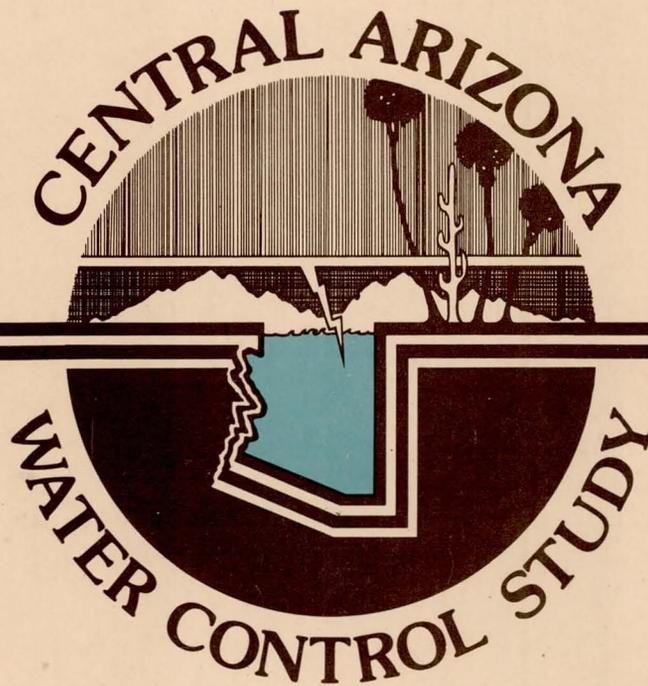


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Public Involvement Plan

Water and Power Resources Service
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Mr. W. D. Mathews
Chief Engineer and General Manager
Maricopa County Flood Control District
3335 West Durango Street
Phoenix, Arizona 85009

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Dear Mr. Mathews:

A copy of the Public Involvement Plan for the Central Arizona Water Control Study is enclosed for your information.

Sincerely,

Edward M. Hallenbeck

Edward M. Hallenbeck
Project Manager

Enclosure

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PHOENIX, ARIZONA 85073

IN REPLY
REFER TO: 330-170
500.

JUN 27 1980

Memorandum

To: Regional Director, Boulder City, Nevada
From: Projects Manager
Subject: Public Involvement Plan, Central Arizona Water Control Study,
Central Arizona Project

In accordance with the draft Water and Power Instructions, Part 351
Public Involvement, we are forwarding the subject plan for your approval.

This Public Involvement Plan has been written to insure that public
involvement activities are integrated into the decision-making process
of the Central Arizona Water Control Study (CAWCS).

Since public involvement has been an integral part of the CAWCS from the
time the study was initiated, two appendices are included to document the
Stage I and II public involvement activities through March 1980.

I recommend your approval.

Enclosure

Approval:

Eugene Hinds
Regional Director

Date:

JUL 8 1980

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PUBLIC INVOLVEMENT PLAN
CENTRAL ARIZONA WATER CONTROL STUDY

I. INTRODUCTION

In 1968, Congress enacted the Lower Colorado River Basin Act (Public Law 90-537) which authorized the Central Arizona Project (CAP) as a means of reducing water shortages in central Arizona. CAP is a multi-purpose water resource development and management project which will bring water from the Colorado River across Arizona into Maricopa, Pinal, and Pima Counties, utilizing a system of aqueducts, generating stations, pump stations, and reservoirs. Currently under construction by the Water and Power Resources Service (Service), the Project is scheduled to begin water deliveries in 1985.

One of the authorized features of the CAP is a dam located approximately 20 miles east of Phoenix at the confluence of the Salt and Verde Rivers, known as Orme Dam. Orme Dam, or a suitable alternative, was authorized to provide a reservoir for seasonal storage and regulation of CAP water upon its arrival in central Arizona. The existence of regulatory storage capacity would increase CAP efficiency by permitting a relatively constant flow of water through the aqueduct system despite fluctuations in demand. Colorado River diversions could be stored during low water demand periods or aqueduct shutdowns; or transferred to the Salt-Gila Aqueduct during high demand or emergency conditions.

In addition to providing regulatory storage, Orme Dam or a suitable alternative would offer a high degree of flood protection to the Phoenix metropolitan area and provide for conservation of flows from the Salt and Verde Rivers that are currently lost. The Salt and Verde Rivers historically have generated serious floods in Phoenix, the largest metropolitan area in the Colorado River basin. Recent floods in March and December 1978, January 1979, and February 1980 were so serious that federal disaster proclamations were issued for the area. It is estimated that construction of Orme Dam would prevent flood damages averaging over \$4 million annually.

In preparation for the construction of Orme Dam, the Water and Power Resources Service issued, in May 1976, a draft environmental statement for the dam and reservoir (Int. DES 76-17). Response to this document revealed concern among some Arizona agencies and citizens regarding the environmental impacts of the proposed dam. Of particular concern are: Inundation of the Fort McDowell Indian Community and riparian habitat, and impacts upon the habitat of the endangered bald eagle and other species; the safety aspects of the proposed dam; and possible restriction of extensive recreational use of the Salt River. These concerns and others caused the Water and Power Resources Service

to reassess the merits of Orme Dam and to delay the preparation of a final environmental statement and initiation of the construction of this CAP feature. In April 1977, President Carter, as a result of the Administration's water projects review, recommended that Orme Dam be eliminated from the CAP.

The Central Arizona Water Control Study (CAWCS) was initiated in July 1978 when the Commissioner approved the concept of a coordinated study with the Corps of Engineers that would focus on identification and evaluation of plans that would provide flood control and CAP regulatory storage capacity.

The Water and Power Resources Service has primary responsibility for the CAWCS. The Corps of Engineers, having considerable experience in flood control matters, is responsible under the Flood Control Act of 1944 for prescribing regulations for operation of flood control projects constructed by the Service. Therefore, the Corps will assist the Service by formulating and evaluating plans for flood control.

Dames and Moore, an environmental and applied earth sciences consulting firm, has received a contract from the Service to design and implement the CAWCS public involvement program. In addition, this firm will also analyze the environmental, social, and economic impacts of the proposed alternatives in the Central Arizona Water Control Study.

II. POLITICAL CLIMATE FOR THE STUDY

This study must be conducted both with extreme political sensitivity and also with a visibility and openness which will lend credibility to the final conclusions. The President of the United States has already indicated his opposition to Orme Dam, one possible alternative in the study. Yet heavy flooding has not only "resuscitated" the consideration of Orme Dam as an alternative, but has created such strong demands for action that many people consider the length of this study to be non-responsive to public needs.

The public involvement element of this study is absolutely crucial to its success. While the technical studies which will be conducted as part of this study are essential, they will only contribute to the final decision to the extent to which the public believes they were objectively conducted and objectively evaluated. As a result, public involvement must not only provide opportunities for the public to participate in drawing conclusions based on the technical data, but must also provide mechanisms by which the public can evaluate the technical studies themselves, and satisfy concerns about their objectivity.

Obviously, not every citizen can be in a position of evaluating the technical adequacy and objectivity of a study, so this public involvement program will have to be designed to recognize different kinds of

publics. While there will be efforts to involve the general public-- "John Q. Public," it needs to be recognized from the beginning that the detailed review of the technical study will necessarily have to be done by relatively well-organized interest groups and other agencies who can provide the time, staffing, and expertise necessary to understand the technical material. Not only do these groups serve as surrogates for the public in the review of the technical information, but they act as communicators back to the public about the adequacy of the study. If, through a public involvement program, the active organized groups and agencies come to the conclusion that the technical studies are being done in an adequate and objective manner, this conclusion will, in turn, be passed on to a broader general public. The general public can then feel confident to participate on the broader issues of philosophy and values, which is the usual level at which the general public is able to participate.

III. PRELIMINARY CONSULTATION ACTIVITIES

This plan was initially developed in consultation with representatives from the Service, the Corps of Engineers, the Arizona Water Commission, and the Governor's office. Subsequently, the program was reviewed by the Governor's Advisory Committee which consists of the leadership of all the major interests, including mayors of the cities, tribal leaders, development interests, agriculture, and environmental groups. This group will continue to serve as a sounding board for all public involvement activities, and the chairman of the committee will participate in all planning sessions.

IV. MAJOR ISSUES

The major issues are well-known--and well-publicized--so are simply stated in summary form below:

1. Continuing opposition to the CAP, of which Orme Dam was originally a part.
2. The level and kind of growth which should be permitted to take place in the urban area.
3. The possible inundation of sizable portions of an Indian reservation if the Orme Dam alternative were chosen.
4. Potential reduction in the habitat of the desert bald eagle.
5. The trade-off between existing rafting recreation and "flatwater" recreation that would be developed if a dam were built.
6. The trade-off between the flood control offered by a dam at the confluence site versus the reduced environmental and social impacts with an alternative plan.

V. LEVEL OF PUBLIC INTEREST

Because of the recent flooding, public concern is extremely high at the present time. This is a shift from previous times when the controversy has been primarily between interest groups. As a result of the floods in February 1980, there continues to be criticism that the agencies are just doing bureaucratic studies instead of solving the problem, and it becomes increasingly important for the Agencies to complete the CAWCS within the timeframe established when the Study was initiated.

VI. INTERESTED GROUPS AND INDIVIDUALS

The Governor, in particular, is concerned to have some answer to the flood control problems as soon as possible. It should be recognized that since this issue has been of great interest at a national level, the publics who must feel satisfied by this study include national interest groups and political figures, as well as local groups and community leaders. The community leaders have a special role in the public involvement program because they are able to focus and articulate the needs and concerns of their constituencies. Governor Babbitt thus organized the Community Advisory Board. A listing of the members of this Board can be found in Appendix A.

The expert public will be organized as the Technical Agency Group which will meet periodically during the Study and will interact with the Service on a continuing basis.

Specifically, the Technical Agency Group will:

1. Assist in the collection of existing information and develop new data.
2. Review and analyze information.
3. Assist in plan formulation.
4. Participate in public workshops and meetings.

VII. PUBLIC INVOLVEMENT EXPERTISE

Major portions of this study are being conducted by a private environmental sciences consulting firm under a contract with the Service. To provide adequate staffing for this public involvement effort, this contract also requires the contractor to provide a full time public involvement coordinator, periodic consultation with an expert public involvement consultant, and considerable publications and graphics support.

The Service staff working with the study have all received public involvement training and have conducted prior public involvement programs.

VIII. INTEGRATION OF PUBLIC INVOLVEMENT AND THE PLANNING PROCESS

One of the fundamental principles of designing effective public involvement programs is to insure that the public involvement activities are integrated into the actual planning and decision-making processes. Without this integration public involvement activities are likely to be inappropriately timed, poorly designed to obtain the specific information needed, targeted at an inappropriate representation of the public, etc. For public involvement to be effective, it must be integrated into the planning process in much the way as are critical technical studies. No decision-maker would go beyond a certain point in decision-making until key technical studies had been completed. In just the same way, if public involvement is to be effective, there must be sufficient definition of what information is needed by particular points in the decision-making process so that the decision-maker would not venture beyond these points without previously having obtained this information from the public.

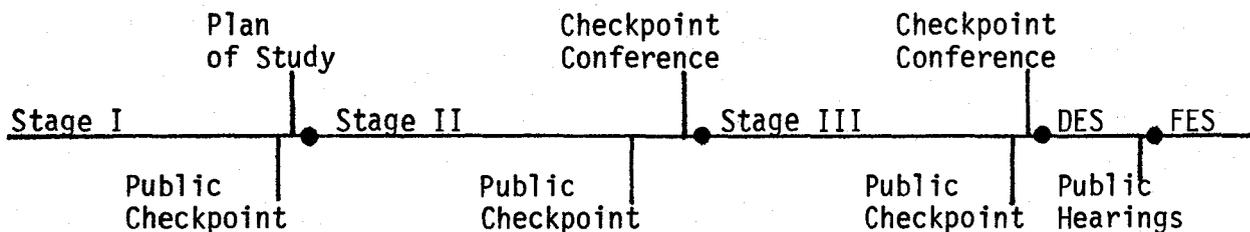
In order to conduct the CAWCS effectively, a three-stage process has been established: Stage I - Plan of Study (P.O.S.), Stage II - Development of Systems or Intermediate Plans, Stage III - Development of Detailed Plans.

Stage I - Plan of Study has already been completed. During this stage the scope and direction of the study were established. The major problems, issues, and concerns were identified. The study was organized, and contact was established with other agencies and publics. The Plan of Study^{1/} published at the end of Stage I, contains alternatives warranting more detailed evaluation and describes the plan of study to be followed, including estimated cost and schedule. Appendix A contains a detailed description of public involvement activities which were conducted during Stage I.

Stage II - Development of Intermediate Plans includes detailed assessments of geology, foundations, hydrology, hydraulics, costs, structural designs, and institutional analyses. More detailed environmental assessments and social and economic studies are also conducted. Non-viable plans are eliminated in Stage II and a limited number of plans are recommended for further detailed study in Stage III. Stage II concludes with a thorough review of findings by the Service, Corps of Engineers, and the general public. Appendix B contains a detailed description of the public involvement activities which have been completed to date (March 1980) in Stage II.

^{1/} Plan of Study, Central Arizona Water Control Study, prepared by Arizona Projects Office, Water and Power Resources Service, Assisted by Los Angeles District, U.S. Army Corps of Engineers, January 1980.

Stage III - Development of Detailed Plans includes modification of plans and designs based on economic, engineering, environmental, and social concerns disclosed during Stage II review. Emphasis is placed on a more thorough evaluation of proposed plans and upon implementation arrangements. Near the end of Stage III, draft planning reports and environmental statements are published and circulated for review and comment. Finally, the Regional Director of the Water and Power Resources Service recommends a plan for adoption. Final planning reports and environmental statements are then submitted to the appropriate authorities for implementation.



The checkpoint conference ^{1/} is essentially a decision-making time for the Agencies for each stage. At Stage I, checkpoint decisions are made as to the scope of the study, adequacy of the problem definition, and adequacy of the public involvement plan.^{2/} At Stage II decisions will be made to narrow the range of alternatives to those which will be considered during the final stage. During Stage III, the checkpoint conference will result in plan selection. At each of these checkpoints a public meeting(s) will be held. These public meetings will be held prior to the checkpoint conference so that the decision would be informed with public reactions.

Different kinds of public involvement will usually take place at these different times in the planning process. In the period labeled in the diagram above "Stage I" the public involvement is likely to be aimed more at "influentials"--leaders of organized groups or interests, other agencies, etc.--because it involves a degree of continuity and understanding which is hard to obtain from the general public. As a result, during these phases techniques such as interviews, advisory groups, workshops, newsletters, etc., are more likely to be used. Care must be taken to be sure that the "influentials" are representative of a whole range of values within the community. It should also be understood by participants that there will be a broader public review to follow.

In the weeks immediately preceding the checkpoint, there is a need for a broader general review by a larger public. Typically this means the use of larger more structured meetings or a series of workshops, a

^{1/}The checkpoint conference is a critical element of the Corps of Engineers internal management program used to review the adequacy of the public involvement effort.

^{2/}Public involvement for Stage I was evaluated as one of the first deliverables called for in the Dames and Moore contract and this evaluation memorandum is included in Appendix A.

heavy use of informational techniques such as brochures, news stories, exhibits, etc., and a heavy use of media to inform the general public of study findings and opportunities for participation. The Appendices section, at the conclusion of this report, contains all newsletters and brochures published through March 1980. There are indications that the broad general public has difficulty participating unless they have something to react to, so the checkpoint provides a natural opportunity for this broad general public. It should also be noted that new publics are likely to emerge at each checkpoint, as different publics begin to see how their interests may be affected.

IX. PUBLIC INVOLVEMENT PLAN

The major objective of the public involvement program is to provide timely information to the public so that individuals may participate in the planning process. This objective requires that information be generated through the public involvement program in such a manner that the planning process can be responsive to public needs and preferences.

Due to the previous controversy regarding Orme Dam and recent flood problems, a greater level of public interest exists in this Study than in a typical planning study. The public divides itself naturally into four levels of interest according to the way a project is perceived. Certain sectors of the public will be satisfied with an information-educational program. On the lowest interest level people have a "need to know" attitude but feel in many cases that the project will have little effect on them personally. On the next interest level, individuals have definite opinions, especially on issues which directly affect their lives, but they may not have the time or technical expertise to make a contribution to the planning process. Beyond this level is a group of about 100-150 individuals who are professional representatives of Federal, state, and local government agencies whose job responsibilities cover subject areas potentially affected by this Study. This group also includes those with a direct stake in the outcome of the CAWCS, such as water users groups, environmental organizations, recreation clubs, Indian tribes, and landowners. Finally, at the highest interest level are the community leaders. These individuals have a special role in a public involvement program because they are able to focus and articulate needs and concerns of their constituencies.

The public involvement program should satisfy information needs at all four levels of public interest. It also should facilitate the involvement of individuals in the CAWCS process.

The lowest interest level or passive public should be approached with information program techniques, including a regular newsletter, brochures, newspaper articles, and television coverage. Since these individuals provide little direct feedback to the CAWCS, the effort

expended on these activities should be limited. On the other hand, it is important to remember that media coverage is the only means available to reach some sectors of the public.

The more active public desires involvement in the process and has opinions it wants heard. Interaction techniques, such as organized public meetings and workshops, are effective. Meetings should be timed to coincide with critical decisions and not held too frequently. The following schedule of meetings and workshops has been established:

1. Introductory meetings were held in January 1979 to explain Study objectives and encourage participation in the Study process.
2. A series of workshops beginning in April 1980 to focus on problems and needs of the Study area and to review preliminary system alternatives and solicit public comment.
3. A public meeting and workshop session near the end of Stage II to focus on intermediate alternative plans and solicit public comment on those plans which should be studied in detail during Stage III.
4. A public meeting and series of workshops near the middle of Stage III to discuss the preferred plan and to explain the rationale leading to its recommendation.
5. A public meeting following release of the draft environmental statement to explain that document and answer questions.

In addition to meetings and workshops, slide shows will be made available for presentation to interested organizations.

The expert public can provide a great deal of technical information. Governmental bodies and water users groups can produce technical studies useful in areas where they lack expertise or are required by law to coordinate with certain agencies.

A. STAGE I PUBLIC INVOLVEMENT ACTIVITIES

The main thrust of this effort will be to get the public involvement program established in the community, get know the leaders of the various interest groups, establish contacts with the media, begin working with the Indian tribes, etc. By the end of this stage, the work will have been detailed for the public involvement plan, an analysis made of affected publics, and communication procedures established.

A summary and evaluation of the public involvement activities for Stage I which have been completed are summarized in Appendix A.

B. STAGE II PUBLIC INVOLVEMENT ACTIVITIES

During the first months of Stage II, the emphasis will shift to a larger number of presentations to civic and interest groups, informing them of the study and inviting alternatives. In addition, there would be heavy advisory committee activity during this period of technical studies.

It is appropriate in mid-Stage II to reanalyze the public involvement activities. The process should provide the kind of visibility to key decision points necessary to allow full integration between the public involvement program and the planning process.

Following is a sequential plan of public involvement activities, timed to integrate with the planning schedule itself. Since the public involvement program must be integrated with several studies, the dates shown are tentative.

The major public involvement activities planned as of March 1979 are shown in the right column.^{1/} The approximate timeframe for these activities is shown by the months on the left. Activities identified as "continuing" are repeated throughout the process, whether or not they are specifically mentioned again.

<u>Month</u>	<u>Public Involvement Activities - Stage II</u>
April 1979	<ol style="list-style-type: none"> 1. Establish study office and hotline. 2. Issue press releases announcing the establishment of the study office and hotline. Establish a procedure for periodic press releases. (Continuing) 3. Review existing materials and develop informational literature as needed. 4. Develop the format for a monthly newsletter and produce the first issue. 5. Establish a computerized mailing list. 6. Begin the newspaper clipping service. (Continuing) 7. Establish a procedure for summarizing and storing public comment.
May	<ol style="list-style-type: none"> 8. Work with Community Advisory Committee on a monthly basis. (Continuing)

^{1/} The plan was prepared in March 1979 as part of the proposal submitted by the prime contractor (Dames and Moore) for the public involvement portion of the contract. While some of the dates have changed, the activities and flow have remained essentially the same.

- May (cont'd)
9. Select Indian liaison staff and develop initial work program for Indian liaison. (Continuing)
 10. Call on major media figures in the area to establish press liaison.
 11. Conduct 15-25 interviews or small group discussions with key individuals or interest groups.
 12. Prepare an analysis of the publics who see themselves affected and the issues as viewed by them.
- June
13. Develop a slide show describing the project and identifying key issues.
 14. Develop a presentation format which allows for audience participation and response.
- July
15. Conduct a series of presentations to civic groups and interest groups, inviting alternatives.
 16. Develop format for a series of workshops.
 17. Develop publicity materials and handouts for workshops.
 18. Arrange for media stories on alternatives.
 19. Conduct field trip, if needed and appropriate.
- August
20. Conduct a series of workshops throughout the study area on alternative systems.
 21. Prepare report summarizing public involvement for the entire stage.

A summary of Stage II activities to date is also included in the Appendices section of this report.

During the second half of Stage II, emphasis will shift from presentations to workshops designed to generate alternative systems, and lead to some preliminary evaluation of known alternatives. At the conclusion of this effort, there will also be checkpoint meetings leading to the identification of the first level of alternatives.

MonthPublic Involvement Activities - Stage II

October 1979

1. Review public involvement program for first half of Stage II and revise public involvement plan as needed.
2. Maintain all continuing activities:
 - Advisory Committee meetings
 - Monthly newsletters
 - Press releases and media contacts
 - Indian liaison program
 - Clipping service
 - Update mailing list
3. Prepare a brochure for the public describing the alternative systems identified early in Stage II.
4. Prepare a slide show describing the alternatives.
5. Work with the Advisory Group to develop criteria for modifying or deleting alternatives.

November-
December

6. Conduct a series of workshops to evaluate alternatives for modification or deletion.

January 1980

7. Prepare an information brochure describing the alternatives and how they were modified and deleted. Update slide show to indicate modifications and deletions.

February

8. Continued presentations to groups on alternatives (also explaining the difference between "systems" and "plans").
9. Preparations for upcoming workshops.

March

10. Workshops on alternative plans, including evaluation of plans for detailed study.

April

11. Checkpoint meeting on alternative plans, including evaluation of plans for detailed study.
12. Prepare report summarizing all Stage II public involvement activities.

C. PUBLIC INVOLVEMENT ACTIVITIES - STAGE III

<u>Month</u>	<u>Public Involvement Activities - Stage III</u>
May	1. Critique public involvement program during the second half of Stage II and revise public involvement plan as required.
May	2. Develop a brochure summarizing the alternatives that will be summarized in detail, and also summarizing the public comment received from the public during Stage II.
	3. Maintain all continuing activities: <ul style="list-style-type: none"> Advisory Committee meetings Monthly newsletters Press releases and media contacts Indian liaison program Clipping service Update mailing list
June	4. Work with the Advisory Committee--or other key publics--to identify methods for reducing the number of plans.
July	5. Conduct a series of presentations to local groups on the alternatives and the criteria for reducing the number of plans.
	6. Develop a workshop format for reducing the number of alternatives and prepare pre-workshop publicity.
August-September	7. Obtain feature stories on alternative methods for reducing the number of alternatives.
	8. Conduct workshops to reduce the number of alternative plans.
October	9. Conduct field trips as needed.
	10. Prepare a brochure describing remaining alternatives.
November	11. Conduct presentations to groups on final alternatives.
	12. Arrange for feature stories on alternatives.

- | | |
|--------------|--|
| December | 13. Conduct field trips, as needed, to sites of final alternatives. |
| | 14. Prepare slide show for meetings showing alternative plans and impacts. |
| | 15. Conduct workshops to evaluate alternatives. |
| January 1981 | 16. Prepare a summary of public comment on the alternative plans. |
| February | 17. Prepare a draft public involvement appendix for the Draft Environmental Statement. |
| | 18. Prepare format and publicity plan for final checkpoint meetings. |
| March | 19. Conduct a series of checkpoint meetings on the Draft Environmental Assessment. |
| | 20. Prepare a summary of public comment. |
| | 21. Prepare final public involvement appendix for the Draft Environmental Statement. |

D. ENVIRONMENTAL IMPACT STATEMENT PROCESS

<u>Month</u>	<u>Activities</u>
May	1. Design a detailed public involvement program for review of the draft environmental statement (DES).
2nd Half-1981	2. Conduct several workshops for detailed review of DES.
	3. Conduct formal hearings on DES.
	4. Prepare a summary of public comment on the DES.
	5. Draft responses to public comment on the DES.
	6. Complete a draft coordination section on the DES.

E. CONTINUING ACTIVITIES

A more detailed description of some of the continuing activities mentioned in the plan include:

1. Study Office and Hotline

It is important to establish a single point of contact for the public with the project. For this reason, a study office will be established and a hotline installed. These will establish one-stop walk-in or call-in points. The office and phone will be staffed primarily by the staff employed on the contract with the environmental consultant, but the intent is to establish a project identity which stands alone, neither Corps, the Service, nor consultant. In the early months of the contract it will be natural that the study office staff will frequently have to track down information for the public from either the Corps or the Service, particularly until Corps and Service staff are comfortable that the study office staff has sufficient background to answer project questions. The intent, however, is that the public can call just one place, and the study office person dealing with them does the tracking down, rather than members of the public having to go to several sources for their information.

2. Newsletter

A monthly newsletter will be established. This newsletter can provide project information, summaries of public comment received to date, and also request information from the public. A mailing list of more than 500 names has already been started during the Stage I Public Involvement Program. These names will be placed on a computer program, and new names will be added with expressions of interest. The newsletter is particularly important during those portions of those studies where technical studies are being conducted, and there are not a lot of highly visible public involvement activities. The newsletter keeps people abreast of what is going on, so that visibility of the process is not lost.

3. Clipping Service

A clipping service will be established to keep track of all news stories from local newspapers and magazines which touch on the study or related topics. The major stories will be circulated weekly to the Corps, Service, study office staff, and other contractors on the project. This will be a way of sensitizing all staff related to the study to public concerns and issues.

4. Advisory Committees

An Advisory Committee will be an integral part of this study in addition to its value as a source of information from publics who become sufficiently well-informed to provide a continuity of response. Advisory Committees can serve a particularly important role in public involvement by overseeing the public involvement process itself and reviewing publications and reports before they go out to the general public.

Governor Babbitt established an Advisory Committee to provide him with counsel on this issue. Considerable effort was made by the Governor to ensure that the membership on the committee was representative of the public. There is little reason to believe that it would be possible, even if desirable, to find a more representative committee. In addition, there could be major drawbacks to having two competing committees. For this reason, it appears desirable to make the arrangements necessary for the committee to be advisory to this study, as well as to the Governor.

The major arrangement which will have to be made is some provision for study staff to be part of the coordination group with the committee. At present, coordination is handled solely by state personnel, and study personnel will have to be included in this coordination group if the committee is to advise both the Governor and the study.

The expert public can also provide a great deal of technical information to the Agencies. Governmental bodies and water users groups can produce technical studies useful to the Agencies in areas where they lack expertise or are required by law to coordinate with certain agencies. The expert public will be organized as the Technical Agency Group (TAG). Membership in the TAG will be adjusted by the Agencies during the CAWCS. The TAG may be organized into disciplinary subgroups such as fish and wildlife, recreational and cultural resources, water resources and uses, flood control, and power and engineering. Subgroups could be standing committees or ad hoc, in which case they would organize to perform certain tasks. In general, subgroups would provide data to the TAG as a whole for consideration. For a listing of membership in the TAG, see Appendix A.

5. Storage and Retrieval of Public Comment

Because of the large quantity of public comment which is anticipated in this study, one major task will be to develop a procedure for summarizing and storing public comment in such a way that it can be readily retrieved and organized for effective evaluation. In the past, one major problem in the analysis of public comment has been the tendency to simply score letters in terms of opposition or support to proposed actions. An individual may write a three-page letter describing all kinds of issues, concerns, and reasons, but the method for storing data will only show whether the person was for or against a project. This reduces the value and impact of public comment.

In this study, a system based on the Forest Service Codinvolve system will be utilized. This is a method of content analysis which allows storage of all of an individual's basic arguments, coupled with any demographic or group membership information. In this way, nearly all of the information supplied in the public comment can be stored, and extensive analysis can be made by crossreferencing the data,

e.g., Do people living in certain areas have similar opinions about a proposed alternative? etc. In addition to the Forest Service Codinvolve system, we would propose to include values information received from the public as a separate category. Such values information can serve in formulation of alternatives and in predicting reactions to various alternatives. This is an area in which relatively little work has been done, so the exact uses of the values portion of the stored information will have to be determined as the study progresses.

6. Indian Liaison^{1/}

It is difficult to describe in advance the exact nature of the consultation program with the Indian tribes. As governmental entities, each Indian tribe will establish its own ground rules for the amount and kind of consultation which will take place. In addition, we believe that the effectiveness of this consultation rests on a substantial amount of informal one-on-one contact with tribal members.

It is expected that a team of three Indian liaison persons will be established. These individuals should be mature individuals with different tribal backgrounds, capable of communicating with "anglo" culture as well as the various Indian cultures. In consultation with the tribes, they will develop consultation activities suitable to each tribe. The basis for this consultation will be--hopefully--a trust relationship which is built through continuous informal contact with tribal members.

^{1/}This proposed method of working with the Indians was never consummated. It was not possible to locate specific individuals who met the requirement nor were tribal members willing to play the role. Instead, the Discipline Director for the Social Assessment team has filled this role.



APPENDIX A

APPENDIX A

Public Involvement Activities Completed in Stage I

This section summarizes the main public involvement activities during Stage I and emphasizes the roles of the Community Advisory Board and the Technical Agency Group, the public meetings, brochures, and media coverage.

Stage I Public Involvement has been conducted to insure that public perceptions, concerns, ideas, and preferences are understood so as to structure the CAWCS appropriately. Fortunately, a great deal of information has been accumulated.

A. Public Response

The responses to the Orme Dam Draft Environmental Statement (1976) provide a great deal of insight to public attitudes. The concerns expressed in these responses include:

Alternative means of controlling floods along the
Salt and Gila Rivers

Conservation of local floodflows

Regulation of CAP water supplies

Reduction of ground-water overdraft

Archeological and historical impacts

Social impacts

Economic impacts

Endangered species

Vegetation and wildlife habitat

Ground-water recharge

Impacts on Indian communities

Water and air quality

Dam safety

Recreation

Fish and wildlife enhancement

B. Interagency Task Force on Orme Dam Alternatives

Based on the responses to the Orme Dam Draft Environmental Statement, the Service reassessed alternatives to Orme Dam. The Interagency Task Force on Orme Dam Alternatives was formed in April 1977 to identify and evaluate primary-purpose alternatives for CAP regulation and flood control. The Task Force consisted of individuals with varying viewpoints and backgrounds. A Technical Work Group was organized, which in turn was divided into Flood Control, Regulatory, and Environmental/Socio-economic Subcommittees. The Task Force suspended work following a September 30, 1977, memorandum from the Lower Colorado Regional Director of the Water and Power Resources Service that no further funds be expended on Orme Dam or any confluence structure. Activities were resumed after clarification was received indicating that Congress had not intended to prohibit the study of alternatives at the confluence site. On May 5, 1978, the Task Force submitted a final report which stated that a consensus recommendation could not be made because of the complexity of the issues involved, a shortage of time and resources, and the divergent opinions of the Task Force members. Opinions expressed in response to the final report are valuable to the current Study and constitute a primary source of information for identification of alternatives to be evaluated further in this Study.

C. Public Meetings

Three public meetings on the Study of Alternatives for Salt-Gila Flood Control and Regulation of Central Arizona Project Waters (now CAWCS) were held at: The Buckeye High School Auditorium, January 30, 1979, 7:00 p.m., with 188 persons filling out attendance cards; the Maricopa County Supervisor's Auditorium, Phoenix, January 31, 1979, 10:00 a.m., with 57 persons filling out attendance cards; and the Centennial Building, Mesa, January 31, 1979, 7:00 p.m., with 52 persons filling out attendance cards. The first meeting was chaired by John Hawley, Mayor of Buckeye; William A. Lavell, Field Solicitor for the Department of the Interior in Phoenix, chaired the second meeting; and Wayne C. Pomeroy, Mayor of Mesa, moderated at the third meeting. Representing the Water and Power Resources Service at these meetings were Dick Shunick, Projects Manager for the Arizona Projects Office, his assistant Dess Chappellear, Stephen Magnussen, Chief of Advance of Planning, and Herb Dishlip, Agency Manager for the Study. Present for the Corps of Engineers were Colonel Gwynn Teague, District Engineer, Los Angeles District; Lieutenant Colonel Verne Doyle, Special Assistant to the District Engineer; Joe Dixon, Agency Manager; and Will Worthington, Urban Studies Chief.

