99,000	68,000	1.46/1.00

1989 -- ADOT has proposed a north south freeway alignment in the vicinity of 51st avenue. This alignment is between the alignments proposed for the W. Phoenix-Maryvale and Maryvale-Glendale projects. The District should consider merging these two projects and initiating discussions with ADOT for a joint project.

**Old Cave Creek Dam**

1963 -- Studied by COE

- a. **Alternate No. 1:** building an earth dike 2900 ft. long across the natural spillway, and construction of a new spillway on the west side of the old dam.
- b. **Alternate No. 2:** construction of an earth-fill dam across the natural spillway as above. An apron will be poured below the old concrete dam and flood water will flow over the dam during floods.

Drnge Area	Location	Job Description	COSTS			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
24	Cave Creek Dam (Old)	Levee	65,000	91,000	156,000	10,200	8,200	1.24/1.00

1989 -- Cave Buttes Dam has been constructed thus eliminating the need for this project.

**Cave Creek Town Dike**  
 1963 -- Studied by COE

- a. Plan consists of constructing approx. 800 ft. of earth dike with rock revetment on the wash about one-half mi. east of the town of Cave Creek.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7	Cave Creek Town	Earth Levee	3,000	12,000	15,000	1,000	840	1.19/1.00

1989 -- Current floodplain delineation does not indicate a breakout. Site should be inspected to assure that erosion and streambed meander will not result in a diversion of flows. Stabilization of the area may be necessary to maintain existing flow path.

**Lower Indian Bend Channel**

1963 -- Approved by COE

- a. Plan is to construct a lined channel, trapezoidal in section, from Arizona Canal at Indian Bend running southerly to and entering Salt River about .5 mi. east of Scottsdale Rd.
- b. Bottom width is 14 ft. and depth varies from 23 to 26 ft. with a crossing structure over Arizona Canal and an energy dissipating structure at Salt River.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
27	Lower Indian Bend	Floodway Channel	1,770,000	7,250,000	9,020,000	530,000	348,000	1.52/1.00

1989 -- Is complete and maintained by the City of Scottsdale. Hydrology and hydraulics need to be assessed to assure conveyance capacity is maintained. ADOT will modify lower end of Indian Bend Wash with new freeway system.

**Maxwell Dam**

1963 -- study by Flood Control

- a. Construction of an earth-fill dam raising 169 ft. above the streambed with a crest length of 5200 ft. Reservoir will store approx. 1,250,000 ac. ft., with 890,000 ac. ft. assigned to flood water storage.
- b. Spillway and related inlet and outlet structures are to be included.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
31	Maxwell Dam (Flood Control)	Earth Dam	650,000	5,050,000	5,700,000	369,000	276,000	1.34/1.00

1989 -- Dam was renamed Orme Dam which lost congressional support, and was replaced by Plan 9 which will lead to the modifying existing dams on the Salt and Verde.

**Apache Junction-Gilbert Structures**

1963 -- Under SCS Study

- a. Construction of one retarding basin and 14.8 miles of floodways.
- b. Retarding structure will be built south of U.S. Highway 60-70-80-89 and west of Vineyard Rd. Total storage capacity: 4,135 ac. ft. with 3,960 reserved for flood storage. Dam will be 3.9 miles long, 25 ft. high.
- c. Floodways will be constructed to safely carry the water to Queen Creek. Max. capacity: 2,550 cfs.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
32	Apache Junction-Gilbert	Levees & Channels	1,209,000	3,803,000	5,012,000	276,700	198,000	1.40/1.00

1989 -- Powerline FRS and Powerline floodway are constructed, Upper portion of EMF will be complete by June 1989. Need to modify structures as development occurs upstream and downstream to meet dam safety requirements for hydrology. Powerline Dam presently meets dam safety hydrologic criteria although it is anticipated that a minor spill will occur in the 100 year flood. However, as the lower watershed develops dam safety hydrologic criteria will than be increased to pass the full PMF without overtopping. The structure will not meet this higher regulatory level. Also the spillway outlet channel may not have sufficient capacity to pass emergency spills as designed. A dam on Weekes Wash would not significantly improve the hydrologic conditions at the Powerline FRS for the extreme events. Powerline floodway capacities should be evaluated for sufficient capacity to pass 100-year discharges from Powerline and Vineyard Structures.

