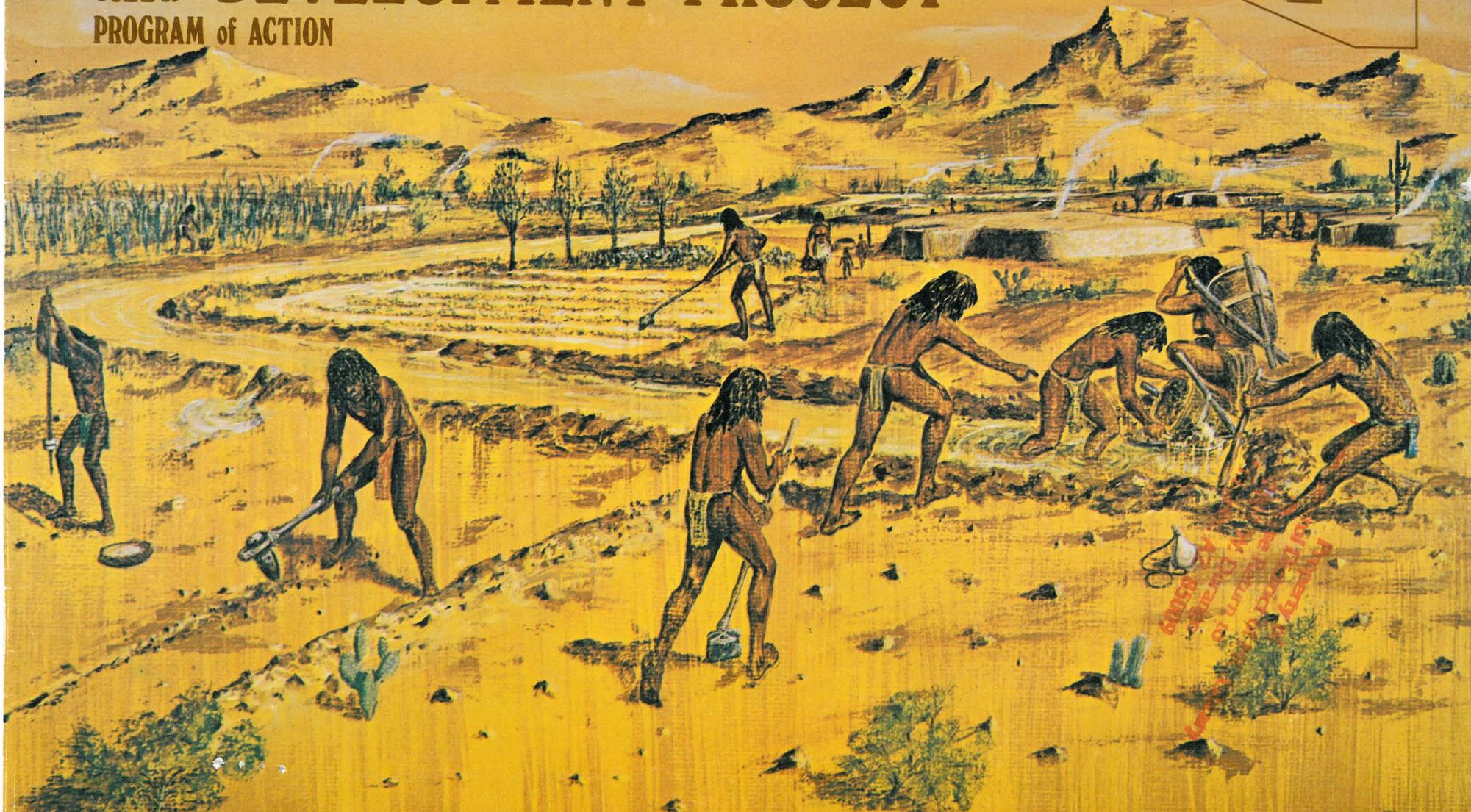


HOHOKAM RESOURCE CONSERVATION and DEVELOPMENT PROJECT

PROGRAM of ACTION



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U.S. GOVERNMENT PRINTING OFFICE: 1950

Assisted by U.S. Department of Agriculture and Other Cooperating Agencies

C. K. EMERSON

HOHOKAM RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

3556 West Buckeye Road - Phoenix, Arizona 85009

Sponsors

Agua Fria-New River NRCD
Buckeye-Roosevelt NRCD
Buckeye Water Conservation
and Drainage District
City of Chandler
City of Gilbert
City of Glendale
City of Mesa
City of Scottsdale
City of Tempe
East Maricopa NRCD
East Mesa Area
Development Association
Gila Bend NRCD
Gila River Indian
Community
Maricopa County Municipal
Water Conservation
District No. 1
Roosevelt Irrigation
District
Roosevelt Water
Conservation District
Salt River Valley
Water Users' Association
San Lucy Tribal Council
Tonto NRCD
Town of Buckeye
Town of Gila Bend
Town of Wickenburg
Wickenburg NRCD

HOHOKAM RC&D PROJECT

The Food and Agriculture Act of 1962 authorized the Secretary of Agriculture to cooperate with local units of government in developing a plan to conserve and develop the areas resources, both human and natural. The Secretary then directed the Soil Conservation Service to assist local sponsoring organizations in the development of their plans, and in carrying out the plans.

Presently there are 168 authorized projects in the United States, and 59 in the application stage. The authorized projects include 1,118 counties, and 702 million acres of land.

Arizona has four authorized projects and one in the application stage. They have formed an Association of RC&D Projects known as the "Arizona Council of RC&D Projects." It includes the:

- a. Little Colorado River RC&D Project in Navajo and Apache counties.
- b. Cocopai RC&D Project in Coconino and Yavapai counties.
- c. Hohokam RC&D Project in Maricopa County and part of Pinal County.
- d. Coronado RC&D Project in Graham, Cochise, Greenlee, and Santa Cruz counties.
- e. Lower Colorado River RC&D Project, in the application stage, includes Yuma and Mohave counties.

All the above counties with the exception of Maricopa and Pinal are sponsoring organizations.

The Hohokam RC&D Project includes all of Maricopa County and that portion of the Gila River Indian Reservation that extends into Pinal County.

It is designed to carry out a program of resource conservation and economic development, wherever these activities are needed. It is locally sponsored, and locally directed, in cooperation with agencies of the State and Federal governments.

The sponsoring organizations include the following:

Agua Fria-New River NRC	Gila Bend NRC
Buckeye-Roosevelt NRC	Gila River Indian Community
Buckeye Water Conservation and Drainage District	Maricopa County Municipal Water Conservation District No. 1
City of Chandler	Roosevelt Irrigation District
City of Gilbert	Roosevelt Water Conservation Dist.
City of Glendale	Salt River Valley Water Users' Association
City of Mesa	San Lucy Tribal Council
City of Scottsdale	Tonto NRC
City of Tempe	Town of Buckeye
East Maricopa NRC	Town of Gila Bend
East Mesa Area Development Association	Town of Wickenburg
	Wickenburg NRC

This list is apt to grow considerably in the next few months, as Gila and Pinal counties along with the natural resource conservation and development projects and some of the cities have submitted resolutions to the Hohokam Steering Committee, requesting that they be included within the boundaries of the Hohokam RC&D Project and that they be designated as sponsoring organizations.

The objectives of the Hohokam RC&D Project are as follows:

---- Quality in the natural resource base for sustained use.

The development and protection of all natural resources through improving the quality and quantity of water, proper land use, controlled flooding, watershed treatment, improved wildlife habitat and controlled pollution.

---- Develop the economic potential to provide sufficient income for better housing, utilities, health care, education and other facilities that satisfy the basic human needs.

---- Provide a satisfying cultural, historical and recreational environment.

RC&D Measures

The RC&D Program of Action is a flexible, open-ended program, whereby measures may be adopted as the need arises.

Proposed measures may be initiated by any agency, organization, or individual. To be eligible for technical and financial assistance they must meet the following requirements:

- Have community benefits.
- Be sponsored by a public body with legal authority to carry out their responsibilities in the installation of the measure.
- Develop an RC&D Measure Plan consisting of a description of the area, sponsors' objectives, alternatives considered, work to be done, economic considerations, operation and maintenance, and other standard requirements.
- Fall within the following categories:
 - a. Critical area treatment (erosion and sediment control).
 - b. Flood prevention (structures and land stabilization).

The Hohokam RC&D can participate in flood control projects just as the SCS does under the P.L. 566 Program. The larger projects are more suited to the P.L. 566 Program, and the smaller ones fit into the concept of RC&D projects.

The Hohokam RC&D Project has adopted a flood control project in Scottsdale, along Granite Reef Wash, and will in due time assist in the construction of the channel.

They will probably adopt a flood control project that the Flood Control District is presently gathering information on -- the Champion Flood Control Project in southwest Phoenix.

- c. Public water-based recreational development.
- d. Public water-based fish and wildlife development.

Water-based recreation facilities are eligible for cost-sharing, provided they meet other requirements. The Hohokam RC&D Project is cooperating with the City of Tempe in the Kiwanis Park Water-Based Recreation Facility because we feel that recreation is a necessity in our overly crowded communities.

- e. Farm irrigation.
- f. Land drainage.

G. Soil and water management for agricultural-related pollutant control.

h. Accelerated services.

The RC&D project is interested in many different kinds of measures that do not fall into the above categories and are not eligible for funding, such as:

Flood Control Legislation

Some of you will remember when the flood control tax in the country was 5 cents on the \$100.00 assessed valuation -- you will probably also remember that this was not enough money to run the office and purchase easements, so the office was maintained but very few easements were purchased. The Hohokam RC&D became interested in this problem and called a statewide meeting on November 18, 1970 to discuss the possibility of increasing the tax to 25 cents per \$100.00 valuation. Of course, Hohokam RC&D does not claim that they were the sole motivating force behind this legislation -- they only assisted. In fact, that is an example of much of the work an RC&D does -- that it recognizes a problem, and then calls the appropriate people together to discuss it, and hopefully, come up with a solution. You must also remember that the Hohokam RC&D Project is made up of 23 individual organizations, most of which are highly qualified to recognize problems, then use the entire RC&D organization to assist in solving them.

Land Use

The Hohokam RC&D Steering Committee has adopted several position papers on land use and has presented these papers to legislative and planning groups. Many times I have heard political leaders remark that they wished other groups would take an interest in local problems and express themselves as the Hohokam RC&D Project does.

Conclusion

RC&D projects are just what the sponsoring organizations want to make them. The legislation is set up to help local units of governments improve their areas by developing their resources -- it is up to the local leaders as to just how much they do.

HOHOKAM RESOURCE CONSERVATION
AND DEVELOPMENT PROJECT
PROGRAM OF ACTION

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1974

THIS PROGRAM OF ACTION WAS PREPARED BY THE
FOLLOWING SPONSORING ORGANIZATIONS:

Cities and Towns

Buckeye
Chandler
Gila Bend
Gilbert
Glendale
Mesa
Scottsdale
Tempe
Wickenburg

Natural Resource
Conservation Districts

Agua Fria-New River
Buckeye-Roosevelt
East Maricopa
Gila Bend
Tonto
Wickenburg

Irrigation Districts

Maricopa Co. Municipal
Water Cons. Dist. # 1
Roosevelt Irrigation
District
Roosevelt Water Cons.
District
Salt River Valley Water
Users' Ass'n.

Indian Reservations

Gila River Indian
Community
San Lucy Tribal
Council

Others

East Mesa Area Devel-
opment Association

Assisted by U.S. Dept. of Agriculture
and other cooperating agencies

Prepared under authority of the Food
and Agriculture Act of 1962 (P.L.
87-703)

U.S. Department of Agriculture
Soil Conservation Service
Phoenix, Arizona

FOREWORD

The sponsors of the Hohokam Resource Conservation and Development (RC&D) Project are proud to present this Program of Action as a guide to the conservation and development of natural and human resources in south central Arizona.

We bring to you the thoughts of rural and urban sponsors from farms and ranches, cities and towns, irrigation and water districts, and the technical resource knowledge from federal, state and local agencies. Proposals contained in this open-ended action program represent the



Ken Fooks, Chairman, Hohokam Resource Conservation and Development Project.

PHOTO COURTESY OF KEN FOOKS

views expressed by hundreds of citizens through twenty-five resource committees. The result is a program to help solve social, economic and natural resource problems.

zoning for flood control, clean air, sewage, open space, green belts and solid waste disposal to bring about the best use of our land.

We have assembled basic data, discussed the problems concerning natural resource development, and listed our RC&D measures in this Program of Action.

This Program of Action is expected to accelerate services over and above the past assistance received from county, state and federal agencies.

We seek technical assistance and cost-sharing from the Soil Conservation Service and other U.S. Department of Agriculture agencies to assist in meeting project objectives.

We invite private investment in needed measures to serve the people of our project area.

We urge federal, state, county and city governments to cooperate in planning and

We know that carrying out this Program of Action will make better use of our natural resources and will make our area a much better place in which to live, work, and play.

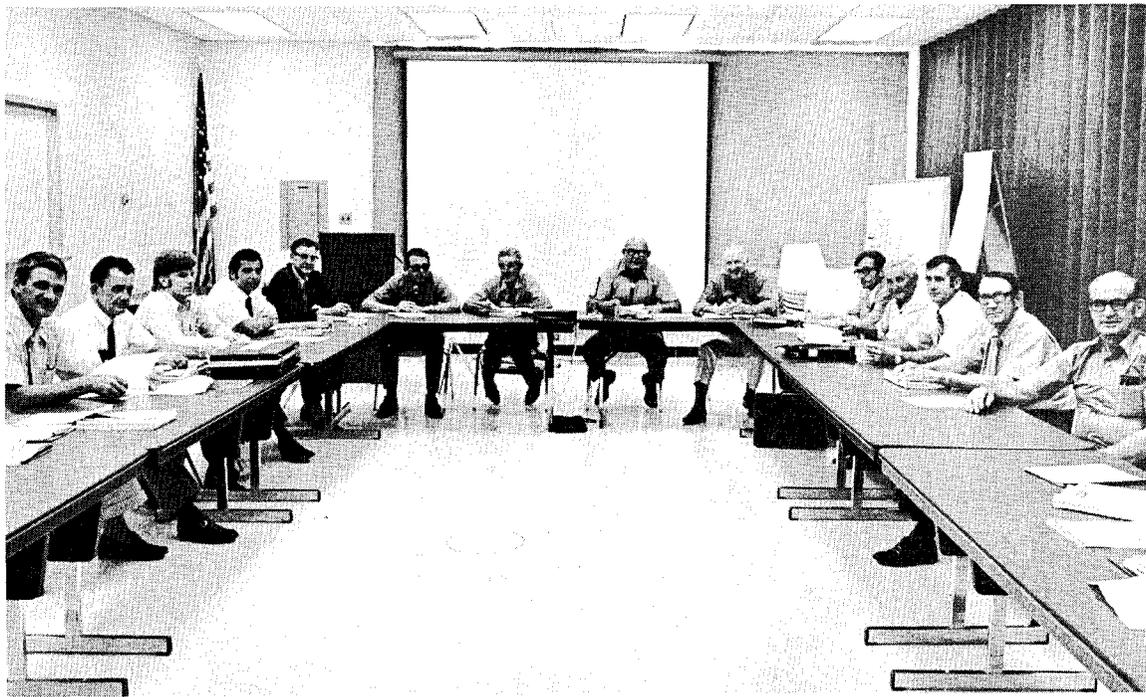
This Program of Action is peopled by men and women of motivation and action; we look forward to an accelerated resource conservation and development program with confidence and optimism.

Kenneth G. Fooks

Kenneth G. Fooks
President



Night Blooming Cereus in blossom. PHOTO COURTESY OF KEN FOOKS



Part of the Hohokam RC&D Steering Committee. SALT RIVER PROJECT PHOTO

Representative (left to right)

Marc Stragier
 Virgil McClanahan
 Darrell Truitt
 Joe Falbo

Virgil Crismon
 Lee Stanley
 William E. Smeltz
 Kenneth G. Fooks
 Desmond G. Wood
 Lynn R. Stuart
 Walter White
 Don Weesner

Gordon Pemberton
 Chester Chatham

Sponsor

City of Scottsdale
 Roosevelt Water Conservation Dist.
 City of Mesa
 Maricopa County Municipal Water
 Conservation District # 1
 East Mesa Area Development Ass'n.
 City of Glendale
 Tonto Natural Resource Cons. Dist.
 City of Chandler
 Gila Bend NRC
 Town of Gilbert
 East Maricopa NRC
 Salt River Valley Water Users'
 Ass'n.
 Roosevelt Irrigation District
 Buckeye-Roosevelt NRC

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JACK WILLIAMS
GOVERNOR

OFFICE OF THE GOVERNOR
STATE HOUSE
PHOENIX, ARIZONA 85007

IN REPLY
REFER TO:

March 15, 1974

Mr. Kenneth G. Fooks, Chairman
Hohokam Resource Conservation
and Development Project
3556 West Buckeye Road
Phoenix, Arizona 85009

Dear Mr. Fooks:

Thank you for the opportunity to review the Hohokam Resource Conservation and Development Program of Action and I am pleased to endorse your fine document.

I firmly believe that solutions to the problems addressed by the Hohokam RC&D are best found through the cooperation and coordination of the many individuals and agencies who share your concern for orderly economic betterment and environmental preservation. You are to be commended for your efforts in the procurement of inputs from these groups.

Congratulations are certainly in order for all of the many people who shared in the creation of the Hohokam RC&D Program of Action.

Sincerely,

A handwritten signature in cursive script that reads "Jack Williams".

Jack Williams

JW:js

ACKNOWLEDGEMENTS

The sponsors of the Hohokam RC&D Project wish to express their appreciation to all those who have donated time, material, photographs, and technical assistance in the development of this Program of Action.

Federal Agencies

Department of the Interior -

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Department of Commerce
- National Park Service
- U.S. Geological Survey

National Weather Service

U.S. Corps of Engineers

U.S. Department of Agriculture -

- Agricultural Research Service
- Economic Research Service
- Farmers Home Administration
- Federal Extension Service
- Forest Service
- Soil Conservation Service
- Statistical Reporting Service

State Agencies

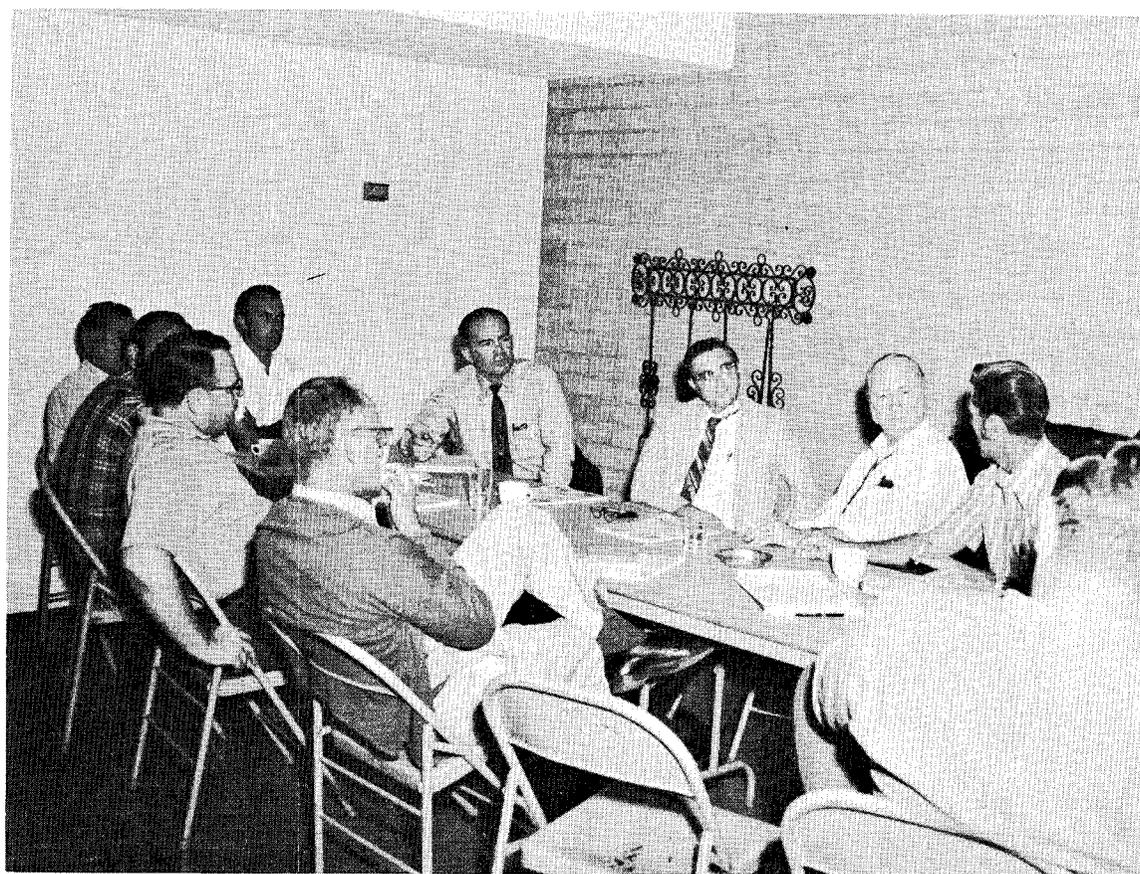
- Governor's Office - Special Assistants
- Arizona Game and Fish Department
- Arizona Outdoor Recreation Coordinating Commission
- Arizona Office of Economic Planning and Development
- Arizona State Land Department
- Arizona State Parks Board
- Arizona Water Commission

Maricopa County

Flood Control District
Parks and Recreation Department
Planning and Zoning Department

Local Organizations

Phoenix Chamber of Commerce
Valley National Bank
Papago Bend Development Commission
And all others who provided information



Papago Bend Development Commission members discussing the development and protection of the ancient Hohokam Indian village "Fortaleza", near Gila Bend, Arizona.

SCS PHOTO

SIGNATURE PAGES

We, the sponsors of the Hohokam Resource Conservation and Development Project, hereby submit this Program of Action for review and authorization for operations.

The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. Sec. 15.1-15.13), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving federal financial assistance.

AGUA FRIA-NEW RIVER NATURAL RESOURCE CONSERVATION DISTRICT

By: [Signature]
Title: Chairman
Date: Sept 7, 1973

This action authorized at an official meeting of AGUA FRIA-NEW RIVER NATURAL RESOURCE CONSERVATION DISTRICT on Sept 7, 1973 at Beauregard, Arizona.

Attest [Signature]
Secretary

BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT

By: [Signature]
Title: Chairman
Date: Nov 6 1973

This action authorized at an official meeting of BUCKEYE-ROOSEVELT NRCD on Nov 6, 1973 at Buckeye, Arizona.

Attest [Signature]
Secretary

CITY OF CHANDLER

By: [Signature]
Title: Mayor
Date: November 8, 1973

This action authorized at an official meeting of CITY OF CHANDLER on November 8th, 1973 at Chandler, Arizona.

Attest [Signature]
City Clerk

CITY OF GILBERT

By: [Signature]
Title: Mayor
Date: November 26, 1973

This action authorized at an official meeting of CITY OF GILBERT on November 26, 1973 at Gilbert, Arizona.

Attest [Signature]
City Clerk

CITY OF GLENDALE

By:

Title: Mayor

Date: 1-8-74

This action authorized at an official meeting of CITY OF GLENDALE on December 11, 1973 at Glendale, Arizona.

Attest

Bernice L. Grogg
City Clerk

CITY OF MESA

By:

Title: City Manager

Date: January 25, 1974

This action authorized at an official meeting of CITY OF MESA ON 1-21-74 ~~1973~~ at Mesa, Arizona.

Attest

J. Cramer
City Clerk

CITY OF SCOTTSDALE

By:

Title: Mayor

Date: 10/11/73

This action authorized at an official meeting of CITY OF SCOTTSDALE on Sept 18, 1973 at Scottsdale, Arizona.

Attest

Jan Anderson Hill
City Clerk

CITY OF TEMPE

By:

Title: Mayor

Date: 1/29/74

This action authorized at an official meeting of CITY OF TEMPE on January 24, 1974 at Tempe, Arizona.

Attest

Virginia J. Thompson
City Clerk

EAST MARICOPA NATURAL RESOURCE CONSERVATION DISTRICT

By:

Title: Chairman, A.C.T.

Date: Nov 6 - 73

This action authorized at an official meeting of EAST MARICOPA NRCD on Nov 6, 1973 at Chandler, Arizona

Attest

Jim Miller
Secretary

EAST MESA AREA DEVELOPMENT ASS'N.

By:

Title: President

Date: 1/29/74

This action authorized at an official meeting of EAST MESA AREA DEVELOPMENT ASS'N. on Feb-15, 1973, at Mesa, Arizona

Attest

Murray Smith
Secretary

GILA BEND NATURAL RESOURCE
CONSERVATION DISTRICT

By: Samuel G. Wood
Title: Chairman
Date: Oct 30 1973

This action authorized at an official
meeting of GILA BEND NRCD on
OCT 30, 1973 at
Gila Bend, Arizona.

Attest John L. Davis
Secretary

GILA RIVER INDIAN COMMUNITY

By: Alfred S. Lewis
Title: Governor
Date: 1/31/74

This action authorized at an official
meeting of GILA RIVER INDIAN COMMUNITY
on January 2, 1973 at
Wickenburg, Arizona.

Attest Julius M. Moseley
Secretary

MARICOPA CO. MUNICIPAL WATER
CONS. DIST. NO. 1

By: W. L. Libby, Pres.
Title: President
Date: 12/10/73

This action authorized at an official
meeting of MARICOPA CO. MUNICIPAL WATER
CONS. DIST. NO. 1 on DECEMBER 4
1973, at BEARDSLEY, Arizona.

Attest J. J. Felt
Secretary

ROOSEVELT IRRIGATION DISTRICT

By: Alfred Younger
Title: President
Date: 1/2/74

This action authorized at an official
meeting of ROOSEVELT IRRIGATION DIST.
on December 18, 1973 at
Buckeye, Arizona.

Attest H. T. Pemberton
Secretary

ROOSEVELT WATER CONSERVATION
DISTRICT

By: Paul E. Hamm
Title: President
Date: November 6, 1973

This action authorized at an official
meeting of ROOSEVELT WATER CONSER-
VATION DISTRICT on November 6,
1973 at Higley Arizona.

Attest Wigil A. M. Sanchez
Secretary

SALT RIVER VALLEY WATER USERS'
ASS'N.

By: Karl F. Abel
Title: President
Date: 1/16/74

This action authorized at an official
meeting of SALT RIVER VALLEY WATER
USERS' ASS'n. on May 5, 1969
at Tempe Arizona.

Attest F. J. Smith
Secretary

SAN LUCY TRIBAL COUNCIL

By: Garfield Lewis
Title: Chairman
Date: 1 Jan. 74

This action authorized at an official meeting of SAN LUCY TRIBAL COUNCIL on Jan. 1, 1974, 1973 at Sila Bend Arizona.

Attest Wilma Ramirez
Secretary

TONTO NATURAL RESOURCE CONSERVATION DISTRICT

By: L. Meredith
Title: Chairman
Date: 12 Oct. 73

This action authorized at an official meeting of TONTO NRCD on OCT 12, 1973 at PRYSON Arizona.

Attest William E. Smith
Secretary

TOWN OF BUCKEYE

By: Jackie Smith
Title: MAYOR
Date: 11/13/73

This action authorized at an official meeting of TOWN OF BUCKEYE on NOV. 13, 1973 at BUCKEYE, Arizona.

Attest John Hammon
Town Clerk

TOWN OF GILA BEND

By: James O Robertson
Title: Mayor
Date: 12-7-73

This action authorized at an official meeting of TOWN OF GILA BEND on Nov 14, 1973 at Gila Bend, Arizona.

Attest Kester J. Dotts
Town Clerk

TOWN OF WICKENBURG

By: E. Curtis Arnold
Title: Mayor
Date: December 5, 1973

This action authorized at an official meeting of TOWN OF WICKENBURG on December 5, 1973 at Wickenburg, Arizona.

Attest Curtis Tom Allison
Town Clerk

WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT

By: Bice Green
Title: Chairman
Date: 12-19-73

This action authorized at an official meeting of WICKENBURG NRCD on Oct 7, 1973 at Agua Fria, Arizona.

Attest Vicki Fingie
Secretary

SUMMARY OF THE PROJECT PLAN

The Hohokam Resource Conservation and Development Project area consists of approximately six million acres of land located in south-central Arizona. It contains a metropolitan area which includes Phoenix, Glendale, Tempe, Mesa, Chandler, Gilbert, Scottsdale, Wickenburg, Buckeye, Gila Bend and other smaller cities. It also includes a large rural area, mostly desert, and a large, intensely cultivated cropland area.

Approximately one million people live in the Hohokam RC&D Project area. Their occupations vary from agricultural related work to the construction of highly sophisticated electronic devices.

The Hohokam RC&D area is one of the fastest growing areas in the United States. It is a wonderful place to live, but it has many of the problems connected with rapidly developing urban areas.

The proper use of the natural resources is one of the greatest problems facing the people of the area. Some of the problems and opportunities discussed in the program of action are as follows:

Problems

- Land is becoming more and more scarce as the urban development expands into the rural areas. The great demand for land brings about improper use in many cases. The definition of "Proper Use" varies considerably between planning organizations.
- Air is becoming more and more contaminated with pollutants from many sources. The rapid population growth requires tremendous construction projects which create dust.
- The great increase in the number of automotive vehicles to serve the needs of the increasing population contributes to the pollution of the air.
- Water is a key natural resource to the survival of people in the desert. The rapidly growing population brings about an increasing demand for water. The supply of water is constantly decreasing, since the use exceeds the recharge.
- The control of floodwaters is a major problem, since many subdivisions have been constructed in flood prone areas.

- The cropland acreage is being rapidly reduced by urbanization. Some cropland should be maintained to provide open space, buffers against noise, air pollution reduction and other amenities afforded by having cropland in urban areas.
- Transportation facilities are extremely overloaded during hours of peak use.
- Wildlife habitat is being reduced by the increasing demand for urban lands.
- There are erosion and sediment problems throughout the area.
- Some of the areas have soils with high salt content and other soils are high in clay.

Opportunities

- There are many conflicts regarding the use of desert rangeland and the irrigated cropland. There is an opportunity to determine what use should be made of the remaining land, and coordinate efforts to develop an overall land use plan.
- There is an opportunity to assist in coordinating plans for the use of water.
- There is an opportunity to accelerate flood control programs and to coordinate the efforts of various government agencies working on flood control projects.
- There is an opportunity to replace cropland lost to urbanization. This would require changes in policies and procedures, and perhaps legislation.
- The increasing demand for land is reducing the wildlife habitat. There is an opportunity to identify biotic communities and include wildlife needs in land use planning.
- There is an opportunity to reduce the problems of the area by accelerating the rate of planning and application of conservation measures.

Key Objectives

- Quality in the natural resource base for sustained use.
- Develop the economic potential to provide sufficient income for better housing, utilities, health care, education and other facilities that satisfy the basic human needs.
- Provide a satisfying cultural, historical and recreational environment.

Major Policies

- Promote coordination between agencies, groups and individuals in the conservation and development of the natural resources.
- Encourage new industries and the expansion of existing industries in the rural communities of the project area.
- Assist in the development of the recreational resources of the project area by coordinating the efforts of many public and private interests.

Major Courses of Action

- Proposed measures will be considered and accepted if eligible. These measures may be initiated by agencies, organizations or individuals.
- Financial and technical assistance may be provided to sponsors in carrying out eligible RC&D measures as shown in the plan of action.
- Provisions have been made for reviewing this program on an annual basis. It will be revised and amended accordingly.
- An annual plan of work will be developed.

Financial help in the form of loans and grants will be requested from federal, state, and local agencies to carry out RC&D measures. Technical assistance will be obtained to plan, design and implement them.

Priorities

Priorities for measure adoption and installation will be determined by the following criteria:

- Will it accelerate the conservation, development and utilization of natural resources.
- Will it improve the general level of economic activity, and enhance the environment.
- Will it conform to overall project objectives.
- What is the interest of the local project sponsors. Do they have leadership ability and resources to carry out their responsibilities.
- What is the economic urgency and the economic feasibility of the project measure.

- What would be the impact on physically deteriorated and economically depressed areas.
- How many people would benefit.

Method of Operation

- Cooperate with The Arizona Council of RC&D's on statewide problems.
- Encourage local groups to consider the needs of their area and submit them as RC&D Measure Proposals.
- Refer new RC&D Measure Proposals to the Measures Review Committee for comments and recommendations.
- Accept or reject the new measure proposals.
- Request technical and financial assistance from appropriate agencies or other organizations.
- Coordinate the development of the measure plans.
- Coordinate implementation.



Arizona Council of RC&D members discussing the program with government representatives.

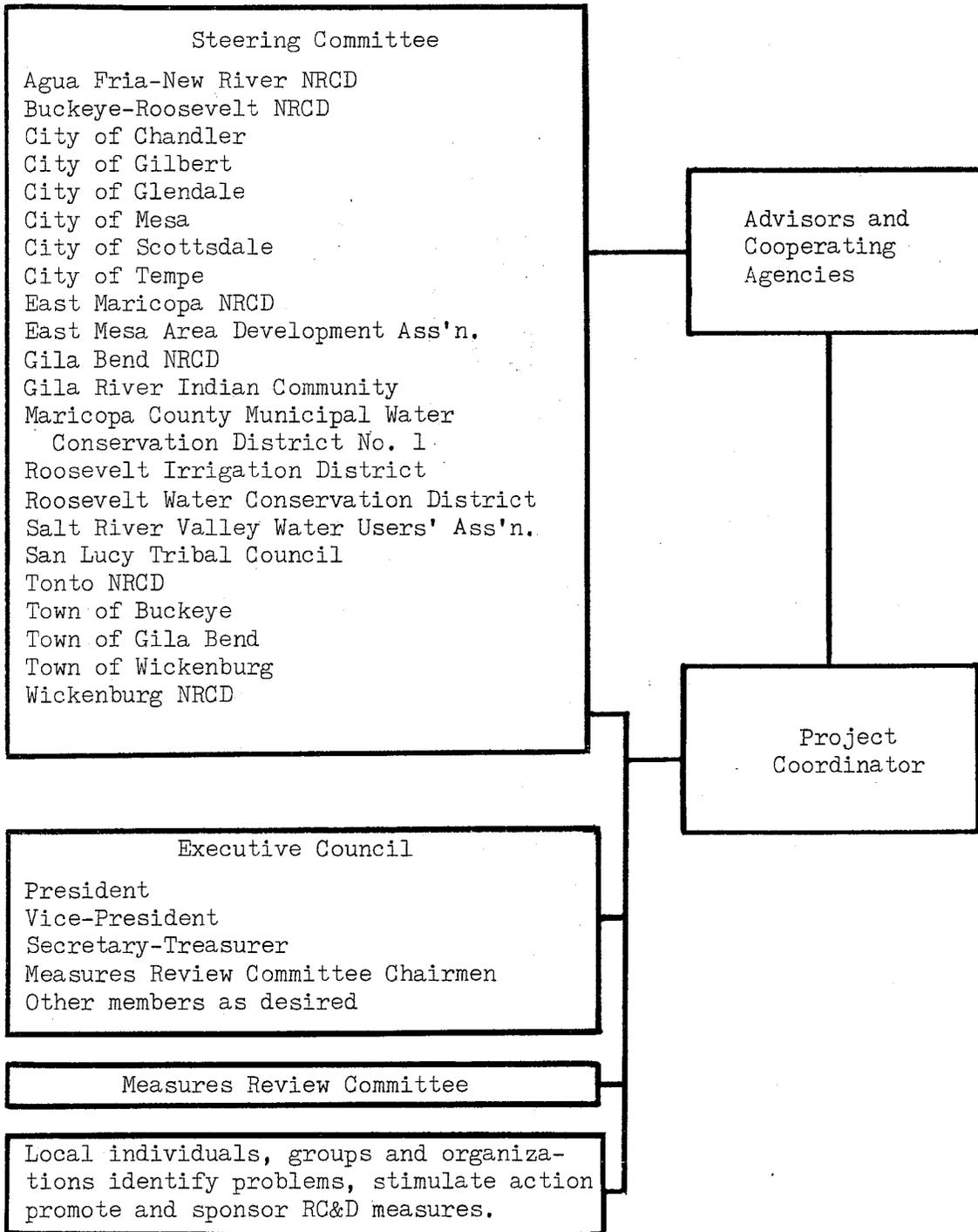
PHOTO COURTESY OF WAYNE KESSLER

Agua Fria-New River Natural Resource Conservation District supervisors discussing a new RC&D Measure Proposal.

PHOTO COURTESY OF WAYNE KESSLER



ORGANIZATION CHART



* NRCD - Natural Resource Conservation District

INTRODUCTION

A resource conservation and development project is defined as a locally initiated, sponsored and directed project. It is designed to carry out a program of land conservation and use, accelerated economic development, and reduced chronic unemployment or under-employment, wherever these activities are needed to foster a sound local economy.

Its basic objectives are:

- To develop, improve, conserve and use the natural resources of the project area, thereby providing employment and other economic opportunities to the people of the area.
- To give local leaders a chance to use all existing related programs in executing the project.
- To effectively plan and carry out the measures necessary to achieve the goals of the project.

Resource conservation and development projects are initiated and carried out by local people with the assistance of agencies of the state, and agencies of the U.S. Department of Agriculture under present program authorizations including that contained in Sections 31 and 32 (e) of Title III of the Bankhead-Jones Farm Tenant Act as amended by Title 1, Section 102 of the Food and Agricultural Act of 1962 (Public Law 87-703) and the Soil Conservation Act of 1935 (Public Law 74-46). Projects will be planned and carried out in areas where there is a need to accelerate the development and utilization of natural resources, improvement of the general level of economic activities, and enhancement of environment and standard of living.

The success of a resource conservation and development project depends on coordinated planning by the sponsors and assistance from state, federal, local agencies, groups, and individuals.

The program concept includes ideas, activities, and program efforts to achieve more prosperous and attractive communities. It is based on the following principles:

1. Prudent use, management, and protection of natural resources, with full consideration of the social and economic benefits to people as a fundamental requirement for improving the quality of life.

2. People can develop and carry out an action-oriented resource conservation and development plan for the betterment of their area, if:
 - a. Attention is given to the orderly development, use and management of resources.
 - b. Local leaders assume responsibility for their area's development.
 - c. Local people learn about their available resources, the various alternatives for their development and use, and the probable consequences of each alternative.
 - d. Local, state, and federal agencies work together to assist the project sponsors, thus enabling them to coordinate available services to meet objectives.
 - e. Local people bring to bear all available political, social, and economic forces to aid in the area's protection, improvement and development.

The Hohokam Resource Conservation and Development Project can be the catalytic agent that leads to increased participation of local people in shaping their future. It can result in larger investments for improvement and growth by private interests, and by local, state and federal agencies.

Initiative and leadership in all phases of RC&D project activities is a responsibility of the local people that cannot be assumed by others. Projects are initiated by conservation district governing bodies, county boards of supervisors, irrigation districts, cities, towns and other similar groups.

The Hohokam RC&D Project is composed of, and sponsored by, six natural resource conservation districts, nine cities and towns, four irrigation districts, two Indian reservations, and an area development association; they solicit assistance from any and all other interested organizations.

LOCATION and SETTING

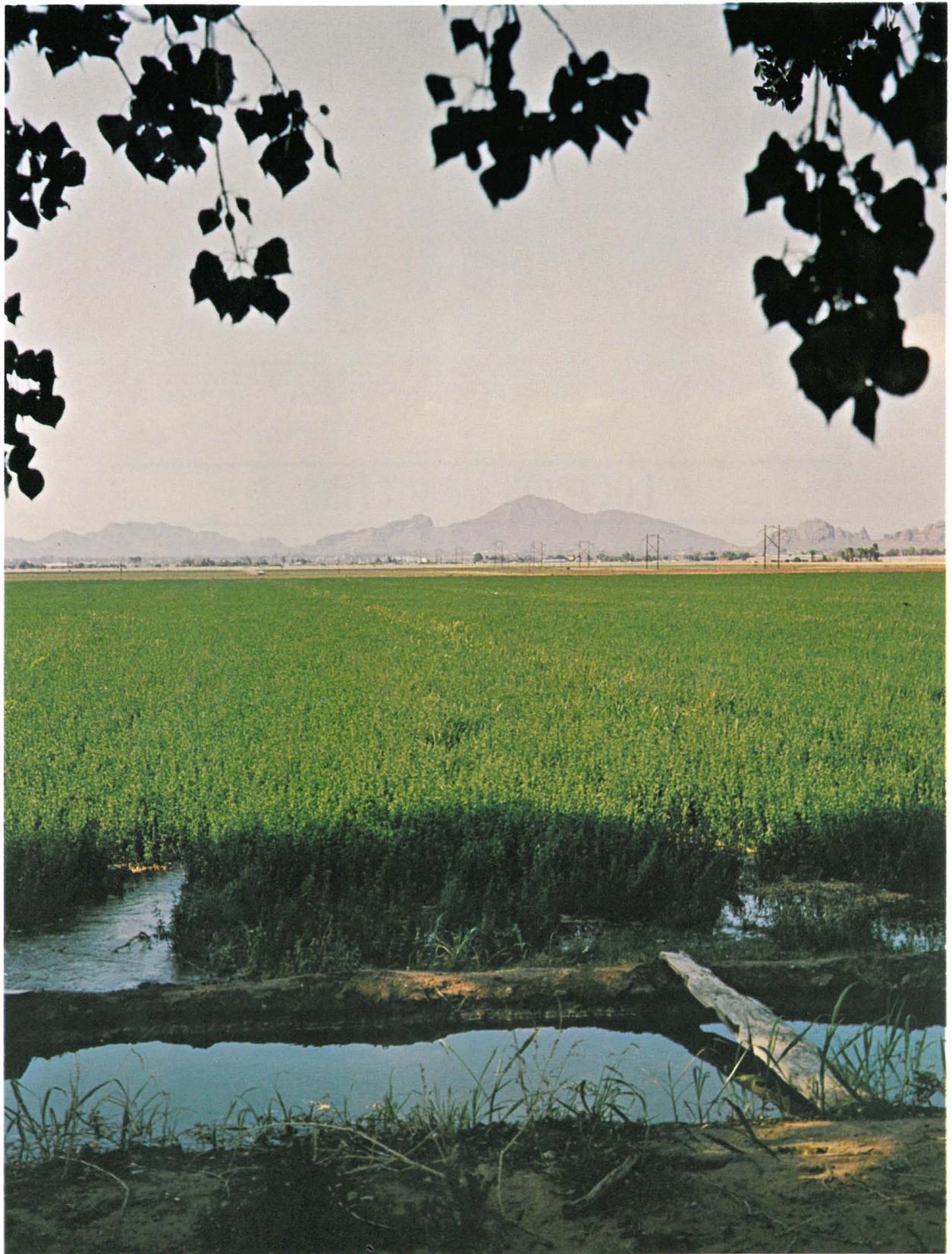


Photo: Salt River Project

LOCATION and SETTING

The Hohokam Resource Conservation and Development Project takes its name from an ancient civilization that flourished in central Arizona and mysteriously disappeared about six centuries ago.

The Hohokam Resource Conservation and Development Project is located in south central Arizona. It includes 5,904,640 acres in Maricopa County and 283,332 acres in Pinal County, as shown on the Project Map at the end of this section.

The project area is one of the fastest growing areas in the United States. The present population is in excess of one million people.

Even though the project area is largely desert, the northeastern portion borders on the largest Ponderosa Pine forest in the world.

The project area includes Arizona's capitol, Phoenix, which has a population of approximately 600,000. It also includes the cities of Glendale, Chandler, Mesa, Tempe, Gilbert, Scottsdale, Gila Bend, Wickenburg and Buckeye, all of which are project sponsors.

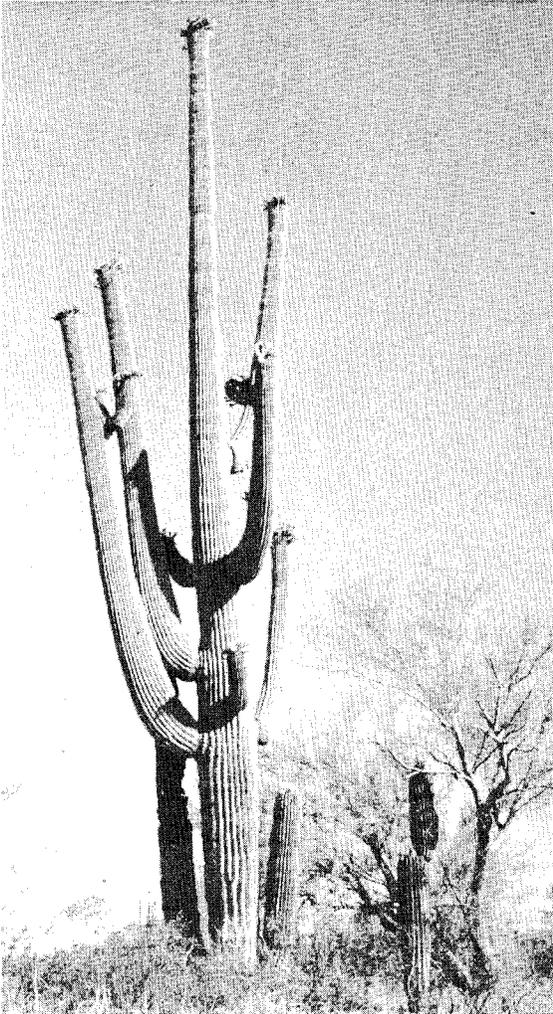
Irrigation water is furnished to the cropland by several large irrigation districts, most of which are discussed in the "Water" section of this Program of Action. Four of the major irrigation districts are project sponsors. They are the Salt River Valley Water Users' Ass'n., Roosevelt Water Conservation District, Maricopa County Municipal Water Conservation District No. 1, and the Roosevelt Irrigation District.

The project includes several Indian Reservations which are extremely progressive. Two of them, the Gila River Indian Community and the San Lucy Tribal Council, are project sponsors.

The area is developing rapidly and one of its leading development associations, the East Mesa Area Development Ass'n., is a project sponsor.

The project area includes six natural resource conservation districts, all of which are project sponsors. They are the Agua Fria-New River, East Maricopa, Wickenburg, Gila Bend, Tonto and the Buckeye-Roosevelt.

These districts have long been involved in resource development and welcomed a chance to band together with cities, towns and other organizations with similar interests to form the Hohokam Resource Conservation and Development Project.



Arizona Desert View. SCS PHOTO 2-5249

Various nomadic Indian tribes inhabited the areas now known as Arizona and Maricopa County from as early as 9,000 B.C. Very little is known as to who these ancient people were, where they were going, or what they carried with them.

The first known permanent dwellers in the project area were the canal builders or the Hohokam Indians. It is now believed that the Hohokam Indians settled in central Maricopa County about two thousand years ago. At the earliest stages of their occupancy they lived in small farming villages. Their dwellings evolved from pit houses, to structures built above ground, to concentrated villages which were eventually walled.

Extensive irrigation works were developed over a period of time, which may have been nearly thirteen centuries. The largest of these canals was thirty feet wide and seven feet deep. There were over 125 miles of these canals. Sometime during the 1300's the Hohokam abandoned their fields and villages. It remains a mystery why they left and what became of these ingenious people.

The territory now known as Arizona was claimed by the Spanish Crown from 1540 to 1821. Spanish explorers crossed Arizona several times. Friar Marcos de Niza in 1539, De Niza in 1540, Coronado with De Niza in 1540, Pedro de Tovar in 1541, Lopez de Gardenos in 1542, Hermando de Alarcon in the same period.

Starting in 1692, Father Kino established 24 missions during the next 24 years. Only three of the missions, Quevavi, Tumacacori, and San Xavier Del Bac, were in full operation at the time of his death in 1711. There were still no settlements in the area now known as Maricopa County.

Mission activity was continuous from 1692 until 1827 when Mexico expelled the Franciscan Order and the Mission era came to an end.

Intensive settlement of Maricopa County did not commence until after the formation of Arizona Territory in 1863, and the end of the Civil War in 1866. Stage, wagon, and freight routes were opened during the period, and by 1867 farms were developing along the Salt and Gila Rivers.

By 1877, Phoenix, the county seat, was described as, "Six or more stores, a good public school, a public library of 250 volumes. The houses are nearly all constructed of adobe.....lumber being expensivestreets are wide and lined by cottonwoods and other trees". Tempe was described as, "A flour mill and large store buildings, with a half dozen dwellings---".

Maricopa County has come to be a complex area of urban and rural development exceeding one million in population.

Most of the area is desert. It is the home of many kinds of wild-life including Diamondback rattlesnakes, Gila monsters, mountain lions, coyotes, Desert Mule deer, Desert Bighorn sheep and many species of birds. It is a beautiful place if you understand and respect it. It can be unbelievably cruel to people who do not know its ways.