Each of these meetings began with slide presentations describing the issues of Salt-Gila flood control and regulation of CAP waters and briefly summarized the alternatives under study by the Service

and Corps. The Study process and schedule which the Agencies will follow also were discussed. The public information brochure was also distributed.

The meetings were then open to public questions and statements. The representatives of the Service and Corps made responses to these questions and comments whenever appropriate.

Fourteen persons made comments at the Buckeye meeting. In general, these involved: Concern over the length of time of the Study, lack of adequate bridges over the Salt and Gila Rivers from 91st Avenue to Gillespie Dam, impaired access to Rainbow Valley, need for channel clearing or channelization of the Salt and Gila Rivers from 91st Avenue to Gillespie Dam, environmental impacts of upstream structures, channel clearing or channelization, concern for the Fort McDowell Indians, operation and safety of Painted Rock Dam, linking downstream flood control (as it relates to the CAWCS) with CAP regulatory storage, criticism of Salt River Project during the recent floods, and support and criticism of Orme Dam.

Specifically, it was suggested that:

1. The Agencies recognize there is no alternative to channel clearing or channelization between 91st Avenue and Gillespie Dam.
2. Gates be installed at Gillespie Dam to lower the height of the structure so that a channel through the Arlington area can be made.
3. The Agencies assist in a local program which would be established to prepare an environmental assessment for channel clearing.
4. The Salt River Project's operations be reoriented to provide greater flood control.
5. The Agencies' priorities be shifted to provide flood protection for downstream areas in advance of any decision on CAP regulatory storage or upstream flood control measures.
6. The potential for water conservation and storage should be studied in order to develop plans to protect the area from the damaging effects of droughts.

At the Phoenix meeting, 12 persons made comments regarding the need for clearing the Gila River channel in the CAWCS area, support for and opposition to Orme Dam or any structure at or near the Salt-Verde confluence, danger to riparian habitat and wildlife posed by some

alternatives, concern for Fort McDowell Indians, support of non-structural solutions to flood control and CAP regulatory storage needs, adequate bridges over the Salt River, both criticism and support of the Salt River Project's operation during the floods of 1978-1979, and concern over safety of Stewart Mountain and Roosevelt Dams.

Specifically, it was suggested that:

1. Channelization or channel clearing is needed below the 91st Avenue wastewater treatment plant even if Orme Dam or an alternative upstream flood control structure is built.
2. Ground-water recharge be thoroughly investigated as an alternative for CAP regulatory storage.
3. Renewed consideration be given to regulatory storage damsites on the Agua Fria and Gila Rivers.
4. San Carlos Lake be investigated for CAP storage.
5. Floodplain regulation be strictly enforced.
6. The Salt River Project's responsibilities should include specific flood control duties.
7. Improved flood warning systems are needed.

Twenty persons made comments at the Mesa meeting. In general, these comments concerned: The length of time of the Study, cost of the Study, costs of Orme Dam and Reservoir and of channelization of the Salt River, operating criteria for any proposed upstream flood control structure, criticism of the Salt River Project's operation during the 1978 floods, the effects of proposed structural alternatives on riparian habitat and eagle nesting areas, the need for non-structural alternatives for both flood control and regulatory storage, the safety of Stewart Mountain and Roosevelt Dams, concern for the Fort McDowell Indians, the need for channels and bridges along the Salt River, and support for and opposition to Orme Dam and Reservoir, as authorized.

Specifically, it was suggested that:

1. The Salt River Project provide increased flood control through modification of existing regulations or restructuring of the Board of Directors.
2. Water exchanges with the Salt River Project be accomplished to provide CAP storage.

3. Bridges, channels, and floodplain regulation be examined as more economical solutions to flood protection.

4. Ground-water recharge be promoted as an alternative for CAP regulatory storage and flood control.

5. Improved flood warning systems be developed.

6. The Agencies recognize that construction of any new upstream structure or modification of existing structures may endanger important archeological sites and critical riparian habitat.

The public meetings were well attended and obtained comment from a broad cross-section of the public; however, only 15 or 20 people would speak at each meeting. Transcripts of the three public meetings were made available to the public for a small fee.

D. The Community Advisory Board

In July 1978, Governor Babbitt organized the Community Advisory Board, Salt-Gila Flood Control and CAP Regulation Study (now CAWCS), with representation from a cross-section of the community to review and advise on the identification and selection of a viable alternative for flood control and CAP regulatory storage. The interest in expediting the CAWCS has been continually expressed by the Board and they will be an extremely important group for providing feedback as the Study progresses and eventually in helping to mold a community-wide consensus for the selected plan.

To date the topics which the Board has reviewed related to this study are the overall study purpose and the schedule. Initially the Committee expressed considerable unhappiness with the 47-month schedule of the study, indicating that they believe this is non-responsive to the immediate flooding problems. Members of the Governor's Community Advisory Board are listed below.

Herschel Andrews
Salt River Pima-Maricopa Indian Council

Ben Avery
Wildlife Groups

Tom Chauncey, Sr.
KOOL-TV

Joan Enos
Fort McDowell Tribal Council

Tom Fannin
Real Estate

Honorable Art Hamilton
State Representative, District 22

Honorable Margaret Hance
Mayor of Phoenix

Honorable John B. Hawley
Mayor of Buckeye

Honorable Bill Jenkins
Mayor of Scottsdale

Thomas Jones
Fort McDowell Tribal Council

Sue Lofgren
League of Women Voters

Honorable Dessie M. Lorenz
Mayor of Avondale

Sam Mardian
Contractor

Honorable Manuel G. Marin
State Representative, District 6

Chet McNabb
Superintendent, Buckeye School District

Honorable Harry Mitchell
Mayor of Tempe

John R. Norton, III
Agriculture

Ed Pastor
Maricopa County Board of Supervisors

Eva Patten
Governor's Commission on the Environment

Honorable Wayne Pomeroy
Mayor of Mesa

Hank Raymond
Central Arizona Project Association

Bill Schulz
Developer

Norris Soma
San Carlos Irrigation and Drainage District

Don Tostenrud
Arizona Bank

Keith Turley
Arizona Public Service Company

Mason Walsh
Phoenix Republic and Gazette Newspapers

Dr. Robert Witzeman
The Maricopa Audubon Society

E. Technical Agency Group

In January 1979 a Technical Agency Group (TAG) was established consisting of all the local, state, and federal agencies which have an interest in the study. Invitations were sent to all the known agencies, and about 45 people attended the first meeting. Future meetings were scheduled after the environmental studies contract had been let. Out of the first meeting a decision was made to establish a recreation sub-committee.

The following agencies were requested to participate in the Technical Agency Group:

Federal Agencies

Advisory Council on Historic Preservation, Denver, Colorado
Army Corps of Engineers, Los Angeles District, California
Army Corps of Engineers, Phoenix Urban Study, Arizona
Bureau of Indian Affairs, Phoenix, Arizona
Bureau of Land Management, Phoenix, Arizona
Bureau of Mines, Denver, Colorado
Soil Conservation Service, Phoenix, Arizona
Fish and Wildlife Service, Phoenix, Arizona
National Park Service, Southern Arizona Group, Phoenix, Arizona
Environmental Protection Agency, San Francisco, California
Federal Highway Administration, Bureau of Public Roads, Phoenix, Arizona
Interagency Archeological Services, San Francisco, California
Tonto National Forest Service, Phoenix, Arizona
U.S. Geological Survey, Water Resources Division, Phoenix, Arizona
Western Area Power Administration, District Manager, Phoenix

Indian Reservations

Fort McDowell Mohave-Apache Tribal Council
Gila River Indian Community
Salt River Pima-Maricopa Indian Community

State Agencies

Arizona Bureau of Mineral and Geology Technology
Arizona Department of Game and Fish
Arizona Department of Health Services
Arizona Department of Transportation
Arizona Outdoor Recreation Coordinating Commission
Arizona State Land Department
Arizona State Parks Board
Arizona Water Commission

County Agencies

Maricopa Association of Governments
Maricopa County:
 Engineering,
 Health Services,
 Parks and Recreation,
 Planning Department

Special Districts

Central Arizona Water Conservation District
Flood Control District of Maricopa County
Maricopa County Municipal Water Conservation District No. 1

Local Entities

City of Avondale, Public Works Director
City of Glendale, Manager
City of Mesa, Manager
City of Peoria, Manager
City of Phoenix, Manager
City of Scottsdale, Manager
City of Tempe, Manager
City of Tolleson, Manager
Salt River Project, General Manager
Town of Buckeye, Manager
Town of El Mirage, Manager

F. Media Publicity

There has been substantial media coverage of the various committees and public meetings, and the general progress of the study. Examples include: 1) Several television stations and a public service radio station covered the January public meetings, 2) participation in radio broadcast call-in talk shows which covered the whole flooding issue, including the progress of this study, 3) the Arizona Republic, a daily newspaper, did a 16-page supplement on the flooding issue and possible actions.

G. Public Review and Comment

Numerous comments and suggestions were received by the Agencies in addition to the statements made at the public meetings. Several letters and telephone calls were received in response to the brochures. A number of comments were included the mailback postcards. Letters containing suggestions and points of view were received as a result of newspaper articles and television coverage of the flood events. Letters written to the newspaper editors often contained information relevant to this Study. Many specific public comments on the Plan of Study were provided by members of the Technical Agency Group and the Community Advisory Board. These groups were furnished early drafts of this report so that their ideas and comments could be incorporated into the final report.

H. Plan of Study

The Plan of Study, Central Arizona Water Control Study, January 1980, summarizes the overall study purpose, describes the alternative actions which could be taken, the broad general impacts that could be expected, and the benefit/cost analysis of the preliminary alternatives. It also identifies alternatives that will receive no further study, due to low economic justification or geological problems. It also describes the public involvement which has taken place, and, in general terms, the public involvement which will take place in the future.

This report is sufficiently well written that the general public could read it and understand it with little difficulty.

I. Brochures

Distribution of 4,000 copies of a brochure entitled "You and Central Arizona's Water Future" was made. Copies of the brochure were mailed to all known agencies and interest groups related to water issues. Included in the brochure was a mail-in response card on which respondents could indicate their interest in receiving future mailings, or participating in future meetings or workshops. Several hundred response cards were received indicating future interest. The brochure was also reprinted as an information paper distributed by the Central Arizona Project. Copies of these brochures follow.

DAMES & MOORE

April 24, 1979

U. S. Bureau of Reclamation
Suite 2200 Valley Center
201 North Central Avenue
Phoenix, Arizona 85073

Attention: Mr. Herb Dishlip (COAR)

Re: Salt-Gila Flood and Storage Study
(9-07-30-V0053)

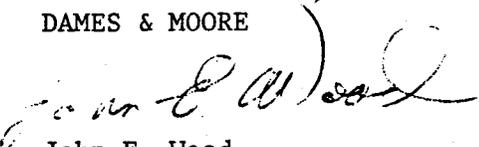
In accordance with the work statement, ten copies of our evaluation of the agencies' Phase I public involvement program is transmitted. This critique was prepared by James L. Creighton.

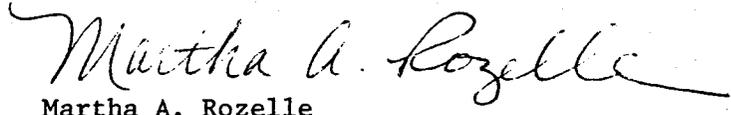
This report summarizes the main public involvement activities during Phase I and emphasizes the roles of the Community Advisory Committee and Technical Agency Group, the public meetings, brochures and media coverage. Each of these activities and issues surrounding them is evaluated and some additional concerns are raised.

Generally, the level of public involvement opportunities has been adequate. As we complete the full staffing of this office, we look forward to increased efforts.

Very truly yours,

DAMES & MOORE


John E. Wood
Project Manager


Martha A. Rozelle
Public Involvement Coordinator

db

April 9, 1979

MEMO

TO: Bureau of Reclamation/Corps of Engineers

FROM: James L. Creighton

SUBJECT: Public Involvement Program, Phase I
Salt-Gila Flood and Storage Study

DESCRIPTION OF PHASE I PUBLIC INVOLVEMENT PROGRAM

The public involvement activities during Phase I of the Salt-Gila Flood and Storage Study public involvement program included:

1. BROCHURE: Distribution of 4,000 copies of a brochure entitled "You and Central Arizona's Water Future". Copies of the brochure were mailed directly to the 208 Program mailing list and all known agencies and interest groups related to water issues. Included in the brochure was a mail-in response card on which respondents would indicate their interest in receiving future mailings, or participating in future meetings or workshops. Several hundred response cards were received indicating future interest. The brochure was also reprinted as an information paper distributed by the Central Arizona Project.
2. COMMUNITY ADVISORY COMMITTEE: Governor Babbit has established a Community Advisory Committee with representation from a cross-section of the community. Despite efforts by the Governor to make the committee representative, several letters protesting that the committee was "pro-dam" were received. These letters requested that two additional leaders of "anti-dam" groups be placed on the committee. While this is set up as the Governor's Committee, with staff assistance provided by state agencies, Bureau and Corps staff have made presentations to all three committee meetings. To date the topics which the Committee has reviewed related to this study are the overall study purpose and the schedule. The Committee has expressed considerable unhappiness with the 47 month schedule of the study, indicating that they believe this is non-responsive to the immediate flooding problems.

3. TECHNICAL AGENCY GROUP: A Technical Agency Group (TAG) has been established consisting of all the local, state, and federal agencies which have an interest in the study. Invitations were sent to all the known agencies, and about 45 people attended the first meeting. No second meeting was scheduled until the environmental studies contract had been let. Out of the first meeting a decision was made to establish a recreation sub-committee. This sub-committee has met two times since the initial TAG meeting. A second committee was established to study early warning systems for flooding. The committee calls itself the Central Arizona Hydro-Met Data Association. This group has also met three times. It has not yet been determined whether this is a sub-committee of the TAG, or a separate group.
4. PUBLIC MEETINGS: Three public meetings have been held. The first meeting on January 30, 1979 in Buckeye drew a crowd of 250 people. Participants in this meeting expressed frustration with the extended duration of the study, and wanted some immediate solutions to transportation problems created by washed-out bridges. They also expressed strong support for channelization in the Buckeye area, and expressed resentment that Phoenix residents "think Phoenix ends at 92nd Avenue". Meetings were also held in Phoenix and Mesa on January 31st. About 100 people attended each meeting. Again there was considerable frustration with the study timetable, and demands for immediate action to protect against flooding. Some speakers indicated that they thought that construction should be started on Orme, without further study. On the other hand, there were comments that there were alternative solutions which were going to be given no further study on grounds that the speakers did not believe were legitimate. Transcripts of these meetings have been made. Several hundred registration cards were completed by participants, who promised that they would be put on the mailing list. A short list of the issues raised during these meetings is contained in the Plan of Study document.
5. MEDIA PUBLICITY: There has been substantial media coverage of the various committees and public meetings, and the general progress of the study. Several television stations covered the public meeting in Phoenix. In addition, Joe Dixon of the Corps of Engineers participated in a broadcast call-in talk show on KOY radio which covered the whole flooding issue, including the progress of this study. One newspaper also did a 16-page supplement on the flooding issue and possible actions, including results from a poll conducted by a local organization. Agency personnel reviewing the results felt that it had a "pro-dam" bias, and didn't give fair consideration to non-structural alternatives.

6. PLAN OF STUDY REPORT: A Plan of Study Report, approximately 125-150 pages in length, has been prepared and will be distributed during May. This report summarizes the overall study purpose, describes the alternative actions which could be taken, the broad general impacts that could be expected, and the benefit/cost analysis of these preliminary alternatives. It also identifies alternatives that will receive no further study, due to low economic benefit or geological problem. It also describes the public involvement which has taken place, and--in general terms--the public involvement which will take place in the future.

CRITIQUE OF PHASE I PUBLIC INVOLVEMENT PROGRAM

It is my belief that the credibility of the entire study rests substantially on the degree to which the public involvement program creates visibility and understanding of the study, and how it was conducted. It is also safe to assume that the adequacy of the entire study, including the public involvement program, will be tested in the courts. For these reasons, it is my belief that this public involvement program must be a model of openness, providing a high level of participation opportunities for anyone who wishes to participate. (I do agree with the comments in the Plan of Study regarding public involvement indicating that there are different levels of publics, each seeking a different kind of involvement. These differences will be observed in the development of the Public Involvement Work Plan.)

The comments of critique provided below are in the context of a model, high intensity public involvement program.

GENERAL LEVEL OF ACTIVITIES: The level of public involvement opportunities offered was adequate, and certainly sufficient from a legal point of view. With a public involvement staff in place the level of activity should increase somewhat. But in light of staffing limitations, and the amount of time going into contractor selection, the level of activity for Phase I is adequate. If we were starting from the very beginning now, I would encourage the additional use of interviews as a means of getting to know some of the principal actors in depth. We will be doing this during the first months of Phase II instead.

BROCHURE: The content of the brochure "You and Central Arizona's Water Future" was quite satisfactory. The language was simple and easy for the public to understand. There was a minimum amount of bureaucratic jargon. The basics of the study were communicated without any substantial bias.

Visually the brochure was not exceptionally appealing, although I would rather err on the side of modesty rather than have printed materials slick or fancy. No one could complain that sending this brochure out was an abuse of government funds.

The inclusion of a mail-in response form was a good idea, and has given us a good start towards an effective mailing list.

COMMUNITY ADVISORY COMMITTEE: There are many advantages to having an effective Advisory Committee. From a public involvement point of view they are particularly helpful in evaluating documents before they go out to the general public and identifying unconscious bias which may have entered into documents or the public involvement process itself. As indicated in the original proposal, establishment of an Advisory Committee has been a planned element of the public involvement program.

One of the first conditions for an effective advisory committee is that it be truly representative of the range of interests and values within the community. The Governor obviously worked hard to make this committee representative. Because of the prestige of the Governor, the level of people participating is quite high. Although there were some protests about two "anti-Orme" activists being left off, it is not clear whether these protests represent a genuine mistrust of the composition of the Committee, or just a power play to get those people on the Committee. On balance, I doubt that we could do any better in balancing an advisory committee, and the odds are high that we could not obtain the same prestigious level of participation. Therefore, it seems wise to use this same Advisory Committee as the Study Advisory Committee.

The difficulty is that the staff people associated with the Committee, Wes Steiner and Larry Landry, want this committee to be the Study's Advisory Committee, yet appear to want to relegate the Bureau and Corps to a subsidiary role in the operations of the Committee. If the Committee is advisory to the Governor alone, the subsiding role of the Corps and Bureau is quite appropriate. If the Committee is to play an important role in this study, then Bureau and Corps personnel must be co-equal in working with the Committee. This issue must be addressed before a permanent commitment is made to work with the Community Advisory Group as the only advisory group.

TECHNICAL AGENCY GROUP: The level of interest and participation in the Technical Agency Group (TAG) appears to be very good. There are some unresolved issues related to the TAG, particularly as regards the relationship between the TAG and the Community Advisory Committee. There is always a tendency for technical advisory groups to become dominant in comparison to a community advisory group, because of their increased technical background and understanding of the subject matter being discussed. As a result, there is some potential for the community advisory group to feel threatened by the technical agency group. The fear is that the superior knowledge of the technical people, coupled with their understanding of the vocabulary of the agencies makes it an unequal contest between a citizen and a technical person.

One mechanical way to deal with this potential problem is to design the program in such a way that the Technical Advisory Group reviews materials before they go to the Community Advisory Group. The commentary of the Technical Advisory Group would be attached to the original document, but the original document itself would not be changed. This would allow the Community Advisory Group to see the comment from the other agencies, but at the same time feel that they are having "the last word," with no changes made in documents until they have had an opportunity to review them.

The size of the Technical Advisory Group is a bit worrisome. At present, there are about 45 people attending the meetings, which is far too large to work effectively as a total group. Perhaps some effort could go into devising a meeting format for the Technical Advisory Group which would allow for brief meetings of the total group, followed by work in small groups or other work-shopping techniques. Without some effort in this direction, I suspect the TAG meetings will be frustrating and boring, and that we will begin to lose participation.

PUBLIC MEETINGS: The public meetings which were held were well attended, and appear to have obtained comment from a broad cross-section of the public. Reviewing the transcripts, however, it was clear that only 15 or 20 people would speak in each meeting, although there were from 100 to 200 people in attendance. Again I would like to work on some alternative meeting designs that would be effective in getting a higher level of participation from everybody in attendance. These could include the use of techniques to break the meeting down into small groups, and/or the use of written response forms from all participants. Given the emotional situation in Buckeye, it may have been necessary simply to let people ventilate in the total public meeting. As we move into stages where we want more specific information from the public, then I think small group techniques might be particularly useful.

MEDIA PUBLICITY: There appears to be no difficulty in obtaining publicity from the local media. This is evidenced by the 16-page supplement put out by one local newspaper on the flooding issue. This is one area in which--now that we have additional staffing--I hope that we will be able to structure a major information effort. Some of the first steps in this include the establishment of a Project Office with a clearly defined identity, establishing a hotline with a well-publicized telephone number, putting out a regular newsletter, meeting with the press to brief them on the background of the Study, regular news releases and press briefings where appropriate. The program during Phase I was satisfactory, but because of the local interest we can gain a great deal more if this area is worked very intensely.

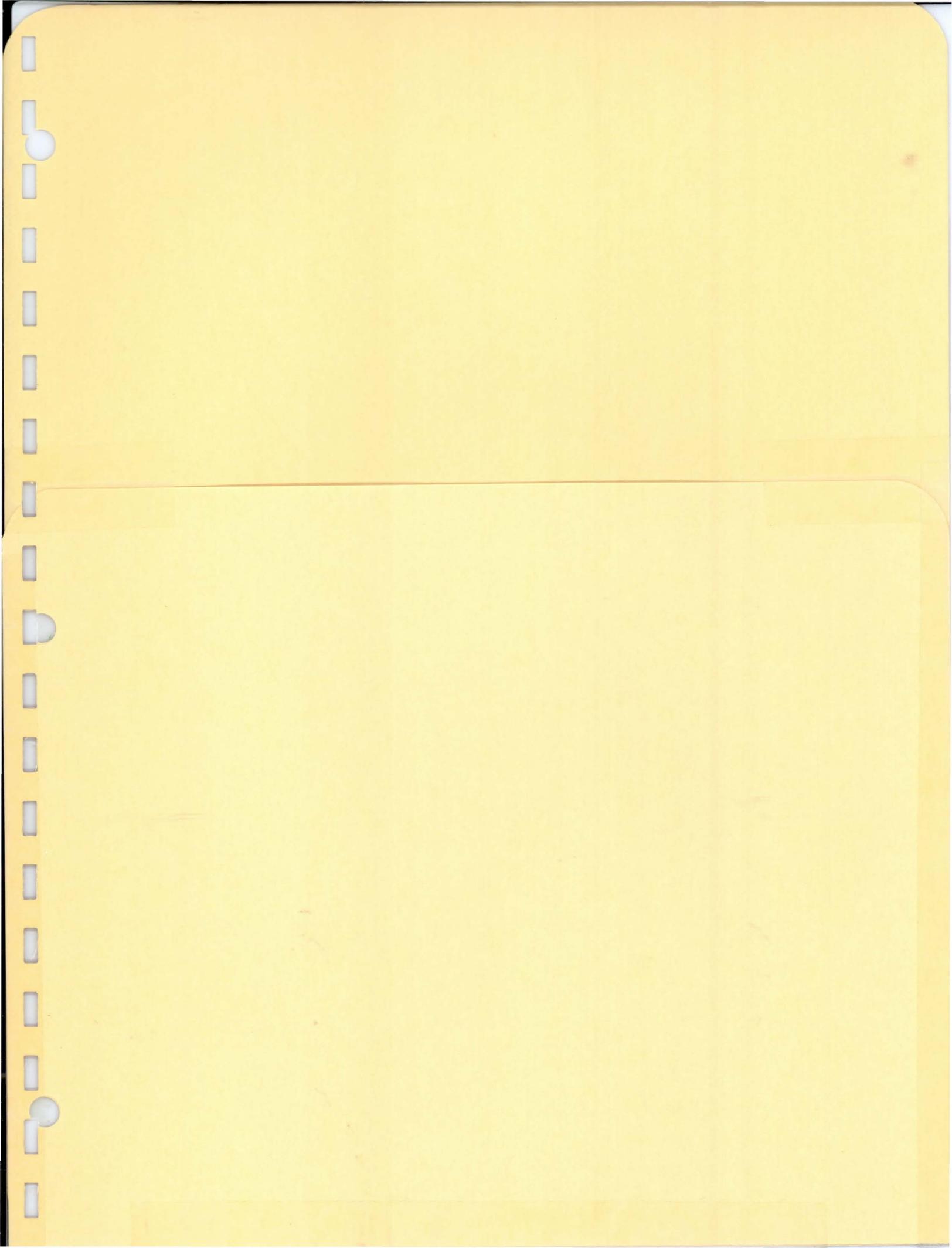
PLAN OF STUDY REPORT: The Plan of Study Report was generally satisfactory. It is sufficiently well-written that the general public could read it and understand it with little difficulty. It has the disadvantage of any 125-150 page report, though, which is that most people will not bother to read it. As a result, I think there is a need to publish a shorter summary of the document

for a general public distribution. Of particular importance in the Plan of Study are the alternatives described which will receive no further study. There were already comments showing up in the public meetings that alternatives had been dropped without good cause. I believe that we are going to have to address this issue in the next stage, as I doubt that the level of argumentation in the Plan of Study is going to be sufficient to satisfy those people who were advocates of the dropped alternatives.

ADDITIONAL PROBLEMS: There are two other problem areas which do not really fit in the categories above:

1. Need for Review of Dropped Alternatives: As indicated above, it does not appear that there was any substantial public participation in dropping certain alternatives during Phase I. Apparently these were substantially dropped out during the work of the Inter-Agency Advisory Committee several years ago. I am not at all sure that this will be sufficient to get any level of acceptance from those people who are advocates of these alternatives. As a result, I would suggest that during Phase II we provide the opportunity for separate workshops to review the reasons why alternatives were dropped out. As an alternative, we could take all the materials to the Community Advisory Committee and have them go over our reasoning for dropping some alternatives. Dropping alternatives is a major decision, and I am a little uncomfortable having that decision made only by an advisory committee. I prefer to have some mechanism for involving the general public. As a minimum, if we don't have further workshops or meetings on it, I would suggest we get out a press release or a briefing to explain to the press why these alternatives have been dropped, so that they don't get all excited by the claims of those people who advocate the dropped alternatives.

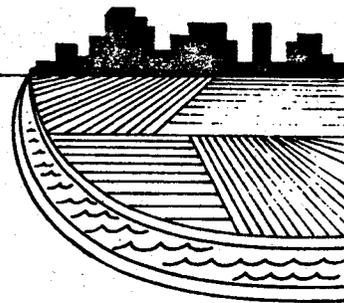
2. Decision-Making Body: It appears that at several points in the process the decision-making body for this Study has consisted of Wes Steiner and Tom Clark of the Arizona Water Commission, Herb Donald of the Maricopa County Flood Control District, Colonel Doyle of the Corps of Engineers, Jack Pfister of the Salt River Project, and Dick Shunick of the Arizona Project Office. The difficulty with this is that all these agencies are part of the "water establishment". If, whenever there is a crisis, these are the people that are called upon for indepth consultation, it appears that in a crunch only the "water establishment" is consulted. Since these are the agencies that are most concerned with water, it is natural to consult with them, but it is important to be aware that from the perception of outside groups, this simply confirms all their worst suspicions that the "water establishment" is going to stick together to fight off new and different ideas. Great caution should be utilized in using this group as the decision-making body.



information paper

January 1979

Number 18



Central Arizona Project

SALT-GILA FLOOD CONTROL & REGULATION OF CAP WATER*

WHAT'S HAPPENING

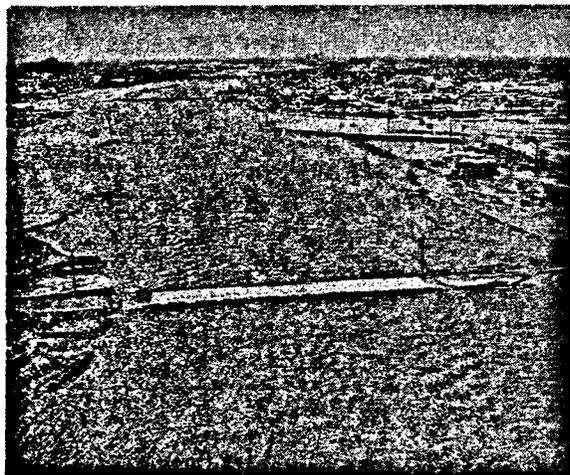
Right now the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers are beginning a comprehensive study which will help provide you a solution for two critical water resources problems. The first deals with the scarcity of water, the second with its occasional overabundance. Working with the public, we hope to identify alternative solutions to the twofold problem of regulating Central Arizona Project waters and controlling flooding along the Salt and Gila Rivers. This is where your help is needed--your ideas, criticisms, questions, and suggestions.

After briefly explaining these problems, this brochure will tell you a little bit about the background, previous work, and scheduled work relating to the study.

THE PROBLEM

To fully understand the regulatory storage problem, we must remember that water is in short supply in central Arizona. Today there isn't enough surface water to support the State's central population and agriculture, so additional water must be pumped from the ground. In fact, more water is being taken out of the ground than Nature is putting back.

The Central Arizona Project will help to relieve this imbalance by delivering water from the Colorado River into Arizona's interior. To be most effective this delivery system should have the capability of adjusting to unavoidable extreme situations--above average user demands, temporary system interruptions, and variable water supplies.



If a reservoir is available at the downstream end of the delivery system, the stored water will provide the capabilities for handling these extremes and insuring a regulated, adequate flow of water. To be most efficient, the Central Arizona Project should have about 400,000 acre-feet of reservoir capacity.

In contrast to water scarcity, heavy rains periodically cause severe flooding along the Salt and Gila Rivers, particularly in the Phoenix metropolitan area.

This study seeks to identify the most practical and economical measures for satisfying this dual need for flood control in the Phoenix area and regulatory storage for the Central Arizona Project.

WHERE HAVE WE BEEN?

The initial plans for the Central Arizona Project proposed construction of Orme Dam and Reservoir at the confluence of the Salt and Verde Rivers. Such a facility would have provided the storage needed for CAP water and also flood protection for the Phoenix area. Today's economic, environmental, and social concerns and issues have prompted the need to study other alternatives.

Regulatory storage has long been recognized as a desirable feature for the CAP, and the importance of flood control for the Phoenix metropolitan area was recently reemphasized during the spring and winter floods of 1978. Because of the additional emphasis on flood control, the Corps of Engineers was asked to join the Bureau of Reclamation in conducting this joint-purpose study.

WHERE ARE WE NOW?

At the present time, the Agencies are in the process of developing a management plan for conducting the study. An important part of this plan is to give an early definition to the study's goals and objectives. This plan also includes a reconnaissance level appraisal of the problems and identifies some potential solutions which need further analysis. The

upcoming public meetings are designed to review this study plan with the community.

WHERE ARE WE HEADED?

As previously stated, the goals of this study are to develop workable alternatives for the two critical water problems of CAP storage and flood control. Some promising alternatives have been tentatively identified. They are:

Roosevelt Dam and Lake

Raise Roosevelt Dam to provide additional reservoir space on the Salt River primarily for flood control.

Horseshoe Dam and Reservoir

Replace the existing Verde River structure with a larger dam to provide additional space, primarily for flood control.

Tangle Creek Site Dam and Reservoir

Construct a new dam on the Verde River upstream from Horseshoe Reservoir, primarily for flood control.

Cliff Site Dam and Reservoir

Construct a new dam on the Verde River about 2 miles downstream from Horseshoe Dam. This new reservoir would incorporate the existing storage in Horseshoe Reservoir but would provide additional capacity, primarily for flood control.

Water Exchanges

Utilize a nonstructural method of achieving CAP regulation using storage, when available, in existing Phoenix area reservoirs.

Confluence Site Dam and Reservoir

Construct a dam at the confluence of the Salt and Verde Rivers. This structure could be the authorized Orme Dam or a modified version, to provide CAP regulatory storage and/or flood control.