**Buckhorn-Mesa Structures**

1963 -- Under SCS Study

- a. The overall plan for flood control will include four floodway retarding structures and 8.1 miles of floodways. Total length 11.2 mi.; max. ht.: varies from 15.5 to 41. feet.
- b. A debris basin and diversion box will be included to properly utilize the floodwater for irrigation purposes.

(The above plan as recommended includes Weekes Wash retarding structure and floodway. While these are considered to be necessary in the watershed plan, the Flood Control Engineer does not recommend that Maricopa County contribute the local share of funds. The greatest benefits do not accrue to developments within the County. If the rights of way and other local costs were borne by local interests, then these structures could be built.)

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
32	Buckhorn-Mesa	Levees & Channels	3,574,000	3,855,000	7,429,000	500,000	281,000	1.78/1.00

1989 -- All structures except Weekes Wash FRS were built. A hydrologic and hydraulic model of system needs to be developed to monitor hydrologic integrity of system. The Spook Hill outlet channel requires an improved culvert system at Bush Highway. The system outlets upstream of Granite Reef Dam, the District must be cognizant of potential water quality conflicts with the discharge of this system into SRP waters. Area below emergency spillways is rapidly developing. ADOT has plans to construct Red Mountain Freeway in the vicinity of and on these structures.

**Mesa-Chandler-Gilbert Floodways**

1963 -- Urban Storm Drain

- a. A system of channels eventually emptying into the Gila River. Channels, leading from the above cities, are designed for a 5-year frequency flood.
- b. Total length: 29 miles; average bottom width: 10 ft.; average depth: 10 feet.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
32	Mesa-Chandler-Gilbert	Channel	3,000,000	-0-	3,000,000	259,500	122,400	2.11/1.00

1989 -- Has been replaced by the Price Road Drain.

**Williams-Chandler Structure**

1963 -- Under SCS Study

- a. Two floodwater retarding structures, 9.2 mi. of floodway construction and one irrigation water turnout with gates.
- b. Total length: 9 mi.; average height: 22 ft. dams.
- c. Floodway length: 9.2 miles; capacity adequate to handle floodwaters released from the retarding structure.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
32	Williams-Chandler	Levees & Channels	837,000	3,738,000	4,575,000	326,000	189,000	1.73/1.00

1989 -- Vineyard and Rittenhouse FRS have been built. Dam safety issues are currently being studied.

**Queen Creek Floodway**

1963 -- FCD Project-Aid expected from U.S. Bureau of Indian Affairs

- a. Overall plan a channel to pick up flood water near the end of the RWCD Canal at the Maricopa-Pinal County line and take it through the Gila Indian Reservation and into the Gila River.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
33	Queen Creek	Channel	920,000	880,000	1,800,000	90,000	72,000	1.25/1.00

1989 -- This portion of the EMF is complete. Need to maintain design integrity by regulating flows into structure. Need to finalize the hydraulic and hydrologic models that impact the structure.

**HARQUAHALA VALLEY STRUCTURES**

1963 -- To be studied by SCS

- a. A levee approximately 10 miles long, parallel to the 1400-ft. contour line from the west side of Range 10 West approximately in the center of Township 3 North, then east to Gin Road.
- b. Improvements of the channel along Gin Road to carry released flood water to Centennial Wash.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
4	Harquahala Valley	Levees & Channels	400,000	3,770,000	4,170,000	70,000	171,000	0.41/1.00

1989 -- The structures have been complete. Need to generate hydrology and hydraulics for the structures.

