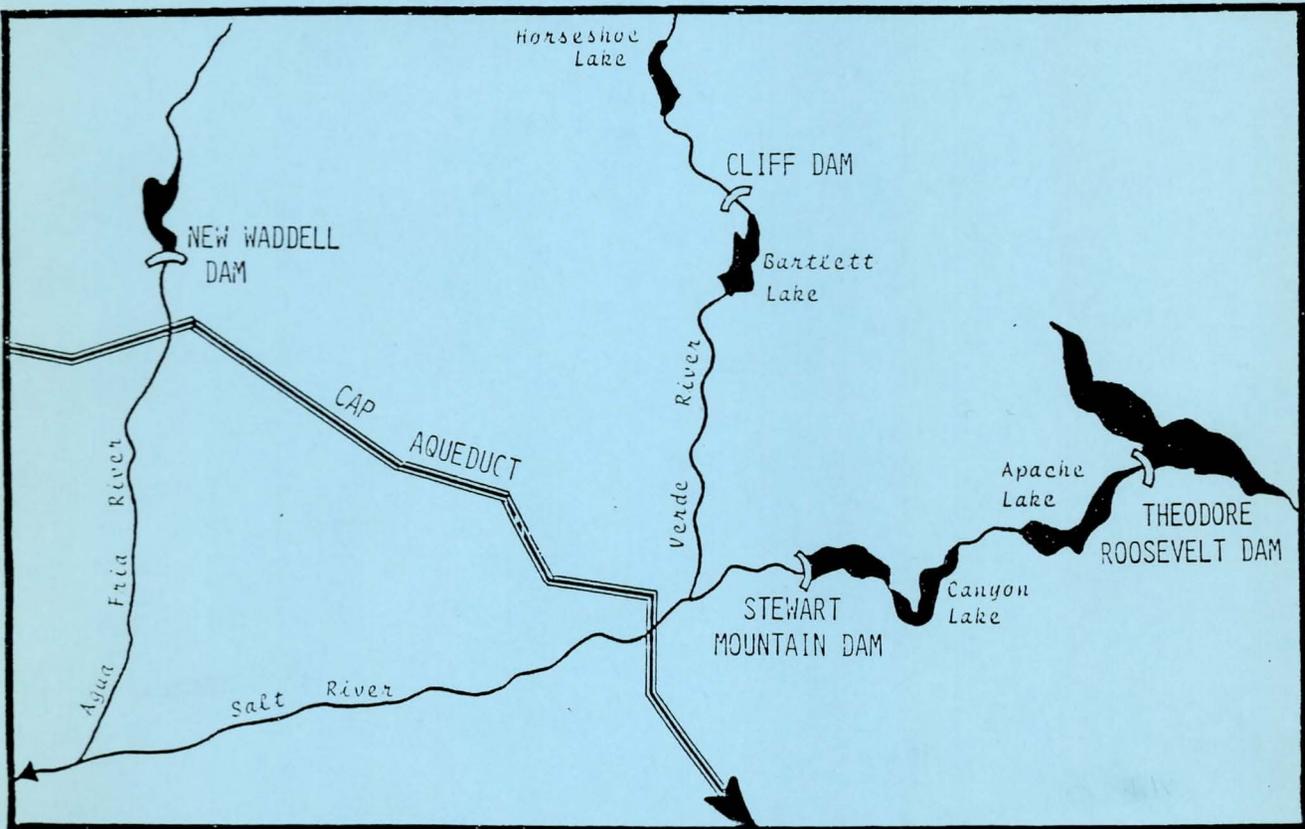


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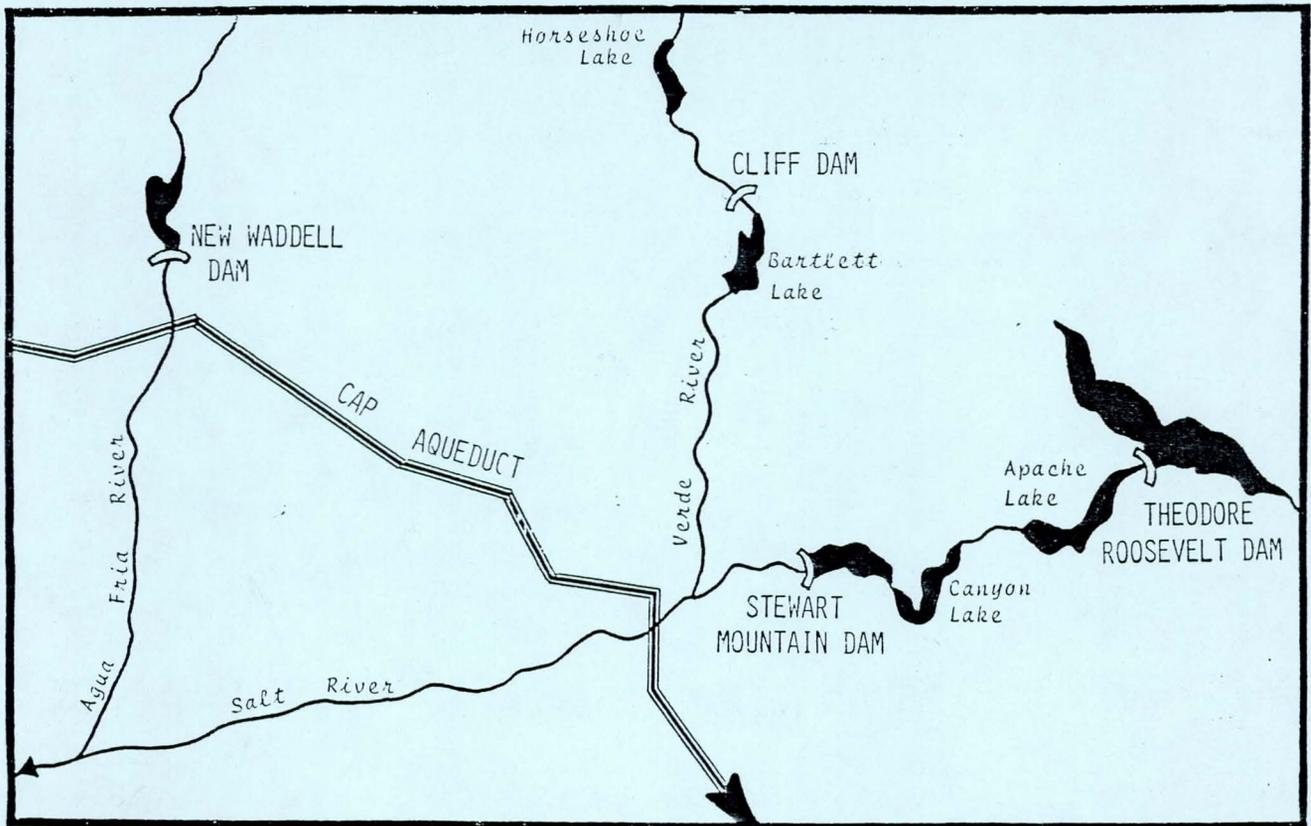
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ARIZONA DEPARTMENT OF WATER RESOURCES

JANUARY 1985

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INTRODUCTION

The estimated cost of the Central Arizona Project has increased substantially since project authorization. In 1968, Congress authorized \$832,180,000 plus normal cost escalation for construction of the project exclusive of non-Indian distribution systems. The 1985 cost estimate for these same facilities is almost \$3 billion dollars. This substantial cost, coupled with expected efforts to reduce the federal budget, causes concern over whether future appropriations will be sufficient to complete Plan 6 facilities in a reasonable period of time.

The concerns over the adequacy of future appropriations has generated substantial interest in the merits of non-Federal up-front financing of a portion of the project costs. This report has been prepared at the request of Governor Babbitt and the Congressional Delegation to describe some alternative up-front financing options. The principal objectives of non-federal contributions to up-front financing are summarized in Figure 1.

Appropriations, which will allow completion of the aqueduct system and distribution systems on schedule, appear fairly well assured. Hence it was assumed for purposes of this study that a non-federal contribution to financing of construction of these features would not be necessary.

On the other hand financing of Plan 6 conservation, flood control, and safety of dams features, at a cost of \$1.1 billion in 1985 dollars, would appear suspect in light of

FIGURE 1

OBJECTIVES OF UP-FRONT FINANCING

1. TO ENHANCE CHANCES THAT THE CONGRESS AND ADMINISTRATION WILL UNDERTAKE AND COMPLETE PLAN 6 OVER NEW START AND BUDGET DEFICIT OBJECTIONS.
2. TO REDUCE THE OVERALL CONSTRUCTION SCHEDULE FOR THE CAP THEREBY AVOIDING DELAYS IN PROJECT BENEFITS AND INCREASES IN COSTS RESULTING FROM INFLATION.
3. TO AVOID EXCEEDING THE AUTHORIZED COST CEILING FOR THE CAP.

concerns over budget deficits, efforts to categorize Plan 6 as a new start, and growing insistence on cost sharing. All non-federal financing options discussed in this report relate strictly to the financing of Plan 6.

The President made it clear in his January 1984 letter to Senator Laxalt that cost sharing would be a necessary ingredient of any new federal water project. However, for the Central Arizona Project and other previously authorized projects there has been no indication cost sharing will be required. Up-front funding, however, appears to be becoming an ever more viable option to assure completion of facilities in a reasonable time frame.

In the case of CAP, there is an added cost in up-front funding because the cost of money or interest on non-federal money borrowed will be greater than the interest rate charged by the federal government for repayment of the project. However the increased cost is offset by the assurance that the project will receive continued federal support and the many benefits associated with early completion of project facilities.

The initial effort to provide up-front funding should focus on opportunities to finance reimbursable costs or costs Arizona must repay. However we should not rule out consideration of opportunities to up-front finance some non-reimbursable costs, or costs which are a federal obligation. The ramifications of agreeing to a local sharing of non-reimbursable costs such as Flood Control and Safety of Dams have not been analyzed. Before

proposing financing non-reimbursable costs, considerable analysis should be undertaken, including the possibility of the federal government agreeing to repay over time all funds advanced for the construction of non-reimbursable functions.

The options presented in this report are designed to show a range of possible non-federal funding levels. Because there are an infinite number of alternatives, the number of options was necessarily narrowed to show the significance various levels of up-front funding have on project construction and repayment.

BACKGROUND

Historic and Future Appropriations

Through September 1984, a total of \$1,262,000,000 has been appropriated and made available for construction of project facilities. Appropriations for the last five years are shown in Figure 2. The average amount available in each of the five years since 1981 has been \$165 million dollars per year.

To realize the best possible construction schedule for project facilities exclusive of Buttes Dam and the Upper Gila River facilities, appropriations between 1985 and 1991 would have to be substantially increased over historic amounts. For example, an appropriation of over \$350 million dollars would be required in 1988 for Plan 6 to be fully operational by 1996. To maintain this schedule a total appropriation over the next four years, through fiscal year 1989, of \$1.2 billion dollars or an average of \$300 million dollars per year would be necessary. This is almost double the average amount received in each of the last four years and a level considered by most observers to be unrealistic under current budget constraints.

Considering the current expressed need to reduce the federal deficit and the administration's intent, that there be greater non-federal cost sharing of water projects, it seems unlikely that Plan 6 will be funded at a rate sufficient to permit an optimal construction schedule. It may even be optimistic to assume that appropriations will be as large as

FIGURE 2

APPROPRIATION HISTORY
 CAP + NON-INDIAN DISTRIBUTION SYSTEMS

YEAR	USBR REQUEST	APPROPRIATION	AVAILABLE
1981	\$144,000,000	\$144,000,000	\$142,000,000
1982	186,000,000	186,000,000	163,000,000
1983	161,000,000	161,000,000	164,000,000
1984	166,000,000	186,000,000	163,000,000
1985	188,000,000	196,000,000	168,000,000
OBLIGATIONS THRU 9/84			\$1,262,000,000
REMAINING OBLIGATION (1984 DOLLARS)			2,127,000,000

those provided in the last four years. However, for the purpose of comparing options, it was assumed in this report that future federal appropriations would be \$170 million dollars per year in each of the six alternatives evaluated.

Construction Cost vs Authorized Cost Ceiling

The total estimated construction cost of the CAP less the cost of Cliff and Roosevelt Dams allocated to Safety of Dams, in 1985 dollars, is \$3,179,000,000. However, some of the features included in this estimate are no longer considered necessary to the project. Removal of these features results in an adjusted estimated construction cost of \$2,933,000,000.