Granite Reef Site Dam and Reservoir

Construct a dam about 4 miles downstream from the confluence on the Salt River at Granite Reef Diversion Dam to provide both regulatory storage and/or flood control. This is primarily an alternative location of the confluence site.

Flexible Reservoir Operating Guidelines

Develop a set of procedures for sophisticated flood forecasting and Salt River Project reservoir operation which attempt to minimize downstream flood damage.

New Waddell Dam and Lake Pleasant

Utilize the existing Agua Fria River structure or an enlarged replacement to provide CAP regulatory storage. This could be accomplished either by water exchanges with Maricopa County Municipal Water Conservation District No. 1, or by physical connection of Lake Pleasant to the CAP aqueduct system.

Channelization

Build floodway channels in the Salt and Gila Rivers between Granite Reef Diversion Dam and Painted Rock Reservoir to prevent flood damages.

Flood Proofing, Zoning, or Flood Plain Acquisition

These nonstructural methods are complementary with all types of flood control measures and act to minimize flood damage.

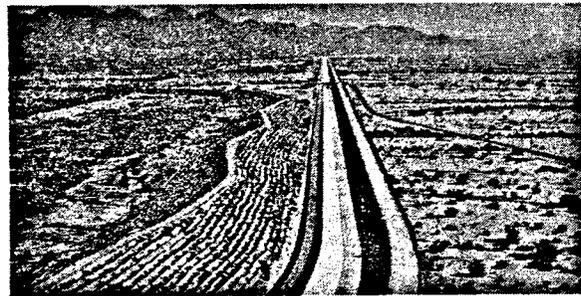
"No Action"

A decision course which provides no CAP regulation of aqueduct system deliveries and no federally sponsored measures to control Salt-Gila flood damages.

Although this list is by no means complete, these measures can be considered separately or in combination with other measures to accomplish the program's goals. It is hoped that during the course of the study, input from citizens, special interest groups, and agencies, will provide additional ideas.

HOW WE'LL GET THERE

The study process will follow the 1973 Water Resource Council's Principles and Standards, as well as specific procedures of the Bureau of Reclamation and the Corps of Engineers.



A draft environmental statement (DES) will identify all workable plans, including the environmentally preferred plan and the "No Action" alternative. The preferred plan of the agencies will also be identified among the listed plans. The DES will display all plans and fully evaluate the environmental, economic and social impacts, consequences, and trade-offs between alternative plans.

While the DES will contain a preferred plan, other workable solutions will be described with comparative detail to allow selection of the final plan. A final environmental statement (FES) will be published before the selected plan can be put into operation.

The study will require intensive coordination between the two principal agencies and other governmental agencies and the public. Each alternative measure considered will be evaluated to determine its possible impact on all sensitive issues.

Present plans call for the draft environmental statement being ready about the fall of 1981, with the final environmental statement being published the following spring.

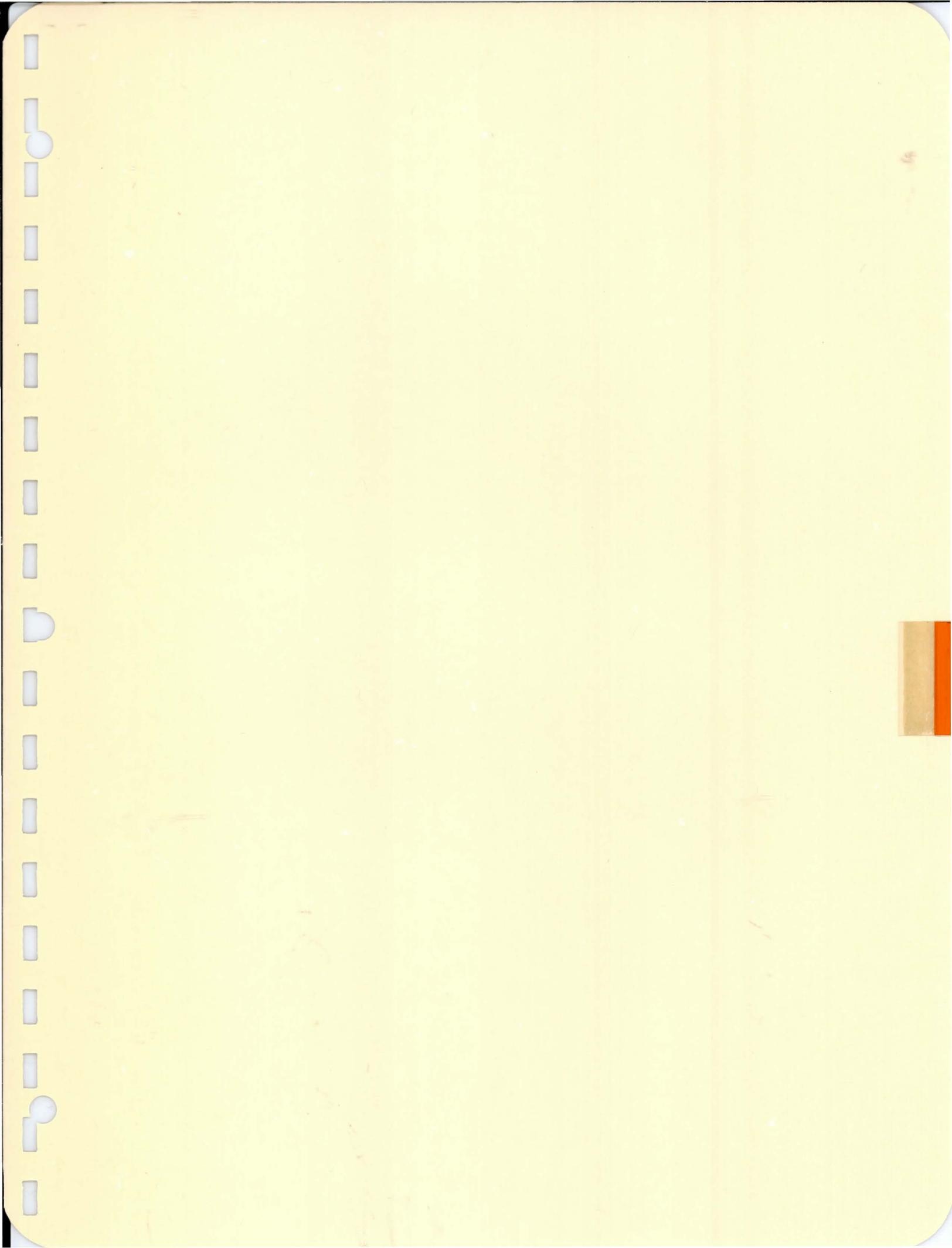
YOUR VOICE

Since the participation of the public will be an important part of this study process, an active program to involve citizens is being set up. We will supply you, the public, with information papers, timely updates on the study's progress, and notice of special events through the news media. In an effort to get feedback from you, we will set up events designed to answer your questions, solicit your ideas, and give you a chance to voice your concerns or recommendations. These may include both large and small meetings, workshops on special issues, listening sessions where most of the conversation comes from the audience, and opportunities for both individuals and organizations to respond in writing to certain points of the study.

* Reprinted from "You and Central Arizona's Water Future"

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Reclamation





APPENDIX B

APPENDIX B

Public Involvement Activities Completed in Stage II

The public involvement program has established a base from which to develop and change to keep pace with the requirements of the overall study schedule. A summary of the Stage II public involvement activities which have been completed to date (March 1980) follows.

A. Public Response

A process for storing public comments has been initiated. These comments will be stored along with demographic and group membership information. A codebook has been written and the basic program run, and the contractor is now in the process of coding the comments. It is anticipated that media coverage will also be coded during major decision points to see if the media is reflecting the same perception of public opinion.

B. Community Advisory Board

The Governor's Community Advisory Board has met five times and discussed or reviewed:

1. CAWCS status and draft of elements summary for brochure.
2. Day-long workshops to generate "future without" assumptions.
3. Discussion of Rio Salado Project.
4. Methodologies for flood damage reduction cost/benefit, water quality, water quantity, and ground-water recharge.
5. Methodologies for assessment of biological and cultural resources.

The public involvement staff has met with several of the Board's members individually to better understand their needs and concerns.

C. Technical Agency Group (TAG)

In July 1979, the Service held a meeting with the TAG to give a status report on the CAWCS. An interest form, requesting the members to indicate their particular interest areas, was distributed. Also the members were asked to provide their agency's planned activities as they relate to the study's "future without" analysis. Preliminary engineering data for each structural site was distributed in booklet form. Other discussions included:

1. Introduction of the contractors, Dames and Moore and The Natelson Company.
2. An explanation of the roles of the Service, Corps, TAG, and the Governor's Community Advisory Board.
3. A review of the computer model used to perform hydrologic studies.
4. The consultants explanation of the economic, environmental, recreational, biological, social, and demographic analyses they will be performing.
5. An update of public involvement activities.

The Maricopa County Flood Control District hosted the September 11, 1979, meeting. A status report was given and included the public involvement activities and technical studies accomplished to date. Other topics for discussion were:

1. The "future without" rationale, impacts, and assumptions used in modeling CAP operations.
2. Colorado River water supply was defined, i.e., normal, surplus, and deficit.
3. Flood control assumptions, including bridges, channel clearing, floodplain management, flood warning systems, and dam safety measures.
4. CAP without regulatory storage.
5. Planning assumptions.

A special session of the TAG was held on September 25, 1980, to discuss ground-water recharge studies. A preliminary scope of work was sent to the members prior to the meeting and addressed:

1. Study objective and scope - the desired results of the study being a recommendation of whether or not more detailed investigations are warranted.
2. Study factors, including the availability of a water supply, identification of recharge methods, technical considerations, economic analysis, and the legal and institutional considerations.
3. Study schedule and work accomplishments.

The February 1980 meeting was held at the Maricopa County Flood Control District and began with a progress report. Procedures for review of CAWCS working papers and for system evaluation were discussed. Within the next 6 months the elements under consideration will be combined into systems for further study and systems will be reduced to plans for detailed study during Stage III. It was stressed that these two major decision points would require participation by the members in order to maintain the study schedule.

D. Presentations

A letter was mailed to interested groups, agencies, tribal representatives, universities, etc. announcing the availability of staff to conduct presentations on the CAWCS. As a result, numerous requests were received from a wide variety of publics including:

Governor's Commission on the Environment Summer Conference
 "Water Resources and Arizona's Future"
 Tonto National Forest Management Meeting
 Achievement Rewards for College Scientists Foundation, Inc.
 Valley Leadership
 Phoenix Varmit Callers
 Mesa Exchange Club
 Central Arizona Project Executive Committee
 Buckeye Chamber of Commerce
 Fort McDowell Tribal Council
 Salt River Pima Tribal Council
 Sif Oadak District, Papago Indian Reservation
 American Society of Civil Engineers Younger Members Forum
 208 Management Subcommittee
 State Legislature
 Republican Forum West
 South Phoenix Planning Committee
 Casa Grande Centennial Festival
 Grand Canyon College - American Government Class
 Kiwanis Club - combined members (100 people)

E. Media Publicity

News clippings from newspapers throughout the state arrive each week. Clippings are filed by discipline in the CAWCS library. Copies of clippings are sent to the Service who also maintains a daily record.

Requests have been made to the Governor's Community Advisory Board and the Technical Agency Group for ideas to gain maximum media coverage. Over the next 6 months, the Agencies are developing a plan for working with the media to get effects/impacts information to the general public.

F. Slide Shows

In November 1979, the first slide show was prepared. The 15-minute program, containing over 100 slides with narration, provides a historical overview of the study, elements under investigation, and ways the public can be involved. CAWCS staff have presented the slide show to a number of groups (see D. Presentations for listing of these groups).

A second slide show was developed in February 1980 outlining the CAWCS background and purpose. It defines the need for regulatory storage/flood control, explains the conceptual systems, and outlines the competing demands important to selecting a system. It is anticipated that the slide show will be a much requested program for educating the public of the study's progress.

G. Brochures

Five newsletters have been published and were released to the public on a monthly basis. Newsletter 1, July 1979, gives an overview on why there is a need for the Central Arizona Water Control Study. The "Special Edition," August 1979, contains a summary of the elements under study. Over 3,000 copies of this newsletter have been distributed. Newsletter 2, September 1979, describes the planning objectives to guide further study. Newsletter 3, November 1979, looks at regulatory storage and how it will increase the efficiency of the Central Arizona Project.

In November 1979, a newsletter, "Extra," was published centering on the non-structural alternatives to flood control, an evaluation of the economic and engineering feasibility, and the environmental and social impacts.

Newsletter 4, released in December 1979, focuses attention on two of the environmental disciplines (cultural and biological resources,) that are being studied. Newsletter 5, January 1980, describes the work being performed by the Flood Control District of Maricopa County to clear a 300-foot wide channel along the Gila River to reduce flooding. Also listed in this newsletter are some of the more recent concerns the public is raising on environmental issues. A response form requesting comments on these issues is included as an insert.

In March 1980, Newsletter 6 was released. The main topic in this issue is flood control. Also included are short articles on the Spring Workshops, the economics of flood control, and definitions of some of the more frequently used "Water Words."

Copies of the newsletters follow.



The Salt River flows under the Mill Avenue Bridge in Tempe during one of last winter's floods.

The Central Arizona Water Control Study

Why the Need for Another Study?

The last few years have amply illustrated Central Arizona's water problem — either too little or too much. A drought, followed by the '78 and '79 floods, have once again made people believe that action must be taken to preserve Arizona's water for dry spells, while at the same time protecting the Phoenix area from the ravages of floods.

But while most people believe some action must be taken, there is considerable disagreement about what this action should be. That's the purpose of the CENTRAL ARIZONA WATER CON-

TROL STUDY: to determine what action should be taken both for regulatory storage and flood control.

Perhaps a little history would be helpful: The Central Arizona Project was authorized by the U.S. Congress in 1968 with Orme Dam as one of its features. This dam would be built at the confluence of the Salt and Verde Rivers and would provide both regulatory storage and flood control for the Phoenix area. In 1976 the U.S. Bureau of Reclamation published an environmental impact statement for this project. The response

caused considerable controversy. Environmental and recreation groups were concerned about the loss of riparian habitat, bald eagles' nesting sites, and downstream tubing recreation. The Fort McDowell Indian Reservation voted against the project, which at high water would flood about two-thirds of their reservation. An Interagency Task Force was established to review all the alternative ways of obtaining regulatory storage, including Orme Dam. But before the Task Force's recommendation was made, President Carter recommended
continued on page 3

CENTRAL ARIZONA WATER CONTROL STUDY

Newsletter 1
JULY 1979

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Dames & Moore Selected for Environmental Studies

Dames & Moore, an international environmental and applied earth sciences consulting firm, has received a contract from the U.S. Bureau of Reclamation to analyze the environmental, social, and economic impacts of the proposed alternatives in the Central Arizona Water Control Study. Dames & Moore will also provide public involvement staff.

The firm was selected by a team of technical experts from the Bureau of Reclamation, Corps of Engineers, and Fish and Wildlife Service, following a nationwide competition of many of the largest environmental consulting firms in the country. Additional contracts for flood control studies are in the process of being awarded to other consulting firms and will be announced in future issues of this newsletter.

Because of the complexity of the study, Dames & Moore will actually coordinate a large team of technical experts. Dames & Moore personnel will conduct the biology, geology, soils, water resources, air quality and acoustic portions of the study, but other studies and services will be provided by these firms which are part of the Dames & Moore study team:

ABT ASSOCIATES: Social, economic and demographic studies.

BATTELLE (COLUMBUS): Land use, visual quality and outdoor recreation.

ARIZONA STATE UNIVERSITY: Archaeological, endangered species.

ARCHAEOLOGICAL RESEARCH SERVICES: Historical.

JAMES L. CREIGHTON: Public Involvement.

NUMKENA ASSOCIATES: Graphics and Indian community communications.

ADCOM: Publicatons.

Introductions of key Dames & Moore personnel are provided elsewhere in this newsletter.

New Faces

In each newsletter important people on the Central Arizona Water Control Study team will be introduced in this column. This edition will feature key staff from Dames & Moore, the consulting firm responsible for analysis of environmental, economic, and social impacts of the alternatives, as well as public involvement.



Project Director for the Dames & Moore team is **Charles NEWLIN**, Ph.D. Charlie is known to many oldtime Phoenix residents from the years when he was Chairman of the Civil Engineering Department at Arizona State. In recent years he has been the coordinator of Professional Development at Dames & Moore and also coordinator of the Soil and Foundation Engineering discipline with the firm. His involvement in Dames & Moore projects has taken him to such exotic places as Lagos, Nigeria; Bandar Abbas, Iran; and Tokyo. In this study Charlie is responsible for the overall direction of the Dames & Moore portion of the project, including coordination with the Corps of Engineers and the Bureau of Reclamation. Charlie will also become well known to the citizens and groups through our public involvement program.



Responsibility for internal coordination of all the various disciplines and technical experts within the Dames & Moore contract falls on **Dr. John WOOD**. Jack can boast 28 years of experience in the managing of many multidisciplinary projects; chairing of two university departments; and conducting research in ecology. He has published over 30 technical articles. Jack has served on both state and national advisory boards and is an active member of six professional societies.



The most important name for readers to remember is **Martha ROZELLE**. Marty is the Public Involvement Coordinator, responsible for providing citizens and groups the opportunity to participate in deliberations about the various alternatives. Marty was formerly the Federal Aid Coordinator for the City of Scottsdale, and as such, conducted several programs involving Scottsdale residents in the planning of community development activities. She has also recently been part of a consultant team evaluating the Arizona Division of Behavioral Health Services for the State Legislature. Marty is completing her Ph.D. in Community Education and is an adjunct faculty member at the Center for Public Affairs, Arizona State University. To top it off, she's listed in *Outstanding Young Women in America* and is a recipient of the Dorothy Shaw Leadership award.

The Congressional Hearing

The U.S. House Public Works Water Resources Subcommittee heard testimony from more than 40 Arizonans on flooding problems, Friday, June 1 and additional testimony on Saturday, June 2.

A Fort McDowell Mohave-Apache Indian leader asked the congressional subcommittee "not to hastily endorse the Orme Dam project with the intention of expediting completion," but opposing statements came from State House Majority Leader, Burton Barr, who stated that "Orme Dam has been planned adequately and should be built." Mesa Mayor Wayne Pomeroy urged, "We in Mesa hope that this

present study can be carried out in the shortest time possible. And then, when the study is done, let's not stall and restudy the issue again, let's get on with it!"

Governor Bruce Babbitt indicated that the proper way to unify the community is to await the completion of the study on alternatives (The Central Arizona Water Control Study).

Water Control Study from page 1

that Orme Dam be eliminated from the CAP for environmental and social reasons.

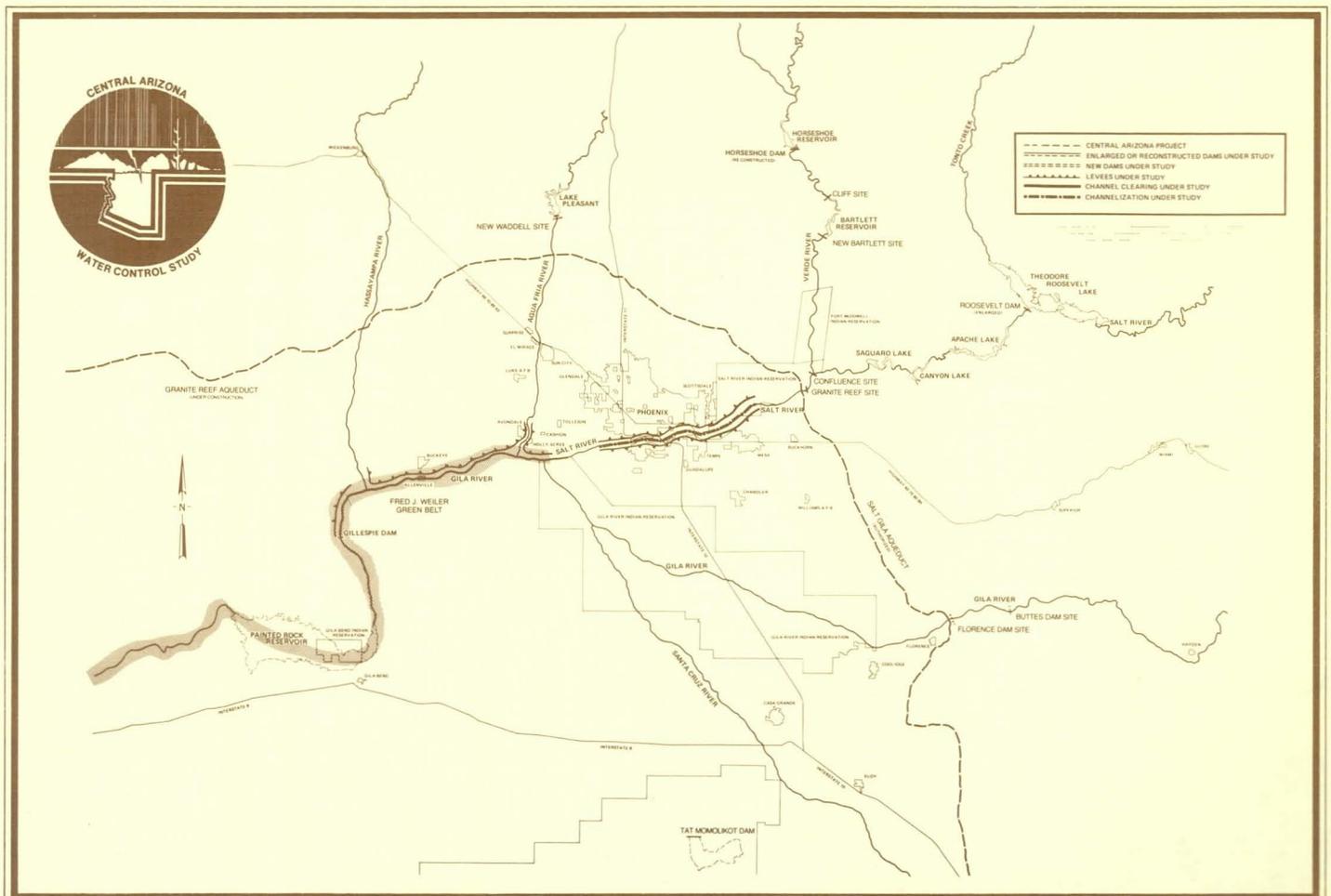
Then came the floods of '78 and '79. Many people felt that Orme Dam could have prevented the flooding and should be built immediately. Others continued to feel it was not necessarily justified, believing that the alternatives had not been thoroughly studied.

The Central Arizona Water Control

Study was born in an effort to provide consensus on what should be done to solve Central Arizona's water problems. The study will examine all reasonable alternatives, including Orme Dam, and will consider both regulatory storage and flood control. The overall study will be conducted by the U.S. Bureau of Reclamation. The U.S. Army Corps of Engineers will provide an analysis of the flood control alternatives.

The Central Arizona Water Control Study is a major feasibility study of all

reasonable alternatives. At the end of the study an environmental impact statement (EIS) will be prepared describing the environmental, economic, and social impacts of all alternatives. Candidly, the chances of any project being built depends on people's willingness to use the study findings and work together toward a consensus on the most desirable action. For this reason there will be a major public involvement effort as part of the study. More details on the public involvement program are provided on page 4.



Public Involvement Opportunities

We hope this newsletter has stimulated your interest in the Central Arizona Water Control Study and you will want to participate in our public involvement program.

Here's how you can participate over the next few months.

HOTLINE:

Got a question or want to make a comment or simply make sure you're on our mailing list? Call Marty Rozelle at 271-0915.

SPEAKERS:

Would you like a speaker to discuss the study with your organization or even a group of neighbors? Call Marty.

WORKSHOPS:

Workshops to review preliminary alternatives and discuss assumptions about community growth patterns will

be held in late Summer — early Fall. If you want to be sure you get a personal announcement, phone and ask that you be put on the mailing list.

Numerous other public involvement opportunities will occur throughout the study. We'll keep you informed.

Next Issue

Our next issue will be a special edition describing the preliminary evaluation of alternatives resulting from Bureau of Reclamation and Corps of Engineers studies over the past six months. The work to date has been primarily engineering and site geotechnical analyses. The environmental, social, and economic assessment of the preferred sites is beginning, coupled with more detailed engineering and geotechnical evaluation.

Also in our New Faces column: Herb DISHLIP and Joe DIXON, Study Managers for the Bureau of Reclamation and Corps of Engineers respectively will be introduced.

Governor Appoints Advisory Board

In July 1978, Governor Bruce Babbitt named a 29-member board of business, community, and conservation leaders to advise the Bureau of Reclamation in the Central Arizona Water Control Study.

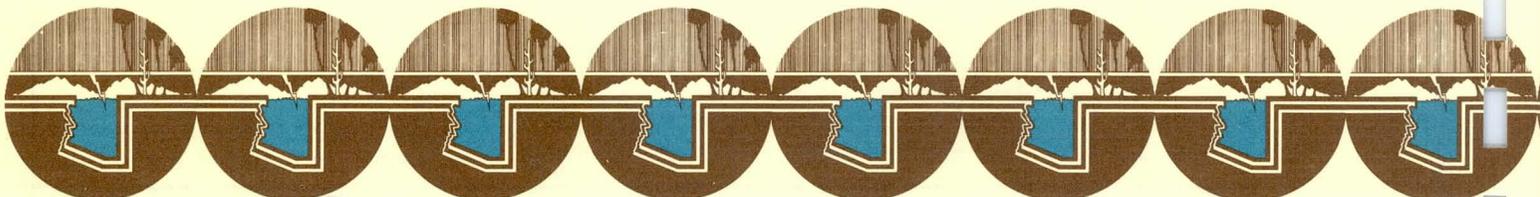
"This advisory board puts significant competing interests under one tent so it can come up with a unanimous community recommendation," Babbitt said. The board has been chaired by Dr. Lee Thompson, former dean of engineering at Arizona State University. It brings together a diverse group of 8 business representatives, 7 government representatives, and 14 members drawn from wildlife groups, Indian tribes, community leaders, and the Central Arizona Project.

The Board met in June to discuss the alternative elements to be studied. They will continue to meet the fourth Thursday of every month.

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SUMMARY OF ELEMENTS UNDER STUDY

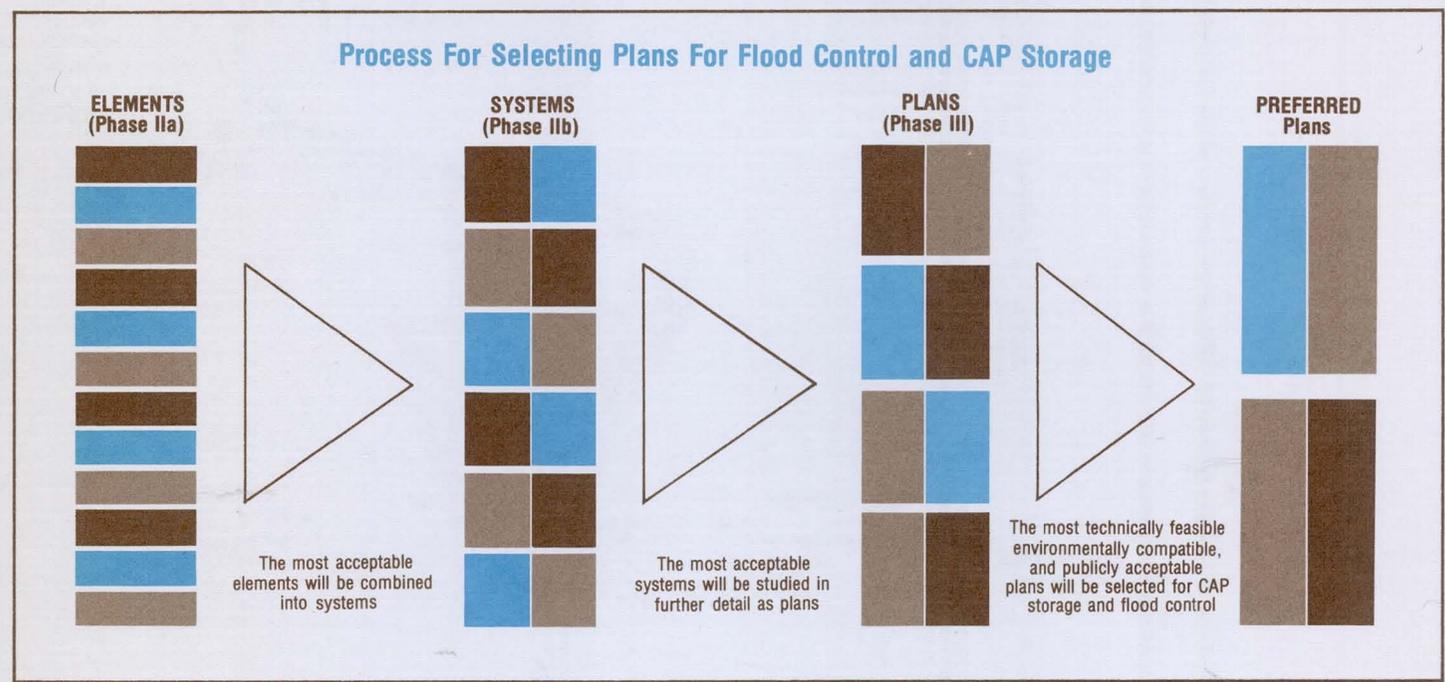
How will flood waters be controlled along the Salt and Gila Rivers? How will Central Arizona Project (CAP) waters be stored for distribution in central Arizona? Solutions to these two critical water problems are being sought by the Central Arizona Water Control Study (formerly known as the Study of Alternatives for Salt-Gila Flood Control and Regulation of CAP Waters). The U.S. Bureau of Reclamation, with assistance from the U.S. Army Corps of Engineers, is conducting the study, with considerable involvement of the public in helping develop solutions to the problems. Many of the ideas discussed in this summary are a direct result of sug-

gestions made by citizens at public meetings or through correspondence with the two agencies.

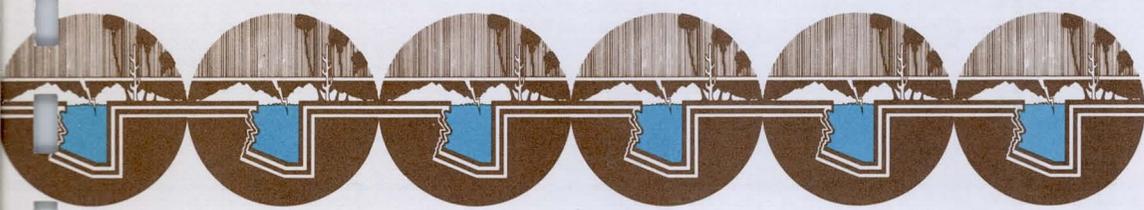
To date, the Bureau and Corps have identified a number of structural and nonstructural actions that singly or in combination could provide for flood control and CAP storage. These "elements" were studied in Phase I of the study and will be studied further in Phase II, along with additional elements that were added as a result of public comment.