**TONOPAH STRUCTURES**

1963 -- To be studied by SCS

- a. A levee approx. 12 miles long along the 1200 ft. contour beginning in Sec. 17, T2N, R7W, and extending to Sec. 16, T2N, R5W.
- b. Channel improvements in Winters Wash to make it adequate to carry the designed release flow.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
4	Tonopah & Winters Valleys	Levees & Channels	120,000	1,950,000	2,070,000	50,000	85,000	0.60/1.00

1989 -- No action has taken place. Need to generate hydrology and determine flooding problems.

**EAGLE TAIL MOUNTAIN STRUCTURES**

1963 -- To be studied by SCS

- a. A dike beginning in Sec. 26, T2N, R11W, and running along the 1400-ft. contour in Sec. 1, T1S, R10W, Total length: 14 miles.
- b. A floodway to be built, beginning in Sec. 1, T1S, R10W, and running easterly along section line intersecting Centennial Wash. Old channel to be enlarged.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
4	Eagle Tail Mt.	Levees & Channels	700,000	1,849,000	2,549,000	70,000	112,000	0.63/1.00

1989 -- Structure has not been built. Distribution system for the Irrigation District has been completed since initial damages were developed. Irrigation system was designed to handle drainage from a 25 year event.

**MATTHIE DAM**

1963 -- Studied for Recreation

- a. An earth-fill dam located on Sols Wash approx. 8 miles west of Wickenburg. Max. dam ht.: 70 ft.; total surface area: 500 acres.

Drnge Area	Location	Job Description	COSTS			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7	Sols Wash (Matthie Dam)	Earth Dam	500,000	556,000	1,056,000	11,000	43,000	0.26/1.00

1989 -- Structure is somewhat remote from Wickenburg, benefits are not self evident. Areas of inundation are indicated on the current flood insurance maps for the area.

**FLYING "E" WASH DAM**

1963 --

- a. An earth-fill dam south of U.S. Highway 60-70, west of Wickenburg. Approx. ht.: 33 ft.; capacity: 335 ac. ft.

Drnge Area	Location	Job Description	COSTS			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
7		Earth Dam	-0-	183,000	183,000	4,500	7,200	.62/1

1989 -- New development has occurred along the wash. A floodplain delineation is proposed in the near future. Project can be analyzed after this information is generated.

**SOUTH MOUNTAIN STRUCTURES**

1963 -- To be referred to SCS

- a. An unlined channel, trapezoidal in section, parallel to Highline Canal on the south side, from 48th St. west to the Indian Reservation boundary and then to Salt River.
- b. A dam west of Guadalupe and one near 43rd Ave., with related inlet and outlet control work as required.

Drnge Area	Location	Job Description	COSTS			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
26	South Mountain, 40th St. to 75th Ave.	Levees & Channels	2,652,000	6,251,000	8,903,000	253,000	351,000	0.72/1.00

1989 -- Area is developing north of South Mountain. Drainage flowpaths are not being maintained. Project could be a joint project with ADOT to tie into the southwest loop freeway.

**UPPER INDIAN BEND CHANNEL**

1963 -- To be studied by COE

- a. An unlined channel from Cholla Road and 36th St. to Arizona Canal below Indian Bend Road, joining lower Indian Bend Channel at the Canal.
- b. Install box culverts to accommodate low flows and wide sections at half-mile roads.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
28	Indian Bend Wash Above Arizona Canal	Channels	1,217,000	1,701,000	2,918,000	76,000	124,400	0.61/1.00

1989 -- Date of Final Acceptance: October 1977.

**GUADALUPE RETARDING STRUCTURE and FLOODWAYS**

1963 --

- a. Three levees of varying lengths; average ht.: 15 ft.; total storage: 1170 ac. ft.
- b. Four floodways in conjunction with retarding structures to take floodwater to Gila River, Channels to be concrete-lined and have adequate capacity to carry maximum flow for the retarding structures.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
26	Guadalupe Watershed	Levees & Channels	519,000	660,000	1,179,000	45,450	60,600	0.75/1.00

1989 -- Date of final acceptance Guadalupe FRS April 1975. Flood retarding structure built although system outlet is north into the Highline canal. Structures to the south have been somewhat incorporated into ADOT facilities for I-10.