The authorized cost ceiling of the project has increased from \$832,180,000 to a 1985 level of \$2,698,000,000. A review of the methods for computing the ceiling indicates that some increases made available through more recent legislation have not been included in the computation. The increases result in an adjusted cost ceiling of \$2,705,000,000 as detailed and compared to the construction cost estimate in Figure 3.

The adjusted cost of CAP exceeds the authorized cost ceiling by approximately \$228 million dollars. Because the only feature of the CAP which has been modified subsequent to authorization is Orme Dam, which is replaced by Plan 6, the excess costs are attributable to the decision to construct Plan 6.

FIGURE 3

C.A.P. CONSTRUCTION COSTS

v. s.

AUTHORIZED CEILING (1985 DOLLARS)

TOTAL COST	\$ 3,414,000,000	
(-) SAFETY OF DAMS COSTS	235,000,000	
C.A.P. COST	<u>\$ 3,179,000,000</u>	
REASONABLE REDUCTIONS IN COST		
SAVINGS IN CONTINGENCIES	\$ 100,000,000	
REMOVE COLORADO RIVER DIV.	15,000,000	
REMOVE DRAINAGE SYSTEM	33,000,000	
REMOVE CHARLESTON DAM*	98,000,000	
TOTAL REDUCTIONS	<u>\$ 246,000,000</u>	
ADJUSTED C.A.P. COST		\$ 2,933,000,000
COMPUTED COST CEILING	\$ 2,698,000,000	
(-) CHARLESTON DAM*	98,000,000	
COST CEILING	<u>\$ 2,600,000,000</u>	
REASONABLE INCREASES TO AUTHORIZED CEILING		
NEPA PLANNING	\$ 40,000,000	
ENDANGERED SPECIES	15,000,000	
CHARLESTON DAM M & I FUNCTION	50,000,000	
TOTAL INCREASES	<u>\$ 105,000,000</u>	
NEW ADJUSTED AUTHORIZED CEILING		\$ 2,705,000,000
ADJUSTED DIFFERENCE BETWEEN AUTHORIZED CEILING & C.A.P. COST		\$ 228,000,000

* REMOVED FROM BOTH COST AND CEILING

It is not well defined how the cost ceiling will apply when non-federal up-front funding is involved; i.e., will contributed funds have the effect of raising the ceiling without requiring reauthorization? However, it is generally expected that Federal appropriations may be made up to the authorized ceiling level and that non-federal financing may be made to complete project features without requiring reauthorization. It is important in our negotiations with the Congress and the Administration that this position be assured.

It should be noted that removal of any feature of Plan 6 would result in a lowering of both the ceiling and the cost. The specific amounts of reductions will vary with each feature.

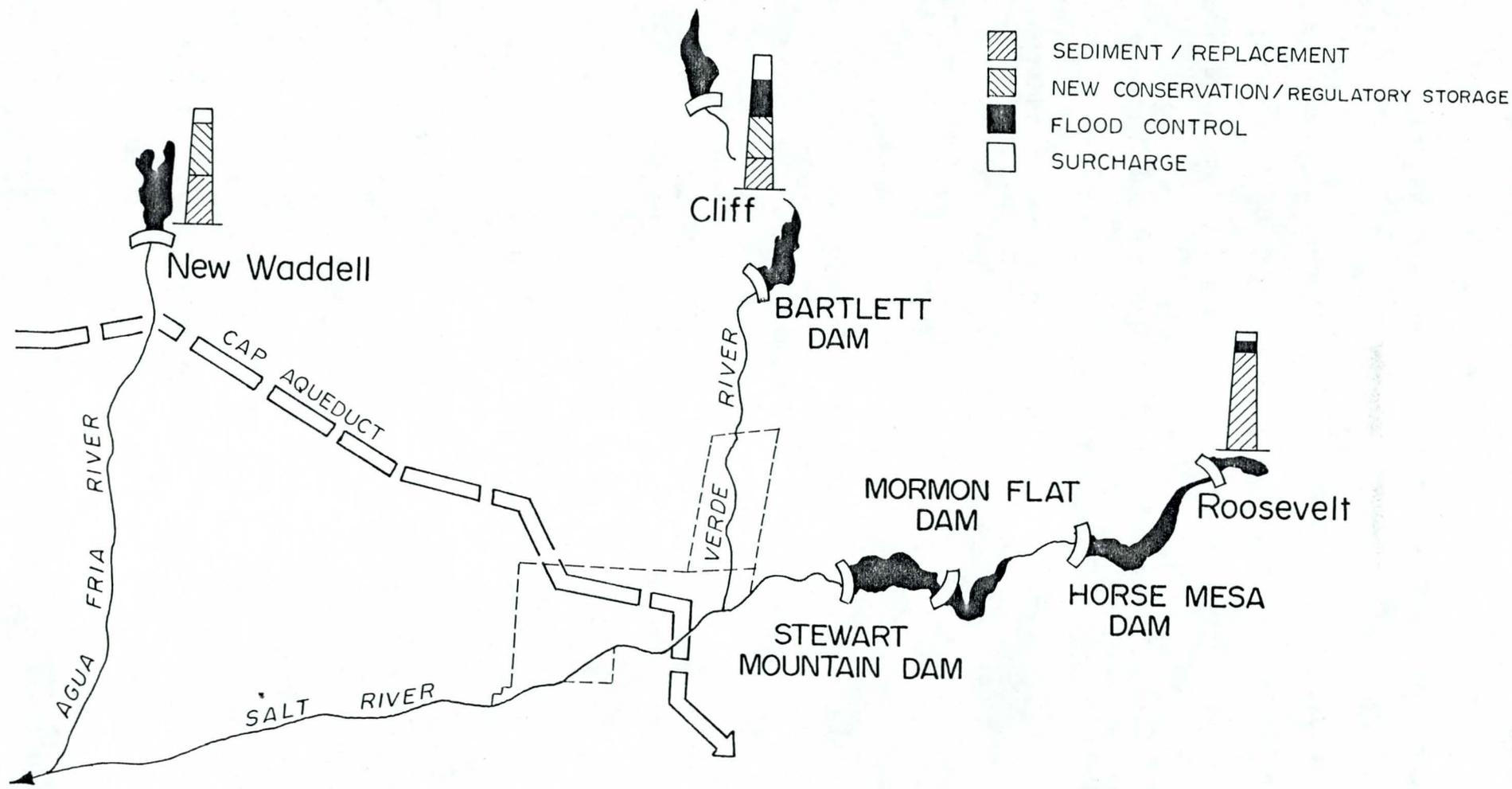
Plan 6

Plan 6 will be constructed to provide regulatory storage and additional water supply for the CAP; to provide flood control for the Salt, Verde, Agua Fria, and Gila Rivers; and to resolve most of the dam safety problems at existing Bureau dams on the Salt and Verde Rivers. The plan also includes development of recreational facilities and mitigation measures for biological, cultural, and social resources.

Plan 6 includes the construction or modification and operation of four dams and associated reservoirs. The plan calls for the construction of New Waddell Dam and Cliff Dam and the modification of Theodore Roosevelt and Stewart Mountain Dams.

(See Figure 4)

Figure 4
10



PLAN 6
NEW WADDELL DAM
CLIFF DAM
ROOSEVELT DAM

The operation of three of these dams (New Waddell, Cliff, and Modified Roosevelt) would provide water supply, flood control, recreation, and fish and wildlife benefits. The dams on the Salt and Verde Rivers (Modified Roosevelt, Modified Stewart Mountain, and Cliff) would correct existing dam safety problems.

The plan will provide 660,000 acre-feet of storage to regulate flows pumped into central Arizona from the Colorado River and 266,000 acre-feet of capacity to conserve additional supplies on the Salt and Verde Rivers for the CAP. Sufficient flood control space would be provided behind dams on the Salt, Verde, and Agua Fria Rivers to control floods measured near the Sky Harbor International Airport on the Salt River and the confluence of the Agua Fria and New Rivers to the following levels:

	Flood Events	Present	Plan 6
Salt River	100-Year Flood	215,000 cfs	55,000 cfs
	200-Year Flood	275,000 cfs	92,000 cfs
Agua Fria River	100-Year Flood	90,000 cfs	13,000 cfs
	200-Year Flood	120,000 cfs	25,000 cfs

New Waddell Dam will be located on the Agua Fria River, immediately downstream of the existing Waddell Dam. Cliff Dam will be located on the Verde River, between Bartlett and Horseshoe Dams. As part of this plan, Horseshoe Dam will be breached and its storage capacity relocated to Cliff Dam. Theodore Roosevelt Dam, located on the Salt River, and Stewart Mountain Dam, also on the Salt, will be modified to ensure their safety.

An allocation of the estimated cost of Plan 6 in 1985 dollars is shown in Figure 5.

FIGURE 5

ALLOCATION OF THE COSTS OF PLAN 6 IN 1985 DOLLARS

		<u>\$ MILLIONS</u>
1.	CLIFF DAM	\$ 385
	A. SAFETY OF DAMS	(140)
	B. FLOOD CONTROL	(220)
	C. CONSERVATION STORAGE	(25)
2.	ROOSEVELT DAM	\$ 255
	A. SAFETY OF DAMS	(95)
	B. FLOOD CONTROL	(143)
	C. CONSERVATION STORAGE	(17)
3.	NEW WADDELL	\$ 460
	A. SAFETY OF DAMS	
	B. FLOOD CONTROL	
	C. CONSERVATION STORAGE	(460)
	TOTALS	\$ 1,100
	A. SAFETY OF DAMS*	(235)
	B. FLOOD CONTROL	(363)
	C. CONSERVATION STORAGE	(502)

* AN ADDITIONAL \$70 MILLION IS NECESSARY FOR SAFETY OF DAMS IMPROVEMENTS AT STEWART MOUNTAIN, HORSE MESA, MORMON FLAT AND BARTLETT DAMS.

FUNDING OPTIONS

Six options have been evaluated and are presented in this report. The purpose of each funding option is summarized in Figure 6. In all options evaluation is limited to funding construction costs of the aqueduct, distribution systems and Plan 6. Conner Dam, Buttes Dam and terminal storage near Tucson were not included and are therefore assumed to be constructed after completion of Plan 6. Since preparation of the options we have been advised by representatives of the City of Tucson of the desire to include consideration of up-front financing of terminal storage in Pima County. Inclusion would increase the non-federal contribution to financing by a modest amount, an amount that would not distort the validity of comparisons of the options analyzed.

The principal assumptions regarding inflation, federal funding availability and construction start priorities are shown in Figure 7. Priorities one and two for completion of the aqueduct and distribution systems respectively are firm. The order of priority for the construction of the features of Plan 6 is flexible, however. There is nothing special about the order assumed for purpose of this study.

FIGURE 6

SUMMARY OF FUNDING OPTIONS

OPTION 1 (BASE CASE)	100 PERCENT FEDERALLY FUNDED NON-FEDERAL FINANCING = 0
OPTION 2	UP-FRONT FUNDING AS NECESSARY TO COMPLETE PROJECT BY 1996 NON-FEDERAL FINANCING = \$755 MILLION
OPTION 3	UP-FRONT FUNDING AS NECESSARY TO AVOID RAISING COST CEILING NON-FEDERAL FINANCING = \$250 MILLION
OPTION 4	UP-FRONT FUNDING OF 15 PERCENT OF SOD AND PLAN 6 REIMBURSABLE COSTS NON-FEDERAL FINANCING = \$130 MILLION
OPTION 5	100 PERCENT FEDERALLY FUNDED WITHOUT CLIFF DAM NON-FEDERAL FINANCING = 0
OPTION 6	INTERMEDIATE LEVEL OF UP-FRONT FUNDING NON-FEDERAL FINANCING = \$500 MILLION

FIGURE 7

ASSUMPTIONS

1. COSTS ARE INFLATED BY 6 PERCENT PER YEAR THROUGHOUT CONSTRUCTION PERIOD.
2. FEDERAL FUNDING OF \$170M IS AVAILABLE EACH YEAR FOR PROJECTS IN ORDER OF PRIORITY. FUNDING IS NOT INDEXED FOR INFLATION.
3. CONSTRUCTION START PRIORITIES:

<u>FEATURE</u>	<u>PRIORITY NO.</u>
AQUEDUCT	1
DISTRIBUTION SYSTEMS	2
NEW WADDELL DAM	3
ROOSEVELT DAM	4
CLIFF DAM (EXCLUDED FROM OPTION 5)	5
4. NON-FEDERAL FUNDING CONTRIBUTIONS WILL NOT COUNT AGAINST THE AUTHORIZED COST CEILING.
5. COST FOR IMPLEMENTATION OF THE SOUTHERN ARIZONA WATER RIGHTS SETTLEMENT ACT (PAPAGO BILL) WILL BE PROVIDED AS NEEDED BY THE FEDERAL GOVERNMENT.
6. NON-FEDERAL CONTRIBUTION TO UP-FRONT FINANCING APPLICABLE ONLY TO FEATURES OF PLAN 6.