During Phase II, the elements will be combined into systems that achieve the goals of the study, and the sys-

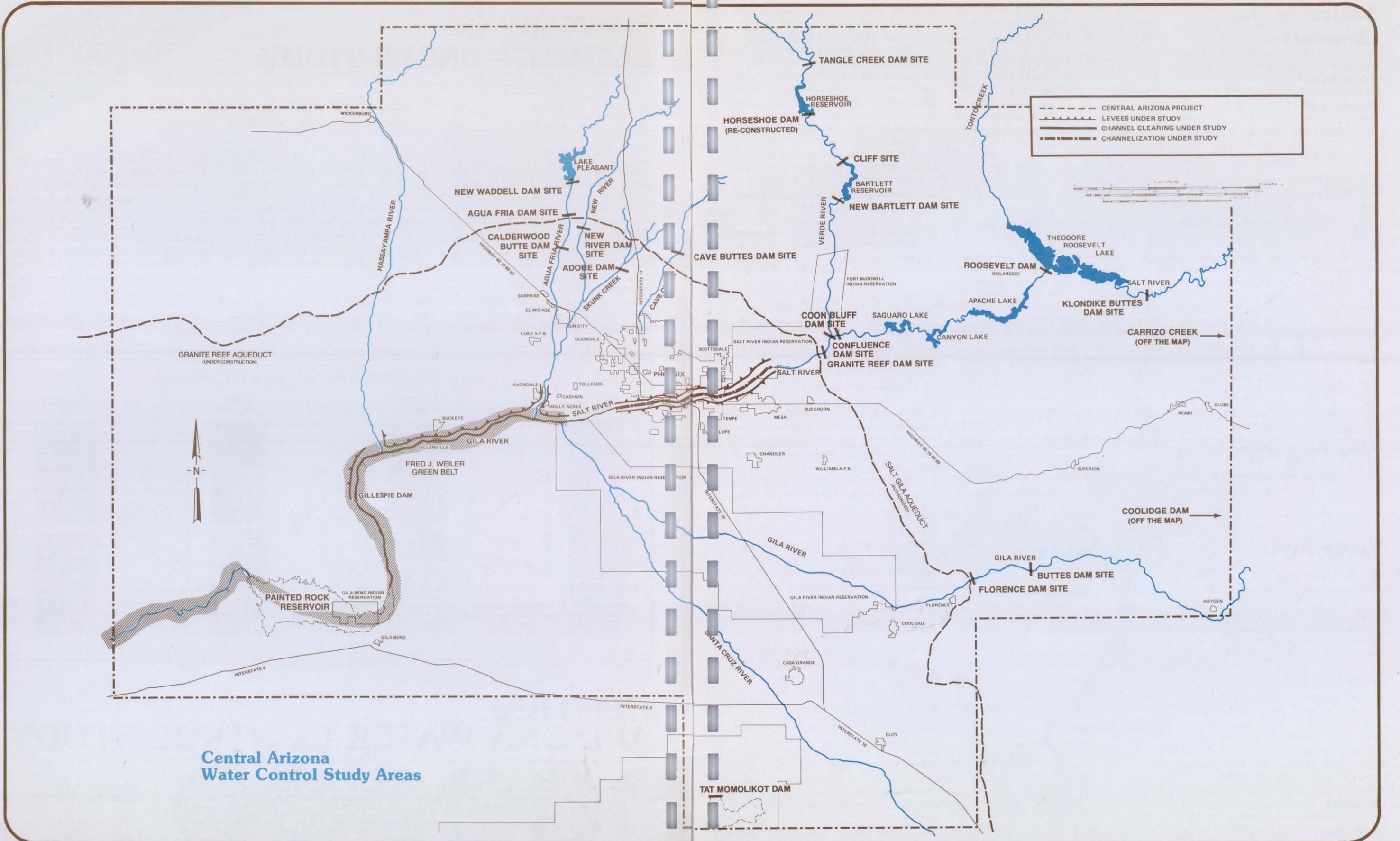
tems will be evaluated using technical and environmental criteria. The systems that are determined to be most acceptable will be studied at an increased level of detail until a preferred plan or plans can be recommended. Plans are combinations of systems with the addition of necessary financial, institutional and operational arrangements. At each decision point the public will be actively involved. The following diagram shows the sequence of the planning process.



CENTRAL ARIZONA WATER CONTROL STUDY



Special Edition 1
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**Central Arizona
Water Control Study Areas**

Analyzing The Elements

Most of the elements have been studied by the Bureau and the Corps in Phase I at an *initial* level of study. This level includes:

1. Preliminary analysis of the element's effectiveness for flood control or supply of CAP water
2. Relationship between dam height and reservoir capacity
3. Literature review of geological information
4. Preliminary cost estimates
5. Review by geologists and engineers in the field

Based on this initial level of study, some elements were recommended for further study, while other elements were eliminated. The recommendations were based on three main factors: (1) geotechnical considerations, (2) site location, and (3) economics. Geotechnical considerations focused on foundation preparation, particularly the prevention of seepage at the dam sites. Sites were evaluated for their proximity to the CAP aqueduct system or for their location in the watershed, and thus their effective-

ness in controlling flood waters. A preliminary cost-benefit analysis constituted the economic evaluation.

During Phase II, *feasibility* studies will be performed for most of the remaining elements. Feasibility studies will include:

1. More detailed analysis of water supply or flood control capabilities of the element
2. Drilling program to determine geological conditions below the surface
3. Site-specific engineering design and cost estimates
4. Studies of environmental, social, economic, demographic, and other relevant non-engineering factors

Elements that have been recently added at the suggestion of the public will receive initial study and, if warranted, feasibility study.

What Are The Elements?

As the diagram of the planning process shows on page 1, the elements are the building blocks out of which

systems, and finally plans will be constructed. The elements range from proposed physical structures such as dams and levees, to institutional measures such as water exchanges and floodplain regulations. In various ways, they provide for flood control and/or CAP regulatory storage. Ideally, an individual element would help solve both CAP regulatory storage and flood control problems. However, most elements offer only partial solutions to these problems and must be combined with other elements to provide both storage capacity and flood control capability.

All of the elements that have been evaluated to date are described in the following sections of the brochure. A map showing the locations of all the currently viable structural elements may be found on page 2. At the end of the description of the elements, a table may be found that shows the function of each element and the recommendations concerning further study.

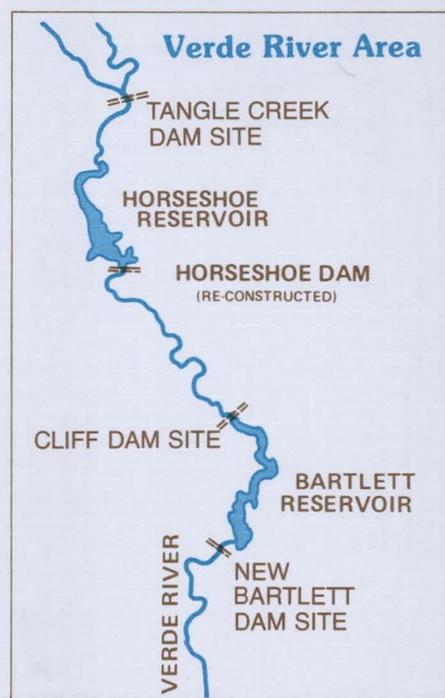
Your comments on any of the elements described or the issues discussed may be added to the tear sheet at the back of the brochure. This tear sheet can be detached and mailed. If you have no comments, you may wish to return the card and have your name added to the Central Arizona Water Control Study mailing list.

Verde River

The four elements that have been considered on the Verde River are dams that would be built primarily for flood control. These structures could also be used for CAP storage through the use of water exchanges between the CAP and the Salt River Project.

Tangle Creek Dam

Tangle Creek Dam would be constructed on the Verde River seven miles upstream from the present Horseshoe Reservoir. This dam would provide limited control over Verde River flood flows, but greater flood control could be obtained in combination with other elements. Geological investigations, including aerial photographs, indicate the site contains serious geotechnical problems. Hot springs have been found



deep under the dam site. At this time no feasible method is known of effectively controlling these springs. Foundation material underlying the proposed left abutment is unsuitable, and treatment is not economically feasible.

Recommendation: No further study is warranted because of geotechnical problems.

Modified Horseshoe Dam

The existing Horseshoe Dam, a Salt River Project water storage facility, is located on the Verde River downstream of the Tangle Creek Dam site. Enlarging the existing structure could provide both flood control and water storage. This modification of Horseshoe Dam could adversely impact bald eagle habitat (i.e., living and nesting areas) as well as archaeolog-

ical sites. Though further geological studies are required, initial investigations indicate that enlargement of Horseshoe Dam is feasible.

Recommendation: A further feasibility study is warranted.

Cliff Dam

Cliff Dam would be constructed on the Verde River, immediately upstream from Bartlett Reservoir. Cliff Dam would provide limited control of Verde River flood flows but could be combined with other elements for

greater flood control. Construction of the dam could affect bald eagle and other wildlife habitats. Further study is needed on the archaeological, social, and historical impacts. Though further geological studies are required, preliminary investigations indicate that this is a suitable dam site.

Recommendation: A further feasibility study is warranted.

New Bartlett Dam

The existing Bartlett Dam, a Salt River

Project water storage facility, cannot be easily modified, but a new and higher dam could be built downstream. The larger reservoir created would be used primarily for flood control with some water storage. Bald eagle and other wildlife habitat could be disturbed. The archaeological, historical, and social impacts have not been fully assessed. Preliminary geological investigations indicate that this is a suitable dam site.

Recommendation: A further feasibility study is warranted.

Salt River

Sites to be considered for dam construction along the Salt River are primarily suited for flood control, except for the sites at the confluence of the Salt and Verde Rivers and at Granite Reef. At this site, regulatory storage can also be provided. Additional water conservation may exist at other sites through the use of water exchanges between CAP and the Salt River Project.

Carrizo Creek Dam

Carrizo Creek Dam would be constructed on the Salt River below the

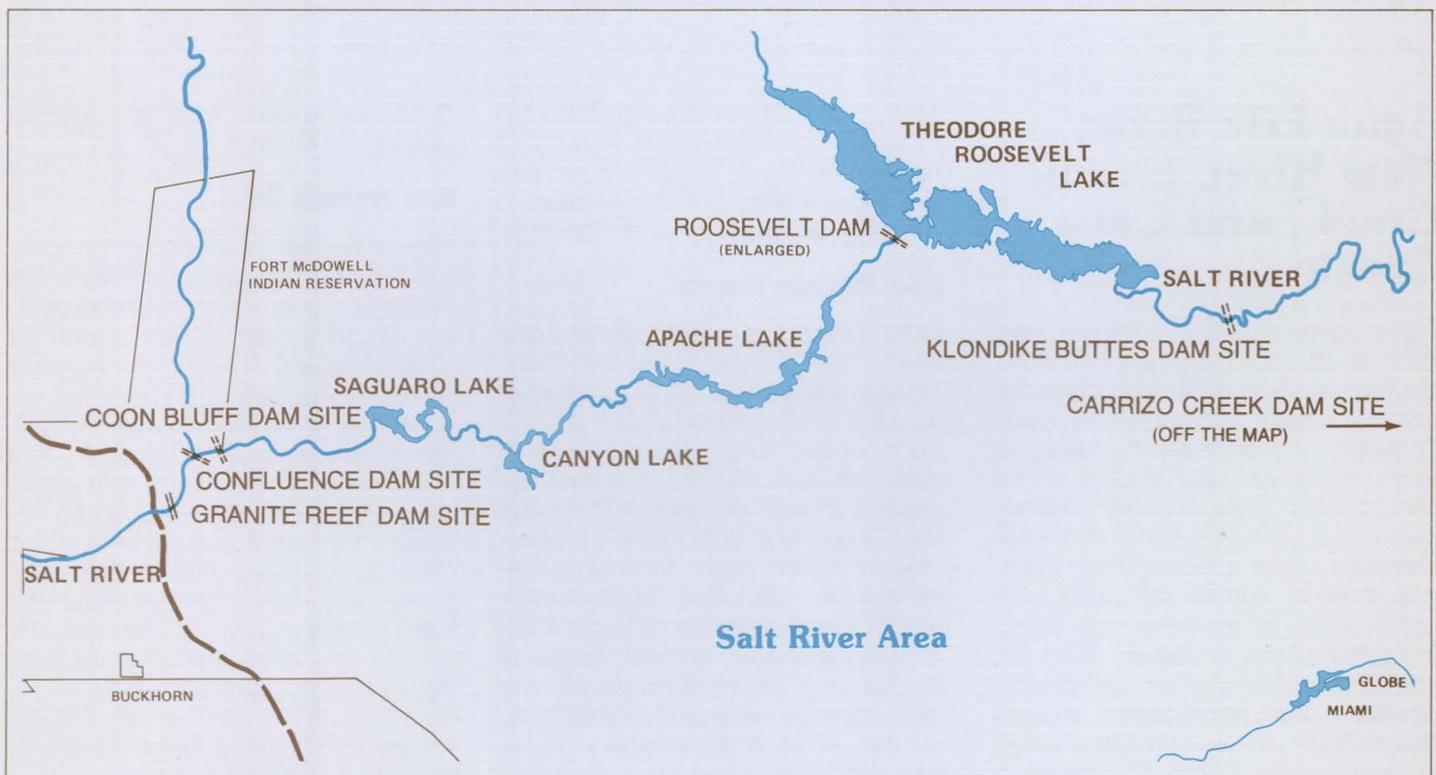
confluence of the Black and White Rivers near Alkali Canyon and east of Roosevelt Lake. The dam would impound flows of poor quality water thereby improving the quality of water in downstream segments of the Salt River. The dam would allow for the diversion of water to the Gila River to augment the natural inflow to the San Carlos Reservoir. Carrizo Creek Dam would be too far upstream to offer effective flood control for the Phoenix area, and it cannot be used for regulatory storage needs.

Recommendation: No further study is warranted because the site meets

neither flood control nor regulatory storage needs.

Klondike Buttes Dam

Klondike Buttes Dam would be constructed on the Salt River just above Roosevelt Lake, and its primary purpose would be flood control of the upper portion of the river. It would not be suitable for CAP storage. A dam and reservoir at this site would impact vegetation along the stream and would encroach upon a proposed "Wild and Scenic Rivers" area. A dam at this site would not control Tonto Creek, a major tributary to Roosevelt



Lake, thus leaving a large uncontrolled drainage area.

Recommendation: No further study is warranted because the site meets neither flood control nor regulatory storage needs.

Modified Roosevelt Dam

The existing Roosevelt Dam, a Salt River Project multi-purpose water hydrogeneration and recreation facility, could be enlarged primarily for flood control, although increased storage for CAP water is also possible. Dam height could be increased up to a maximum of 20 additional feet without requiring major design changes. Some archaeological sites would be adversely affected by a larger reservoir. Roosevelt Dam is on the National Register of Historic Places. This site has no identified geological problems.

Recommendation: A further feasibility study is warranted.

Coon Bluff Dam

Coon Bluff Dam would be constructed on the Salt River one mile upstream from its confluence with the Verde River. The site has been analyzed only for regulatory storage, but flood control could be an alternative use if there were no technical constraints. However, serious geotech-

nical problems have been found at the site. The foundation consists of highly permeable materials, and efforts to reduce seepage are not practical because of local topography.

Recommendation: No further study is warranted because of the geotechnical problems.

Confluence Site (Orme Dam)

A dam built at the confluence of the Salt and Verde Rivers would provide CAP storage and flood control for both rivers. The reservoir created by the dam would affect wildlife and bald eagle habitats, flowing stream recreation, archaeological and historical sites, and would flood significant portions of the Fort McDowell and Salt River Indian Reservations. Smaller structures at this site will also be studied. Some adverse impacts could be reduced by construction of a smaller dam, but a loss in flood control capacity would also result. It is possible for a smaller structure to be used in combination with other elements to achieve flood protection.

Recommendation: A further feasibility study is warranted.

Granite Reef Dam

Granite Reef Dam would be constructed four miles downstream from

the confluence of the Salt and Verde Rivers, providing a large amount of CAP storage capacity in addition to flood control. This dam would require twice the length needed at the confluence site, and similar environmental and social impacts would result from its construction. In particular, the wildlife habitats and flowing stream recreation opportunities would be affected. Portions of the surrounding Indian reservations would be flooded.

Recommendation: A further feasibility study is warranted.

Rio Salado Low Dams

Rio Salado Low Dams would consist of three earthen structures on the Salt River between Mesa and Phoenix and could provide minimal CAP storage. These sites have serious geological problems and would require lining the reservoirs to prevent seepage. Surface regulatory storage does not appear to be feasible since these dams themselves may require upstream protection from flooding and silting. No archaeological, environmental, or historical impacts have been identified.

Recommendation: No further study is warranted because of geotechnical problems and because the sites meet neither flood control nor regulatory storage needs.

Agua Fria River, New River, Skunk Creek, and Cave Creek

Hydrological studies indicate that flood flows from the Agua Fria River contribute only a small portion to the total flood waters on the Gila River. Therefore, Agua Fria sites have not been analyzed for single-purpose flood control. Since Granite Reef Aqueduct crosses these four drainage channels close to existing and proposed flood control structures, the construction of multi-purpose structures has been analyzed. Planning and construction are currently under way to provide flood control on New River, Skunk Creek, and Cave Creek by way of the Corps of Engineers'

New River and Phoenix City Streams Project. Sites along the Agua Fria River, New River, Skunk Creek, and Cave Creek were therefore evaluated primarily as regulatory storage sites.

Lake Pleasant Storage

Lake Pleasant is located on the Agua Fria River behind Waddell Dam. Enough vacant space is available behind the existing dam for CAP storage during years when Agua Fria River runoff is low. A canal would be needed to connect the CAP Granite Reef Aqueduct with Lake Pleasant. Waddell Dam was constructed in 1928 by the Maricopa County Municipal Water Conservation District No. 1. Since this dam is not a Bureau of Reclamation structure, it would have to be carefully analyzed to determine if it would meet Reclamation criteria and standards for water storage.

Recommendation: A further feasibility study is warranted.

New Waddell Dam

New Waddell Dam would be constructed on the Agua Fria River immediately downstream from the existing Waddell Dam which impounds Lake Pleasant. The primary purpose of this earthen dam and reservoir enlargement would be to provide additional space for CAP storage. The reservoir would be directly connected to the Granite Reef Aqueduct by means of a canal and pumping plant. Geological investigations are currently under way to determine the most feasible dam and spillway locations and to determine if seepage from the reservoir is a problem.

Recommendation: A further feasibility study is warranted.

Agua Fria Dam

Agua Fria Dam would be constructed five and one-half miles downstream of the existing Waddell Dam where the Granite Reef Aqueduct crosses the Agua Fria River. This site, considered primarily for CAP storage, would have a long, narrow basin limiting storage capacity. Environmental impacts are expected to be minimal, but several archaeological sites would be affected. Extensive foundation treatment would be necessary. Severe seepage losses from the reservoir area to the ground-water basin are likely, since no bedrock separation between the Agua Fria River and New River has been found.

Recommendation: No further study is warranted because of geotechnical problems.

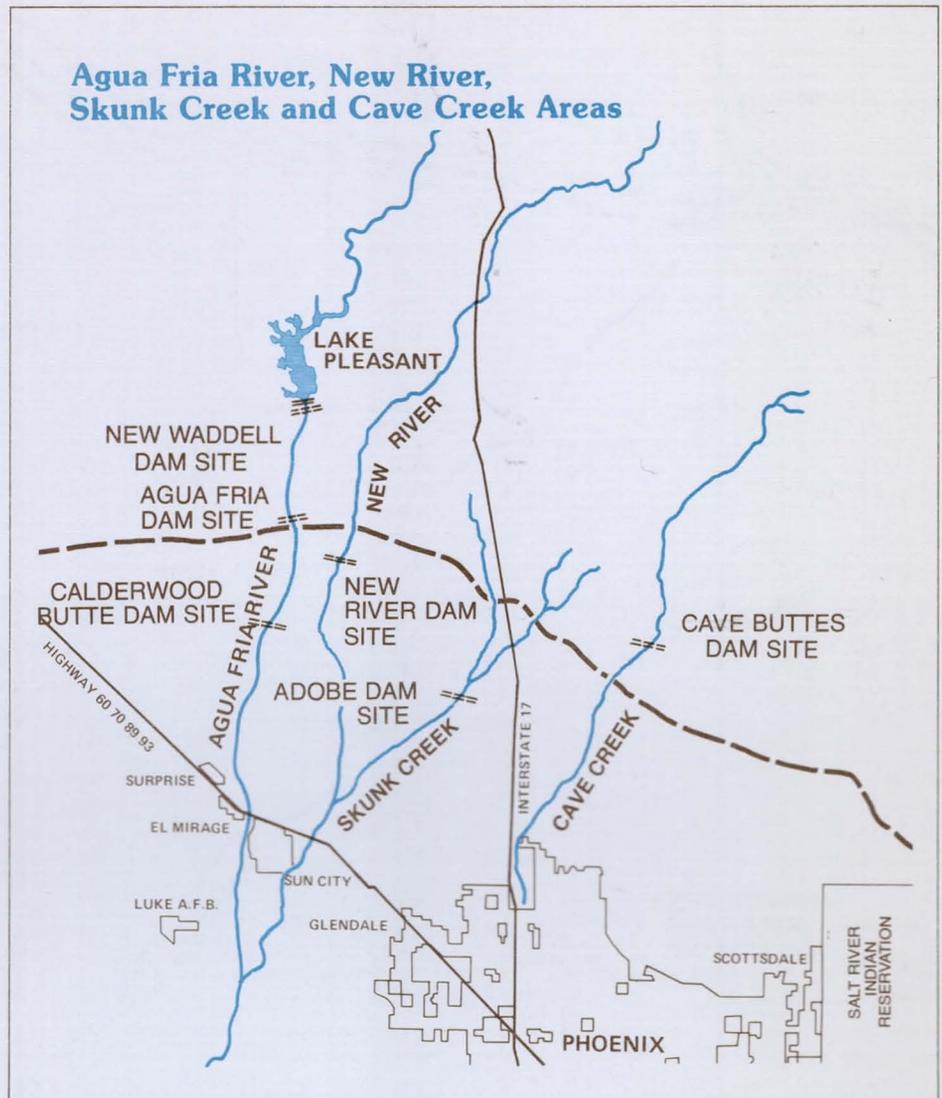
Calderwood Butte

Calderwood Butte Dam would be a mile-long earthen dam constructed about three miles downstream from the Granite Reef Aqueduct on the Agua Fria River. This site would be primarily used for CAP storage. Pumping would be necessary to return reservoir water to the aqueduct. No serious environmental impacts have been identified, although several archaeological sites would be affected. The depth of bedrock would require extensive foundation preparation, and the reservoir area would require lining to prevent massive seepage losses. No significant flood control for the study area would be provided.

Recommendation: No further study is warranted because of geotechnical problems.

North Phoenix Flood Control Dams (for CAP)

The Army Corps of Engineers is currently constructing three dams: Cave Buttes Dam on Cave Creek, New River Dam on New River, and Adobe Dam on Skunk Creek. These dams will protect much of Phoenix from floods on these streams, but they will not offer flood protection on the Salt and Gila Rivers. Neither will they provide water storage. Enlarging these



dams to store CAP water has been suggested, but the topographical conditions at these sites would preclude the larger reservoirs. If converted to regulatory storage, these dams would lose their flood control effectiveness. Conversion of the

dams could also impact archaeological sites

Recommendation: No further study is warranted because of conflicting requirements between regulatory storage and flood control.

Gila River and Santa Rosa Wash

The proposed elements along these streams have received limited attention. They were added to the study at the suggestion of the public and will be evaluated for CAP storage. They have no potential for flood control in the Phoenix area. These elements, with the exception of Coolidge Dam and Painted Rock Reservoir (see below), will receive an initial level of study.

Coolidge Dam

Coolidge Dam is located on the Gila River within the San Carlos Indian Reservation about 60 miles east of the town of Florence. Historically, San Carlos Reservoir behind Coolidge Dam has rarely filled and space has been available. However, to use this space would require a sixty-mile pipeline and a series of pumping plants to connect the reservoir with the Salt-Gila Aqueduct. Construction of such a pipeline would be difficult, and the costs would be prohibitive.

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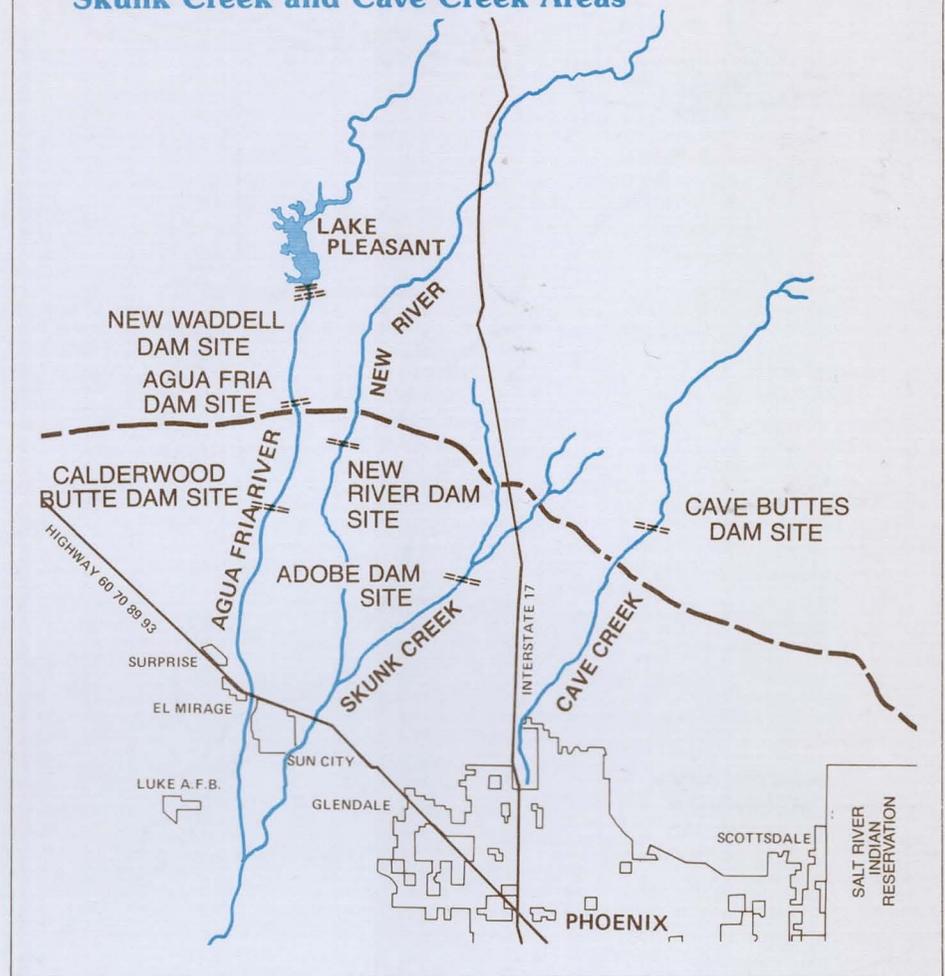
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Agua Fria River, New River, Skunk Creek and Cave Creek Areas



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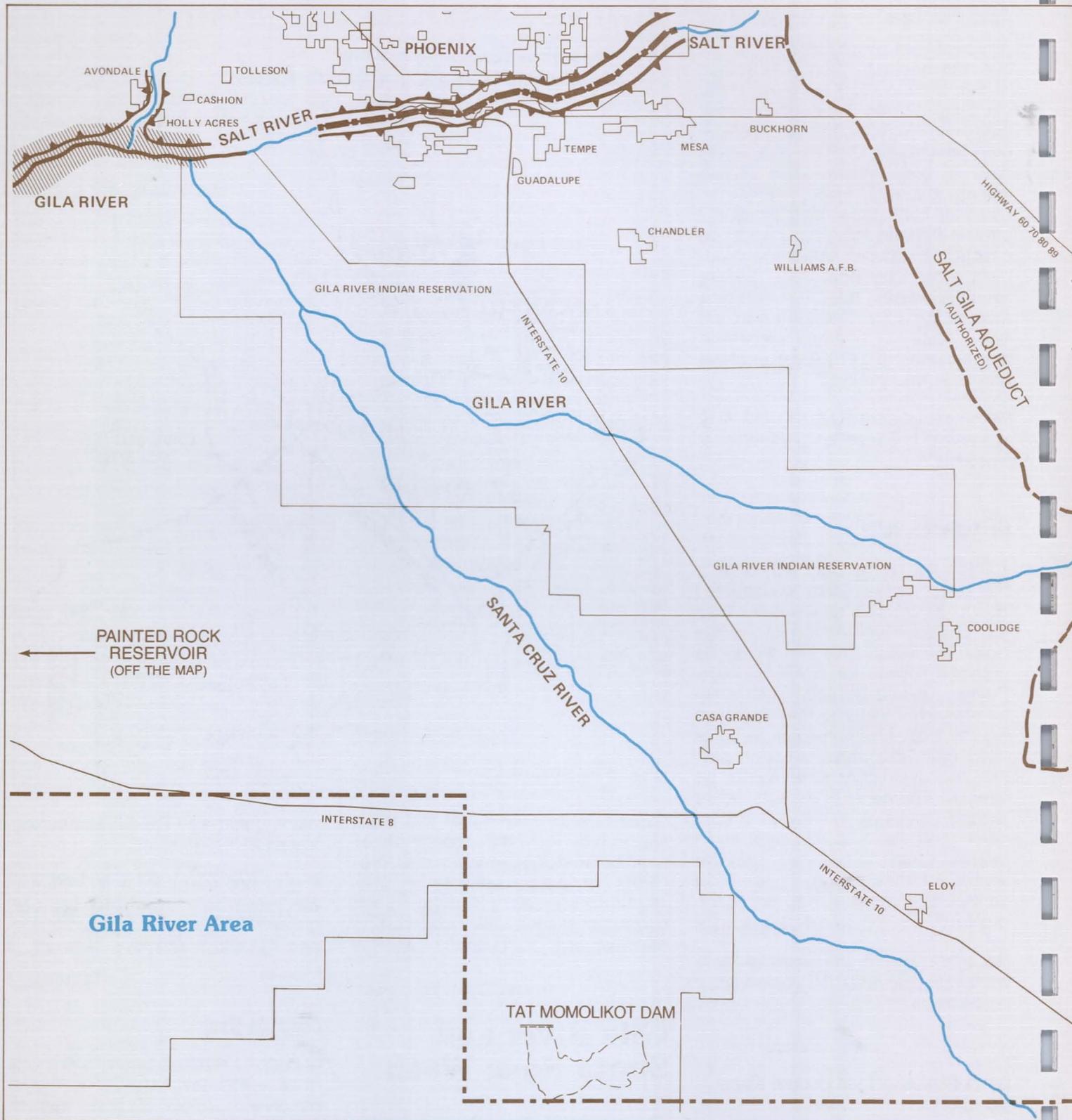
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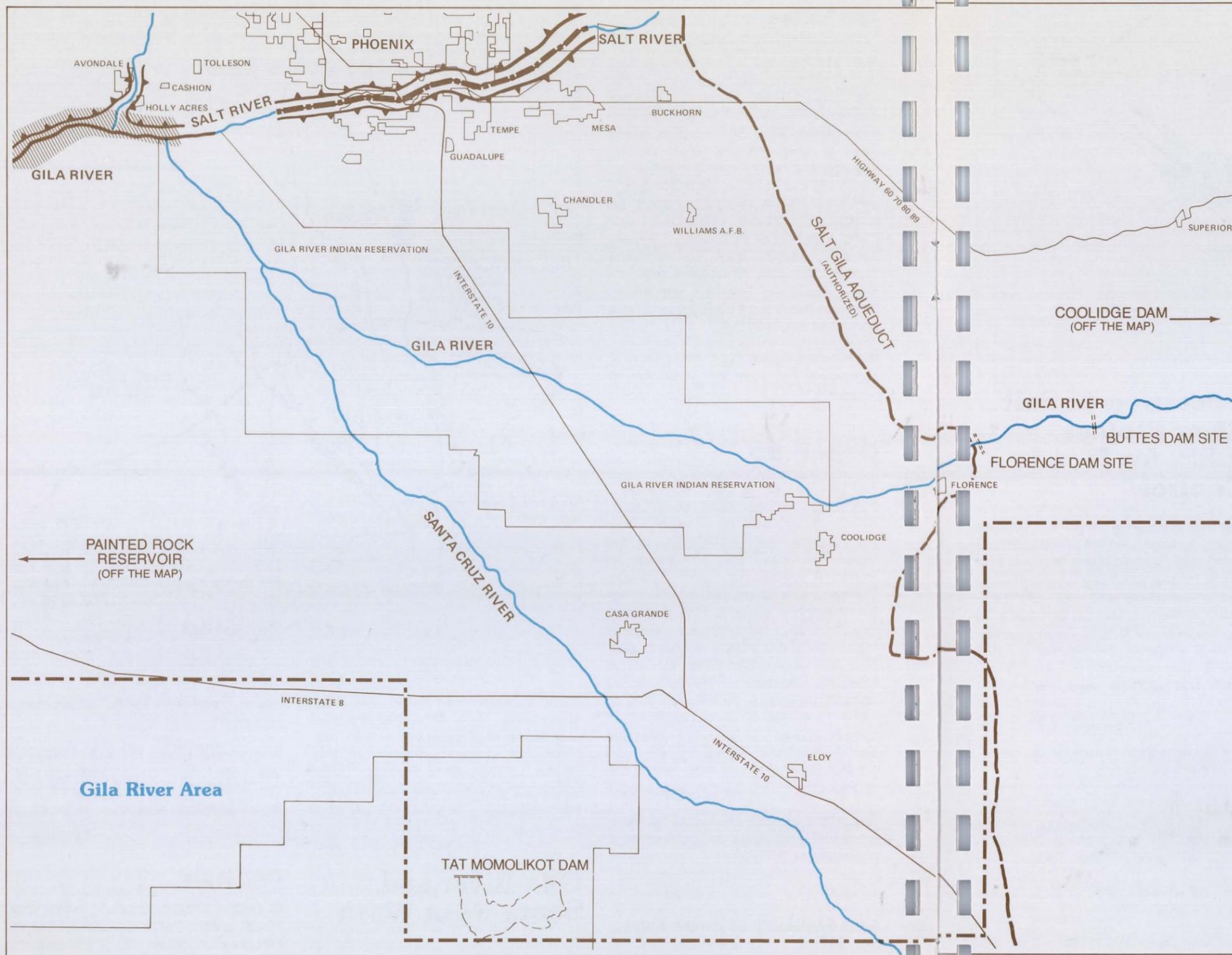
Recommendation: No further study is warranted because this site meets neither flood control nor regulatory storage needs.