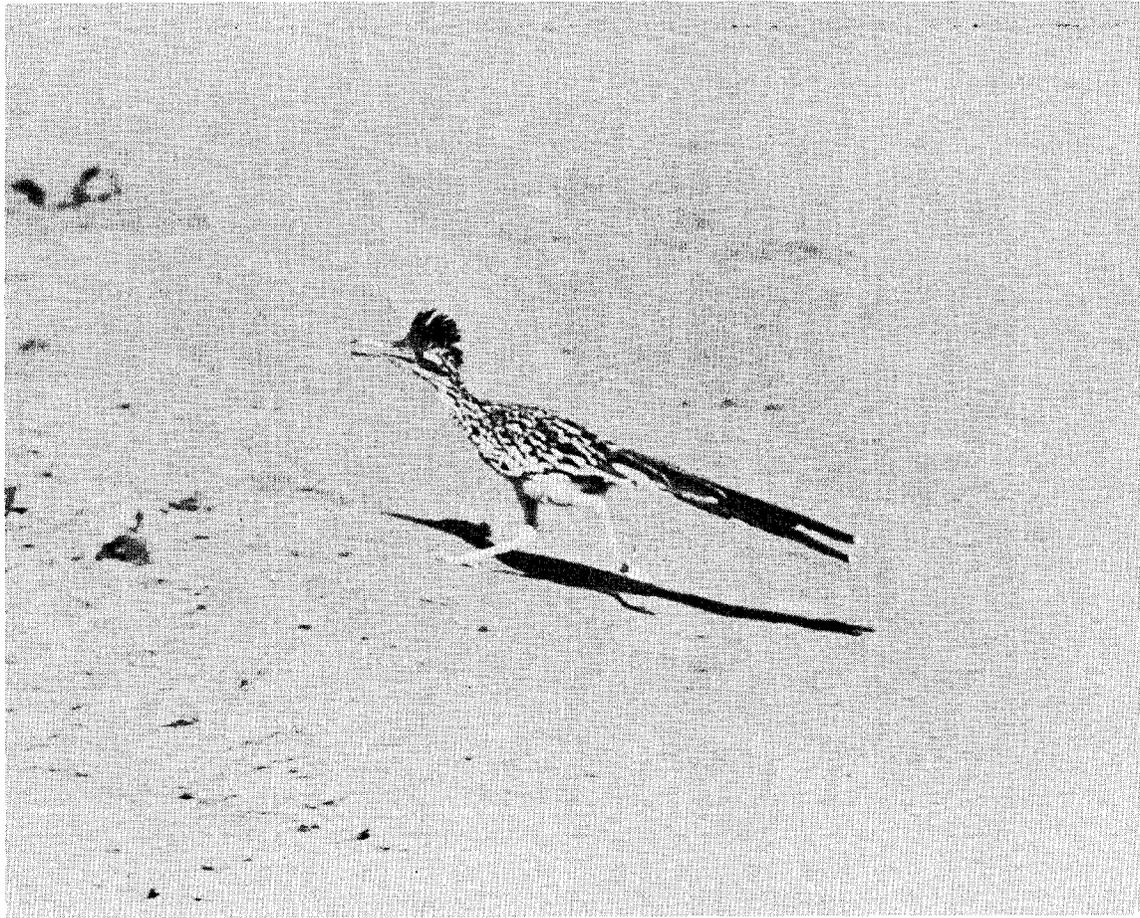
Dendora Valley Pony Express
Stop west of Gila Bend, Arizona,

SCS PHOTO

Diamondback Rattlesnake.

SCS PHOTO





Roadrunner

ARIZONA GAME AND FISH DEPT. PHOTO

Many plants live comfortably in the desert heat. These include the giant saguaro cactus, Joshua trees, mesquite trees, ironwood trees, palo verde trees and many perennial grasses and shrubs.

There are 18 incorporated cities and towns in the Hohokam RC&D project area and numerous unincorporated towns. The people have not adapted to the weather as much as they have adapted their environment to suit them by modern refrigeration and heating.

Several Indian reservations are included within the boundaries of the Hohokam RC&D Project. They are the Fort McDowell, Gila Bend, Gila River, Salt River and a part of the Papago Indian Reservation, with a population in excess of 11,607, and an area of more than 700 square miles.

The major sources of income for the Hohokam RC&D Project residents are from wholesale suppliers, retail outlets, finance and consumer services, manufacturing, construction, transportation, utilities, agriculture and tourism.

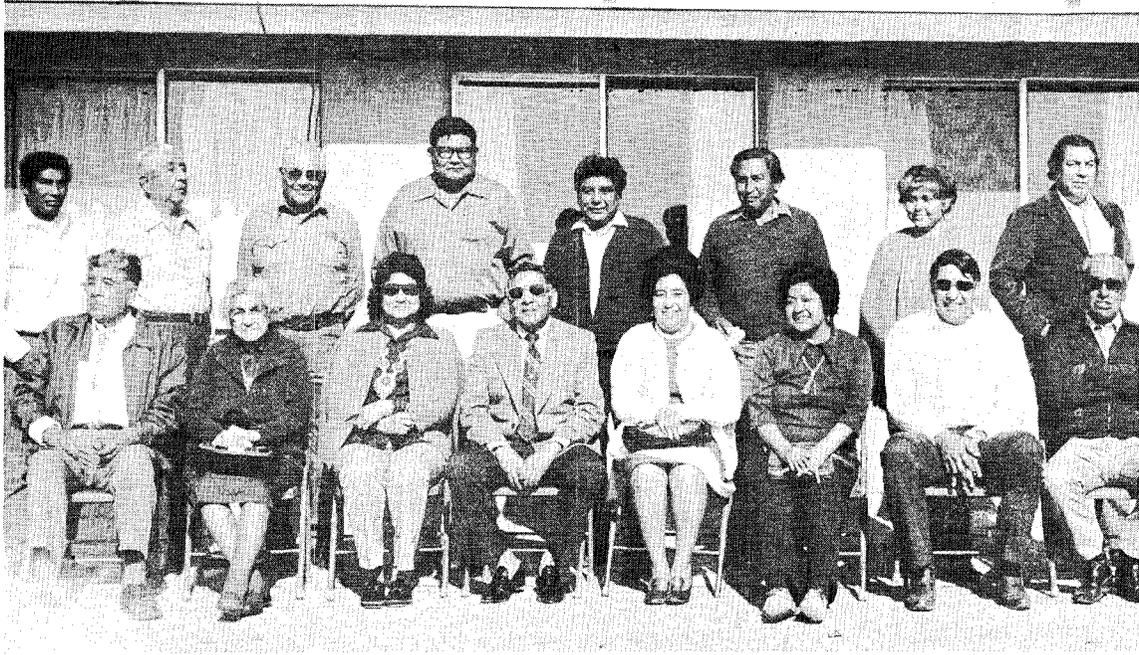
Social life varies from the extremely wealthy "Jet Set" to the migrant farm laborer, and all the human problems of race, poverty and affluence are present.

The intelligent development and wise use of all resources, human as well as natural, is essential to the continued well-being of this unique area. To this end the Hohokam Resource Conservation and Development Project is dedicated.



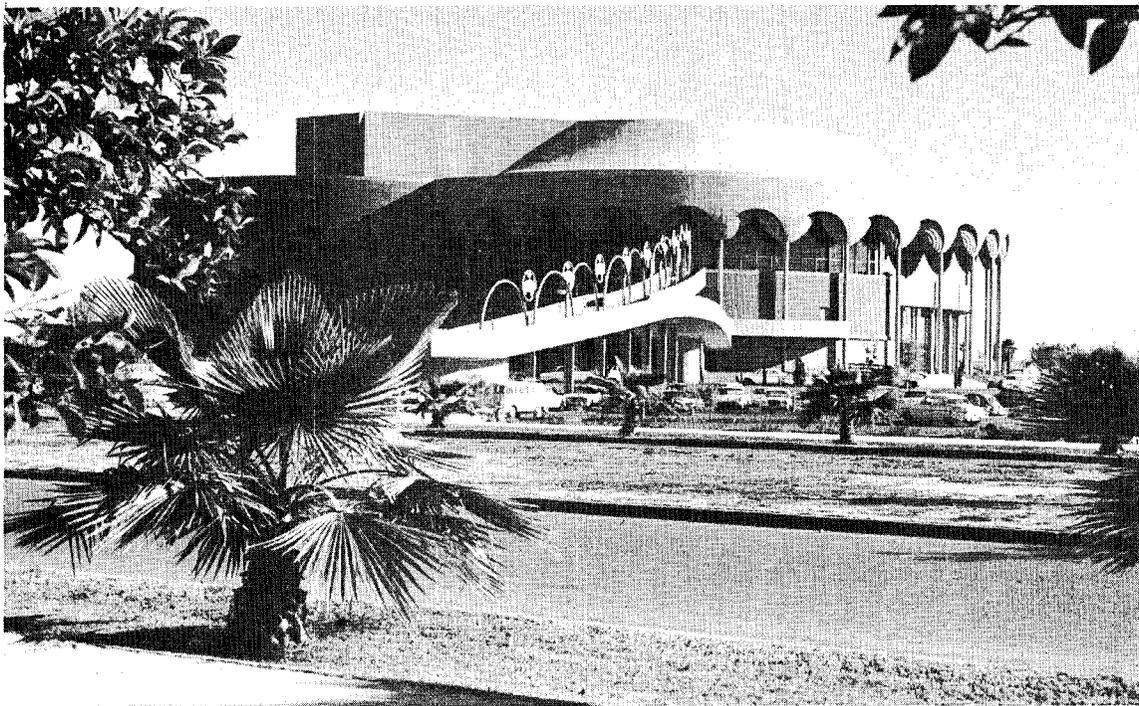
Arizona
State Capitol Building

SCS PHOTO



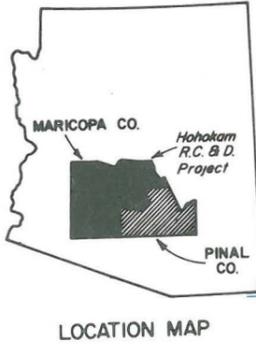
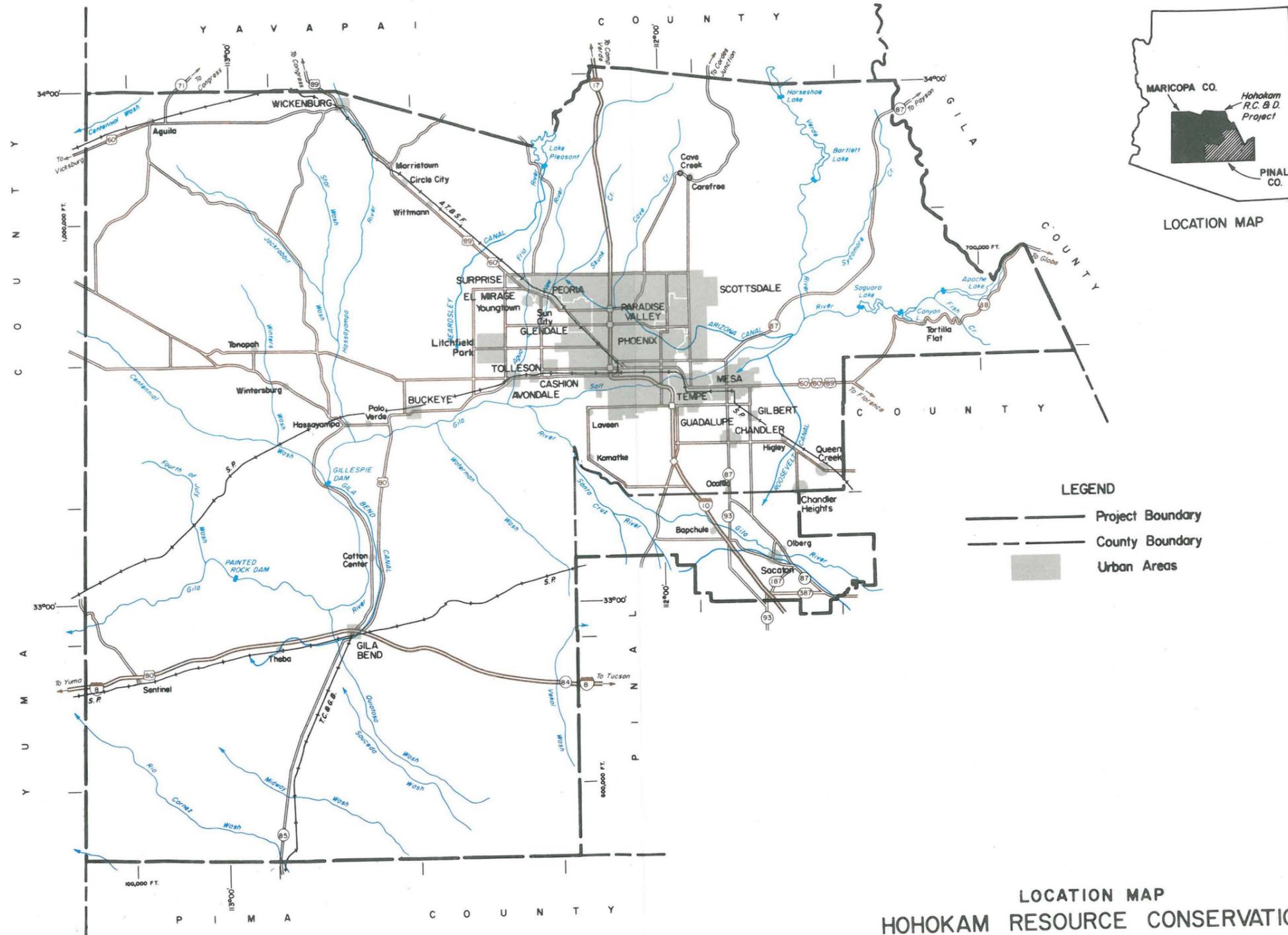
Governor Alexander Lewis and the Gila River Indian Community Tribal Council, Sacaton, Arizona, one of the Hohokam RC&D sponsoring organizations

LAND OPERATIONS, BUREAU OF INDIAN AFFAIRS PHOTO



Grady Gamage Auditorium, nationally known cultural center, at Arizona State University, Tempe, Arizona

ARIZONA STATE UNIVERSITY PHOTO



LEGEND

- Project Boundary
- - - County Boundary
- Urban Areas

**LOCATION MAP
HOHOKAM RESOURCE CONSERVATION
AND DEVELOPMENT PROJECT
MARICOPA AND PINAL COUNTIES, ARIZONA**

JANUARY 1974
SCALE 1:1,000,000



ARIZONA STATE PLANE COORDINATE SYSTEM,
CENTRAL ZONE, 100,000 FOOT GRID.

PEOPLE



Photo: Arizona Farmer-Ranchman

PEOPLE - SOCIO -ECONOMIC

The Hohokam RC&D Project area is a fast growing area as a result of migration from other states. These people are seeking more opportunities for employment and a better way of life.

The leading industries in the Hohokam area are manufacturing, agriculture, wholesale and retail trade (regional and national headquarters for several companies). Education is a very important factor in the area's economy, as the largest university, Arizona State, is located in Tempe, Arizona. In addition, the fifth largest community college district in the United States is located in the project area.

Population

The population for Maricopa County was estimated to be 1,058,000 in 1972, or a 46 percent increase over the 663,510 reported in 1960. The project area has approximately 55 percent of the total state population.

The Indian population on reservations varies since some leave and others return. The approximate number of residents and the size of the reservations are:

<u>Reservation</u>	<u>Population</u>	<u>Area in Square Miles</u>
Fort McDowell	345	39
Gila Bend	470	16
Gila River	8,320	581
Salt River	<u>2,470</u>	<u>73</u>
TOTAL	11,605	709

The number of people of Spanish heritage was about 79,000 in 1960 and over 140,000 by 1970.

Nearly 10 percent of the total population is sixty-five years of age or older; slightly less than fifty percent are in the working age class, 20 to 60; and nearly twenty percent are ten years of age or younger. This is illustrated in Figure 1, "Population in Maricopa County by Age Class - 1970."

Ethnic groups and population are shown in Figure 2, "Breakdown of Population in Maricopa County - 1970." The occupations of the workers are shown in Figure 3, "Employment by Occupational Groups, Maricopa County - 1970." The major occupations are managers and administrators, professionals and technicians, clerical, sales, operatives, craftsmen, and service.

Total employment was estimated to be 386,200 in 1971. The wholesale and retail trade industry leads in employment with 84,700 or 22 percent of the total. Figure 4 illustrates the employment picture by industry in the RC&D project area. The unemployment rate was 4.5 percent (average 1971) or about 18,200.

The metropolitan area around Phoenix has had exceptional increases in population as shown for several cities in the table below and in Figure 5.

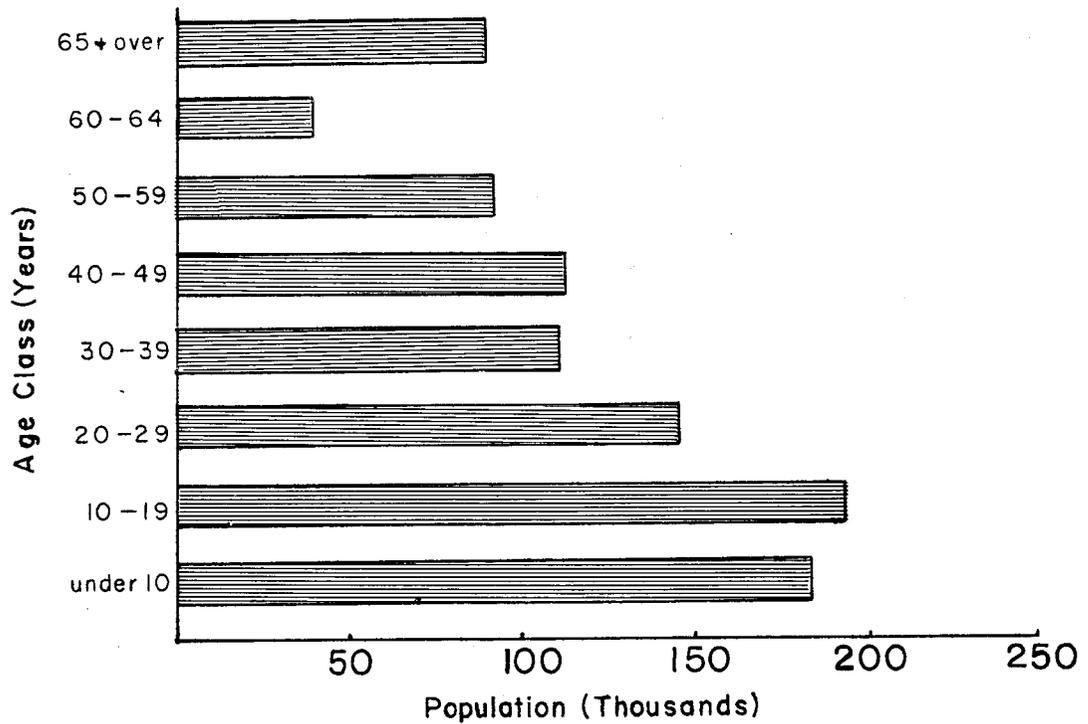
POPULATION AND INCOME CHARACTERISTICS

	<u>Phoenix</u>	<u>Mesa</u>	<u>Scottsdale</u>	<u>Glendale</u>
1970	582,500	62,853	67,823	36,228
1960	439,170	33,772	10,026	15,893
% Increase 1960-1970	32.4%	86.1%	576.5%	127.9%
Median Family Income	\$9,956	\$9,633	\$12,726	\$9,233

The following table shows the industry payroll and number of establishments in the Hohokam Resource Conservation and Development Project area for 1971.

<u>Industry</u>	<u>First Quarter Payroll</u>	<u>Number of Establishments</u>
Agriculture	\$2,571,000	247
Mining	438,000	28
Construction	57,683,000	1,679
Manufacturing	141,158,000	1,107
Transportation and Utilities	35,163,000	331
Wholesale and Retail Trade	109,939,000	5,543
Finance, Insurance and Real Estate	43,528,000	1,503
Services	78,202,000	5,701
Unclassified	<u>2,028,000</u>	<u>325</u>
TOTAL	\$470,710,000	16,464

POPULATION IN MARICOPA COUNTY
BY AGE CLASS - 1970

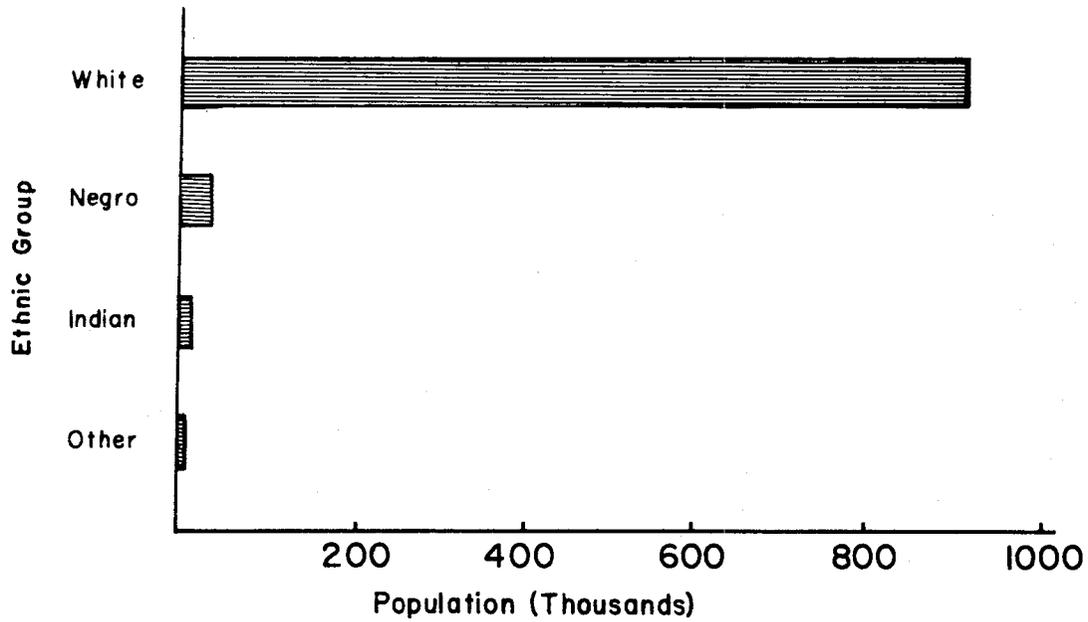


<u>Age</u>	<u>Population</u>
Under 10	183,801
10-19	194,334
20-29	145,027
30-39	110,303
40-49	112,016
50-59	92,591
60-64	39,106
65 & Over	90,334
Not Allocated	1,903
Total Population	969,425

Source: U.S. Bureau of the Census

Figure 1

BREAKDOWN OF POPULATION
IN MARICOPA COUNTY — 1970

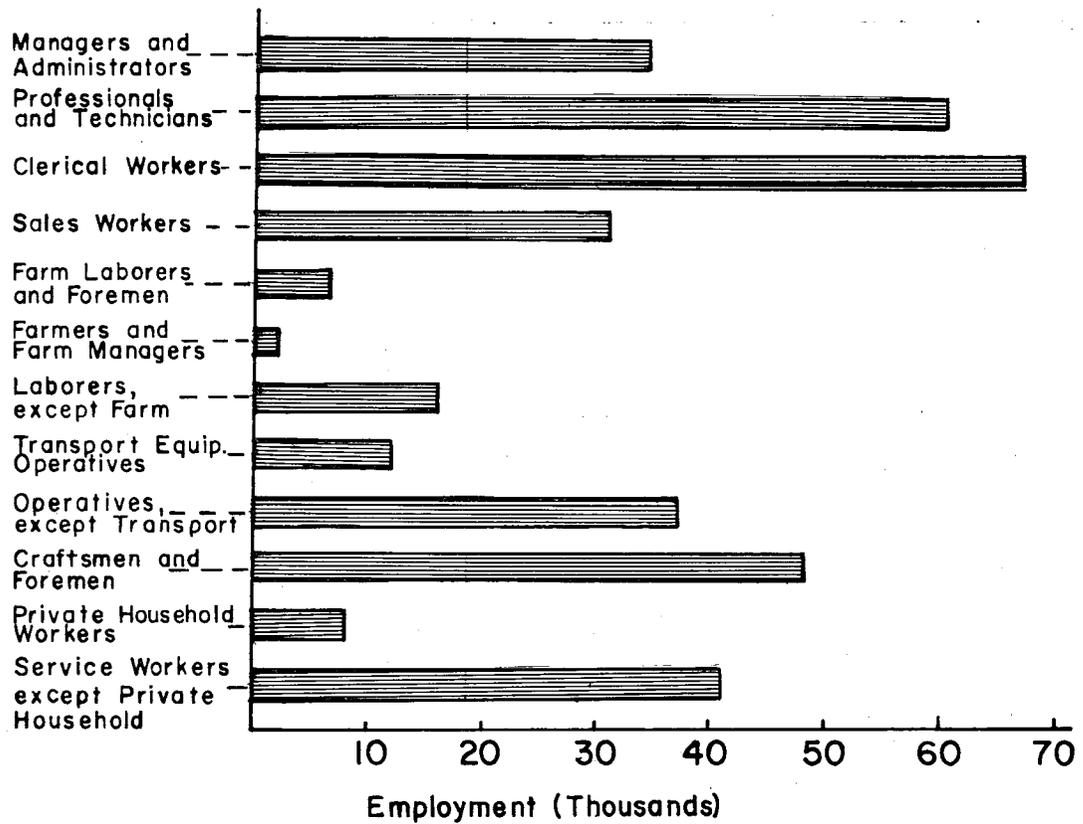


<u>Ethnic Group</u>	<u>1970 Population</u>
White	916,314
Negro	32,905
Indian	11,170
Other	9,036

Source: U.S. Bureau of the Census

Figure 2

EMPLOYMENT BY OCCUPATIONAL GROUP IN MARICOPA COUNTY — 1970

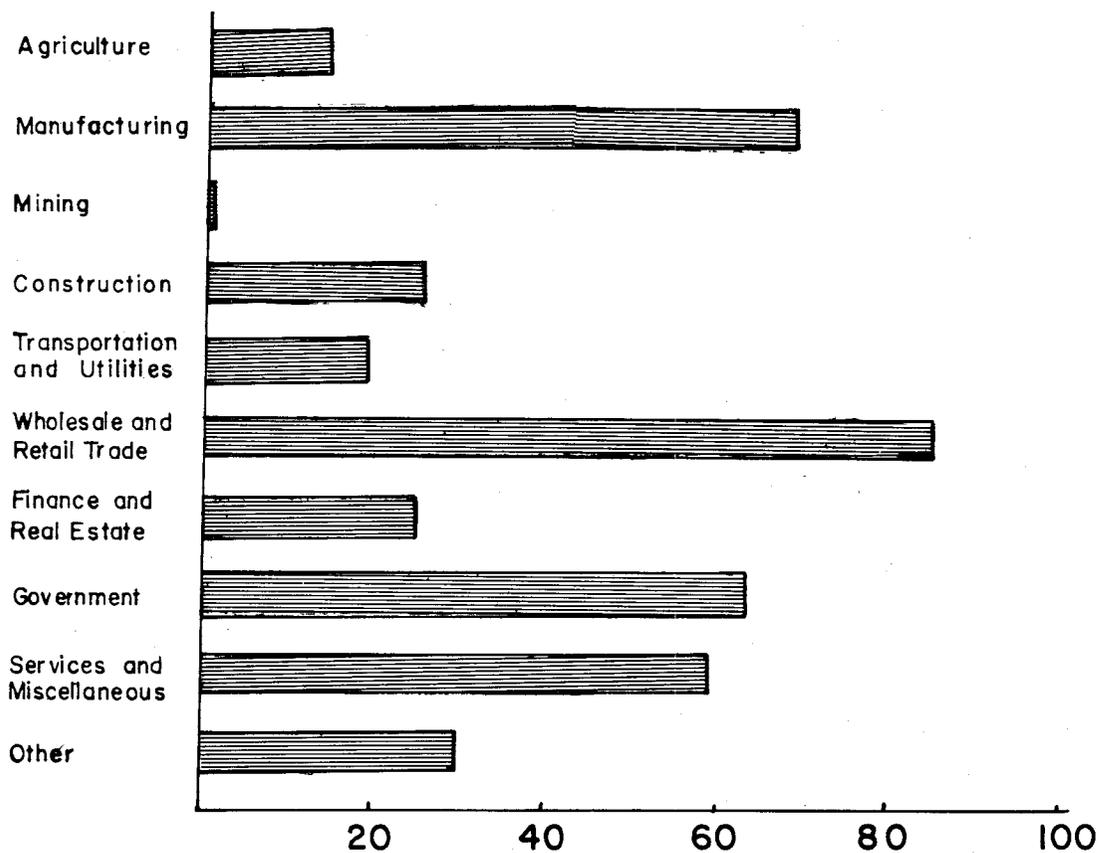


Occupational Group	Employment
Managers and Administrators	34,545
Professionals and Technicians	60,745
Clerical Workers	67,012
Sales Workers	31,162
Farm Laborers and Foremen	6,872
Farmers and Farm Managers	1,935
Laborers, except Farm	16,348
Transport Equipment Operatives	12,428
Operatives, except Transport	37,474
Craftsmen and Foremen	48,345
Private Household Workers	4,149
Service Workers, except private household	41,141
Total Employment	362,156

Source: U.S. Bureau of the Census

Figure 3

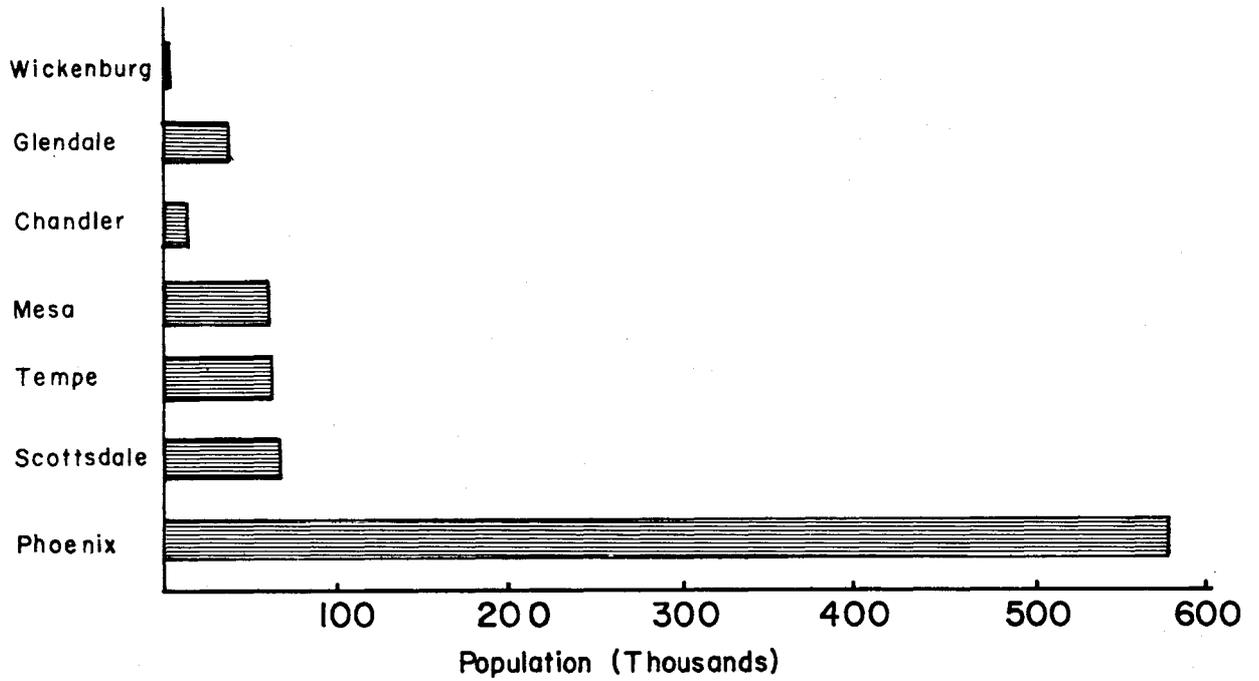
**1971 AVERAGE ANNUAL EMPLOYMENT
BY INDUSTRY IN MARICOPA COUNTY**



INDUSTRY	EMPLOYMENT
Agriculture	13,800
Manufacturing	68,200
Mining	400
Construction	25,000
Transportation and Utilities	18,400
Wholesale and Retail Trade	84,700
Finance and Real Estate Trade	24,700
Government	63,100
Services and Miscellaneous	58,900
Other	29,000
TOTAL EMPLOYMENT	386,200

Source: Employment Security Commission of Arizona (Figure 4)

POPULATION OF CITIES WITHIN
MARICOPA COUNTY — 1970

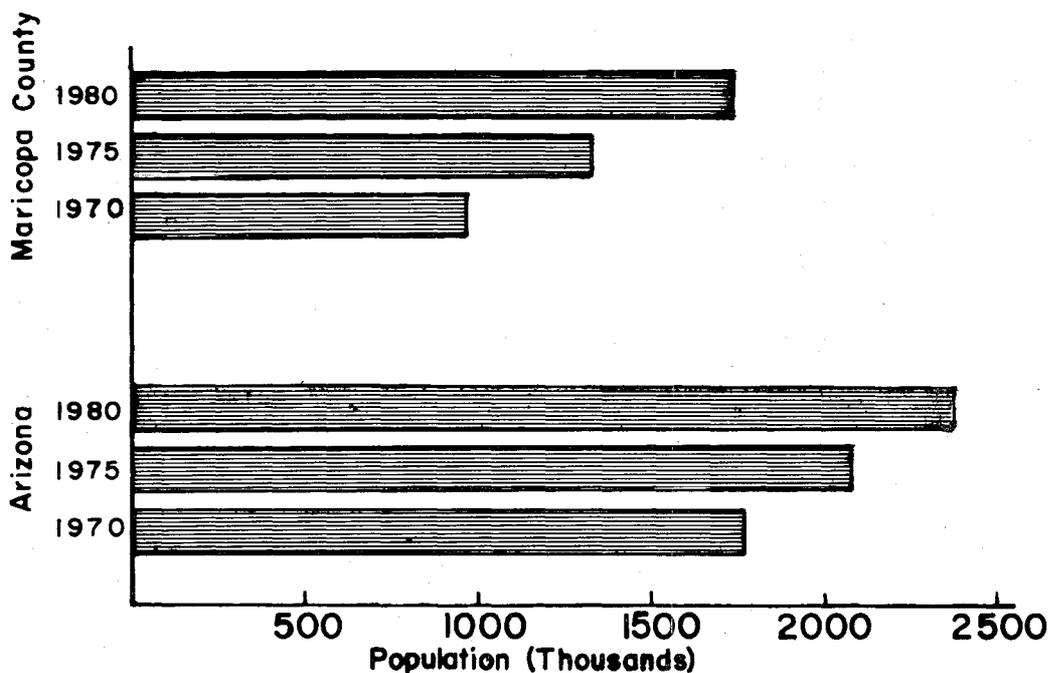


<u>City</u>	<u>Population</u>
Phoenix	582,500
Scottsdale	67,823
Tempe	63,550
Mesa	62,853
Chandler	13,763
Glendale	36,228
Wickenburg	2,698

Source: U.S. Bureau of the Census

Figure 5

POPULATION PROJECTIONS—1975 AND 1980



	<u>1970 Census</u>	<u>1975 Projection</u>	<u>1980 Projection</u>	<u>% Change 1970-80 Projection</u>
* Arizona State Total	1,773,428	2,081,500	2,381,500	+ 34.3
** Maricopa County	969,425	1,362,000	1,713,000	+ 76.7

* Source: U.S. Bureau of the Census, Arizona Department of Economic Planning and Development.

** Source: U.S. Bureau of the Census, Maricopa Association of Governments.

Figure 6

Trends

The increase in population from 1960 to 1970 varied from a 33 percent increase for Phoenix to a 576 percent increase for Scottsdale. Population growth is projected in Figure 6 and in the table below:

1975 AND 1980 POPULATION PROJECTIONS

	<u>1970 Census</u>	<u>1975 Projection</u>	<u>1980 Projection</u>	<u>Change 1970-80 Projection</u>
United States	203,235,298	214,833,000	226,934,000	+11.7%
Arizona - State	1,773,428	2,081,500	2,381,500	+34.3%
Maricopa County*	969,425	1,362,000	1,713,000	+76.7%

Many industries will be expanding to meet the needs of the growing population. Construction of homes, schools, and businesses will continue, as will the complementary services of the construction industry. Agriculture will continue to be an important part of the area's economy, but of lesser importance due to expanding urban development and the increasing importance of the manufacturing and tourist industries.

Questionnaires concerning environmental problems were distributed to local leaders for their response.

The questions were very general in nature, in an attempt to get a picture of the local problems as the residents viewed them.

The respondents generally agreed on the choices they made as follows:

----- More attention was needed in the conservation and development of natural resources in the following order: ground water, green belts, air, land, scenic attractions, vegetation, lakes and streams, fish and wildlife, forests, and minerals.

----- Potential benefits to the community from a list of economic development opportunities were in this general order: local business development, industrial parks, manufacturing industry, recreation, residential development, tourism, land development, highway service, retirement facilities, specialized agriculture, food processing, feed lots, and mining.

* Information developed by Maricopa Association of Governments.

---- "Which of the following community services are deficient in your area?", was answered in this general order: flood control and local public transportation with pollution control and fire protection next. Of intermediate deficiency were hospitals and clinics, postal, hotel and motel accommodations, solid waste disposal, telephone service, medical and education. Of lesser deficiency were sewer, small item repairs, zoning, banking, and 24-hour information service.

---- Types of recreation most needed with the greatest benefit to the community were listed in this general order: community parks, teen recreation centers and bicycle trails, picnic facilities, additional wilderness areas, movies, regulated dunebugging and motorcycling, fishing, swimming, camping, boating, hiking, and hunting.

More than 80 percent of those responding indicated the need for more detailed plans for future development.

Problems

- There is insufficient employment opportunities for all components of the population.
- Housing shortages are developing in the low and middle income brackets.
- Incoming workers do not have the skills required by local industries.
- Migrant farm laborers lack sufficient education and training to secure full-time employment.

Opportunities

- Cooperate with other organizations interested in bringing new industry to rural areas in order to furnish more employment opportunities.
- Cooperate with employment organizations in developing training programs that will enable local people to become skilled enough to qualify for new employment.
- Assist in coordinating efforts of agencies and organizations to match human skills with employment needs.

ORGANIZATIONS and INSTITUTIONS

Many governmental agencies and local organizations are deeply concerned with the use of natural resources. Most of them are actively cooperating in the RC&D program and are listed in the Acknowledgement section.

The planning, development, and management of federal lands is carried out by the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Bureau of Reclamation, National Park Service, Bureau of Sport Fisheries and Wildlife, and the Corps of Engineers.

The State Land Department administers most of the state-owned lands. It has a Division of Natural Resource Conservation that supervises the natural resource conservation district operations and provides program planning assistance.

Natural resource conservation districts cover the entire Hohokam RC&D Project area. They are legal subdivisions of the state and are governed by locally elected officials who serve without pay. The districts have action programs that assist the land users in applying conservation practices on their lands. They also work closely with the U.S. Department of Agriculture and other governmental organizations in solving natural resource problems.

The Soil Conservation Service of the U.S. Department of Agriculture has agreements with the natural resource conservation districts, whereby technical assistance is furnished to the land users in the development and application of conservation plans.

These plans generally call for land leveling, ditch lining, irrigation water management, and conservation cropping systems on the irrigated lands.

Plans on rangelands deal with the proper management of range vegetation through planned grazing systems, proper grazing use, and the construction of livestock water facilities.

The Soil Conservation Service also works with local units of government in the planning and construction of flood control projects, which are generally financed through Public Law 566 authorities, but may also be constructed with RC&D funds. All costs for easements, rights-of-way and other non-flood control costs are borne by the local sponsors.

The Farmers Home Administration makes loans to farmers and families of low and moderate income in rural communities. It also provides financial assistance for the development of essential public services to rural cities and towns.

The FHA has twenty major loan programs which are divided into four major categories as follows:

- Rural Housing Program: This includes home ownership loans, rental and cooperative housing loans, repair and rehabilitation housing loans, and farm labor housing loans.
- Community Service Loans: Included in this group are water and waste disposal loans and grants, watershed loans for flood protection, irrigation and drainage loans, and resource conservation and development loans.
- Farmers' program loans include farm ownership loans, farm operating loans, and soil and water conservation loans.
- Business and industry loans are available to small businesses and industries located in rural areas.

The RC&D Project sponsors are very concerned about the rapid growth of the area and the misuse of the natural resources.

The Hohokam RC&D Project is a coordinating organization working with federal, state, and local units of government to bring about the proper use of the area's resources. It may share the cost of measures dealing with water-based recreation, flood control, critical area seeding, irrigation system improvement and other resource related measures.

Maricopa County administers approximately 100,000 acres for parks and other recreational uses.

The State Game and Fish Department administers several tracts of land and manages the wildlife in the area.

Other organizations carry out various activities: The Federal Cooperative Extension Service has a broad education and information program. Arizona Sub-State Planning and Development District I is engaged in comprehensive planning and has nearly the same boundaries

as the Hohokam RC&D Project area. The Arizona Office of Economic Planning and Development and the Maricopa Association of Governments are designated as the clearinghouses for local development projects.

The Hohokam RC&D Project and the Maricopa Association of Governments are presently discussing more formalized liaison arrangements in relation to the goals and objectives of each agency in inter-agency cooperation. There has been a healthy dialogue on an informal basis as evidenced by the cooperation in development of a recommended five-year capital improvements program for flood control which was transmitted to the Flood Control District of Maricopa County.



Left to right, Governor Jack Williams and Salt River Project President, Karl Abel, at an Arizona Association of Conservation Districts Annual Convention.

SCS PHOTO

CLIMATE



Photo: Salt River Project

CLIMATE

The sun always shines on the Hohokam Resource Conservation and Development Project area - that is, almost always. There are about 300 days of sunshine every year. This is over 80 percent of all the possible sunshine.

The excellent climate is one of the most important resources. It is one of the many attractions that bring thousands of new Arizonans to the area each year.

Spring and fall in the desert areas are mild and beautiful. Sunshine and blue skies dominate the daytime hours and humidity is very low. Temperatures are just about perfect with warm sunny days and refreshingly cool evenings.



SCS PHOTO

Summers are hot, no question about it! Temperatures commonly go up to 110° and above during June, July, and August. However, temperature readings are misleading in desert climates, since the low humidity makes one feel much more comfortable than the temperature might suggest.

More visitors each year are discovering the pleasures of summer vacations here as they find the truth in the old saying, "It isn't the heat that bothers you, it's the humidity." Of course, the fact that nearly everything is air-conditioned helps a lot, and so do the many swimming pools found in almost every hotel, motel, and in many private homes.

The climate of the Hohokam RC&D Project area is primarily of a desert type, with very low annual rainfall. The mean annual precipitation over most of the area is less than 10", but varies from about 6" in the southwestern corner, to slightly over 30" in the Mazatzal Mountains in the northeastern corner.

Daytime temperatures throughout the summer months are normally high, but winters are usually mild. Nighttime temperatures frequently drop below freezing during the three coldest months, December, January, and February, but afternoons are usually sunny and mild.

The average daytime relative humidity is approximately 30 percent.

There are two separate rainfall seasons. The first occurs during the winter season from November to March, when the area is subjected to storms from the Pacific Ocean.

The second rainy season occurs in July, August, and part of September when the area has widespread thunderstorm activity, associated with moist air moving into Arizona from the south. These storms are extremely variable in intensity and location, and some of the heaviest amounts of precipitation observed in a short period of time occurred during these months.

Table 1 shows the precipitation during the 100-year frequency storms in the Phoenix area for various lengths of time.

TABLE 1

<u>Duration</u>	<u>Inches</u>
One hour	2.66
Three hours	2.97
Six hours	3.35
Twelve hours	3.69
Twenty-four hours	4.04

The above table indicates that one can expect 2.66 inches of precipitation to fall in a one-hour period in the Phoenix area, once in about 100 years. During the Phoenix storm of June 22, 1972, 5.25 inches fell in two hours.

The Hohokam RC&D area has an extremely wide variation of temperatures. The average date of the first occurrence of at least 100° is May 17. The daytime temperature will remain 100° or more until the latter part of September.

Because we have high temperatures, we also have high evaporation rates. The mean annual lake evaporation for the area as a whole is about 71 inches. A maximum amount of about 75 inches per year occurs in the southwestern corner, decreasing in a northeasterly direction across the country to a minimum value of 64 inches per year in the northeastern corner.

The "growing season" is defined as the length of time between the last occurrence of 32° in the spring, and the first occurrence in the fall. The mean dates of first minimum temperature of 32° (or lower) in the fall, and the last such temperature in the spring is shown for a number of stations in the area in Table 2. The mean length of the growing season in days is also listed.

TABLE 2

Station	First	Last	Growing Season Mean Length (days)
Aguila	Nov. 15	Mar. 30	230
Buckeye	Nov. 17	Mar. 10	252
Chandler Heights	Dec. 2	Feb. 28	277
Gila Bend	Dec. 1	Mar. 1	275
Litchfield Park	Nov. 23	Feb. 26	270
Phoenix Airport	Dec. 6	Feb. 14	295
Wickenburg	Nov. 15	Mar. 24	236

GEOLOGY

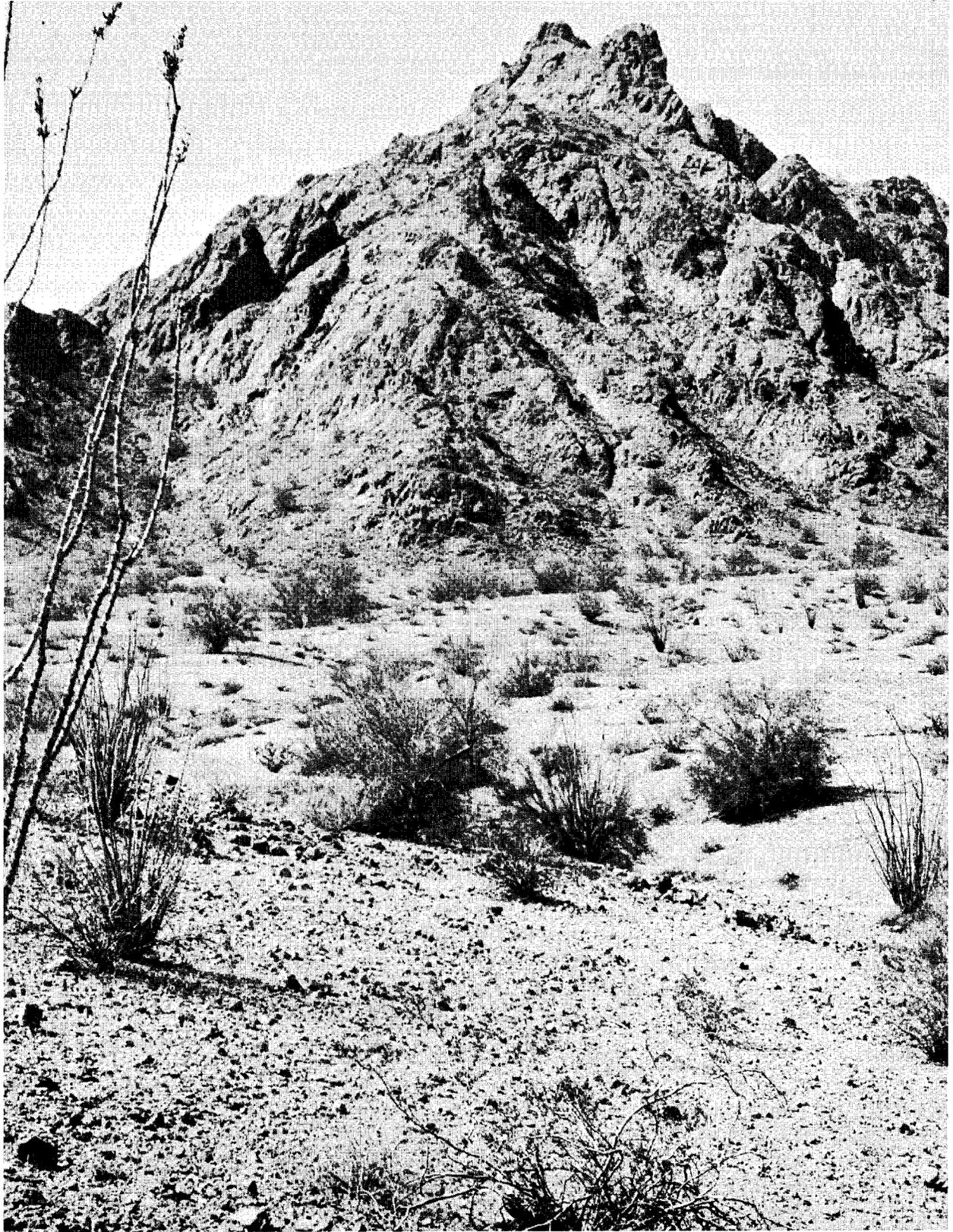


Photo: Soil Conservation Service

GEOLOGY

The Hohokam RC&D Project area lies entirely within the Basin and Range Physiographic Province. The area is within the Desert Region of the Province except for northeastern Maricopa County where the Mountain Region extends from the north into the project area. This is a land of dramatic terrain where solitary mountains stand stark against the horizon. The Desert Region has a general slope toward the south and west and is characterized by broad, gently sloping alluvial valleys separated by short, sharply carved northwest trending mountain ranges rising abruptly out of the desert.

