

DRAFT

Watershed Plan -- Environmental Assessment
For
Maricopa-Stanfield Watershed
Pinal County, Arizona

DRAFT

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Prepared by:

MARICOPA-STANFIELD IRRIGATION & DRAINAGE DISTRICT
P.O. Box 57
Maricopa, Arizona 85239

WEST PINAL NATURAL RESOURCE CONSERVATION DISTRICT
115 East First St., Suite B
Casa Grande, Arizona 85222-5201

Assisted by:

UNITED STATES DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

March 1998

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March 5, 1998

**United States
Department of
Agriculture**

Natural
Resources
Conservation
Service

3003 N. Central Ave.
Suite 800
Phoenix, AZ
85012-2945

AGENCY: U.S. Department of Agriculture, Natural Resources Conservation Service

ACTION: Distribution for Interagency and Public Review of the **DRAFT** Plan/Environmental Assessment for the Maricopa Stanfield Watershed.

SUMMARY: In 1994 the Natural Resources Conservation Service authorized PL83-566 assistance to plan for the installation of works of improvement in the Maricopa Stanfield Watershed. The Maricopa Stanfield Irrigation and Drainage District and the West Pinal Natural Resource Conservation District prepared the Watershed Plan/Environmental Assessment with the assistance of the Natural Resources Conservation Service.

The watershed plan consists of land treatment measures and management practices to conserve irrigation water by improving irrigation efficiencies. Specific measures include land leveling, irrigation water conveyance, structures for turnouts and water measurement for irrigation water. Management practices include irrigation water management, crop residue use, conservation cropping sequence, appropriate erosion control practices as needed, and nutrient and pest management. The project area consists entirely of currently irrigated cropland.

COMMENTS: Your comments are welcome and will be considered during preparation of the FINAL Watershed Plan/Environmental Assessment. To be considered, all comments must be received at the above address by April 30, 1998.

Sincerely,

MICHAEL SOMERVILLE
State Conservationist

Enclosure

| | | |
|---------------------------------|---|----------|
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| REMARKS | | |

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For
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ABSTRACT

This document describes a plan for water conservation on 13,500 acres of cropland irrigated with surface water and pumped groundwater. Taking no project action was one of the alternatives considered during planning. Economic benefits exceed costs of the recommended plan. Total project costs are \$ 8,310,500. Project effects include the retention of irrigated cropland and the improvement of irrigation efficiencies, thereby reducing, by an average of 1.0 acre-foot per acre per year, the amount of water currently needed for irrigation. This also reduces the opportunity for agrichemicals to be leached into the vadose zone. This document fulfills requirements of the National Environmental Policy Act and the Water Resources Council's principles and guidelines for water implementation studies. It serves as a basis for authorization of funding under Public Law 83-566.

For additional information, contact:

Michael Somerville, State Conservationist
USDA, Natural Resources Conservation Service
3003 North Central Avenue, Suite 800
Phoenix, Arizona 85012-2945

Telephone (602) 280-8801

Prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (16 U.S.C. 1001-1008) and in accordance with the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.)

Watershed Agreement

among

**Maricopa-Stanfield Irrigation & Drainage District
and the
West Pinal Natural Resource Conservation District
(Referred to herein as sponsors)**

State of Arizona

and the

**Natural Resources Conservation Service
United States Department of Agriculture
(Referred to herein as NRCS)**

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsors for assistance in preparing a plan for works of improvement for the Maricopa-Stanfield Watershed, State of Arizona, under the authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the sponsors and NRCS a watershed plan/environmental assessment for works of improvement for the Maricopa-Stanfield Watershed, State of Arizona, hereinafter referred to as the Plan/EA, which Plan/EA is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the sponsors hereby agree on this Plan/EA and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this Plan/EA and including the following:

1. Cost-sharing rate for the establishment of enduring land treatment practices is 65 percent of the average cost of installing the enduring practices in the selected plan for the evaluation unit. The estimated total financial assistance cost for enduring practices is \$ 4,613,250.
2. The NRCS will assist the sponsors in providing technical assistance to landowners or operators to plan and install land treatment practices shown in the Plan/EA. Percentages of technical assistance costs to be borne by sponsors and NRCS is as follows:

| Works of Improvement | Sponsors (%) | NRCS (%) | Estimated Technical Assistance Costs (\$) |
|---------------------------------|---------------------------|-----------------------|--|
| Land treatment | 0 | 100 | \$ 928,000 |

3. The sponsors will obtain applications from owners of not less than 25 percent of the land in the problem area, indicating that they will carry out the planned land treatment measures. These applications will be obtained before the first long-term land treatment contract is executed.