Florence Dam

Florence Dam would be constructed on the Gila River about four miles below Ashurst-Hayden Diversion Dam

and six miles east of the town of Florence. If Florence Dam were constructed, the Ashurst-Hayden structure would be inundated, thus backing up water to the proposed Buttes Dam. CAP water would have to be pumped from the Salt-Gila Aqueduct to the reservoir for regulatory storage. As presently envisioned, a

dam and reservoir at the Florence site would provide no downstream flood control on the Gila River. Environmental impacts along the river may be limited since the site is partially located on a dry wash. However, four prehistoric sites would be affected. The geology of the area is a problem and



Recommendation: No further study is warranted because this site meets neither flood control nor regulatory storage needs.

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seepage losses from the storage pool could occur. Additional geological analysis is needed.

Recommendation: More initial study is warranted.

Buttes Dam

Buttes Dam and Reservoir is an au-

thorized CAP feature to be located seven miles upstream from the Florence Dam site. A canal would be required to connect the Salt-Gila Aqueduct with Buttes Reservoir for CAP regulatory storage. Impacts to mineral resources and wildlife habitat along the river could result. Some water exchanges may be possible in connection with Buttes Reservoir and San Carlos Reservoir behind Coolidge Dam.

Recommendation: More initial study is warranted.

Tat Momolikot

Tat Momolikot Dam is an existing flood control structure located on Santa Rosa Wash on the Papago Indian Reservation. CAP water storage could be provided by constructing a thirty-mile feeder canal from the Salt-Gila Aqueduct to Tat Momolikot. However, seepage of water out of the reservoir basin is a major concern. If

converted to regulatory storage, this dam would lose its flood control effectiveness. Environmental impacts are expected to be minimal since the Santa Rosa Wash is dry.

Recommendation: More initial study is warranted.

Painted Rock Dam and Reservoir

Painted Rock Dam and Reservoir are located on the Gila River near the town of Gila Bend. It has been proposed that flood waters stored in Painted Rock Reservoir be put to beneficial uses in other parts of Arizona. Unfortunately, the Reservoir's downstream location creates a problem in delivering the water to the major agricultural and metropolitan area.

Recommendation: No further study is warranted because the site meets neither flood control nor regulatory storage needs in the Phoenix metropolitan area.

Channels

Channelization of portions of the Salt and Gila Rivers has been proposed to reduce flooding. Flows would be confined in relative deep, narrow channels constructed in the riverbed. A Phase I cost-benefit analysis on channelization showed that a continuous system of channels between Granite Reef Dam and Gillespie Dam is not justified. Specifically, the sections between Granite Reef Dam and Country Club Road and between 35th Avenue and Gillespie Dam do not incur enough flood damages to demonstrate a need for channels. The section between Country Club Road and 35th Avenue does incur enough damages to warrant further study of channels.

Recommendations:

1. Granite Reef Diversion Dam to Country Club Road: *No further study is warranted because of a lack of economic justification.*
2. Country Club Road to 35th Avenue: *A further feasibility study is warranted.*
3. 35th Avenue to Gillespie Dam: *No further study is warranted*

because of a lack of economic justification.

Levees

Levees are embankments along a river that contain flows. They generally provide a wider floodway than channels and are constructed of earthen materials. A continuous system of flood control levees along the Salt and Gila Rivers has been analyzed and found to be economically unjustified as a solution to the flood problem. However, further feasibility studies are warranted locally in two sections: the Salt River from Country Club Road to 35th Avenue and the Gila River from the Salt-Gila confluence to Gillespie Dam.

Recommendations:

1. Granite Reef Diversion Dam to Country Club Road: *No further study is warranted because of a lack of economic justification.*
2. Country Club Road to 35th Avenue: *A further feasibility study for two-sided levees is warranted.*
3. 35th Avenue to Salt-Gila River

RESPONSE FORM

After you have read this report,
we would appreciate any comments or questions you may have on the following:

For mailing: Please fold with address showing, tape or staple edge. — No postage required.

a) Criteria used to eliminate several elements.

b) Potential impacts of remaining elements.

c) Other elements that should be considered.

If you would like your name added to the CENTRAL ARIZONA WATER CONTROL STUDY mailing list,
please complete the form and drop it in the mail.

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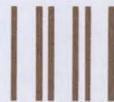
STREET _____

CITY _____

ORGANIZATIONAL AFFILIATION _____

AREA OF INTEREST — Please Circle

- | | | |
|--------------------|-------------------------|--------------------------|
| a. Biology | g. Historical resources | n. Rio Salado |
| b. Geology/Soils | h. Land use | o. Agriculture |
| c. Water Resources | i. Recreation | p. Wildlife |
| d. Air quality | j. Social | q. Indians |
| e. Acoustics | l. Economic/Demographic | r. Other (Specify) _____ |
| f. Archaeology | m. Public involvement | _____ |



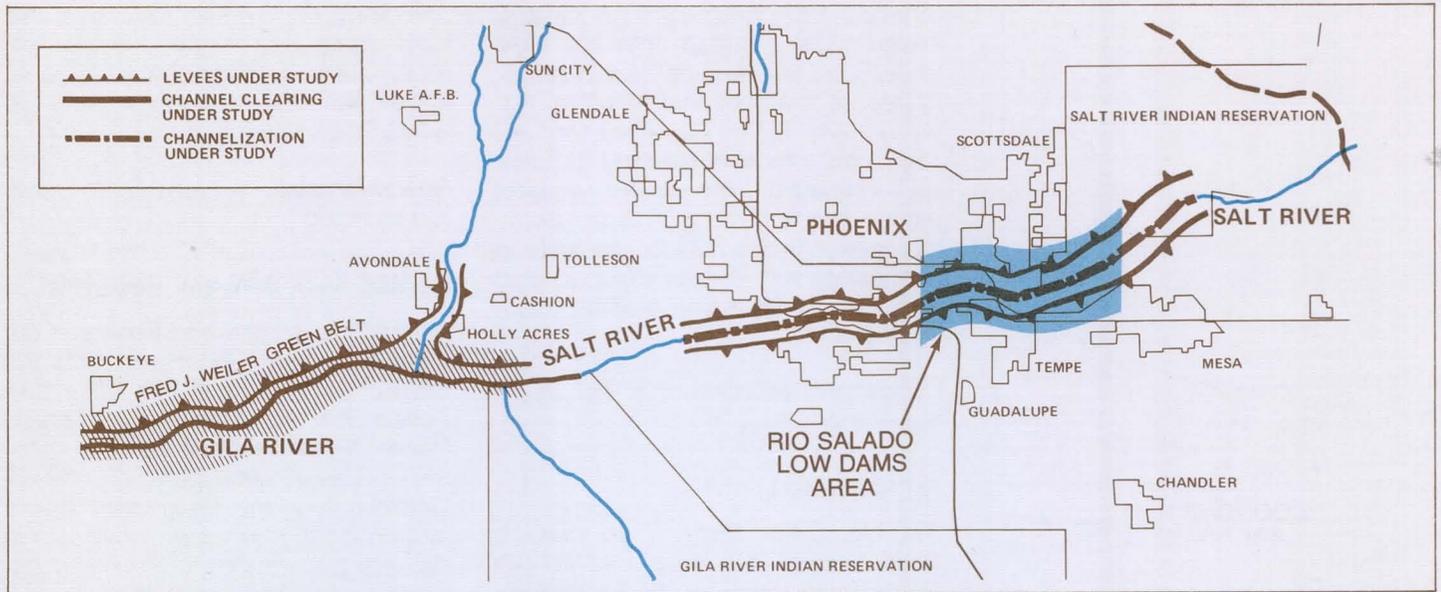
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Confluence: No further study is warranted because of a lack of economic justification.

4. Salt-Gila Confluence to Gillespie Dam: A further feasibility study is warranted for a **single-sided** levee along the north side of the river.

Channel Clearing

The overgrowth of salt cedar and other such long-rooted vegetation has obstructed the river channel in parts of the Salt and Gila Rivers from 91st Avenue to Gillespie Dam. Clearing a swath through this growth (channel clearing) has been suggested as a means to allow flood flows a path to follow. Several methods could be used to accomplish the clearing.

The Maricopa County Flood Control District is presently investigating a plan to provide a 1,000-foot-wide clear channel from 91st Avenue to Gillespie Dam. In addition, the Corps of Engineers has an authorized, but not funded, flood control project (1957 Survey for Flood Control, Gila and Salt Rivers, Gillespie Dam to McDowell Dam Site, Arizona) which includes clearing the riverbed to create a 2,000-foot floodway from Gillespie Dam to Granite Reef Dam.

Recommendation: A further feasibility study is warranted.

Water Exchanges

Water exchanges would involve agreements between the Bureau of Reclamation and responsible water agencies for the exchange of quantities of CAP water for quantities of watershed-derived water controlled by these agencies. Three agencies with surface water sources and storage reservoirs in central Arizona could be involved in water exchanges: the Salt River Project on the Salt and Verde Rivers, the San Carlos Project on the Gila River, and the Maricopa County Municipal Water Conservation District No. 1 on the Agua Fria River (Lake Pleasant).

The exchanges could be accomplished as follows:

1. Vacant storage in a reservoir would be made available for CAP storage at the time this storage is needed
2. The exchanging organization would agree to trade its water for an equal amount of CAP water
3. The exchanging organization would later trade the exchanged water in partial satisfaction of its CAP allotment or deliver on demand the exchanged water to the CAP aqueduct system.

Recommendation: A further feasibility study is warranted.

Operation of Salt River Project (SRP) for Flood Control

The Salt River Project (SRP) operates under federal charter its system of dams and reservoirs on the Salt and Verde Rivers, primarily for water storage and hydropower. The SRP Reservoir system could be operated so as to gain additional flood control. One or more of the following items could be included in increasing SRP's flood control capabilities:

1. Sophisticated runoff forecasting
2. Improved monitoring of watershed conditions
3. Designated flood control space in existing reservoirs, which could vary according to season and watershed conditions
4. Additional water outlets to the existing system.

Use of these capabilities would decrease downstream releases of water from the system, lessen flood damages, and increase utilization of the Salt River floodplain. Impacts on flood control, water conservation, hydropower generation, recreation, and fish and wildlife habitat must be evaluated.

Recommendation: A further feasibility study is warranted.

Element	Purpose		Further Study		
	Flood Reduction	CAP Regulatory Storage	Warranted Initial	Warranted Feasibility	Unwarranted
VERDE RIVER					
Tangle Creek	●	●			●
Modified Horseshoe	●	●		●	
Cliff Site	●	●		●	
New Bartlett	●	●		●	
SALT RIVER					
Carrizo Creek	●				●
Klondike Buttes	●				●
Modified Roosevelt	●	●		●	
Coon Bluff		●			●
Confluence	●	●		●	
Granite Reef	●	●		●	
Rio Salado Low Dams		●			●
AGUA FRIA RIVER AND TRIBUTARIES					
Lake Pleasant		●		●	
New Waddell		●		●	
Agua Fria Siphon		●			●
Calderwood Butte		●			●
North Phoenix Flood Control Dams (for CAP)		●			●
GILA RIVER AND SANTA ROSA WASH					
Coolidge		●			●
Florence		●	●		
Buttes		●	●		
Tat Momolikot		●	●		
Painted Rock Reservoir		●			●
CHANNELS					
Granite Reef Diversion to Country Club Road	●				●
Country Club Road to 35th Avenue	●			●	
35th Avenue to Gillespie Dam	●				●
LEVEES					
Granite Reef Diversion to Country Club Road	●				●
Country Club Road to 35th Avenue	●			●	
35th Avenue to Salt-Gila Confluence	●				●
Salt-Gila Confluence to Gillespie Dam	●			●	
CHANNEL CLEARING	●			●	
WATER EXCHANGE		●		●	
SALT RIVER PROJECT OPERATION AND FLOOD CONTROL	●			●	
FLOODPLAIN MANAGEMENT	●			●	
GROUNDWATER RECHARGE	●	●		●	
NO ACTION				●	

Floodplain Management Measures

Measures for flood plain protection include the following:

1. Floodproofing — alteration of existing and future development by such means as floodwalls, small levees, temporary closures on openings, raised structures, and removal of structures and/or their contents
2. Floodplain acquisition — purchase and removal of existing structures from the floodplain
3. Floodplain regulation — use of regulations to lessen flood damage
4. Flood warning techniques — use of advance warning of impending flooding to evacuate people and damageable property

5. Bridge construction — construction of bridges of sufficient capacity to pass flood flows, thereby reducing traffic delay costs during floods.

Groundwater Recharge

Subsurface storage of water has been suggested in connection with both flood control and CAP regulatory storage. Water could be controlled upstream and infiltrated into the ground to raise the water table, thus storing surplus water for later use. In order for this concept to be used for flood control, water must be taken out of an aboveground reservoir during the winter season and placed underground. This underground water storage could be used in exchange for space behind existing dams during the times of flooding. Pumping would be required to recover the groundwater when it is needed. For CAP purposes, proposals have been made that surplus Colorado River water be stored underground for recovery at a later time.

The type of information needed to analyze groundwater recharge and recovery in the study area is quite limited. Also, conflicts over water ownership could arise unless provisions are made for such a scheme under Arizona's groundwater laws.

Recommendation: Further feasibility study is warranted.

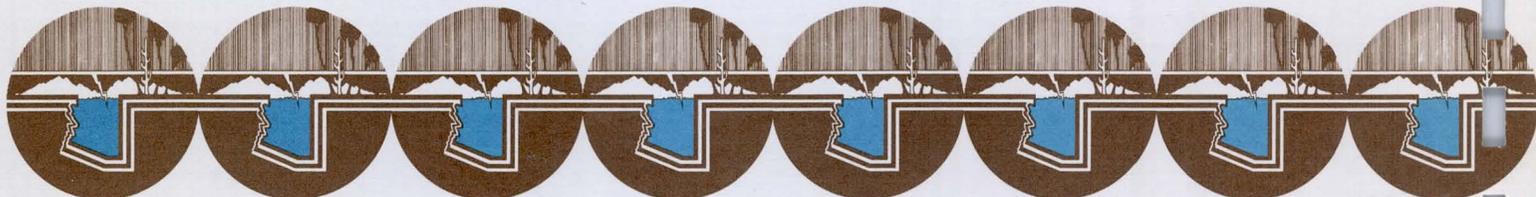
No Action Alternative

The "no action" alternative assumes that none of the study elements would be implemented. However, any existing or presently authorized flood control and related structures (i.e., dams, Indian Bend Wash, bridges) and the CAP Aqueduct and Buttes Dam and Reservoir will be included in this element. No additional water storage or federally funded flood protection facilities will be studied. Future development of the Salt River floodplain would be limited under the "no action" alternative in accordance with Federal Insurance Administration regulations.

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Planning Objectives to Guide Further Study

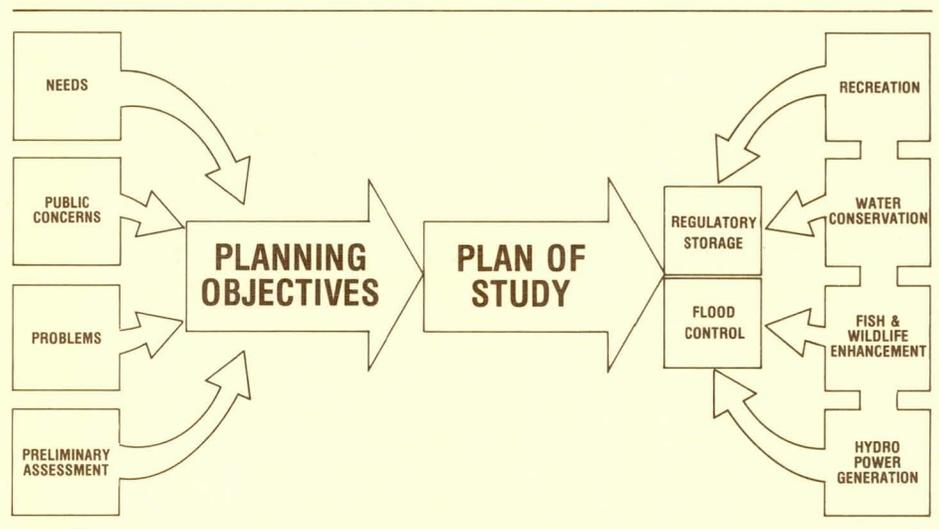
The Plan of Study prepared by the Bureau of Reclamation assisted by the Corps of Engineers (Phase I) clearly states the focus of the Central Arizona Water Control Study:

- Increase efficiency of the Central Arizona Project by providing regulatory storage capacity in central Arizona and
- Decrease flood damages along the Salt and Gila Rivers between Granite Reef Dam and Painted Rock Dam

Also, the study team will give equal consideration to the potential of each element, and later each alternative system, to provide opportunities for fish and wildlife enhancement, recreation, hydroelectric power generation and water conservation. The presence or absence of these aspects and the values placed upon them by the technical and the public communities will be very important in the evaluation of the alternative solutions and in the final decisions.

A particular element or system that meets one or both requirements for flood control or regulatory storage would become more desirable if for example it provides additional recreational opportunities or enhances fish and wildlife. Still the focus of the planning will be flood control or regulatory storage.

To aid the study team in assessing the wide array of elements nine additional planning objectives in the



plan of study were adopted:

- Increase conservation of waters emanating from the Salt, Verde, Agua Fria, and Gila watersheds.
- Maximize energy efficiency as it relates to water resources, especially in regard to groundwater and CAP pumping requirements.
- Develop and illustrate opportunities for hydroelectric power production associated with structural and nonstructural alternatives.
- Take advantage of opportunities to enhance the social well-being of Indian communities.
- Take advantage of opportunities to protect and/or improve the quality of certain natural or cultural resources or ecological systems.
- Develop plans for recreational facilities in urban areas (such as those proposed in the Rio Salado concept) as well as in rural/natural areas to provide opportunities for recreational enhancement at both upstream and downstream locations in the CAWCS area.
- Take advantage of opportunities to improve the management and protection of open space and to increase its extent by maintaining existing wildlife areas and studying the potential for development of greenbelt floodways and multi-purpose projects such as the Rio Salado concept.
- Improve management and preservation of unique archaeological and historical resources in the CAWCS area.

continued on page 3

CENTRAL ARIZONA WATER CONTROL STUDY

Newsletter 2
SEPTEMBER 1979

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PHOENIX, ARIZONA 85004
TELEPHONE (602) 271-0915

Governor's Board Reaches Conclusions About "Future Without Project"

To determine if an action proposed in the Water Control Study has an economic, environmental or social impact, the study team is creating an image of what the future would be like if no regulatory storage or federal flood control projects were built. This is known as the "future without project" against which all alternatives developed in the study will be compared.

Much of the task of identifying the "future without project" is technical in nature. The study team has consulted with local and state agencies to identify existing plans and projections. Research and field studies have been initiated to determine existing conditions and trends. But what about the citizens' view? What about people's expectations for the future and how it ought to be?

The Governor's Advisory Committee met August 23rd to begin developing ideas about the "future without project" from the citizens' viewpoint. Some of their conclusions follow:

- Greater coordination among municipalities on flood control projects will be required.
- The inability to capture flood water and continued groundwater overdraft will limit economic development.
- Water supply will decrease.
- Recreation on flowing waters will remain the same, but less opportunities for flat water recreation will be developed.
- Without regulatory storage, there is less chance for Rio Salado as presently envisioned.

continued on page 3

New Faces

Featured this month are four of the key persons who manage the Bureau of Reclamation and Corps of Engineers activities in the Central Arizona Water Control Study.



As Study Manager for the Bureau of Reclamation, **Herb DISHLIP** is responsible for overall direction of the study. Since the Bureau serves as lead agency, Herb ensures that the efforts of all the agencies, contractors and advisory groups involved in the study are coordinated. The Secretary of the Interior has also named him "Expeditor" to make sure schedules are met. A graduate of the University of Iowa, Herb has been with the Bureau for seven years, six of those spent in Colorado. No stranger to such complex studies, the majority of his experience has been with plan formulation studies where individual elements are analyzed and combined to develop the best overall plan.



Management responsibility for the Corps' portion of the study belongs to **Joe DIXON**. Joe joined the Corps in Los Angeles after graduating from the University of Arizona. A year later he returned to Phoenix to manage the water conservation, recreation, fish and wildlife enhancement and public involvement elements of the Corps' Phoenix Urban Study. Joe has done extensive flood emergency work throughout Arizona, especially in the last two years. This includes assessment and survey of flood damages and subsequent inspection of flood damage repair on public facilities. He lists Indian Bend Wash among the flood control projects on which he has assisted.



Tim HENLEY is Bureau Project Engineer and is responsible for most of the technical engineering on the Bureau's portion of the study. Before moving from Nevada to Phoenix to work on the Water Control Study, Tim was involved in the Bureau's Southern Nevada Water Project and the Las Vegas Desalting Project. He's a registered engineer in California and a member of the American Society of Civil Engineers.



Corps Project Engineer **Don GROSS** coordinates the day-to-day technical work on their portion of the study. Don came to Phoenix in 1976 to work on the original Orme Dam flood control study. In fact, he was Flood Control Subcommittee Chairman of the Inter-agency Task Force on Orme Dam alternatives. Don is a graduate of Loyola University in Los Angeles and member of the American Society of Civil Engineers. Racquetball, basketball and backpacking take up much of his leisure time.

TAG Provides Feedback

A Technical Agency Group (TAG) was formed in January of this year to provide additional technical assistance to the Corps and Bureau during the Central Arizona Water Control Study. The group comprises representatives of federal, state and local agencies with programs underway or proposed that may impact the project.

"Review and feedback is what's needed from agency representation," said Bureau Study Manager Herb Dishlip. "We don't want to make decisions behind closed doors." In addition to technical assistance, the TAG will review study progress and help develop and select a final plan. "Agency representatives know their jobs and areas," adds Corps Study Manager Joe Dixon, "and can help to speed the process of deriving the best alternative."

The TAG met last month for an update on the status of the study and to provide the Bureau and Corps with information on projects that may affect future conditions in the study area. This month the study team presented the "future without project" assumptions developed for the purpose of comparing impacts of alternatives.

The TAG will meet next month to discuss the strategy for studying groundwater recharge, an element being examined in the Central Arizona Water Control Study.

Conclusions About "Future Without Project"

continued from page 2

The study team is now putting together its best estimate of the "future without project" using a combination of the technical information and citizens' viewpoint plus federal regulations. The public will have opportunities to review the results and offer comments.

Two Flood Control Study Contracts Awarded

The Corps of Engineers has awarded two separate contracts for flood control studies in the Central Arizona Water Control Study.

The Natelson Company, a firm specializing in land use economics, has received a contract to perform economic analysis of flood control alternatives. The firm will determine existing and proposed land uses, evaluate the present and projected value of lands subject to flooding, and determine expected damages from future floods. Based on their findings, the

benefits of the alternatives will be evaluated relative to costs.

The Corps has also contracted with Professor Will Graf of Arizona State University to perform a phreatophyte growth assessment on the Salt and Gila Rivers. Professor Graf will document the effects of vegetation growth on the stream channel, describe methods of controlling or clearing vegetation, and develop future scenarios of how growth will affect or be affected if no action is taken.

Public Involvement

Reading our newsletter for the first time? If so, you may want more information on the Central Arizona Water Control Study. A "special edition" brochure is available that describes actions that singly or in combination could provide for CAP storage and flood control. Twenty of the thirty-four elements are still under study. Call Marty Rozelle at 271-0915 and request a copy.

To receive future issues of the newsletter, make sure you're on our mailing list.

We're stepping up our public involvement program. We've planned activities over the next three to four months that will prepare the public for upcoming informational meetings in January and February.

Between now and January take advantage of available opportunities:

Speakers — someone will discuss the study with your organization or neighborhood group.

Slide Show — A slide show is being prepared and will be updated as the study progresses.

Library of Information — A library of background information on many aspects of the Water Control Study is available for your use in the project office.

Call Marty to schedule a presentation or to use any of the above. The "hotline" 271-0915 is open. Let us answer your questions and hear your comments and suggestions.

PHASE I

continued from page 1

- Conserve and enhance fish and wildlife resources by taking such measures as creating minimum pools for bass fisheries and developing cottonwood seeding programs.

From this point forward, the study will move toward selecting one plan that best resolves the regulatory storage

and flood control problems of the study area. The planning objectives, which are consistent with the national objectives of environmental quality and national economic development, are the guide for these efforts and will serve as a measure of study progress.

In coming issues of this newsletter, we'll be taking a closer look at each of these objectives and what the study is doing to meet them.

We Get Letters

Response to the "Summary of Elements Under Study" brochure has been great. We received many valuable comments and suggestions.

Support and interest in further examination of nonstructural alternatives, such as water exchange, SRP flood control, and floodplain management, were expressed as a "positive step" in the study.

In regard to the potential impacts of remaining elements, comments centered on the possible loss of the bald eagle and other wildlife habitat along the river. The flooding of parts of the Fort McDowell and Salt River Indian reservations at the confluence site (Orme Dam) was a concern of several respondents.

Other elements suggested for consideration were: further studies on flood damages for the area between 35th Avenue and Gillespie Dam; extension of levees on the north side of

the Salt River to 91st Avenue; use of existing storage capacity on the Colorado River System; and the possibility that Rio Salado dams could be collapsible and eliminate some flooding destruction.

It's not too late to send in a response form. We appreciate your comments and will continue to provide opportunities for your involvement.

Water Words

Flood: An overflow of water onto lands that are used or usable by man and are not normally covered by water.

Floodplain: A belt of low flat ground bordering one or both sides of a river or stream. This area is inundated when surface flows exceed the capacity of natural channels.

Flood Control: The reduction of the potential for flood damages by structural (dams, channels) or nonstructural (floodproofing, floodplain zoning) means.

FLOOD CONTROL AT ALLENVILLE

Public Meeting

Friday, September 28, 7:00 P.M.
Buckeye Union High School
Auditorium
902 Eason Avenue,
Buckeye, Arizona

The Corps of Engineers and the State Division of Emergency Services will report the results of Phase I of the recent study and discuss flood control alternatives, including the relocation of Allenville out of the floodplain.

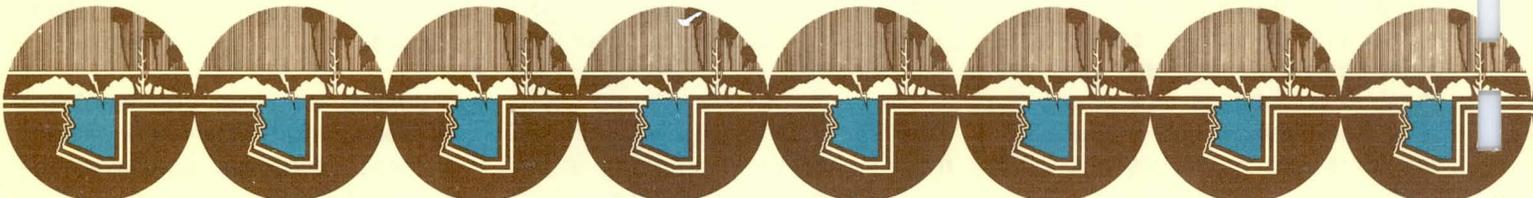
Next Issue

Next month we'll take a look at regulatory storage and how it will increase the efficiency of the Central Arizona Project.

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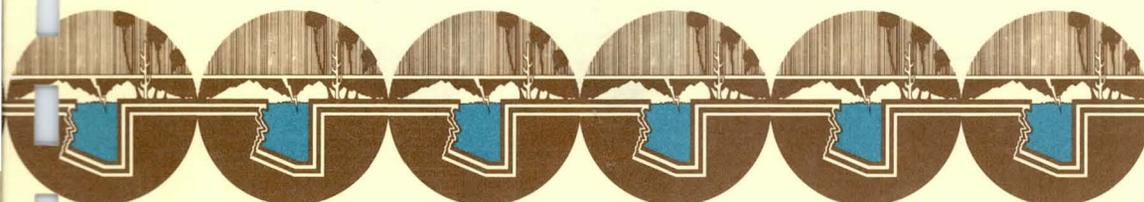
EXTRA
November 1979



WHAT CAN YOU DO BESIDES BUILD A DAM?

Traditionally, attempts to solve flood problems have taken the form of dams, levees or channels that control the elevation and flow of water. These kinds of "structural" solutions are not only expensive and involve lengthy construction time, but often have significant environmental effects as well. Because development in the floodplain has occurred faster than these structural flood control works have been built, flood damages continue to increase year by year.

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In response to recent directives from the President and the U.S. Congress, flood control planning studies are required to examine alternative measures to reduce flood damages. These "nonstructural" flood loss reduction measures are aimed at reducing flood damages due to development in flood-prone areas, rather than changing the flow of water.

One inherent difficulty of these measures is that they usually involve changing human behavior rather than the behavior of a natural element such as flooding. While nonstructural measures have been conceptually identified for some time, community education and implementation of the measures has been slow.

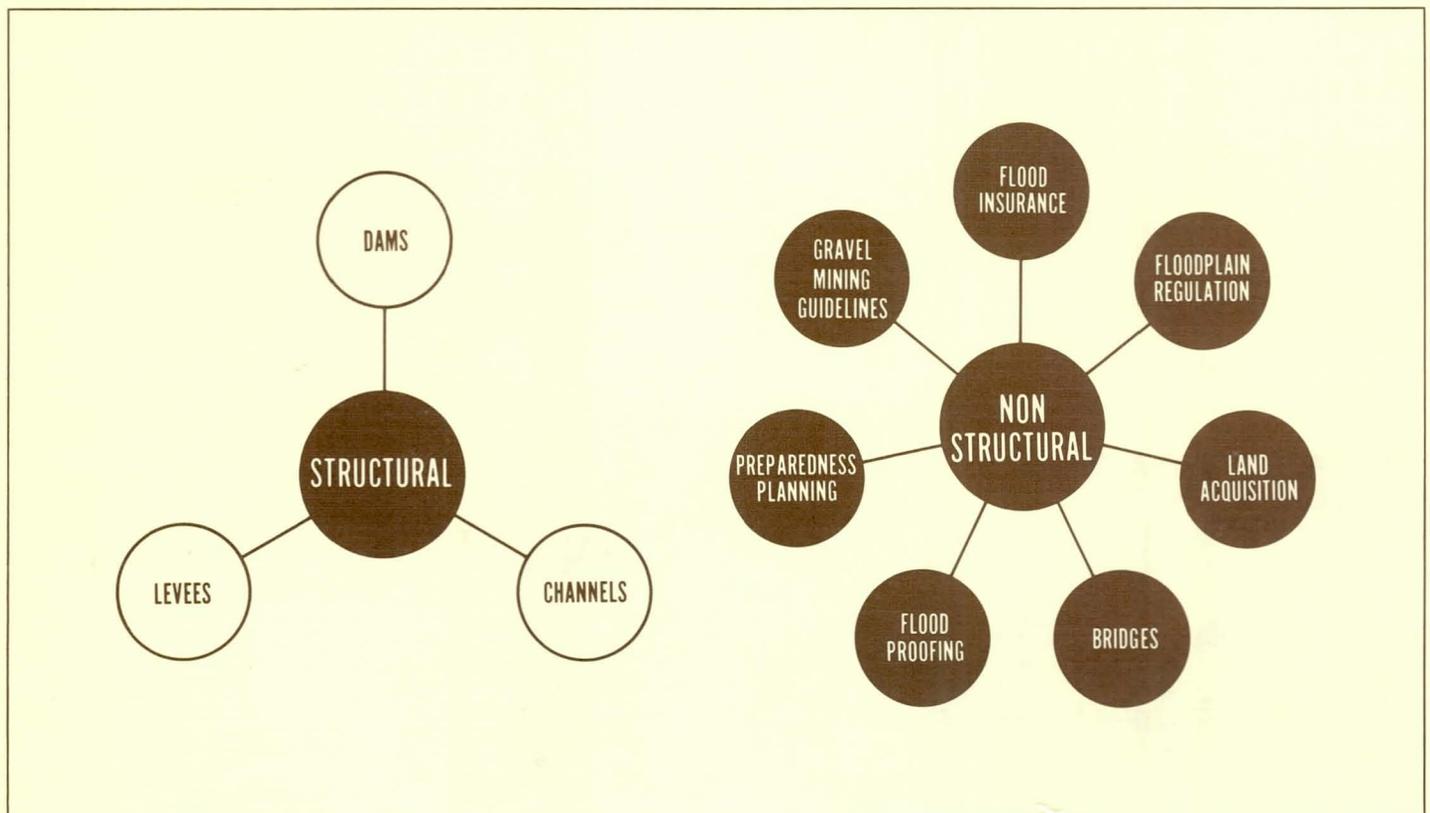
Generating public awareness of the potential for nonstructural measures is one of the aims of the flood control portion of the Central Arizona Water Control Study (CAWCS). Planners will investigate the nonstructural measures already in use in the study area. They will develop and make available new information that the public and local agencies can use, and where appropriate, recommendations will be made on ways to improve the effectiveness of these measures. Based on these studies, local action may be taken to implement measures.