Option 1

Option 1 evaluates schedule and funding requirements to complete the project utilizing only federal funds with federal appropriations limited to \$170 Million per year. This option is also the base case against which the other options are compared.

The schedules and funding requirements by feature are displayed on Figure 8. It can be seen from this figure that the aqueduct and distribution systems would be completed by 1992, while Plan 6 completion is delayed until 2008. The total federal funding requirement for this option would be \$3,579,000,000, of which \$2,482,000,000 is for the completion of Plan 6. It should also be noted that because of construction limitations appropriation requirements in many years fall well below the \$170 million. This is caused primarily because of the physical constraint on the work effort which can be undertaken to modify Roosevelt Dam.

In conjunction with this option, one suboption (Option 1A) was evaluated where annual federal appropriations were assumed to increase at a rate consistent with the estimated rate of inflation. Figure 9 shows that this would have a significant effect and Plan 6 could be completed by 1998 without non-federal contributing appropriations between 1985 and 1997 and would average \$225 million per year.

OPTION 1

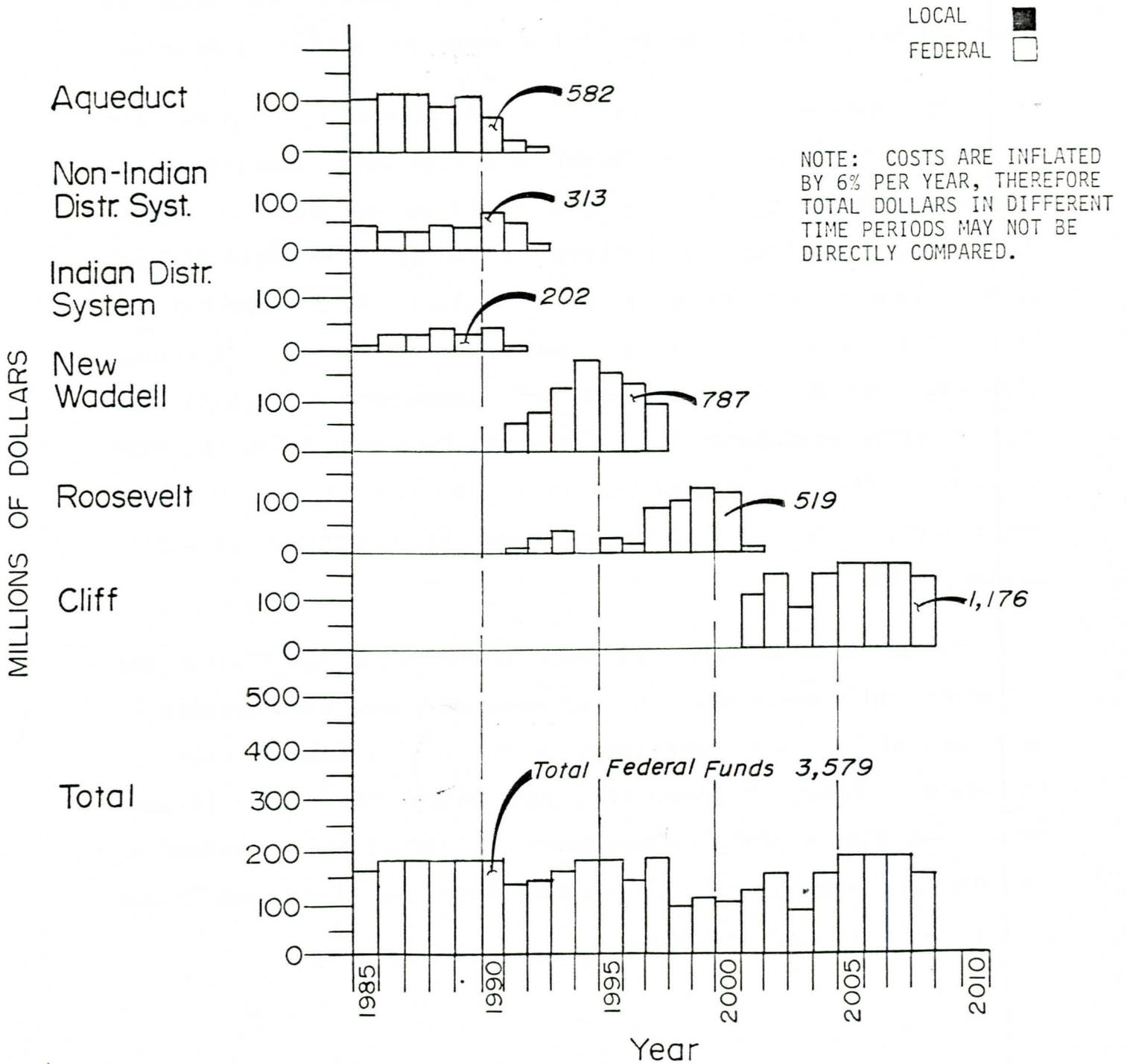


Figure 8

OPTION IA

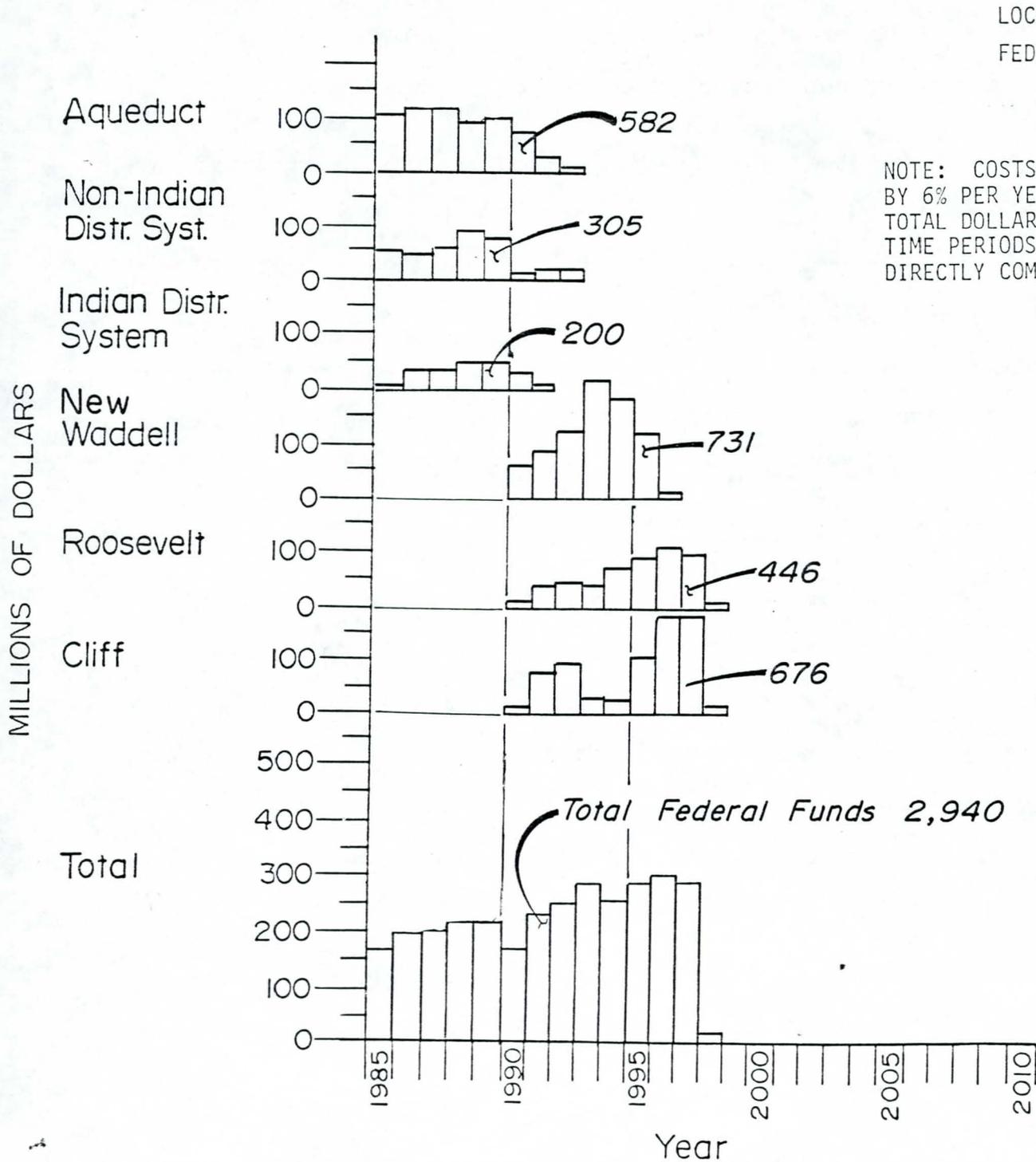


Figure 9

Option 2

Option 2 allows for the completion of the project with no constraint on yearly expenditures. This option assumes that any difference between the yearly federal appropriations of \$170 million dollars and yearly construction requirements would be provided through non-federal financing.

The schedules and funding requirements by feature are displayed in Figure 10. With this option the aqueduct and distribution systems would be completed by 1992, while Plan 6 would be completed in 1996, 12 years earlier than in Option 1. The total funding requirement for this option would be \$2,626,000,000 of which \$1,529,000,000 is for the completion of Plan 6. Of the \$1,529,000,000; \$755,000,000 would be financed locally and the federal share would be \$774,000,000.

Figure 11 graphically displays a possible allocation of the \$755,000,000 local share between four sponsors. This allocation would assure that water users would be called upon to finance only costs associated with water conservation and energy management and that flood control and safety of dams beneficiaries would finance all costs associated with flood control and safety of dams respectively.