Increasing aridity toward the west and southwest has influenced the erosive processes such that the topography of the mountains becomes progressively sharper and more rugged in the same direction. Some of the better known ranges are the McDowell, Salt River, Hieroglyphic, Sierra Estrella, White Tank, Vulture, Big Horn, Harquahala, Gila Bend, Maricopa, Sand Tank, Saucedo, and Crater Mountains.

Past volcanic eruptions are clearly marked along the southwestern margin of the project area where lava and ash issued from a now extinct crater in the Crater Mountains. Later, great upheavals breaking and thrusting blocks of the earth's crust upward, and subsequent erosion have resulted in the present unusual shapes within the range.

The Mountain Region is a combination of basins and ranges similar to the Desert Region but distinguished from it by higher altitudes, less desert, and large mountains. The Mazatzal Range towers on the northeastern boundary of the Hohokam. This is a precipitous area of high ridges separated by V-shaped canyons. The view from the west is dominated by the extremely rugged Four Peaks which receive about 30 inches of precipitation annually and frequently are covered with snow in winter.

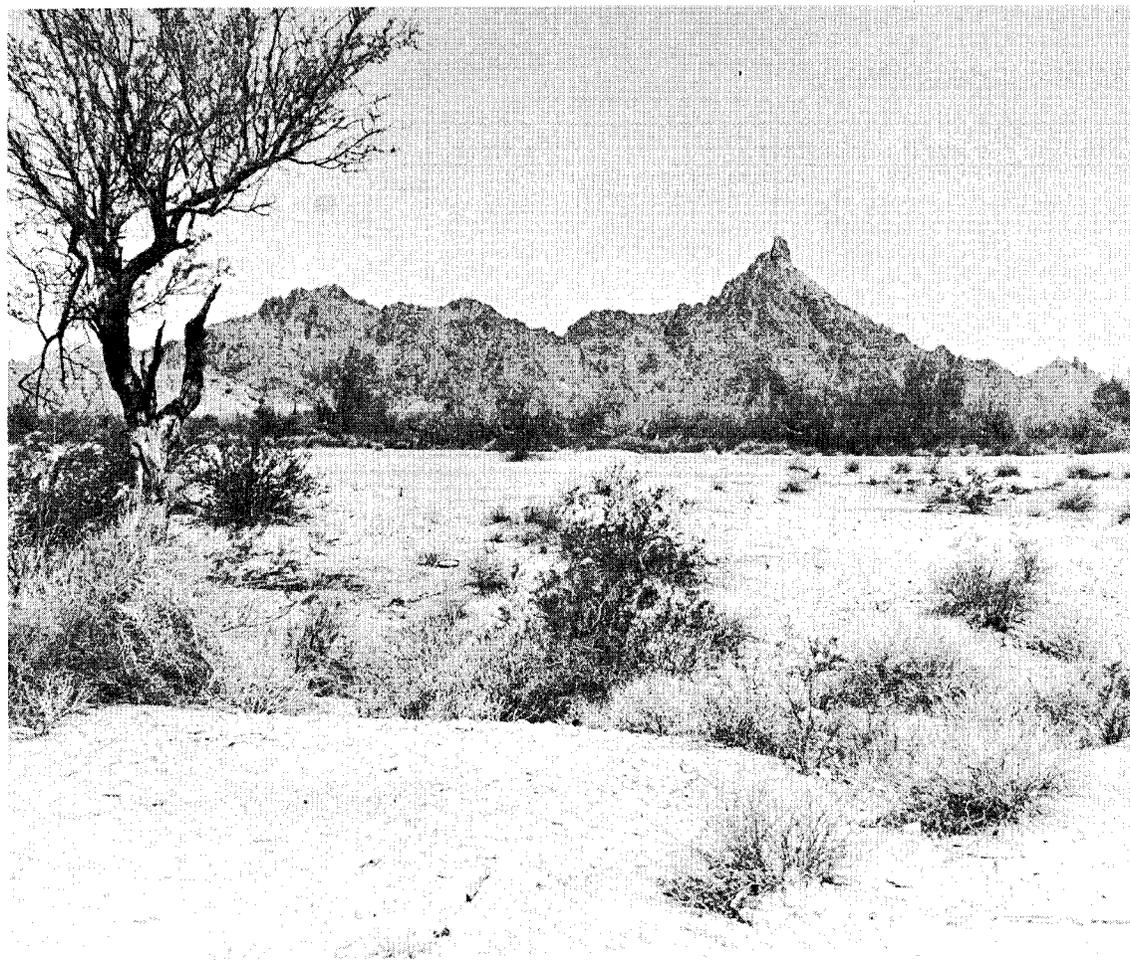
The present forms of the alternating mountains and valleys have been produced by faulting (displacement) of great blocks of the earth's crust, erosion of the uplifted mountain blocks, and deposition in the basins of sediment derived from the mountains.

The mountain masses are composed primarily of very old rocks, including granite, gneiss, and schist. Also, there are large areas of comparatively young volcanic rocks including basalt, andesite, rhyolite, agglomerate, tuff, and cinders.

Geologic conditions have a pronounced effect on the suitability of the area for various uses. Because of the steep, rocky nature and the lack of large water supplies, the mountain masses are limited primarily to such uses as grazing, wildlife habitat, recreation, and mining.

The basins are highly suited for agriculture and human habitation. Water contained in the coarser, more permeable beds is the principal ground water supply.

The alluvial fill consists primarily of poorly consolidated clay, silt, sand, gravel, and caliche. Volcanic rocks, mostly basaltic flows and tuff beds, are included within the alluvium. The thickness of the valley fill varies from basin to basin, but it ranges from 3,000 to 5,000 feet or more near the basin axis to a feather edge near the margins.



Southern Desert Mountains created by
recent volcanic action

SCS PHOTO 2-5126

The major ground water areas, occurring wholly or partially within the project area, are the Salt River Valley, Waterman Wash area, Gila Bend Basin, Palomas Plain, Harquahala Plain, and McMullen Valley. The Salt River Valley is one of the largest agricultural areas in Arizona. A very rapid water-level decline has taken place. Other areas where withdrawals of ground water have caused large declines in water levels are the Gila Bend Basin, McMullen Valley, and the Harquahala Plains.

One apparent result of rapid water-level declines has been the occurrence of earth fissures in many parts of southern Arizona, including the Hohokam RC&D Project area. Various studies have led to the belief that water-level declines are accompanied by consolidation, evidently causing tensile stresses to be built up around the peripheries of heavily pumped areas. This leads to the ultimate rupture of the valley fill. Continued water-level declines probably will result in the development of additional fissures. The results could include serious effects on such features as reservoirs, canals, utilities, buildings, transportation facilities, and farming operations.



Earth fissure that may have been formed by a declining water table

SCS PHOTO

The principal source of surface water for the project area is the more humid mountainous region to the north and east. The combination of high altitude, shallow soils, steep slopes, large exposures of bare rock, and low absorption capacities of most of the rocks results in the development of relatively high rates of runoff. Most of the surface water reaching the arid project area arrives as flow in the Salt, Verde, and Agua Fria rivers.

There are several persistent hazards relative to man's use of geologic strata in the Hohokam RC&D Project area. One is the occurrence of weak horizons in alluvial soils. Evidently some of these soils have not been saturated since their deposition and are prone to rapid and pronounced consolidation when wetted and loaded. Other problems include costly rock excavation in mountain areas and high soluble salt content, brittleness, and low erosion resistance in many alluvial beds. The earthquake hazard is considered to be moderate.

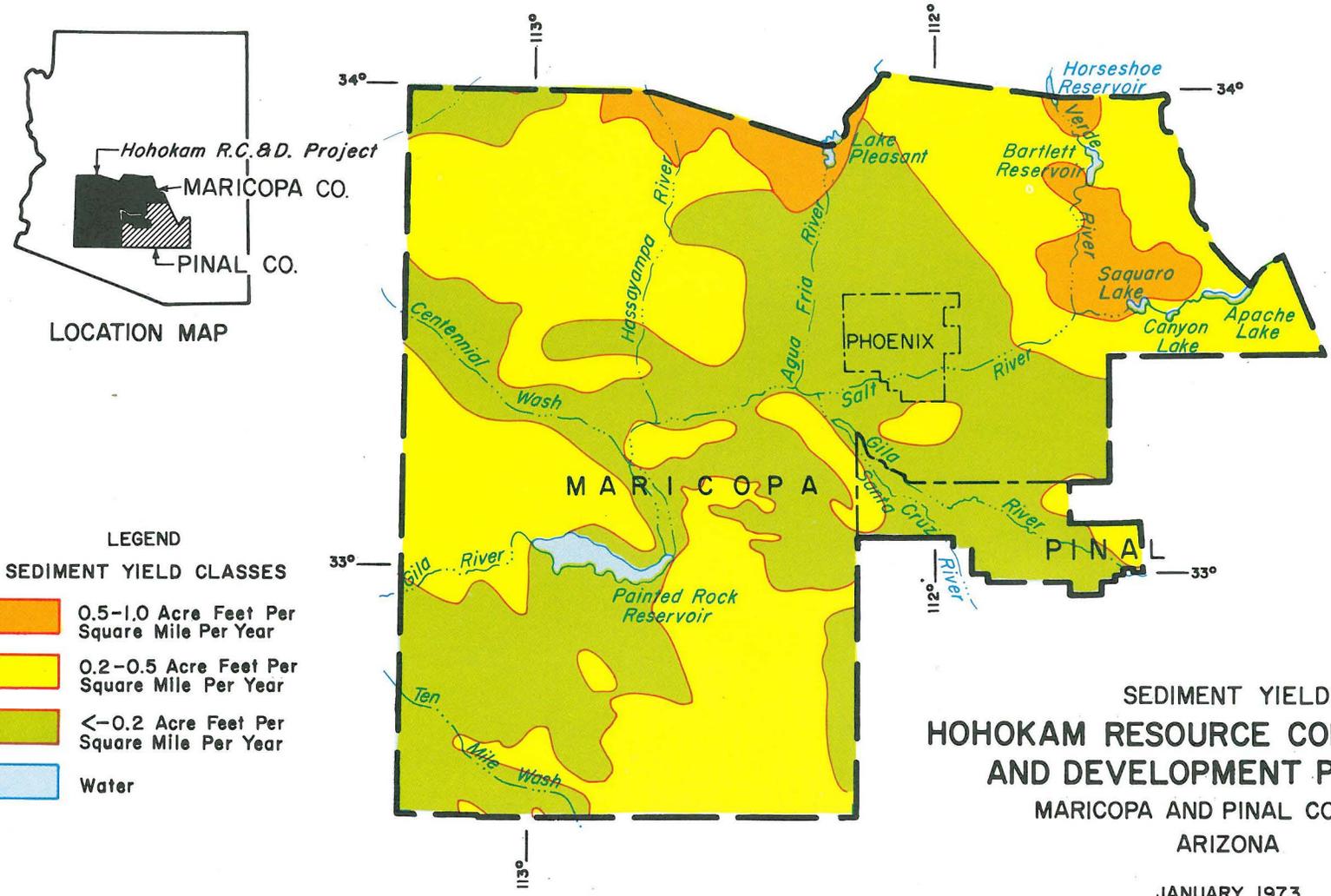
Erosion and sediment yield range from slight to moderately severe. The higher erosion rates are occurring on steeply sloping outcrops of softer rocks and on alluvial soils which are not protected by gravelly surfaces or vegetation. See the Sediment Yield Map on Page 30.

A great variety of minerals occur within the project area, but present production is quite limited. Mineral resources which have been or are being produced include sand, gravel and crushed rock, structural clay, schist and granite for building stone, mica, diatomite, barite, kyanite, limestone, slate for flagstone and decorative uses, amethyst for gem stones, manganese, mercury, niobium-tantalum, gold, lead, silver, zinc, and beryllium.

The more productive districts have been Vulture, White Picacho, Aguila, Cave Creek, Big Horn, Wickenburg, San Domingo, Buckeye, and Gila Bend.

Mineral resources known to occur within the project area, which may have potential for future production, include tuff for building stone, refractory clay, vermiculite, lithium minerals, quartzite, strontium sulfate, halite and associated brines, feldspar, fluorospar, perlite, gypsum, bentonite, thermal springs, turquoise, opal, agate, jasper, and Apache tears for gem stones, marble, copper, molybdenum, rare earths, vanadium, tin, tungsten, iron, and thorium.

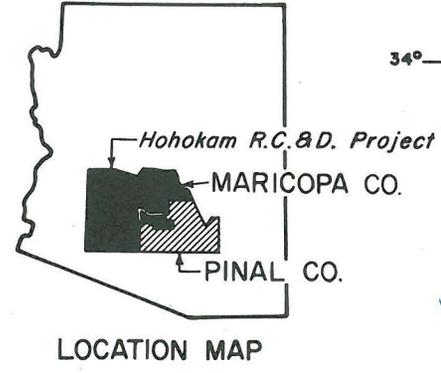
In the future, improved methods of prospecting, mining, metallurgy, and transportation and the development of new uses for various minerals undoubtedly will result in initiating, increasing, or resuming production of many mineral resources in the Hohokam RC&D Project area.



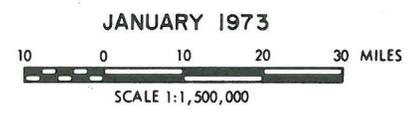
LEGEND

SEDIMENT YIELD CLASSES

- 0.5-1.0 Acre Feet Per Square Mile Per Year
- 0.2-0.5 Acre Feet Per Square Mile Per Year
- <0.2 Acre Feet Per Square Mile Per Year
- Water



**SEDIMENT YIELD
HOHOKAM RESOURCE CONSERVATION
AND DEVELOPMENT PROJECT
MARICOPA AND PINAL COUNTIES,
ARIZONA**



SOILS



Photo: Salt River Project

SOILS

The characteristics of the soils in the project area are a result of the climate, slope, vegetation, and nature of the parent rocks. It is possible to recognize patterns in which combinations of characteristics, such as soil texture, depth, slope or parent material, dominate. These patterns have been delineated on the General Soil Map. Each delineation outlined is called an association and named to reflect in a general way the characteristics of the soils. (See the General Soil Map at the end of this section.)

Generally, each association contains two or more dominant soils and several minor soils in patterns. The patterns are not necessarily uniform but are characteristic of the association. Slope, soil depth, rock material, and other features may change quickly in any area. The General Soil Map does not show the kind of soil at any particular point. It does show land patterns made up of different kinds of soils.

Such associations have been recognized in the Hohokam RC&D Project area. These have been placed in groups according to the topography in which they occur. These are soils of the mountains and buttes, soils from recent alluvium, and soils from old alluvium.

The kind of soil in general is listed in Table A along with estimated soil properties, other features and soil suitability. Interpretation of soil properties for community uses and limitations for recreational uses are found in Tables B and C.* These tables provide a basis to judge soil potentials and limitations. They are a basic tool for planning. The normal problems in construction related to soil, such as high shrink-swell clay, low water intake and movement, corrosivity to steel and concrete and other materials, are outlined in the tables. General location of such problem areas may be found on the map.

The Conservation Needs Inventory, published in 1970, indicates a limited soil potential for agricultural uses on about 570,000 acres due to erosion hazards. Rooting zone limitations reduce the capability of the soil on over 1,600,000 acres in the same report. All soil areas are subject to some erosion if natural or existing vegetation is reduced or other protection is not present. Such erosion produces sediment problems downstream and polluted water.

* Guide for Interpreting Engineering Uses of Soils.

Note in the tables that salts may be a problem in some soils. The tables reveal other hazards important to decision making in the planning process.

Knowledge of soil properties, characteristics and limitations for use is necessary to formulate land use plans and implement projects within the capabilities of the natural resources.

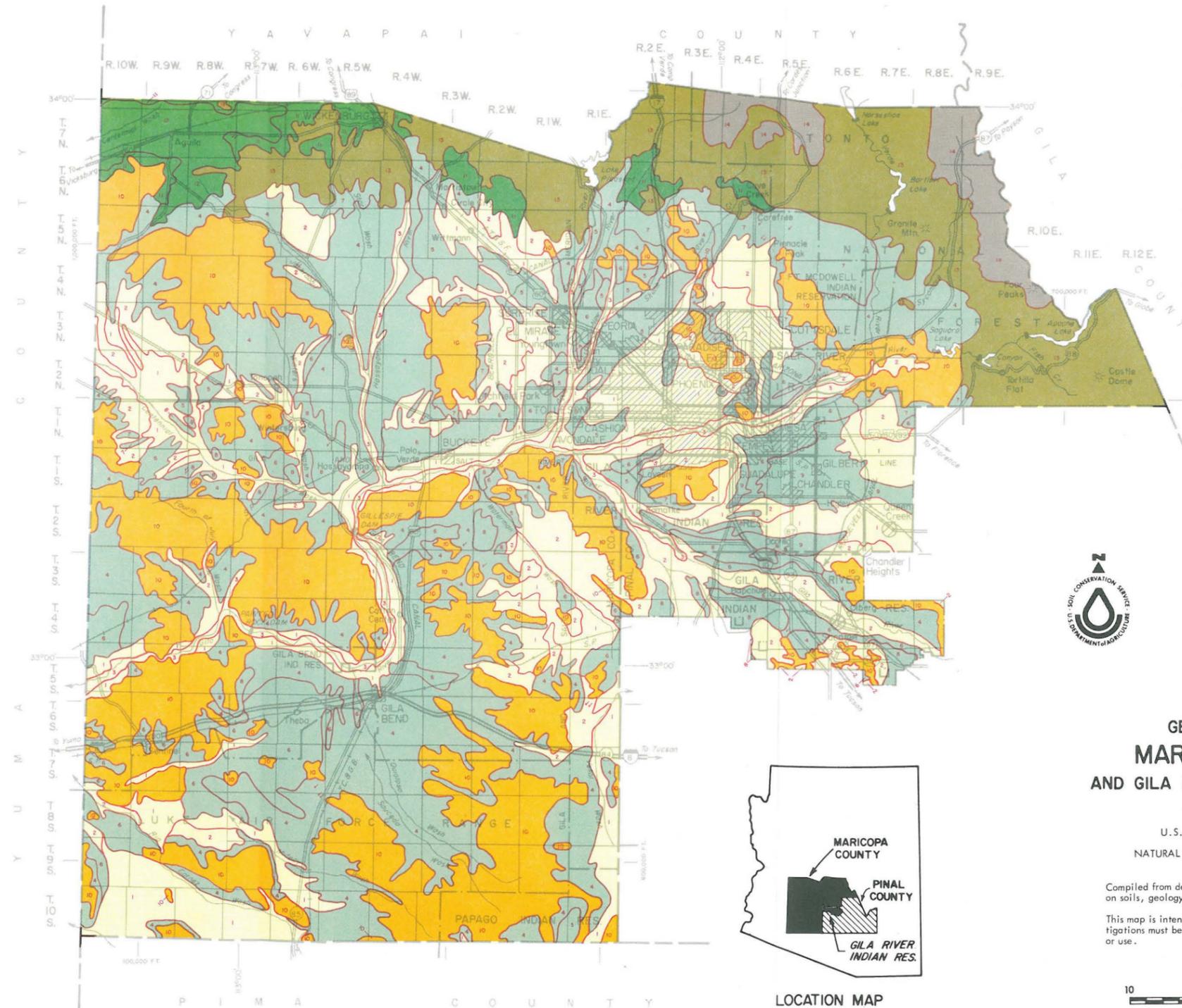
Problems

- Soil erosion is accelerated by improper land use, loss of vegetative cover and by the construction of residential and other facilities.
- Sediment, resulting from soil erosion, fills reservoirs and canals, chokes streams and is deposited on flood plains.
- Soils in some areas cause foundation failure after the construction of roads, dwellings, recreation and similar improvements.

Opportunities

- Land use plans and project plans provide the opportunity to include more vegetative land treatment measures to reduce erosion and sediment.
- The program of monitoring the soil moisture, as pictured on the soil section divider, could be expanded to furnish more soils information to more people regarding water-holding capacity of the soils. This information is used to determine the amount of water to be applied during the next irrigation. This program assists in obtaining efficient use of water and also in getting maximum production from the soil.
- A greater number of small type structural land treatment measures may be used to reduce the sediment problem.
- Plan the use of land areas based on sufficient knowledge of the soil to insure against failures and future problems.
- Coordinate Tables A, B, and C, with the General Soil Map to determine the solution to problems before construction.

The following tables provide soils information that may be used in planning efforts.



- LEGEND
- I. Very hot, very dry soils.
- A. Soils from recent alluvium.
- 1 Gilman-Estrella-Avondale association. Nearly level loam soils on valley plains and flood plains.
 - 2 Anho-Valencia association. Nearly level to gently sloping sandy loam soils on alluvial fans and valley plains.
 - 3 Carrizo-Brias-Vint association. Nearly level sandy soils in stream channels.
- B. Soils from old alluvium.
- 4 Rillito-Gunsight-Pinal association. Nearly level to gently sloping, gravelly to very gravelly limy soils on old alluvial fans and valley plains.
 - 5 Mohall-Laveen association. Nearly level loam and clay loam soils on old valley plains and alluvial fans.
 - 6 Laveen-Coolidge association. Nearly level, limy, sandy loam and loam soils on old alluvial fans and valley plains.
 - 7 Eban-Pinamt-Tremant association. Gently sloping to sloping, gravelly and very gravelly clay and clay loam soils on old alluvial fans at the base of mountains.
 - 8 Casa Grande-Harqua association. Nearly level, saline-alkali, clay loam soils on old alluvial fans and valley plains.
 - 9 Mohall-Contine association. Nearly level clay loam and clay soils on old alluvial fans and valley plains.
- C. Soils of mountains and low hills.
- 10 Chirioni-Gachado-Rock Outcrop association. Moderately sloping to steep, shallow and very shallow soils on mountains and low hills.
- II. Hot and dry soils.
- A. Soils from old alluvium.
- 11 Continental-Pinaleno-Cave association. Gently sloping to moderately sloping clay to loam soils on old alluvial fans at the base of mountains.
 - 12 Latene-Vekol-Anthony association. Nearly level to gently sloping, clay to sandy loam soils on valley plains and alluvial fans.
- B. Soils of mountains and low hills.
- 13 Cellar-Lehman-Rock Outcrop association. Gently sloping to very steep, shallow to very shallow soils on mountains and low hills.
- III. Warm, subhumid soils.
- A. Soils of mountains and low hills.
- 14 Barkerville-Cabezon-Rock Outcrop association. Gently sloping to very steep, shallow to very shallow soils on mountains and low hills.
- Rock outcrop areas of 200-400 acres
 - Rock outcrop areas of 400 acres or more



**GENERAL SOIL MAP
 MARICOPA COUNTY
 AND GILA RIVER INDIAN RESERVATION
 ARIZONA**

U. S. SOIL CONSERVATION SERVICE
 in cooperation with
 NATURAL RESOURCE CONSERVATION DISTRICTS
 in MARICOPA COUNTY

Compiled from detailed soil surveys, and available information on soils, geology, topography, climate and vegetation.

This map is intended for general planning use. On-site investigations must be made for detailed planning for a specific site or use.

NOVEMBER 1973

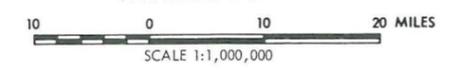


TABLE A

ESTIMATED PROPERTIES OF THE SOILS, OTHER FEATURES AND SOIL SUITABILITIES ^{A/}

Map Symbol and Major Soil Components	Estimated Properties of the Soils								Other Features	Suitability as a Source of:		
	Depth from Surface (in)	Tex- ture	Perme- ability (in/hr)	Available Water Capacity (profile) (in)	Shrink- Swell Potential	Soil Reaction pH	Corrosivity		Hydro- logic Group	Roadfill	Sand &/or Gravel 1/	Topsoil
Uncoated Steel	Concrete											
<u>1. Gilman-Estrella-Avondale Association</u>												
Gilman loam 0-1% slopes (55% of Unit)	0-60	1	.6-2	9.6-10.8	Low	7.9-8.4	High	Low	B	Fair: ML soil mate- rial	Unsuited	Good
Estrella loam 0-1% slopes (15% of Unit)	0-24 24-60	1 cl	.6-2 .2-.6	10.3-11.5	Low Moderate	7.9-8.4 7.9-8.4	High High	Moderate Moderate	B	Fair: ML soil mate- rial	Unsuited	Good
Avondale clay loam, 0-1% slopes (10% of Unit)	0-12 12-60	cl 1	.2-.6 .6-2	9.5-11.0	Moderate Moderate	7.9-8.4 7.9-8.4	High High	Low Low	B	Fair: ML & CL soil material	Unsuited	Fair: clay loam
<u>2. Antho-Valencia Association</u>												
Antho sandy loam 0-5% slopes (55% of Unit)	0-60	sl	2-6	6.6-7.8	Low	7.9-8.4	High	Low	B	Fair: Low strength	Poor: sand excess fines	Good
Valencia sandy loam, 0-1% slopes (25% of Unit)	0-26 26-60	sl cl	2-6 .2-.6	8.3-9.5	Low Moderate	7.9-8.4 7.9-8.4	High	Low	B	Fair: CL soil material shrink-swell	Unsuited	Good
<u>3. Carrizo-Brios-Vint Association</u>												
Carrizo gravelly sandy loam 0-1% slopes (35% of Unit)	0-5 5-60	gs1 vgs	2-6 20+	2.0- 3.3	Low Low	7.9-8.4 7.9-8.4	Low Low	Low Low	A	Good	Good: Gravel fair for sand	Poor: very gravelly sand
Brios sandy loam, 0-1% slopes, (30% of Unit)	0-14 14-60	sl s	2-6 6-20	3.7-4.9	Low Low	7.9-8.4 7.9-8.4	Moderate Moderate	Low Low	A	Good	Good for sand, un- suited for gravel	Fair: 14 in- ches of material

Map Symbol and Major Soil Components	Depth from Surface (in)	Texture	Estimated Properties of the Soils					Other Features		Suitability as a Source of:		
			Permeability (in/hr)	Available Water Capacity (profile) (in)	Shrink-Swell Potential	Soil Reaction pH	Corrosivity		Hydrologic Group	Roadfill	Sand &/or Gravel <u>1/</u>	Topsoil
Vint loamy fine sand, 0-1% slopes, (15% of Unit)	0-60	lfs	6-20	3.5-5.0	Low	7.9-8.4	Moderate	Low				
<u>4. Rillito-Gunsight-Pinal Association</u>												
Rillito gravelly loam, 0-5% slopes (35% of Unit)	0-60	gl	.6-2	6.5-7.5	Low	7.9-8.4	High	Moderate	B	Good	Poor: gravel excess fines	Poor: gravelly
Gunsight gravelly loam, 0-10% slopes, (25% of Unit)	0-60	vgl,gl	.6-2	4.0-5.5	Low	7.9-8.4	High	Moderate	B	Good	Poor for gravel, unsuited for sand	Poor: gravelly
Pinal gravelly loam, 0-5% slopes, (20% of Unit)	0-12 12	gl	.6-2	1.5-2.7 Indurated pan	Low	7.9-8.4	High	Moderate	D	Poor: thin layer	Unsuited	Poor: thin source
<u>5. Mohall-Laveen Association</u>												
Mohall clay loam 0-1% slopes (45% of Unit)	0-10 10-37 37-60	Cl cl gsi	2-6 .2-.6 2-6	7.5-9.0	Low Moderate Low	6.6-8.4 7.9-8.4 7.9-8.4	Moderate High High	Low Low Low	B	Fair: CL soil material	Poor for sand, unsuited for gravel	Fair: clay loam
Laveen loam 0-1% slopes (30% of Unit)	0-60	1	.6-2	8.5-9.5	Low	7.9-8.4	High	Moderate	B	Fair: ML soil material	Unsuited	Good

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ESTIMATED PROPERTIES OF THE SOILS, OTHER FEATURES AND SOIL SUITABILITIES ^{A/}

Map Symbol and Major Soil Components	Estimated Properties of the Soils							Other Features		Suitability as a Source of:		
	Depth from Surface (in)	Texture	Permeability (in/hr)	Available Water Capacity (profile) (in)	Shrink-Swell Potential	Soil Reaction pH	Corrosivity Uncoated Steel	Concrete	Hydrologic Group	Roadfill	Sand &/or Gravel _{1/}	Topsoil
6. Laveen-Coolidge Association												
Laveen loam 0-1% slopes (45% of Unit)	0-60	1	.6-2	8.5-9.5	Low	7.9-8.4	High	Moderate	B	Fair: ML soil material	Unsuited	Good
Coolidge sandy loam, 0-1% slopes, (30% of Unit)	0-60	s1	2-6	6.0-7.5	Low	7.9-8.4	High	Low	B	Fair: Low strength	Unsuited for gravel, poor for sand	Fair: 24 inches of sandy loam over lime accumulation
7. Ebon-Pinamt-Tremant Association												
Ebon gravelly loam, 1-10% slopes, (35% of Unit)	0-38 38-60	g1,vkc vksc1	.06-.2 .2-.6	3.0-5.0	Moderate Low	7.9-8.4 7.9-8.4	High High	Low Low	C	Fair: Low strength	Unsuited	Poor: >50% coarse fragments
Pinamt very cobbly loam, 1-10% slopes, (25% of Unit)	0-35 35-60	vk1 vgsc1 vg s1	.2-.6 2-6	3.5-5.0	Moderate Low	7.9-8.4 7.9-8.4	High High	Low Low	B	Good	Poor for gravel, unsuited for sand	Poor: >50% coarse fragments
Tremant very gravelly loam 1-5% slopes (20% of Unit)	0-36 36-60	vgcl,g1 g1	.2-.6 .6-2	6.5-8.0	Moderate Low	7.9-8.4 7.9-8.4	High High	Moderate Low	B	Fair: ML soil material when mixed	Poor for gravel, unsuited for sand	Fair: gravelly material
8. Casa Grande-Harqua Association												
Casa Grande sandy loam, 0-1% slopes (35% of Unit)	0-23 23-60	s1,c1 s1	.06-.2 .6-2	8.5-11.5	Moderate Low	8.5-9.6 8.5-9.6	High High	High High	C	Fair CL & ML material	Poor: sand Unsuitable: gravel	Poor: very strongly alkaline soil material

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TABLE A - Page 4

ESTIMATED PROPERTIES OF THE SOILS, OTHER FEATURES AND SOIL SUITABILITIES ^{A/}

Map Symbol and Major Soil Components	Depth from Surface (in)	Estimated Properties of the Soils							Other Features		Suitability as a Source of:		
		Texture	Permeability (in/hr)	Available Water Capacity (profile) (in)	Shrink-Swell Potential	Soil Reaction pH	Corrosivity		Hydrologic Group	Roadfill	Sand &/or Gravel _{1/}	Topsoil	
							Uncoated Steel	Concrete					
Harqua very gravelly clay loam 0-5% slopes (35% of Unit)	0-60	vgcl, gcl	.2-.6	5.0-6.5	Low	7.9-9.6	High	High	B	Fair: GC soil material	Unsuited	Poor: gravelly, highly saline soil	
<u>9. Mohall-Contine Association</u>													
Mohall loam 0-1% slopes (55% of Unit)	0-10 10-37 37-60	1 cl gsl	2-6 .2-.6 2-6	7.5-9.0	Low Moderate Low	6.6-8.4 7.9-8.4 7.9-8.4	Moderate High High	Low Low Low	B	Fair: CL soil material	Poor for sand, unsuited for gravel	Fair: clay loam below 10 inches	
Contine clay loam 0-1% slopes (35% of Unit)	0-12 12-38 38-60	cl cl,c l,c1	.06-.2 .06-.2 .06-.2	8.5-12.5	High High High	7.9-8.4 7.9-8.4 7.9-8.4	Moderate High High	Low Low Low	C	Poor: CH soil material, shrink-swell	Unsuited	Fair: thin clay loam surface	
<u>10. Cherioni-Gachado-Rock Outcrop Association</u>													
Cherioni gravelly very fine sandy loam, 10-40% slopes (35% of Unit)	0-9 9-12	gvfsI	.6-2 Indurated pan over bedrock	.9-2	Low	7.9-8.4	Moderate	Low	D	Poor: limited material	Unsuited	Poor; shallow gravelly soil	
Gachado very cobbly loam 10-40% slopes (15% of Unit)	0-13 13	vk1,c1	.06-.2 Bedrock	1.5-2.1	Low	7.9-8.4	Moderate	Low	D	Poor: limited material	Unsuited	Poor: shallow cobbly	
Rock Outcrop 10-80% slopes (35% of Unit)	Exposures of bedrock - no estimates can be made												

TABLE A - Page 5

ESTIMATED PROPERTIES OF THE SOILS, OTHER FEATURES AND SOIL SUITABILITIES ^{A/}

Map Symbol and Major Soil Components	Depth from Surface (in)	Estimated Properties of the Soils							Other Features		Suitability as a Source of:		
		Texture	Permeability (in/hr)	Available Water Capacity (profile) (in)	Shrink-Swell Potential	Soil Reaction pH	Corrosivity Uncoated Steel Concrete		Hydrologic Group	Roadfill	Sand &/or Gravel _{1/}	Topsoil	
<u>11. Continental-Pinaleno-Cave Association</u>													
Continental gravelly sandy loam 1-20% slopes (30% of Unit)	0-6	gsl	.6-2	5.5-8.0	Low	6.8-7.5	Moderate	Low	C	Poor: CH material shrink-swell	Unsuited	Poor: contains 15-35% gravel	
	6-52	c	.06-.2		High	7.9-8.4	High	Low					
	52-60	gsl	2-6		Low	7.9-8.4	High	Low					
Pinaleno very gravelly sandy loam, 1-15% slopes, (25% of Unit)	0-30	vgs1	.2-.6	3.5-5.5	Low	6.1-8.4	High	Low	B	Good:	Poor for sand, and gravel excess fines	Poor; contains >50% gravel & cobble stones	
	30-60	gsl	2-6		Low	7.9-8.4	High	Low					
Cave gravelly sandy loam 1-5% slopes (25% of Unit)	0-12 12-14	gsl,1	.6-2	.8-1.5 Indurated pan	Low	7.9-8.4	High	Low	D	Poor: limited material	Unsuited	Poor: contains >15% gravel	
<u>12. Latene-Vekol-Anthony Association</u>													
Latene loam 0-1% slopes (35% of Unit)	0-60	1,g1	.6-2	7.5-10.5	Low	7.9-9.0	High	Moderate	B	Fair: ML material	Unsuited	Fair: high lime content	
Vekol clay loam 0-1% slopes (30% of Unit)	0-60	1,c1	.06-.2	9.0-10.5	High	7.9-8.4	High	Low	D	Poor: CH soil material	Unsuited	Poor: clay loam material	
Anthony sandy loam 0-5% slopes (15% of Unit)	0-60	s1	2-6	4.0-7.5	Low	7.9-8.4	High	Moderate	B	Fair low strength	Poor: excess fines	Good:	
<u>13. Cellar-Lehmans-Rock Outcrop Association</u>													
Cellar very gravelly sandy loam 5-40% slopes (25% of Unit)	0-8 8-9	vgs1	.6-2	.5-1.0 Bedrock	Low	7.4-8.4	Moderate	Low	D	Poor: thin layer	Unsuited	Poor: thin source with >50% coarse fragments	

Map Symbol and Major Soil Components	Depth from Surface (in)	Estimated Properties of the Soils						Other Features		Suitability as a Source of:		
		Texture	Permeability (in/hr)	Available Water Capacity (profile) (in)	Shrink-Swell Potential	Soil Reaction pH	Corrosivity Uncoated Steel Concrete	Hydro-logic Group	Roadfill	Sand &/or Gravel ^{1/}	Topsoil	
Lehmans cobbly loam, 15-60% slopes, (20% of Unit)	0-14 14-16	k,gc	.06-.2	1.5-2.5 Bedrock	High	6.6-8.4	High Low	D	Poor: thin layer shrink-swell	Unsuited	Poor: thin, cobbly	
Rock Outcrop 10-80% slopes (35% of Unit)	Exposures of bedrock - no estimates can be made											
<u>14. Barkerville-Cabazon-Rock Outcrop Association</u>												
Barkerville cobbly sandy loam 10-40% slopes (25% of Unit)	0-5 5-40 40	ksl	2-6	.3-.6 Weathered granite Hard granite bedrock	Low	6.1-7.3 6.1-7.3	Moderate Low	C	Fair hard thin layer	Unsuited	Poor: limited soil depth, excessive amounts of coarse fragments	
Cabazon cobbly loam, 10-30% slopes, (20% of Unit)	0-15 15-17	k1,kc	.06-.2	1.4-1.7 Basalt bedrock	High	6.7-7.3	High Low	D	Poor: CH soil material. thin layer	Unsuited	Poor: cobbly material over bedrock at about 15 inches	
Rock Outcrop	Exposure of bedrock - no estimates can be made											

^{A/} See Appendix for explanation of terms and column headings. See Tables B and C for soil limitation ratings based on soil properties listed in this Table.

^{1/} Suitability rating is given only for the material indicated (i.e., fair-sand). No mention means the secondary material is unsuitable. An unsuitable rating is given if the soil is unsuitable for both sand and gravel.

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TABLE B

INTERPRETATIONS OF ENGINEERING PROPERTIES OF THE SOILS
FOR COMMUNITY USES ^{A/}

Map Symbol and Major Soil Components	Soil Limitation Rating and Restrictive Features Affecting Engineering Uses for:					
	Sanitary Facilities			Community Development		
	Septic Tank 1/ Absorption Field	Sewage Lagoons	Sanitary Land- fills (Trench)	Shallow Excavations	Dwellings 2/ (Without Basements)	Local Roads & Streets
<u>1. Gilman-Estrella-Avondale Association</u>						
Gilman loam 0-1% slopes (55% of Unit)	Slight: severe where flooded	Moderate: se- vere where flooded	Slight: severe where flooded	Slight: se- vere where flooded	Moderate: ML soil material; severe where flooded	Moderate: ML soil material; severe where flooded
Estrella loam 0-1% slopes (15% of Unit)	Severe: moder- ately slow permeability	Moderate: ML soil material	Slight	Slight	Moderate: ML soil material	Moderate: ML soil material
07 Avondale clay loam 0-1% slopes (15% of Unit)	Severe: moder- ately slow permeability, some areas flooded	Slight: severe where flooded	Slight: se- vere where flooded	Slight severe where flooded	Moderate: moder- ate shrink-swell potential, ML, CL material severe where flooded	Moderate: moderate shrink-swell poten- tial severe where flooded
<u>2. Antho-Valencia Association</u>						
Antho sandy loam 0-5% slopes (55% of Unit)	Slight	Severe: mod- erately rapid permeability	Severe: mod- erately rapid permeability	Slight	Slight	Moderate low strength
Valencia sandy loam, 0-1% slopes (25% of Unit)	Severe: moder- ately slow permeability	Slight	Slight	Slight	Slight	Moderate low strength
<u>3. Carrizo-Brios-Vint Association</u>						
Carrizo gravelly sandy loam 0-1% slopes (35% of Unit)	Severe: subject to flooding, hazard of ground water pollution	Severe: very rapid perme- ability, subject to flooding	Severe: very rapid perme- ability, dan- ger of ground water pollu- tion, subject to flooding	Severe: gravelly subject to flooding	Severe: subject to flooding	Severe: subject to flooding

INTERPRETATIONS OF ENGINEERING PROPERTIES OF THE SOILS
 FOR COMMUNITY USES A/

Map Symbol and Major Soil Components	Soil Limitation Rating and Restrictive Features Affecting Engineering Uses for:					
	Sanitary Facilities			Community Development		
	Septic Tank 1/ Absorption Field	Sewage Lagoons	Sanitary Land- fills (Trench)	Shallow Excavations	Dwellings 2/ (Without Basements)	Local Roads & Streets
Brios sandy loam 0-1% slopes (30% of Unit)	Severe: subject to flooding, hazard of ground water pollution	Severe: rapid permeability, subject to flooding	Severe: rapid permeability subject to flooding	Severe: sandy subsoil subject to flooding	Severe: subject to flooding	Severe: subject to flooding
Vint loamy fine sand, 0-1% slopes (15% of Unit)	Slight: severe where flooded	Severe: rapid permeability, some areas flooded	Severe: rapid permeability, some areas flooded	Severe: sandy subsoil some areas flooded	Slight: severe where flooded	Slight: severe where flooded
<u>4. Rillito-Gunsight-Pinal Association</u>						
Rillito gravelly loam, 0-5% slopes (35% of Unit)	Slight	Moderate: moderate permeability	Slight	Moderate: gravelly	Slight	Slight
Gunsight gravelly loam, 0-10% slopes (25% of Unit)	Slight	Severe: very gravelly	Slight	Severe: very gravelly	Slight on slopes <8%, moderate on slopes 8-10%	Slight: 0-8% slopes, Moderate: 8-10% slopes
Pinal gravelly loam, 0-5% slopes (20% of Unit)	Severe: shallow to hardpan	Severe: shal- low to hardpan	Severe: shallow to hardpan,	Severe: shal- low to hard- pan	Severe: shallow to hardpan	Severe: shallow to hardpan
<u>5. Mohall-Laveen Association</u>						
Mohall clay loam 0-1% slopes (45% of Unit)	Severe: moder- ately slow permeability, slight if tile placed below clay loam layers	Severe: mod- erately rapid permeability below 37 inches	Severe: moder- ately rapid permeability below 37 inches	Moderate clay loam material	Moderate: CL material, mod- erate shrink- swell potential	Moderate: moderate shrink-swell poten- tial, CL soil material
Laveen loam 0-1% slopes (30% of Unit)	Slight	Moderate: moderate permeability	Slight	Slight	Moderate: ML soil material	Moderate: ML soil material

INTERPRETATIONS OF ENGINEERING PROPERTIES OF THE SOILS
FOR COMMUNITY USES ^{A/}

Map Symbol and Major Soil Components	Soil Limitation Rating and Restrictive Features Affecting Engineering Uses for:					
	Sanitary Facilities			Community Development		
	Septic Tank 1/ Absorption Field	Sewage Lagoons	Sanitary Land- fills (Trench)	Shallow Excavations	Dwellings 2/ (Without Basements)	Local Roads & Streets
<u>6. Laveen-Coolidge Association</u>						
Laveen loam 0-1% slopes (45% of Unit)	Slight	Moderate: moderate per- meability	Slight	Slight	Moderate: ML soil material	Moderate: ML soil material
Coolidge sandy loam, 0-1% slopes (30% of Unit)	Slight	Severe: mod- erately rapid permeability	Severe: mod- erately rapid permeability	Slight	Slight	Moderate: Low strength
<u>7. Ebon-Pinamt-Tremant Association</u>						
Ebon gravelly loam 1-10% slopes (35% of Unit)	Severe: slow permeability	Severe: very cobble sub- soil	Severe: very cobble material	Severe: very cobble material	Slight: moderate on slopes 8-10%	Moderate: Low strength
Pinamt very cobble loam, 1-10% slopes (25% of Unit)	Severe: mod- erately slow permeability, slight if tile line placed below about 2 feet	Severe: mod- erately rapid permeability below 22 in- ches, very cobble	Severe: mod- erately rapid permeability below 22 in- ches	Severe: very cobble & gravelly	Slight: moderate on slopes 8-10%	Slight: moderate on slopes 8-10%
Tremant very gravelly loam 1-5% slopes (20% of Unit)	Severe: mod- erately slow permeability, slight if lines are below about 36 inches	Severe: mod- erately rapid permeability below 36 inches	Severe: mod- erately rapid permeability below 23 inches	Moderate: gravelly	Moderate: mod- erate shrink- swell potential	Moderate: moderate shrink-swell potential
<u>8. Casa Grande-Harqua Association</u>						
Casa Grande sandy loam, 0-1% slopes (35% of Unit)	Moderate: Moderate slow permeability	Moderate: mod- erate perme- ability below 23 inches	Moderate: clay loam subsoil	Moderate: clay loam subsoil	Moderate: mod- erate shrink- swell potential	Moderate: ML, CL soil material
Harqua very grav- elly clay loam 0-5% slopes (35% of Unit)	Severe: mod- erately slow permeability	Severe: very gravelly	Slight	Severe: very gravelly	Slight	Moderate: GC material, low strength

INTERPRETATIONS OF ENGINEERING PROPERTIES OF THE SOILS
FOR COMMUNITY USES ^{A/}

Map Symbol and Major Soil Components	Soil Limitation Rating and Restrictive Features Affecting Engineering Uses for:					
	Sanitary Facilities			Community Development		
	Septic Tank 1/ Absorption Field	Sewage Lagoons	Sanitary Land- fills (Trench)	Shallow Excavations	Dwellings 2/ (Without Basements)	Local Roads & Streets

9. Mohall-Contine Association

Mohall loam 0-1% slopes (55% of Unit)	Severe: moder- ately slow permeability, slight if tile line is below 37 inches	Severe: moder- ately rapid permeability below 37 inches	Severe: moder- ately rapid permeability below 37 inches	Moderate: clay loam material	Moderate: CL soil material, moder- ate shrink-swell potential	Moderate: moderate shrink-swell poten- tial, CL soil material
Contine clay loam 0-1% slopes (35% of Unit)	Severe: slow permeability	Slight	Severe: clayey subsoil	Severe: clayey subsoil	Severe: CH soil material, high shrink-swell potential	Severe: high shrink- swell potential, CH soil material

10. Cherioni-Gachado-Rock Outcrop Association

Cherioni gravelly very fine sandy loam, 10-40% slopes, (35% of Unit)	Severe: shallow to bedrock, slope	Severe: shal- low to bed- rock, slope	Severe: shal- low to bed- rock, slope	Severe: shal- low to bed- rock, slope	Severe: shal- low to bed- rock, slope	Severe: shallow to bedrock slope
Gachado very cob- bly loam, 10-40% slopes, (15% of Unit)	Severe: shallow to bedrock, slope	Severe: shal- low to bed- rock, very cobbly, slope	Severe: shal- low to bed- rock, slope	Severe: shal- low to bed- rock, slope	Severe: shal- low to bed- rock, slope	Severe: shallow to bedrock
Rock Outcrop 10-80% slopes (35% of Unit)	Exposures of bedrock - all ratings are severe					

11. Continental-Pinaleno-Cave Association

Continental grav- elly sandy loam, 1-20% slopes (30% of Unit)	Severe: slow permeability	Slight on 1-2% slopes, moderate on 2-7% slopes, Severe on slopes >7%	Severe; clayey subsoil	Severe: very gravelly & clayey sub- soil	Severe: CH soil material, high shrink-swell potential	Severe: CH soil material, high shrink-swell potential
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TABLE B - Page 5

INTERPRETATIONS OF ENGINEERING PROPERTIES OF THE SOILS
FOR COMMUNITY USES ^{A/}

Map Symbol and Major Soil Components	Soil Limitation Rating and Restrictive Features Affecting Engineering Uses for:					
	Sanitary Facilities			Community Development		
	Septic Tank <u>1/</u> Absorption Field	Sewage Lagoons	Sanitary Land- fills (Trench)	Shallow Excavations	Dwellings <u>2/</u> (Without Basements)	Local Roads & Streets
Pinaleno very grav- elly sandy loam 1-15% slopes (25% of Unit)	Severe: moder- ately slow permeability	Severe: moder- ately rapid permeability below 30 in- ches, very gravelly	Severe: moder- ately rapid permeability	Severe: very gravelly material	Slight on slopes <8%, moderate on 8-15% slopes	Slight on slopes <8%, moderate on 8-15% slopes
Cave gravelly sandy loam 1-5% slopes (25% of Unit)	Severe: indur- ated hardpan at shallow depths	Severe: in- durated hard- pan at shal- low depths	Severe: indur- ated hardpan at shallow depths	Severe: in- durated hard- pan at shal- low depths	Severe: indur- ated hardpan at shallow depths	Severe: indurated hardpan at shallow depths
<u>12. Latene-Vekol-Anthony Association</u>						
Latene loam 0-1% slopes (35% of Unit)	Slight	Moderate: moderate permeability	Slight	Slight	Moderate: ML soil material	Moderate: ML material
Vekol clay loam 0-1% slopes (30% of Unit)	Severe: slow permeability	Slight	Severe: clayey subsoil	Severe: clay- ey subsoil	Severe: CH material high shrink- swell potential	Severe: CH soil material, high shrink-swell potential
Anthony sandy loam, 0-5% slopes (15% of Unit)	Slight	Severe: mod- erately rapid permeability	Severe: mod- erately rapid permeability	Slight	Slight	Moderate: low strength
<u>13. Cellar-Lehmans-Rock Outcrop Association</u>						
Cellar very grav- elly sandy loam 5-40% slopes (25% of Unit)	Severe: shal- low to bedrock, slope	Severe: shal- low to bed- rock, very gravelly, slope	Severe: shal- low to bed- rock, slope	Severe: shal- low to bed- rock, very gravelly, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope

INTERPRETATIONS OF ENGINEERING PROPERTIES OF THE SOILS
FOR COMMUNITY USES ^{A/}

Map Symbol and Major Soil Components	Soil Limitation Rating and Restrictive Features Affecting Engineering Uses for:					
	Sanitary Facilities			Community Development		
	Septic Tank ^{1/} Absorption Field	Sewage Lagoons	Sanitary Land- fills (Trench)	Shallow Excavations	Dwellings ^{2/} (Without Basements)	Local Roads & Streets
Lehmans cobbly loam, 15-60% slopes, (20% of Unit)	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope
Rock Outcrop	Exposures of bedrock - all ratings are severe					
<u>14. Barkerville-Cabazon-Rock Outcrop Association</u>						
Barkerville cobbly sandy loam, 10-40% slopes (25% of Unit)	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope
57 Cabazon cobbly loam 10-30% slopes (20% of Unit)	Severe: shallow to bedrock, slow permeability, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope	Severe: shallow to bedrock, slope
Rock Outcrop	Exposures of bedrock - all ratings are severe					

^{A/} See Table A and text of report for soil characteristic upon which these interpretations are based. See Appendix for explanation of column headings, assumptions and criteria used in ratings.