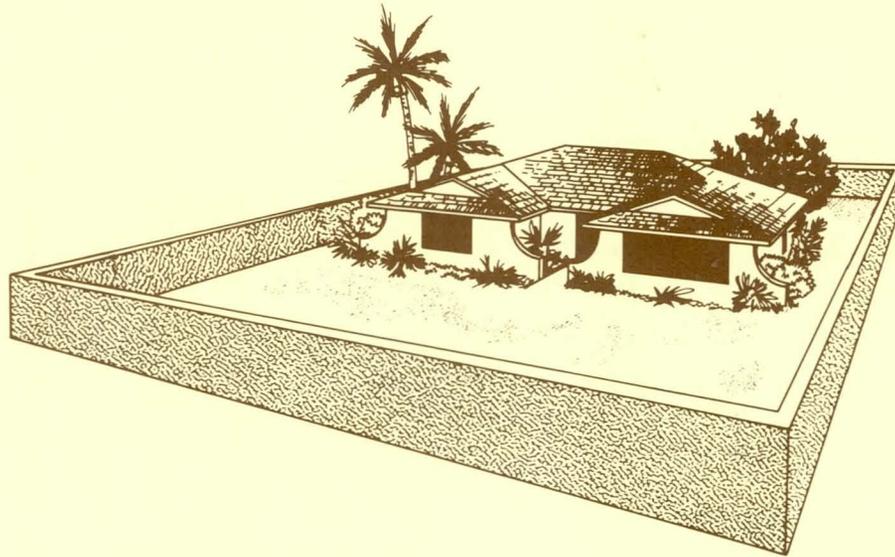
Nonstructural flood loss reduction measures have traditionally included:

- Floodproofing
- Flood insurance
- Flood forecasting and preparedness planning
- Relocation from or land acquisition in flood-prone areas
- Floodplain regulations

The CAWCS will address these nonstructural measures, as well as some measures developed specifically for the study area, and will evaluate their engineering and economic feasibility and environmental and social impacts.

FLOOD CONTROL MEASURES





Floodproofing reduces flood damages through modification of structures and their contents. The CAWCS will investigate constructing floodwalls around structures in the Salt-Gila floodplain as a means of floodproofing.

Floodproofing

Floodproofing consists of modifying buildings and homes and their contents to keep water out or reduce its damaging effects. Buildings and homes can be floodproofed during construction or existing structures can be floodproofed during remodeling or expansion. Floodproofing may be temporary or permanent.

For example, new or existing structures can be elevated by fill, stilts, piers or similar methods. Using floodwalls or dikes to protect a site, sealing floors or closing openings are other examples of floodproofing. CAWCS planners will evaluate the cost and effectiveness of constructing floodwalls and dikes around homes and commercial buildings in the floodplain of the Salt and Gila rivers. Planners will also determine the effectiveness of requiring, as part of local zoning ordinances, that all future residences in flood-prone areas be elevated above the level of the worst possible

flood that can reasonably be expected.

Flood Insurance

In the past, insurance against flood losses did not exist. Now, however, flood insurance is available to flood-prone communities under the federally subsidized National Flood Insurance Program, a cooperative effort between the federal government and the private insurance industry. The intent of the program is mainly twofold: 1) to make affordable flood insurance available for existing structures in flood-prone areas, and 2) to provide a basis for zoning controls and building codes that require new development to be constructed to better withstand major floods. While flood insurance does not prevent flood damage, it does reduce the financial loss to individual property owners due to flooding.

One of the keys to the flood insurance program is the identi-

fication of flood hazard areas. These areas are designated by the Federal Insurance Administration using floodplain delineation maps prepared in cooperation with local agencies. In communities that have agreed to join the flood insurance program, anyone building or purchasing a new home or business in a designated flood-hazard area, is required to have flood insurance. In fact, federally insured lending institutions will not finance homes or businesses without it. While flood insurance is not required for existing structures, once flood damage has occurred, the insurance is required in order to obtain any future federal relief.

The CAWCS will provide information on flood insurance and discuss its application. Flood hazard maps and further information about flood insurance can be obtained through municipalities or through the Maricopa County Flood Control District for unincorporated areas.

Flood Forecasting and Preparedness Planning

Flood forecasting systems provide information on when floods can be expected and how large they might be. The primary objective of such a system is to save lives and to allow time for residents and floodfighters to reduce damage to property. Along with flood forecasting, it is essential that local officials establish a preparedness plan for disseminating the flood warning to communities in the floodplain.

During its last session, the Arizona State Legislature appropriated funds for improvement of the existing flood forecasting system. With an improved flood forecasting system, communities can develop better preparedness plans.

The CAWCS will investigate ways to enhance the preparedness plans. Working closely with local jurisdictions, data will be developed and evaluated on flood warning dissemination, emergency actions, post-flood recovery, and continued awareness programs. The major emphasis of the efforts will focus on the improvement of emergency actions such as temporarily evacuating people and property, flood fighting, and maintaining vital services.

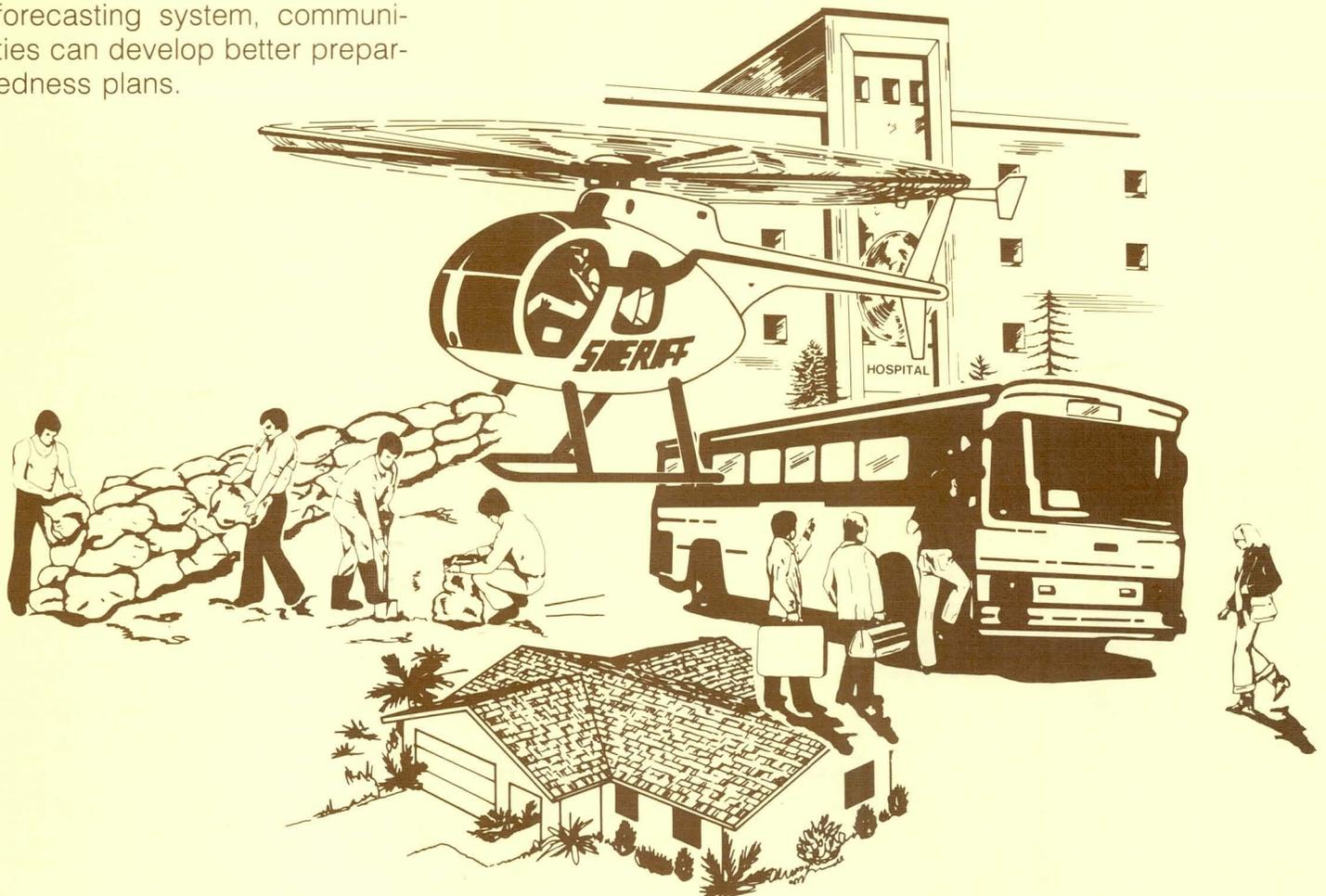
Floodplain Regulations

Floodplain regulations are legal tools, intended to control development in the floodplain to reduce the damaging effects of floods. Regulation of the flood-

plain is usually the responsibility of state and local governments and can be accomplished by a variety of means, such as:

- Zoning ordinances and subdivision regulations that provide an efficient means of controlling construction in undeveloped flood-prone areas
- Revised building codes that can effectively reduce damages to existing buildings in the floodplain

The CAWCS will summarize and make available information on existing floodplain regulations in the study area.



Flood forecasting and preparedness planning saves lives and allows residents and floodfighters to reduce property damage. The CAWCS will focus on ways to improve emergency actions.



Vacant land in the Salt-Gila floodplain will be evaluated to determine if it is feasible to acquire and convert the land to recreational or other open space use.

Relocation from or Land Acquisition in Flood-prone Areas

Another possible way to reduce flood losses is to encourage alternative use of flood-prone land for recreation, agriculture, or other open space uses.

Permanent relocation from developed land in the floodplain involves acquiring that land, removing existing structures, relocating the population and converting the floodplain to a new use.

In the CAWCS planners will examine the acquisition of undeveloped flood-prone land, in order to prevent private devel-

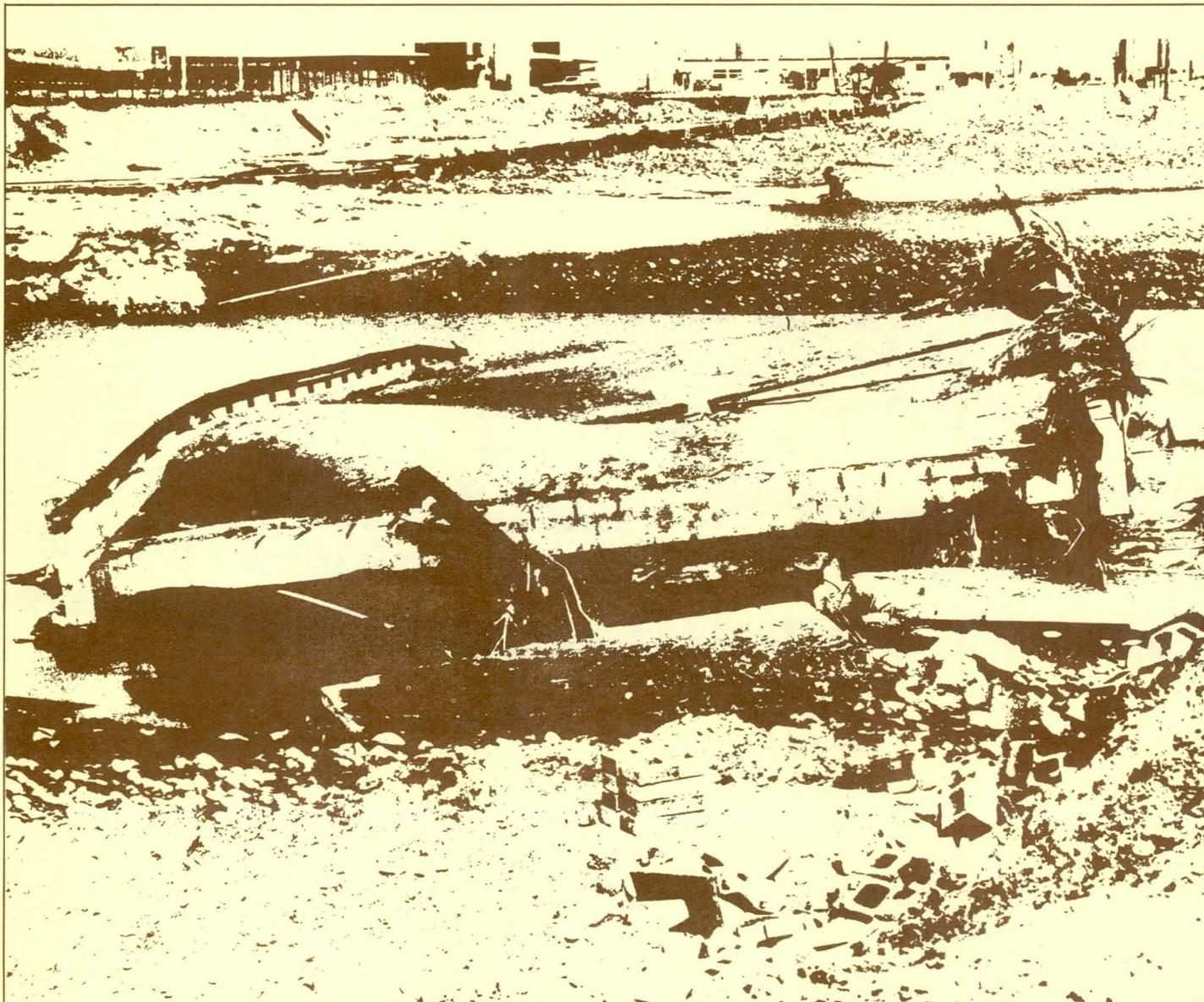
opment and subsequent flood damages. All vacant land within the Salt-Gila floodplain will be evaluated for the physical, environmental and economic feasibility of acquiring and converting the land to uses that are compatible with potential flood inundation.

Bridges

Considerable traffic delays and critical transportation problems for police, fire and emergency vehicles occurred in the past several years when the Salt and Gila rivers inundated or damaged dip crossings and bridges. Design and construction is underway to build or modify seven

bridges on the Salt and Gila rivers to withstand flood flows of up to 130,000 cfs. But, these bridges are not designed to withstand floods as large as those which could occur in the future (290,000 cfs). If one or more bridges were built to withstand such a major flood, traffic delays, inconvenience and bridge damage could be reduced. But, larger bridges cost more money.

CAWCS planners will quantify the damages which occur when some or all of the existing and proposed bridges on the Salt and Gila river are closed. Then planners will evaluate the ben-



Recent flooding emphasized the problems of limited bridge capacity on the Salt and Gila rivers. Adding one or more bridges to withstand large floods could reduce traffic delays and critical transportation problems caused by bridge closures.

efits and estimate the costs of constructing additional bridges sized to withstand a range of great flood levels. Finally, the benefits and costs of each bridge size will be compared to determine if adding large bridges is economically feasible.

Gravel Mining Guidelines

In the process of gravel mining operations, earth and fill are removed from the river bed. This can result in erosion or deposits of material in the channel which may divert or block the flow of

water and cause greater flood damage.

The CAWCS planners will develop guidelines for operating gravel mining in such a way as to improve the flow of water in the river. They will study ways to minimize adverse effects on the natural floodway and prevent erosion damages to bridges or adjacent property.

Operation of the SRP for Flood Control

The Salt River Project (SRP) operates under federal charter its

system of dams and reservoirs on the Salt and Verde Rivers, primarily for water storage and hydropower. The CAWCS is studying ways the SRP Reservoir system could be operated so as to gain additional flood control such as:

- Improved flood warning system
- Sophisticated runoff forecasting

- Requiring SRP by law to maintain a certain amount of space in existing reservoirs for flood control storage
- Increasing the outlet capability of the system so that water could be released more quickly in response to a flood warning

Use of these capabilities could decrease downstream releases of water from the system, lessen flood damages, and increase utilization of the Salt River floodplain. Impacts on flood control, water conservation, hydro-

power generation, recreation, and fish and wildlife habitat will have to be evaluated.

Although nonstructural measures normally do not provide as complete a solution as structural measures might, they may offer new courses of action at times when structural solutions are not justified for environmental, economic, or other reasons.

Nonstructural measures do not have to be considered only as alternatives to structural solutions, they can also be combined with structural solutions

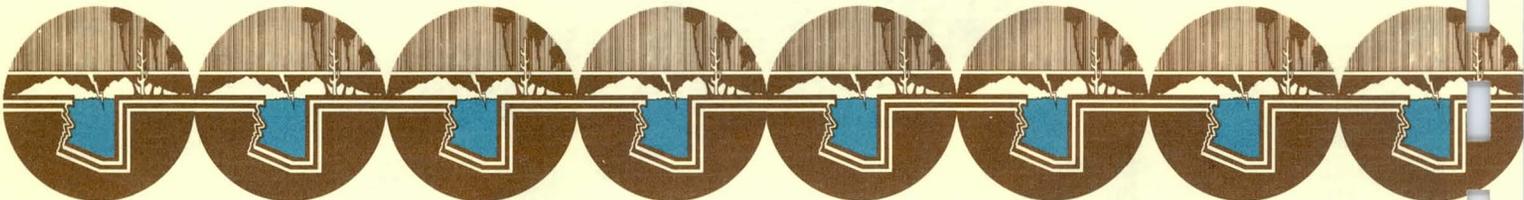
to produce plans which increase the level of flood protection, reduce cost and decrease negative environmental impact. The CAWCS will definitely consider these mixes of structural and nonstructural alternatives. Finally, by identifying nonstructural measures, the CAWCS hopes to encourage local communities to proceed with nonstructural measures which could alleviate flood damages pending construction of any structure. As the various studies are completed, findings will be reported in the monthly newsletter. Your views on nonstructural measures are encouraged.

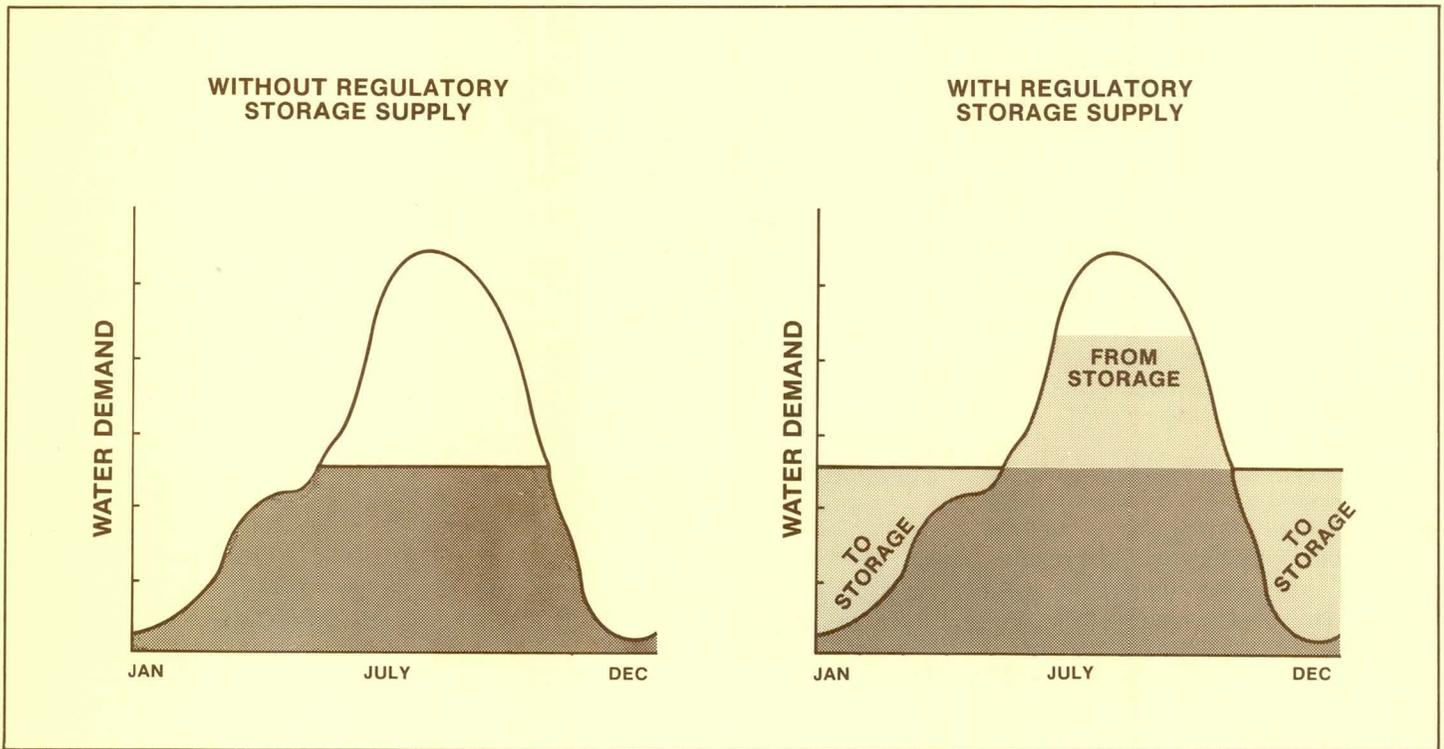


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With regulatory storage, the heavy summertime water demands of CAP users could be better satisfied because water was brought in and stored in advance.

Regulatory Storage

What Is It and Why Do We Need It?

The value of any water delivery system lies in its ability to provide water when it's needed. To do this, the system has to be able to operate under a wide range of flow conditions — during peak demand time, when interruptions occur in the delivery system, and when water supplies are reduced.

This is why planners of the CENTRAL ARIZONA WATER CONTROL STUDY are seeking ways to provide regulatory storage capability in the Central Arizona Project. According to Tom Burbey of the Bureau of Reclamation, the CAP can operate

without it, which is why construction continues on the aqueduct system today. "But," says Burbey, "the aqueduct system could only be operated in direct response to people's demand for water from CAP." This rigid way of operating the aqueduct not only has ramifications in meeting seasonal water demands and emergency situations, but it ultimately influences how much water can be brought in from the Colorado River.

In its broadest sense regulatory storage provides the necessary link between the CAP aqueduct system

and the highly variable water demands of CAP water users. Extra water can be brought in during the winter months, put in storage, and be available in Central Arizona to add to the amount of Colorado River water the CAP can deliver in the summer months. The heavy summertime demand for water could be better satisfied because water was brought in and stored in advance.

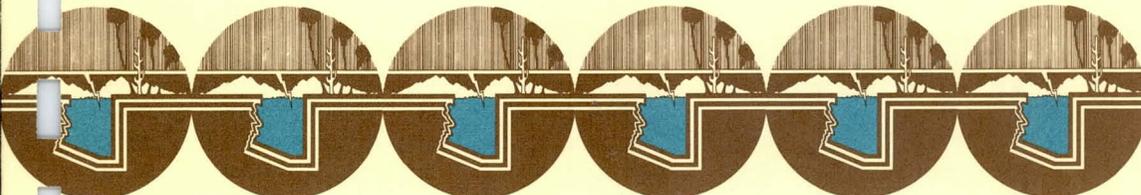
"Take a typical summer month, in which the Granite Reef Aqueduct is being loaded to capacity," Burbey explains. "As water is brought to

Continued on page 3

CENTRAL ARIZONA WATER CONTROL STUDY

**Newsletter 3
NOVEMBER 1979**

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NEPA Guides Decision-Making Process

At the end of the Central Arizona Water Control Study an Environmental Impact Statement (EIS) will be prepared. This document will be the culmination of environmental analyses conducted throughout the planning process and it will explain to the public why certain decisions were made.

Preparation of an EIS is required for all major Federal actions by the National Environmental Policy Act (NEPA). NEPA was enacted by Congress in 1969 to insure the restoration, protection and enhancement of the environment. The Act means that alternatives must be studied and that environmental concerns must be used in making decisions. The cheapest and most technically feasible alternative may not be the best solution, if it causes significant adverse environmental impacts.

The Central Arizona Water Control Study is organized to facilitate close coordination between environmental and technical studies. Environmental impacts will be assessed throughout the study. At major decision points, environmental effects, as well as technical input, will be used to help make decisions. At the end of each major phase of the study, there will be a "trade-off analysis" which will weigh environmental impacts against technical feasibility.

By incorporating these analyses as part of the decision-making process, not only is the study fulfilling the spirit of NEPA, but also it ensures that in 1981, when the Central Arizona Water Control Study is essentially complete, the information needed to prepare the EIS will be there — adequate and accurate.

NEPA is just one of many forms of regulation that guide the Central Arizona Water Control Study. In future issues we will be discussing some of the others.

Next Issue

In our next newsletter, we will focus on one or more of the environmental disciplines and what's happening in the investigations.

New Faces



Larry MORTON is currently assigned as the Environmental Officer for the Bureau of Reclamation Arizona Projects Office. As such, he makes sure that the environmental studies and documentation of the CAWCS are adequate for preparation of the EIS at the end of the study. Larry has over 17 years service with the federal government, all with the Bureau in Phoenix. During that time he has touched almost every aspect of the CAP. Larry is a 27-year resident of Arizona and graduated from Arizona State University with a degree in Engineering.



As the Corps of Engineer's Environmental Coordinator, **Carol GROOMS** is responsible for coordinating the preparation of the study EIS for the Corps. A UCLA engineering graduate, Carol has been with the Corps for seven years. In that time she became familiar with all aspects of Corps activities and ultimately chose the environmental area. Locally, Carol was involved in preparation of the Environmental Impact Statement for the Maricopa Association of Governments 208 wastewater management program.



Jan HENLEY is the newest face to the Central Arizona Water Control Study. He will soon be starting as Environmental Discipline Director, overseeing the various environmental studies on the Dames and Moore portion of the study. Jan comes to Phoenix from Denver where he spent the past three years as project economist for Dames and Moore. Jan did spend six months in Phoenix last year as project manager for the CAP municipal and industrial water allocation environmental assessment for the Bureau of Reclamation. He has published several articles on economic development of water and land resources, water-oriented recreation, and agricultural and forestry economics.



Natalie WAUGH is report coordinator and editor for the technical portion of Dames and Moore's work. While she is now acting environmental discipline director, her role as editor will come into full play when the final reports on the Central Arizona Water Control Study are being prepared. Natalie has been involved almost exclusively with preparing Environmental Impact Statements and Environmental Assessments while with the firm. She was involved in assessing the impacts of the U.S. Antarctic Program on the Antarctic environment. In the Phoenix area she was involved in preparing the EIS for the Maricopa Association of Governments 208 program.

Regulatory Storage

continued from page 1

Central Arizona, some deliveries are made to users along the way and some water is lost through evaporation and seepage. By the time it reaches the Phoenix metro area, the aqueduct is no longer fully loaded. If there is water in storage, the aqueduct can be reloaded to full capacity and make greater deliveries from the Salt-Gila and Tucson Aqueducts.

Without regulatory storage, Central Arizonans actually lose use of water — water that otherwise would be pumped in and stored, would stay in the Colorado River and if not storable there, spilled into the Gulf of California.

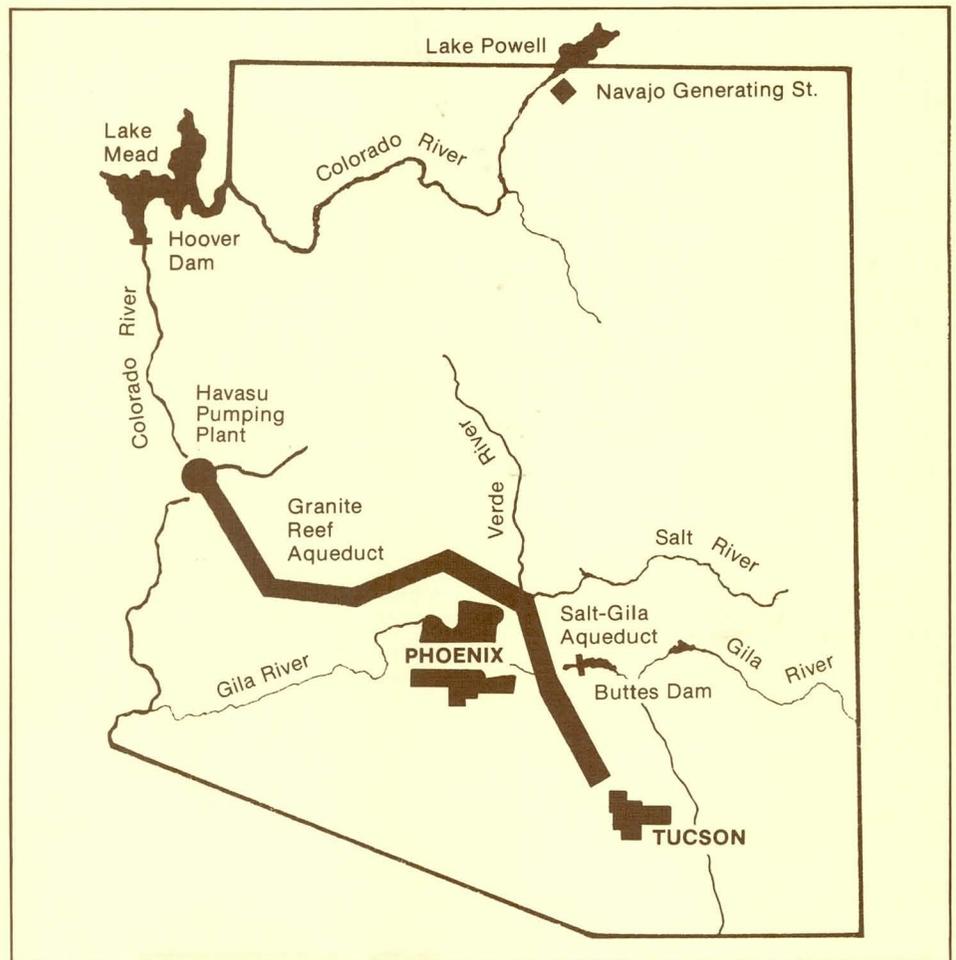
"According to the Colorado River Basin Project Act, which authorized construction of CAP, the only time CAP can divert continuously at capacity is when the Colorado River reservoirs, such as Lake Mead and Lake Powell, are essentially full or spilling," Burbey explains. "The choice is use it in CAP or spill it to the Gulf of California. If the water is not used then, it's gone forever."

In addition, there are no provisions in the law that allow CAP to "bank" water in the mainstem reservoirs. Water can't be left in reservoirs in "an account." If the water is not used one year, the next year it gets reshuffled out to all the states.

Aside from the broad concept of meeting fluctuating water demands and getting maximum use of Colorado River water, regulatory storage offers a number of opportunities in day-to-day operation as well. One such opportunity centers on the availability of pumping energy.

The CAP Havasu Pumping Plant represents a very large energy load — one-half the energy required for all CAP pumping. When power system emergencies threaten the energy supply, utilities are looking for places to reduce or eliminate large, noncritical loads from the power network. In this way, critical users can use what's left of the energy supply while the power system is being put back into full operation.

"Should CAP have to be shut off at its power source," Burbey says, "CAP water deliveries would likely be



Central Arizona Project

severely curtailed during that time without regulatory storage. With regulatory storage, at least we could keep water flowing through parts of the system."

In terms of pure energy marketing dollars, regulatory storage offers some plusses as well. CAP revenues will be derived from the sale of energy, sale of water and ad valorem taxes paid by all property owners in the three-county area. These revenues are available to the Central Arizona Water Conservation District to repay the Federal loan for the CAP.

With regulatory storage, maximum water pumping would be done during off-peak times when energy is at its lowest market value. During on-peak hours the pumping could be minimized and the energy sold commercially at high market values.