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4. The sponsors will obtain agreements with landowners or operators to operate and maintain the land treatment practices for the protection and improvement of the watershed.
 5. The sponsors and NRCS will each bear the cost of project administration that each incurs, estimated to be \$8,000 and \$75,000 respectively.
 6. The costs shown in this Plan/EA are preliminary estimates. Final costs to be borne by the parties hereto will be the average costs incurred in the installation of works of improvement or an approved variation.
 7. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the Plan/EA is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
 8. A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
 9. This Plan/EA may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsor has failed to comply with the conditions of this agreement. In this case, NRCS shall promptly notify the sponsors, in writing, of the determination and the reasons for deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS shall be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and sponsor(s) having specific responsibilities for the measure involved.
 10. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this Plan/EA, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
 11. The program conducted will be in compliance with the nondiscrimination provisions as contained in Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987 (Public Law 100-259), and other nondiscrimination statutes, namely, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and in accordance with regulations of the Secretary of Agriculture (7 CFR 15, Subparts A & B), which provide that no person in the United States shall, on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity receiving Federal financial assistance from the Department of Agriculture or any agency thereof.
 12. **Certify Drug-Free Workplace (7 CFR 3017, Subpart F):** By signing this watershed agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.
- Controlled substance** means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 1308.11 through 1308.15);
- Conviction** means a finding of (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;
- Criminal drug statute** means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;
- Employee** means the employee of a grantee directly engaged in the performance of work under a grant, including: (1) all direct charge employees; (2) all indirect charge employees unless their impact or involvement is

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insignificant to the performance of the grant; and, (3) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsors certify that they will begin to provide or will continue to provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(2) Establishing an ongoing drug-free awareness program to inform employees about:

(a) The danger of drug abuse in the workplace;

(b) The grantee's policy of maintaining a drug-free workplace;

(c) Any available drug counseling, rehabilitation, and employee assistance programs; and

(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will:

(a) Abide by the terms of the statement; and

(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted:

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The sponsors may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.

C. Agencies shall keep the original of all disclosure reports in the official files of the agency.

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13. Certification Regarding Lobbying (7 CFR 3018):

(1) The sponsors certify to the best of their knowledge and belief, that:

(a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement;

(b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an office or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions;

(c) The sponsors shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

(2) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

14. Certification Regarding Debarment, Suspension and Other Responsibility Matters - Primary Covered Transactions (7CFR 3017):

(1) The sponsors certify to the best of their knowledge and belief, that they and their principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction, violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

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(2) Where the primary sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

Signatures:

Maricopa-Stanfield Irrigation & Drainage District By _____
P.O. Box 870 Dennis Nowlin, Chairman
Stanfield, Arizona 85272

Date _____

The signing of the Maricopa-Stanfield Watershed Plan/EA was authorized by a resolution of the governing body of the Maricopa-Stanfield Irrigation & Drainage District and adopted at a meeting held _____ (date)

Dan Walker, Secretary P.O. Box 870
Stanfield, Arizona 85272

Date _____

* * * *

West Pinal Natural Resource Conservation District By _____
14291 N. Anderson Rd. McD Hartman, Chairman
Maricopa, Arizona 85239 Date _____

The signing of the Maricopa-Stanfield Watershed Plan/EA was authorized by a resolution of the governing body of the

West Pinal NRCD and adopted at a meeting held _____ (date)

Gary Butler, Treasurer 115 E. First Street, Ste. D
Casa Grande, Arizona 85222-5201

Date _____

* * * *

United States Department of Agriculture Approved: _____
Natural Resources Conservation Service Michael Somerville
3003 N. Central Ave., Suite 800 State Conservationist
Phoenix, AZ 85012-2945

Date: _____

**WATERSHED PLAN-ENVIRONMENTAL ASSESSMENT
for
MARICOPA-STANFIELD WATERSHED, ARIZONA**

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MARICOPA-STANFIELD WATERSHED
Glossary of Selected Acronyms and Abbreviations

| | |
|-------------|--|
| ADWR | Arizona Department of Water Resources |
| AMA | active management area |
| CAP | Central Arizona Project |
| IDD | irrigation & drainage district |
| IWM | irrigation water management |
| LTC | long-term contract |
| NED | national economic development |
| NEPA | National Environmental Policy Act of 1969 |
| NRCD | natural resource conservation district |
| NRCS | Natural Resources Conservation Service: Formerly Soil Conservation Service |
| O&M | operation & maintenance |
| OM&R | operation, maintenance, & replacement |
| PinAMA | Pinal Active Management Area |
| PL-566 | Public Law 83-566, the Small Watersheds Act |
| Plan/EA | watershed plan and environmental assessment |
| RTA | resource treatment applied |
| SCS | Soil Conservation Service: Now the Natural Resources Conservation Service |
| SHPO | State Historic Preservation Officer |
| T&E species | threatened and endangered species |
| USDA | U.S. Department of Agriculture |

MARICOPA-STANFIELD WATERSHED
Glossary of Selected Acronyms and Abbreviations

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| ADWR | Arizona Department of Water Resources |
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| CAP | Central Arizona Project |
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| IWM | irrigation water management |
| LTC | long-term contract |
| NED | national economic development |
| NEPA | National Environmental Policy Act of 1969 |
| NRCD | natural resource conservation district |
| NRCS | Natural Resources Conservation Service: Formerly Soil Conservation Service |
| O&M | operation & maintenance |
| OM&R | operation, maintenance, & replacement |
| PinAMA | Pinal Active Management Area |
| PL-566 | Public Law 83-566, the Small Watersheds Act |
| Plan/EA | watershed plan and environmental assessment |
| RTA | resource treatment applied |
| SCS | Soil Conservation Service: Now the Natural Resources Conservation Service |
| SHPO | state historic preservation officer |
| T&E species | threatened and endangered species |
| USDA | U.S. Department of Agriculture |

WATERSHED PLAN -- ENVIRONMENTAL ASSESSMENT
For
MARICOPA-STANFIELD WATERSHED

Project name: MARICOPA-STANFIELD County: PINAL State: ARIZONA

Longitude: 112°00' Latitude: 33°04'

Sponsors:

1. Maricopa-Stanfield Irrigation & Drainage District;
2. West Pinal Natural Resource Conservation District.

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Description of recommended plan:

A water conservation project consisting of soil, plant, and water management practices and the installation of land treatment practices on 13,500 irrigated acres.