^{1/} Pertains to materials below a minimum depth of 24 inches (AZ State Dept. of Health, Eng. Bul. No. 12, P 10, adopted 8/1962).

^{2/} These ratings may also apply to small industrial buildings or shopping centers if slope limits are reduced 50 percent.

TABLE C SOIL LIMITATION RATINGS AND SOIL FEATURES AFFECTING RECREATIONAL USES

Map Symbol and Major Soil Components	Camp Areas	Playgrounds	Paths & Trails	Picnic Areas	Lawns & Golf Fairways
<u>1. Gilman-Estrella-Avondale Association</u>					
Gilman loam 0-1% slopes (55% of Unit)	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
Estrella loam 0-1% slopes (15% of Unit)	Moderate: moderately slow permeability, may be dusty	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
Avondale clay loam 0-1% slopes (10% of Unit)	Moderate: clay loam surface	Moderate: clay loam surface	Moderate: clay loam surface	Moderate: clay loam surface	Moderate: clay loam surface
<u>2. Antho-Valencia Association</u>					
Antho sandy loam 0-5% slopes (55% of Unit)	Slight: may be dusty	Slight: moderate for areas with slopes >2%, may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
Valencia sandy loam 0-1% slopes (25% of Unit)	Slight: may be dusty	Moderate: moderately slow permeability, may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
<u>3. Carrizo-Brios-Vint Association</u>					
Carrizo gravelly sandy loam 0-1% slopes (35% of Unit)	Severe: subject to flooding	Severe: subject to flooding	Moderate: gravelly, subject to flooding	Moderate: flood hazard, gravelly	Moderate: gravelly, flood hazard
Brios sandy loam 0-1% slopes (30% of Unit)	Severe: subject to flooding	Moderate: subject to flooding	Slight	Moderate: flood hazard	Moderate: rapid permeability

Map Symbol and Major Soil Components	Camp Areas	Playgrounds	Paths & Trails	Picnic Areas	Lawn & Golf Fairways
Vint loamy fine sand, 0-1% slopes (15% of Unit)	Moderate: loamy fine sand surface	Moderate: loamy fine sand surface	Moderate: loamy fine sand surface	Moderate: loamy fine sand surface	Moderate
<u>4. Rillito-Gunsight-Pinal Association</u>					
Rillito gravelly loam 0-5% slopes (35% of Unit)	Moderate: gravelly	Severe: gravelly	Moderate: gravelly	Moderate: gravelly	Moderate: gravelly
Gunsight gravelly loam, 0-10% slopes (25% of Unit)	Moderate: gravelly, slope	Severe: gravelly, slopes >2% in places, may be dusty	Moderate: gravelly, may be dusty	Moderate: gravelly	Moderate: gravelly
Pinal gravelly loam 0-5% slopes (20% of Unit)	Severe: very slowly permeable hardpan	Severe: <20 inches to hardpan, gravelly	Moderate: gravelly, may be dusty	Moderate: gravelly, may be dusty	Severe: <20 inches to hardpan, low water capacity
<u>5. Mohall-Laveen Association</u>					
Mohall clay loam 0-1% slopes (45% of Unit)	Moderate: moderately slow permeability, clay loam surface	Moderate: moderately slow permeability, may be dusty, clay loam surface	Moderate: clay loam surface, may be dusty	Slight: may be dusty	Moderate: clay loam surface
Laveen loam 0-1% slopes (30% of Unit)	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
<u>6. Laveen-Coolidge Association</u>					
Laveen loam 0-1% slopes (45% of Unit)	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
Coolidge sandy loam 0-1% slopes (30% of Unit)	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight

TABLE C - Page 3

SOIL LIMITATION RATINGS AND SOIL FEATURES AFFECTING RECREATIONAL USES

Map Symbol and Major Soil Components	Camp Areas	Playgrounds	Paths & Trails	Picnic Areas	Lawn & Golf Fairways
<u>7. Ebon-Pinamt-Tremant Association</u>					
Ebon gravelly loam 1-10% slopes (35% of Unit)	Moderate: gravelly, slow permeability	Severe: gravelly	Severe: very cobble	Moderate: gravelly	Severe: slow per- meability
Pinamt very cobble loam, 1-10% slopes (25% of Unit)	Severe: very cobble	Severe: very cobble	Severe: very cobble	Severe: very cobble	Severe: very cobble
Tremant very gravelly loam, 1-5% slopes (20% of Unit)	Severe: very gravelly	Severe: very gravelly, some slopes >2%	Severe: very gravelly	Severe: very gravelly	Severe: very gravelly
<u>8. Casa Grande-Harqua Association</u>					
Casa Grande sandy loam, 0-1% slopes (35% of Unit)	Severe: slow permeability, may be dusty	Moderate: slow permeability, may be dusty	Slight: may be dusty	Slight: may be dusty	Severe: slow per- meability
Harqua very gravelly clay loam, 0-5% slopes, (35% of Unit)	Severe: very gravelly surface	Severe: very gravelly	Severe: very gravelly	Severe: very gravelly	Severe: very gravelly
<u>9. Mohall-Contine Association</u>					
Mohall loam 0-1% slopes (55% of Unit)	Moderate: moder- ately slow per- meability	Moderate: moder- ately slow permeability	Slight: may be dusty	Slight: may be dusty	Moderate: moder- ately slow per- meability
Contine clay loam 0-1% slopes (35% of Unit)	Moderate: slow permeability	Moderate: slow permeability, clay loam surface	Moderate: clay loam surface, may be dusty	Moderate: clay loam surface	Severe: slow per- meability

Map Symbol and Major Soil Components	Camp Areas	Playgrounds	Paths & Trails	Picnic Areas	Lawn & Golf Fairways
<u>10. Cherioni-Gachado-Rock Outcrop Association</u>					
Cherioni gravelly very fine sandy loam 10-40% slopes (35% of Unit)	Severe: slope	Severe: shallow soil, slope	Severe: gravelly, slope	Severe: slope	Severe: shallow soil, low water capacity, slope
Gachado very cobbly loam, 10-40% slopes (15% of Unit)	Severe: very cobbly surface, some slopes >15%	Severe: very cobbly, slope	Severe: very cobbly, slope	Severe: very cobbly, slope	Severe: very cobbly, slope
Rock Outcrop 10-80% slopes (15% of Unit)	Exposures of bedrock - all ratings are severe				
<u>11. Continental-Pinaleno-Cave Association</u>					
Continental gravelly sandy loam, 1-20% slopes, (30% of Unit)	Moderate: slow permeability, severe on slopes >15%	Severe: gravelly, slope	Moderate: gravelly	Moderate: gravelly; severe on slopes >15%	Severe: slow permeability, slope
Pinaleno very gravelly sandy loam 1-15% slopes (25% of Unit)	Severe: very gravelly	Severe: very gravelly, slope	Severe: very gravelly	Severe: very gravelly	Severe: very gravelly
Cave gravelly sandy loam, 1-5% slopes (25% of Unit)	Moderate: gravelly, may be dusty	Severe: gravelly, shallow soil, may be dusty	Moderate: gravelly, may be dusty	Moderate: gravelly, may be dusty	Severe: very low available water capacity
<u>12. Latene-Vekol-Anthony Association</u>					
Latene loam 0-1% slopes (35% of Unit)	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight: may be dusty	Slight

TABLE C - Page 5

SOIL LIMITATION RATINGS AND SOIL FEATURES AFFECTING RECREATIONAL USES

Map Symbol and Major Soil Components	Camp Areas	Playgrounds	Paths & Trails	Picnic Areas	Lawn & Golf Fairways
Vekol clay loam 0-1% slopes (30% of Unit)	Moderate: clay loam surface, slow permeability	Moderate: slow permeability, clay loam surface	Moderate: clay loam surface	Moderate: clay loam surface	Severe: slow permeability
Anthony sandy loam 0-5% slopes (15% of Unit)	Slight: may be dusty	Slight: 0-2% slopes; moderate: 3-5% slopes; may be dusty	Slight: may be dusty	Slight: may be dusty	Slight
<u>13. Cellar-Lehmans-Rock Outcrop Association</u>					
Cellar very gravelly sandy loam 5-40% slopes (25% of Unit)	Severe: very gravelly, slope	Severe: very gravelly, slope	Severe: very gravelly, slope	Severe: very gravelly, slope	Severe: very gravelly, slope, low available water capacity
Lehmans cobbly loam 15-60% slopes (20% of Unit)	Severe: slope	Severe: cobbly, slope, shallow soil	Severe: slope	Severe: slope	Severe: slope
Rock Outcrop 10-80% slopes (35% of Unit)	Exposures of bedrock - all ratings are severe				
<u>14. Barkerville-Cabezon-Rock Outcrop Association</u>					
Barkerville cobbly sandy loam, 10-40% slopes, (25% of Unit)	Severe: slope	Severe: cobbly, shallow soil, slope	Severe: slope	Severe: slope	Severe: low available water capacity slope
Cabezon cobbly loam 10-30% slopes (20% of Unit)	Severe: slope	Severe: cobbly, slope, shallow soil	Moderate: cobbly, slope; severe where slopes >25%	Severe: slope	Severe: slope
Rock Outcrop 10-80% slopes (35% of Unit)	Exposures of bedrock - all ratings are severe				

LAND



Manufacturing is a land use . . .



Farming is a land use . . .



So are parking lots a use of land.

Photos: Spreckles Co. & Salt River Project

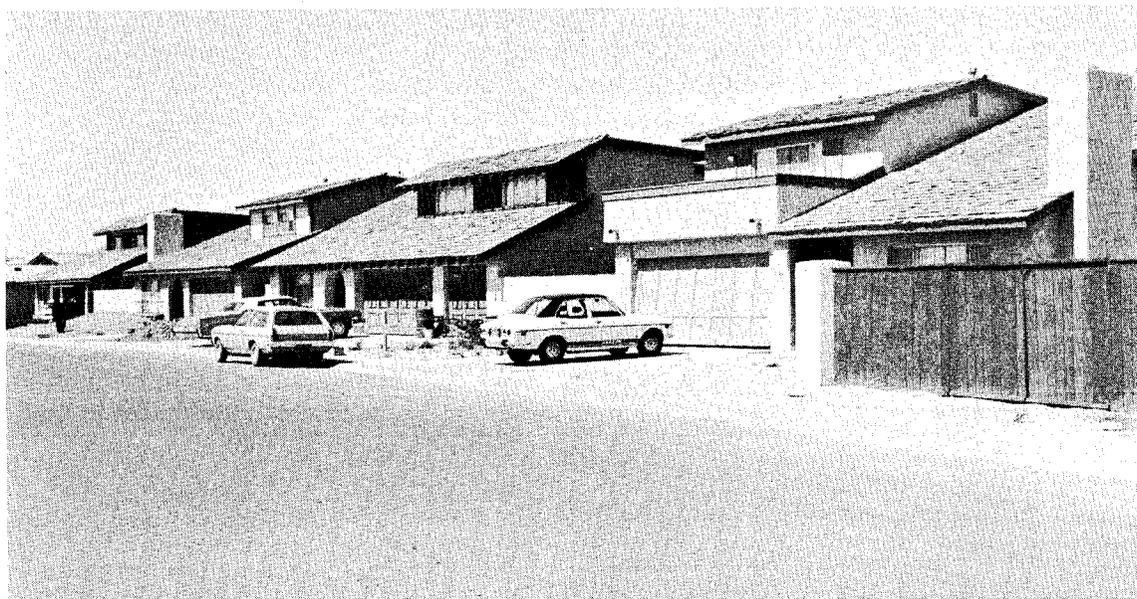
LAND USE

Central Arizona was developed primarily for irrigated agriculture. The population growth was slow and irregular until the 1940's, at which time many people became aware of the sunny climate through military activities. The war also stimulated the need for food and fiber, and the agricultural industry responded by developing more cropland and improving the efficiency of crop production on existing farms.

Air-conditioning in homes and industrial buildings made the area more attractive for incoming residents, and the population has grown at an increasing rate since World War II.

Population in Arizona increased 73 percent from 1950 to 1960. An additional 36 percent increase occurred from 1960 to 1970. The total in 1970 was about 1.7 million in Arizona, of which about 90 percent were urban residents. Approximately 55 percent of the total population were within the boundaries of the Hohokam RC&D Project area.

There are two areas of concern related to population density. One is that apartment housing, "quads", townhouses and mobile home parks are placing families in very close proximity--as many as 12 families per acre.



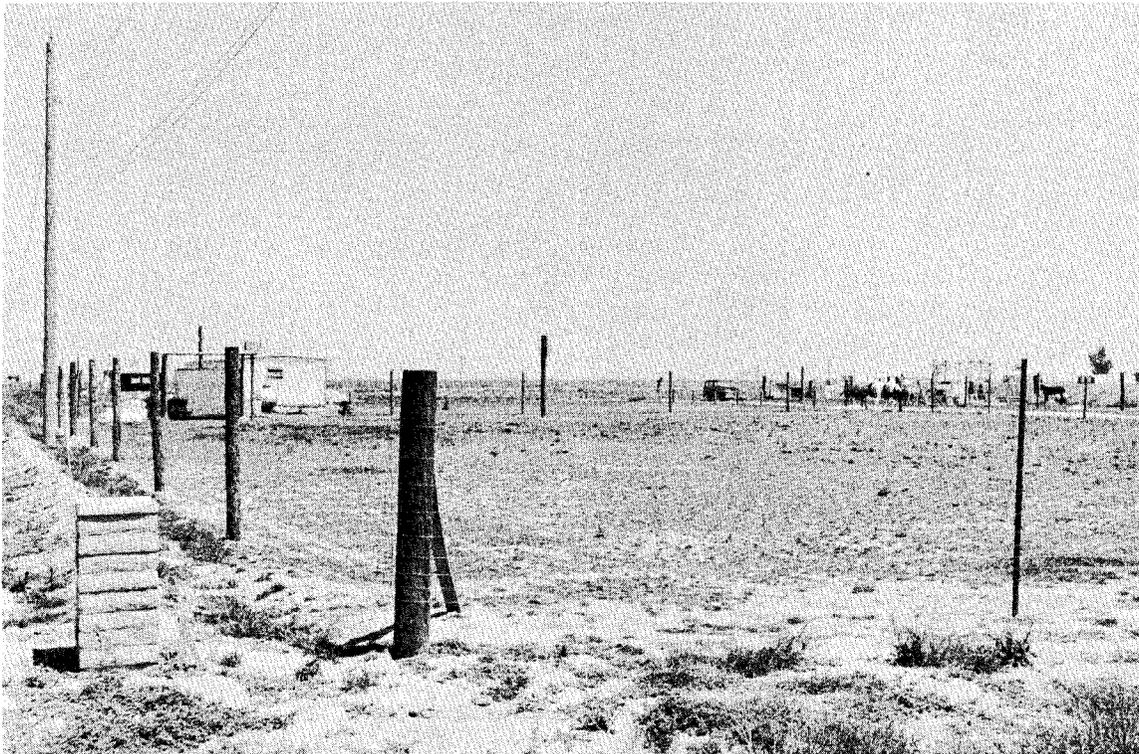
Dense new housing

SCS PHOTO

Contrasted to the excessively high density areas are the "ranchette" type of development, some of which are poorly planned.

Some developers have purchased the larger farms and subdivided them into small parcels of 10 acres or less. These "ranchettes" now number in excess of 3,000 within the project area.

The majority of the owners of these ranchettes have limited experience in land, plant or animal management.

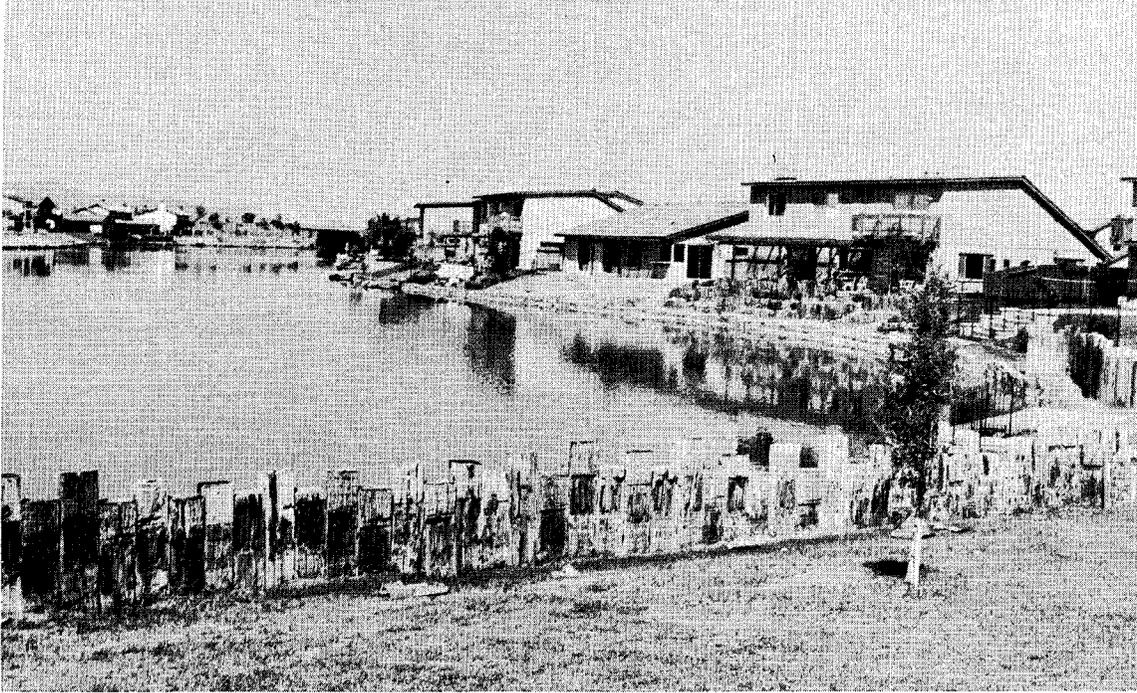


Mobile home located on small ranchette

SCS PHOTO

For example, Maricopa County Extension Office revealed the following: "---A new ranchette owner had purchased one milk cow, and not knowing how to milk a cow, purchased a milking machine which cost more than the cow. After a hasty glance at the directions, he attached the milking machine to the cow. After 30 minutes of milking, he noted the milk was turning pink from injury to the udder. At this point he sought help.---"

Good planning in the use of land and water results in a pleasing environment. Some developers are taking advantage of modern comprehensive planning and are building within the capabilities of the resources.



Soil and water resources integrated
into a well planned development

SCS PHOTO

Land uses are varied, overlapping, and in some cases, conflicting. Irrigated agriculture is a major use of land. About 500,000 acres are used to produce food and fiber and over 5 million acres are grazed by domestic livestock.

The irrigated cropland not only tempers the climate by cooling in the summer, but it also helps alleviate the cold in the winter. This interaction, though unrecognized by most of the people, reduces the energy requirements for maintaining a comfortable living for the residents and tourists.

Another factor for consideration is the matter of air purification that takes place by growing plants. Plants remove carbon monoxide and carbon dioxide from the air and replace it with oxygen. Rough estimates show that 240,000 acres of crops will produce more oxygen than the present population requires. Additional benefits include esthetic values, reduction of noise levels, and the trapping of particulate matter in the air. Many landscape architects use plants for these purposes in new construction.

With these advantages already available in much of the area, it seems logical that areas be designated as green belts to continue this multiple use of the land and decentralize the various sources of pollution. With proper land use planning, green belts would enhance the area. They could be used as floodways to reduce flood damage and furnish additional recreational areas.

Municipalities in other states have developed schemes to encourage this type of land use in many ways. One of these is the "sell back" method in which the local unit of government would purchase a needed parcel of land. They would retain the necessary easements for flood control and open space, then re-sell it to a new owner, and use the funds to purchase the bordering parcel of land and repeat the process. Some of the municipalities have reduced the taxes on cropland to encourage the owners to keep it in open space and green belts by continuing to farm it. With proper planning and dedication, such land use plans may be put into practice in this area.

Some governmental agencies are required to present an acceptable environmental study on any major change in the land use. Should not this same requirement be made of land developers and other potential land users?

The principal of "internalizing the externalities" should be a guiding factor in allowing change in our present land use. This principal holds that no one has the right to take actions that adversely affect others. An example of this is in the building of subdivisions. Runoff water is increased, solid waste is created, more schools and recreational facilities are needed. The developer should be required to take care of these requirements in his overall plan for the area.

Land grazed by domestic livestock is also used for recreation. It has esthetic value and provides habitat for wildlife. Land for urban uses, both residential and industrial, occupies approximately 221,000 (1970) acres.

Military activities include major air bases which are used for training in military tactics. Some 3/4 million acres are used for such national defense purposes. Restrictions on these lands eliminate most non-military uses.

Lakes, ponds, rivers and other open water bodies cover about 17,000 acres within the project area.

A "Comprehensive Plan for Maricopa County," prepared by the Maricopa County Planning Department and published in 1967, lists land use and projections to 1980 according to the following tables. This plan is being updated to more accurately reflect present conditions. It is, however, the best source of information available at this time.

EXISTING LAND USES - 1964*

<u>Land Utilization</u>	<u>Area in Square Miles</u>	<u>% of Total County Area</u>
Urbanized Areas	160	1.7
Agriculture	860	9.3
Major Public Open Spaces**	2,425	26.3
Indian Reservations	415	4.5
Desert or Mountainous Areas***	5,366	58.2
TOTAL COUNTY AREA	9,226	100.0

FUTURE LAND USES - 1980*

<u>Land Use Category</u>	<u>Area in Square Miles</u>	<u>% of Total County Area</u>
Existing or Potential Urbanized Areas	451	4.9
Agriculture	707	7.7
Major Public Open Spaces**	2,425	26.3
Indian Reservations	415	4.5
Desert or Mountainous Areas***	5,228	56.6
TOTAL COUNTY AREA	9,226	100.0

* Taken from Maricopa County Planning Department.

** Includes 2 Air Force Bases, the Tonto National Forest and Maricopa County Parks.

*** Includes Public Domain and other vacant lands.

Land Ownership

The Federal Government owns approximately 58 percent of the land. About 10 percent of the land is owned by the state of Arizona. Indian reservation lands, held in trust by the federal government, occupy about 8 percent. Nearly 24 percent is in private ownership.

Land ownership and administration is shown in the following table and the location is shown on the map at the end of this section.

Approximate Land Ownership and Administration - Hohokam RC&D

	<u>Project Area</u>
	<u>Acres</u>
Federally Administered Land	3,608,557
Indian Trust Lands	500,000
State Administered Lands	603,443
Private and Other Public Lands	<u>1,476,000</u>
TOTAL	6,188,000

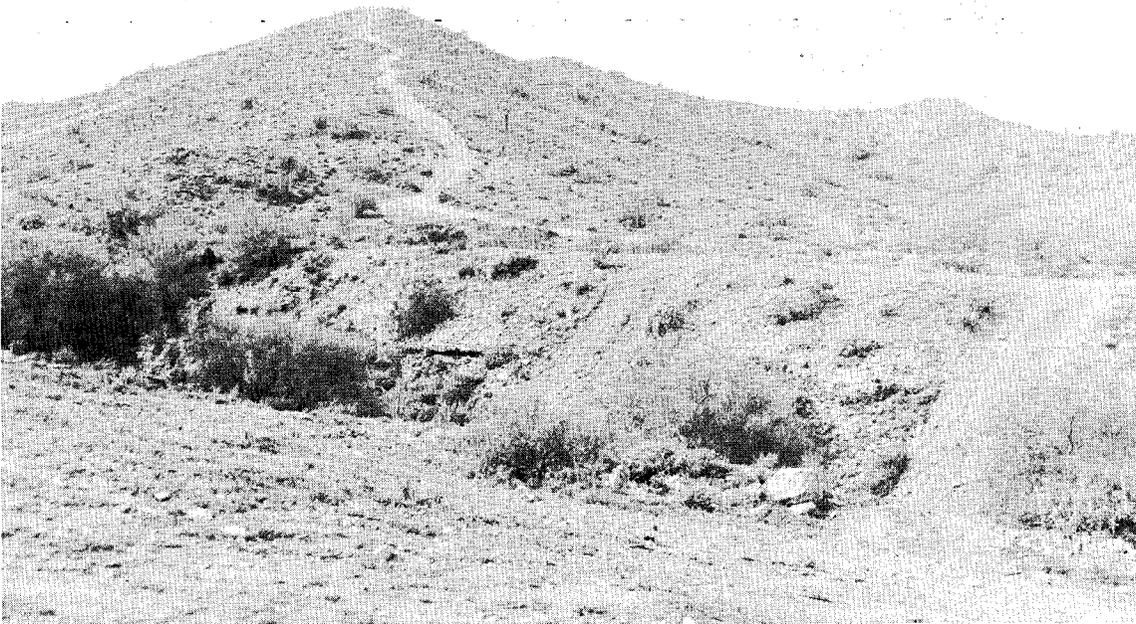
Land Changes and Trends

The urban area is rapidly expanding onto cropland and desert land. Only small areas of land are being developed for crop production, and the total acreage of cropland is decreasing.

Areas used for livestock grazing are subject to increasing pressures from other uses. The trend is a reduction in the length of time the desert lands are grazed and lesser numbers of livestock on the land, except when precipitation is above average and forage is abundant. The same lands support increasing uses for recreation, such as motorcycle riding, sightseeing, rockhounding, and exploration. As a result, vegetative cover is being destroyed, soil erosion is increasing, and increasing amounts of sediment are being deposited in lakes, streams and on lands at lower elevation. Esthetic values of the land and wild-life habitat are being degraded.

Desert ecosystems are very fragile and, when damaged, are difficult to restore. Most of the area is in need of some kind of land treatment. Over one million acres need special conservation treatment such as the reestablishment of vegetative cover, erosion control and other vegetative changes.

Management and control of the use of land is necessary to reduce the deterioration. Land use restrictions must be strengthened where resources are deteriorating.



Off-road vehicles leave their trails

SCS PHOTO 2-1056-12

The development of vacant lands to urban uses can increase the water runoff approximately 300 percent, causing severe flood hazards and sediment damage to the developed areas below them. This excess water often has no natural drainageway, since many of the water courses have been altered by the construction of homes in these areas prone to flooding.

Scattered urban areas are difficult to serve with utility systems which require more land, pipelines, etc. There is no shortage of land for urban uses, although change of land use is difficult. Legal barriers, water supply, transportation and utilities are factors that must be considered.

Many owners of cropland live elsewhere and lease the land to farmers on a year-to-year basis. The public may obtain some use permits on public land.



New construction in flood prone areas
is not good land use planning

ARIZONA REPUBLIC NEWSPAPER PHOTO

Comprehensive Land Planning Status

Recent legislation (Thirty-first Legislature-regular session) has outlined the procedure under which a state comprehensive land use plan will be developed. This planning process will include the further collection and analysis of information (ATOM)* concerning present and future uses of land. It will also include the social, economic, and environmental conditions relating to the land and the formulation of alternative goals and objectives for land use.

The Maricopa Association of Governments has compiled a composite land use plan, consisting of all approved land use plans of cities, towns, Maricopa County and Indian reservations within the county. This composite map has assisted in illustrating the relationships of land use planning among the governmental jurisdictions.

A comprehensive plan for future general land use has been developed by the Maricopa County Planning Department. The summary of major findings of this report included:

- An expected increase of the total land area in urban uses in Maricopa County from 160 square miles in 1964 to 451 square miles in 1980. Most of this growth is projected for the Phoenix urban area. It is expected to increase from 150 square miles in 1964 to 398 square miles in 1980.

* Arizona Trade Off Model Computer Program

----- There are several comprehensive planning studies completed or in progress within Maricopa County. The existing study areas include 13 of the 18 incorporated cities and towns in Maricopa County. Each of these cities and towns has comprehensive planning studies or programs for their defined areas of study.

----- The Maricopa Association of Governments has compiled a composite land use plan, consisting of all approved land use plans of cities, towns, Maricopa County and Indian reservations within the county. This composite map has assisted in illustrating the relationships of land use planning among the governmental jurisdictions.



Urban encroachment on rural areas

SCS PHOTO

Problems

- There has been inadequate study, and planning and zoning to insure that actions of builders and land developers do not adversely affect others or seriously overuse the natural resources, such as surface water, ground water, soils, wild-life and vegetation.
- The addition of many new people to an area places an extremely heavy load on the existing water and sewage systems, solid waste disposal systems, school districts, police departments, and transportation facilities.
- Uncoordinated development of the land is allowing urban sprawl, excess erosion, pollution, and many other related problems.
- There is insufficient knowledge to revegetate the desert lands after plant life and the soil surface have been damaged by construction or misuse.

Opportunities

- There is an opportunity to coordinate planning and zoning for future growth through research and meetings.

Actual Example:

Meeting of RC&D Sponsors
Chandler
Gilbert
Mesa
Tempe

Common Problem - Flooding

Observations - Tempe is requiring the lots in new subdivisions to be submerged to catch and hold rainwater, thus, reducing flood hazard.

Solution - All cities adopt similar requirements, thus, reducing flood hazard and land requirements for floodways.

- There is an opportunity to participate in the development of a comprehensive plan for the proper use of the land.
- There is an opportunity to obtain information and to develop practical methods of revegetating disturbed desert areas.

WATER

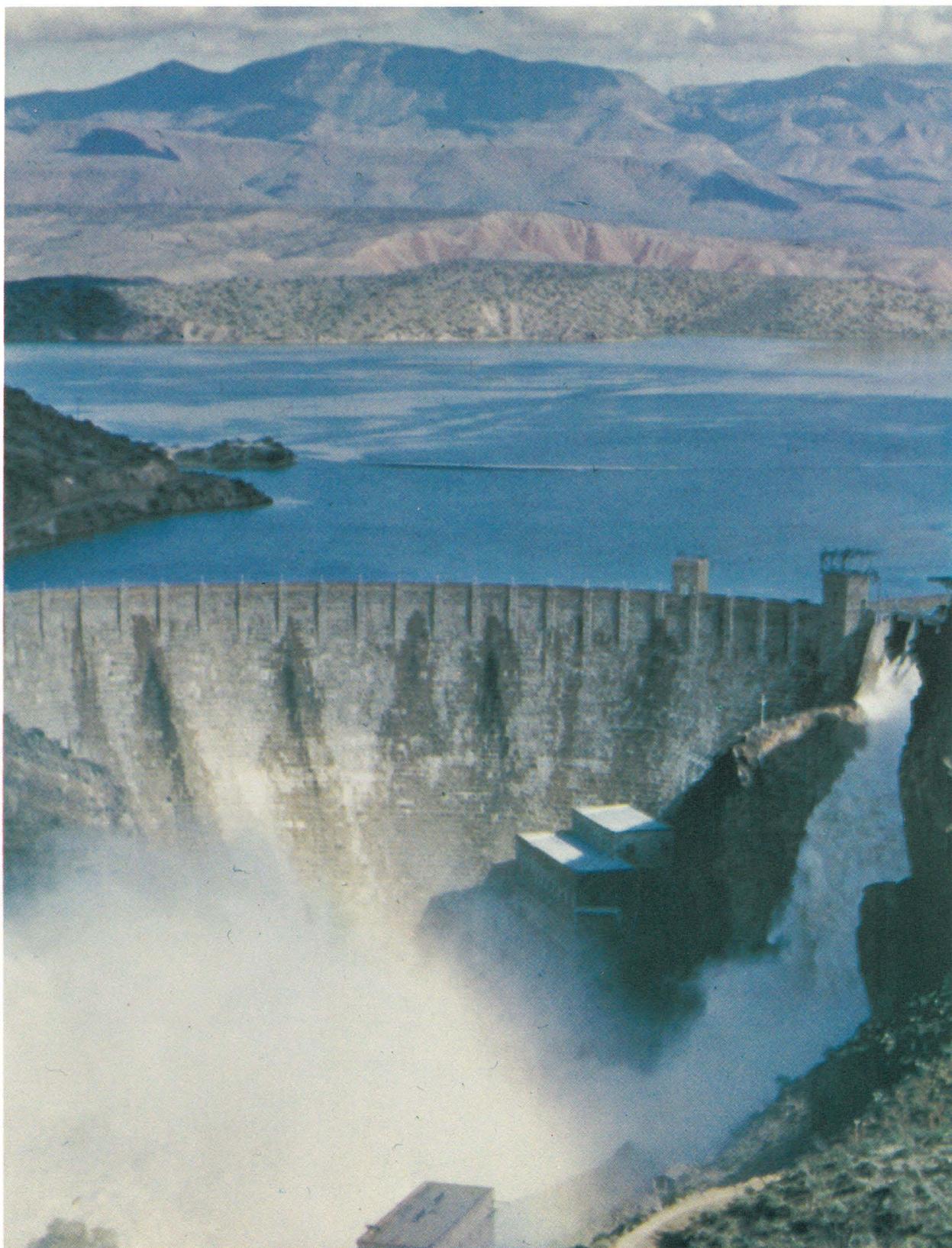


Photo: Salt River Project

WATER

Water is one of the most important natural resources in the Hohokam RC&D Project area. Most of the area is desert and would be uninhabitable without the very complex water management systems designed to store and distribute water as efficiently as possible.

The largest Ponderosa Pine forest in the world borders the project on the north, and most of the water used in the project comes from this forested area.

The Soil Conservation Service and the Salt River Project carefully monitor the mountain watersheds for snow pack, since this is a very good indicator of the future water supplies for the large metropolitan areas and for the agricultural interests.



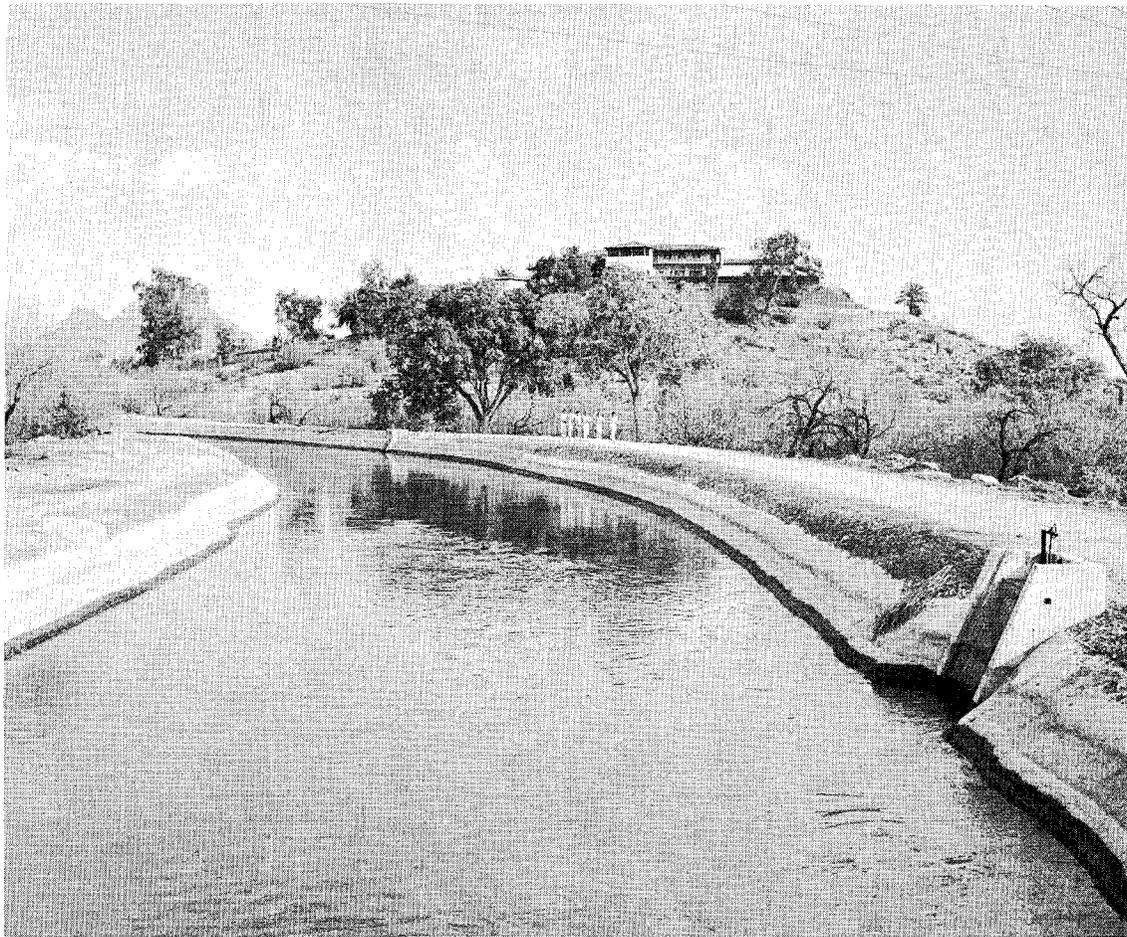
Dick Enz, Soil Conservation Service Snow Survey Supervisor, surveying the winter snow pack. This information furnishes vital data necessary to predict the available water supply in the Hohokam RC&D Project area

SCS PHOTO 2-5460

Approximately 1,800,000 acre-feet of water is used in the project area each year. This water comes from two sources. One source is direct runoff from the watersheds of the Salt, Verde, Hassayampa, Gila and Agua Fria Rivers. The other source is ground water that must be pumped from varying depths. (See the maps at end of this section.)

Large storage reservoirs, which accommodate most of the runoff, have been constructed on the major streams in the Hohokam area. Water from the reservoirs is distributed to the large metropolitan areas and croplands by a system of canals.

This series of storage reservoirs serve many very important purposes other than agricultural and domestic. Their use for recreation, such as swimming, boating, fishing, picnicking and esthetic appreciation, is enjoyed by hundreds of thousands of people. The reservoirs with their capacities are shown in the following table.



Salt River Project Canal

SALT RIVER PROJECT PHOTO

<u>River</u>	<u>Reservoir</u>	<u>Storage Capacity in Acre-Feet</u>	<u>Surface Acres - High Water Line</u>
Salt River	Roosevelt	1,382,000	17,000
	Apache	245,000	2,600
	Canyon	58,000	950
	Saguaro	70,000	1,280
Verde River	Horseshoe	139,200	2,800
	Bartlett	178,500	2,700
Gila River	San Carlos	948,000	5,000
Agua Fria	Lake Pleasant	<u>157,600</u>	<u>3,500</u>
	Total	3,178,900	35,830

There are about 36,000 surface acres of water in the project area as shown in the table above. The average surface acreage is estimated to be 25,000 acres.

Evaporation is approximately 71 inches per year. This results in about 150,000 acre-feet of water lost annually to the atmosphere.

The quality of the surface water is good. Total dissolved salts range from 300 to 400 parts per million in the Agua Fria and Verde rivers. The Salt and Gila rivers contain from 700 to 900 PPM dissolved salt.

The second source of water in the Hohokam RC&D Project area is the ground water.

Most of the project area is underlain by large ground water aquifers which are supplying approximately half of the total water used.

Water is being pumped from the underground supplies faster than they are being recharged. This has caused the water level to drop approximately ten feet per year in recent years. If this overdraft continues, this ground water resource will be seriously depleted.

Some areas have been designated "critical ground water areas", and pumping for agricultural purposes is restricted. This state-administrated program precludes further agricultural development in these designated areas.

The quality of the ground water in the project area is, for the most part, suitable for both irrigation and domestic uses. There are, however, local problems where the salt content is excessive for domestic use. When saline waters are used for irrigation, greater amounts of water are required to leach the salts below the root zone.

As underground water levels decline, the quality of water may deteriorate, usually becoming more saline. This compounds the water problem for the particular areas.

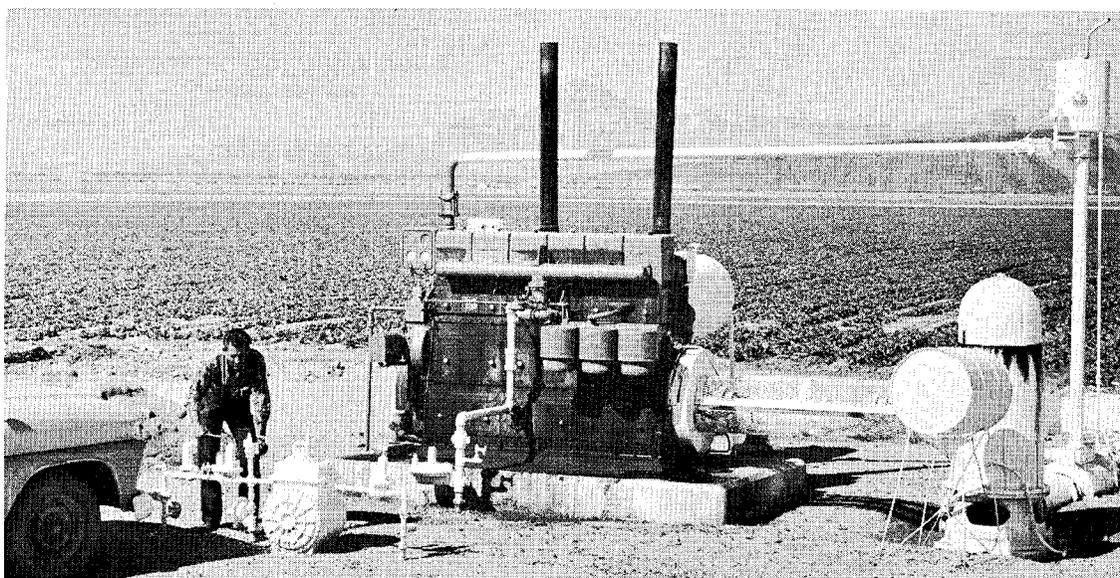
The ground water contains many dissolved salts. Chlorides and bicarbonates of calcium, magnesium or sodium are common. The total dissolved salts range from 300 to 5,000 parts per million with most of it between 1,000 and 2,500 PPM.

All the surface waters have been appropriated and are managed primarily by six irrigation districts. These districts include the Salt River Project, the Roosevelt Water Conservation District, Maricopa County Municipal Water Conservation District No. 1, the Roosevelt Irrigation District, the Buckeye Irrigation District and the San Carlos Irrigation District.

All the irrigation districts are very conscious of the need for efficient use of water. Agriculture uses about 90 percent of the total water supply. There are approximately 1,600 miles of canals and laterals in the Hohokam RC&D Project area. Approximately 1,200 miles have been lined with concrete to reduce seepage losses.

The sponsors will have to determine priorities on over 50 project measures and proposals dealing with the conservation of irrigation water.

Irrigation districts cooperate with many agencies' programs of water management to increase the efficiency of water deliveries and uses. Agencies involved in such programs include, among many others, the natural resource conservation and development districts, the universities, the Arizona Water Commission, the Bureau of Reclamation, the Soil Conservation Service, and the U.S. Geological Survey.



Arizona Public Service Pump

ARIZONA PUBLIC SERVICES COMPANY PHOTO

A third possible source of water is the Central Arizona Project. This is a plan to import Colorado River water into central Arizona by an aqueduct.

Importation of Colorado River water to the Hohokam RC&D Project area via the Central Arizona Project will have several major long-term effects. The aqueduct, with its protective dikes, will provide flood control in the Scottsdale, Paradise Valley and northeast Phoenix areas. Orme Dam, at the confluence of the Salt and Verde rivers, will reduce the flow rate of releases from the Salt River Project reservoir system when watershed runoff exceeds storage capacity. The imported water will reduce the annual overdraft upon ground water reserves, and the rate of land subsidence associated with the declining water tables. It will also assure municipal and industrial users of water that inevitably increasing future demands can be met. Availability of water for recreation use will also be increased in the areas where the pressure of use upon existing water resources is extremely high.



Robert L. Tyson, Jr., applying an efficient irrigation to his well-leveled field from his concrete-lined ditch.

SCS PHOTO

Problems

- The ground water is being depleted.
- Distribution and delivery of irrigation water is, in some cases, in earthen ditch systems that need to be lined with impervious linings, and in other cases, such impervious lining is in need of repair or replacement. A few systems need to be redesigned and replaced.
- Evaporation of water is near six feet per year from open surfaces. This causes the loss of a large amount of water that could otherwise be used for irrigation, municipal and industrial uses, and recharge of ground water.
- All the water is not being used as efficiently as possible.
- Water at some locations is high in salt.