OPTION 2

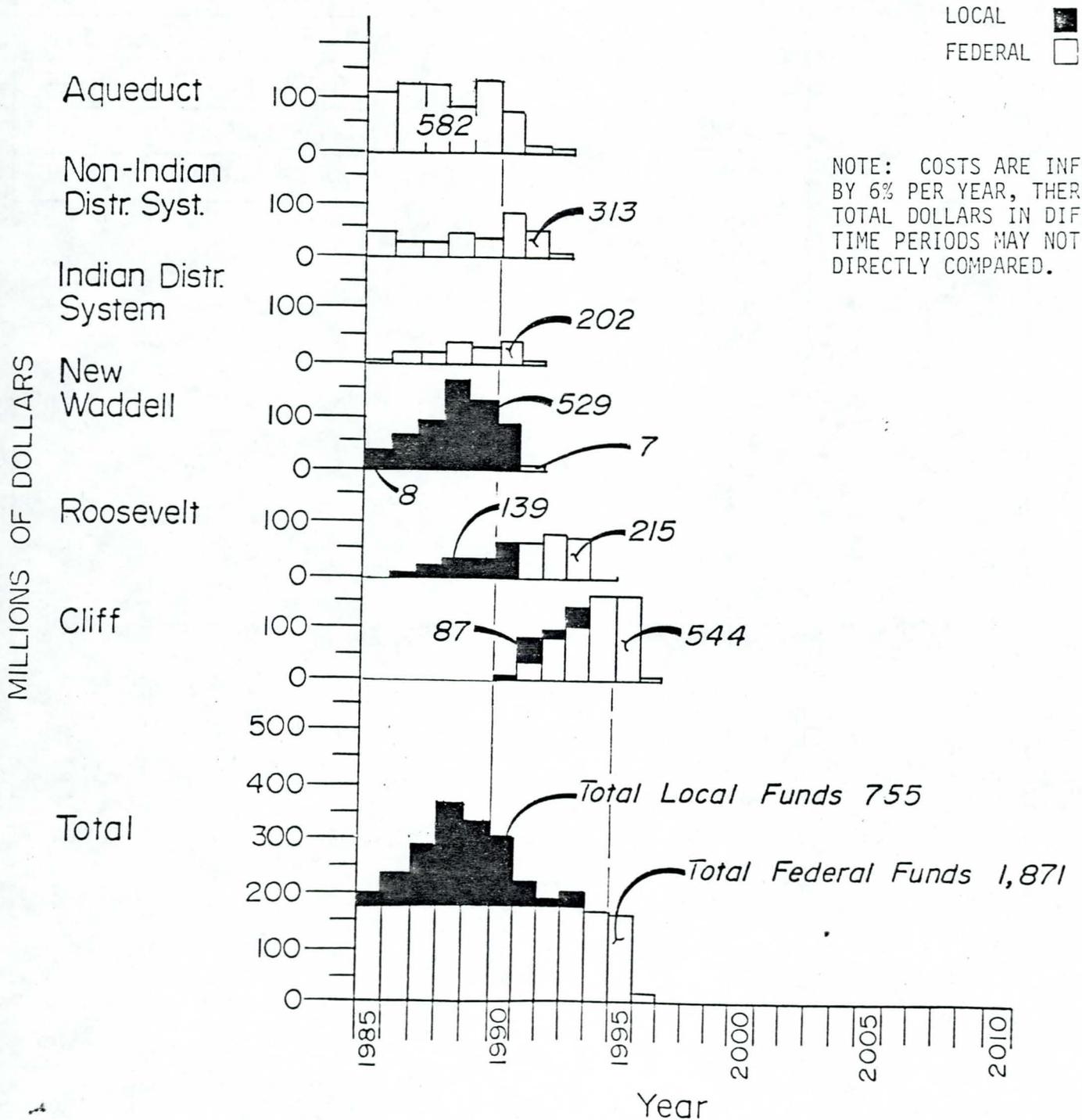
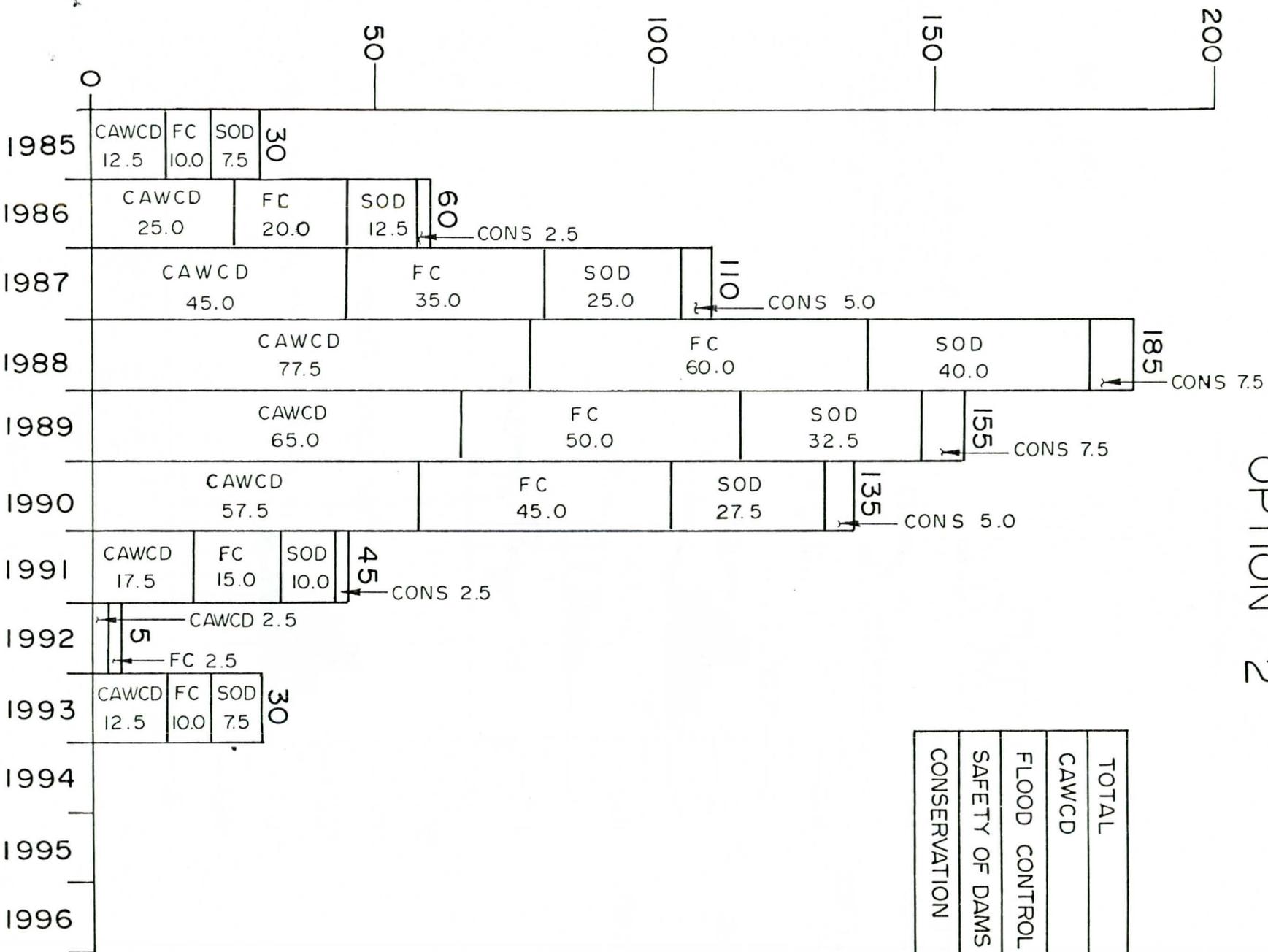


Figure 10

PLAN 6 ANNUAL LOCAL SHARE

OPTION 2

DOLLARS (MILLIONS)



TOTAL	= 755
CAWCD	= 315
FLOOD CONTROL	= 247.5
SAFETY OF DAMS	= 162.5
CONSERVATION	= 30

Option 3

Option 3 evaluates the impact of scaling the non-federal contribution to a level just sufficient to offset the short fall between the estimated construction cost and the authorized cost ceiling of \$228,000,000 (rounded to \$250,000,000 for study purposes) with the objective of avoiding having to seek Congressional reauthorization of the CAP with an increased cost ceiling.

The schedules and funding requirements by feature are displayed in Figure 12. As is the case with the first two options the aqueduct and distribution system could be completed by 1992. Plan 6, however, would not be completed until 2001. The total project cost for this option would be \$3,053,000,000 of which \$1,956,000,000 would be for the construction of Plan 6. Of the \$1,956,000,000, \$250,000,000 would be financed locally and the federal share would be \$1,706,000,000.

Figure 13 graphically displays one possible allocation of the \$250,000,000 local share between four sponsors. This allocation would assure that water users would be called upon to finance only costs associated with water conservation and energy management and that flood control and safety of dams beneficiaries would finance all costs associated with flood control and safety of dams respectively.

In conjunction with this option a suboption (Option 3A) was evaluated in which the priorities for New Waddell and Roosevelt

OPTION 3

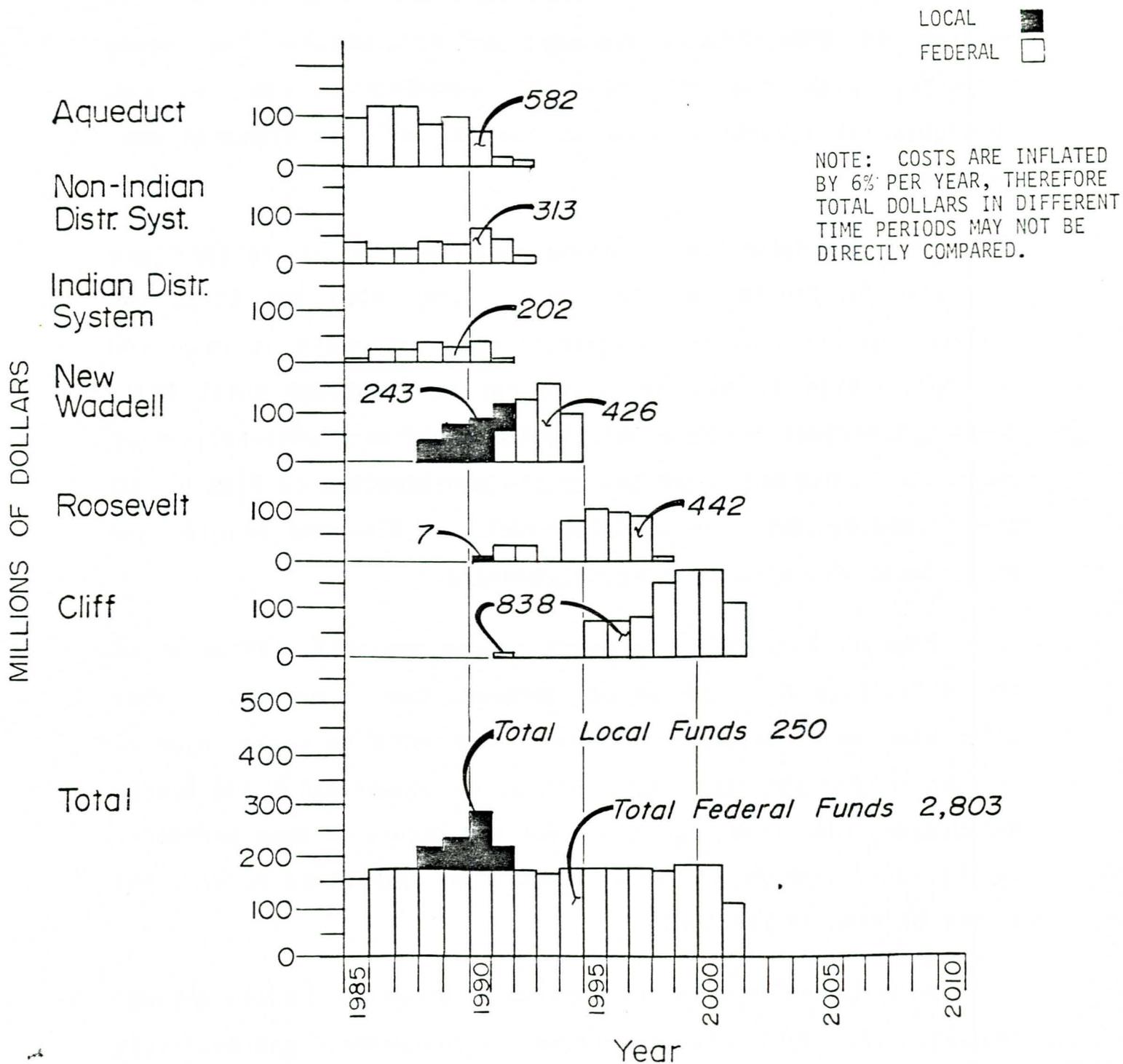
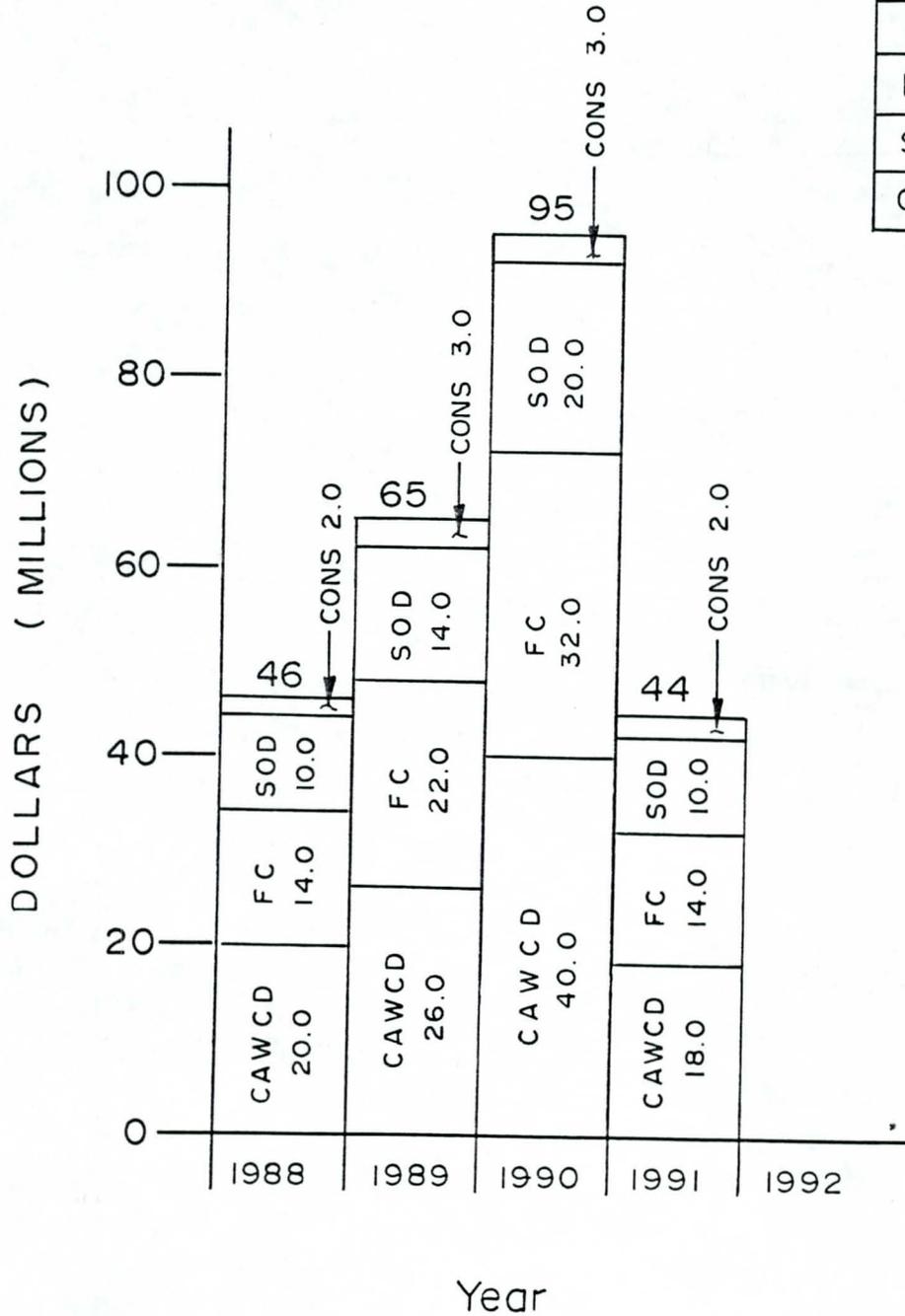