Resource information:

- a. Watershed size: 87,000 acres
- b. Irrigated Cropland
 1. 43,250 acres irrigated cropland (with conservation practices)
 2. 43,250 acres irrigated cropland (without conservation practices)
 3. 500 acres miscellaneous use (non-farm agricultural, roads, houses, etc)

Wetlands: None present.

Flood plains: 5,000 acres (est.)

Endangered species: None known to inhabit the cultivated area.

Cultural resources: Approximately 30-40 known sites; future discoveries possible

Land ownership: Private land - 100 %

Number of holdings: 72 private farming operations on about 86,500 cropland acres (not necessarily currently farmed)

Average farm size: 72 farms averaging 1,200 acres

Important farmland: (est.)

1. 75,000 acres prime farmland;
2. 12,000 acres additional land of statewide importance.

Number of farmers:

- 72 operations total
- 3 protected class operations, (1 limited resource farmer (estimated))

Project beneficiary profile:

Per capita income for all persons in Pinal County in 1989 (from 1990 Census of Population) averaged \$9,228; per capita State income for the same period was \$13,460. Members of all ethnic groups averaged less than the State average, but Hispanics and American Indians averaged less than 50 percent of the State average. Owner occupied housing in Pinal County

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 has a median value of \$53,200 versus the State average of \$80,100. The average age of 49.4 years in the county is comparable to 51.5 years for the State.

Civil rights implications:

There are no proposed policy actions connected with this project which will negatively and disproportionately affect the operations of an estimated 3 protected class owner/operators. Small potential for farmworker dislocations/job losses (especially on larger farms) as irrigation labor is decreased.

Problem identification:

1. Overdraft of groundwater resources exacerbated by inefficient irrigation systems.

Alternative plans considered:

1. No action;
2. Onfarm surface system improvement, conversion to alternative systems, irrigation water management, and other management improvement measures.

Project purpose: Agricultural Water Management (Water Conservation) - Project goal is the conservation of 13,500 acre/feet/year. Measures installed will increase the efficiency of the use of agricultural water so that more is available for other uses.

Principal project measures:

1. 13,500 acres of irrigation land leveling;
2. 592,800 linear feet of suitable irrigation water conveyance on 12,670 acres;
3. 700 structures for turnouts & water measurement for irrigation water mgt;
4. 13,500 acres of soil, water, plant, and fertility management practices (not cost-shared). Practices may include irrigation water management, crop residue use, conservation cropping sequence, appropriate erosion control practices as needed, nutrient management, and pest management.

Acreage treated: 13,500 acres

Estimated long-term contracts: maximum of 47

Table of estimated project costs, Maricopa-Stanfield Watershed, Pinal County, Arizona

| Item | PL-566 | % | Other | % | Total |
|-------------------------|------------------|---|------------------|---|------------------|
| | Funds | | Funds | | |
| | (\$1,000) | | (\$1,000) | | (\$1,000) |
| Land treatment measures | 4,613,250 | | 2,686,250 | | 7,299,500 |
| Project administration | 75,000 | | 8,000 | | 83,000 |
| Technical assistance | 928,000 | | | | 928,000 |
| TOTAL | 5,616,250 | | 2,694,250 | | 8,310,500 |
| Price Base 1997 | | | March 1998 | | |

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Project benefits:

Irrigated cropland - \$783,000 average annual value of water not used for irrigation
Irrigation Labor Savings- \$325,100 average annual value due to increased efficiency

Other impacts:

1. Land use changes - Convert about 850 acres of cropland to ditch bank and farm road uses. Reclaim 525 acres of ditchbank and roadway for cropland. Net Loss 325 acres. Project activities to take place only on previously cropped farmland. There will be no loss of desert habitat.
2. Water use - Reduce the average yearly amount of water currently used for crop irrigation by an average of 1.0 acre-feet per acre. The water conservation goal for the Maricopa-Stanfield Watershed Project is 13,500 acre/feet per year. The total amount of water savings will vary from field to field will vary depending on soil and other factors.
3. Groundwater pumpage - Assumed reduction in the amount of groundwater pumpage resulting from the reduced irrigation requirement.
4. Local production - Maintain or increase agricultural production on 13,500 acres of irrigated cropland. Possibility of initial decrease in crop response in some cases due to potential presence of saline or sodic soils.
5. Local economy - Retain the agricultural economy of the region, and retain or improve the livelihood and way of life for a maximum of 47 farm operations and their farm employees.
6. Agricultural intensification - More profitable crop rotations and decrease in amount of time needed to irrigate a crop.
7. Energy use - Reduce the average amount of energy expended to pump groundwater.
8. Abandoned land - Reduce the potential for land abandonment.
9. Groundwater quality - Reduce the potential for leaching of nutrients and pesticides to the groundwater by reducing deep percolation.

Environmental values changed or lost:

1. Important farmland - 325 acres, net, converted to roadway and ditchbank.
2. Habitat value of farmland - The value of 325 acres of cropland will be lost. The reorganization of irrigation systems will result in generally smaller fields and a coincidental increase in field-edge habitat.
3. Visual aspect - Depending on present orientation of various systems, long-term changes in appearance might occur on farms on which systems are reorganized.
4. Compensatory mitigation: None unless unavoidable cultural resources are encountered.