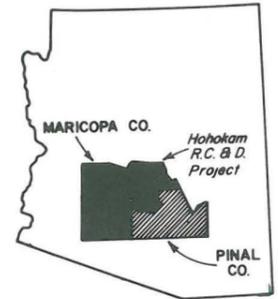
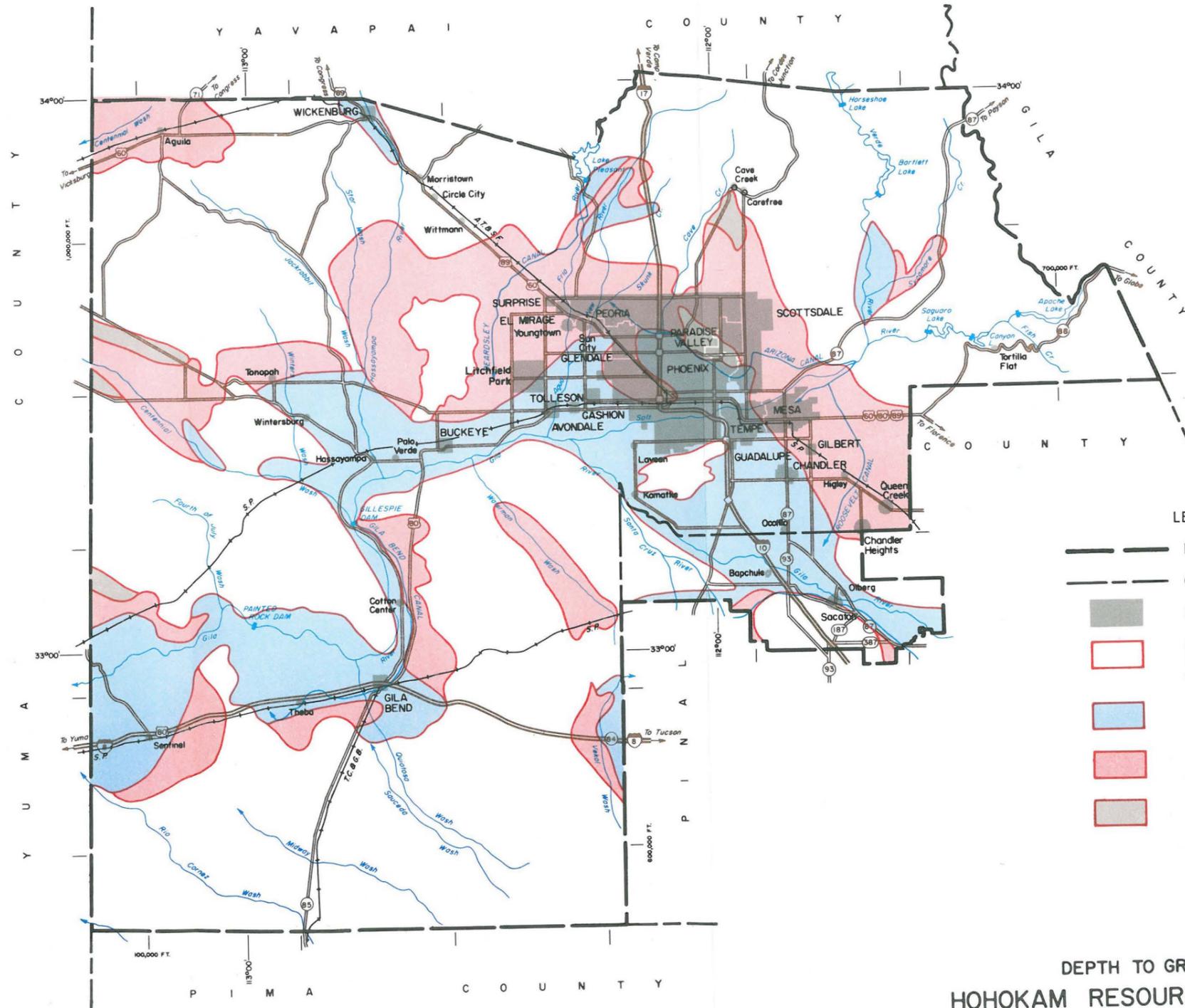


Irrigation system in need of improvement

SCS PHOTO

Opportunities

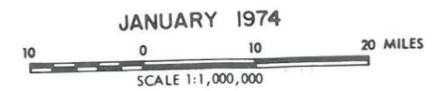
- Accelerate construction of the Central Arizona Project.
- Accelerate watershed research for maximum water yield, and implement accepted practices.
- Control seepage in canals, laterals, ditches and ponds by lining with concrete or other relatively impervious materials.
- Control the use of water for esthetic purposes and the creation of lakes in developments, to insure prudent use of available water.
- Establish "critical ground water areas" as soon as the need is evident.
- Expand consultive irrigation services in the distribution and application of water such as those provided by federal and state agencies, irrigation projects and private consultants.
- Implement better irrigation water scheduling and delivery procedures in urban areas.
- Implement a meteorological telemetry system to provide early warning of peak runoff, and changes in water supply forecasts to facilitate better reservoir system management.
- Improve regulations governing the establishment of critical ground water areas.
- Increase irrigation efficiency on the cropland by such practices as flat leveling the land, the use of sprinkler irrigation, tailwater return systems and trickle irrigation systems.
- Investigate the feasibility of increased precipitation by weather modification techniques.
- Investigate the use of floodwaters from minor tributaries for recharge or other uses.
- Promote accelerated research of evaporation suppression for exposed water surfaces.
- Promote an extensive water conservation information program.
- Reuse municipal effluent.



LEGEND

- Project Boundary
- County Boundary
- Urban Areas
- Mountainous areas in which data are insufficient to delineate depth to water
- In general, depth to water is less than 200 feet below land surface
- In general, depth to water is 200 to 500 feet below land surface
- In general, depth to water is greater than 500 feet below land surface

**DEPTH TO GROUNDWATER
HOHOKAM RESOURCE CONSERVATION
AND DEVELOPMENT PROJECT
MARICOPA AND PINAL COUNTIES, ARIZONA**



ARIZONA STATE PLANE COORDINATE SYSTEM,
CENTRAL ZONE, 100,000 FOOT GRID.

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA-SCS-PORTLAND, OREG. 1974

M7-N-22792 G

FLOOD CONTROL



Photo: Soil Conservation Service

FLOOD CONTROL

Flooding can occur at many locations in the Hohokam RC&D Project area. The majority of land is on alluvial fans with poorly defined drainage areas. High intensity storms cause some flooding because of the lack of drainage.

Rural areas are rapidly being converted to urban uses and the construction of thousands of homes, roadways, and industrial buildings has increased runoff, thereby, adding to the tremendous flood hazard. A recent study by the Soil Conservation Service indicated that an increase of over 300 percent in runoff volume may occur when an area is converted from natural desert into housing.



ARIZONA REPUBLIC NEWSPAPER PHOTO

Some developers have shown an almost complete disregard for the flood hazard. Dry washes have been filled for subdivision development, and no channels were provided for floodwaters. Buildings without flood-proofing have been constructed in flood plains. Cities and towns have grown rapidly with insufficient means of disposing of local flood flows. Newcomers to the area are generally unaware of the flood problem, and the philosophy of, "let the buyer beware," has resulted in many homeowners suffering unexpected damages. Damage during the June 21-22, 1972 flood amounted to about \$10,588,000 in the Phoenix metropolitan area.

The control of floodwaters in the project area requires the cooperation of all agencies and organizations with responsibilities in that field.

The Hohokam RC&D Project has cooperated with the Flood Control District of Maricopa County, the Maricopa Association of Governments, the Army Corps of Engineers, and other state and federal agencies in the development of a five-year capital improvement program for flood control in the project area.

Based on data taken from the "Comprehensive Framework Study - Lower Colorado Region," if no flood control measures are implemented within the Hohokam RC&D Project area, the annual flood damages are projected to increase by more than ten-fold by the year 2020. Flood control measures identified by this study could reduce the estimated annual flood damages over 90 percent.



Indian Bend Wash in Scottsdale area

ARIZONA REPUBLIC NEWSPAPER PHOTO

The avoidance of flood damage will require structural and non-structural measures. Flood plain zoning is the most critical non-structural measure needed. Wise use of flood prone areas can result in property which will be a valuable asset to the community and the property owners. Agriculture, ranching, parks, golf courses, small lakes, and riding trails are just a few of the developments which are very compatible with flood plains.

The lack of enforceable land use plans has resulted in subdivisions being built in areas subject to flooding. Homes are being built in the right-of-way required for potential watershed projects. The development of needed land is causing a large increase in the costs of the flood control projects.

House Bill 2010, which became effective August 3, 1973, provides for flood plain management by cities, towns and counties; authorized adoption of rules and regulations therefore, and prohibited obstruction of water courses. The passage of this bill will require flood plain zoning and provide for a better use of flood plains.

The "Comprehensive Flood Control Program Report," prepared by the Flood Control District of Maricopa County in 1963, describes the important flood control projects in the area. The present status and estimated costs of the flood control projects are shown in Table 1. The flood control map shows the locations of the various works of improvement. It is recognized that other projects are needed to reduce the total flood damage.

Construction of the Buckeye project was started in August 1973, and Phase I is scheduled for completion in March 1974. Phases II and III are scheduled for completion in 1975 and 1976, respectively. Dreamy Draw Dam, a Phase B project of the Corps of Engineers (Table 1), was completed in August 1973. Construction can begin on other projects as soon as rights-of-way can be acquired. Funds available for purchasing rights-of-way have recently been increased and also have been matched by state funds. This will greatly expedite land acquisition.

Problems

- Floods damage homes, businesses, public facilities, cropland, and other resources; interrupt communications and threaten lives.
- There is insufficient flood plain zoning and enforcement.
- Damage from floodwaters is increasing.
- Insufficient land treatment on the watershed.
- Insufficient channels and floodways to control runoff waters.

Opportunities

- Install flood control projects as presently planned.
- Broaden the present flood control program to include those areas for which there are no flood control plans.
- Reduce runoff by using non-structural flood control measures.
- Develop and enforce flood plain zoning.



ARIZONA REPUBLIC NEWSPAPER PHOTO

TABLE 1
SUMMARY OF STATUS AND COSTS
OF
FEDERAL AND FEDERALLY ASSISTED FLOOD
CONTROL PROJECTS IN HOHOKAM RC&D AREA

December 1972

ARMY CORPS OF ENGINEERS PROJECTS

<u>Map Symbol</u>	<u>Name</u>	<u>Status</u>	<u>Fed. Cost</u> <u>(\$1,000)</u>	<u>Local Cost</u> <u>1/</u> <u>(\$1,000)</u>	<u>Total Cost</u> <u>(\$1,000)</u>
(M)	McMicken Dam	Const. (1956)	1,820	-0-	1,820
(P)	Painted Rock Dam	Const. (1957)	19,660	200	19,860
(W)	Whitlow Ranch Dam	Const. (1960)	1,650*	300*	1,950
(A)	Phase A	Auth. for Const.	12,400	3,000	15,400
(B)	Phase B	Auth. for Const.	86,000	18,900	104,900
(C)	Phase C	Being studied	<u>2/</u>	<u>2/</u>	55,000
(D)	Phase D	Being studied	<u>2/</u>	<u>2/</u>	62,000
Subtotal			\$121,530	\$22,400	\$260,930

BUREAU OF RECLAMATION PROJECTS

<u>Map Symbol</u>	<u>Name</u>	<u>Status</u>	<u>Fed. Cost</u> <u>(\$1,000)</u>	<u>Local Cost</u> <u>(\$1,000)</u>	<u>Total Cost</u> <u>(\$1,000)</u>
(I)	Paradise Valley Detention Dam	Auth. for Const.	12,000	-----	12,000
(II)	Orme (Maxwell) Dam	Auth. for Const.	91,600**	**	91,600
Subtotal			\$103,600	\$103,600	

TABLE 1 (Continued)
SOIL CONSERVATION SERVICE PROJECTS

Map Symbol	Name	Status	Fed. Cost (\$1,000)	Local Cost ^{1/} (\$1,000)	Total Cost (\$1,000)
(1)	White Tanks	Const. (1955)	200	195	395
(2)	Magma	Const. (1969)	1,205	385	1,590
(3)	Buckhorn-Mesa	Auth. for Const.	4,230	3,250	7,480
(4)	Apache Jct.-Gilbert ^{3/}	Auth. for Const.	2,000	2,000	4,000
(5)	Williams-Chandler ^{3/}	Auth. for Const.	4,130	2,740	6,870
(6)	Buckeye	Under Const.	3,250	4,000	7,250
(7)	Harquahala Valley	Auth. for Const.	5,000	2,500	7,500
(8)	Eagle Tail Mountain	Being Studied	1,850	700	2,550
(9)	Guadalupe	Auth. for Const.	330	360	690
(10)	Gila Floodway-LQ Creek	Being Studied	10,350	12,800	23,150
(10A)	(Gila Floodway Portion) ^{4/}		(8,000)	(12,000)	(20,000)
(10B)	(Lower Queen Creek Portion)		(2,350)	(800)	(3,150)
(11)	Wickenburg	Auth. for Const.	300	60	360
Subtotal			\$32,845	\$28,990	\$61,835
TOTAL COSTS OF ALL PROJECTS					\$424,195

SUMMARY OF PROJECTS CONSTRUCTED AND AUTHORIZED FOR CONSTRUCTION

	Fed. Cost (\$1,000)	Local Cost (\$1,000)	Total Cost (\$1,000)
TOTAL COSTS	245,475	37,830	283,305
Money spent on these projects by 7/1/72.	27,633	5,197	32,830
Amount remaining to be spent.	217,842	32,633	250,475

^{1/} Costs include the estimated value of donated private, state, and federal lands.

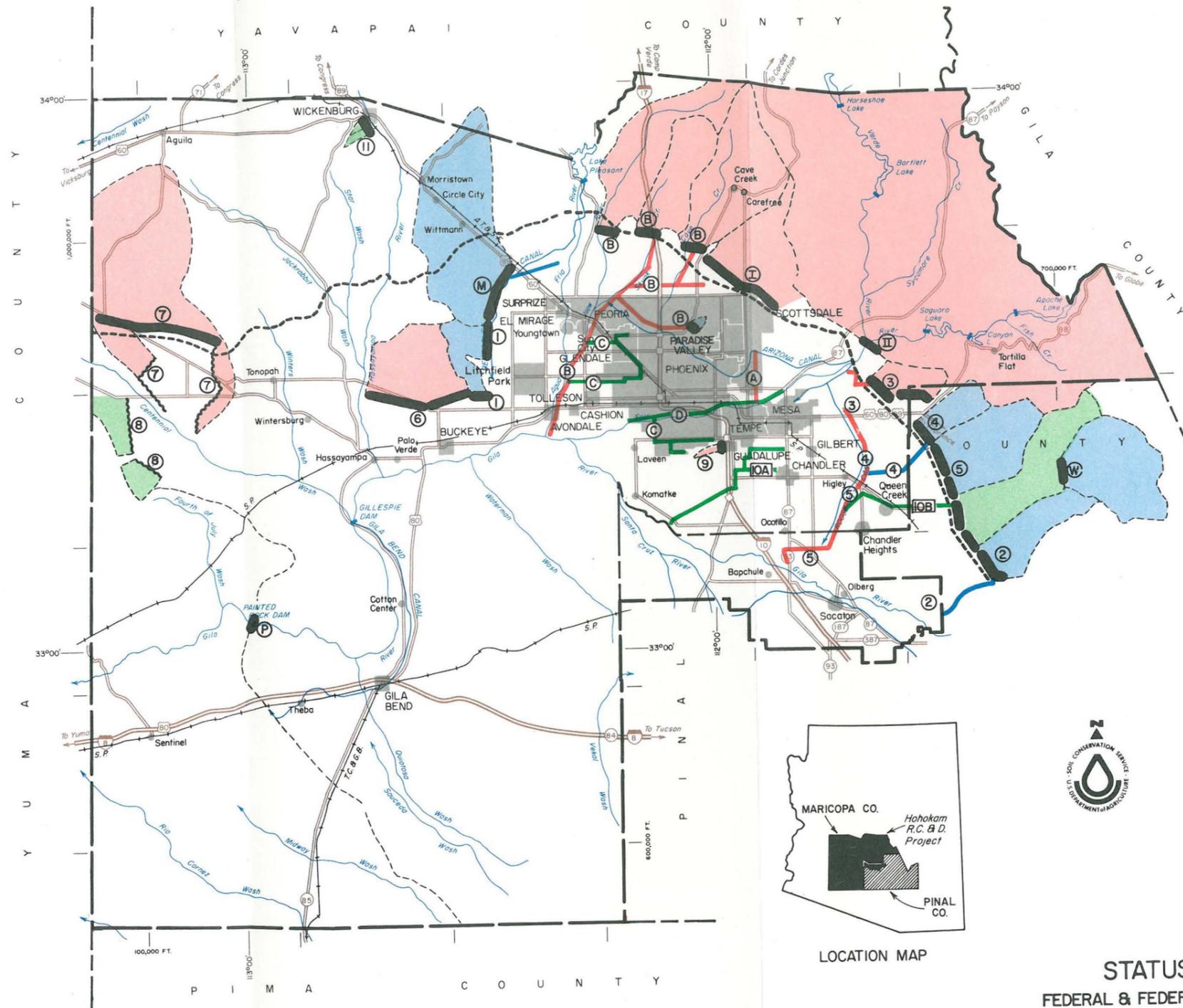
^{2/} Breakdown of costs not available.

^{3/} The floodwater retarding structures have been constructed. Remaining to be constructed is the outlet channel for these structures called RWCD Floodway.

^{4/} A question has been raised as to the federal funding of this project under the PL 566 or RC&D programs.

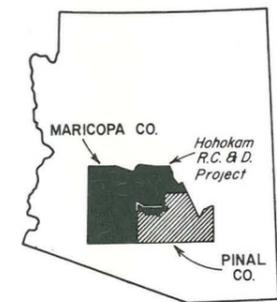
* Estimated breakdown of total costs.

** CAP Water User fees will repay the irrigation portion of this structure after the project is in operation.



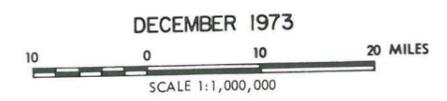
- HOHOKAM BOUNDARY
- C.A.P. CANAL
- FLOODWATER RETARDING STRUCTURES
- DIVERSION DIKES
- DRAINAGE AREA BOUNDARIES
- STATUS OF DRAINAGE AREA
 - Blue box: Above Constructed Structures
 - Pink box: Above Structures Authorized For Construction
 - Green box: Above Structures Being Studied
- STATUS OF FLOODWAYS
 - Blue line: Constructed
 - Red line: Authorized For Construction
 - Green line: Being Studied
- CORPS OF ENGINEERS PROJECTS
 - (M) McMicken Dam
 - (P) Painted Rock Dam
 - (W) Whitlow Ranch Dam
 - (A) Phase A
 - (B) Phase B
 - (C) Phase C
 - (D) Phase D
- BUREAU OF RECLAMATION PROJECTS
 - (I) Paradise Valley Detention Dam
 - (II) Orme (Maxwell) Dam
- SOIL CONSERVATION SERVICE PROJECTS
 - (1) White Tanks
 - (2) Magma
 - (3) Buckhorn - Mesa
 - (4) Apache Junction - Gilbert
 - (5) Williams - Chandler
 - (6) Buckeye
 - (7) Harquahala Valley
 - (8) Eagletail Mountain
 - (9) Guadalupe
 - (IOA) Gila Floodway - Lower Queen Creek
 - (IOB) Gila Floodway Portion
 - (IOB) Lower Queen Creek Portion
 - (II) Wickenburg
 - Grey box: URBAN AREAS

Note:
The Painted Rock Dam is a completed structure. Its drainage includes all the Hohokam R.C. & D. area located above the structure.



LOCATION MAP

STATUS & LOCATION MAP FEDERAL & FEDERALLY ASSISTED FLOOD CONTROL PROJECTS IN HOHOKAM R.C. & D. AREA ARIZONA



ARIZONA STATE PLANE COORDINATE SYSTEM,
CENTRAL ZONE, 100,000 FOOT GRID.

CROPLAND

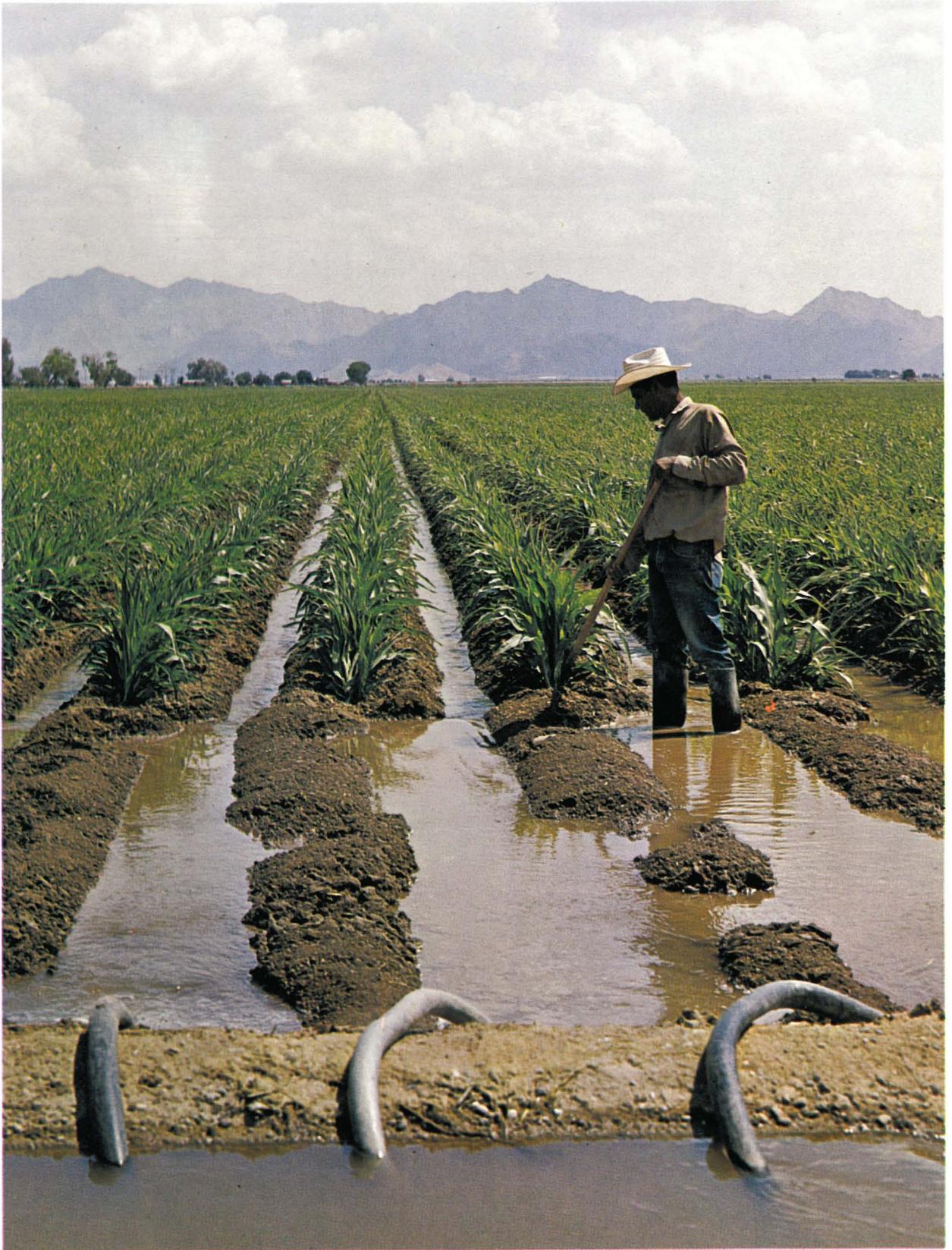


Photo: Salt River Project

CROPLAND

Agriculture is a major land use in the Hohokam RC&D Project area. The project area includes about 4 million acres that are suitable for irrigated agriculture, if water is available. Rainfall will not sustain crop production; irrigation is necessary. Fields are predominantly irrigated with furrows and borders. Interest in the use of sprinklers and drip irrigation methods is increasing. To date, about 500,000 acres are irrigated and are producing crops. More land is being developed for irrigation but is idle, abandoned as cropland, or held in speculation for urban uses. Presently about 6,000 acres are being converted annually from irrigated cropland to urban uses according to Salt River Project data. The irrigation water supply consists of about half from surface water and about half from ground water.

The number of all farms in the project area is estimated at about 1,800. Of these approximately 1,400 are farms with irrigated land. The others include poultry, livestock on range, and a few woodland pasture farms.

The following table shows a breakdown of numbers of farms by sizes and by economic classes: *

<u>Acres</u>	<u>Sizes</u>		<u>Economic Classes</u>	
		<u>Number</u>	<u>Dollar Sales</u>	<u>Number</u>
1-9		430	Class 1, 40,000 and over	630
10-99		680	Class 2, 20,000 to 39,999	160
100-499		380	Class 3, 10,000 to 19,999	140
500-1,999		230	Class 4 and 5, 2,500 to 9,999	430
2,000 and over		80	Below 2,500	440

The climate of the project area is favorable for the production of many kinds of crops. The following table shows the approximate number of acres used for growing some of the crops:

* Information based on 1969 Census of Agriculture, Dept. of Commerce, Bureau of the Census.

<u>Crops</u>	<u>Acres</u>	<u>Crops</u>	<u>Acres</u>
Cotton	98,900	Lettuce	11,840
Alfalfa	94,000	Potatoes	10,000
Barley	54,000	Onions	3,000
Wheat	52,000	Other Vegetables	900
Grain Sorghum	41,100	Grapefruit	5,000
Sugar Beets	7,200	Lemons	2,000
Safflower	12,750	Oranges	9,750
Other Crops	35,000	Tangerine Types	2,400
Cole Crops	2,030	Grapes	2,800
Melons	2,900	Nuts	300
Carrots	2,160	Deciduous Fruit	700

Arizona's commercial vegetable industry brought \$75,434,000 into the state's economy in 1971, according to USDA Cooperative Extension Service data. Long summer seasons and mild winters permit the growing of vegetables year around. Because of climatic advantages, the Arizona growers can supply higher demand off-season markets. Approximately 70 percent of the vegetables in Arizona are produced in the project area.

Approximately 35 percent of the state's citrus production originates in the Hohokam Resource Conservation and Development Project area. Most of the navel oranges and grapefruit are produced in the project area. Sizable plantings of deciduous fruits (plums, peaches, and apricots) in recent years indicate renewed interest in these crops. Pecans are also becoming an important commercial crop, with trial plantings of pistachios increasing as well. (USDA Cooperative Extension Service data.)

Cotton is the leading irrigated crop in Arizona and was valued at \$74,786,000 in 1971. Approximately 88 percent of the acreage is upland cotton and 12 percent is American-Egyptian. Arizona cotton is noted for its high yield and quality of fiber. Barley, wheat, and grain sorghums are the major grain crops. Approximately 560,000 tons of alfalfa hay is grown annually in the area with approximately six to eight cuttings per season. About 45 percent of all field crops in Arizona is produced in the Hohokam RC&D Project area.

The volume of cash receipts from principle crops ready for market is shown in the following table:

	<u>1971 Values</u>
Vegetables	\$40,262,000
Cotton lint and cotton seed	28,120,000
Feed grains	15,676,000
Citrus	8,739,000
Grapes	5,300,000
Sugar beets	2,300,000
Miscellaneous	3,650,000

(USDA-Economic Research Service)



ARIZONA FARMER - RANCHMAN MAGAZINE PHOTO

Insects, disease, weeds and low soil fertility continue to limit or reduce crop quality and yield. These factors must be overcome or the farmer cannot stay in business. Some of the present controls degrade the environment. New technology that provides for environmentally acceptable solutions and practical methods to apply these solutions is needed.

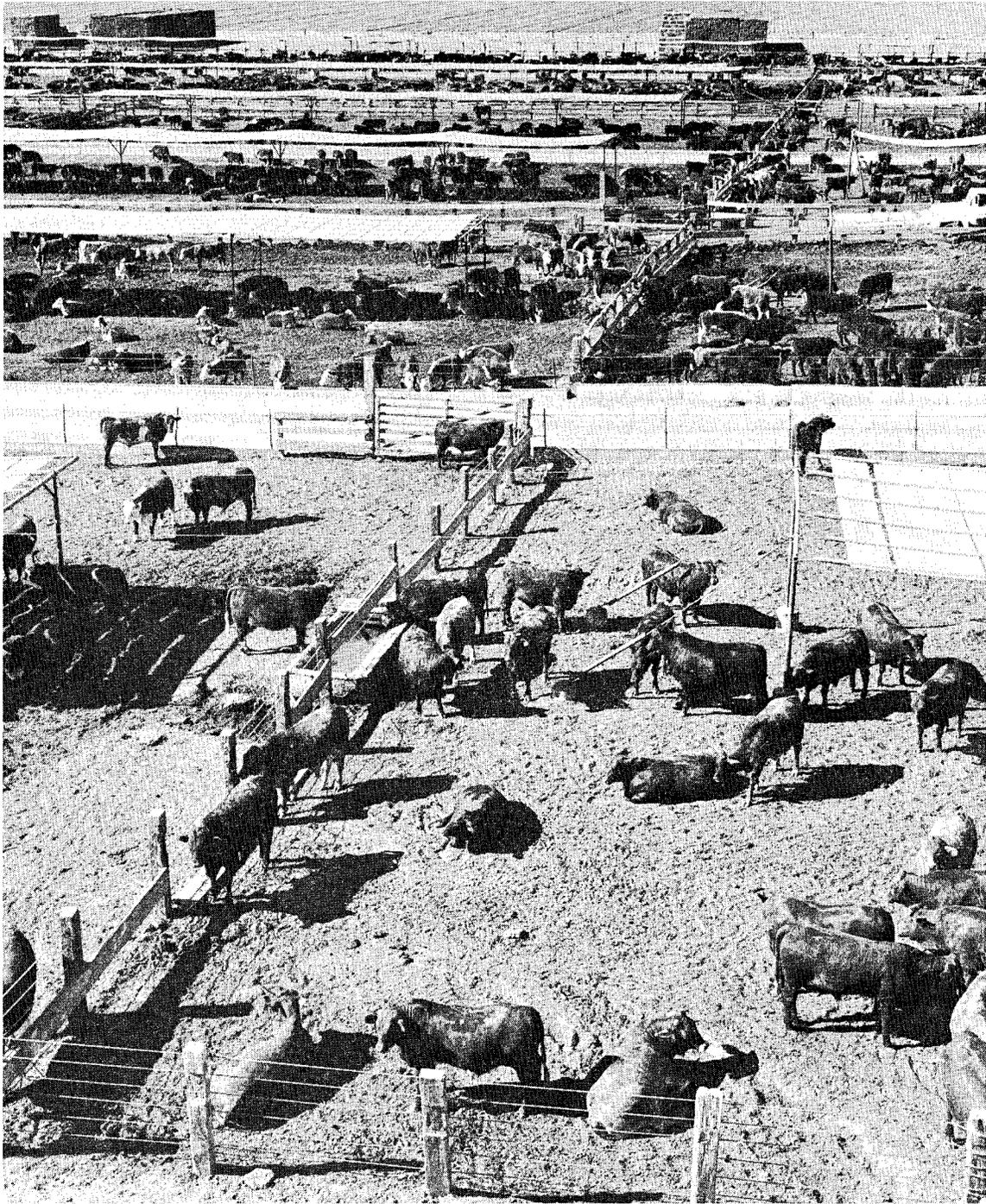
High winds, originating in the desert areas, cause damage to irrigated plants and dwellings in some areas, and contribute to the air pollution problem. These winds cause soil erosion, excessive evaporation, crop yield loss, and are an aggravation to humans and animals. Properly designed and maintained windbreaks, where necessary, will protect human and natural resources from these hazards.

Soil erosion by water is slightly moderate. Violent storms producing 2 to 3 inches of precipitation within an hour cause sheet and rill erosion.

Such storms occur at irregular intervals. They are widely disturbed and are significant to the erosion problem. According to the Conservation Needs Inventory (CNI) published in 1970, there are about 9,000 acres in land capability classes II and III because of erosion. Sheet erosion control is considered in designs for irrigation systems. The CNI indicates improved irrigation systems are needed on about 280,000 acres. In addition, small areas are severely eroded and need structural and vegetative treatment. Some areas in flood plains are subject to damage from erosion or sediment deposition.

In the foreseeable future, conservation practices such as irrigation water management, conservation cropping systems, crop residue use, pasture management, minimum tillage, vegetating erodible areas, and other erosion control measures, will be necessary to meet food needs and maintain a quality environment for a growing population.

The chart on page 84 shows that approximately 25 percent of the cropland is adequately treated. The remaining acreage needs conservation treatment. This includes practices that conserve soil and water, reduce farm-related pollution, and provide habitat for wildlife. These all help maintain clean air, clean water, and help control pollution in our environment.



Livestock in feedyards for finishing is a very important part of agriculture in the Hohokam RC&D Project area. Sheep, hogs, and poultry are also produced. Horses are generally only used for recreation.

SCS PHOTO

One hundred sixty-five dairies with 52,000 cows brought nearly \$40 million to Arizona in 1971. Nearly ninety percent of the dairies in Arizona are located within the Hohokam Project area. Arizona dairy-men have a very effective cooperative organization to balance milk supply with demand. The typical dairyman manages a well-designed dry-lot operation equipped with a milking parlor. Such a typical dairy has about 300 to 500 cows producing about 10,000 pounds of milk daily. Nearly all the animal feed is purchased from crop-farmer neighbors and about three-fourths of the labor is hired.

Thirty-three commercial poultry operations in Arizona have a total of 800,000 layers, producing 198 million eggs. Eighty percent or 156 million eggs per year are produced in the Hohokam Project area. Little expansion is expected due to intense competition from other states.

The following table shows the type of livestock, number, and inventory value as of January 1, 1970:

<u>Type of Livestock</u>	<u>Number</u>	<u>% of State Inventory</u>	<u>\$ Inventory Value</u>
All cattle & calves	415,000	34	\$73,000,000
Dairy cows	37,000	88	11,000,000
Sheep & lambs	98,000	19	8,500,000
Hogs & pigs	19,000	28	504,000
Poultry	340,000	30	170,000
Horses	28,500	30	-0-

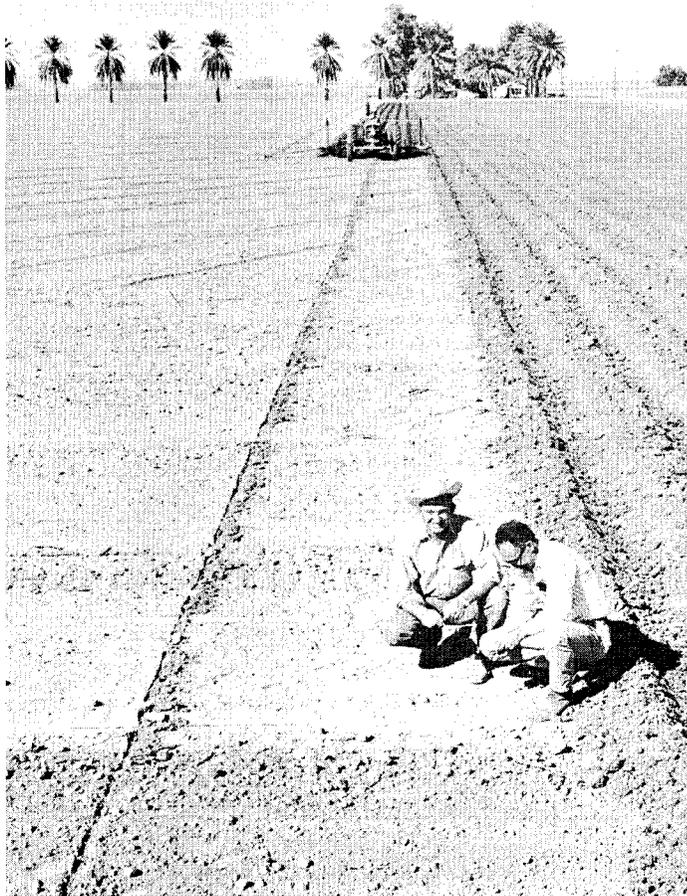
(USDA-Statistical Reporting Service)

Problems

- The southwest portion of the project area receives damage from excessive winds.
- Twenty-five percent of the cropland is inadequately treated with conservation practices such as erosion control, conservation cropping systems, and efficient irrigation systems.
- There is insufficient technology available on control of weeds, insects, crop diseases, and maintenance of soil fertility that is not degrading to the environment.
- The cropland base is being reduced by conversion to urban uses.
- Urbanization induces and intensifies problems concerning chemical drift from weed, insect and disease control, water management, and drainage from the adjoining and nearby croplands.

Opportunities

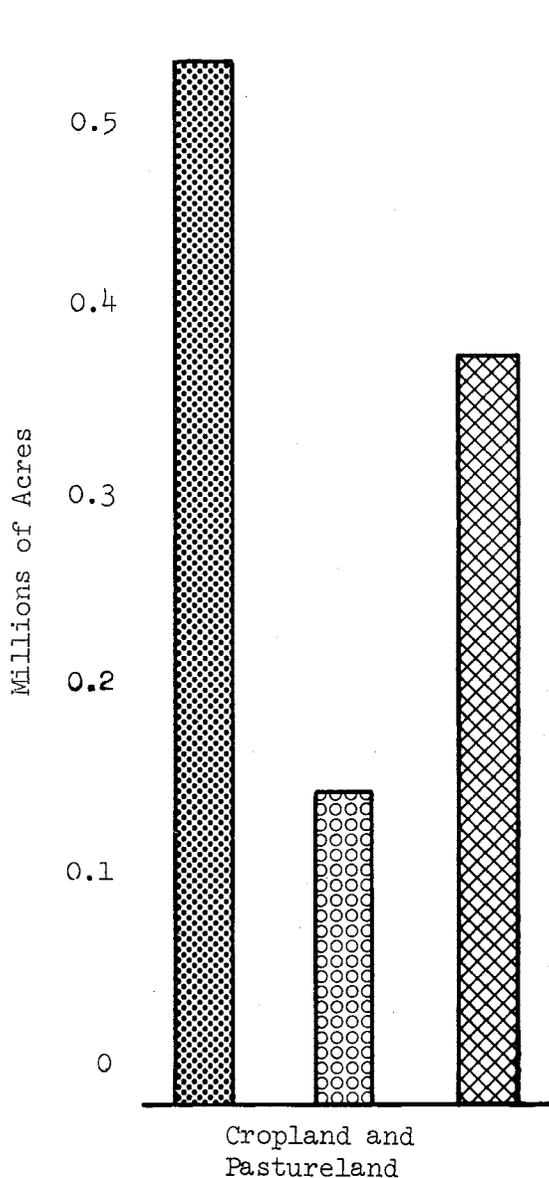
- Support legislation that would tax property in accordance with its present use.
- Accelerate the use of windbreaks, where necessary, along cropland fields, roads, and near dwellings and farm buildings.
- Accelerate the rate of planning and application of resource conservation measures.



SCS PHOTO

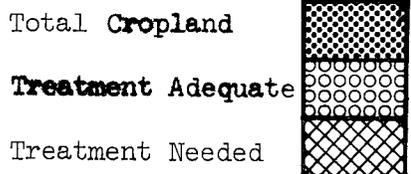
- Assist in coordinating the research and educational programs to obtain and extend knowledge in control of weeds, insects and diseases, and maintenance of soil fertility that is not degrading to the environment.
- Support legislation for proper land use planning that would have the effect of replacing cropland lost to urbanization.
- Improve resource data gathering systems and methods of locating and identifying agricultural problems. An example is photography that affords quick location of disease and insect outbreaks in crops, or poor irrigation water management.

Treatment Needs - Irrigated Cropland



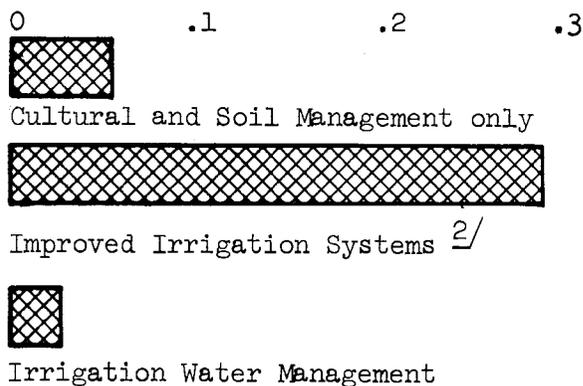
Conservation Needs Inventory Data (1970) for non-federal rural lands - Maricopa County (does not include Gila Indian Reservation in Pinal County)

Legend



Kind of Treatment Needed ^{1/}

Acres - in millions



^{1/} Any one acre generally needs more than one kind of treatment.

^{2/} Includes maintenance of installed measures and updating of irrigation water management.

RANGE and WOODLAND



Photo: Tonto Natural Resource Conservation District

RANGE and WOODLAND

There are approximately 5,413,000 acres of rangeland and woodland in the Hohokam RC&D Project area. Most of these lands furnish grazing for livestock.

Unrestricted use in the early grazing history caused a significant reduction of perennial forage species. Proper management to allow for the use of ephemeral species without the destruction of desirable perennial plants is needed in the southern desert shrub portion.

Good grazing management systems need to be strengthened in all areas used by domestic livestock.

There are no commercial woodlands in the project area. Wood products produced in the area come from juniper, pinyon, species of chaparral and small desert trees, such as ironwood and palo verde.

These lands are adjacent to the Phoenix metropolitan area, and perhaps the most important uses are for watershed, wildlife, esthetics and recreation.

With proper management, livestock production from the rangeland and woodland has proven compatible with vegetative improvement.

There is a trend toward keeping livestock on farms and in feedlots and using the range only when sufficient forage is available.

There are about 80 ranch units in the project area, which vary in size from a few sections to over 300,000 acres. About half are owner-operated and the remaining are absentee-owned. Income per acre produced by the range livestock is relatively low, due to the large acreage required to support livestock.

Impacts on the rangeland and woodland are created by travel zones along the main roads and water influence zones along the Verde, Salt and Gila rivers. No substantial mineral deposits have been located, but considerable mining exploration has adversely affected the esthetics and watershed resources. More use is being made of the land by people engaged in outdoor activities.

The ecological changes which have taken place in the vegetation on both rangelands and woodlands have not been sufficiently evaluated. Steps must be taken to place all uses in their proper perspective to prevent further deterioration and allow for needed improvements.

The wide variation in plant communities growing on these kinds of lands are the result of extreme abrupt changes in climate, soil, elevation and past uses. They can however, be placed in the following vegetative classification:

1. Mixed woodland-grassland. Distinguished by juniper-pinyon with various species of grasses in the understory.
2. Chaparral. Dominated by evergreen shrubs such as turbinella oak and manzanita.
3. Southern Desert Shrub. Species most prevalent are creosote bush, palo verde, cacti (the saguaro being the most unusual) bursage, big galleta and numerous annual grasses and forbs.

Mixed Woodland-Grassland

This vegetative type occupies about 26,000 acres in the northern and eastern portions of the area. The average annual precipitation is from 10" to 16", and the elevation varies from 4,000 to 5,000 feet. Plant communities vary from nearly pure stands of pinyon and juniper to areas dominated by grass, interspersed with pinyon, juniper and shrubs. Ecologically, the majority of this type is in fair condition.

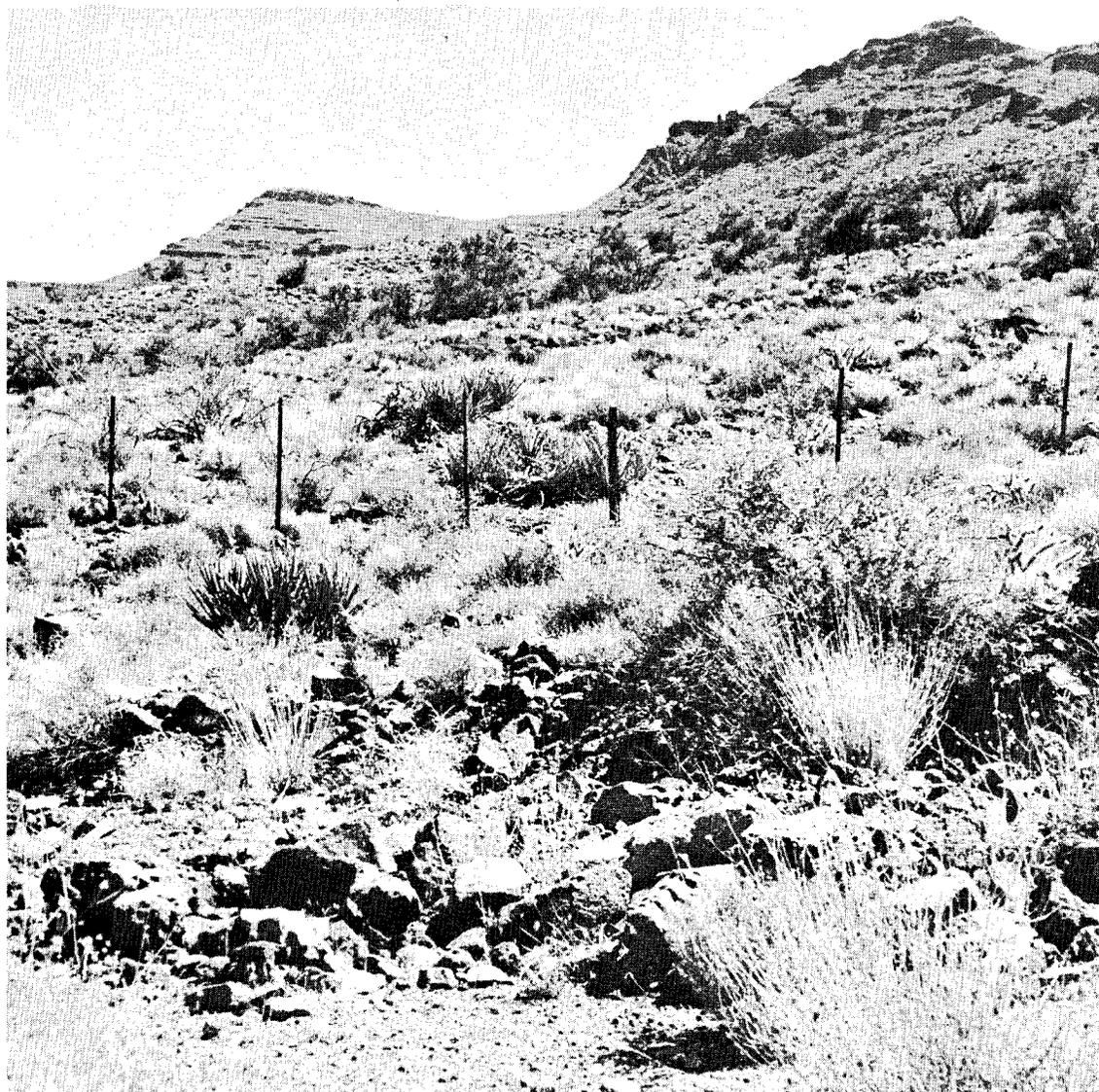
Chaparral

This vegetative type occupies about 422,000 acres in the northeastern portion of the area. Elevation ranges from about 4,000 to 6,000 feet and average annual precipitation varies from 14" to over 20". Shrub densities have increased throughout most of the area. Grasses and desirable forbs have decreased significantly. This vegetative change has resulted in a major decrease in water yield, livestock production and desirable big game habitat. Recreation and esthetic values have also deteriorated. Ecologically, this vegetative type is in fair to poor condition. Sediment yield from the watersheds approach two tons per acre per year in its present condition. Experimental studies show that when brushland is converted to grassland, sediment yield is reduced to less than 0.1 ton per acre per year, and water yield and quality increases significantly. When properly planned, brush control improves the wildlife habitat and increases forage for livestock.

Southern Desert Shrub

The area occupied by this vegetative type is by far the largest in the project area, totaling approximately 4,937,000 acres. The elevations range from about 500 to 4,000 feet with average annual

rainfall varying from 6" to 12". Temperatures range from slightly below freezing to above 115° F. The area is dominated by shrubs, cacti, and small trees and, following winter and summer storms, an abundance of annual grasses and forbs.



Transition zone between grassland and pinyon juniper

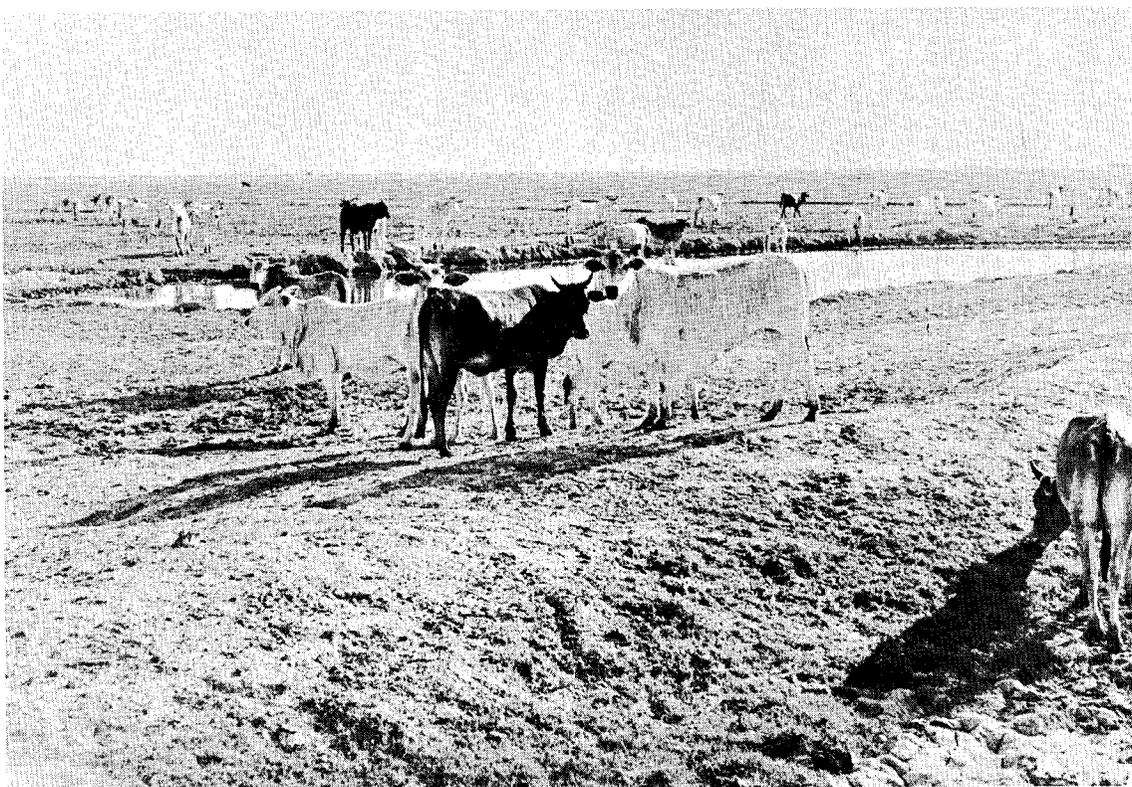
SCS PHOTO

Problems

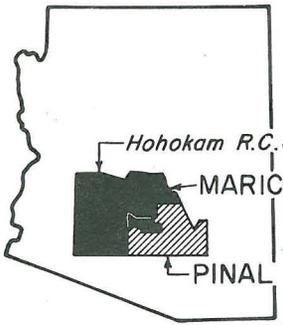
- Increased use of these lands for recreation often conflicts with the control and management of livestock.
- In most areas the more palatable perennial grasses, forbs and shrubs are scarce or non-existent, thus preventing range recovery when livestock are left on the range throughout the year.
- In most of the southern desert shrub types the major forage species are annuals. Good production occurs on an average of once in five or six years.
- The great variability in supply of livestock forage from year to year causes extreme fluctuations in the range livestock industry. Ranchers must be able to acquire livestock in large numbers when forage is available, and yet remain in business when it is not.
- Vegetative cover is not sufficient to prevent severe erosion during high intensity storms.
- Off-road vehicular travel causes severe damage to vegetation and increases soil erosion.
- Vandalism is increasing.
- Livestock thefts are increasing.
- Evaluations of changes in ecological conditions are not sufficient to establish proper priorities on these kinds of lands.
- Intensive management is becoming more difficult to achieve.
- Theft of native vegetation, including protected and endangered plants, is increasing.
- Soil erosion is increasing, and quality and quantity of water yield is decreasing due to the invasion of woody growth into the chaparral type.
- Cultural treatments, such as brush control and range seeding designed to hasten vegetative recovery in the Southern Desert Shrub zone, have not been developed.