According to Burbey, "by maximizing revenues from the sale of energy, less money will have to come from the sale of water and especially, from ad valorem taxes."

No regulatory storage sites have been selected as yet. But, the need for regulatory storage to increase the flexibility and efficiency of the CAP is recognized.



Tom BURBEY is Chief of the Studies Branch in the Operations Division of the Bureau of Reclamation, which is responsible for setting up operations of the CAP. Tom's

been with the Bureau 18 years, the last 12 of which he has been involved in the Central Arizona Project. He was Chairman of the Regulatory Subcommittee of the Inter-agency Task Force on Orme Dam and is currently a representative on the City of Tempe Rio Salado Advisory Committee.

Governor's Board Discusses Rio Salado

Rio Salado was the focus of an informational meeting of the Governor's Advisory Board held at the end of last month. Previous discussions of Rio Salado by the Board indicated great interest in the concept and brought up a number of questions about its technical feasibility. There seemed to be little present agreement as to whether or not some form of Rio Salado could be constructed without upstream flood protection.

A panel of five presented the concept of Rio Salado and the technical, economic and institutional issues related to it.

The presentation was geared toward addressing three major questions: What is Rio Salado? What is Rio Salado without upstream flood control? What relationship does Rio Salado planning have to flood control planning?

As originally conceived, Rio Salado

would combine lakes and meandering streams that could provide boating, swimming and other land and water related recreation. A collapsible dam or something similar might empty lakes prior to oncoming floods to allow for water retention.

In terms of hydraulics, future flows on the Salt River are unknown at this time, and Rio Salado must be designed to accommodate the flows.

The economic benefits of a project such as Rio Salado must stand up to careful review if federal funding is to be used. An economic view of the project raises questions relative to its market feasibility, net regional benefits, social implications and the level of local commitment to pay for the facility.

Members of the Committee had an opportunity to comment and clarify issues. Their comments will be used by the study team during the "trade-off analysis".

Water Words

CONSERVATION STORAGE SPACE is that portion of a single or multi-purpose reservoir that is dedicated to the **permanent** capture and control of water regardless of source or rate of inflow for the purpose of increasing the utilization of available water supplies. SRP's reservoirs are single purpose conservation reservoirs.

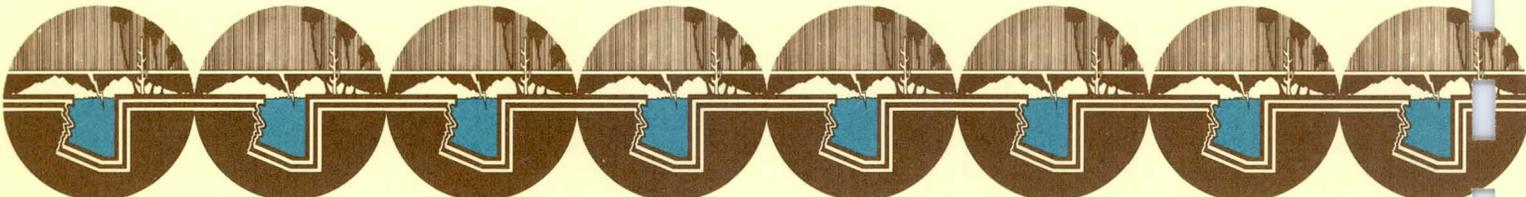
FLOOD CONTROL STORAGE SPACE is that portion of a single or multi-purpose reservoir dedicated to the **temporary** capture and control of water regardless of source or rate of inflow for the purpose of decreasing downstream damage which would otherwise occur from such flows. Painted Rock Reservoir is a single purpose flood control reservoir.

REGULATORY STORAGE is one specific purpose for which conservation storage space may be used and balances the water supply and water demands over a given period of time. Senator Wash Dam near Yuma is an example of a single purpose regulatory reservoir.

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CULTURAL AND BIOLOGICAL RESOURCE STUDIES

During this coming February through April, the first round of reports will be published identifying the environmental and economic effect of any of the proposed regulatory storage/flood control actions which might be taken, (See August Special Edition for a complete list). The next several newsletters will feature stories about how these studies are being conducted, so you can better understand the impacts reported from these studies.

In this issue we focus on studies of cultural resources and biological resources. Future issues will deal with economic and social resources.

If you ask the average person on the street what a cultural resource is, he might answer the arts or the symphony. But more than that, cultural resources are things and traditions that are passed on from generation to generation, such as prehistoric ruins or historic buildings. Congress started protecting Arizona's cultural resources 90 years ago when they set aside the Casa Grande Ruin as an archaeological reservation. Since then Congress has been passing more and more laws with ever-increasing frequency to reduce or eliminate the impacts of projects on cultural resources.

All of the proposed regulatory storage/flood control actions included in the CAWCS have the potential to impact significant cultural resources in the study area. To comply with legislation, the archaeological and historical investigations conducted in the CAWCS will identify and evaluate the cultural resources that exist at the various elements under study, determine



Biologists sample habitat types by walking ¼-mile sample lines, recording birds, reptiles, mammals, and vegetation.

if and how the site may be affected by a proposed action, and develop plans to avoid or "mitigate" any adverse impacts.

From the beginning, the archaeological and historical studies were organized so that the efforts of the investigators would not be duplicated. In the archaeological studies, there are three levels of investigations. In the first level, all known data is investigated without doing any field work. In the second, teams actually go out in the field and do a sample survey in order to determine where archaeological sites are likely to be found. From 20-25 percent of the project area would be investigated in this way. The third level is a more intensive study of

specific sites covering 50 percent or more of the area.

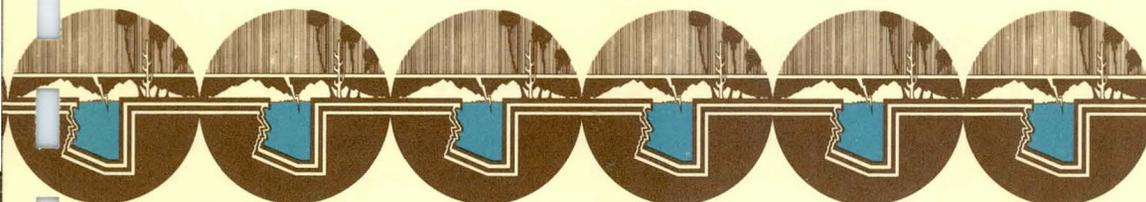
To save time on the CAWCS, the archaeological investigators have been doing both first-level and second-level investigations at the same time. During the second-level study, teams of 4-5 archaeologists spaced about 20 meters apart systematically covered a series of 40-acre units of land, recording and mapping sites. Some artifacts were also collected and will be analyzed to determine some aspect of their cultural affiliation and age. To assure that the same ground is not covered twice, the last person in a line is responsible for marking the line with "biodegradable" flagging, the scien-

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CENTRAL ARIZONA WATER CONTROL STUDY

**Newsletter 4
DECEMBER 1979**

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Bureau Of Reclamation Changes Name

After nearly 78 years, the Bureau of Reclamation has changed its name to the Water and Power Resources Service (WPRS).

R. Keith Higginson, who has been Commissioner of Reclamation since 1977, will be Commissioner of Water and Power Resources. The agency name change was recommended by Commissioner Higginson and accomplished by Secretarial Order on November 6, 1979.

"Reclamation has a great history," said Secretary of Interior Cecil D. Andrus. "However," he explained, "some changes in emphasis have been made in the functions of the agency in recent months. The initial purpose of reclaiming arid western lands has expanded to a much broader responsibility for water and power resource management. The WPRS is very concerned with its role in the total environment and hopes to enhance the public's understanding of participation in the management of water and renewable energy resources."

This latest action now gives the agency a name which clearly identifies it with its principal function — supplying water and power.

Public Involvement

Need an interesting program for a club or community meeting? The CAWCS slide show is now ready and we're eager to reach as many groups as we can. The 15-minute program provides a historical overview of the study, elements under investigation, and ways the public can be involved. If you'd like to schedule a presentation, call Marty Rozelle at 271-0915.

Let us know if you have any ideas or suggestions for other public involvement activities.

New Faces



This month, meet three of the Principal Investigators for the environmental studies underway in the CAWCS.

DICK MAZE is Dames and Moore's principal investigator in biology and oversees the technical investigations of biological resources and their impacts. A project biologist and principal investigator with the firm for almost six years, Dick has been involved in projects throughout the United States and the Pacific. Previously Dick traveled extensively in third world nations and spent four years teaching in West Africa. A certified wildlife biologist, he is a member of several professional societies and has published numerous scientific articles and co-authored several scientific and technical reports.

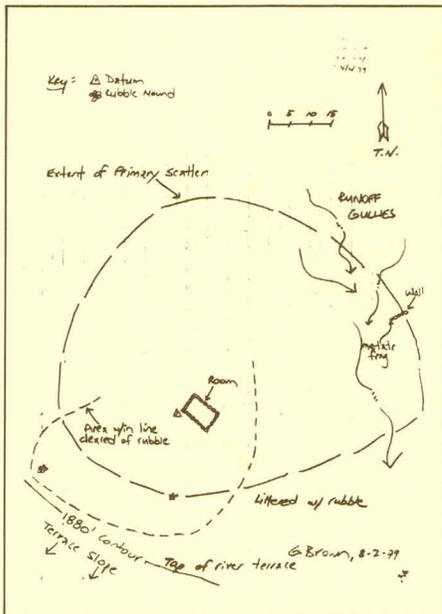


DR. GLEN RICE is principal archaeological investigator on the CAWCS. He is currently Head of the Office of Cultural Resource Management at Arizona State University. In 1977, Glen was principal investigator for the archaeological survey and investigative studies on the Granite Reef Aqueduct of the Central Arizona Project. He has also been involved in environmental related work in California. A member of the American Anthropological Association, Arizona Archaeological Council, and the Society for American Archaeology, Glen has prepared numerous research papers and reports on his varied investigations.



Another of the study's principal investigators, LYLE STONE, Ph.D. is responsible for the direct supervision and performance of the historical investigations. Owner of Archaeological Research Services, he has conducted numerous studies in the Phoenix area, including surveys on the Salt River, Gila, San Carlos and Fort Apache Indian Reservations. Currently, Lyle is President of the Society for Historical Archaeology and he is on the Board of Directors of the Heritage Foundation of Arizona. He is a member of the Executive Board of the Arizona Archaeological Council and a member of the Arizona Historical Advisory Commission's Historical Sites Review Committee which, working with the State Historical Preservation Office, reviews all sites in the state proposed for the National Register of Historic Places.

Let us know if you have any ideas or suggestions for other public involvement activities.



Archaeologists draw maps as shown above and record each site found in their field investigations.

Methodologies

continued from page 1

tific term for the not so scientific procedure of tying bits of toilet paper to trees.

The historical investigations are conducted somewhat differently than the archaeological studies. However, because of the nature of historic sites, time has primarily been spent in the library going through historical documents and land ownership documents looking for information on historic sites, and depending rather heavily on the archaeological field work to turn up sites that are not identified by documentary research. As specific sites are identified in areas where project actions might take place, they will be further investigated in the field.

Already 360 historic sites have been identified in documents; but these may or may not still exist in the ground. For example, near the Confluence Site, about 40 percent of the sites have been confirmed, but in other areas it drops down to four or five percent.

At the end of the intensive level of historical and archaeological investigation, there will be sufficient data on the number and significance of sites to develop plans to mitigate any adverse effects.

While the cultural resource investigators are looking for sites that stay in place and remain relatively constant over the years (unless there is human impact), the biological resource investigators are looking for "critters" that move around and don't like contact with humans, or plants that may grow only in certain months of the year, or only in years with particular rainfall patterns.

Congress has passed a number of laws in recent years that require the evaluation of biological resources and the development of plans to protect them or mitigate the effects of proposed actions. In particular there are very strong laws governing proposed actions which could have an effect on threatened or endangered animals or plants. Many Americans in recent years have heard of the snail darter, a small fish, which delayed construction of Tellico Dam in Tennessee.

Similar to the archaeological investigations, since the study area is so large, during the first stages of the study it is necessary to select "sample" areas and investigate them. A first part of the study is to get an overall assessment of plant and animal life in the study area. This research includes all areas within a 1-mile radius from any proposed impoundment and 1/2-mile out from channels or levees. Since it would take years to count the actual population or numbers of animals and plants in the study area, biologists have taken a "habitat" approach. Animals or plants live in closely interrelated communities or habitats. Certain animals require specific plant life for survival, and in some cases, certain animal species are a necessary part of plant propagation as well.

The biologists start out by using aerial photographs to identify the various biological communities which exist at the site of the project elements under study. Then to verify their photo interpretations, they will conduct field reconnaissance and sample representative habitat types during the four biological seasons. Biologists do this by walking 3/4-mile sample lines, each divided into three segments. Birds, reptiles, mammals, and vegetation are

recorded during each sampling period. It is assumed that similar species would be found in similar habitats within elements and from element to element. Similar results should therefore reflect the biological resources for the various elements.

What endangered species occupy the study area? And what techniques are used to investigate them? The U.S. Fish and Wildlife Service provided a list of proposed or listed threatened and endangered species. The three most significant animal species are the bald eagle, the Yuma clapper rail, and the peregrine falcon. The peregrine falcon is a winter transient — nature's version of the human snowbird — so it is somewhat less critical. In addition there are nine plant species which have been proposed as endangered species, and although they do not yet have that status, they will be given equal attention.

In the endangered species investigations, biologists first identified important plant and animal life, with particular interest in those habitats where endangered plants or animals might occur. For endangered plants, they then go out in the field to find those

Here is a brief summary of some of the important laws which guide the biological and archaeological/historical studies described in this newsletter.

FISH AND WILDLIFE COORDINATION ACT: This act requires that during planning of a federal water project, equal consideration be given to fish and wildlife as to all other resources. Under the act, agencies must consult with the U.S. Fish and Wildlife Service and the State agency and reports and recommendations of these agencies are made a part of the federal agency report. In addition, "justifiable" recommendations which the agency finds should be adopted to obtain maximum overall project benefits should be implemented.

ENDANGERED SPECIES ACT: This act provides a means to protect and recover threatened and endangered species against any adverse effects of federal actions. Section 7 of this act outlines a consultation process under which federal actions are reviewed by the President's cabinet for exemption.

NATIONAL HISTORIC PRESERVATION ACT: This act provided for the creation of the National Register of Historical Places and a special advisory council that would review and comment on any federally sponsored action that could affect properties on or eligible for the National Register (Section 106 Consultation).

Corps Awards Two Contracts

The Corps of Engineers recently awarded two separate contracts in the Central Arizona Water Control Study.

Camp Dresser McKee, Inc. (CDM), received a contract to perform preliminary hydraulic design and cost estimates of structural flood control elements under study. These include the new Horseshoe, Cliff and Bartlett dam sites; flood outlets on the existing Bartlett and Horseshoe dams; and channels and levees on the Salt and Gila Rivers. CDM will provide a range of structure sizes and associated costs for each of these elements, which when combined into systems, will be used in a comparative analysis.

The Corps also contracted with Willdan Associates to perform recreation planning on most elements identified in the CAWCS. The firm will first perform a recreation needs analysis to determine the needs for all types of recreation at specific element sites. Then, based on the results of the needs analysis, and the opportunities and

constraints associated with each site, Willdan will develop an array of conceptual recreation plans for each element studied.

Water Words

THREATENED AND ENDANGERED SPECIES: An *endangered* species is any fish, wildlife or plant that is in danger of extinction throughout all or a significant portion of its range. A *threatened* species is any fish, wildlife or plant that is likely to become an endangered species within the foreseeable future.

CULTURAL RESOURCES: Any building, site, district, structure or object significant in history, architecture, archaeology, culture or science.

NATIONAL REGISTER OF HISTORIC PLACES: A list of cultural resources of local, state and national significance. Most sites are nominated to this list by federal agencies responsible for actions which may affect land surface. Roosevelt Dam is on the National Register of Historic Places.

Methodologies

continued from page 3

habitats in the area of the elements that would support endangered species. Then they do a random search of those habitats to actually determine if the endangered plant is there or not. For endangered animals, the technique is somewhat different. The habitats that support endangered species are already known. For example, the Yuma clapper rail is found in a cattail marsh habitat, so these areas are investigated to see if the condition is suitable to support the species. These investigations are coordinated with agencies involved in investigations of specific endangered species.

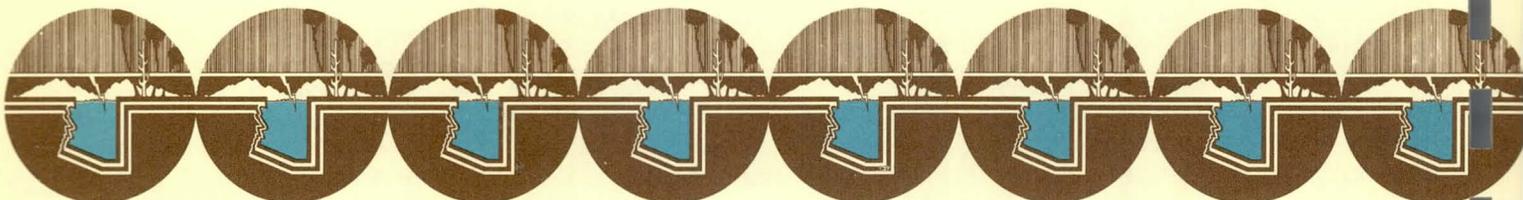
After the number of elements being studied is reduced, biologists will go back into the field and make more detailed studies of biological resources.

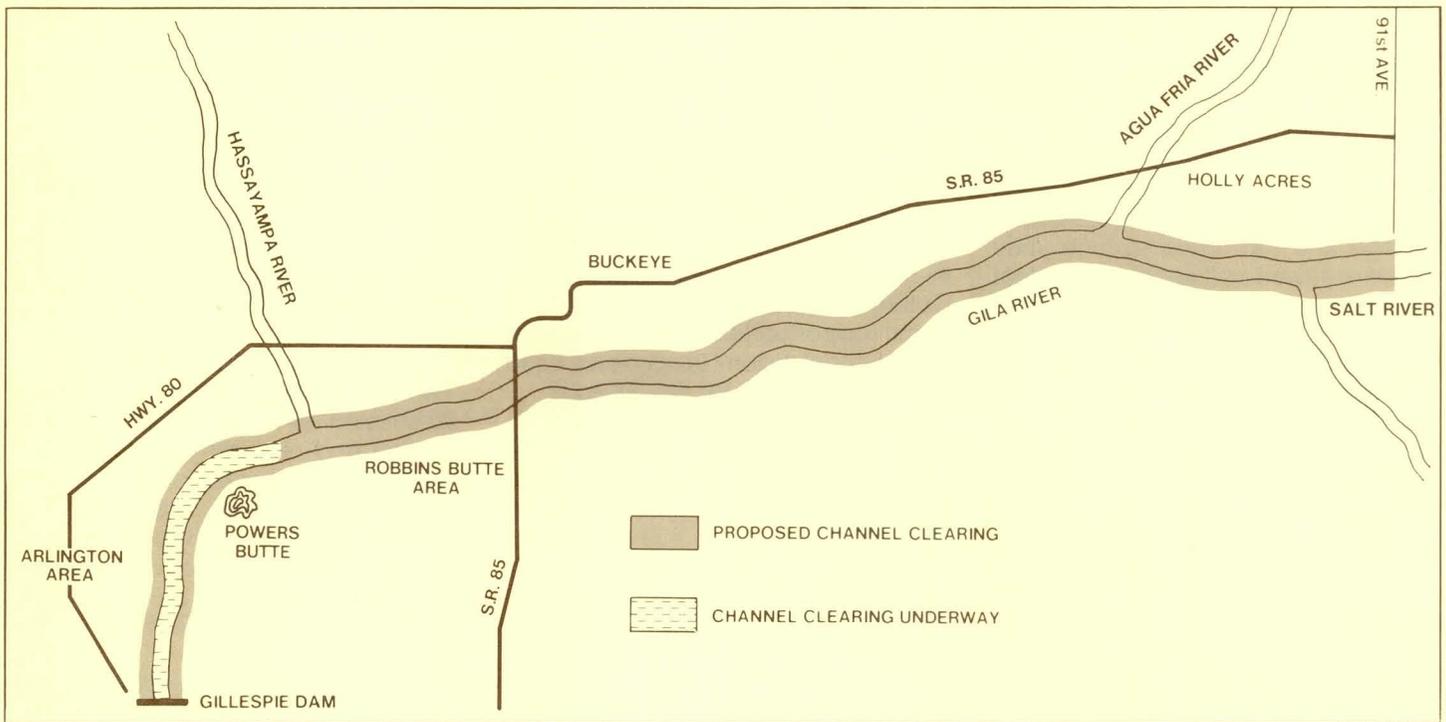
These studies assure that decisions regarding proposed actions in the CAWCS are made using the best available information on effects upon cultural and biological resources and that great efforts have been made to minimize those effects.

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Gila Channel Clearing Underway

The Flood Control District of Maricopa County has begun clearing a 300-foot wide channel along the seven-mile stretch of the Gila River between Gillespie Dam and Powers Butte. The project, which is expected to be completed by mid-March, will help ease flooding problems in the Arlington area. The State appropriated \$100,000 for the project on a 50/50 matching funds basis. The \$100,000 local share is being provided by Maricopa County.

The clearing project is one of four related projects being undertaken by the District to reduce flooding along the Gila River. State funds were also appropriated on the same basis to clear a 1000-foot wide channel from 91st Avenue to 123rd Avenue. Clearing in this area may reduce some of the flooding problems around Holly Acres.

The District is in the process of acquiring the land rights needed from the Arizona Game and Fish Department, Arizona Land Department, private owners and the Gila River Indian Community before clearing can proceed. Award of a contract to clear is anticipated sometime in April and work will be completed about 90 days later.

The remaining stretch of the river between 91st and the dam is federal land under the control of the U.S. Fish and Wildlife Service. An environmental assessment of the project is required before any clearing can begin. The District is now negotiating with consultants to prepare an assessment of a 1000-foot wide clearing from 91st Avenue to Gillespie Dam. (The 300-foot wide clearing from the dam to

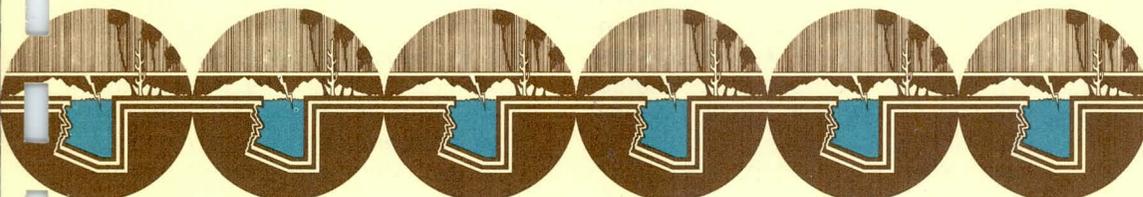
Powers Butte will be widened to 1000 feet).

In addition to the clearing projects, the District is negotiating with a consultant to study and recommend ways to modify Gillespie Dam to reduce siltation and better pass flood waters. Once the District has the results of the environmental assessment of the channel clearing and the Gillespie Dam study, it will be looking for additional funding to implement the recommendations.

The clearing projects and dam modifications are interim measures to reduce flooding problems along the Salt and Gila Rivers until the CAWCS and other studies currently underway are completed and long-term solutions to the area's flood problems are implemented.

CENTRAL ARIZONA WATER CONTROL STUDY

Newsletter 5
JANUARY 1980



Environmental Issues Reflect Public Concerns

CAWCS planners are continually identifying issues to make sure that public concerns are addressed throughout the study process. Because issues change and new ones surface, they will be reviewed and updated to reflect the various concerns.

We have summarized below the major environmental issues which have been expressed to us so far by agencies, organizations and individuals. Are these the important issues? Are there others you're concerned about? If so, let us know on the enclosed response form.

Water Resources. How much flood control is enough? People's views on the severity of floods in the Phoenix area differ greatly, mainly depending on where they live and how floods affect their everyday lives. Their views on flooding and the best means of control are key to solving flood problems in the study area. Other water related issues are:

- *Floodplain Management* — How will proposed actions affect the use of the floodplain?
- *Water Supply and Demand* — How much more water will be available with CAP regulatory storage? How will potential water exchanges between CAP and other water user organizations affect the area's overall water picture?
- *Changes in Water Quality* — What are the effects of mixing lower quality CAP water with water from the Verde, Salt, Agua Fria, and Gila Rivers? How will groundwater quality be affected?
- *Groundwater Overdraft and Recharge* — To what extent will possible actions to conserve surface water reduce groundwater overdraft and increase recharge?

Recreation. Some water-related activities are stream-oriented, such as canoeing, tubing and rafting. Others, such as sailing or water skiing, are typically associated with flat water (lakes behind dams). Some elements, specifically along the Salt and Verde Rivers, could replace flowing water with flat water behind dams, and potentially alter the relationship of these two contrasting recreational opportunities. Other recreational issues include:

- *Recreation and the Energy Crisis* — Will higher costs and less gasoline create the need and demand for nearby recreational areas?
- *Rio Salado and Structural Flood Control Measures* — What recreational opportunities are associated with channelization? Is upstream flood control necessary for Rio Salado?
- *Private Enterprise* — Will proposed actions reduce the demand for the use of private recreation facilities in the study area?
- *Institutional Role in Recreation* — Even if recreational areas are feasible, will some agency commit to operate them?
- *Indian Role in Recreational Planning* — How will recreation plans affect Indian lands? For example, on the Fort McDowell Reservation considerable undeveloped recreation potential represents a significant resource to residents of the reservation. The degree to which the project elements either adversely affect or enhance recreational development on Indian lands will be of major concern.

• *Loss of Public Hunting Opportunities* — To what extent will construction activities, channel clearing, or flooding disturb wildlife habitats and cause loss of hunting opportunities?

• *Reservoir Operation* — Is the level of water maintained in reservoirs consistent with what the recreation public feels is needed for their use?

Biology. Several of the alternative actions being considered in this study have received a lot of public attention because they may harm threatened and endangered species. The bald eagle, peregrine falcon, Yuma clapper

rail, and possibly nine species of plants occupy areas that may be affected by the project. This issue was discussed in some detail in our last newsletter (Newsletter 4, December 1979, "Cultural and Biological Resource Studies").

Another issue relates to land and water habitats which could be degraded or destroyed by construction of flood control and regulatory storage structures. On the other hand, opportunities to create or enhance habitats also exist with the project. Such groups as the Audubon Society have expressed interest in preserving habitats along the Salt, Verde and Gila Rivers.

Cultural Resources. Archaeological and historical sites, frequently found along rivers, could be affected by construction and the formation of lakes. Some resources could also be lost through continued flooding if no federal flood control actions were taken (See Newsletter 4, December 1979, for more information).

Land Use. Conflicts or impacts of proposed actions on urban growth patterns, existing land uses or even land ownership are issues which are under study. For example, construction of reservoirs and levees could influence land use patterns and redirect urban growth. Agricultural interests are concerned that some study elements may affect the rate at which agricultural lands are urbanized.

Geology. Changes in the use of the Salt River floodplain could mean a loss of mineral resources, particularly sand and gravel. Mining companies that have leases for mining in the area, land owners, agencies which control lands involved, and certain Indian Commu-

Continued on Page 4

CAWCS Slide Show Getting Around

CAWCS staff made slide show presentations recently to members of the State Legislature, the Central Arizona Project Association Executive Committee, the Phoenix Varmint Callers, the Buckeye Chamber of Commerce, Kiwanis Clubs, the South Phoenix Planning Committee, Republican Forum West, the Maricopa Association of Governments 208 Management

Subcommittee, the Governor's Advisory Board, and the Younger Members Forum of the American Society of Civil Engineers. The CAWCS also had an exhibit at the Casa Grande Centennial Festival. These presentations provide opportunity for questions to be answered and concerns to be recorded. Many more presentations are scheduled for the future.

RESPONSE FORM

We would appreciate any comments or questions you may have on the environmental issues described in this newsletter.

For mailing: Please fold with address showing, tape or staple edge. No postage required.

Have we covered your concerns? If not, what are they?

Any comments on the issues described?

If you would like your name added to the CENTRAL ARIZONA WATER CONTROL STUDY mailing list, please complete the form and drop it in the mail.

NAME _____

STREET _____

CITY _____

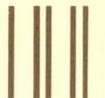
ORGANIZATIONAL AFFILIATION _____

AREA OF INTEREST — Please Circle

- | | | |
|--------------------|-------------------------|--------------------------|
| a. Biology | g. Historical resources | n. Rio Salado |
| b. Geology/Soils | h. Land use | o. Agriculture |
| c. Water Resources | i. Recreation | p. Wildlife |
| d. Air quality | j. Social | q. Indians |
| e. Acoustics | l. Economic/Demographic | r. Other (Specify) _____ |
| f. Archaeology | m. Public involvement | _____ |

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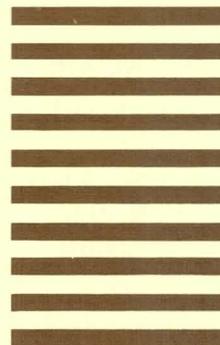
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Meet the Governor's Advisory Committee

In 1978, Governor Babbitt appointed a 29-member Committee to advise the Water and Power Resources Service and the Corps of Engineers on the Central Arizona Water Control Study. The Committee, chaired by Dr. Lee Thompson, former Dean of the College of Engineering at Arizona State University, brings together business, community and conservation leaders.



Dr. Lee Thompson

Members of the Board are:

Herschel Andrews
Salt River Pima Indian Council

Ben Avery
Wildlife Groups

Tom Chauncey, Sr.
KOOL

Joan Enos
Fort McDowell Tribal Council

Tom Fannin
Real Estate

Honorable Art Hamilton
Legislator

Honorable Margaret Hance
Mayor of Phoenix

Honorable John B. Hawley
Mayor of Buckeye

Honorable Bill Jenkins
Mayor of Scottsdale

Thomas Jones
Fort McDowell Tribal Council

Sue Lofgren
League of Woman Voters

Honorable Dessie M. Lorenz
Mayor of Avondale

Sam Mardian
Contractor

Honorable Manuel G. Marin
Legislator

Chet McNabb
Buckeye School District

Honorable Harry Mitchell
Mayor of Tempe

John R. Norton, III
Agriculture

Ed Pastor
Maricopa County Board of Supervisors

Eva Patten
Governor's Commission on the Environment

Honorable Wayne Pomeroy
Mayor of Mesa

Hank Raymond
CAP

Bill Schulz
Developer

Norris Soma
San Carlos Irrigation District

Don Tostenrud
Arizona Bank

Keith Turley
Arizona Public Service Co.

Mason Walsh
Republic and Gazette

Dr. Robert Witzeman
Maricopa County Audubon Society

Howard Wuertz
Central Arizona Water Conservation District



Howard Wuertz, Ben Avery, Sue Lofgren, Bob Witzeman



Chet McNabb, Terry Hudgins (APS), Mason Walsh

Since its creation, the Committee has played a key part in the study, serving as a sounding board for study progress. Involved throughout the decisionmaking process, they review reports and other public information documents to assure they are adequate and objective. Study methodologies are subject to their review for adequacy as well. The Committee plays a dual role, providing insight into public perceptions of issues and carrying back information to the people they represent. The Committee will advise the study team at key decision points, such as narrowing alternatives; and as the study nears completion, the Committee will identify areas of mutual agreement and those processes which might lead to resolution of differences.

Issues

Continued from Page 2

nities are therefore concerned with this issue. Other related issues are:

- *Loss of Prime Soil Resources* — These could be lost by either dam and levee construction or by uncontrolled flood waters.
- *Loss of Rockhounding and Mineral Collection Areas* — The loss of collection areas could be caused by dam construction and the formation or enlargement of lakes.
- *Presence of Faults or Geologic Features Which Could Affect Construction of Structures* — This becomes significant in location and design of some proposed dams in terms of dam safety.

Air Resources. Three issues relate to air resources in the CAWCS area:

- *Air Quality* — Will construction and increased recreational travel (to reservoirs created by dams) increase air pollution and ultimately degrade air quality in the area?

- *Visibility* — Will visibility be impaired due to dust and emissions from construction and increased recreation activities?

- *Weather Conditions* — How will added surface water impounded behind dams and the resulting increased evaporation affect the climate at sites?

Sound. Federal guidelines call for minimizing noise during construction so it won't interfere with people's activities, risk hearing damage, or become an annoyance to the community. Depending on land use around the site, construction noise could be an issue. Noise could also disturb wildlife.