Congressional Representatives:

Senate:

John McCain
241 Russell Senate Office Building
U.S. Senate
Washington D.C. 20510

Jon Kyle
724 Hart Senate Office Building
U.S. Senate
Washington D.C. 20510

House of Representatives:

J.D. Hayworth
U.S. Congressman
1017 S. Gilbert Rd.
Mesa, Arizona 85204

INTRODUCTION

GENERAL

The watershed plan and environmental assessment have been combined into a single document referred to as the Plan/EA. The Plan/EA describes project formulation, identifies the expected environmental and economic impacts, and provides the basis for authorizing federal assistance for implementing the planned measures.

The Maricopa-Stanfield Watershed Project is a water conservation project consisting of soil, plant, and water management practices and the installation of land treatment practices on 13,500 irrigated acres.

A reduction in the amount of irrigation water applied will result in reduced groundwater pumpage. This in turn will reduce the potential for nutrients to leach into the vadose zone. The average annual water conservation goal is 1.0 acre/feet/year. The value of water conservation benefits due to plan measures are estimated to be \$783,000.

Improved irrigation efficiencies also will reduce labor, permit improved productivity, and allow continued production on cropland that otherwise might be abandoned. Irrigation labor savings benefits are estimated to be approximately \$325,100 per year. Onsite benefits due to crop productivity were not calculated. Total benefits are \$1,108,100 per year.

The estimated annual cost of land treatment is \$759,800. The average annual net benefits exceed project costs by \$348,300. The overall benefit-cost ratio is 1.5 to 1.0.

The Plan/EA was prepared under the authority of the Watershed Protection and Flood Prevention Act, PL-566 as amended (16 U.S.C. 1001-1008). The environmental assessment is in accordance with the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.), also referred to as NEPA. Responsibility for compliance with NEPA rests with the USDA, Natural Resources Conservation Service.

Local sponsoring organizations are the Maricopa-Stanfield Irrigation & Drainage District and the West Pinal Natural Resource Conservation District.

Federal, state and local agencies, groups, and private citizens were given the opportunity to participate in the planning process including the review of planning documents.

PROJECT SETTING

DRAFT

GEOGRAPHY AND LAND USE

The Maricopa Stanfield Irrigation and Drainage District (MSIDD) serves approximately 87,000 acres of irrigated farmland in central Arizona, approximately 30 miles south of Phoenix. The district is primarily a rural area and includes the small towns of Stanfield and Maricopa. The 21,840 acre Ak-Chin Indian Reservation is also located within the district boundaries. The district's altitude ranges from 1,400 feet in the south to 1,150 feet in the north. The climate is characterized by long, hot summers and short, mild winters.

The MSIDD was established by order of the Pinal County board of Supervisors on July 23, 1962. This action resulted from the efforts of local growers who wished to form an irrigation district, which, if included in the proposed Central Arizona Project (CAP), would be able to deliver Colorado River water to their farms. The original organizers of the district wanted to ensure a more permanent water supply for future generations in the Maricopa and Stanfield areas while controlling the rapid depletion and deterioration of groundwater in the area.

Cotton is produced on up to 90% of the farmland (depending on the year) with the rest in alfalfa, citrus, grain, grapes, pecans, and vegetables. In the Maricopa-Stanfield Watershed, the advent of commercial food processing in Casa Grande and the proximity to Phoenix and Tucson has increased the attractiveness of horticultural crops. The mean size of the farms in the MSIDD is approximately 1,270 acres. The estimate of planted acres for the 1997 crop year is approximately 60,000 acres.

In a sample conducted during the Management Improvement Process (MIP) forty-seven cotton growers were identified as the population from which a sample of 27 growers was randomly selected for interviews. These interview provided much information about agriculture in the district.

For growers interviewed in the district area, upland cotton yields during 1990 averaged 2.6 bales per acre, while Pima cotton yields for the same year averaged 1.6 bales per acre. Average yields during 1988 and 1989 averaged 0.6 and 0.8 bales per acre more for upland and Pima cotton, respectively.

Seventy percent of the growers interviewed for the MIP study had no long-term debt, but virtually all growers used various credit sources for operating costs. About half used cotton ginning/marketing companies, and half used commercial banks.

The average age of the growers interviewed was 49, and 90% were between the ages of 35 and 63. The average amount of formal schooling was 15 years or 3 years of college with some growers having one or more years beyond a college degree.

On-farm employment was as follows

| <u>No. of Employees</u> | <u>Percentage</u> |
|-------------------------|-------------------|
| ≤ 3 | 25 |
| 4-6 | 38 |
| 7-9 | 21 |
| ≥10 | 16 |

The mean number of farm employees was six. It appears that most growers are significant employers of local family members, who play a critical role in farming operations and irrigation water management.

Topography within the District varies from flat river plains to steeply sloping foothills. Irrigation systems vary with the slope and soil type.

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The types of irrigation systems managed by farmers include sloping furrows, level or low gradient furrows with side slope, and level basins farmed with furrows if a row crop is grown. A few farms have modified slope furrows, and a few additional farms use trickle or sprinkler irrigation, but the pressurized systems were excluded from the sample. The types of irrigation systems used by the growers interviewed were as follows:

| <u>Type of System</u> | <u>Percentage of Total Acreage</u> |
|-------------------------------|------------------------------------|
| Sloping Furrows | 40 |
| Level or Low Gradient Furrows | 36 |
| Level Basins | 24 |

The slope of the actual topography varies from nearly zero to about 1% in the cultivated land. Milder slopes are obtained through land grading and by altering row directions to conform more closely to the natural contours, i.e., angling rows from a standard north-south or east-west orientation.