Figure 12

PLAN 6 ANNUAL LOCAL SHARE OPTION 3



TOTAL	= 250
CAWCD	= 104
FLOOD CONTROL	= 82
SAFETY OF DAMS	= 54
CONSERVATION	= 10

Year
Figure 13

OPTION 3A

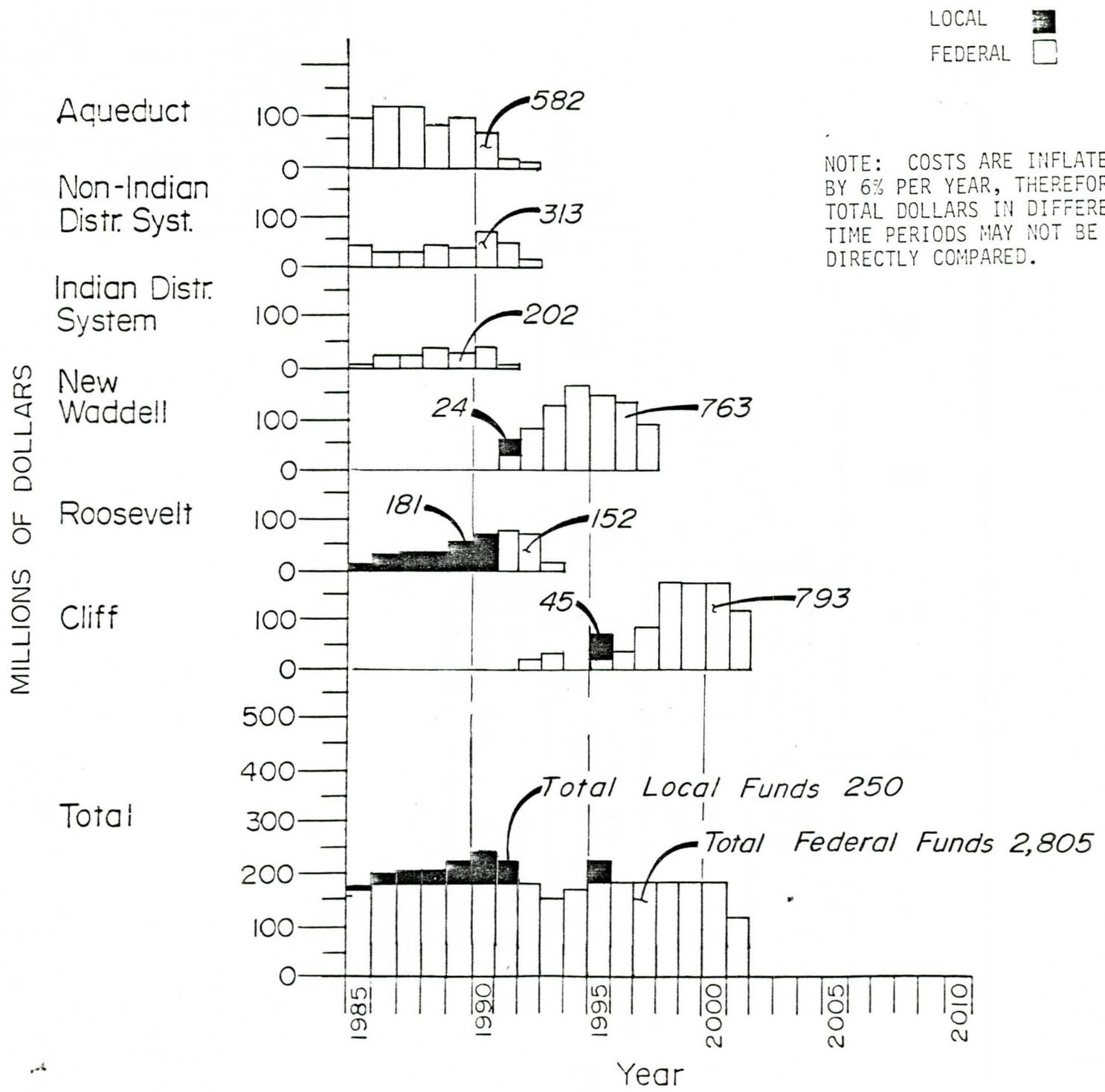


Figure 14

Dams were reversed. As can be seen on Figure 14, this would have no effect on the overall schedule of funding requirements. However, comparing these options to the base case, in Option 3 both New Waddell and Roosevelt Dams are accelerated while in Option 3A only Roosevelt Dam is accelerated.

Option 4

Option 4 evaluates the funding and scheduling requirements if only the 15% of cost required to be repaid by The Reclamation Safety of Dams Act, Amendments of 1984, and 15% of the reimbursable costs of Plan 6 were provided up-front by non-federal interests. It was assumed that although the Act does not require that the 15% be provided up-front, the local sponsor would be willing to do so.

This option provided very little benefit over the base case. Completion of Plan 6 would not occur until the year 2006 and the funding requirement is \$3,395,000,000. The total local funds for this option would be \$130,000,000. Figure 15 displays the schedule and funding requirements for this option.

Figure 16 graphically displays the allocation of the \$130,000,000 between the two local sponsors who would participate in funding this option. This allocation would assure that water users would be called upon to finance only costs associated with water conservation and energy management and that Safety of Dams' beneficiaries would finance costs associated with Safety of Dams.