Opportunities

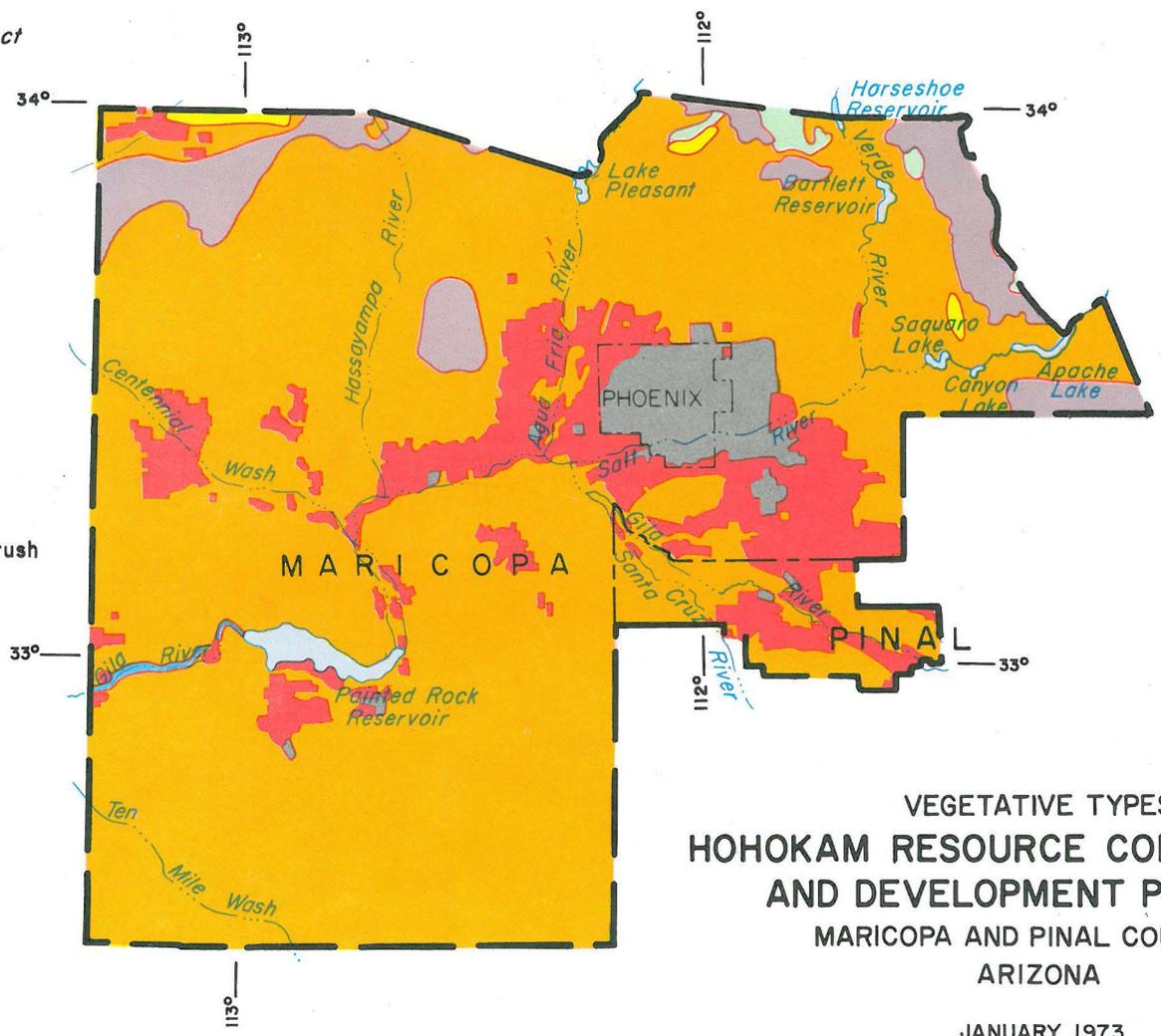
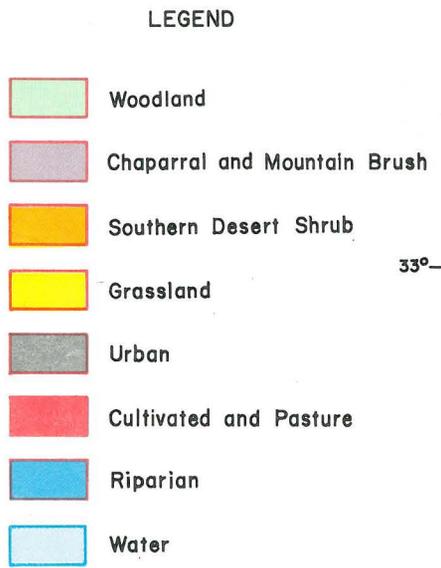
- Establish areas for off-road vehicle users where erosion hazards are slight.
- Encourage commercial production of native plants for landscaping. Explore the possibilities of selective harvesting of native plants from natural areas for transplanting.
- Determine how much use the various vegetative areas can tolerate without deteriorating.
- Reduce vandalism by promoting information programs that bring public attention to the irresponsible actions of some people.
- Control erosion, increase the quantity and quality of water, increase forage for livestock, and improve the wildlife habitat by controlling shrubs and establishing vegetative cover.
- Develop planned grazing programs in those areas where there is a potential for increasing the production of desirable perennial forage species. These programs will also allow for the use of the ephemeral species without the destruction of desirable perennial plants in the southern desert shrub portion (4,937,000 acres).



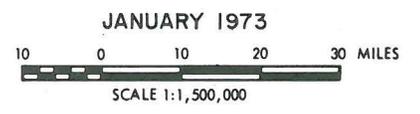
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LOCATION MAP



VEGETATIVE TYPES
 HOHOKAM RESOURCE CONSERVATION
 AND DEVELOPMENT PROJECT
 MARICOPA AND PINAL COUNTIES,
 ARIZONA



FISH and WILDLIFE



Photo: U. S. Forest Service

FISH and WILDLIFE

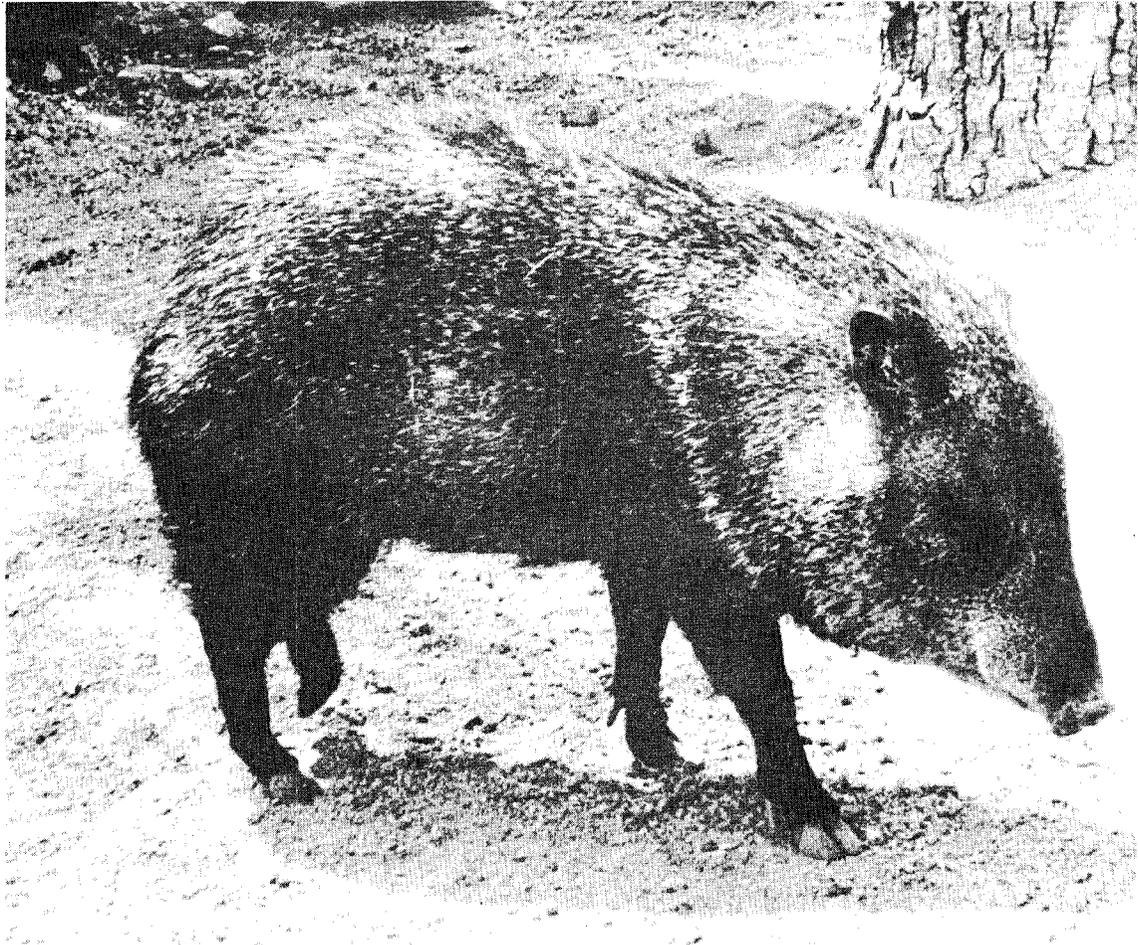
The sponsors of the Hohokam RC&D Project recognize that fish and wildlife are a very valuable resource and should be conserved and/or developed just as any other resource. Technical and financial assistance is available to help carry out wildlife programs. Cost-sharing is available for obtaining land, land rights, and installing structures and facilities on approved measures.

"Wildlife" in the project area refers to all animals, with the exception of domesticated livestock, whether managed or escaped to the wild. Wildlife, in this sense, includes such diverse forms as fish, birds, lizards, deer, insects, and soil microorganisms. Most ecologists believe that the stability and quality of an ecosystem increases as the number of different living organisms increase. The diversity of wildlife, then, plays an important role in stabilizing the ecosystems within which man must live.

The values of wildlife are not always obvious, either to the layman or to the trained scientist. Some values are known and include the economic value of hunting, fishing and fur trapping; the biological value of insect predation, flower pollination, and carrion removal; the esthetic values of bird watching, photographing or observing the native desert animal life.

The increasing human population has caused increasing contact with wildlife and subsequent conflicts in resource uses. Crop predation by birds, insect damages to crops, livestock predation, damage to ditches and dikes by burrowing rodents, and nuisance problems from spiders, scorpions and flies all contribute to the adverse values of wildlife. These problems are as much a part of wildlife management as is habitat management, law enforcement, or license sales, and must be recognized with the positive benefits of wildlife.

There is a wide diversity of habitat in the project area. There are several man-made lakes, mountain ranges, desert-urban landscapes, relic rivers, and rural farming areas to be found. Most of the project



Arizona Javalina

ARIZONA GAME AND FISH DEPT. PHOTO

lies within the central Arizona basin and range. The biotic communities are:

1. Mixed woodland-grassland - 26,000 acres
2. Chaparral - 422,000 acres
3. Southern Desert Shrub - 4,937,000 acres

(Refer to Range-Woodland section for detailed vegetation information for each community.)

Each of these communities support characteristic forms of wildlife.

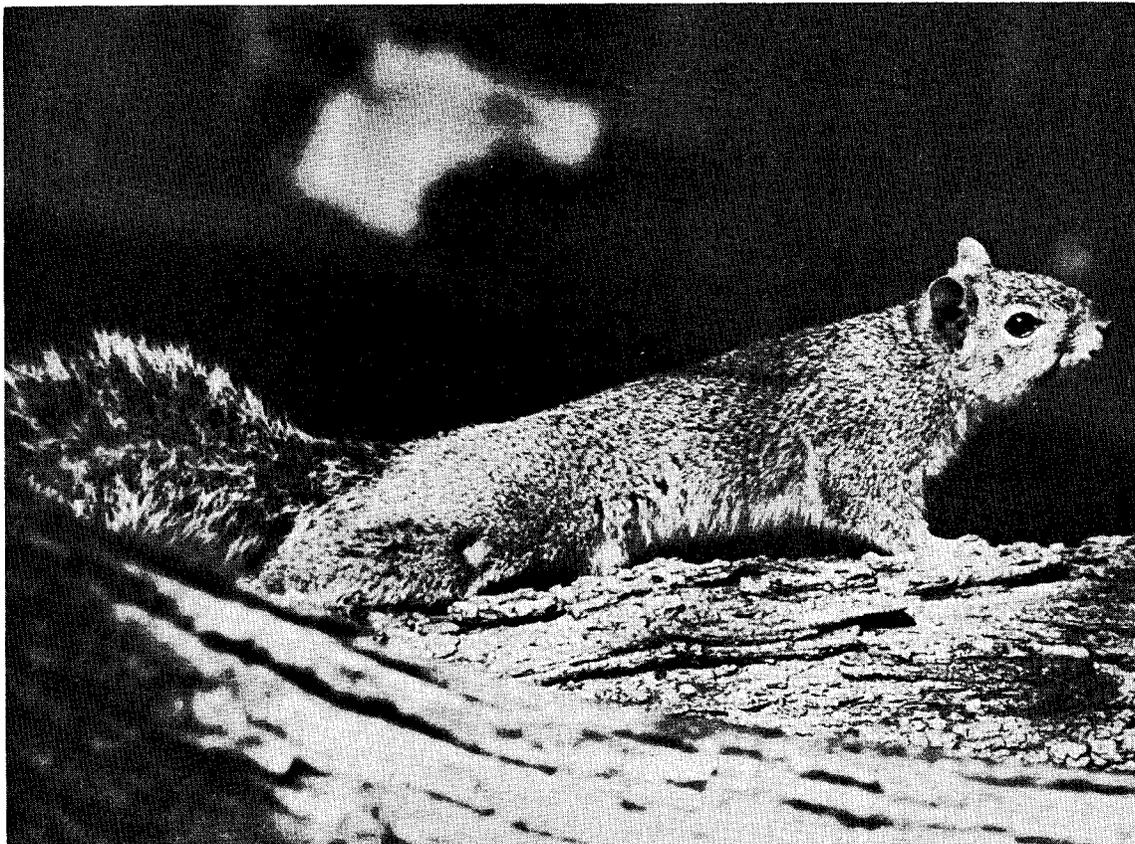
All of Arizona is divided into Game Management Units. Management of both wildlife habitat and hunters is based on these units. These units are shown on the Game Management Unit Map.

A complete listing of all living organisms in the project area is a lengthy document and beyond the scope of this program of action. The following lists are representative of the diversity of species of wild-life found in the project area.

Mammals

- | | |
|---------------------------------|-----------------------------------|
| 1. Beaver-----Rare | 12. Ariz. gray squirrel----Common |
| 2. Javelina-----Common | 13. Sonoran antelope-----Rare |
| 3. White-tailed deer-----Common | 14. Raccoon-----Common |
| 4. Desert mule deer-----Common | 15. Ringtail-----Common |
| 5. Mountain lion-----Rare | 16. Coati-----Rare |
| 6. Bobcat-----Common | 17. Badger-----Common |
| 7. Coyote-----Common | 18. Skunks-----Common |
| 8. Gray fox-----Common | 19. Cottontail rabbit-----Common |
| 9. Kit fox-----Rare | 20. Jack rabbit-----Common |
| 10. Black bear-----Common | 21. Porcupine-----Common |
| 11. Abert's squirrel-----Common | 22. Desert bighorn sheep---Rare |

There are many species of rats, mice, gophers, bats, ground squirrels, and chipmunks in the project area.



ARIZONA GAME AND FISH DEPT. PHOTO

Birds

1. White-winged dove
2. Inca dove
3. Mourning dove
4. Gambel's quail
5. Blackbird
6. Starlings
7. Band-tailed pigeon
8. Mearns' quail
9. Several birds of prey
10. Numerous shore, wading and marsh birds
11. Robin
12. Waterfowl
13. Plus a host of perching birds

Fish

1. Largemouth bass
2. Smallmouth bass
3. White bass
4. Yellow bass
5. Crappie
6. Bluegill
7. Catfish
8. Trout
9. Carp
10. Tilapia and numerous other species of fish.

The principle fisheries in the project area are situated on the Salt and Verde rivers. The Agua Fria River provides a fishery at Lake Pleasant. (See Table 1.)

Reptiles and Amphibians

There are approximately 29 species of lizards, 29 species of snakes, 15 species of toads and frogs, and one species of salamander. There are several ranges of animals that overlap into the project area, so that specific species counts are difficult to make.

Rare and Endangered Species

The project area has several rare and endangered species of wildlife. There are several known species of fish and some that may be found in several springs and flowing water areas.

1. Gila top minnow-----Found in the Lake Pleasant Drainage, Boyce-Thompson Arboretum, and other spots.
2. Wound fin dace-----Hassayampa River drainage near Wickenburg, Salt River below Stewart Mt. Dam.
3. Western speckled dace-----Seven Springs Wash
4. Gila intermedia (Chub)-----Seven Springs Wash

The following may be in the project area:

1. Squaw fish-----Salt River
2. Gila cypha (Chub)-----Salt River
3. Gila elegans-----Salt River
4. Loach minnow-----Seven Springs Wash
5. Spike dace-----Verde River

Other rare or endangered species of wildlife are:

1. Sonoran pronghorn antelope-----Southern part of project area.
2. Yuma clapper rail-----Gila River southwest of Phoenix.
3. Prarie falcon-----Entire area.
4. Peregrine falcon-----Entire area.
5. Bald eagle-----Riparian zones on Verde River.
6. Osprey-----Riparian zones on Verde River.
7. Gray hawk-----North-northeast areas.
8. Black hawk-----North-northeast areas.
9. Marsh birds-----Breeding in Gila drainage and dependent on marshy areas along Gila River northwest of Phoenix.

- | | |
|-----------------------------|---------------------|
| a) Blackcrowned night heron | d) Least bittern |
| b) Yellow throat | e) Great blue heron |
| c) Long billed marsh wren | |



Bighorn Sheep

ARIZONA GAME AND FISH DEPT. PHOTO

These marsh birds, while not endangered in other areas of the country, would cease to exist in the project area if the marshes are drained.

White-winged dove hunting is one of the most important small game activities in the state. The project area includes very important nesting and roosting habitat for this dove. Mesquite thickets and salt cedar thickets along the Salt and Gila rivers are the major vegetative types used by white-wings. This habitat is disappearing. There were slightly over one million acres of riparian habitat in Arizona in 1955. This has dwindled to less than 250,000 acres statewide. The three major areas in the project are Komatke thicket, Painted Rock to Gillespie Dam, and Gillespie Dam to the confluence of the Gila and Salt rivers. These thickets comprise about 20,000 acres of the 69,000 acres of prime white-wing habitat left in Arizona. Several channel clearing proposals and a proposed water salvage project threaten these three thickets. About 75 percent of the total riparian vegetation has been lost in the past two decades.

Marsh birds and waterfowl utilize the ponds fed by effluent from the Phoenix sewage treatment plant. The loss of these ponds would not cause the extinction of any known birds; however, the birds would cease to live in the Phoenix area if the ponds and marshes disappear. The ponds do breed mosquitoes and criticism of the area is increasing as the area becomes urbanized.

The Phoenix metropolitan area is expanding into rural areas. Impact on native wildlife is in the form of harassment of the species. Motorcyclists and all terrain vehicle travel is increasing and, while difficult to quantify, has resulted in disturbed nest sites, fawn abandonment, and destruction of habitat. The degree of destruction is not known; however, the state of Arizona is concerned enough to consider a law to limit off-road vehicle travel.

The urban areas covered 160 square miles in 1964; 451 square miles are expected to be covered by 1980. Major public open space areas are not expected to grow at all. Consideration must be given to setting aside more open space acres for wildlife as the total urban area grows.

Many species of wildlife are unique to the project area and are found no other place in the world. Most of these are lizards, toads, geckoes and small mammals. While not a major economic contributor to the project, they are none-the-less important in attracting people to the unusual flora and fauna of the Sonoran desert.

The limiting factor for many game animals and birds is water. All game animals in the project require permanent water, as do most of the non-game species. There are exceptions, such as the Bannertailed kangaroo rat. Development of water is necessary, if populations of species are to be increased. Increase of numbers will reach a peak at the point where habitat can no longer provide food and cover. The Game Management Units in the project area have many such interrelated problems.

The Game Management Units (GMU) in the RC&D Project area are shown on page 102 and the major units are described as follows: 1/

GMU #20B - Habitat as of 1971 is rated fair to very good. Populations of deer, however, are declining. Unit managers report increasing human pressures throughout the Unit.

GMU #21 - Habitat is rated good. Manager reports tremendous increase in motorized equipment damage to habitat, land and erosion prone areas. Populations of deer appear to be declining. Very few Javelina are seen. A few Band-tailed pigeons were harvested in 1970.

GMU #22 - Habitat for deer is fair to good. Populations are declining. Very few Javelina are seen; turkey, stable; 200+ Band-tailed pigeons harvested in 1970.

GMU #23 - Fawn survival dropping. Increase in predators very noticeable; deer population declining - habitat, fair to good; very few Javelina seen; 200-400 Band-tailed pigeons harvested in 1971.

GMU #24B - Fawn survival dropping. Habitat, good to very good. No Javelina seen in the Unit.

GMU #39 - There are two very small deer herds in the Estrella and Maricopa Mountains. Habitat has been overgrazed by livestock, and populations in the herds are declining. There is increasing low hunter success and, because of low success, a decline in hunter participation. Javelina are very scarce and herds appear to be declining. Cottontail populations appear to be stable at present but also fluctuate with available food and water. Desert bighorn sheep remain stable.

GMU #40 - Range conditions are generally poor due to below average rainfall. Much of the Unit lying outside the military reservation has been severely overgrazed by livestock. All wildlife are heavily dependent on water catchments due to the lack of water in most natural water holes. Javelina are declining. Bighorn sheep are increasing. There are Sonoran Pronghorn antelope, a rare and endangered species, in this Unit. Exact distribution and condition information is not readily available for these animals.

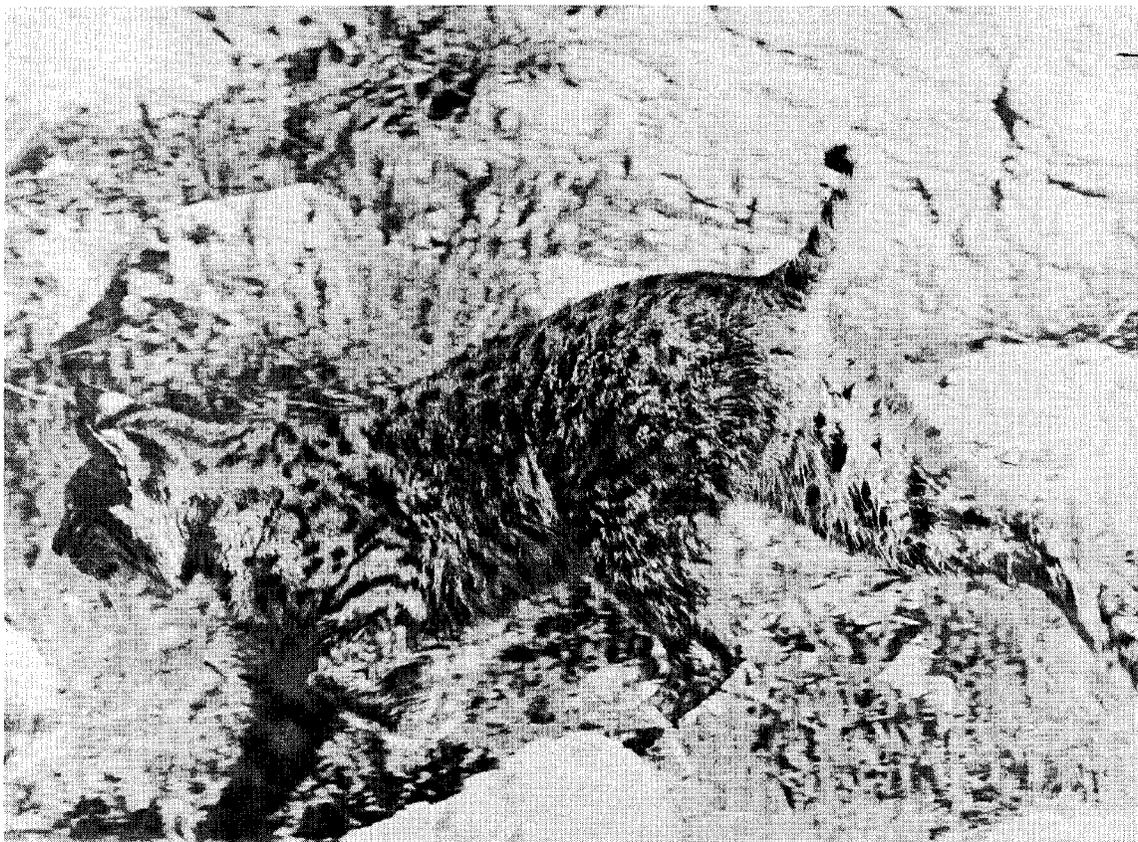
GMU #41 - Fawn crops are good. Water is short. Natural forage is of excellent quality and sufficient quantity to maintain the present deer herd. Bighorn sheep populations are stable. One lion taken in 1970.

GMU #42 - Main deer herds were observed in the White Tank Mountains and Vulture Mountains. Deer range throughout the Unit is in excellent condition. No Javelina data available. No Bighorn sheep data available.

1/ Data from the Federal Aid Project W53R21 Job Completion Reports as prepared by the Arizona Game and Fish Department

Gambel's quail harvested in Maricopa County in 1969 amounted to 405,552 birds or about 20 per licensed hunter. There were 116,318 cottontail rabbits harvested in the county, and 1,442,245 doves of all kinds taken in 1968-1970 in all Units in the project area (Maricopa County Reports), 3/. These figures will drop as habitat is lost to urban encroachment. Esthetically, it isn't a pleasant thought; economically, 35 percent of the total annual expenditure of approximately 40 million dollars for hunting is spent on small game. This is incentive enough to encourage habitat management and land acquisition for small game hunting. All species benefit from this type of program, particularly the non-game species, which require the same elements of habitat as the game species.

Fisheries management problems in the project area are nominal--the most serious being not enough water to meet the projected demand by 1980. Planned reservoirs for the Central Arizona Project will help alleviate some of the pressure. 2/



Bobcat

ARIZONA GAME AND FISH DEPT. PHOTO

2/ Lower Colorado River Framework Study, Appendix XIII, "Fish and Wildlife."

3/ Arizona Small Game Investigations, 1968-1970.



PHOTO COURTESY OF KEN FOOKS.

A primary concern in fisheries management is for the native fish species, which have little economic value but are part of the unique fauna of Arizona. These fish have very specific requirements as to locations and associated aquatic biota. These are fish in danger of extinction from loss of habitat or introduction of hardier fish that suppress the natives by competition or hybridization. Intensive research into the status of these fish is needed, especially as the metropolitan area grows and demands for water-based recreation increases.

Sometime between 1980 and 2000 the projected demand for wildlife for all uses will exceed the supply. The hunting use of wildlife amounted to about 900,000 man-days in 1965 in the Gila sub-drainage of the project. Demand by mid-1980 will exceed supply by 240,000 man-days. If hunting is to continue, plans must be made to intensify habitat management and increase land acquisition. Zoning and planning experts should be aware of the economic impact of hunting and allow for un-met demand needs when planning land use.

WILDLIFE AND WILDLIFE HABITAT - MARICOPA COUNTY

Species	Population Rating				Existing Habitat				Habitat Trend			Habitat Potential		
	I	II	III	IV	I	II	III	IV	Up	Down	Same	Good	Fair	Poor
Antelope				x				x		x				x
Bear				x				x		x				x
Bighorn sheep			x				x				x		x	
Mule deer			x				x				x	x		
White-tail deer			x				x				x		x	
Mountain lion			x				x				x		x	
Javelina			x				x				x		x	
Turkey				x				x			x			x
Mearns' quail				x			x				x			x
Gambel's quail	x				x						x	x		
Mourning dove	x				x					x		x		
White-wing dove	x				x					x		x		
Band-tail pigeon				x				x			x			x
Cottontail rabbit		x			x						x	x		
Predators	x					x					x	x		
Warm water fisheries		x				x			x			x		

100

I - Excellent

II - Good

III - Fair

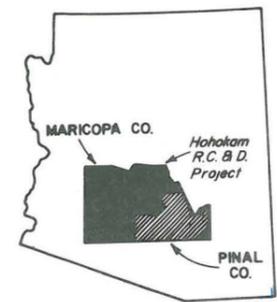
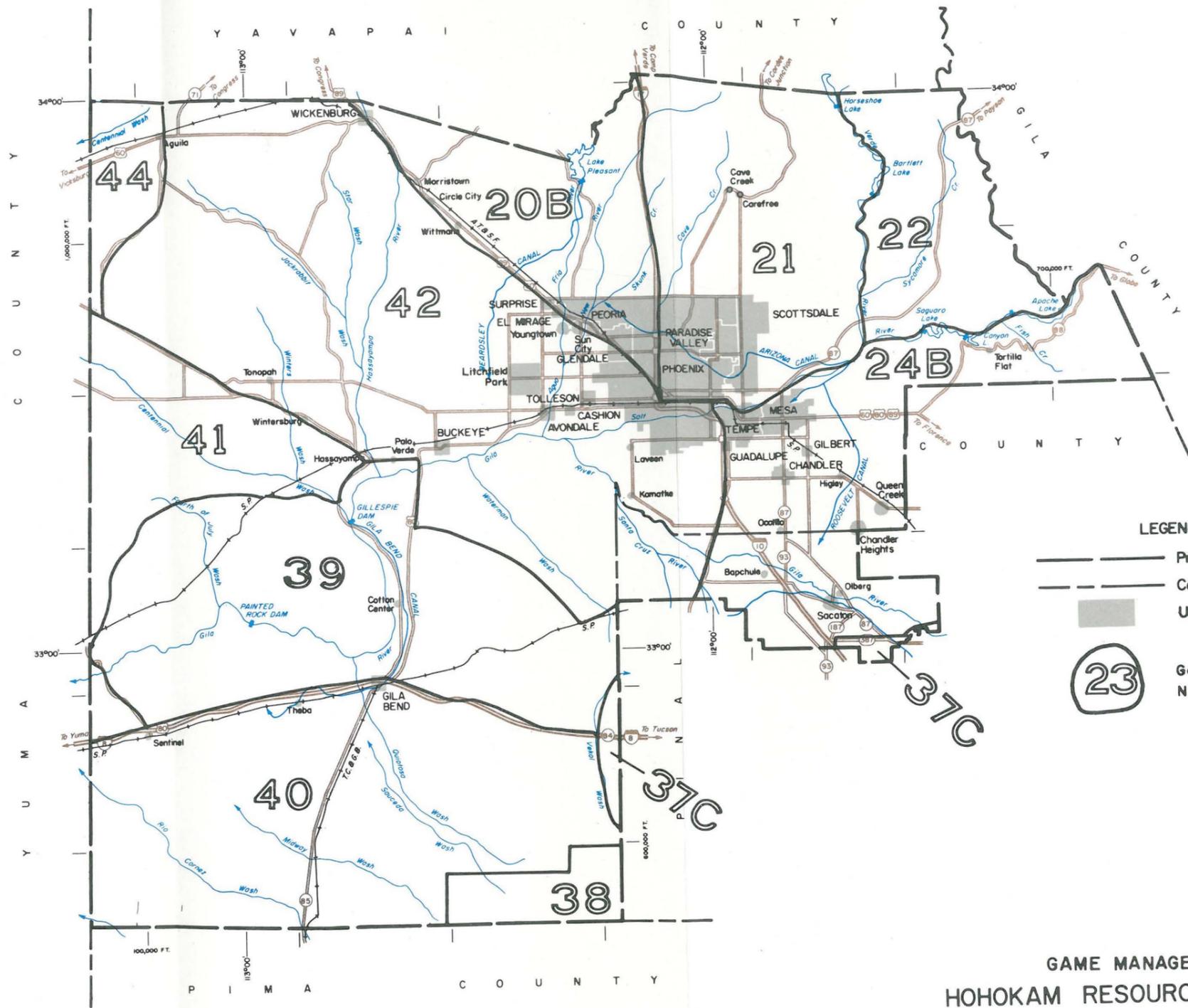
IV - Poor

Problems

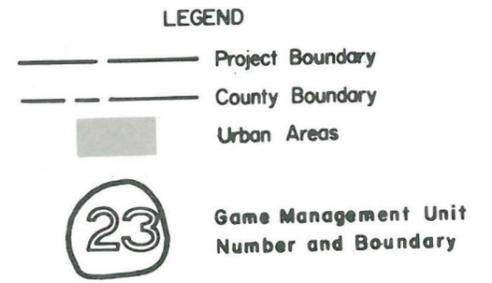
- Salt cedar thickets are being reduced.
- Mesquite thickets have been significantly reduced.
- Marsh birds will cease to exist in the area southwest of Phoenix if the marshes are drained.
- Increasing use in all parts of the project is disrupting the native wildlife.
- There is insufficient planning for wildlife habitat preservation and management.
- Zoning and management controls are not sufficient to protect wildlife unique to Arizona.
- Lands specifically devoted to wildlife and recreation are not large enough to sustain future use pressures.
- Rare and endangered native fish species need protection.
- Shortage of water for wildlife.

Opportunities

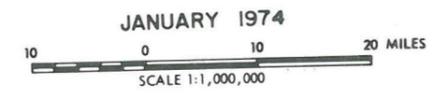
- Wildlife needs should be included in present planning and implementation of projects. The effects of projects on wildlife should be evaluated by environmental impact studies.
- Encourage a survey of all biotic communities with recommendations for the preservation and enhancement of all wildlife habitat.
- Encourage a survey of all potential wetland, marsh land or open water developments.
- Assist in coordinating plans for the protection or enhancement of wildlife species and habitat needs.
- Assist in coordinating plans for wildlife in measures primarily for flood prone areas, open space, green belts and other areas.
- Assist in developing practical and effective controls so that planned benefits for wildlife are, in fact, a reality.
- Assist agencies in developing watering facilities for wildlife.



LOCATION MAP



**GAME MANAGEMENT UNITS
HOHOKAM RESOURCE CONSERVATION
AND DEVELOPMENT PROJECT
MARICOPA AND PINAL COUNTIES, ARIZONA**



ARIZONA STATE PLANE COORDINATE SYSTEM,
CENTRAL ZONE, 100,000 FOOT GRID.



RECREATION

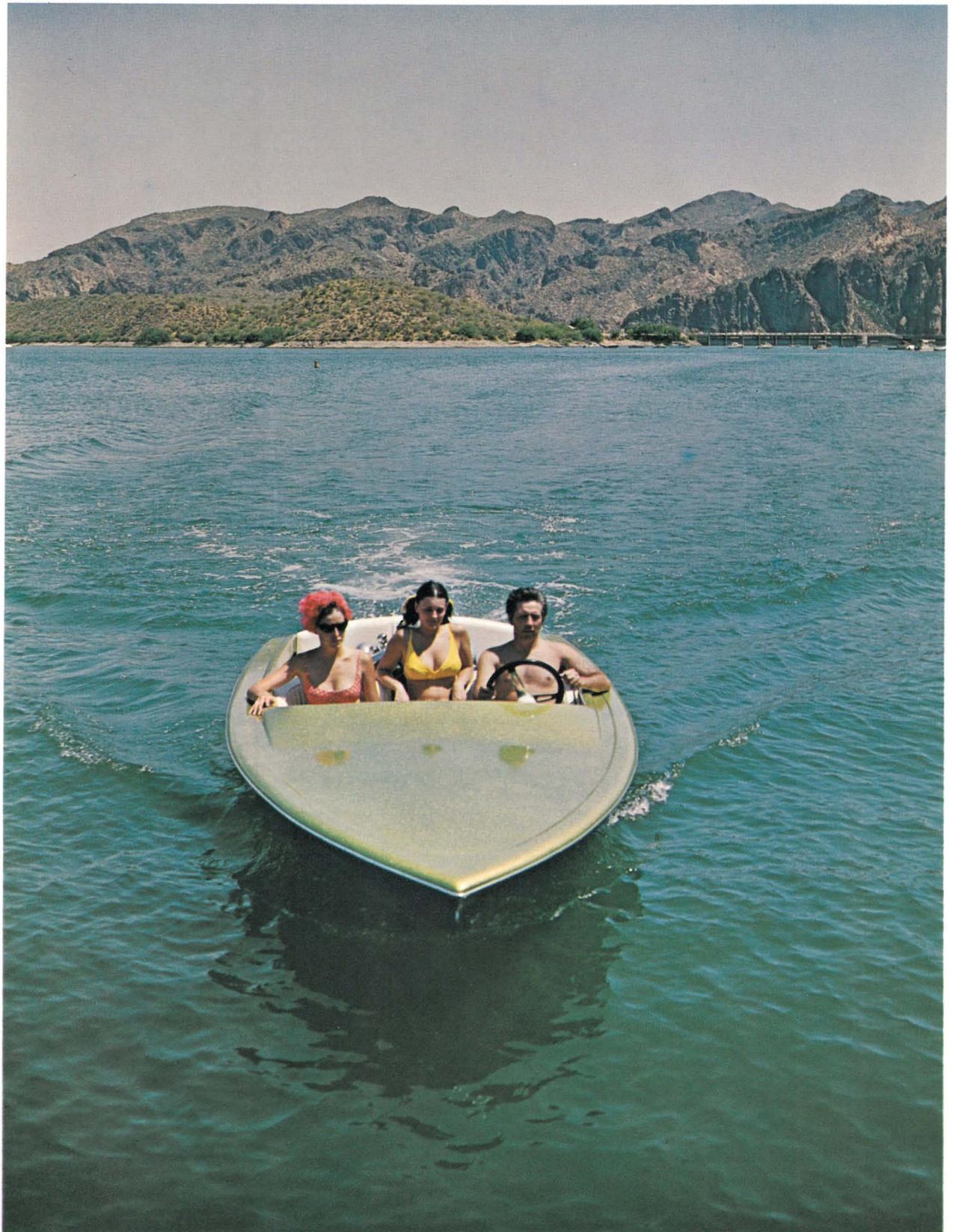


Photo: Salt River Project

RECREATION

The Hohokam RC&D Project area is nationally known as a winter retreat and recreational center. Mild winters are normally characterized by sunny days and cool nights. Visitors and residents can participate in snow-oriented activities and retreat to the desert, all within a one-day period.

The use of outdoor recreational facilities is governed by the extremes of temperature found in the project area. Heavy use of the scenic areas, drives, trails, mountain areas, and the desert occur in the fall, winter, and spring. Use is considerably reduced during the summer when temperatures can reach 110-118° F. The winter visitors leave and the recreational facilities are used at night, or the residents flee to the cooler parts of north and north central Arizona.

The lakes receive heavy use during the summer. Water for recreational use is in short supply in the project area, and yet, is in very great demand during the summer season.

The project area is a complex of urban and rural land use problems and patterns. There is a present population of over one million people, most of whom seek some form of recreation. This population is extending rapidly into rural areas, and some land having potential for recreation is being urbanized (over 3,000 acres are urbanized per year). There are approximately 3,355,000 acres of public lands on which recreation does or could take place. Even though money may not always be a problem, the sheer magnitude of moving soil, men, and materials severely limits the ability to match construction pace with population growth. This phenomenon has resulted in over-used facilities, spillovers onto undeveloped land (with attendant vandalism and sanitary problems) and deterioration of the somewhat fragile desert ecosystems.

Several studies have been made on recreational use patterns in Arizona. One fact that stands out over others is that the large population in the project area influences use and demand throughout the state. Recreational use in the northern half of Arizona is directly related to population and patterns of use in the project metropolitan area. Recreational uses in the project area are closely related to recreational uses in the state of Arizona. Tables 7 and 8 compare the outdoor activities (use) by the state and by the project area for both winter and summer. These tables point to potential developments based on the preference of users by season.

Outdoor games are most popular during the winter and swimming is the most popular during the summer. These patterns do not follow national patterns and can be explained by the severe heat during the summer months. Although camping ranks high during the summer, it must be remembered that the highly mobile recreating public migrates to the cooler mountains for their camping experience. Temperature differences of 40° F. are common within a two-hour driving distance of the project area.

These facts suggest the need for a totally coordinated recreational plan between the project area and the areas which supply the bulk of summer type recreational uses.

Table 6(1.) and 6(2.) 1/ show past, present, and future recreational demand by categories of recreation. Demands within the project area is compared to the total demand of the state. These tables are good for showing the importance of the project area recreating public by category to the state of Arizona. The most important figure is that the total statewide demand for all recreation by 1985 is 256,233,000 participation days. The participation days demand for the Hohokam area by 1985 is 213,157,000. This is almost equal to the total demand for the entire state. Demand by the project must be integrated into any recreational planning done anywhere in the state.

The supply of fully developed recreational facilities is short of demand. Tables 1, 2, 3, 4, 5, and 11 list the total supply in the project area by agency and a summary of all facilities.

Demand, use, and supply do not constitute the total view of recreation in the project area. The fourth part of the recreational equation is potential. Table 12 presents the findings of a multiple agency evaluation of the potentials for outdoor recreation. Table 10 lists potential impoundment sites. The assessment of recreational potential in the project area shows several categories with a high potential for future development. Each of the 12 kinds of recreational developments analyzed is summarized as follows: 2/

1. Vacation cabins, cottages, and homesites have a medium potential, primarily to meet the growing needs of winter visitors.
2. Campgrounds, including vacation sites, transient, and pack trips, have a high potential.

1/ All demand, use, and supply data from Arizona Outdoor Recreation Coordination Commission, State-wide Comprehensive Outdoor Recreation Plan.

2/ Outdoor Recreation Potential Appraisal - Maricopa County-USDA, SCS, 1969.

3. Picnicking and field sports areas rated a high potential.
4. Fishing waters, as recreational developments, rated high for warm water and medium-low for cold water.
5. Golf courses included both standard and par-3. Both rated high.
6. Hunting areas were divided into three categories. Small game, rated high; big game, rated high; and waterfowl, rated medium.
7. Natural, scenic, and historic areas rated high for expansion in the area.
8. Riding stables rated high.
9. Shooting preserves have a high potential.
10. Vacation farms were not rated due to so few small family-sized units.
11. Water sports areas rated high.
12. Winter sports were not rated for potential in the area due to climatic factors.

The analysis in this report on outdoor recreation potential did not consider market, need, demand, or economics. The appraisal was solely on the potential of the resources.

Several studies have been done in the resource area by federal, state and county organizations. They contain detailed information for use by planners and other interested organizations or individuals. They are as follows:

1. "A Plan for Outdoor Recreation in Arizona," Arizona Outdoor Recreation Coordinating Commission, 1967.
2. "Meeting Arizona's Current Recreation Needs," Arizona Outdoor Recreation Coordinating Commission, 1969.
3. "Maricopa County Regional Park System Plan," Maricopa County Parks Department, 1965.
4. "A Study of Recreation and Parks in Phoenix and Maricopa County, Arizona," National Recreation Association, 1958.

5. "The Economic Implications of the Regional Park System in Maricopa County," Kenneth E. Daane, Bureau of Bus. Service, Arizona State University, Tempe, Arizona, 1964.
6. "National Forest Public Camp and Picnic Grounds in Arizona and New Mexico," USDA-Forest Service.
7. "A Park, Recreation, and Open Space Study" prepared by the Maricopa County Planning and Zoning Department for the Maricopa Association of Governments, 1970, 106 pages, plates, tables, and text.