Sloping furrows range in slope from nearly flat in the length-of-run to 0.2% with lengths-of-run from 1,000 to 2,600 ft., often depending upon the slope and soil type. Level furrows have no fall, and low-gradient furrows have 0.0 to 0.2 ft. of fall within the furrow length. Side fall is generally not removed. Lengths vary from 660 to 1,320 ft. Furrows typically are irrigated with individual siphons in each furrow, regardless of slope.

Level basins may have zero slope in either direction. The width of the basin ranges from 100 to 330 ft. with zero side fall. Lengths vary from 660 ft. to 1,320 ft. If cotton, as a row crop, is grown in level basins, furrows are constructed within the basin. Growers use multiple ports or a single, large turnout and irrigate the basin as one irrigation unit.

CLIMATE

The area is climatically suited to irrigation agriculture, having hot summers, mild winters, and a dry climate. Mean annual precipitation is about nine and three-quarters inches. The average daily temperature from early June until late in September exceeds 80° F. Daily summertime temperatures commonly range from about 70° near dawn to 100° or higher in early afternoon

Winter temperatures usually range from the high thirties or low forties near dawn to the high sixties in the afternoon, but may exceed 80° during warming periods. Freezing temperatures are not common and the frost-free period normally lasts from late winter until mid-November or early December. Daytime highs always exceed freezing.

REGIONAL SOCIOECONOMIC CONSIDERATIONS

Irrigation agriculture has played a major role in the economy of central Arizona since the early 1900s. The Maricopa-Stanfield Irrigation & Drainage District was formed by local agricultural interests in 1962 for the purpose of receiving and distributing irrigation water from the Central Arizona Project. However, to eliminate the economically damaging effects of the district's assessments on farmers in this depressed agricultural economy, the IDD has sold its CAP water rights to several cities in central Arizona.

Of the 72 private operations, it is estimated that 3 are owned/operated by protected class operators. Of those, 1 is estimated to be limited resource operations.

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Per capita income for all persons in Pinal County in 1989 averaged \$9,228; per capita income in the State for the same period was \$13,460. Members of all ethnic groups averaged less than the State average, but Hispanics and American Indians averaged less than 50 percent of the State average. Owner occupied housing in Pinal County has a median value of \$53,200 versus the State average of \$80,100. The average age of 49.4 years in the county is comparable to 51.5 years for the State.

The largest incorporated community in the vicinity of the project area is Casa Grande (estimated 1992 population of 20,600). The small community of Stanfield which is surrounded by the irrigation district has a population of several hundred residents. For the most part, Western Pinal County is still rural and continues to be generally reliant on local agriculture for economic stability. Many businesses in the Casa Grande area are oriented toward agriculture, and both communities rely heavily on local agricultural trade. A trend of note, however, is the growth of light manufacturing and of goods and services industries around Casa Grande. Since Casa Grande began experiencing an increase in these types of industries, its economy has become somewhat less reliant on agriculture than it has been in the past.

SOILS

General soil map units show broad areas that have a distinctive pattern of soils, relief, and drainage. The general map units in the study area are as follows:

Denure-Laveen-Dateland - This unit is found on the intermediate to lower position of fan terraces. Slopes range from 0 to 8 percent. Denure soils are very deep and somewhat excessively drained. They formed in alluvium derived from mixed sources. These soils are loamy throughout and extend to a depth of 60 inches or more. Laveen soils are very deep and well drained. These soils are loamy throughout and have soft masses and concretions of lime to depths of 60 inches or more. Dateland soils are very deep and well drained. They formed in alluvium and are loamy throughout to a depth of 60 inches or more. This unit is used as irrigated cropland and rangeland. The main limitations for irrigated crops are the hazard of wind erosion, the moderate available water capacity of the Denure soils, and the high lime content of the Laveen soils.

Marana-Sasco-Denure: This map unit is adjacent to the soils on flood plains along the major drainageways and tributaries. Marana and Sasco soils are deep and well-drained. They formed in alluvium derived from mixed sources. These soils are loamy throughout and extend to a depth of 60 inches or more. Denure soils are deep and somewhat excessively drained. They formed in alluvium derived from mixed sources. These soils are loamy throughout and extend to a depth of 60 inches or more. Slopes of the soils in this unit are 0-1 percent. The elevation is 1,140-3,200 feet. This unit is used mainly for irrigated crops. It is also used as rangeland and for homesite development. The main limitations to crops are the hazard of flooding and the susceptibility to gullying.

Glenbar-Gilman-Trix: This map unit is along the Santa Cruz River, the Gila River, and the major intermittent tributaries. Slopes are 0-1 percent. The vegetation in areas not cultivated is mainly mesquite, cottonwood, and perennial and annual grasses and forbs. Elevation is 1,140 to 2,000 feet. Glenbar and Gilman soils are deep and well drained. They formed in alluvium derived from mixed sources. These soils are loamy throughout and extend to a depth of 60 inches or more. Trix soils are deep and well drained. They formed in alluvium deposited over older alluvium derived from mixed sources. These soils are loamy throughout and extend to a depth of 60 inches or more. This unit is used mainly as irrigated cropland. It is also used as rangeland and for homesite development. The main limitation to irrigated crops is the hazard of flooding. The risk of flooding can be reduced by the use of dikes and levees.