**BOX CANYON DAM**

1963 -- To be Studied by COE

- a. An earth-fill dam across the Hassayampa River, height approx. 246 ft.; storage capacity: 200,000 ac. ft.
- b. Related outlet works to provide for flood control and domestic water.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
6	Box Canyon	Earth Dam	652,000	6,948,000	7,600,000	290,000	325,000	0.90/1.00

1989 -- No action has been taken on structure. Areas that structure would protect are defined on most current flood insurance study. Still discussion by local officials of possible construction.

**SANTAN STRUCTURES**

1963 -- To be studied by SCS

- a. A system of retarding structures and floodways to intercept and carry the floodwater to Queen Creek.
- b. Four levees and four floodways; total length: approx. 7.3 mi. for levees with height of 18 ft. Length of floodways: 6.1 mi.; capacity: 400 cfs.

Drnge Area	Location	Job Description	----- COSTS -----			Annual Benefits	Annual Costs	B/C
			FCD	Other	Total			
33	Santan Watershed	Levees & Channels	895,000	2,678,000	3,573,000	100,000	145,000	0.70/1.00

1989 -- No action has been taken. Increased urbanization has occurred in watershed. Queen Creek and Sanoqui Wash floodplains are quite wide. Significant flooding has occurred along Hunt Highway. Gilbert has annexed part of the areas that would be protected.

APPENDIX B

TABLE OF CONTENTS

<u>PROJECT</u>	<u>Page</u>
Criteria of Evaluation.....	B-1
Union Hills Diversion.....	B-1
Maryvale-Glendale Drain.....	B-1
Glendale-Peoria Drain.....	B-1
Cassandro Wash.....	B-1
Bender and Sand Tank Wash.....	B-2
West Phoenix Maryvale.....	B-2
North Phoenix - Old Crosscut.....	B-2
Sols Wash Channel Clearing and Stabilization.....	B-2
Powder House Wash Dam.....	B-2
Salt River (Granite Reef to 107th lined Channel).....	B-3
Cave Creek Town Dike.....	B-3
Maxwell Dam: Earth Dam.....	B-3
Flying "E" Wash: Earth Dam.....	B-3
South Mountain Diversion.....	B-3
San Tan Watershed.....	B-3
Tonopah-Wintersburg Valley.....	B-4
Eagle Tail Mountain.....	B-4
Box Canyon.....	B-4
Sols Wash (Matthie Dam).....	B-4
Upper New River Dam.....	B-4

APPENDIX B

PROJECT EVALUATION OF UNBUILT PROJECTS

CRITERIA OF EVALUATION:

- \* Past B/C Ratio
- \* Urban Pressures
- \* ADOT Activity
- \* Flooding Problems
- \* Is Solution Still Possible/Needed

**Union Hills Diversion**

B/C = 1.72/1 -> Part of Deer Valley Package  
Urban Pressure = Potential corridors are being built out  
ADOT = Loop 101 1 mile north  
Exist Prob = Yes/lack of outfall  
Still Possible = Yes/ project could alleviate flooding from  
Scatter Wash, Phx proposing projects in area

**Maryvale-Glendale Drain (67th Ave Grand Canal to Salt River )**

B/C = 1.46/1  
Urban Pressure = Part of Estrella master plan.  
Expect 20 year build out.  
ADOT = 1 mile - 2 miles East on north 59th Ave.  
Exist Prob = North of I-10 most corridors fully built out/  
still ponding behind Grand Canal/  
Possible small outlet (Storm Drain to ADOT  
channel)  
South of I-10 - plenty of open land. Area  
suffers from lack of drainage outfall to river.  
Still possible = Yes, (especially south of I-10)

**Glendale-Peoria Drain (35th ave. to New River along Olive ave.)**

B/C = 1.46 to 1  
Urban Pressure = yes  
ADOT = might be possible to tie into Agua Fria  
freeway drainage channel  
Exist = provides outfall from Grand Ave., and for general area  
Possible = Yes