MARICOPA COUNTY PARKS AND REC. DEPT. PHOTO

TABLE 1

ARIZONA GAME AND FISH DEPARTMENT LAND RESOURCES

IN HOHOKAM PROJECT AREA

(ALL IN MARICOPA COUNTY)

NAME	Planning District I	Use(1)	Land Status(2)	Acreage		Acreage by BOR Classification		
				Land	Water	I	II	III
1	Arlington Wildlife Area	W	D/L	430	50			480
2	Base and Meridian	W	L	93	30			123
3	Black Canyon Shooting Range	R	D	1,548		1,548		
4	Gila River Wildlife Area	W	W/D	6,896				6,896
4	Gila River-Black Butte	W	D	636		636		
4	Gila River-Green Tract	W	W	150				150
5	Painted Rock Wildlife Area	FW	L	5,426	150			5,576
6	Paradise Valley	W	L	40				40
7	Phoenix Headquarters	FW	L	20			20	
8	Robbins Butte Wildlife Area	W	D	300	20			320
	Total			15,539	250			

1 W: Recreation
 F: Fish
 R: Shooting Range

2 D: Deeded
 L: Leased
 W: Bureau of Land Management
 Withdrawal or Agreement

TABLE 2

SUMMARY OF OUTDOOR RECREATIONAL SPACE AND FACILITIES

BY JURISDICTION

<u>FACILITIES</u>	<u>UNIT</u>	<u>FEDERAL</u>	<u>STATE</u>	<u>COUNTY</u>	<u>CITY</u>	<u>QUASI PUBLIC</u>	<u>PRIVATE</u>	<u>SCHOOL</u>	<u>TOTAL</u>
Picnic Tables	Each	266	14	611	1111	0	2	130	2134
Picnic Ramadas	Each	4	1	44	180	0	0	1	230
Swimming Pools	Each	3	0	0	38	0	106	20	167
Swimming Beaches	Each	0	1	0	0	0	0	0	1
Tennis Courts	Each	4	0	0	51	0	6	316	377
Multiple Use Courts	Each	1	0	6	237	4	0	832	1080
Camping Spaces	Each	124	16	54	8	0	4825	0	5027
Shooting Ranges	Each	0	0	6	4	0	0	0	10
Playing Fields	Each	5	0	3	122	1	0	1000	1131
Horse Trails	Mile	0	0	126	56	0	0	0	182
Hiking Trails	Mile	2	0	126	55	0	0	0	183
Bicycle Trails	Mile	0	0	110	12	0	0	0	122
Golf Holes	Holes	9	0	63	117	342	261	9	801
Archery Ranges	Each	0	0	5	4	0	0	2	11
Gymkhana Facilities	Each	0	0	1	1	0	0	0	2
Boat Ramps	Each	4	1	1	3	0	0	0	9
Playgrounds	Acre	1	0	2	25	0	4	0	32
Group Camps	Each	2	0	0	0	0	0	0	2
Oval Tracks	Each	0	0	0	0	0	0	65	65
Designated Recreation Space	Acre	75	14271	92945	22337	2336	3494	2657	138116

TABLE 3

U.S. FOREST SERVICE

TONTO NATIONAL FOREST RECREATIONAL SITES

Name of Recreation Site	FACILITIES					ACTIVITIES AND ATTRACTIONS			
	Camping	Picnicking	Camp Trailers	Drinking Water	Number Family Units	Fishing	Boating	Special	Season of Use
1. Seven Springs	x	x	x	x	23				All year
2. Cave Creek	x	x	x	x	12				All year
3. Horseshoe Lake	x	x	x		20	x			All year
4. Bartlett Lake	x	x	x		20	x	x		All year
5. Riverside	x	x			3	x			All year
6. Granite Reef	x	x			5	x			All year
7. Phon D. Sutton		x							All year
8. Saguaro del Norte		x			38	x	x	B	All year
9. Butcher Jones		x		x	32	x			Apr.-Oct.
10. The Point	x	x			3	x	x		All year
11. Acacia		x			27	x	x		All year
12. Palo Verde		x			8	x	x	B	All year
13. Boulder Creek		x			8	x			Apr.-Oct.
14. Lagune	x	x	x			x	x	B	All year
15. Tortilla	x		x	x	77				All year
16. Apache Lake	x	x			12	x	x		All year
17. Burnt Corral	x	x	x		17	x	x		All year

TABLE 4

LAKES AND RESERVOIRS IN HOHOKAM RC&D
USED FOR OUTDOOR RECREATION

<u>Reservoir or Lake</u>	<u>County</u>	<u>Activities</u>			<u>Water Skiing</u>	<u>Average Surface Acres</u>
		<u>Fishing</u>	<u>Swimming</u>	<u>Boating</u>		
PLANNING DISTRICT I						
Apache Lake	Maricopa	x	-	x	x	2,400
Bartlett Lake	"	x	-	x	x	2,200
Canyon Lake	"	x	x	x	x	850
Horse Shoe Lake	"	x	-	x	-	1,500
John Hands' Dam	"	x	-	x	-	1
Lake Pleasant	"	x	x	x	x	3,540
Painted Rock Lake	"	x	x	x	x	300
Saguaro Lake	"	x	x	x	-	<u>1,100</u>
TOTAL						11,891

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TABLE 5

HISTORICAL AND ARCHAEOLOGICAL SITES IN MARICOPA
COUNTY FOR POTENTIAL INCLUSION IN NATIONAL REG-
ISTER OF HISTORIC PLACES

PLANNING DISTRICT I

Name of Site:

<u>Agua Caliente</u> Agua Caliente, ca. 1744	<u>Old Scottsdale Elementary School</u> Scottsdale, ca. 1914
<u>Apache Cave (Skull Cave)</u> Apache Horse Mesa Dam vicinity, ca. 1872	<u>Painted Rocks State Park</u> Painted Rock Mts.
<u>Bartlett Dam</u> Carefree vicinity, ca. 1939	<u>Rose Pauson's House Site</u> Phoenix, ca. 1941
<u>Burke's Station Site</u> Agua Caliente vicinity, ca. 1858	<u>Niels Peterson House</u> Tempe, ca. 1892
<u>Desert Station</u> St. John's Mission vicinity, 1858	<u>Phoenix Original Site</u> E. Van Buren & 28th St., 1868
<u>Gila Bend</u> Gila Bend City, ca. 1774	<u>Pit House</u> Scottsdale, 1957
<u>Hayden's Ferry</u> Tempe, ca. 1872	<u>George Poil's House</u> Tempe, 1905
<u>Governor Hunt's Tomb</u> Papago Park, Phoenix, ca. 1934	<u>Dr. R. L. Rossen's House</u> Phoenix, 1892
<u>Initial Point</u> South Side of Gila - opposite Salt River mouth, ca. 1864	<u>Solar House</u> Scottsdale, 1956
<u>Ft. McDowell</u> Ft. McDowell, ca. 1867	<u>Sun Bonnet House (Boomer House)</u> Phoenix, 1953
<u>Dr. Carlos' Montezuma Grave</u> Ft. McDowell Cemetary, ca. 1923	<u>Tierra Verde</u> Litchfield Park, 1916
<u>Oatman Flat</u> Painted Rock vicinity, ca. 1851	<u>Trinity Episcopal Cathedral</u> Phoenix, 1910
	<u>Vulture Mine</u> Wickenburg, 1863

TABLE 6

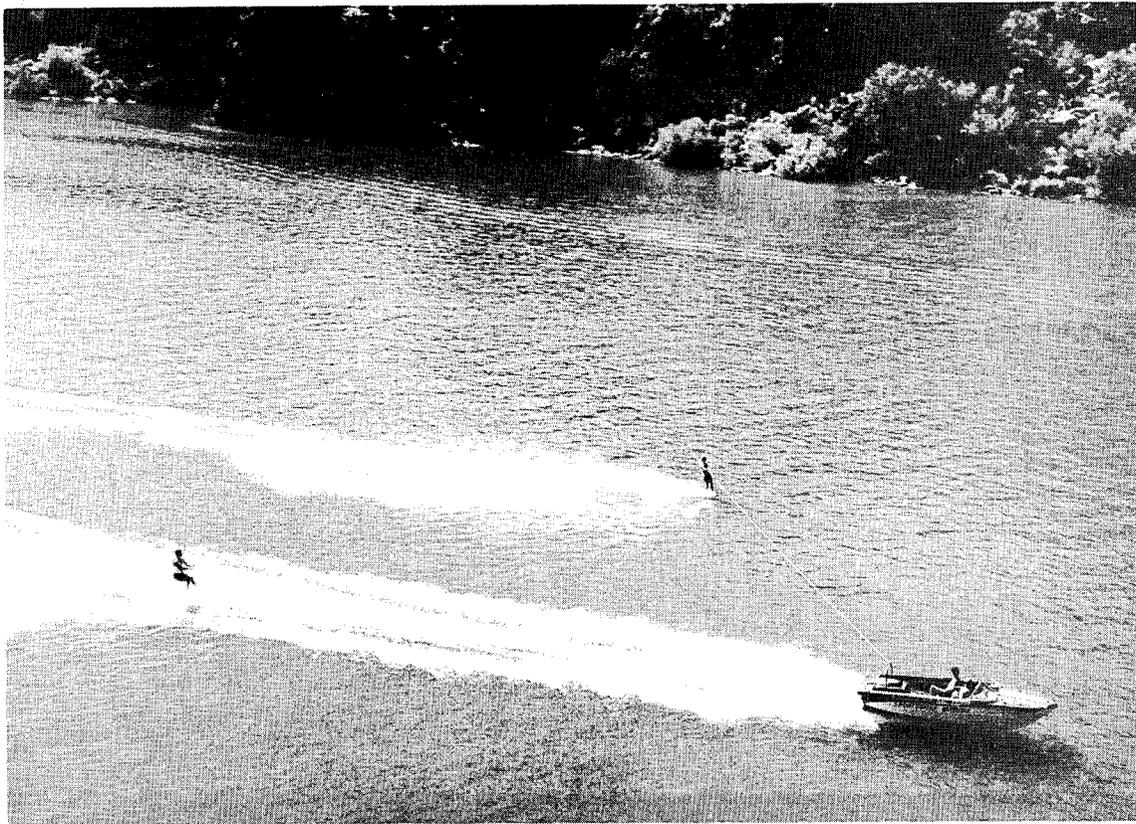
MAJOR RECREATIONAL CATEGORIES AND SELECTED SUB-CATEGORIES
 DEMAND BY DISTRICT OF PARTICIPATION
 1970, 1975, 1980, and 1985
 THOUSANDS OF PARTICIPATION DAYS

<u>Activity and District</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
1. Active Outdoor Recreation:				
Hohokam Area	28,290	34,077	39,602	43,775
Statewide	54,607	64,095	73,053	80,463
a. Bicycling				
Hohokam Area	13,386	16,127	18,744	20,722
Statewide	24,958	29,185	33,373	36,774
b. Outdoor Games/Sports				
Hohokam Area	15,104	18,197	21,151	23,385
Statewide	26,308	30,976	35,489	39,107
c. Horseback Riding				
Hohokam Area	1,995	2,404	2,794	3,088
Statewide	5,166	5,995	6,778	7,443
d. Golfing				
Hohokam Area	1,553	1,870	2,173	2,402
Statewide	2,885	3,382	3,847	4,235
2. Passive Outdoor Recreation:				
Hohokam Area	29,314	41,142	40,997	45,317
Statewide	61,266	71,749	82,103	90,260
a. Picnicking				
Hohokam Area	7,370	10,770	10,318	11,404
Statewide	15,359	18,040	20,566	22,617

TABLE 6 (Continued)

MAJOR RECREATIONAL CATEGORIES AND SELECTED SUB-CATEGORIES
 DEMAND BY DISTRICT OF PARTICIPATION
 1970, 1975, 1980, and 1985
 THOUSANDS OF PARTICIPATION DAYS

<u>Activity and District</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
3. Snow-related Recreation:				
Hohokam Area	0	0	0	0
Statewide	1,447	1,673	1,895	2,075
a. Snow Skiing				
Hohokam Area	0	0	0	0
Statewide	359	418	471	516
ALL ACTIVITIES STATEWIDE	173,975	204,064	232,894	256,233
ALL ACTIVITIES HOHOKAM	137,906	173,744	192,832	213,157



SALT RIVER PROJECT PHOTO

TABLE 7
PROJECT AREA RECREATIONAL ACTIVITIES

OUTDOOR ACTIVITIES	WINTER (%)	SUMMER (%)
Attending Outdoor Events	4.0	2.0
Bicycling for Pleasure	8.0	2.0
Boating (except sailing)		3.0
Camping	5.0	10.0
Cookouts	*	*
Chores (outdoor)	2.0	2.0
Driving Off-road Vehicles	*	
Fishing	2.0	4.0
Gardening	1.0	2.0
Games (outdoor)	16.0	6.0
Gen'l. Outdoor Play	3.0	*
Golfing	4.0	4.0
Hiking	4.0	2.0
Horseback Riding	7.0	3.0
Hunting	4.0	*
Ice Skating	2.0	
Loafing Outdoors	*	1.0
Mini-Bike/Cycle Riding	*	
Motorcycling	1.0	*
Mountain Climbing	*	
Mountain Visits		*
Park Outings		*
Picnicking	3.0	2.0
River Floating/Rafting		1.0
Roller Skating	1.0	
Sailing	*	*
Scuba Diving		*
Sightseeing	2.0	
Sledding-Tobogganing	3.0	
Snow Play	2.0	
Snowmobiling	1.0	
Snow Skiing	5.0	
Surfing		*
Swimming	1.0	45.0
Tennis	4.0	*
Travel	*	1.0
Walking	3.0	1.0
Water Skiing		3.0
All Others	2.0	*
Sub-Total	91.0	99.0
No Favorite Recreation	9.0	1.0
Totals: Percent	100.0	100.0
Number	300	300

*Less than 0.5 percent

**Percentages may not add to exact S.T.

TABLE 8

STATEWIDE FAVORITE OUTDOOR ACTIVITIES
ANNUALLY AND SEASONALLY

Activity	All Year		Summer		Winter	
	Rank	(%)	Rank	(%)	Rank	(%)
Swimming	1	18.0	1	35.0	20	1.0
Outdoor Games	2	9.5	4	7.0	1	12.0
Fishing	3-1	5.5	2	9.0	16	2.0
Camping	3-2	5.5	3	8.0	11	3.0
Picnicking	5	4.0	5	6.0	16	2.0
Horseback Riding	6-1	3.5	7-1	3.0	4-1	4.0
Golfing	6-2	3.5	7-2	3.0	4-2	4.0
Bicycling	6-3	3.5	10-1	2.0	2-1	5.0
Gardening	9	2.8	6	4.0	19	1.5
Hiking	10-1	2.5	10-2	2.0	11	3.0
Att. Outdoor						
Events	10-2	2.5	10-3	2.0	11	3.0
Walking	10-3	2.5	17-1	1.0	4-3	4.0
Outdoor Play	10-4	2.5	17-2	1.0	4-4	4.0
Snow Skiing	10-5	2.5	-	-	2-2	5.0
Tennis	15	2.3	14-1	1.5	11	3.0
Hunting	16-1	2.0	-	-	4-5	4.0
Sightseeing	16-2	2.0	17-3	1.0	11	3.0
Snow Play	16-3	2.0	-	-	4-6	4.0
Sledding	16-4	2.0	-	-	4-7	4.0
Chores Outdoors	20	1.8	14-2	1.5	16	2.0
Water Skiing	21	1.5	7-3	3.0	-	-
Boating	22	1.0	10-4	2.0	-	-
Loafing Outdoors	23-1	8	14-3	1.5	-	-
Motorcycling	23-2	8	17-4	1.0	22	.5
Ice Skating	25	.5	-	-	20	1.0



Fishing is good at Painted Rock Lake, Gila Bend, Arizona. SCS PHOTO

TABLE 9

INVENTORY OF NATURAL, SCENIC AND HISTORIC AREAS

Name or Identity of Area	Type	Location	Description
Apache Trail	Scenic	Eastern Maricopa County	Scenic mountain road with view of dams and lakes on Salt River.
Lower Salt River		Eastern Maricopa County	Eleven-mile long, readily accessible stretch of the Salt River between Stewart Mountain and Granite Reef Dams. Also known as Blue Point.
Salt River Canyon	Scenic	Eastern Maricopa County	Spectacular gorge containing three of the Salt River chain of lakes. Often called the "Little Grand Canyon."
Superstition Mountain	Scenic	Southeastern Maricopa County and adjacent county	Area in which legendary Lost Dutchman Gold Mine was supposed to be located.
Arizona History Room	Historic	Phoenix, Maricopa County	Selected facets of life in early Arizona.
Arizona State University Art Collection		Arizona State University, Tempe, Maricopa County	Paintings, sculpture, prints; both European and American.
Arizona Temple Gardens	Scenic	Mesa, Maricopa County	Gardens with trees and plants from all parts of the world surround the Temple of Church of Jesus Christ of Latter-day Saints. Offers historical information about the church, its foundings, etc.

TABLE 9 (Continued)
 INVENTORY OF NATURAL, SCENIC AND HISTORIC AREAS

Name or Identity of Area	Type	Location	Description
Buckeye Historical and Archaeological Museum	Historic	Buckeye, Maricopa County	Collection of prehistoric Indian artifacts from Buckeye Valley in particular, and from other sections of the state.
Capitol Museum	Historic	Phoenix, Maricopa County	Indian and historical artifacts, mineral display, various paintings of scenes and individuals of Arizona history.
Desert Botanical Garden	Scenic	Papago Park, Phoenix, Maricopa County	Extensive desert botanical garden.
Heard Museum	Historic	Phoenix, Maricopa County	Exhibits of anthropology and primitive art, large collection of Indian artifacts, native rugs, Indian baskets, pottery, Plains Indian effects; African, Middle America, South America, Mexico, Hopi, Navajo, Apache, Pima, Hohokam, Oceanis, and others are included.
Mineral Museum	Historic	Phoenix, Maricopa County	Minerals; ores; mine pictures, maps, data; earth sciences.
Mineralogy Museum	Historic	University of Arizona, Phoenix, Maricopa County	Mineral specimens, fossils, paintings of mines.

TABLE 9 (Continued)
 INVENTORY OF NATURAL, SCENIC AND HISTORIC AREAS

Name or Identity of Area	Type	Location	Description
Painted Rock State Historic Park	Historic	Northwest of Gila Bend, Maricopa County	Outstanding collection of Indian writings. The pre- historical and historical significance related and interpreted in self-conducted tour of site.
Phoenix Art Museum	Historic	Phoenix, Maricopa County	Both permanent and loan collections of various forms of fine art. Exhibits in- clude major part of perma- nent collection in field of Renaissance, Baroque and Oriental art as well as Western American and contem- porary expressions in paint- ing and sculpture.
Pueblo Grande Ruins	Historic	Phoenix, Maricopa County	Prehistoric ruins of Hohokam Indian culture, and museum containing artifacts and ex- hibits which have come from excavations.
Read Mullen Gallery of Western Art		Phoenix, Maricopa County	Private gallery of Western American paintings as well as Navajo Indian rugs, Indian paintings and Indian jewelry.
Gatlin Site		Maricopa County, about 3 miles north of Gila Bend	

TABLE 9 (Continued)

INVENTORY OF NATURAL, SCENIC AND HISTORIC AREAS

Name or Identity of Area	Location	Description
Hohokam-Pima Irrigation Sites	Park of the Four Waters, Phoenix, Maricopa County	
Roosevelt Dam	80 miles northeast of Phoenix on Arizona 88, Maricopa and adjacent county.	

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TABLE 10

INVENTORY OF POTENTIAL IMPOUNDMENT SITES
MARICOPA COUNTY

Name	Stream	Dam Location			Surface Ac.		Capacity		Drainage Area Sq. Mi.	Land Status
		Sec.	Twp.	Rge.	Min.	Max.	Min.	Max.		
New River Lake	New River	6	7N	3E	100	300	2000	15000	70	State
Sand Tank Lake					100	150				
Centennial Wash Wildlife Area					60	80				

TABLE 11

MARICOPA COUNTY PARKS AND RECREATIONAL SITES

1. Black Canyon Shooting Range
2. Buckeye County Regional Park
3. Cave Creek County Regional Park
4. Estrella Mountains Regional Park
5. Lake Pleasant Regional Park
6. McDowell Regional Park
7. Thunderbird County Park
8. Utery Mountain County Regional Park
9. White Tank County Regional Park

STATE PARKS DEPARTMENT SITES IN MARICOPA COUNTY

1. Painted Rock Historic Park
2. Gatlin Ruins Historic Park
3. Pueblo Grande Ruin Historic Park

TABLE 12

SUMMARY OF APPRAISALS OF POTENTIALS FOR OUTDOOR RECREATION
MARICOPA COUNTY, MARCH, 1968

KINDS OF RECREATION DEVELOPMENTS	SCORES FOR KEY ELEMENTS (RATING X MULTIPLIERS)																TOTAL SCORE	APPRAISAL (ADJECTIVE)
	CLIMATE	SCENERY	NATURAL AREAS	HISTORIC AREAS	SOILS	EXISTING	IMPOUNDMENT SITES	HABITAT	POPULATIONS	SIZE & DISTRIBUTION	AGE & OCCUPATION	INCOME LEVELS	PROXIMITY	ACCESS	TOURIST ROUTES	RURAL OWNERSHIP & LAND USE PATTERN		
I. VACATION CABINS, COTTAGES, & HOMESITES	18	20	10	xxx	5	1	3	xxx	xxx	3	xxx	20	5	8	xxx	xxx	93	Medium
II. CAMPING	20	20	20	xxx	5	16	4	xxx	xxx	xxx	xxx	xxx	xxx	6	xxx	xxx	91	High
-VACATION SITE	20	20	20	xxx	5	16	4	xxx	xxx	xxx	xxx	xxx	xxx	6	xxx	xxx	91	High
-PACK TRIP	30	30	30	xxx	xxx	5	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	95	High
-TRANSIENT	10	10	xxx	xxx	6	xxx	1	xxx	xxx	xxx	xxx	xxx	xxx	xxx	50	xxx	77	High
III. PICNIC & SPORTS AREAS	8	xxx	xxx	xxx	5	xxx	xxx	xxx	30	10	16	24	8	xxx	xxx	xxx	101	High
-GAME, PLAY, TARGET AREA	8	xxx	xxx	xxx	5	xxx	xxx	xxx	30	10	16	24	8	xxx	xxx	xxx	101	High
-BICYCLING	8	3	xxx	xxx	3	xxx	xxx	xxx	30	10	8	16	10	xxx	xxx	xxx	88	High
-PICNICKING	10	10	xxx	xxx	7	9	2	xxx	xxx	30	xxx	8	24	10	xxx	xxx	110	High
IV. FISHING WATERS	10	xxx	xxx	xxx	xxx	15	10	xxx	16	10	xxx	xxx	10	xxx	xxx	xxx	71	High
-WARM WATERS	10	xxx	xxx	xxx	xxx	15	10	xxx	16	10	xxx	xxx	10	xxx	xxx	xxx	71	High
-COLD WATERS	10	xxx	xxx	xxx	xxx	9	6	xxx	6	xxx	10	xxx	10	xxx	xxx	xxx	51	Medium
V. GOLF COURSES	10	8	xxx	xxx	8	xxx	xxx	xxx	30	20	24	20	xxx	xxx	xxx	xxx	120	High
-STANDARD & PAR-3	10	8	xxx	xxx	8	xxx	xxx	xxx	30	20	24	20	xxx	xxx	xxx	xxx	120	High
-MINIATURE & DRIVING RANGES	xxx	xxx	xxx	xxx	8	xxx	xxx	xxx	30	20	8	30	xxx	xxx	xxx	xxx	96	High
VI. HUNTING AREAS	10	xxx	xxx	xxx	8	xxx	xxx	45	27	20	xxx	xxx	10	xxx	xxx	10	130	High
-SMALL GAME	10	xxx	xxx	xxx	8	xxx	xxx	45	27	20	xxx	xxx	10	xxx	xxx	10	130	High
-BIG GAME	10	xxx	xxx	xxx	8	xxx	xxx	30	18	20	xxx	xxx	xxx	xxx	xxx	xxx	86	High
-WATERFOWL	10	xxx	xxx	xxx	7	xxx	xxx	25	15	10	xxx	14	xxx	xxx	xxx	xxx	81	Medium
VII. NATURAL SCENIC & HISTORIC AREAS	xxx	32	60	xxx	xxx	xxx	xxx	7	10	xxx	xxx	10	7	10	xxx	xxx	136	High
-NATURAL AREAS	xxx	32	60	xxx	xxx	xxx	xxx	7	10	xxx	xxx	10	7	10	xxx	xxx	136	High
-SCENIC AREAS	xxx	40	40	xxx	xxx	xxx	xxx	xxx	20	xxx	xxx	10	14	10	xxx	xxx	134	High
-HISTORIC AREAS	xxx	xxx	35	xxx	xxx	xxx	xxx	xxx	10	xxx	xxx	10	xxx	30	xxx	xxx	85	High
VIII. RIDING STABLES	10	xxx	30	xxx	xxx	xxx	xxx	xxx	20	10	20	30	xxx	xxx	xxx	xxx	120	High
IX. SHOOTING PRESERVES	10	10	xxx	xxx	20	xxx	xxx	xxx	20	7	21	16	xxx	xxx	xxx	xxx	104	High
X. WATER SPORTS AREAS	9	9	xxx	xxx	xxx	28	24	xxx	xxx	20	10	xxx	10	xxx	xxx	xxx	110	High
	A.	B.	C.	D.	E.	F.1	F.2	G.1	G.2	H.1	H.2	H.3	I.1	I.2	I.3	J		

Problems

There are over 137 million participation days of recreation on the lands in the Hohokam Project area. This heavy use poses many problems. Included as problems are:

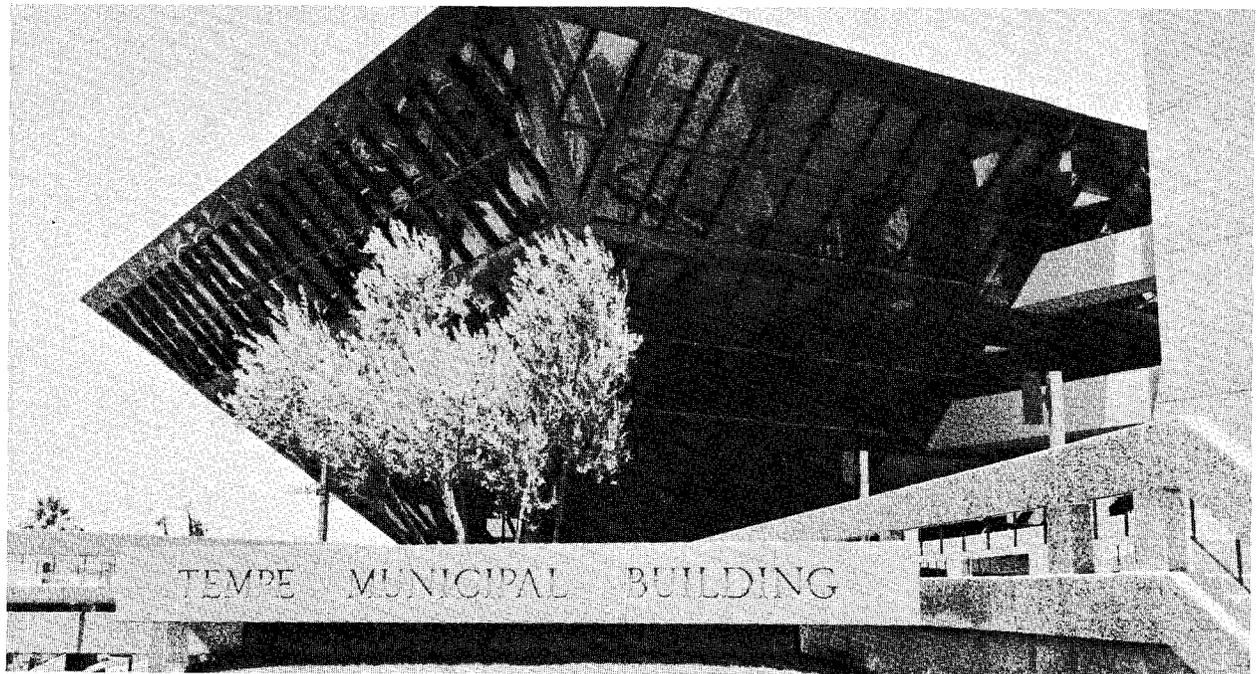
- Demand for recreational opportunities is growing rapidly and is projected to be over 200 million participation days by 1985. Present facilities are inadequate to handle this load.
- Overuse and subsequent deterioration of existing facilities will continue unless additional facilities are constructed.
- There is no accepted, overall, coordinated plan for recreation for the project area.
- Demand is increasing so fast that facilities can't be constructed fast enough to keep up with this demand.
- The bulk of the states recreational demand exists in the Phoenix metropolitan area and winter activities are almost exclusively confined to the desert areas. This places a heavy burden on very fragile ecosystems.
- There is a lack of technical data and use information on many areas. This limits the ability of planners to choose the correct alternatives for developing recreational facilities on these areas.

Opportunities

Opportunities do exist for improving the current trends in use of land for recreation and for improving future recreational considerations. The RC&D Project can assist by:

- Sponsoring a coordinated work group to plan recreation on all areas within the project boundaries.
- Contributing to the development of water-based recreational sites, both financially and technically.
- Sponsoring technical committees and groups to study recreational demand for and use of the desert areas during the winter months.
- Sponsoring and assisting the county to set up reservation fees and programs to control use of all public recreational facilities.
- Sponsoring and assisting private landowners in recreational developments that remove some of the burden of use from public facilities.

COMMUNITY FACILITIES and SERVICES



Photos: Soil Conservation Service



Photo: City of Chandler

COMMUNITY FACILITIES and SERVICES

An attempt has been made to develop information concerning community facilities and services. While all possible areas are not identified and discussed, the major problem and opportunity areas are outlined.

Energy

Governor Williams states that, "We are nearing the end of the fossil fuel age, and must turn to other energy sources. In the long range we must look to utilization of nuclear energy, solar energy, geothermal devises and the use of wind currents."

The era of dependence on fossil fuels for energy use is about over. As the supply of fossil fuels becomes less abundant by increased use, the effect of its pollution of the environment becomes more evident.

Other sources of energy must be found for future use. It is not intended to select one energy source over another. There are two areas of need for energy. One is energy for transportation to move cars, trucks, busses, ships, railroads and airplanes, which is probably the most critical. The other is energy to run homes, light cities and turn the wheels of industry.

Methods of generating and conveying electrical energy is a most important need for the future.

The study of more efficient use of hydro-electrical power to turn turbines for electrical generators must be continued.

Geothermal possibilities for steam and water use to produce electrical power must be explored. Another source of energy may be power cells creating energy by chemical reaction. There is also the safe development of atomic energy as a power source.

Solar energy is probably the least developed and the most important source of energy for Arizona. The sun is in abundance for 300 days in the year in the area which is covered by the Hohokam RC&D Project.

Housing

The 1970 United States Census has provided a wealth of information concerning Hohokam Project area housing facilities. Of Maricopa County's 298,989 dwelling structures, 213,363 were found to be single family; 64,204 contained two or more units; and 21,422 were mobile homes. During the period 1960 through 1970, the number of single unit structures expanded by 31.8 percent while multiple unit structures and mobile homes increased by 153.3 percent and 96.0 percent respectively. The popularity of the latter two categories is explained in part by the scarcity of privately owned lands (only 24.4 percent of Maricopa County land is privately owned) resulting in higher land costs, increased labor and material construction costs, and the changing life styles of a younger, more mobile population. It should be mentioned that the latter two forms of housing carry the advantage of consuming less land per family housed.

Maricopa County vacancy rates ranged from 1 percent for single units to 7.5 percent for multiple units reflecting a slight over-supply condition during 1971.

Utilities

Electrical

Electrical power service is provided to the Hohokam Project area by two firms: Arizona Public Service and Salt River Project. The power is supplied by hydro-electric generating plants along the Salt River, steam powered generators consuming fossil fuels, and it is also purchased from interstate sources. Salt River Project reports an annual growth rate in electrical sales of approximately five percent over the last ten years and anticipates a $7\frac{1}{2}$ percent growth rate over the next ten years.

Gas

Natural gas is supplied to the area by the El Paso Natural Gas Company pipeline. The city of Mesa, Arizona Public Service Company, and the Black Mountain Gas Company purchase and distribute gas to residential and industrial users in the Hohokam area. Recent nationwide gas shortages have forced El Paso Natural Gas to curtail service on two occasions to its larger industrial users in order to preserve service to residential customers.

Water

Water service for commercial, residential, and agricultural users is provided by the Salt River Project and more than a dozen smaller, local water companies, which utilize wells and water from lakes created by dams of the Salt River above Phoenix. Water is transported to users by an extensive canal and irrigation ditch system, pipe, and in some cases, by truck to outlying areas. Recent conversations with Salt River

Project officials have indicated that no short-term growth in the demand for water is expected, since irrigated agricultural lands are being urbanized, resulting in less water consumed per acre.

Recent studies have indicated that the water supply is probably sufficient to support project area growth to the 1980's. This overall favorable picture is largely due to the Salt and Verde river waters. However, dropping water table levels and increasing salinity of some wells pose future problems. In the long-run, as project area population grows, additional water is expected to be provided from the Colorado River through the proposed Central Arizona Project.

A very small percentage of the purified water is used for drinking, cooking, and bathing. The majority of the purified water is used for irrigating lawns, cooling houses, washing cars, and flushing toilets.

Telephone

Telephone service to the Hohokam Project area is provided by Mountain Bell Telephone Company and Arizona Telephone Company. Currently, the residential service installation wait averages one week, but may range from one day to two weeks, depending upon the specific area. As compared to many areas nationally, this is a relatively short service installation wait.

Police and Fire

The Hohokam Project area is provided with police protection by the Arizona Highway Patrol, the Maricopa County Sheriff Department, and more than 30 local police departments.

Fire protection is provided in a variety of ways in the project area. The Rural Fire Protection Company, a private firm, maintains 12 stations in Maricopa County, serving outlying county areas and several municipalities on a contract basis. The Phoenix metropolitan area communities maintain municipally operated fire departments, while a number of outlying county areas have volunteer fire departments.

Solid Waste

Disposal of solid waste has been, and will continue to be, one of the major problems for the Hohokam Project area. Currently, the area is served by approximately 21 authorized sanitary landfill areas operated by municipalities, the county, joint city-county operations, and a few private contractors. Solid waste pickup is performed by private and public operations, and in some outlying areas, not at all.

The Maricopa County Health Department has indicated that the county alone has more than 600 illegal dumpsites. The problems of site location and transportation costs continue to plague attempts to

manage the disposal effort. Compounding the problem is public unawareness and apathy, which make it difficult to generate public support for solid waste disposal systems.



SCS PHOTO

Minor amounts of glass and metals are being recycled through local organizations and private facilities. There are no practical systems in operation that are capable of recycling large volumes of solid waste.

While the consumption of water, in the short-term, is not expected to increase as agricultural land is developed into residential uses, it can be expected that the production of sewage will increase vastly. Currently, sewage waste disposal is not reported to be an area-wide problem.

Septic system malfunctions are reported to be widely scattered among rural areas not served by sewage lines, due to local impermeable soil conditions. Huge leach pits to disperse the effluent must be excavated in these areas.

The sewage waste water and solids are resources. As such, they may be reclaimed and recycled for further use.

Transportation

Roads and highways



SCS PHOTO

Maricopa County alone contains more than 5,200 miles of paved roadway; the county highway department reports that at least 500 miles are deficient, according to state highway department standards.



Interstate highways enter the Hohokam Project area from four directions; Interstate 10 enters from the south and west; Interstate 17 from the north, and Interstate 8 from the east and west, connecting with U.S. Highway 80 and Interstate 10. Five state highways and three U.S. highways also enter the area.

SCS PHOTO

Air Service

Phoenix Sky Harbor International Airport provides domestic and international service. In addition, fifteen publicly and privately owned airports are available for public use. The area also contains five military airports, twenty heliports (eight of these associated with hospitals), and twenty-six private airports not available for public use. Nine abandoned airports may potentially provide additional facilities as needed in the face of future growth.



Phoenix Sky Harbor International Airport

PHOENIX SKY HARBOR INTERNATIONAL AIRPORT PHOTO

International service to Mexico from Phoenix Sky Harbor International Airport is supplied by two airlines. Seven additional airlines provide passenger and freight service domestically, with connections to international flights at numerous destinations. Four airlines provide freight service only. All thirteen above carriers offer scheduled service. Other non-scheduled airlines offer service to the area on a demand basis.

Bicycle Trails

There are no facilities or marked areas in the transportation systems to accommodate bicycle or motorcycle travel. Wider rights-of-way on 1/2 or 1 mile section line roadways into new subdivisions would furnish sufficient area for bicycle pathways or trails.

Rail and Truck Transportation

Two transcontinental railroads serve the Hohokam Project area. The Santa Fe provides freight service on two routes entering the area, while Southern Pacific provides freight and passenger (AMTRAK) service.

Thirty major interstate truck lines and many local transporters serve the Hohokam Project area. Two interstate bus lines and five state lines also supply passenger and limited freight service.

Churches

More than 850 places of worship, including 32 on the Gila River Indian Reservation, represent all religious denominations. Aside from the number and location of area churches, they also exemplify some of the area's most beautiful architecture.

Shopping

In addition to the downtown shopping areas of the various cities and towns, the area is served by some 137 widely dispersed shopping centers totaling 14,348,980 square feet as reported in "Inside Phoenix '72" published by the Arizona Republic and the Phoenix Gazette. The same publication indicates that six more centers are under construction and 48 centers proposed, adding over seven million square feet to the total. Projections made by a Western Management Consultants, Inc. study have indicated that as Maricopa County population grows to 1.5 million, the needed retail shopping space must more than double to 55,840,000 square feet.

Credit and Finance

The Hohokam Project area is fortunate in being a major financial and commercial center of the Southwest. Area banks and savings and loan associations have played a major role in stimulating and responding to economic development and area growth.

Eleven banks, with more than 200 branch banks, provide a wide range of services to the consumer and business sectors of the economy. On the consumer side, checking and savings accounts, installment loans, insurance, investment, estate, trust, and national credit card services are available. In addition to these, commercial loans, agricultural crop and livestock loans, mortgages, leasing services, automobile dealer financing, and international banking services are available to the business sector.

Six savings and loan associations, with more than 60 branches, provide mortgage loans and home improvement loans. In addition, the area is served by more than 200 finance companies, mortgage companies, and credit unions, which supply credit for a broad variety of business and consumer needs.

Medical-Health Services

County Area

The Hohokam Project area contains some 34 hospitals and more than twice that number of clinics dealing with specialized medical problems or general local practices. Despite the number of hospitals in the area, residents of outlying communities, such as Gila Bend, must drive 45 to 60 miles to reach complete medical care facilities. More than 35 area nursing homes supply extended care facilities and services to retirees, convalescents, and the chronically ill. Ambulance service is available from more than 18 companies, several of whom provide air as well as surface transportation.

Conversations with medical professional societies show that approximately 1,700 doctors (M.D.), 180 osteopaths (O.D.), 500 dentists, and 150 chiropractors are licensed and active in servicing the area.

The Maricopa County Health Department provides a variety of health services from four district offices and more than thirty clinics. Clinics deal with general or specialized medical services, including family planning, rehabilitation, cardiac chest x-ray, dental, immunization, mental health, retardation, and veterinary services to name a few. Public health nurses are located in each of the four district offices. They make home visits and provide health information and counseling to area residents.

The Gila River Indian Reservation is served by four full-time physicians. In addition, radiologist, psychiatrists, surgeons, and other specialists visit the reservation on a part-time basis. A field health nurse staff provides health education and other services.

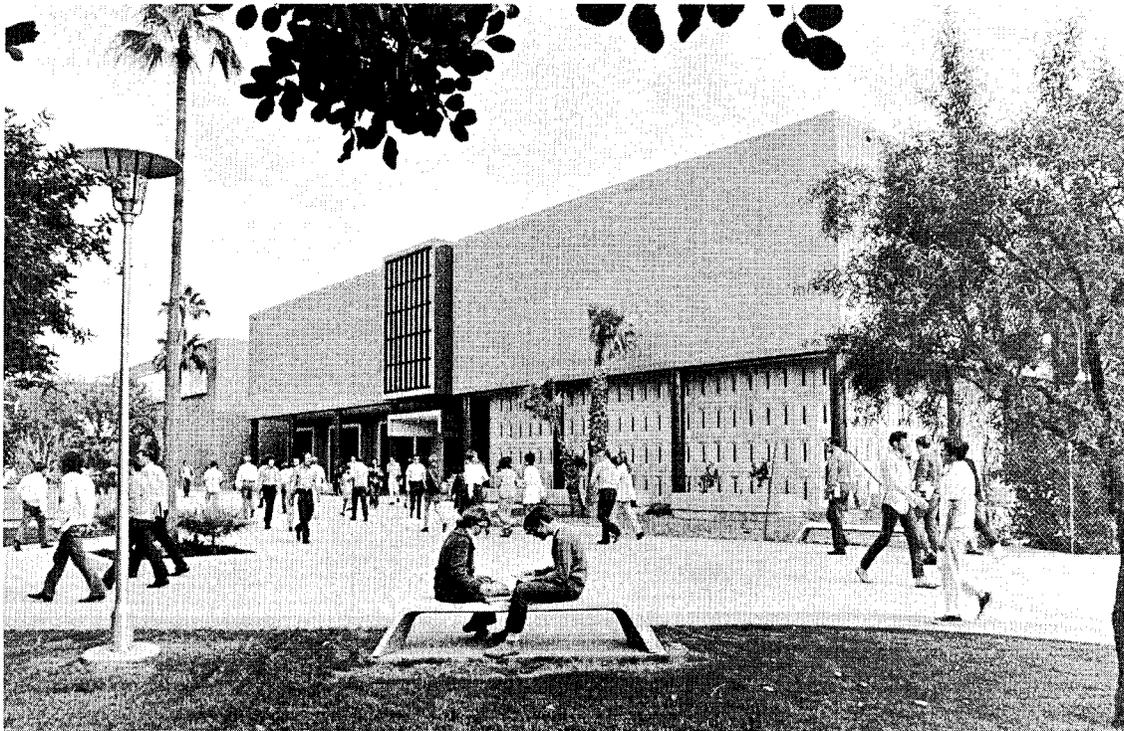
The forty-bed Indian hospital operated by the Public Health Service is located at Sacaton. A clinic at Gila Bend provides out-patient care only. A National Institute of Health Clinic, also located at Sacaton, performs diabetes research. These facilities care for reservation as well as non-reservation residents. Many residents of the western portion of the reservation also seek medical services at the Phoenix Indian Hospital. Ambulance service is provided by a private business on a contract basis.

Educational Facilities

Colleges and Universities

Arizona State University is located within the Hohokam area providing bachelor, master, and doctoral degree programs in a wide variety of academic disciplines to more than 30,000 students. Five other area institutions, including College Del Rey, DeVry Institute of Technology, Grand Canyon College, Southwestern College, and American Graduate School of International Management, also offer programs of study leading to the bachelor's degree. American Graduate School also offers a master's degree in International Management.

An extensive Maricopa County Community College system composed of Glendale, Mesa, and Scottsdale community colleges, Phoenix College, and Maricopa Technical College, has an enrollment of 33,575 day and evening students. Vocational training is provided by the community colleges, as well as by many local private, industrial, technical and trade schools.



Arizona State University - Tempe, Arizona

ARIZONA STATE UNIVERSITY PHOTO

Primary and Secondary Schools

Average daily school attendance (primary and secondary) for Maricopa County is 227,550 pupils. Approximately 2,000 additional students reside on the Gila River Indian Reservation. County parochial elementary and high schools number 39 and 13 respectively. The area public school system is composed of 231 elementary schools, 17 junior high schools, 37 high schools, and two special accommodation schools.

The Bureau of Indian Affairs operates six primary schools on the Gila Indian Reservation. Three parochial schools also serve the reservation area. Reservation students of high school age attend Casa Grande, Chandler, Coolidge, or Maricopa schools. The Gila River Career Center at Sacaton, operated by Central Arizona College, provides a wide range of vocational and career training to both reservation and non-reservation students, currently numbering 246.

Communications

Radio

A wide variety of radio fare is available to the Hohokam Project area listening public. More than 30 AM, FM, and FM stereo stations provide classical, country, and contemporary music, as well as news, weather, and sports information in two languages, Spanish and English.

Television

Five VHF stations on Channels 3, 5, 8, 10, and 12 broadcast national network programming to central Arizona. Channel 8 is the local public broadcasting network station, which originates from Arizona State University. The project area also has one UHF station broadcasting on channel 21.

Newspapers

Over 60 daily and weekly newspapers, including five Phoenix metropolitan area dailies, provide news coverage. A number of these newspapers provide topically specialized information in several languages.

Cultural Facilities

The rich cultural life of the Hohokam Project area is favorably influenced by Arizona's Indian and Spanish heritage. Arizona State University's location within the area also lends an international flavor, since music, art, and theater companies visit from many nations.

A pot pourri of musical categories, ranging from rock, classical, and jazz to mariachis and Indian music are presented live in the valley.

Phoenix Civic Plaza is the new home for the Phoenix Symphony while the university and community colleges have regular concert series. Legitimate theatre is presented by at least ten local groups and touring companies.

Many nationally recognized artists live and work in the valley. Art groups, galleries, museums, and shows are numerous. Historical, and art museums are widely dispersed throughout the area, numbering more than 17.

Library services, including books, films, and phonograph records, are available at project area colleges and numerous public libraries. The Maricopa County Library System also supplies bookmobile service to 19 outlying areas.

Problems

Problems in the area of transportation seem to be related to the physical condition of public facilities in the area. These physical conditions include health hazards created by dust from heavy traffic on unpaved roadways (such as those recently corrected in the San Lucy area); the above-mentioned 500 miles of substandard paved county roadway; and the isolation of areas due to flooding over roadways.

- Falling water table levels and increasing salinity of some wells pose localized problems.
- Sewage discharges are expected to increase vastly as cropland is urbanized.
- Solid waste disposal continues to be a major problem as evidenced by the more than 600 reported illegal dumpsites in the county. Many dumpsites have the potential to pollute ground and surface water supplies.
- One of the most pressing housing problems is that of substandard housing. On the Gila River Indian Reservation, for example, of 1,037 dwellings, 742 or 71.6 percent were reported to be substandard by the 1970 Census (as compared to an estimated 1970 statewide average of 15.6 percent). This is not to imply that this problem is limited to the reservation area alone. Fully 2.6 percent (8,094 units) of Maricopa County units were also reported to be lacking all or some plumbing facilities. Much of the county's substandard housing is occupied by rural, seasonal, and migrant farm workers.
- The growth of retail shopping space has, in many areas, followed heavily traveled streets and highways, resulting in mixed residential, commercial, and agricultural strips. This sort of development is often unsightly and has an adverse effect on residential property values.

Opportunities

The community facilities of the Hohokam RC&D Project area have been found, in several instances, to be either lacking or inadequate. In view of this, the committee has outlined seven general objectives to serve in the planning and development of facilities to meet current needs and future growth. These objectives are:

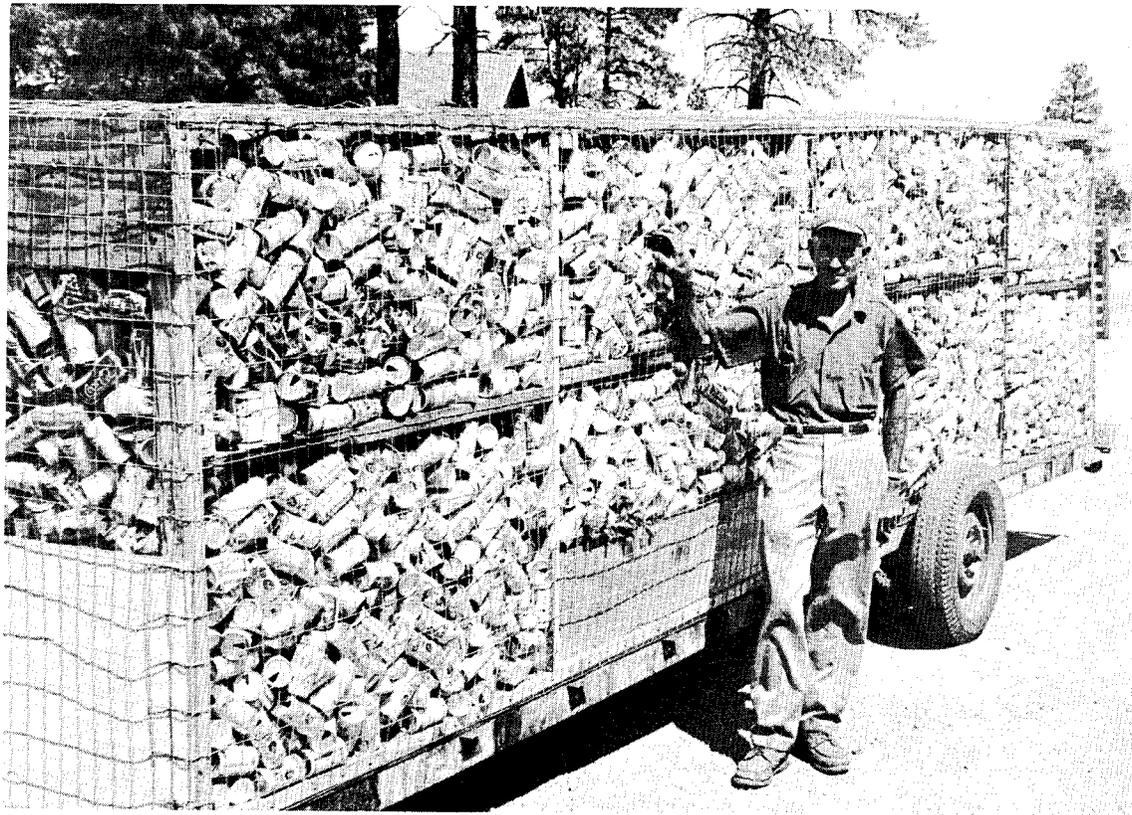
- Assist in the provision of community facilities necessary to raise existing communities and rural areas to an acceptable quality of life.
- Assist in the provision of community facilities in the necessary quantity and location to meet the needs of area growth.
- Assist and cooperate with other concerned groups to achieve orderly growth and optimal utilization of resources.
- Consider the forces of the environment, especially weather and geology, in planning for provision of community facilities.
- Consider the diversity of needs and wants of urban and rural populations in an area composed of a huge metropolitan area, small cities and towns, and vast, sparsely populated areas.
- Improve medical care facilities for communities not near the Phoenix metropolitan area.
- Assist and cooperate with individuals and organizations that voluntarily conduct campaigns to clean litter from the roadsides and other public places, as illustrated by Mr. Bill Smeltz, in the following pages.

Mr. Bill Smeltz, Hohokam RC&D Steering Committee member representing the Tonto Natural Resource Conservation District, is a strong believer in protecting the environment from litterbugs, as well as from erosion and other hazards.

Bill is retired professionally, but spends many hours each week cleaning the litter from the roadsides in the beautiful mountain resort area he calls home. He separates the aluminum beer cans from other trash he collects and hauls them to Phoenix for recycling. Money he collects for this effort is used to furnish equipment for his favorite little league baseball teams, for travel expenses to the RC&D Steering Committee meetings, and to help his natural resource conservation district when necessary.

Mr. Smeltz kept a rough count on the cans he provided the Reynolds Aluminum Company in Phoenix during the first seven months of his operation. It totaled approximately 4 million cans.

Bill knows that the area would be much cleaner and more beautiful if other concerned citizens would take this kind of action.



Bill Smeltz and his beer can collection

PAYSON ROUNDUP PRINTING AND PUBLISHING CO. PHOTO

INDUSTRY and BUSINESS



New 40 story Valley Center – corporate headquarters of the Valley National Bank. Photo: Valley National Bank

INDUSTRY and BUSINESS

"The long-lived phoenix bird of Egyptian legend rose from its own ashes with renewed youth and strength. Phoenix, the capitol of Arizona, has this 'magical' power, too! Time after time, in the last sixty years, Phoenix has risen above all previous growth records by the addition of some new and vigorous business dimension." So says the 1973 Directory of Manufacturers in the Metropolitan Phoenix area, developed by the Phoenix Metropolitan Chamber of Commerce.