Casa Grande-Mohall-Dateland - This unit extends from Casa Grande to Coolidge and in an area south of the Sawtooth Mountains. These soils are very deep and well drained. They formed in alluvium derived from mixed sources. They are loamy throughout and extend to a depth of 60 inches or more. This unit is used mainly as irrigated cropland. The main limitation for irrigated crops is the content of toxic salts in the Casa Grande soils and some of the Dateland soils

IMPORTANT FARMLANDS

The loams, clay loams, and sandy clay loams comprising most of the project's irrigated cropland are among the most productive of Arizona's cropland soils. These are deep, well-drained soils and, when irrigated, meet the USDA criteria for prime farmland. The remaining cropland soils consist of inclusions of sandy loams, loamy sands, and loamy fine sands. These deep, well-drained, but somewhat droughty soils meet the criteria for additional farmland of statewide importance as established by State officials.

THREATENED AND ENDANGERED SPECIES AND OTHER BIOLOGICAL RESOURCES

Although threatened, endangered, or otherwise protected birds and animals range into or inhabit the Pinal AMA, no known threatened or endangered plant or animal species have been recorded as inhabiting irrigated cropland within the watershed.

CULTURAL RESOURCES

Archaeological work within the exterior boundaries of the MSIDD has been limited largely to linear and small parcel surveys which have resulted in coverage of only a small percentage of the total acreage. Of the approximately 40 archaeological sites that have been recorded to date (attached), the majority are affiliated with the prehistoric Hohokam culture, which flourished in the region from about 300 B.C. to 1450 A.D.

these sites most often consist of artifact scatters of uncertain depth. Many are small or diffuse, however, a few are large, dense, and may be associated with pithouses, structures (including masonry structures), cremations, and a variety of additional features indicative of intensive settlement. All four major Hohokam periods appear to be represented.

A few other sites or components dating to protohistoric and historic Pima/Papago occupation have also been reported, and although no sites clearly representative of the preceding Archaic or Paleoindian traditions are known, work in adjacent areas suggests that their presence within the MSIDD cannot be discounted. although the total of known sites is not very impressive, when viewed as a ratio to the limited acreage surveyed, the overall archaeological sensitivity appears to be relatively high.

current (and historical) land use, however, can be expected to have seriously reduced the scientific value of any archaeological resources which may be present. The Maricopa Stanfield Irrigation District is entirely cultivated and is 90 percent row cropland. The acreage has been plowed and planted for decades and in many cases may have been "deep ripped" to a depth of several feet. Most fields will also have undergone leveling or grading to one degree or another, and will usually be extensively ditched for irrigation. Under these circumstances, it can be anticipated that virtually all archaeological resources in the area of potential effect will have suffered from agricultural activities and many may lack integrity altogether.

WATERSHED PROBLEMS AND OPPORTUNITIES

Irrigation Water Supply

The principle problems related to irrigation water supply is the mining of groundwater supplies, a result of the large demand. That demand increases with population growth because groundwater has been the predominant source of domestic water for the region's communities and the rural population.

Agricultural pumping, which began around the turn of the century, is the largest source of groundwater withdrawal. In 1990 about 98 percent of the estimated total of 973,000 acre-feet of water used in the AMA was for agriculture and 2 percent was for municipal/industrial uses. Of the total, approximately 460,000 acre-feet was pumped groundwater. The Arizona Department of Water Resources estimates there remains 37,000,000 acre-feet of groundwater in storage to a depth of 1,200 feet, which represents about half of the water which was in storage to that depth in 1949.

Even though the dwindling groundwater supply became evident in the 1920s, during the '40s the amount of cultivated land in central Arizona increased and deficit pumping was accelerated. This was particularly true in the Eloy and Maricopa-Stanfield subbasins where, since 1952, average annual groundwater decline rates have been in excess of five feet per year. In Eloy, hundreds of acres of prime farmland have been abandoned because of the drastically-lowered water table.

In the project area portion of the Eloy Subbasin, the water level did not change appreciably between 1977 and 1985. Areas such as Maricopa Stanfield, situated along major watercourses, have experienced a stabilization or even a rise in water levels. This slackening of water level

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declines is primarily the result of heavy recharge from above-normal precipitation, reduced groundwater pumpage, and deepening of existing water wells to deeper aquifers.

In the Pinal AMA, as in other areas of central Arizona, the continuing depletion of the groundwater reserve has been manifested by the steady decline of the water table, and remains a major problem. Between 1900 and 1983, water level changes varied from less than fifty feet to over 550 feet of decline. Historically, only about eight percent of irrigation needs in the region were met by surface water supplies. The advent of Central Arizona Project water delivery alleviated some of the demand against groundwater Pumping since the 1940's has dramatically lowered the water table in most of central Arizona. In Maricopa-Stanfield the depths to water vary from 200 to 450 feet.

Since the introduction of CAP and water conservation measures groundwater tables have risen and are expected to continue as long as CAP water is available and as water conservation measures are practiced.

Currently, all wells in the Maricopa-Stanfield IDD are privately owned but leased to the District for a 40 year term. Pumpage and CAP water is tempered by state-assigned water duties and delivered according to the overall water needs of the District.