OPTION 4

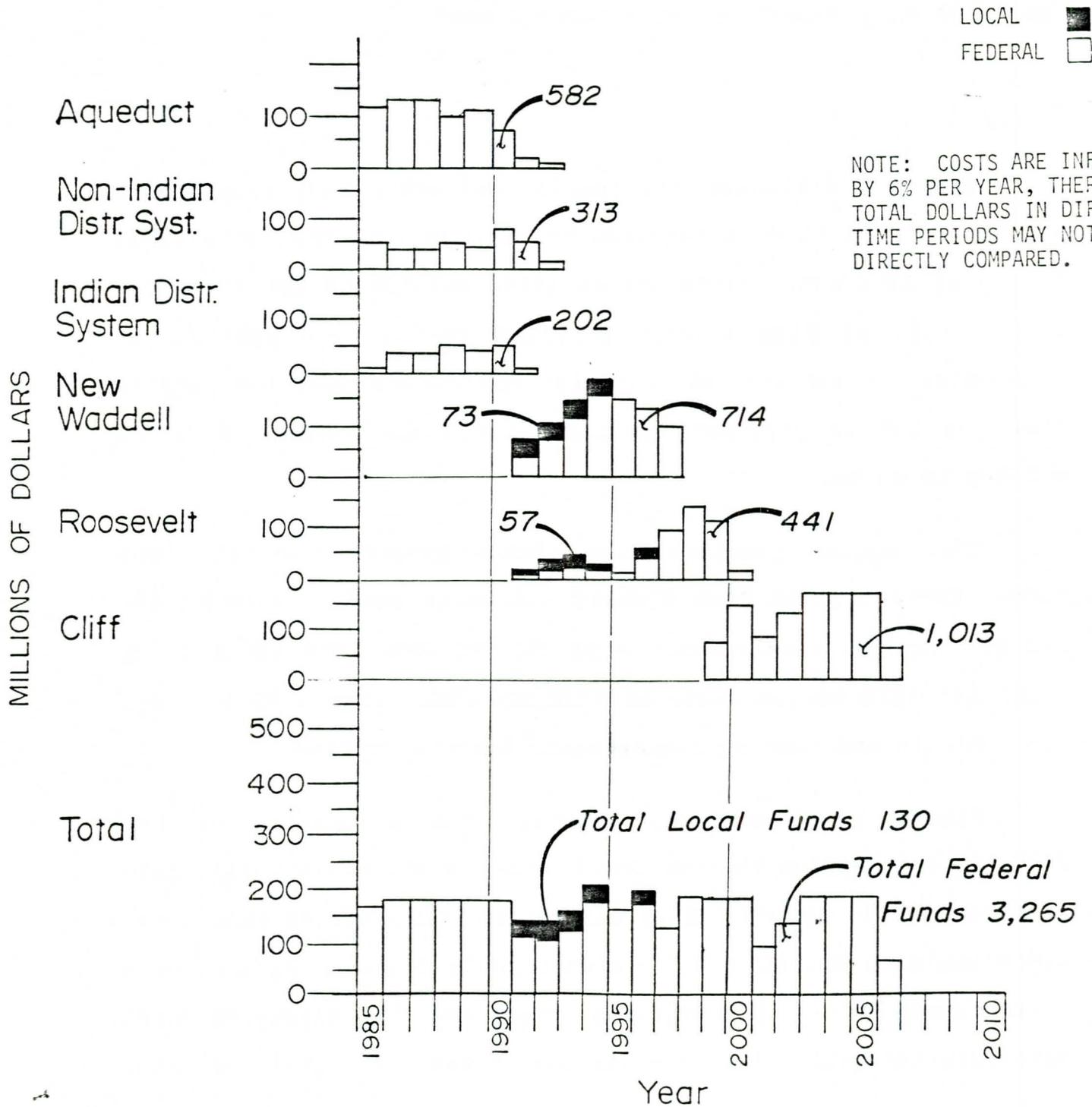


Figure 15

PLAN 6 ANNUAL LOCAL SHARE OPTION 4

TOTAL	= 130
CAWCD	= 73
SOD	= 57

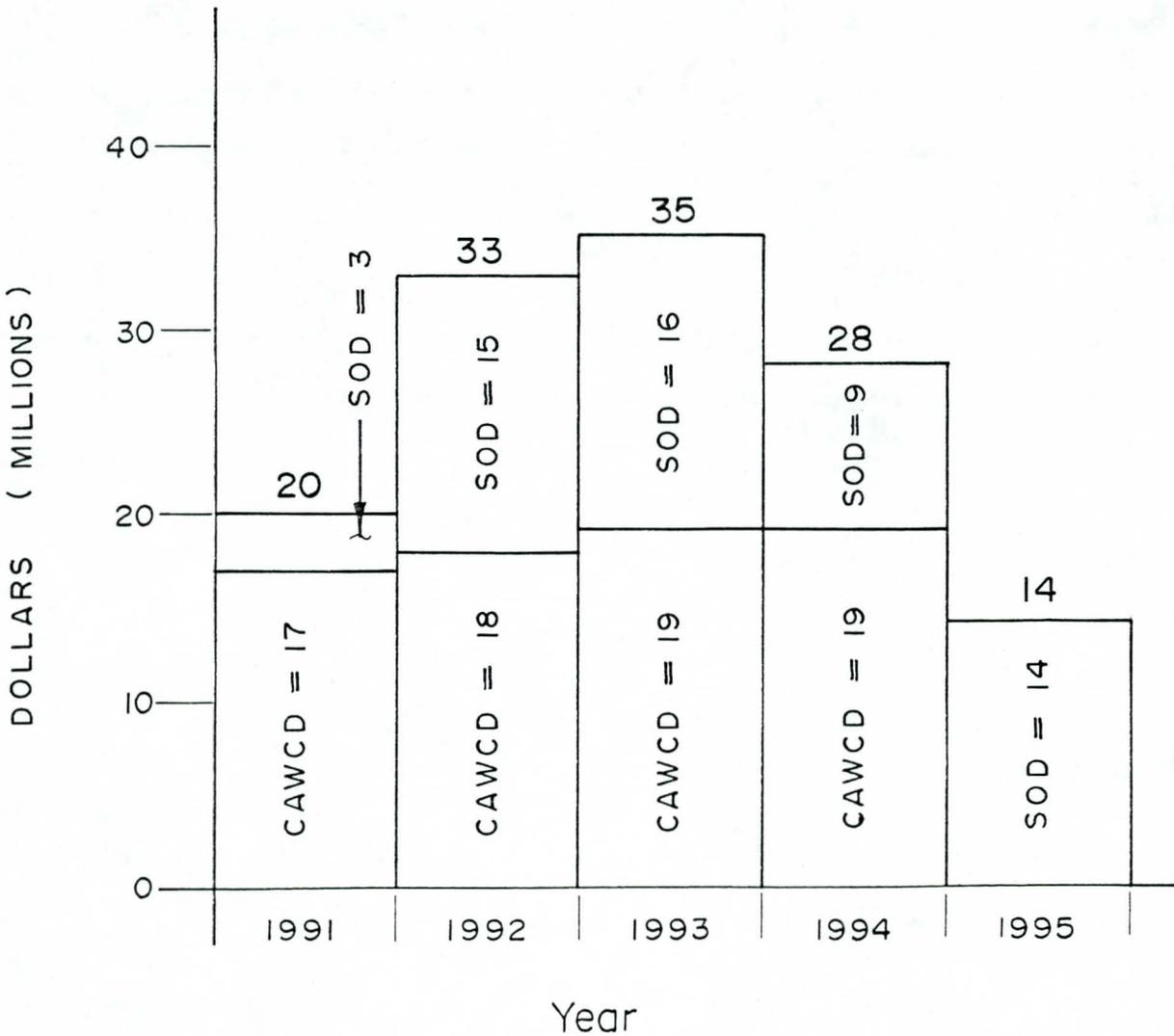


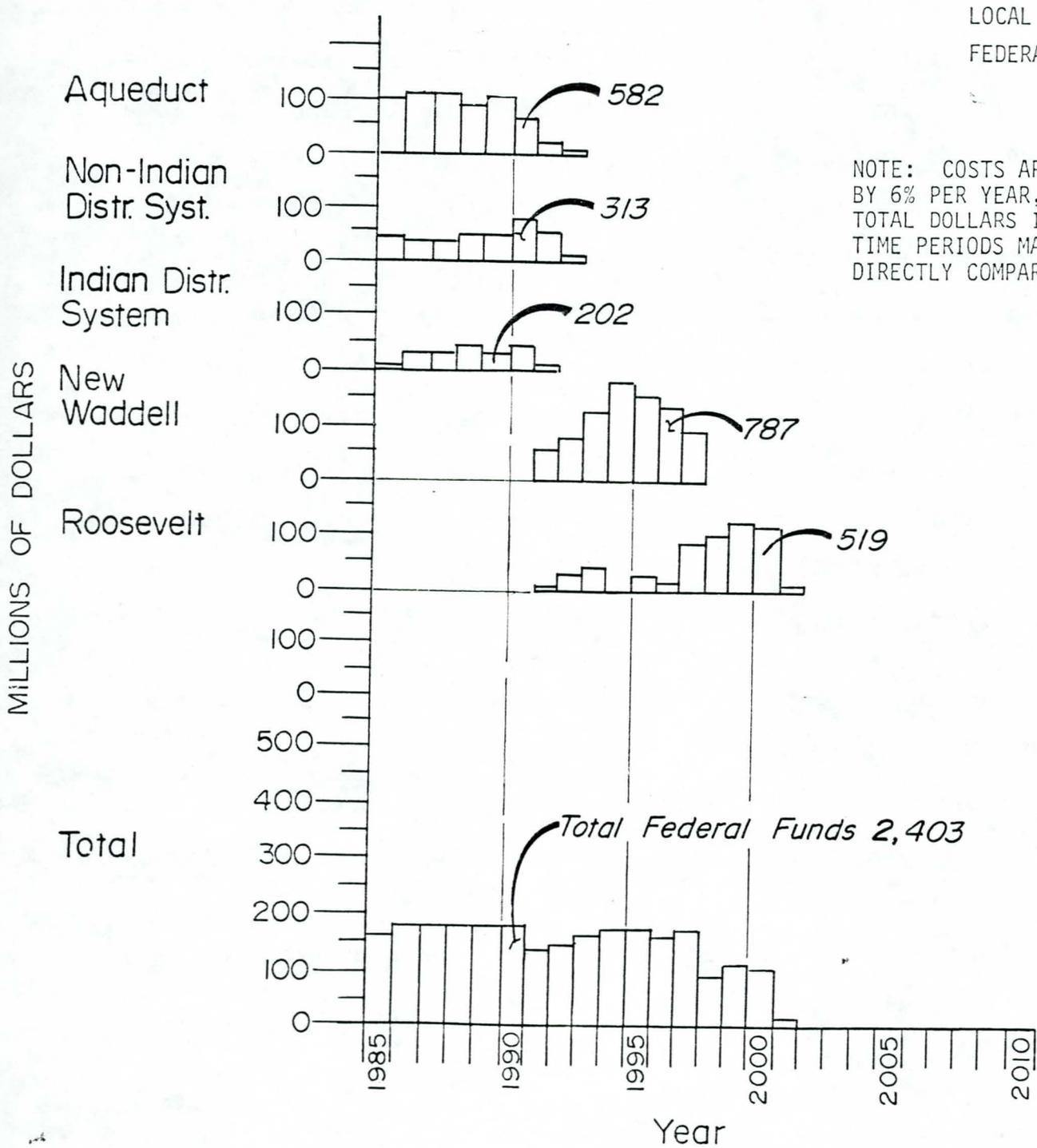
Figure 16

Option 5

Option 5 evaluates impacts on the construction schedule and funding requirements if Cliff Dam was dropped. This option, as with the base case, was evaluated using only federal funds for construction with a \$170,000,000 appropriations limitation.

As can be seen in Figure 17, the completion dates for the remaining two features do not change from the base case and the federal funding requirement is reduced by the cost of the eliminated feature. It should be noted however, that the removal of any feature significantly reduces the benefits of Plan 6. In the case of removing Cliff Dam, the flood control benefits are greatly reduced. With Cliff and Roosevelt Dams the 100-year and 200-year flood flows at Sky Harbor International Airport are 55,000 and 92,000 cfs respectively. Without Cliff, these flows would be 170,000 cfs and 215,000 cfs, much too high to accommodate the Rio Salado Project as currently envisioned.

OPTION 5



NOTE: COSTS ARE INFLATED BY 6% PER YEAR, THEREFORE TOTAL DOLLARS IN DIFFERENT TIME PERIODS MAY NOT BE DIRECTLY COMPARED.

Figure 17

Option 6

Option 6 evaluates the impacts on the construction schedule of providing a local up-front share of \$500 million.

The schedules and funding requirements by feature and composite are displayed in Figure 18. All features are accelerated from the base case with completion of Plan 6 occurring in 1999. New Waddell's completion date is similar to the date in Option 2, while Roosevelt's date is similar to that in Option 3. The reason the Roosevelt completion date is not accelerated from Option 3, in which \$250,000,000 is the local up-front share, is because of the necessary construction sequencing of Roosevelt. It should also be noted that because of this construction sequencing expenditure capability drops to approximately \$50,000,000 in the year 1992. The total funding requirement for this option is \$2,819,000,000 of which \$1,722,000,000 is required for the completion of Plan 6.

Figure 19 graphically displays one possible allocation of the \$500,000,000 between four local sponsors. This allocation would assure that water users would be called upon to finance only costs associated with water conservation and energy management and that flood control and safety of dams beneficiaries would finance all costs associated with flood control and safety of dams respectively.