How important is any one issue in comparison to another, or in comparison to the possible benefits resulting from a project? How can these issues be resolved? These questions will be addressed with the help of the public through meetings, upcoming workshops in the Spring and through response to articles such as this one.

NOW AVAILABLE

FLOOD PROBLEMS-STATE OF ARIZONA
(96-13)
HEARINGS BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES
OF THE
COMMITTEE ON
PUBLIC WORKS AND TRANSPORTATION
HOUSE OF REPRESENTATIVES
NINETY-SIXTH CONGRESS
FIRST SESSION

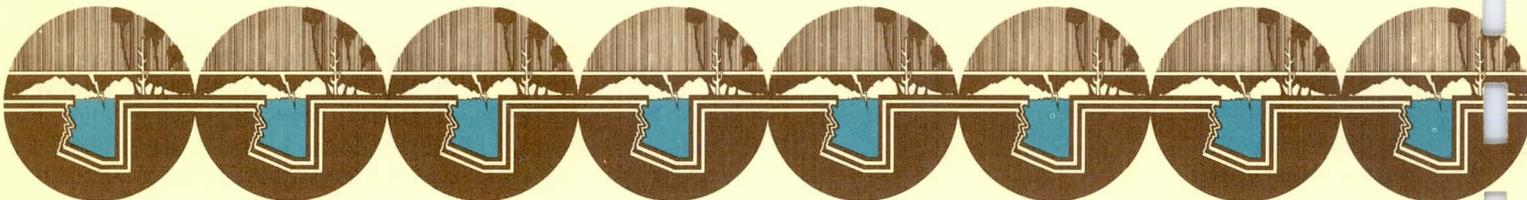
June 1 and 2, 1979 at Phoenix, Arizona

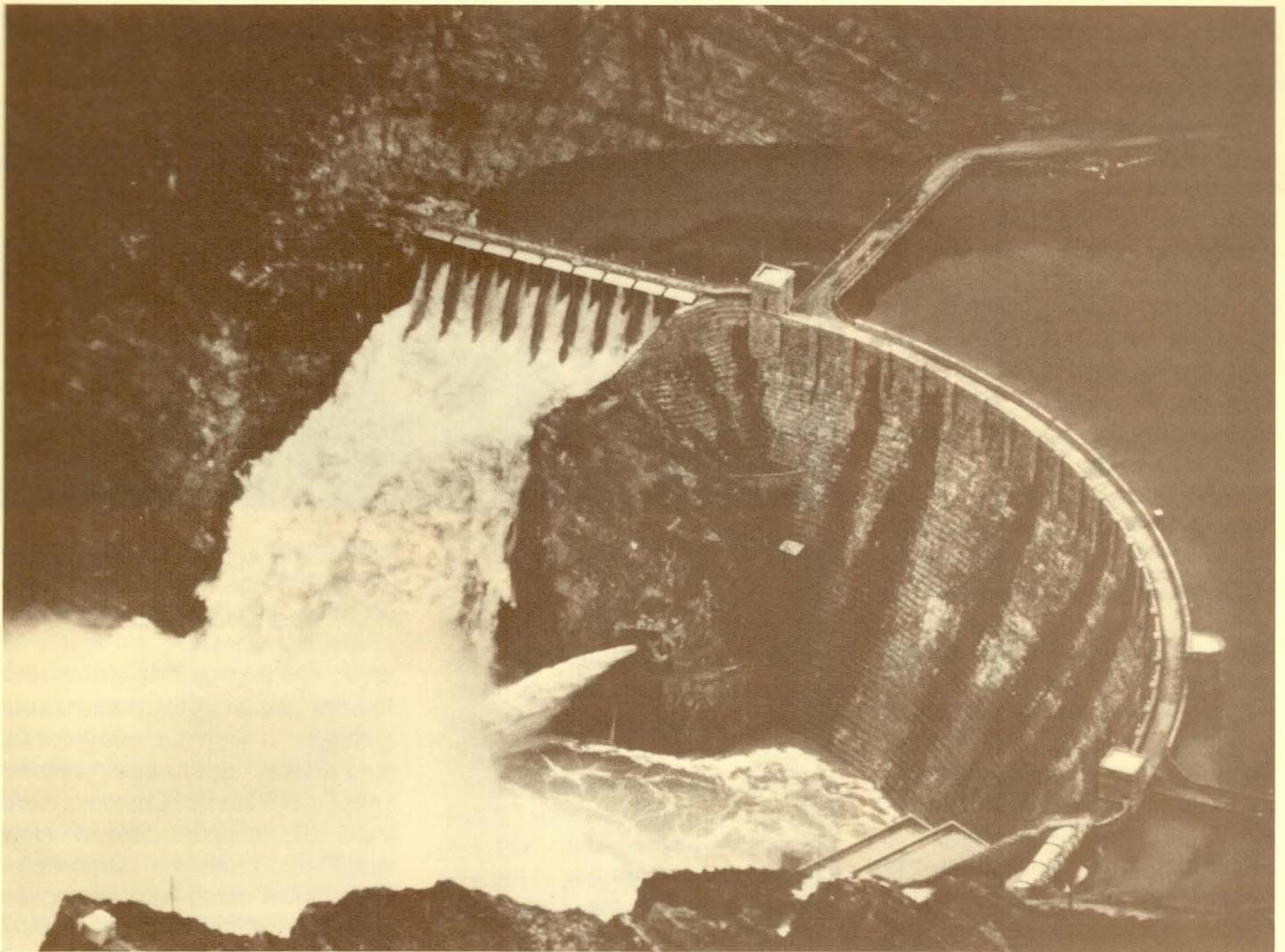
Copies of the hearing proceedings are available to the public through the U.S. Government Printing Office, Washington, D.C., 20402. A copy is also in the CAWCS library, Suite 666, Security Center, 234 N. Central Avenue, Phoenix

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FLOOD CONTROL

On January 28, 1980, reservoirs on the Salt and Verde Rivers were 84 percent full. A storm coming in from the Pacific was predicted to drop one to two inches of rain on the watersheds. The runoff from this storm would more than fill the reservoirs; so SRP started releasing water. After ten days of re-

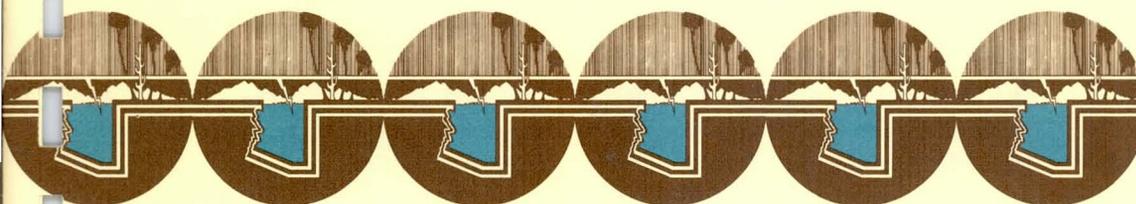
leases at or below 10,000 cubic feet per second (cfs) reservoirs were almost 90 percent full on February 13, still leaving enough space to handle a second, similar size storm that was on its way. On the Agua Fria River, Lake Pleasant behind Waddell Dam was about 95 percent full.

Things appeared to be under control, but then the second storm arrived. Even though this storm was predicted to be similar to the last, it in fact dropped three to four times as much rainfall on the watersheds above Phoenix, as had the first storm, and the area was facing its fourth flood in two years.

CENTRAL ARIZONA WATER CONTROL STUDY

**Newsletter 6
MARCH 1980**

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TELEPHONE (602) 271-0915



By the evening of Thursday, February 14, flows into Lake Pleasant were peaking at 28-30,000 cfs, and peak releases of 25,200 cfs were made through the night into the Agua Fria. On the Salt and Verde, flow into the reservoirs was steadily increasing.

By midday Friday, flows in the Agua Fria reached 44,000 cfs, the largest since the December 1978 flood. By the evening, combined releases on the Salt and Verde reached a peak flow of 170,000 cfs. Governor Babbitt declared a state of emergency and Federal, State and local emergency operations centers were mobilized.

To compound the already severe problems, still another storm was expected and a potential problem was thought to exist with Stewart Mountain Dam if significant rainfall occurred on the Salt watershed. It was feared that the spillway capacities could be exceeded and the left abutment could be eroded if water got out of the concrete-lined spillway. Whether or not the dam could survive this condition was in question. Should Stewart Mountain Dam fail, by the time water reached Sky Harbor Airport, the estimated flow would be 468,000 cfs. The following day a team of engineers from the Water and Power Resources Service examined the dam and determined that there was no new damage to the dam. However, safety problems still existed if an additional large storm occurred.

By 9:00 a.m. Saturday, flows in excess of 170,000 cfs were roaring through Phoenix. Portions of the floodplain in Phoenix, Mesa and Tempe had been significantly damaged; evacuations had been made throughout the night from these and smaller communities such as Holly Acres and Allenville on the Gila River and Avondale, Hound Dog Acres, Rose Garden,



and El Mirage on the Agua Fria River.

Through the beginning of the following week, flows in the Salt, Gila and Agua Fria Rivers eased. However, on Tuesday evening another storm on the Agua Fria watershed increased flows into Lake Pleasant, causing peaks of about 74,000 cfs below Waddell Dam. On the Salt, a scouring problem in the riverbed threatened the stability of the Interstate-10 bridge supports and necessitated closing the bridge for inspection. Now with only two crossings open across the Salt, traffic delays caused inconveniences that affected residents long after flood flows subsided.

The ten days of rain in February 1980 caused the highest flows

ever on the Agua Fria. Flows along the Salt in the Phoenix area were the highest since 1905.

People were asking the same questions heard so many times before. Why can't flood flows be better controlled? Couldn't more water be released earlier? How much flood protection can be provided? How much flood protection do people want? What will it cost? There are ready answers to some of these questions. Others are harder to answer.

In this newsletter, we will explore these and other questions regarding flood control planning and the CAWCS in particular.

THE FLOODS

Watershed, runoff, 100-year flood, Standard Project Flood. . . . Phoenix area residents have been reading words and phrases like these in news articles daily since the February flood. What do they mean and how do they relate to measures to control floods in the area?

When rain or snow falls on the land, four different things can happen: The water can evaporate, or it can soak into the ground, or it can stay on the surface as snow or ice, or

it can run over the ground and into streams. Water that runs over the ground and into streams is called *runoff*. The area or region from which the rainfall or snowmelt drains to a stream is called a *watershed*. Floods occur when water in a stream rises and overflows onto normally dry land. The Phoenix area can be viewed as being situated at the narrow end of a large funnel fed by the Salt, Verde, and Agua Fria watersheds. The

Continued on page 7

Water Conservation, Flood Control or Both

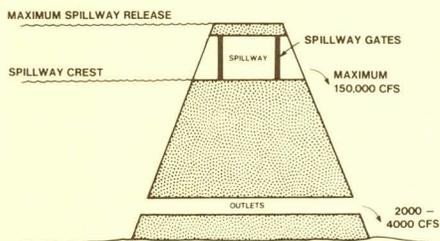
Why can't flood flows be better controlled and water released earlier to prevent flood damages? An explanation of how water conservation dams and flood control dams operate will help answer these questions.

Dams are designed to accomplish specific purposes such as flood control, water conservation and hydropower. Dams can be designed for a single purpose or multi purposes.

Dams designed for the primary purpose of water conservation, such as the SRP dams, have no space in the reservoir dedicated specifically for flood control. They are designed only to store and deliver water. As shown in the illustration, valves (outlets) at the bottom of the dam are small, sized to release water at a rate sufficient to meet water demands of Valley users. The spillway at the top of the dam is only for protection of the dam itself. A spillway can be thought of as a channel cut through the top of the dam where water can spill over the dam when the reservoir becomes too full, causing minimal damage to the structure. Because of this design, large amounts of water cannot be released until the water level reaches the spillway gates.

To illustrate, at Roosevelt Dam on the Salt River, a maximum of 2,700 cfs can be released until the water level reaches the spillway crest. Releases can then be increased,

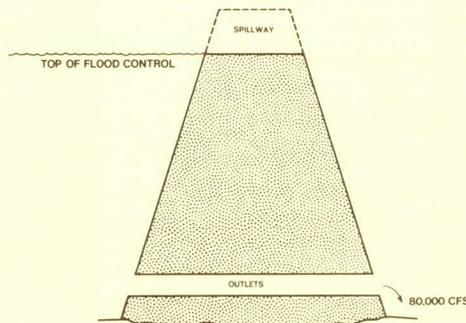
TYPICAL SRP WATER CONSERVATION DAM



but the amount of the releases is governed by the height of the water above the spillway crest. A maximum release of 150,000 cfs can be made only when water reaches the top of the spillway. According to SRP, the peak flow was reduced by one-third during the February flood, even with these design limitations.

On the other hand, dams constructed for flood control, as shown in the illustration, have space dedicated specifically for storing and controlling flood waters. Large outlets at the bottom of the dam allow controlled releases of incoming flow. Up to a design flow (maximum "acceptable" flow), everything coming into the reservoir goes out—inflow equals outflow. Inflows over that acceptable amount can be stored in space dedicated (kept empty) for that purpose and released later at a less damaging rate, until the flood storage space is again empty.

FLOOD CONTROL DAM

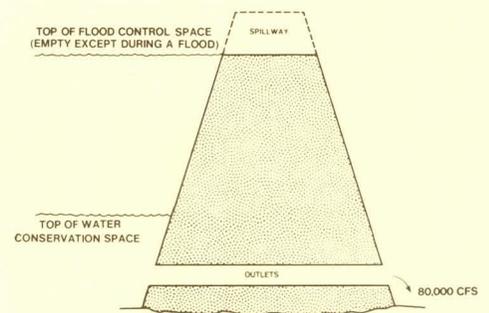


To illustrate, if the design flood flow is 80,000 cfs, then the outlets at the bottom of the dam would be sized to 80,000 cfs. During a flood, inflow would equal outflow up to that point, and from then on flow would be released steadily at 80,000 cfs. Inflow greater than 80,000 cfs (the peak) would be stored. Water would be released until the water in the flood storage space is gone, and the space is again available for the next flood.

Multi-Purpose, Single-Purpose

As we discussed earlier, dams can be multi-purpose or single purpose. Multi-purpose dams operate for both flood control and water conservation. For example, as originally designed, Orme Dam would have had a total of 1,360,000 acre-feet of storage space. Of that amount, 410,000 acre-feet were for CAP regulatory storage. The remaining 950,000 acre-feet were specifically dedicated for flood control. This meant, according to operating rules prescribed for the structure, that 950,000 acre-feet had to be kept empty so that this space would be available when a flood occurred.

MULTI-PURPOSE DAM



Preliminary analysis of the February storm indicate that, with continual releases of 50,000 cfs, the floodpool at Orme Dam would have reached 452,000 acre-feet, or about one-half the flood control space would have been used.

Single purpose dams can be designed solely for flood control (such as Painted Rock Dam or Cave Buttes Dam) or water conservation (such as the SRP dams and Waddell Dam).

Existing water conservation dams can also be modified to operate for flood control purposes. Larger outlets may be provided at the bottom of an existing dam, and a portion of the existing storage space may be permanently dedicated for flood

control. Another method of providing flood control is to make space available by releasing water just before a flood event is forecast. This method is not as reliable as dedicating permanent flood storage space, and any water released would be lost if the predicted flood did not occur.

Design Flow, Hydrograph Key to Flood Control Planning

How do planners determine how much reservoir space is needed to store flood waters? Part of the answer is a "hydrograph" which shows the volume of a flood and the relationship of flow over time. Planners also need to know what kind of flow is desired downstream (*design flow*). For example, if you want a design flow of 80,000 cfs downstream through the Phoenix area, that means you can only make certain releases on the Salt and on the Verde, so that the combined flow does not exceed the 80,000 cfs target downstream. Any water that cannot be released must be stored. The amount that must be stored determines the amount of reservoir space needed to control the flood to the desired downstream flow.

CAWCS planners are developing hydrographs for a range of

simulated flood events (50-year, 100-year, Standard Project Flood) with a computer model. They are determining the flood control storage (volume) required for a range

of "acceptable" flows downstream (50,000 cfs, 100,000 cfs, and 150,000 cfs) for the various elements and combinations of elements under investigation.

CAWCS Studying Flood Control Alternatives

The CAWCS is examining both upstream and downstream alternatives to reduce flood damages.

Upstream Flood Control

Basically, there are three concepts for upstream flood control under study in the CAWCS.

The first concept is construction of a single, multi-purpose dam at the confluence of the Salt and Verde rivers (similar to "Orme Dam"). Two sites for the dam are presently under consideration: The Confluence Site itself and the Granite Reef Site, approximately four miles downstream from the confluence. A multi-purpose dam constructed at either of these sites would provide regulatory storage for CAP water and flood control of both the Salt and Verde Rivers.

The second concept involves constructing or modifying two dams, one to control the Verde River and one to control the Salt River.

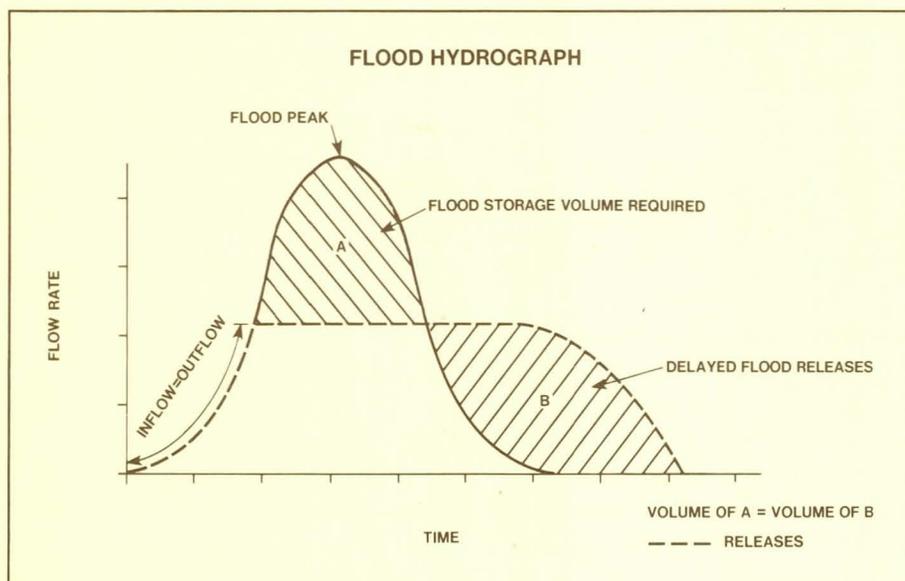
The Verde River could be controlled either at the confluence of the Salt and Verde or further upstream on the Verde. At the confluence, a small, single-purpose dam could be built for flood control. Further upstream, three options for control of the Verde are under consideration: reconstructing Horseshoe Dam, constructing Cliff Dam, and reconstructing Bartlett Dam.

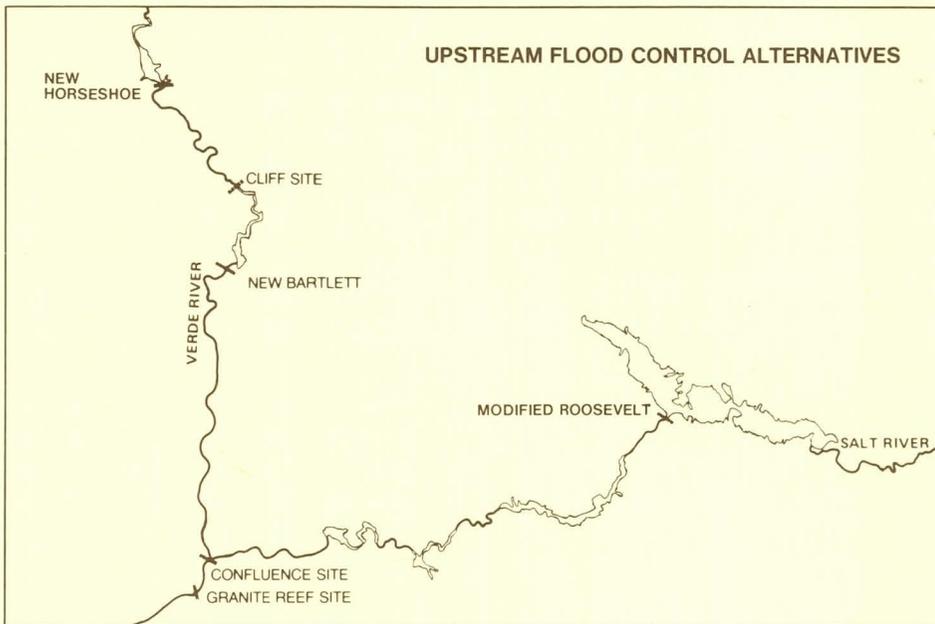
The Salt River could be controlled, like the Verde River, by a small, single-purpose dam at the confluence. The Salt could also be controlled by modifying Roosevelt Dam—raising the crest 20 feet to provide flood storage space and adding new outlet works for flood control operations.

By combining these options for control of the Salt and Verde, three basic upstream flood control systems can be obtained: 1) Verde control at one of the three upstream sites plus Salt control at modified Roosevelt, 2) Verde control at one of three upstream sites plus Salt control at the confluence, and 3) Verde control at the confluence plus Salt control at modified Roosevelt.

The third concept for upstream flood control involves reoperation of SRP dams by enlarging the outlet works of existing dams or adding new outlets for greater operating flexibility during flood events. The CAWCS is not considering dedication of permanent flood control space in SRP reservoirs.

Although all three concepts provide flood control of the Salt and Verde, the degree of flood protection offered by each is not nec-





Flood Control Economics: Determining a Feasible Alternative

Economic analysis of the flood control alternatives proposed for the Phoenix area will be a major determinant of how much and what kind of flood protection can be provided with federal funds. Each time a major flood occurs, the U.S. Army Corps of Engineers evaluates the level and type of damage which resulted. This information is combined with projections of the level of runoff anticipated in the region's rivers from a variety of different storms to produce an estimate of the potential amount of flood damage the Phoenix area can expect over an extended period of time (average annual damages). (See accompanying illustration.)

essarily equal. In particular, reoperation of SRP dams would not, by itself, offer the degree of protection of either a multi-purpose dam at the confluence or a combination of single-purpose dams on the Salt and Verde Rivers. It is likely that reoperation of SRP dams would be combined with downstream flood-damage reduction measures to provide a comparable degree of protection.

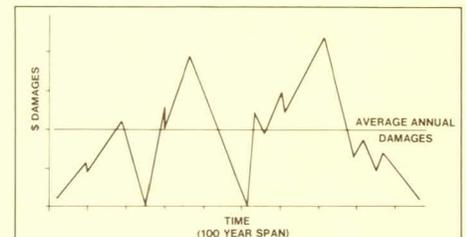
Downstream Flood Protection

In addition to upstream control, measures downstream of the Salt/Verde confluence to reduce flood damages are being studied. The CAWCS is considering such alternatives as channels or levees through Phoenix, levees to protect Buckeye, Arlington and Holly Acres, and channel clearing along the Gila. Other measures downstream aimed at reducing flood damages would be nonstructural options, such as an improved flood warning system, floodproofing, land acquisition in the floodplain, and bigger and better bridges. These and other measures were described in the November 1979 Extra, "What Can You Do Besides Build A Dam?"

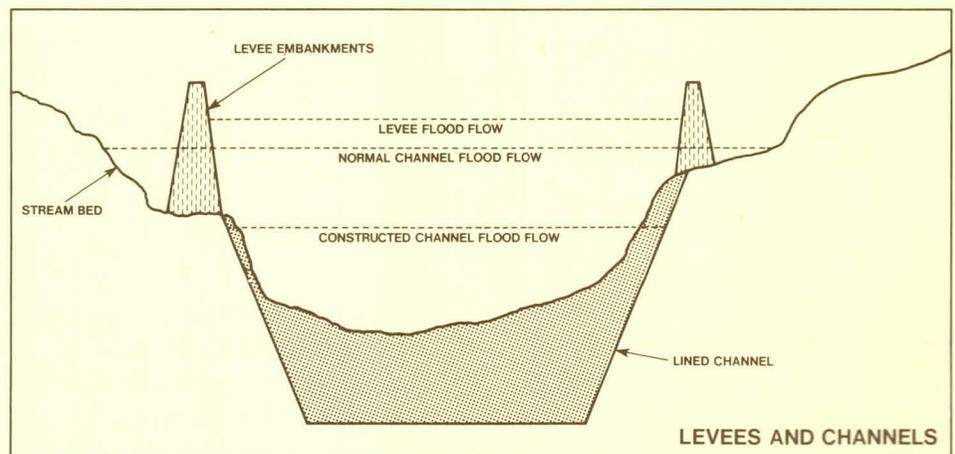
Levees and channels are designed to prevent flooding in areas

adjacent to a river or floodplain. They provide a direct means of flood protection in that they can be located where needed and can act to confine floodwater to the channel up to a certain design discharge. Channel modifications, such as the clearing on the Gila River, are designed to increase the carrying capacity of a reach of the river, so that flood waters pass more efficiently.

Unlike upstream control, which stores peak flow and releases it at a less damaging rate, these measures do not cut the peak flow in a flood event. And while they have a local effect of reducing flooding at a particular location, they can potentially increase flooding and flood damage downstream.



"Damages prevented" by a flood control program are considered "benefits," and are related to the cost of providing the program. For example, if the average annual



flood damage is \$1,000,000 and with a design flow of 80,000 cfs damages are limited to \$100,000, then, \$900,000 of damages have been prevented. Planners must then relate that amount of prevented damage to how much it would cost to provide the protection. If the anticipated benefits (damage prevented) from a particular alternative equals or exceeds the analyzed cost of providing it, the alternative is considered economically justified.

Although sometimes superseded by environmental, social, or dam safety considerations, flood control programs must generally be economically justified in order to receive federal funding. Since most major flood control structures—such as the large dams and/or extensive channel systems being considered for the Phoenix area—are very expensive and exceed local governments funding ability, the economic analysis being performed as part of the CAWCS will be a major determinant of what is finally built.

Not all damages considered in the economic analysis are from physical losses. The cost to the region of traffic delays produced when all but three bridges across the Salt River were closed last December, accounted for over 40 percent of all the losses recorded. Flood control planning can also consider benefits from proposed solutions which will allow more intensive or more productive uses of land which has been subject to flooding.

Spring Workshops

In this newsletter we have addressed some of the many factors that have to be considered in deciding upon the best flood control alternative for the CAWCS area. Careful choices will have to be made among the measures de-

scribed, weighing benefits against cost, level of protection desired against the feasibility of providing it, environmental and social concerns and economic concerns.

There are many issues to be discussed, analyzed and evaluated. For instance, without downstream control, maximum upstream control might be required. Upstream control could be limited if combined with downstream control. With downstream control only,

damage would be reduced; however the protection would be localized. These considerations and many others are taken into account while CAWCS planners are building and evaluating systems.

Workshops and community meetings scheduled for April will ask the public to help the planners set criteria for evaluating systems. Watch for an announcement of time and place in the next newsletter.

Emergency Actions

Federal, state and local emergency actions and assistance go into effect in the event of a natural disaster. Federal disaster assistance is intended to be supplemental in nature and to be used only when state and local resources are inadequate, or have been exhausted. When the February 1980 flood occurred, the county emergency coordinator investigated and reported disaster conditions to the State of Arizona. The State Division of Emergency Services then conducted a damage survey and reported to the Governor.

Realizing that the damages were beyond the resources of the State, the Governor requested on February 15 that the President declare selected counties as disaster areas. The President then requested the U.S. Department of Housing and Urban Development (HUD) to investigate. HUD activated its Federal Emergency Management Administration (FEMA). FEMA field teams were organized and sent out to make preliminary field assessments. Based on FEMA recommendations the President made a Disaster Declaration for Yavapai, Maricopa, and Gila Counties. His decla-

ration activated federal agencies (including the Corps of Engineers) that began providing and are still providing various forms of emergency assistance such as emergency shelter, search and rescue, emergency hospitalization, debris removal, emergency construction and restoration of public facilities.

Federal financial assistance also becomes available. The Department of Agriculture, Farmers Home Administration, will provide up to 80 percent cost-sharing assistance to farmers and may include debris removal and rehabilitation. The Small Business Administration will provide emergency funds and technical assistance to small businesses affected by the disaster. The Department of Housing and Urban Development will provide emergency funds for private homeowners whose homes have been damaged.

In addition to federal agencies, and several national organizations such as the American Red Cross and the Salvation Army, state and local (county and city) agencies assist in monitoring flood flows and in evacuations and flood fighting.

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Salt-Verde watershed drains through Phoenix and includes almost 13,000 square miles above the confluence of the two rivers.

Floods occur in the Phoenix area when there is a large volume of runoff in the watersheds of the Salt, Verde, and/or Agua Fria Rivers. The runoff is caused by several kinds of conditions. For example, warm rains can cause rapid snowmelt in the high country, and this leads to excessive runoff. Rain which falls on soil already wet from an earlier storm becomes runoff because the soil has reached its capacity to absorb water. The major cause of the 1978, 1979 and 1980 floods was the large amount of precipitation that fell on the watersheds during winter storms.

Historically, the highest flows in the area's rivers have been produced by winter storms. The "flood of record" on the Salt-Verde system occurred in February 1891 when a

peak flow of 300,000 cfs was recorded at the Salt-Verde confluence. Recent peak flows measured at the confluence were 122,000 cfs in March 1978, 140,000 cfs in December 1978, and 170,000 cfs in February of this year.

The SRP dams and reservoirs upstream on the Salt and Verde Rivers have reduced peak flows through Phoenix. The SRP system of six dams and reservoirs was constructed primarily for water conservation, but it also provides hydropower and incidental flood control (see following story, "Water Conservation, Flood Control or Both"). During some years, the SRP reservoirs are filled to capacity toward the end of the annual runoff season and consequently there is little or no space in the system for flood control. However, the two reservoirs on the Verde and four on the Salt can reduce peak flows if storage space is available. According to SRP, peak flows in the February storm were reduced

by approximately one-third through use of storage space in the upstream reservoirs.

The storage space in the SRP system is not evenly divided between the Salt and Verde Rivers. Approximately 85 percent of the 2,063,900 acre-feet of storage in the system is provided on the Salt River. As might be expected from this, a disproportionate share of the water from recent floods has emanated from the Verde River.

Newspaper accounts refer to the February flood as a "100-year flood." Floods of a designated size are rated or described by their chances of occurring. This is called "flood frequency." A history of past flows is maintained and analyzed to project the probability of future flows. As Valley residents well know, a 100-year flood does not mean that such a flood will occur only once every 100 years. What it does mean is that there is a 1 in

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Water Words

- Flood: Overflow of water on lands not covered by water under normal flows.
- Floodplain: Land adjacent to the channel of a river or stream that has been or may be inundated by water.
- cfs: Cubic feet per second; measure of the magnitude of flow in a stream. Streamflow is measured by the number of cubic feet of water passing a given point each second.
- Acre-Foot: A measure of the volume of water to cover one acre of land to a depth of one foot.
- Watershed: Area or region in which the rainfall or snowmelt drains to a particular watercourse or body of water.
- SPF: Standard Project Flood; the most severe flood that can reasonably be expected to occur in a region based on its geographic and meteorological historic characteristics. In the CAWCS area, this hypothetical flood has been established as 295,000 cfs as it passes the Salt/Verde confluence.
- 100-Year Flood: A flood which has a 1 percent chance of occurring in any given year, based on analysis of streamflow records for the watershed and of rainfall and runoff in the general region of the watershed.
- Runoff: Water from rain or snowmelt which flows downhill as surface water.
- Design Discharge: Amount of flow through an area to keep damages to an "acceptable" level.
- Annual Average Flood Damage: An estimate of the amount of flood damage to be expected over an extended period of time.
- Flood Peak: The highest flowrate encountered during a flood event.

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100 (1 percent) chance of a flood of a designated size occurring in any given year. Similarly, a 50-year flood (which is smaller than a 100-year flood) has a 2 percent chance of occurring in a given year. And, once a flood has occurred, the chances of having a flood of similar size occur in the same year or the following year remains the same.

The Standard Project Flood (SPF) is a flood which would result from the most severe combination of weather and runoff conditions that can reasonably be expected to occur in the region. Flood control dams are designed to control and store water from a Standard Project Flood to an acceptable level of release.

The most recent analysis of flood flows by the U.S. Army Corps of

Engineers has resulted in the following flood frequency and SPF data:

Salt-Verde Confluence

100-year flood: 245,000 cfs

50-year flood: 175,000 cfs

SPF: 295,000 cfs

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