As CAP allocations will be less than State-assigned water duties, pumped groundwater will be used to make up the shortfall. CAP water will be delivered through the district distribution system. CAP water and groundwater, both supplies managed by the District, vary individually in annual percentage. CAP generally supplies between 40 and 60 percent of the total water utilized. Although water delivered plus groundwater pumpage generally does not exceed the water duty, crediting and debiting based on water used is allowed under certain circumstances.

Land Subsidence/Earth Fissuring

Two additional problems usually associated with a declining water table are land subsidence and earth fissuring. Regionally, earth fissures appeared in the Pinal AMA near Casa Grande as early

as 1927. Since that time isolated instances of earth fissuring have appeared occasionally in and near the Maricopa-Stanfield Watershed, but, to date, have caused little damage. Depending on the permanence of water table stability, these phenomena might never present themselves as problems again. Programs to monitor earth fissuring in other parts of the subbasin have been initiated by state and federal agencies.

Irrigation Efficiency

High groundwater withdrawals are exacerbated when irrigation efficiencies are very low. Irrigation efficiencies in the Maricopa-Stanfield irrigation district range from 30 percent (in rare cases) to around 85 percent. Irrigation applications run as high as nine acre-feet per acre per year. All cropland in the Maricopa-Stanfield Irrigation district is subject to the Pinal AMA Second Management Plan (SMP) efficiency goals. According to the SMP, the total water delivered to a water user will not exceed the assigned water duty. The SMP originally set water duties based on achievement of 85 percent irrigation efficiency on most soils by the year 2000.

Additionally, the water delivery rate to farms will be based on the rate of delivery from the Central Arizona Project (CAP) system and determined by the irrigation district. Currently, the delivery rate to farms is up to fifteen cubic feet per second --about twice the amount many onfarm systems in the Maricopa-Stanfield Watershed are capable of carrying. Those farmers with inadequate onfarm systems have not been able to achieve a high degree of irrigation efficiency.

The West Pinal Natural Resource Conservation District (NRCD) believes that this irrigation efficiency goal may soon be lowered to 75 percent. An ongoing study funded by the Arizona legislature will review the experiences of farmers to determine how realistic the 85 percent irrigation efficiency goal really is. Natural Resource Conservation District leaders believe that while it is desirable to achieve the highest irrigation efficiencies possible, the 85 percent goal is neither realistic nor achievable in much of Maricopa-Stanfield Irrigation District due to the

existence of restrictive soils, including hardpans and saline-sodic conditions. The District leaders believe that a 75 percent irrigation efficiency is a more realistic average for the area because of the soils and other conditions found in the District. Experience shows that the installation of improved irrigation systems on fields with limiting soils can actually result in an increase in water usage and a decrease in yields in the years immediately following the improvements.

Higher irrigation efficiency means that water application is more closely correlated to the ability of the crop to utilize that water. As a result, little or no excess water runs off the field or percolates below the root zone of the crop. The reduction in water use creates the opportunity to reduce the potential for the leaching of agricultural chemical and fertilizers into groundwater.

Water Quality

On irrigated cropland, the inefficient irrigation increases the potential for the leaching of nitrogenous fertilizers into the vadose zone. Studies currently are underway by Arizona Cooperative Extension in this and an adjacent watershed to determine, through the use of bromide tracers, whether irrigation may be contributory to the movement of nitrate nitrogen into the groundwater resources of the area. Additionally there may be deterioration of groundwater quality in areas where variable or poor quality water has migrated toward zones of heavy withdrawal. Any decrease in the amount of water withdrawn from the aquifer or in the amount of water used for irrigation will decrease the potential for damage to the aquifer.

Legislative Actions: Water Conservation

The Arizona Groundwater Management Act of 1980, known as the Code, was enacted to bring groundwater mining under control. The code caused the creation of the Arizona Department of Water Resources (ADWR) to manage the quality and quantity of the State's groundwater resources. Among its many mandates, the Code established the Pinal active management area (AMA).

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AMAs are geographical areas needing intensive groundwater management because of large and continuous groundwater depletion rates.

The Code has a long-range management goal of preserving future water supplies for nonirrigation uses and provides for continual, mandatory conservation by all water users and distributors. To achieve the reduction in groundwater mining, ADWR assigns water duties to the various water users. Water allotments consist of a combination of groundwater and augmentative surface water.

In recognition of the importance of irrigation agriculture to the regional economy, however, the law mandates an interim goal of preserving the existing agricultural economies for as long as is feasible.

The project objectives are to reduce groundwater mining. This will in turn help to retain the regional agricultural economy, maintain agricultural productivity and reduce the potential for water quality problems. The sponsors intend to realize these goals by assisting farmers in improving the efficiency of their irrigation systems and in achieving a higher level of management of soil, water and plant resources

SCOPE OF THE PLAN/EA

Scoping of Concerns

To concentrate planning efforts on those **concerns** that may be affected by the project or that may affect the project, a scoping process was used to solicit comments of diverse viewpoint from farm owners and operators; interested citizens; members of state, local, and federal agencies; and scientific and special interest groups. Thus, the public, government agencies, and the scientific community were invited to a widely-advertised public meeting held specifically to begin the scoping process. The results of that meeting held March 19, 1997 follow:

Concerns ranked as high priority:

1. **Water**

a. Water quantity (cost/use)

- a. reorganize irrigation delivery systems to handle large flows for efficient irrigation
- b. reduce production costs

b. Water quality

- a. maintain or improve water quality (pH)
- b. assist farmers with planning/implementing best management practices
- c. improve quality of irrigation water - reduce salinity of irrigation water

2. **Economics/agricultural sustainability**

- a. improve local economy (yields, financing) to maintain the agricultural lifestyle.