OPTION 6

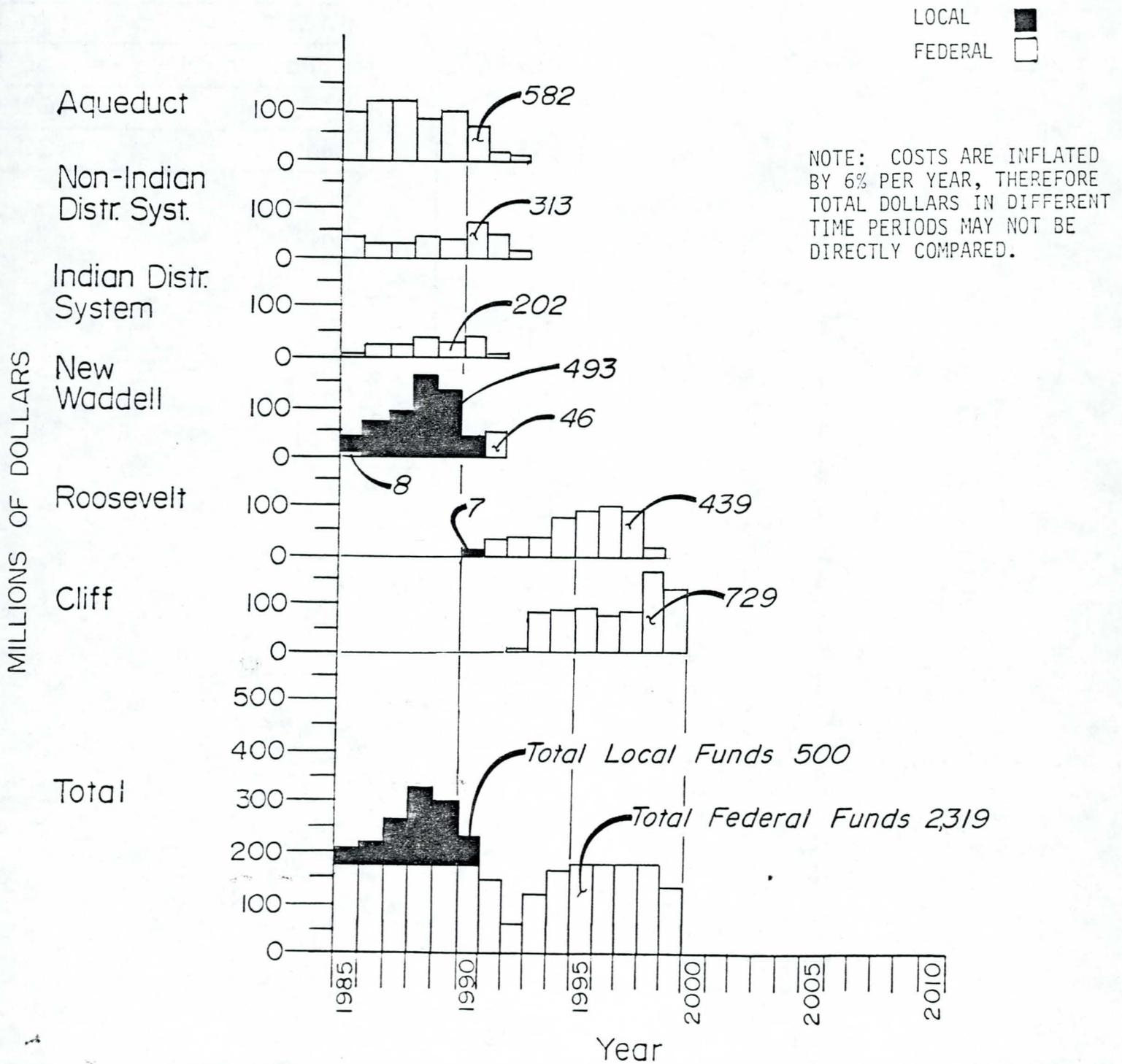


Figure 18

PLAN 6 ANNUAL LOCAL SHARE OPTION 6

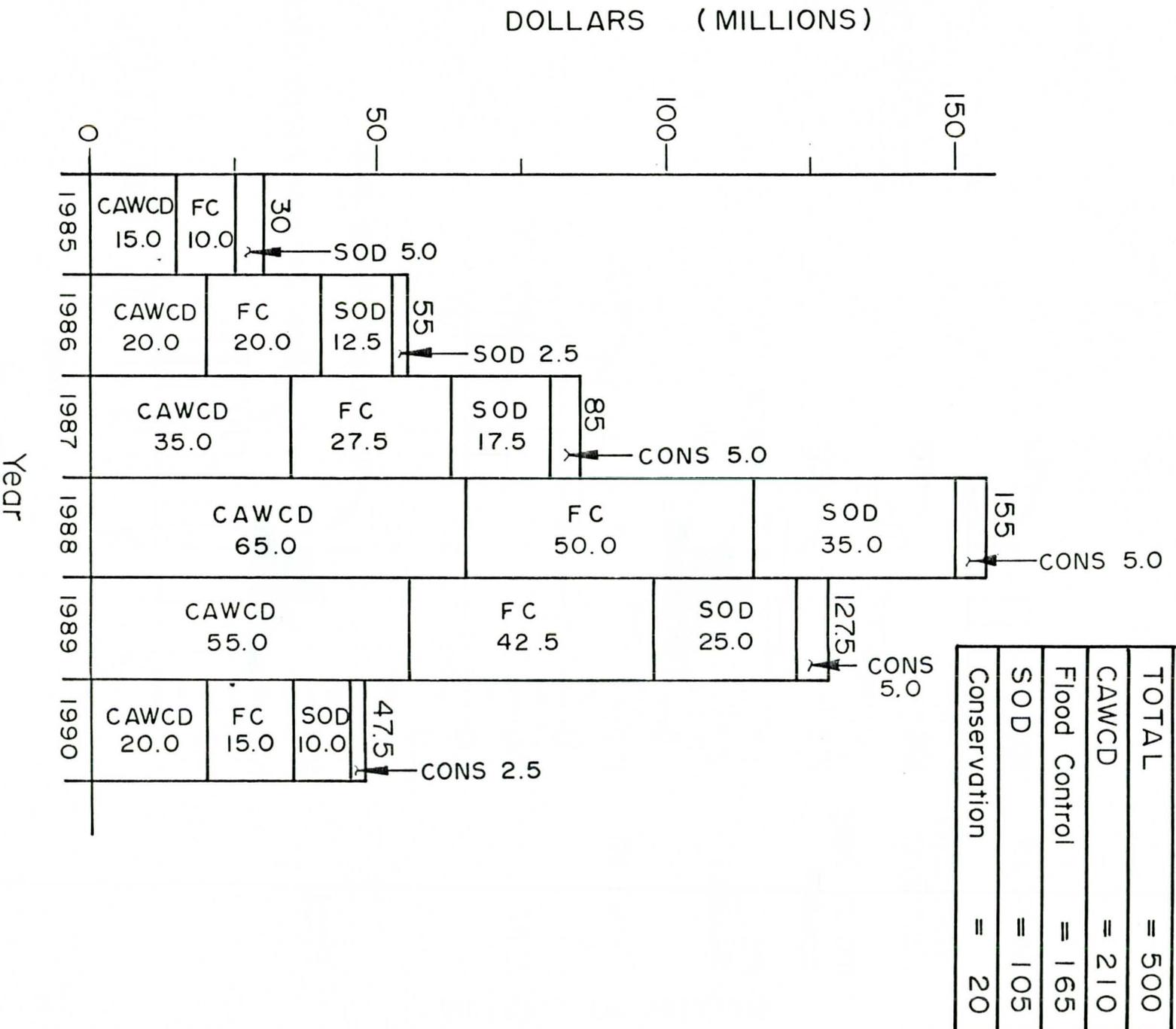


FIGURE 19
33

Comparison of Options

Three summary figures have been prepared to show a comparison of the options.

Figure 20 compares the completion date by feature of the six options. It should be noted that:

- 1) The completion dates for the aqueduct and distribution systems are the same for all options.
- 2) As local up-front funds increase, Plan 6 feature completion dates accelerate.
- 3) Option 2 provides the earliest completion of Plan 6.
- 4) Because of inflation the longer it takes to complete a feature the more it costs.
- 5) Changing feature priorities would change the feature completion date but not the overall option completion date.

SUMMARY OF OPTIONS

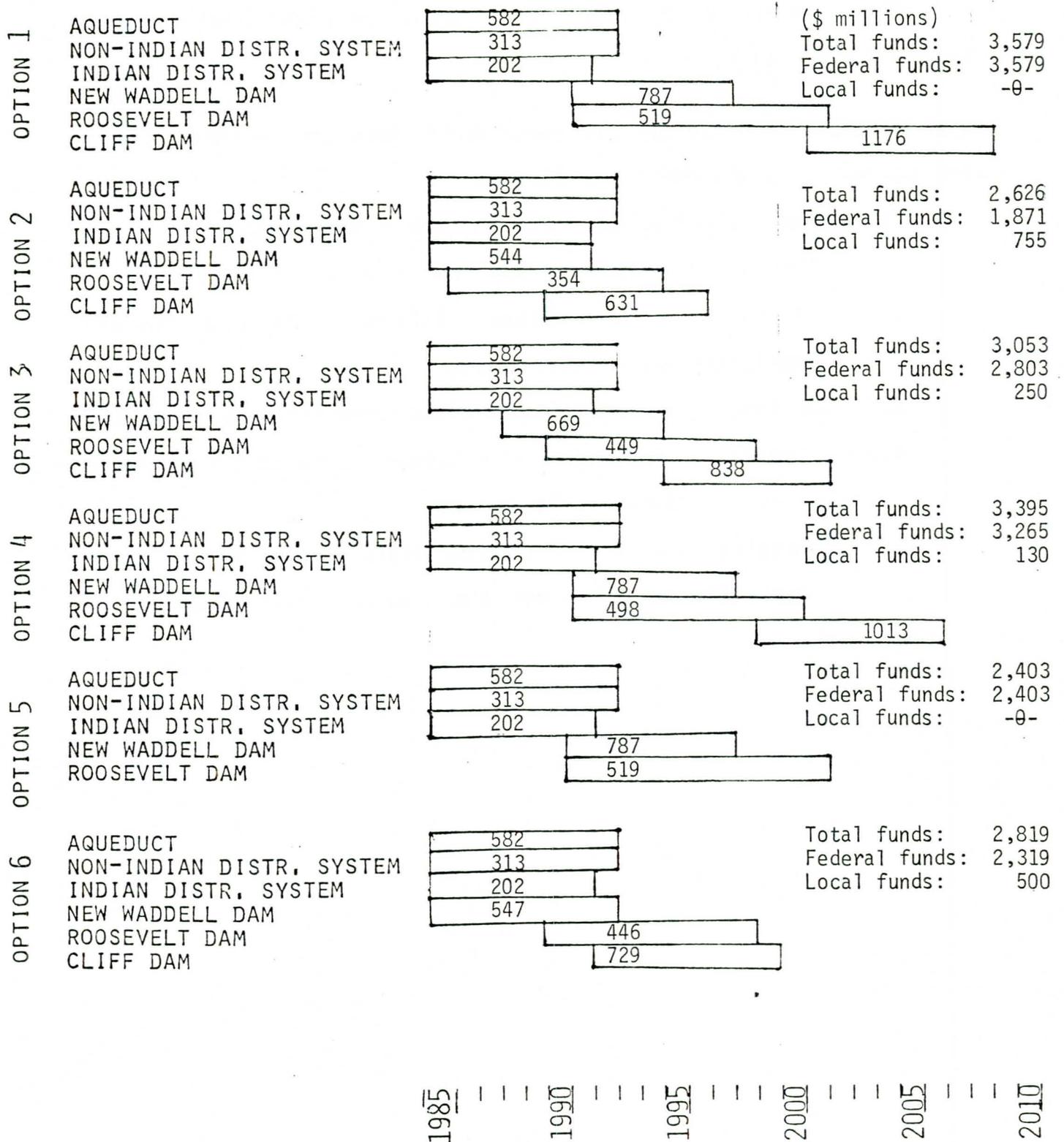


FIGURE 20

Figure 21 compares the local up-front share with the federal share for Plan 6 and the effect up-front financing has on completion date.

Figure 22 is an identification and comparison of option impacts. The figure displays the non-federal and federal funding requirements under each option and the total construction cost savings of each when compared to Option 1, the base case. The costs savings are directly attributable to early construction to avoid inflation. For example, under Option 2 a savings of \$953 million is realized from the up-front funding of \$755 million. The table of comparisons also shows whether each option avoids exceeding the cost ceiling; enhances federal support for future appropriations; requires local funding of non-reimbursable costs; and requires an additional interest bearing cost to CAWCD. The dates each function of Plan 6 become operational under each option are also shown.

Only Options 2, 3 and 6 obviate the need to seek reauthorization of the CAP construction cost ceiling. The exclusion of Cliff Dam from Option 5 has the effect of reducing both the construction cost and the authorized ceiling and it would still be necessary to seek reauthorization.

Under Options 2, 3, and 6, New Waddell Dam would be completed and operational at a desirable time from a power marketing standpoint.

PLAN 6 FUNDING SUMMARY

OPTION	PLAN 6 NON FEDERAL FINANCING SHARE \$M	PLAN 6 FEDERAL SHARE \$M	YEAR COMPLETED
1	0	2,482	2008
2	755	774	1996
3	250	1,706	2001
4	130	2,168	2006
5	0	1,306	2001
6	500	1,222	1999

FIGURE 21

FIGURE 22

COMPARISON OF OPTION IMPACTS

OPTIONS	1	2	3	4	5	6
PLAN 6 LOCAL FUNDING (\$M)	0	755	250	130	0	500
FEDERAL APPROPRIATIONS FOR PLAN 6 (\$M)	2482	774	1706	2168	1306	1222
CONSTRUCTION COST SAVINGS OVER OPTION 1 (BASE CASE) (\$M)	-	953	526	184	1176	760
EXCEEDS AUTHORIZED FUNDING CEILING	YES	NO	NO	YES	YES	NO
ENHANCE FEDERAL SUPPORT FOR FUTURE APPROPRIATIONS	NO	YES	YES	YES	YES	YES
LOCAL FUNDING OF NON-REIMBURSABLE COSTS	NO	YES	YES	NO	NO	YES
ADDITIONAL INTEREST BEARING COST TO CAWCD	NO	YES	YES	YES	NO	YES
YEAR NEW WADDELL BECOMES OPERATIONAL	1998	1991	1995	1997	1997	1991
YEAR ROOSEVELT DAM CONSTRUCTION COMPLETED	2001	1994	1998	2000	2001	1998
YEAR CLIFF DAM CONSTRUCTION COMPLETED	2008	1996	2002	2006	-	1999

POSSIBLE SOURCES OF NON-FEDERAL FUNDS

It is not the purpose of this report to present detailed analysis of how up-front funding may be accomplished. However, a number of possible sources of funds may be identified. In general, these sources may be related to a specific project feature and purpose. Summarized below are some potential contributors to construction of the CAP.

CAWCD

Any up-front funds provided by CAWCD would be used exclusively to offset costs reimbursable to the federal government which have been allocated to power and M&I water deliveries from the project and are interest-bearing. Several opportunities appear possible for the District to generate up-front funds. General obligation or revenue bonds are a possibility, although the District has no current bonding authority. Legislation would be required to authorize this authority. Revenue from the sale of surplus Navajo power as authorized by the Hoover Power Plant Act (PL98-381) may be dedicated to the support of bonds. An alternative is to dedicate surplus Navajo capacity and energy to a utility or user for a specified period of time in exchange for an up-front payment. It is estimated that between \$200 and \$300 million can be raised from this source.

Salt River Project

As the operator of the affected dams, the Salt River Project will be the agency called upon to assume responsibility for repayment of that portion of the Plan 6 costs allocated to safety of dams. There are indications that SRP would be willing to advance its current 15 percent repayment obligation as up-front funds if assured in turn, of timely construction of Roosevelt and Cliff Dams.