With the completion of the Roosevelt Dam across the Salt River in 1911, and the assurance of a plentiful supply of irrigation water, the area now composing the Hohokam RC&D Project soon became the center of commerce and farming. Cattle, cotton, and citrus provide the three-way guarantee to economic well-being.

The Phoenix Chamber of Commerce report goes on to state that "When World War II began, the Army Air Corps selected Phoenix for important training bases. Few areas could match the ideal weather of this 'Valley of the Sun'. The Phoenix industrial community grew rapidly as aircraft, metals, and other manufacturing plants located here. But development didn't stop with the war's end. Expansion continued at an unbelievable rate. From a population of 65,000 in 1940, Phoenix grew to nearly 107,000 in 1950."

"The dry and sunny climate of Phoenix had always attracted winter visitors from the blizzard states of the East and Midwest. Improvements in home air conditioning now made Phoenix attractive for year-round living. Tourists turned to residents and the boom was on in construction, banking, new business, utilities and more and more manufacturing. By 1960, the city of Phoenix had grown to 439,000 people - a fantastic 300 percent increase in ten years - by far the fastest rate of growth of any major city in the United States."

"And now another decade of development is on the record. Major credit goes to the great influx of manufacturing. In the metropolitan Phoenix area (Maricopa County), manufacturing employment increased from an annual average of 33,600 in 1960, to more than 75,000 now. The total annual manufacturing output of the Phoenix area is well over 1.7 billion dollars."

The Marketing and Research Section of the Arizona Republic and Phoenix Gazette has developed a booklet entitled: "Inside Phoenix '73" which states that: "In brief, the key factors in Metropolitan Phoenix' healthy economic climate reacted as follows in 1972:

- "POPULATION increased by nearly ten percent in 1972, with year-end estimates standing at 1.175 million."
- "EMPLOYMENT showed resounding gains as 38,600 new jobs were added to the economy. Unemployment figures put Metro Phoenix at 3.4, well below the national average of 5.2, the comparable seasonally adjusted figure."
- "NEWCOMER households numbered 46,000 in 1972, 12 percent of the area's total households. This dynamic market segment is greatly responsible for the changing face of the city, for newcomers bring their new ideas, tastes and habits here and seek out - or create - fulfillment of their needs."
- "INCOME for area households rose by nine percent in 1972, with the median household income now standing at \$10,692. Total personal income for the Phoenix SMSA reached \$4.8 billion in 1972 and is projected to grow to \$5.5 billion by year-end 1973."
- "FINANCIAL institutions in the area realized impressive gains as well. Bank debits, an indicator of market activity, increased by 17 percent in 1972. Total assets of banks rose 18 percent to over \$6 billion, and savings and loan firms realized a 36 percent increase, registering over \$1.4 billion in assets."
- "HOUSING construction, repeating its 1971 performance, exceeded nearly all expectations in 1972; 36,427 new units were permitted and vacancy rates stood at two percent for single family dwellings, six percent in multiple units."
- "TOURISM is still our strong number three income producer, with an estimated \$320 million added to the economy in 1972, and a projected \$340 million to be realized in 1973."

The rapid expansion of urban areas and business enterprises in the Phoenix area has also been experienced by the surrounding cities. This rapid growth can be partially attributed to the fact that the area has a good labor supply, excellent education, research and development facilities, a strategic location, and is a good place in which to live.

The area has a tax structure favorable to business and industry. It compares very favorably with other major metropolitan areas in states across the nation.

The following charts, as developed by the Marketing and Research Section of the Arizona Republic and Phoenix Gazette, illustrate the significant existing industry and business enterprises in the Hohokam RC&D Project area as compared to the number of establishments within the entire state. They also show the growth through the years 1970, 1971, and 1972.

The charts reflect the contribution to the area's economy by listing the kinds of business in the area and the number of people they employ.

The business and industry segment in the Hohokam RC&D Project area has expanded into all the resource-related processing, manufacturing and distribution industries and businesses. The rapid increase in population and consequent demand for supplies is being matched by rapid increase in the business and industry enterprises.

There is a need to establish industrial sites in the smaller rural areas to accomplish three purposes:

- Furnish employment opportunities to local residents, and thereby allow them to remain in their hometowns and make a satisfactory living.
- Meet the increasing demands for all kinds of goods.
- Disperse population and industry to reduce air pollution and transportation problems.

The Hohokam RC&D Project Steering Committee can work with state and local organizations to encourage the industrial expansion in the rural towns.

It is evident that the Hohokam RC&D Project area will continue to grow and will continue to have a major role in the Southwest for finance, administrative headquarters, professional and governmental services, and for industry and business.

With this growth it is also evident that there will be many of the problems that are related to rapid expansion.

The Socio-Economic Committee for the development of this Program of Action tried to determine the most pressing needs for the Hohokam RC&D Project area. They sought information concerning the problems and the answers to those problems by mailing out 500 questionnaires to the community leaders. The most pressing problems are outlined in the problems section.

MANUFACTURING ESTABLISHMENTS
MARICOPA COUNTY & STATEWIDE
1970-1971-1972*

Number of Plants with Employment of:

SIC ** Code Industry Class & Area	1-19			20-49			50-99			100-249			250-499			500-999			1000+			TOTAL		
	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72
Ordinance																								
Maricopa Co.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1	1	-
Statewide	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1	1	5	4	4
Food																								
Maricopa Co.	45	46	53	23	22	25	10	12	11	12	9	9	5	6	8	-	-	-	-	-	-	95	95	106
Statewide	88	89	96	40	37	43	20	23	19	11	9	12	6	6	7	-	-	1	-	-	-	165	164	178
Apparel																								
Maricopa Co.	15	15	18	2	1	5	4	4	3	5	4	4	2	2	2	-	-	-	1	1	1	29	27	33
Statewide	22	24	27	3	3	9	7	8	6	12	8	11	3	5	4	-	-	-	1	1	1	48	49	58
Lumber																								
Maricopa Co.	22	24	37	4	9	7	7	6	3	2	2	5	-	-	2	-	-	-	-	-	-	35	41	54
Statewide	70	72	88	15	23	17	7	7	6	5	4	7	4	3	2	-	-	1	-	-	1	101	109	122
Furniture																								
Maricopa Co.	24	22	33	11	12	17	1	2	2	2	2	2	-	-	-	-	-	-	-	-	-	38	38	54
Statewide	35	33	51	14	16	21	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	53	53	76
Paper																								
Maricopa Co.	4	4	6	1	2	1	3	2	3	1	1	1	-	-	-	-	-	-	-	-	-	9	9	11
Statewide	8	6	9	2	4	2	4	3	4	1	1	1	1	1	-	-	-	-	-	-	-	16	15	16
Printing																								
Maricopa Co.	91	100	153	17	20	27	10	9	7	2	3	4	-	-	-	-	-	-	1	1	1	121	133	192
Statewide	146	159	228	32	32	41	14	14	11	2	3	5	-	-	-	1	1	1	1	1	1	196	210	287
Chemicals																								
Maricopa Co.	22	27	31	6	4	7	2	2	2	1	1	-	-	-	-	-	-	-	-	-	-	31	34	40
Statewide	28	33	38	9	7	10	2	2	1	1	1	2	1	1	1	-	-	-	-	-	-	41	41	52
Petroleum																								
Maricopa Co.	2	3	3	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	4
Statewide	3	5	4	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6	6
Rubber & Plastic																								
Maricopa Co.	23	27	40	8	8	9	4	4	6	1	3	2	-	-	-	-	-	-	-	-	-	36	42	57
Statewide	30	35	50	9	9	11	5	4	6	1	4	4	-	-	-	-	-	-	-	-	-	45	52	71

SIC Code Industry Class & Area	1-19			20-49			50-99			100-249			250-499			500-999			1000+			TOTAL				
	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72		
Leather																										
Maricopa Co.	5	4	6	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	5	7
Statewide	7	6	8	2	2	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	8	11
Stone, Clay, Glass																										
Maricopa Co.	31	35	34	11	9	12	2	4	5	1	2	2	3	2	3	-	1	1	-	-	-	-	-	48	53	57
Statewide	69	74	90	18	21	21	4	5	7	3	5	4	3	2	2	1	1	2	-	-	-	-	-	98	108	126
Prim. Metal																										
Maricopa Co.	10	10	9	3	4	3	3	2	4	1	1	1	1	1	1	-	-	-	2	2	2	2	2	20	20	20
Statewide	18	15	16	6	6	6	4	3	6	2	2	1	2	2	1	1	1	2	2	2	2	2	2	35	31	34
Fab. Metal																										
Maricopa Co.	62	75	87	22	24	26	11	10	11	5	4	5	-	-	-	-	1	1	1	-	-	-	101	114	130	
Statewide	83	93	111	26	29	32	11	11	13	8	6	5	1	-	-	1	2	2	1	-	-	-	131	141	163	
Machinery																										
Maricopa Co.	88	97	119	16	20	22	14	9	6	2	2	3	1	1	-	1	1	1	1	2	3	123	132	154		
Statewide	107	119	145	18	23	26	15	10	7	3	2	3	1	1	1	1	1	1	1	2	3	146	158	186		
Elec. Ma- chinery																										
Maricopa Co.	23	33	43	8	8	10	6	4	4	4	4	4	1	3	2	4	2	2	1	1	1	47	55	66		
Statewide	35	46	60	12	11	11	7	5	7	8	8	7	2	4	4	4	2	2	1	1	1	69	77	92		
Trans. Equip.																										
Maricopa Co.	43	51	8	25	28	26	13	15	13	7	3	10	2	1	3	1	1	1	2	2	2	93	101	123		
Statewide	52	64	83	26	30	27	17	17	15	9	5	14	2	1	3	1	1	1	2	2	2	109	120	145		
Instruments																										
Maricopa Co.	5	5	15	2	3	3	-	-	-	2	2	1	-	-	1	-	-	-	1	1	1	10	11	21		
Statewide	8	8	20	4	4	5	-	-	-	2	2	1	-	-	-	-	-	1	1	1	15	15	28			
Miscellaneous																										
Maricopa Co.	21	25	33	8	3	4	2	4	3	1	1	2	-	-	-	-	-	-	-	-	-	32	33	42		
Statewide	40	42	54	9	4	5	2	4	5	2	5	3	2	2	4	-	-	-	-	-	-	53	53	66		

Source: Arizona Department of Economic Security

*1972 data not strictly comparable to previous years due to changes in methodology and legal provisions.

**Standard Industrial Code

Problems

- An improved mass transportation system.

Transportation is a very serious problem in the Hohokam RC&D Project area as the density (persons per square mile) is very light compared to eastern, more heavily populated areas. In 1970 the total urban area in the Phoenix vicinity had a density of approximately 874 people per square mile. By comparison, Houston, Texas had a density of 2,140 and Baltimore, Maryland had a density of 4,750.

The low density figures indicate the personal desires of the people of the Hohokam RC&D Project area to live in uncrowded conditions. This desire, plus the desire to be mobile and flexible, has caused a very high ownership of private automobiles. It is not uncommon for a family to own three or four automobiles.

The lack of mass transit and the extremely high automobile ownership are factors in many problems concerning rapidly developing areas.

- The rapidly increasing population creates a need for manufacturing growth and development so there will be more jobs for the people coming into the area.
- The expansion in the last decade has greatly increased the pressure on the area's city streets, and there is a serious air pollution and congestion problem.

Opportunities

- Assist the general public in recognizing that mass transit systems are necessary to reduce air pollution, as well as to furnish transportation, even though the densities do not make it economically feasible and subsidization may be necessary.
- Work with city and county offices towards the improvement of our existing roads and street systems.
- Work with local city councils concerning the types of businesses that come into the communities. Emphasis should be placed on "clean" businesses that produce little, if any, pollution.
- Work with cities and councils in the development of properly designed industrial parks.

**NATURAL
RESOURCES**

**SOIL
WATER
AIR
VEGETATION**

PROGRAM of ACTION

PLAN OF ACTION

Introduction

This Plan of Action is a discussion of the major project objectives. It includes major policy statements concerning future land use patterns, comprehensive land use planning, upgrading of the quality of our environment, ways in which we can cooperate with other public bodies and organizations, and other significant positions that should be stated to effectively guide future decisions.

Actions are expressed in project-wide terms to guide land use changes, control erosion and sediment, prevent floods, obtain recreational developments, and work with regulatory bodies and other authorities to carry out our RC&D measures.

The procedures for obtaining RC&D measures will be discussed along with provisions for keeping the plan up-to-date.

It includes a list of the RC&D measures we have adopted to date, and the actions we will take to get them installed.

It discusses our short-term plan, which includes RC&D measures that are scheduled for action in the next three to five years.

Objectives

---- Quality in the natural resource base for sustained use.

The development and protection of all natural resources through improving the quality and quantity of water, proper land use, controlled flooding, watershed treatment, improved wildlife habitat and controlled pollution.

---- Develop the economic potential to provide sufficient income for better housing, utilities, health care, education and other facilities that satisfy the basic human needs.

---- Provide a satisfying cultural, historical and recreational environment.

Major Policies

- Promote coordination between agencies, groups and individuals in the conservation and development of the natural resources.
 - a. Encourage local units of government to adopt and enforce regulations that will allow the proper conversion of rural lands to urban uses.
 - b. Assist in the proper, purposeful and timely application of technology now available, and that which will be developed within the decade of the 70's, to improve and maintain air quality.
 - c. Encourage local units of government, irrigation districts and natural resource conservation districts to improve methods of operation that will maintain high water quality, assure the efficient use of water, and protect urban and rural areas from flood damage.

- Encourage new industries and the expansion of existing industries in the rural communities of the project area.
 - a. Assist in the development of local community improvement programs, in the development of water supplies, distribution systems, sewers, roads, streets, health and educational facilities.
 - b. Obtain better rural and urban housing through the use of private and public loan funds for financing home construction or improvement.

- Assist in the development of the recreational, cultural and plant resources of the project area by coordinating the efforts of many public and private interests.
 - a. Encourage the development of art and craft centers, museums and the location and investigation of archeological sites.
 - b. Encourage the restoration and preservation of ghost towns, Indian ruins, historic, natural, unique and other sites. Develop information about and access to these areas for public use.
 - c. Encourage the inclusion of beautification as a part of specific project activities. Encourage the planting of trees, shrubs and grasses for windbreaks for noise barriers on disturbed areas and for wildlife and esthetic values.

Major Courses of Action

The RC&D Program of Action is a flexible, open-ended program, whereby measures may be adopted as the need arises.

Proposed measures may be initiated by any agency, organization or individual. To be eligible for technical and financial assistance they must meet the following requirements:

- Have community benefits.
- Be sponsored by a public body with legal authority to carry out their responsibilities in the installation of the measure.
- Develop an RC&D Measure Plan consisting of a description of the area, sponsors' objectives, alternatives considered, work to be done, economic considerations, operation and maintenance, and other standard requirements.
- Fall within the following categories:
 - a. Critical area treatment (erosion and sediment control).
 - b. Flood prevention (structures and land stabilization).
 - c. Public water-based recreational development.
 - d. Public water-based fish and wildlife development.
 - e. Farm irrigation.
 - f. Land drainage.
 - g. Soil and water management for agricultural-related pollutant control.
 - h. Accelerated services.

Priorities

High priorities will be given to measures that:

- Conform to the overall project objectives.
- Accelerate the conservation, development and use of natural resources.
- Improve the general level of economic activity and enhance the environment.
- Have sponsors with leadership ability and the resources to carry out their responsibilities.

- Have economic urgency and feasibility.
- Are beneficial to economically depressed areas.
- Have community benefits.

Method of Operation

- Accept measures if eligible.
- Form a Measures Committee with the responsibility to carry out the RC&D responsibilities.
- Request technical and financial assistance from appropriate agencies and organizations.
- Coordinate the development of the Measure Plan including:
 - a. Description of planning area.
 - b. Sponsors' objectives.
 - c. Alternatives considered.
 - d. Installation procedures.
 - e. Operation and maintenance.
 - f. Other items as may be required.
- Assist in obtaining local approval of the plan.
- Coordinate implementation.

RESOURCE CONSERVATION and DEVELOPMENT MEASURES

RC&D Measures are the individual projects that local people want in their particular part of the RC&D Project area. Some of the measures are eligible for RC&D financial and technical assistance and fall within the following categories:

A. Critical Area Treatment Measures (Erosion and Sediment Control).

Critical area treatment measures are carried out on public and private lands, primarily for the purpose of stabilizing active gullies or seriously eroding lands that are sources of excessive runoff or sediment and that, if left untreated, adversely affect downstream land, streams, reservoirs, and the general public.

B. Flood Prevention Measures.

Flood prevention measures are planned and carried out where there is a need for reducing or preventing damage from inundation of property.

C. Public Water-based Fish and Wildlife and Public Water-based Recreation Development.

Fish and wildlife development includes the creation or improvement of habitat or facilities primarily for the preservation, production, or harvest of fish and wildlife.

Recreational developments include the creation or improvement of an area for water-related forms of outdoor recreation.

D. Farm Irrigation Measures.

Farm irrigation measures are planned and installed by eligible public bodies where more efficient use of the irrigation water on land now used for agricultural purposes would result.

Measures in this category may include, but are not limited to, the construction of water supply reservoirs, wells, diversion dams, pumping plants, canal head works, canals and laterals.

E. Land Drainage Measures.

Land drainage measures are planned and installed by public bodies where wetness problems are extensive and adversely affect the economy and the use of land.

RC&D Measures, presently adopted, fall into the major categories as follows:

A. Flood Prevention Measures.

1. Agua Fria-New River Flood Control Project

Purpose: The purpose of this RC&D measure is to control flooding in the Agua Fria and New River drainageways.

Sponsor: The Agua Fria-New River Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: The installation of this measure would eliminate flood damage to the cropland irrigation systems and urban areas along the river channel.

Assistance Needed: This measure is of such a magnitude that it falls within the jurisdiction of the U.S. Army, Corps of Engineers. The Corps was contacted in 1968 concerning this measure. They have been working on surveys and designs on this flood control project for many years.

2. Lower Queen Creek Watershed Project

Purpose: To construct a floodway that will conduct flood waters safely across the Central Arizona Project canal and through the rich cropland below it to the Gila River.

Sponsors: East Maricopa Natural Resource Conservation District, Roosevelt Water Conservation District, Gila River Indian Community, Flood Control District of Maricopa County.

Estimated Cost: \$3,150,000.

Benefits Expected: This flood control structure will protect the Central Arizona Project canal and the cropland along the river channel from flood damage.

Assistance Needed: This project will be constructed under Public Law 566 and all construction costs will be borne by the Federal Government. All easements and rights-of-way will be obtained by the local sponsors.

3. Buckhorn-Mesa Flood Control Project

Purpose: To protect the urban areas in the vicinity of Apache Junction and to protect the Central Arizona Project canal from flood damage.

Sponsors: East Maricopa Natural Resource Conservation District, Flood Control District of Maricopa County.

Estimated Cost: \$7,427,000.

Benefits Expected: The installation of this measure would protect the residents of Apache Junction and Highways 60, 80, and 89 from flood damage.

Assistance Needed: This is a Public Law 566 job with the Soil Conservation Service performing design and construction. Funds for rights-of-way have been made available and acquisition has been started. Technical assistance is needed from the Bureau of Reclamation and Soil Conservation Service.

4. Guadalupe Development

Purpose: To cooperate with the community of Guadalupe in carrying out the provisions of their plan. The plan calls for economic development, community improvement, recreational facilities, flood control, and other items.

Sponsors: East Maricopa Natural Resource Conservation District, community of Guadalupe, and others as needed.

Estimated Cost: The flood control portion of this measure will cost approximately \$373,000. It is not known what the cost of the other phases of this measure will be.

Benefits Expected: The community will be protected from flood damage. It will have better streets, houses, and facilities, which should make it a better place in which to live, work, and play.

Assistance Needed: This project has been given a high priority in planning and design. Assistance is needed from the State Highway Department to complete right-of-way acquisition.

5. Buckeye Flood Control Project

Purpose: To protect the new interstate highway, cropland, and the town of Buckeye from flood damage.

Sponsors: Buckeye-Roosevelt Natural Resource Conservation District, town of Buckeye, Flood Control District of Maricopa County.

Estimated Cost: \$7 million.

Benefits Expected: This flood control project will protect a new freeway, the town of Buckeye, and the surrounding cropland from flood damage.

Assistance Needed: Technical assistance is needed from the Soil Conservation Service. Approximately \$3 million in federal money and approximately \$4 million in local funds will be required.

6. Wickenburg Flood Control Project

Purpose: Prevent flood damage to parts of the town of Wickenburg, and control erosion on the watershed above town.

Sponsors: The town of Wickenburg, Wickenburg Natural Resource Conservation District, and the Flood Control District of Maricopa County.

Estimated Cost: Approximately \$360,000.

Benefits Expected: This flood control project will protect the town of Wickenburg from flood damage, and reduce erosion and sedimentation on the watershed.

Assistance Needed: Technical assistance will be necessary through the Soil Conservation Service. Approximately \$300,000 of federal money and approximately \$60,000 of local funds will be required to finance this project. Partial funding has been approved and design is underway. Also, rights-of-way are being acquired.

7. Roosevelt Water Conservation District Floodway

Purpose: To construct a floodway channel to carry runoff water from the Buckhorn-Mesa, Apache Junction-Gilbert, Williams-Chandler, and Queen Creek Public Law 566 Flood Control Watershed Projects.

Sponsors: Roosevelt Water Conservation District, East Maricopa Natural Resource Conservation District, and Flood Control District of Maricopa County.

Estimated Cost: Approximately \$11 million.

Benefits Expected: This project will protect the Roosevelt Water Conservation District canal and irrigation water distribution system valued at \$7 million. It will protect the town of Gilbert, city of Mesa, the city of Chandler, plus 37,000 irrigated acres of very valuable cropland.

Assistance Needed: Technical assistance will be needed from the Soil Conservation Service. Financial assistance will be needed from the Federal Government and from the local sponsors.

8. Hassayampa River Channel Construction

Purpose: To protect the Wickenburg Sewage Plant, homes, guest ranches, motels, trailer courts, Santa Fe Railroad, Arizona State Highway Department, Wickenburg City Park, Community Building, State Highway Park, and other properties from flood damage.

Sponsors: Town of Wickenburg and Wickenburg Natural Resource Conservation District.

Estimated Cost: Not available

Benefits Expected: Protection of the above listed properties from flood damage.

Assistance Needed: Technical and financial assistance will be necessary from the Corps of Engineers.

9. Gila Floodway

Purpose: To construct a floodway that will conduct floodwaters to the Gila River that originate south of the Salt River in the Tempe-Mesa-Chandler-Gilbert area.

Sponsors: East Maricopa Natural Resource Conservation District, cities of Chandler, Mesa, Tempe, and Gilbert.

Estimated Cost: Approximately \$20 million.

Benefits Expected: The sponsoring cities need this flood system to dispose of waters originating in their areas. It will also be necessary to dispose of floodwaters originating in the rural areas between urban developments.

This area is developing rapidly and presently there is no way of disposing of the surface waters.

The installation of this project measure would be of untold value in the future development of this area in that it would furnish a disposal system that would collect the surface waters and safely conduct them to the Gila River.

Assistance Needed: Technical and financial assistance would be needed from the Federal Government in this flood control project.

10. Powder House Wash

Purpose: To prevent future damages to homes and recreational facilities in Powder House Flood Plain near Wickenburg.

Sponsors: Town of Wickenburg and Wickenburg Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: The prime benefits would be flood protection to the homeowners in the area. The town of Wickenburg is presently planning to develop a park in the Powder House Wash. This park would benefit the entire area on the east side of the Hassayampa River.

Assistance Needed: Technical and financial assistance will be required to install this measure.

11. Lawsuit Flood Control Project

Purpose: To prevent damage to cropland and homes by floodwaters coming from the Maricopa Mountains to the Gila River.

Sponsors: Gila Bend Natural Resource Conservation District, Papago Bend Development Commission.

Estimated Cost: Not available.

Benefits Expected: The installation of this measure will safely conduct the floodwaters through the cropland areas. This would eliminate damage to homes and to the surrounding cropland.

Assistance Needed: Technical and financial assistance will be needed through the Hohokam RC&D.

12. Grand Canal Flood Relief

Purpose: To widen and line the canal for flood control benefits.

Sponsors: Salt River Valley Water Users' Ass'n., city of Phoenix, Agua Fria-New River Natural Resource Conservation District, city of Glendale, and Maricopa County Flood Control District.

Estimated Cost: \$300,000.

Benefits Expected: Increased capacity of the canal would reduce the risk of major flooding from the canal itself east of 99th Avenue. Wasteway improvement to the river would carry the increase in canal capacity and reduce diversion to Grand Canal laterals west of 67th Avenue with a consequent reduction in lateral floodings.

Assistance Needed: Technical and financial.

B. Public Water-based Fish and Wildlife and Public Water-based Recreation Development

1. Alvord Park Water-based Recreational Development

Purpose: Develop a water-based recreational facility for the southwest Phoenix and Laveen areas.

Sponsors: Agua Fria-New River Natural Resource Conservation District, City of Phoenix.

Estimated Cost: \$750,000.

Benefits Expected: The Alvord Water-based Recreational Development will serve the residents of south Phoenix and Laveen and will provide water-based recreational opportunities.

Assistance Needed: Technical and financial assistance will be needed on a 50-50 cost-sharing basis.

2. Thawnc Lake Project

Purpose: To develop a water-based recreational facility on the Gila River Indian Reservation.

Sponsors: East Maricopa Natural Resource Conservation District and the Gila River Indian Community.

Estimated Cost: \$96,000.

Benefits Expected: The installation of this measure will develop a recreational facility that will furnish recreation to the Gila River Indians, as well as to the people in the surrounding rural and urban areas.

Assistance Needed: Technical and financial assistance.

C. Farm Irrigation Measures

1. RWCD Irrigation Water Reservoir Lining Measure (Reclaimed Water Lake Lining).

Purpose: To prevent seepage losses and to prevent the danger of burrowing animals digging holes through the dam and having the entire lake wash out.

Sponsors: Roosevelt Water Conservation District and the East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: Reduction in seepage losses and elimination of the hazard of washouts caused from burrowing animals digging holes through the bank.

Assistance Needed: Technical and financial assistance will be required through the RC&D program. The RWCD will share in the cost on a 50-50 basis.

2. Western Canal Lining

Purpose: To line the canal for seepage reduction and to consider enlargement of the canal for possible flood control benefits.

Sponsors: Salt River Valley Water Users' Ass'n. and Maricopa County Flood Control District.

Estimated Cost: \$325,000 for irrigation capacity; additional costs required if enlarged for flood control.

Benefits Expected: Conservation of water now lost to seepage in this 2 1/2 mile reach of canal. Benefits for flood control depend on the ultimate improvement of the Gila Drain.

Assistance Needed: Technical and financial.

3. Beardsley Canal Lining

Purpose: To concrete line the irrigation district's main canal, which delivers water from Lake Pleasant to water-righted land below. Presently, the canal is thirty-three miles in length with about eighteen and one-half miles having gunite lining.

Sponsors: Maricopa County Municipal Water Conservation District Number One and Agua Fria-New River Natural Resource Conservation District.

Estimated Cost: \$1,200,000.

Benefits Expected: Water conservation through reduction of seepage losses and increased efficiency in water deliveries. Economic benefits from lower maintenance costs.

Assistance Needed: Technical and financial assistance available through the RC&D program with cost-sharing for construction on a 50-50 basis.



Beardsley Canal

SCS PHOTO

D. Associated Measures.

Many of the RC&D Measures adopted by the Hohokam RC&D Steering Committee do not fall into the above categories and are, therefore, not eligible for technical and financial assistance through the RC&D program. These measures are known as Associated Measures and are just as important to the Steering Committee as the measures eligible for assistance.

The Steering Committee works closely with the agencies and organizations having responsibilities related to the Associated Measures in bringing about their completion.

The following Associated Measures have been adopted by the Steering Committee and are in progress at this time:

1. Painted Rock Dam Lake

Purpose: To develop Painted Rock Dam Lake into a recreational facility.

Sponsors: Gila Bend Natural Resource Conservation District, town of Gila Bend, Gila Bend Chamber of Commerce, and Papago Bend Development Commission.

Estimated Cost: \$250,000.

Benefits Expected: This measure would provide needed water-based recreation to the western part of the project area. It would have a beneficial economic effect on Gila Bend and the western part of the project area.

Assistance Needed: Technical and financial. Most of the assistance will come through the U.S. Army Corps of Engineers.



Representatives of various agencies and organizations meeting on the shores of Painted Rock Lake to plan its development so it will be compatible with all interests.

SCS PHOTO

2. Historic Fortaleza Hohokam Indian Village

Purpose: To develop this ancient Indian village into a national park so it can be preserved and enjoyed by all.

Sponsors: San Lucy Indians, Papago Bend Development Commission, Gila Bend Natural Resource Conservation District, Papago Bend Development Commission.

Estimated Cost: Not available.

Benefits Expected: The installation of this measure would open a very historic site to the public. It would also benefit the economy of the San Lucy Indians and the town of Gila Bend.

Assistance Needed: Bureau of Indian Affairs and the National Park Service have both been involved in this measure. A plan and funds are needed to complete this measure.

3. Gila Bend Gunnery Range

Purpose: To develop a viewpoint near the Luke Air Force Base Gunnery Range.

Sponsors: Papago Bend Development Commission, Gila Bend Natural Resource Conservation District.

Estimated Cost: \$15,000.

Benefits Expected: The installation of this measure would allow tourists and local residents to stop along the roadway and view the aerial gunnery practice by the Air Force fighter pilots. It would eliminate a safety hazard caused by tourists and local residents parking along the side of the road to view these activities. It would also add one more point of interest to the proposed scenic tour in the vicinity of Gila Bend.

Assistance Needed: Technical and financial assistance are needed for the installation of this measure. The highway department has been contacted but, to date, no agreements have been reached.

4. Margie's Cove

Purpose: To develop a desert area for camping and other recreational activities.

Sponsors: Gila Bend Natural Resource Conservation District, Papago Bend Development Commission.

Estimated Cost: \$25,000.

Benefits Expected: The installation of this measure would open a scenic desert area to tourists and local residents for camping, rock-hounding, nature trails and other desert recreation.

Assistance Needed: This land is presently federal land under the jurisdiction of the Bureau of Land Management. It should be transferred to the state of Arizona and under the jurisdiction of the State Parks Department. A State Parks Department could then improve the area with camping and other facilities.

5. Allenville Community Development

Purpose: Develop the Allenville community to make it a better place in which to live, work, and play.

Sponsors: Buckeye-Roosevelt Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: The installation of this measure would:

- a. Develop domestic water for the community.
- b. Provide better streets.
- c. Develop a recreational area for the young people.
- d. Allow the planting of lawns, shrubbery, trees, and etc.
- e. Obtain better housing.
- f. Provide more job opportunities.

Assistance Needed: Technical assistance and financial assistance will be needed on this measure.

6. Photographic Guideposts

Purpose: To promote tourism, recreation, documentation of Arizona's historic beauty through photography.

Sponsors: East Maricopa Natural Resource Conservation District and the Arizona Camera Club Council.

Estimated Cost: Not available.

Benefits Expected: Numbered guideposts pinpointing desert scenes that would be erected at selected sites for use by tourists and interested residents of the area. A booklet would be published describing the site of each guidepost, and the road to be used to get there, and the time of year and date most photogenic.

Assistance Needed: Financial assistance is needed for the purchase of guideposts and publishing the booklet.

7. Solid Waste Disposal

Purpose: To develop sufficient sanitary landfills throughout the project area to allow relatively easy disposal in landfills rather than on the desert.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: With sufficient sanitary landfills easily accessible there would be less solid waste material scattered over the desert and cropland of the project area.

Assistance Needed: Financial assistance will be needed to develop and operate the landfills. This assistance should come from Maricopa County.

8. South Gila Bend Development

Purpose: To provide the area on the south side of Gila Bend, on a multi-project basis, adequate utility facilities, flood control, street and alley improvements and beautification, home improvement and additional housing, recreational facilities, health, education, and training.

Sponsors: Gila Bend Community Action Neighborhood Council, Gila Bend Natural Resource Conservation District, city of Gila Bend, Papago Bend Development Commission.

Estimated Cost: Not available.

Benefits Expected: Under the completion of this measure the south Gila Bend community will have good quality domestic water, sewer facilities, flood protection, recreation, education and training, and better homes.

Assistance Needed: Financial assistance from many sources will be needed to bring about this measure. It is impossible at this time to estimate the total cost.

9. Buckeye Hills Recreation Area

Purpose: To provide recreation for the people of the area and tourists passing through.

Sponsor: Buckeye-Roosevelt Natural Resource Conservation District.

Estimated Cost: Not available

Benefits Expected: Development of this area will provide the local people and tourists with access to the desert scenery and facilities for picnicking.

Assistance Needed: Technical and financial.

10. Recreational Planning for Maricopa County

Purpose: To review and make needed revisions on the recreational potential of Maricopa County. To coordinate the development of a comprehensive recreational plan for Maricopa County.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Approximately \$1,000.

Benefits Expected: This comprehensive plan should provide information to many organizations interested in the recreational potential in Maricopa County.

Assistance Needed: Technical assistance from many of the local organizations will be necessary. Financial assistance will be necessary for the printing of the publication.

11. Efficient Management of Irrigation Water

Purpose: To obtain efficient use of irrigation water, apply it in accordance with the soils' water-holding capacity and the plants' needs.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: It is expected that there will be a savings in the cost and amount of irrigation water used, and more uniform production of crops.

Assistance Needed: Technical and financial assistance will be needed to bring about this water management program. Cooperation with the local irrigation districts, the natural resource conservation districts, the Agricultural Research Service Water Laboratory, University of Arizona, Extension Service, and agencies of the U.S. Department of Agriculture will also be needed.

12. Fortaleza Farms Development

Purpose: To develop approximately 1,200 acres of land into irrigated cropland to improve the economy of the Gila Bend Papago Indian Reservation.

Sponsors: San Lucy Tribal Council, Gila Bend Natural Resource Conservation District.

Estimated Cost: Approximately \$500,000.

Benefits Expected: The development of this land into cropland would give the San Lucy Indians a very valuable resource which could be used to improve their economic base. It would create employment for the residents of the Gila Bend Papago Reservation and contribute to the self-sufficiency of the reservation.

Assistance Needed: Technical and financial assistance will be required to bring about this development. A large tractor company is discussing the use of this area as a testing ground for their equipment, and in the process will level the land.

13. Mosquito Control on the Salt River

Purpose: To control the growth of mosquitoes in the sewage effluent on the Salt River west of 35th Avenue.

Sponsor: The Agua Fria-New River Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: Sewage presently ponds in the Salt River bed and allows the breeding and growth of mosquitoes. This is a health hazard to all the surrounding areas, which if eliminated, would allow the development of this area for urban houses and industrial uses.

Assistance Needed: Technical and financial assistance will be needed to control this health hazard. Cooperation among many organizations interested in this area will be necessary, since it is considered to be a fine wildlife area.

14. Harquahala Valley Swimming Pool

Purpose: To provide a recreational facility for the children, as well as adults of the community.

Sponsors: Harquahala School, Harquahala Valley Association, Arlington School District, Buckeye-Roosevelt Natural Resource Conservation District.

Estimated Cost: Approximately \$100,000.

Benefits Expected: This proposed pool would keep the children and adult members involved in a healthful recreational activity. The social benefits derived from such a facility in this semi-isolated area would be most beneficial. There is no other park or recreational area in the valley and this facility would especially give the young people a place to enjoy themselves and make profitable use of their spare time.

Assistance Needed: The local community can raise several thousand dollars but there will be many thousand dollars additional needed in the way of grant money. Cooperation will be needed from Maricopa County, since an incorporated city or town is necessary to receive grants of outdoor recreational funds.

15. Air Quality

Purpose: To assist in any way possible in cleaning up the air.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: There is no monetary value that can be placed on the benefits of having clean air. It's value is beyond measurement by money.

Assistance Needed: Cooperation from state, county, and local cities and towns would be necessary to control this problem. Clean air standards should be set and adhered to.

16. Glendale Parks Design

Purpose: To establish development plans for several neighborhood parks.

Sponsor: City of Glendale.

Estimated Cost: Not available.

Benefits Expected: The city of Glendale owns several vacant areas that could be developed into parks. With the completion of plans, the city will proceed to develop these areas so the neighborhoods will have public recreation and open space.

Assistance Needed: The city of Glendale will assist financially in the development and will be responsible for the operation and maintenance of these areas. Assistance needed in the development of the overall plan and financial assistance will be necessary for the construction of the parks.

17. Glendale Dump Removal

Purpose: To move an existing (closed) dump so the site can be used for public recreational purposes.

Sponsor: City of Glendale.

Estimated Cost: Not available.

Benefits Expected: After clearing, the site will be developed as a public park as soon as possible. It is located in an area where no public recreational facility now exists.

Assistance Needed: Technical assistance is needed in planning the project, and financial and equipment help is desired to implement same.

18. Intercity Transit System

Purpose: To assist in any way possible to overcome the transportation difficulties in the project area.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: A good mass transportation system would reduce congestion on the freeways and on the city streets. This would lessen the number of individual cars traveling these thoroughfares, and thus reduce the air pollution problem.

Assistance Needed: An understanding of the problem concerning mass transportation by the local public, and needed policies by the local cities and towns involved.

It is possible, and quite probable, that subsidization of mass transit systems will be necessary.

19. Maricopa County Green Belts

Purpose: To have Maricopa County Planning and Zoning Commission to include green belt areas in their comprehensive planning.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: The inclusion of green belts in the comprehensive plan will assist in the proper development of rural areas and will assure the setting aside of green belt areas.

Assistance Needed: Public awareness of the need for green belts and cooperation by the county and local organizations to assign responsibilities in planning and zoning for green belt areas between the cities.

20. Urban Development

Purpose: To have Maricopa County Planning and Zoning Commission give top priorities to urban development in the non-cropland areas of the county.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: Cropland in the project area is subject to heavy urban development. This action would reduce the rate at which irrigated cropland is taken out of production for urban uses.

Assistance Needed: Recognition by the governing bodies that it is important to conserve our cropland and that desert non-cropland areas are good for urban uses.

21. Use of Sewage Effluent

Purpose: To encourage Maricopa County Health Department to provide safeguards for the release and/or use of sewage effluent and industrial liquid waste.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: This would prevent the accumulation of sewage and stagnant pools which is detrimental to the health and well-being of rural people and wildlife. Sewage effluent would not be discharged in irrigation use until research has provided a safe method for re-use of irrigation water.

Assistance Needed: Technical.

22. Floodplain Information

Purpose: Assist the Flood Control District of Maricopa County in providing floodplain information concerning flood hazards to prospective homeowners and to industrial developers. To provide needed rights-of-way for flood channels in the rural areas between cities and towns in the project.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: Needed information will be furnished to the planning and zoning commissions for their planning programs.

Assistance Needed: Technical assistance from the Soil Conservation Service and from the Corps of Engineers in surveying and delineating floodplains throughout the area.

23. Planning and Zoning for Flood Control

Purpose: Determine areas in need of floodplain management. Encourage the city and county planning

and zoning committees to coordinate planning and zoning activities for drainage and flood control between cities and the rural areas before subdivision development and industrial use occurs.

Sponsor: East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: This measure, when installed, would reduce construction in floodplains, and thus reduce flood damage during times of flooding. It would locate flood channels between cities in the urban areas prior to development, and reduce the flood control construction cost.

Assistance Needed: Technical.

24. City of Scottsdale Resource Plan

Purpose: To obtain a logical inventory of the physical characteristics of the area, including, but not limited to, availability and potential recharge of ground waters, land drainage, slopes, geology, soil types, wildlife, unique floral site hazards and other unique characteristics.

Assembly of information which will serve as a reasonable basis for control and limitation of land uses.

Determination of soil and land characteristics which limit site or soil uses.

Sponsor: City of Scottsdale and East Maricopa Natural Resource Conservation District.

Estimated Cost: Not available.

Benefits Expected: Information obtained will help guide the development of the city of Scottsdale in harmony with natural resources.

Assistance Needed: Technical assistance in obtaining the necessary information.

SHORT TERM PLAN

The Hohokam Resource Conservation and Development Projects' Short Term Plan discusses the action part of the "Program of Action." It includes a possible schedule for the completion of some of the higher priority measures.

It is recognized that this is a period of rapidly changing priorities, and that measures may be adopted later that will be assigned higher priorities than some of the older measures.

Most of the RC&D Measures will depend on cooperation between local organizations and governmental agencies to accomplish their purpose.

Some of the measures will be in categories that may qualify them for RC&D technical and financial assistance as shown in the chart on the following page. This assistance program is subject to constant change and each of the measures must qualify for assistance according to the regulations in effect at the time the measure plan is developed.

Those measures not eligible for RC&D funding are known as "Associated" Measures and are just as important to the overall success of the program as the measures that are eligible.

The sponsors plan and carry out associated measures, either as primary leaders or in a supporting role to other leaders or organizations. These measures may obtain new or expanded facilities and industries necessary for the utilization, processing, and marketing of natural resource products.

Some examples of associated measures are:

- a. Special resource studies and inventories designed to identify problems and/or opportunities.
- b. Transportation arteries associated with resource use and development.
- c. Establishing or expanding training or re-training programs.
- d. Any other measures which are associated with the project such as beautification, industrial parks, and etc.

ASSISTANCE AVAILABLE TO ELIGIBLE SPONSORS
OF RC&D MEASURES BY PURPOSE AND AUTHORITY

PURPOSE	RC&D ASSISTANCE AVAILABLE AND AUTHORITY			RC&D LOAN
	TECHNICAL MAXIMUM (PERCENT)	FINANCIAL	AUTHORITY	MAXIMUM PERCENT AUTHORITY P.L. 87-703 AND P.L. 98-706
1. CRITICAL AREA TREATMENT	100	Not to exceed the level of going programs	P.L. 46	100
2. FLOOD PREVENTION				
(a) Structures	100	Up to 100% of construction costs	P.L. 46	100
(b) Land Stabilization	100	Up to 100% of construction costs	P.L. 46	100
3. FARM IRRIGATION	100	Up to 50% of construction costs	P.L. 46	100
4. LAND DRAINAGE	100	Up to 50% of construction costs	P.L. 46	100
5. SOIL AND WATER MANAGEMENT FOR AGRICULTURE-RELATED POLLUTANT CONTROL	100	Not to exceed the level of going programs	P.L. 46	100
6. PUBLIC WATER-BASED FISH AND WILDLIFE AND RECREATION DEVELOPMENT				
(a) Structures	100	Up to 50% of construction costs	P.L. 91-343	100
(b) Landrights	Consultative	Up to 50% of landrights costs	P.L. 91-343	100
(c) Basic Facilities	50	Up to 50% of costs	P.L. 91-343	100
7. ACCELERATED SERVICES	100		P.L. 46	

- NOTE: 1. Plans covering all purposes except numbers 1, 5, 6 (Public Water-based Fish and Wildlife), and 7 are to show a BC ratio of 1:1 or better.
2. Municipal and industrial water stored in reservoirs serving flood prevention, irrigation, fish and wildlife or recreation purposes is 100 percent local costs, except for relocation costs.
3. Responsibility for acquiring land rights rests with local sponsors.

Fiscal Year 1975

RC&D Measure	Action Planned	Assistance Needed		Funding		
		Kind	Source	Local	RC&D	Other
<u>Measures that May be Eligible for Financial Assistance</u>						
Lawsuit Flood Control Project	Develop Measure Plan	Technical	SCS			Information not available
Thawnc Lake	Study flood proofing needs	Technical	Army Corps Of Engineers, SCS			Information not available
Maricopa County Water Conservation Dist. # 1 Canal Lining for Farm Irrigation	Develop plan and design	Technical	SCS			Information not available
Salt River Valley Water Users' Ass'n. Canal Lining for Farm Irrigation	Develop Plan Design	Technical	SCS			Information not available
<u>Associated Measures</u>						
Historic Fortaleza Hohokam Indian Village	Develop Plan	Technical	National Park Service, Ariz. State Park Service			Information not available
Painted Rock Dam Lake	Construct new facilities	Technical	Corps of Engineers	160,000		160,000
RWCD Lake Lining-Farm Irrigation Project	Include in Williams-Chandler Flood Control Project Supplement	Technical	SCS			Information not available
Gila Floodway	Study feasibility	Technical	Corps of Engineers			40,000

Fiscal Year 1975

RC&D Measure	Action Planned	Assistance Needed		Funding		
		Kind	Source	Local	RC&D	Other
Associated Measures (Cont'd.)						
Agua Fria-New River Flood Control Project	Survey and design	Technical	Corps of Engineers			
Wickenburg Flood Control Project	Complete plan Start construction	Technical	SCS	\$60,000*		\$300,000*
Buckhorn Mesa Flood Control Project	Start construction			3,250,000*		4,230,000*
Solid Waste Disposal	Inventory existing landfill sites	Technical	Maricopa Co. Health Dept., cities of Chandler, Glendale, Buckeye, Avondale, and others	Information not available		
Mosquito Control on the Salt River	Develop land ownership map	Technical	Maricopa Co. Planning Dept., Agua Fria-New River NRCD, Buckeye-Roosevelt NRCD	Information not available		
Margie's Cove	Develop Plan	Technical	Bureau of Land Mgt., Ariz. St. Parks Dept.	Information not available		

* Cost of Entire Project

Fiscal Year 1976

RC&D Measure	Action Planned	Assistance Needed		Funding		
		Kind	Source	Local	RC&D	Other
<u>Measures that may be Eligible for Financial Assistance</u>						
Lawsuit Flood Control Project	Develop design	Technical	SCS Flood Control Dist. of Maricopa Co., Gila Bend NRCB		Information not available	
Thawnc Lake	Develop plan Start construction	Technical	SCS	\$75,000	\$75,000	
Maricopa Co. Water Conservation Dist. # 1 Canal Lining for Farm Irrigation	Construct Phase 1	Technical	SCS	300,000	300,000	
Salt River Valley Water Users' Ass'n. Canal Farm Irrigation Measure	Construct	Technical	SCS	162,500	162,500	
<u>Associated Measures</u>						
Historic Fortaleza Hohokam Indian Village	Start Construction	Technical	Arizona State Parks Dept.			\$150,000
RWCD Lake Lining Farm Irrigation Project	Construct	Technical	SCS	25,000	25,000	
Gila Floodway	Develop plan	Technical	Corps of Engineers		Information not available	

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Fiscal Year 1976 (Cont'd.)

RC&D Measure	Action Planned	Assistance Needed		Funding		
		Kind	Source	Local	RC&D	Other
<u>Associated Measures (Cont'd.)</u>						
Agua Fria-New River Flood Control Project	Continue design	Technical	Corps of Engineers			Information not available
Wickenburg Flood Control Project	Complete construction	Technical	SCS	*		*
Buckhorn Mesa Flood Control Project	Continue construction	Technical	SCS	*		*
Solid Waste Disposal	Develop plan of needed landfill sites	Technical	Maricopa Co. Health Dept.			Information not available
Mosquito Control on Salt River	Develop Land Use Plan on Salt River	Technical	Agua Fria-New River NRCD, Buckeye-Roosevelt NRCD, and other interested governmental agencies.			Information not available
Margie's Cove	Install plan	Technical	Bureau of Land Mgt., Arizona State Parks Dept.			Information not available

* See Fiscal Year 1975 schedule

Fiscal Year 1977

RC&D Measure	Action Planned	Assistance Needed		Funding		
		Kind	Source	Local	RC&D	Other
<u>Measures that may be Eligible for Financial Assistance</u>						
Lawsuit Flood Control Project	Construct	Technical	SCS	Information not available		
Thawnc Lake	Complete construction	Technical	SCS	*	*	
Maricopa County Water Conservation Dist. # 1 Canal Lining Farm Irrigation Project	Construct Phase 2	Technical	SCS	\$300,000	\$300,000	
<u>Associated Measures</u>						
Historic Fortaleza Hohokam Indian Village	Complete construction	Technical	Arizona State Parks Dept.			\$150,000
Gila Floodway	Continue plan development	Technical	Corps of Engineers	Information not available		
Agua Fria-New River Flood Control Project	Continue design	Technical	Corps of Engineers	Information not available		
Buckhorn Mesa Flood Control Project	Complete construction	Technical	SCS	*		*
* See Fiscal Year 1975 schedule						

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Fiscal Year 1977 (Cont'd.)

RC&D Measure	Action Planned	Assistance Needed		Funding		
		Kind	Source	Local	RC&D	Other
<u>Associated Measures (Cont'd.)</u>						
Solid Waste Disposal	Start Construction of landfill sites	Technical	Maricopa Co. Health Dept.	Information not available		
Mosquito Control on the Salt River	Implement plan	Technical	Agua Fria-New River NRCD, Buckeye-Roosevelt NRCD, and other governmental agencies	Information not available		