**Cassandro Wash**

B/C = 1.8/1 1963, 1.24/1 1980  
Urban Pressure = Static, fully developed  
ADOT = No  
Exist Flooding = Downstream community damages  
Possible = Yes

**Bender and Sand Tank Wash**

B/C = 1.16/1  
Urban Pressure = No  
ADOT = I-8 crosses both washes  
Exist Problem = unknown  
Possible = Yes

**West Phoenix Maryvale**

B/C = 1.46/1  
Urban Pressure = Part of Estrella master plan.  
Expect 20 year build out.  
ADOT = 1 mile - 2 miles west on north 59th Ave.  
Exist Prob = North of I-10 most corridors fully built out/  
still ponding behind Grand Canal/  
Possible small outlet (Storm Drain to ADOT  
channel)  
South of I-10 - plenty of open land. Area  
suffers from lack of outfalls. Still possible  
Still possible = Yes, (especially south of I-10)

**North Phoenix - Old Crosscut**

B/C = 1.72/1 -> Part of Deer Valley Group  
Urban Pressure = Developed Watershed  
ADOT = Build an adjoining channel for Squaw Peak Parkway  
Still possible = Yes, study currently under way

**Sols Wash Channel Clearing and Stabilization**

B/C = 1.25:1  
Urban Pressure = Development stable but on banks of  
Sols Wash  
ADOT = No  
Existing Problem = Unstable banks along developed areas  
and railroad  
Solution Possible = Yes

**Powder House Wash Dam**

B/C = 1.79  
Urban Pressure = Extensive development at U.S. 60  
ADOT = No  
Existing Problems = unknown level of severity but high  
potential  
Solution possible = yes

**Salt River (Granite Reef to 107th) lined channel)**

B/C - N.A.

Urban Pressure - continual encroachment of floodway  
anticipated

ADOT - currently is channelizing part of the reach

Problem Exist - Yes

Solution Possible - Probably not as envisioned but FCD should  
continue with river master plan.

**Cave Creek Town Dike**

B/C - 1.19:1

Urban Pressure - Yes

ADOT - No

Problem Exist - No (FIS shows River contained)

Solution - Possible bank protection required.

**Maxwell Dam: Earth Dam**

B/C - 1.34/1.00

Urban Pressure - upstream of metropolitan Phoenix

ADOT - No

Problem Exists - yes

Solution needed - replaced by Plan 9 of CAWCS Study

**Flying "E" Wash: Earth Dam**

B/C - .62:1

Urban Pressure - growth occurring in floodplain

ADOT - No

Problem Exist - unknown

Solution needed - unknown

**South Mountain Diversion**

B/C - .72/1

Urban Pressure - Rapidly urbanizing area

ADOT - Yes, could tie into ADOT at Southwest Loop

Flooding exist - Yes/potential flash flooding

Is Solution Possible - Yes

**San Tan Watershed**

B/C - .70/1

Urban Pressure - High potential for growth

ADOT - No

Flooding Exist - Yes, flash floods along Hunt Hwy

Possible - Yes

**Tonopah-Wintersburg Valley**

B/C = .6/1

Urban Pressure = Low due to Nuclear Power plant  
restrictions on development

ADOT = I-10

Flooding Exist = unknown

Possible = Yes

**Eagle Tail Mountain**

B/C = .63/1

Urban Pressure = low

ADOT = No

Flood Problem = May have increased due to CAP lateral system

Solution Possible = Yes

**Box Canyon**

B/C = .9/1

Urban Pressure = Downstream on Hassayampa

ADOT = No

Flooding Problem = Defined by current F.I.S.

Possible = Technically yes

**Sols Wash (Matthie Dam)**

B/C = .26/1

Urban Pressure = Not at dam site

ADOT = No

Flooding Problem = Defined but not significant

Possible = Yes

**Upper New River Dam**

B/C = (None)

Urban Pressure = No

ADOT = No

Possible = no longer needed due to existing Dam