Maricopa County Flood Control District

All CAP costs allocated to flood control are non-reimbursable and therefore an obligation of the federal government. Nevertheless, to assure federal participation in the construction of Cliff and Roosevelt Dams it may be necessary to provide up-front funds for allocated flood control costs. The Maricopa County Flood Control District is the entity most likely to provide this type of funding as it is responsible for all flood control efforts in Maricopa County where the flood control benefits from Plan 6 are realized. The advantage for the County to participate in this type of funding arrangement is the earlier flood control benefits realized.

Rio Salado Development District

The Rio Salado Project cannot be implemented as envisioned without substantial flood control on the Salt River system. Like the Maricopa County Flood Control District, the Rio Salado

Development District would benefit from early construction of facilities and may be willing to provide some up-front funding of costs allocated to flood control.

City Of Phoenix Or Other Water Users

As part of the Plan 6 features, Cliff and Roosevelt Dams will conserve a portion of the waters now spilled down the Salt River during floods. A portion of the costs of these features are therefore allocated specifically to water conservation. The City of Phoenix has expressed an interest in purchasing the water supply developed behind Cliff Dam and may be willing to up-front fund the \$25 million portion of the water conservation cost associated with this facility.

COST AND BENEFIT CONSIDERATIONS REPAYMENT

Water Supply and Power Management

Approximately 64% of CAP construction costs must be repaid to the U.S. Treasury. Project costs charged to municipal and industrial water and power purposes will be repaid with interest. The Project interest rate is 3.342%. Cost allocated to non-Indian agricultural water delivery purposes are repaid without interest. Flood control costs and project costs allocated to delivering Indian water are a federal obligation and therefore are not reimbursable.

The Central Arizona Water Conservation District (CAWCD) is the entity responsible for repayment of reimbursable costs. Repayment provisions used in this report are those contained in the master contract negotiated between the CAWCD and the Secretary of Interior in 1972. The CAWCD will repay Project costs over a 50-year period beginning when the Secretary of the Interior declares that the Project is substantially completed.

The CAWCD will have five basic sources of revenue to meet its repayment obligations: water sales to M & I users, water sales to non-Indian farmers, excess Navajo power sales, a surcharge applied to Hoover and Parker-Davis energy sold in Arizona, and property taxes. Water service subcontracts between the CAWCD and each individual water user sets forth in detail the provision for the sale and delivery of water. In addition to O&M costs, agricultural water users will pay \$2 per acre foot for project repayment and M&I users will pay a rate based on a

schedule of purchased capacity starting at \$5 per acre foot escalating to \$40 per acre foot over the 50-year repayment period. The sale of excess power at the Navajo Generating Station and revenue from a surcharge of 4.5 mills applied to energy generated at Hoover Dam and Parker-Davis Dams for sale in Arizona will be available to help repay Project costs. Property taxes will supplement the other sources of revenue and will provide a measure of flexibility to the CAWCD in meeting its repayment obligation.

Presently, the District is empowered to levy a maximum of 10 cents per one hundred dollars of assessed valuation on all property within the Districts' boundaries. Since the other revenue sources are essentially fixed over the repayment period, property taxes will be the revenue variable which will change in relation to the various funding options set forth in this report.

Figure 23 summarizes the results of repayment studies performed by the Department of Water Resources, and shows the amount of property tax revenue required to meet the repayment obligation of the CAWCD for options 1, 2, 3, 4 and 6 for the 1985-2010 period. This period was selected because it coincides with the retirement of Project interest bearing costs and costs associated with the retirement of bonds used to acquire the CAWCD share of local funding. Only a small portion of the non-interest bearing costs are repaid in this period and are not shown.

In order for the CAWCD to contribute to up-front financing a larger reliance on property tax revenues will be required.

Option 2 requires the highest utilization of tax revenues and Option 1 the least. Accordingly, Option 2 has the highest average tax rate over the period. Option 3, the lowest level of non-federal financing that would circumvent the need to seek reauthorization, would appear to require a maximum tax rate almost double the currently authorized rate but an average rate only 4 cents per \$100 greater than Option 1, with no non-federal financial assistance.

FIGURE 23

COMPARISON OF CAWCD REPAYMENT OBLIGATION TO THE UNITED STATES TREASURY AND REVENUE SOURCES USED TO SATISFY THIS OBLIGATION
IN THE 1985 - 2010 PERIOD

	(\$ MILLIONS)				
	OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 6
<u>Total Up-Front Funding</u>	0	755	250	130	500
<u>CAWCD Share of Up-Front Funding</u>	0	345	114	73	210
<u>Repayment Obligation</u>					
Interest Bearing Repayment Obligation to U.S. Treasury (P&I) ^{1/}	1,240	930	1,160	1,230	1,040
Bond Repayment Obligation (P&I) ^{2/}	0	810	270	160	540
Total Obligation	1,240	1,740	1,430	1,390	1,580
<u>Revenue Sources</u>					
Revenue From the Sale of M&I Water	210	210	210	210	210
Revenue From the Sale of Power	290	290	290	290	290
Property Taxes Collected ^{3/}	740	1,240	930	890	1,080
Total Revenue	1,240	1,740	1,430	1,390	1,580
Maximum Tax Rate (cents/\$100)	12	28	19	18	24
Average Tax Rate (cents/\$100)	7	15	11	12	12

^{1/} Only the interest bearing items associated with Project Repayment are shown. Revenue from the sale of agricultural water and the non-interest bearing repayment obligation are not shown.

^{2/} Assumes that all of the CAWCD up-front funds are acquired from a bonding program. Bonds are repaid over a 23 - 28 year period at a 10% rate. Difference in the length of repayment periods result from differences in the number of year required to fund Project construction with local share.

^{3/} Tax rates and revenues are based on an annual growth rate of 10% in net assessed value within the CAWCD.. Assumes that the CAWCD will be authorized to exceed the current 10 cent limit.

NOTE: Values in this table are for comparative purposes and were developed by ADWR based on our interpretation of repayment provisions. Final repayment values could differ substantially but the relative differences between options should not vary greatly.

FLOOD CONTROL

Up-front funding allocated to flood control would have to be assumed by the beneficiaries of flood control. Were the Maricopa County Flood Control District to assume this responsibility, the District would have to utilize its taxing authority to raise the necessary funds. Presently the District is empowered to levy a maximum of 50 cents per one-hundred dollars of assessed valuation on all property within Maricopa County. Options 2, 3 and 6 require up-front funding for flood control. Option 2 requires the highest utilization of revenues and Option 3 the least. Figure 24 shows the amount of allocated funding and the property taxes collected by the District and the resulting tax rates for Options 2, 3 and 6.

FIGURE 24

COMPARISON OF THE MARICOPA COUNTY FLOOD CONTROL DISTRICT
 SHARE OF UP-FRONT FUNDING AND PROPERTY TAX REVENUES
 REQUIRED TO SATISFY THIS OBLIGATION

	1	2	3	4	5	6
Total Up-Front Funding	0	755	250	130	0	500
Flood Control District Share of Up-Front Funding	0	247.5	82.0	0	0	165.0
Property Taxes Collected	0	247.5	82.0	0	0	165.0
Maximum Tax Rate (cents/\$100)	0	41	19	0	0	35
Average Tax Rate (cents/\$100)	0	25	13	0	0	20

The average tax for Option 2, the maximum level of non-federal financing investigated, at 25 cents per hundred would represent one-half of the Flood Control Districts current authority and is equal to the level being discussed by the Rio Salado Development District. The average tax for Option 3, the minimum level of up-front financing that would avoid reauthorization, at 13 cents would only require approximately 25% of the Flood Control Districts' current taxing authority and would leave 75% for other purposes.

Safety of Dams

All costs associated with Safety of Dams are assumed in this analysis to be the responsibility of the Salt River Project. Revenue from the sale of water or power to users within the boundaries of the SRP are the primary sources of revenue available to SRP to meet its funding obligations. Figure 25 shows the amount of financing allocated to SRP under the options studied. For the purposes of this report we have assumed that the SRP would also issue bonds for its share of up-front funds and these amounts are also shown on figure 25. No attempt was made to identify the source or sources of revenue SRP would select to fund the Safety of Dams' share.

FIGURE 25

COMPARISON OF THE SALT RIVER PROJECTS' SHARE OF UP-FRONT
FUNDING AND BOND REPAYMENT OBLIGATION

	1	2	3	4	5	6
Total Up-Front Funding	0	755	250	130	0	500
SRP Share Of Up-Front Funding	0	162.5	54.0	57.0	0	105.0
Bond Repayment Obligation ^{1/}	0	382.0	126.0	134.0	0	247.0

^{1/} Bonds are repaid over a 23 - 28 year period at a 10% interest rate. Differences in the length of repayment periods result from differences in the number of years required to fund Project construction with local share.

The Central Arizona Water Control Study categorized the benefits associated with Plan 6 as water and power, flood control, safety of dams, and recreation and fish and wildlife. A financial analysis was performed by the USBR as part of the CAWCS to equitably allocate Plan 6 costs among the various functions served. Annual benefits calculated for these features total to 127 million dollars annually. The analysis of total benefits and costs resulted in a benefit cost ratio of 1.2 to 1. All costs and benefits were assumed to accrue in the year when all features of Plan 6 were completed.

The up-front funding proposals in this report will not affect the benefit determination developed in the Central Arizona Water Control Study. No additional benefits will result nor will there be a reduction in benefits as they have been identified in the CAWCS. However, the year in which they are realized will be advanced. Additional interest costs will be incurred as a result of the bonding programs associated with the CAWCD and Safety of Dams share of up-front funding.

The primary effect of the up-front funding concept is the earlier realization of the \$127 Million in average annual benefits from Plan 6 when other options are compared with Option 1. For example, Option 2 would result in the realization of all project benefits by 1996, a full 12 years earlier than those from Option 1, which would occur in 2008. Time has not permitted a thorough recalculation of benefits and costs in light of interest costs added by local funding and reduced interest costs realized

both by early construction and reduction of the federal obligation. Figure 26 displays the number of additional years that full benefits could be realized for each option, the value of the benefits and the additional local interest cost that would result from local funding for the CAWCD and safety of dams. No account is made for interest savings discussed above.

FIGURE 26

PLAN 6 BENEFITS AND COSTS
 RESULTING FROM EARLY IMPLEMENTATION

	<u>OPTION 1</u>	<u>OPTION 2</u>	<u>OPTION 3</u>	<u>OPTION 4</u>	<u>OPTION 6</u>
Number Of Years Full Benefits Advanced	0	12	7	2	9
Value of Benefits Advanced (\$Millions) ¹	0	1,524	889	254	1,143
Additional Interest Costs Incurred ²	0	359	112	71	246

1 Value of benefits advanced are calculated by multiplying annual average benefit of Plan 6 of \$127M by number of years advanced.

2 Interest costs stated in 1985 dollars.

CONCLUSIONS

The report provides no specific recommendation as to which option should be pursued, but some general conclusions can be advanced:

1. If local funds are necessary to complete the total Project, the CAWCD would have to obtain authorization to bond and to increase the ceiling on its property taxing authority above the present level of 10 cents.
2. Option 3, whereby \$250 million of non-federal funds are provided up-front, would result in an average CAWCD tax increase during the first 25 years of 4 cents over the option of no up-front funding. Substantial non-federal financing of flood control and safety of dams costs would also be required. In return, however, each of the Plan 6 facilities would be completed 7 years earlier than without financing assistance, the cost ceiling issue would be avoided and federal support enhanced.
3. Option 6, whereby \$500 million of non-federal funds are provided up-front, would result in an average CAWCD tax increase during the first 25 years of 5 cents over the option of no up-front funding. Substantial non-federal financing of flood control and safety of dams costs would also be required. In return - New Waddell would

be completed 7 years earlier, Roosevelt Dam 3 years earlier and Cliff Dam 9 years earlier than without financing assistance. The cost ceiling issue would be avoided and federal support enhanced.

4. Option 2 (\$755 million), Option 3 (\$250 million) and Option 6 (\$500 million) require substantial contributions towards flood control and safety of dams costs which are currently a federal obligation. If any of these options is pursued an effort should be made to obligate the federal government to repay over time any funds advanced for non-reimbursable costs.

5. The benefits of advancing funds would appear to substantially outweigh the costs for all options investigated.