3. **Plants**

- a. improve with cover crops, cropping rotation and other conservation practices.

Problems and concerns ranked as medium and low concern:

1. Soil Condition

- a. improve management of sandy soils (water use, wind erosion)

2. Water availability

- a. less concern now because of Central Arizona Project supplemental water availability

3. Air Quality

- a. dust arising from unpaved farm roads

4. Wildlife Habitat

- a. undesirable species (birds, wild horses, Javelinas, coyotes, etc.)

Early concerns that were set aside as neither being directly affected by, nor directly affecting the project included long-term effects on visual resources, on air quality, on fish or other aquatics, or on wetland habitat. All highly erodible lands in the watershed are operated under erosion control plans so that no Food Security Act restrictions apply.

The scoping process has been in effect throughout the planning process via the public meetings held frequently by the Sponsors. In addition, many of the public and agencies prefer to provide written or verbal comments during the review period for the draft document. Such comments were welcomed until the planning process had been completed.

Scoping of concerns caused the Sponsors direct planning efforts to address the conservation of agricultural water by the reorganization of onfarm irrigation systems and the practice of irrigation water management. The Sponsors feel the reduction in groundwater mining by means of improved irrigation efficiencies will conserve water for other uses while preserving agricultural productivity and retaining the agricultural economy of the region. The Sponsors believe that the achievement of an average 75 percent irrigation efficiency is an achievable goal that will result in benefits to both society and to farmers in the irrigation district.

Table A displays a synopsis of the results of the scoping process including concerns expressed in addition to those of the March 1997 scoping meeting.

TABLE A -- Evaluation of Identified Economic, Social, Cultural, and Environmental Concerns Maricopa-Stanfield Watershed, Arizona

| Economic, Social, Environmental, and Cultural Concerns | Degree of Local Concern | Degree of Significance to Decisionmaking ^{1/} | Remarks |
|--|-------------------------|--|--|
| Groundwater quality | High | High | Reduce contamination potential |
| Groundwater mining | High | High | Maintain agricultural base. reduce subsidence |
| Economics/sustain ag. | High | High | Costs vs. returns, maintain ag. economy |
| Important farmland | High | High | Retain in production, protect from degradation |
| Crop yield, soil quality | High | High | Maintain or improve, diversify crops |
| Economic stability | High | Low | Diversify crops, improve soil quality |
| Irrigation efficiency | High | High | Inefficient onfarm systems |
| Cultural resources | Medium | High | Assess continually during construction |
| Wildlife habitat | Low | Medium | Net cropland change to ditches & roads |
| T&E species | Low | Medium | Assess continually; include AZ protected species |
| Social effects | Low | Medium | Maintain way of life |
| Erosion | Low | Low | Site-by-site assessment |
| Water availability | Low | High | Insure adequate supplies for ag. and other uses |

^{1/} High - Must be considered in the analysis of alternatives
 Medium - May be affected by alternative solutions
 Low - To be considered, but not too significant

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FORMULATION AND COMPARISON OF ALTERNATIVES

GENERAL

Agriculture is the major water user in central Arizona with irrigation water accounting for more than 90 percent of all groundwater pumpage. Over the years the pumping of irrigation water has contributed to groundwater mining in central Arizona. Studies have established various improvements and enduring conservation practices which can be used to increase irrigation efficiency and conserve irrigation water for other uses. In addition, the correction of inefficient irrigation management by irrigators and the implementation of appropriate soil, water, plant, pest, and nutrient management practices have been shown to have a significant effect on both the amount of water applied to cropland and the amount pumped from an aquifer over the course of a year.

The Sponsors' objective was to formulate alternative plans to reduce agricultural water application by increasing irrigation efficiency. To increase efficiency it is necessary to address irrigation system inadequacies, water application inefficiencies, and the need for various related cultural practices in order to conserve agricultural water for other uses. The increase in irrigation efficiency, in turn, reduces the potential for the leaching of water and soluble amendments into groundwater.

FORMULATION PROCESS

The alternative of taking no action whatsoever has been dubbed "Alternative 1, FUTURE WITHOUT PROJECT."

An examination was made of engineering and management methods considered successful for the conservation of agricultural water. These methods must address the overuse of water

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caused partly by inadequate or inefficient systems, and partly by inefficient methods used by irrigators. Successful conservation alternatives initially identified as having potential were: 1) uniformly graded irrigation systems with lined ditches and structures (various lengths) , 2) level basin irrigation systems with lined ditches and structures (various lengths) , and 3) other irrigation systems such as sprinkler or drip according to soil depth and texture.

Due to the interdependence of irrigation practices and the variety of field conditions present in the project area, no single method was considered capable of addressing the stated problems. A viable course of action, dubbed "Alternative 2, ONFARM IRRIGATION SYSTEM IMPROVEMENT AND WATER QUALITY PROTECTION," would consist of any methods installed in combination Irrigation Water Management (IWM)

Other methods considered but discarded because of high cost and low local acceptance included complete cessation of irrigation agriculture and the use of tailwater recovery and pumpback systems. A pumpback system, while not commonly used, occasionally has a place as a conservation measure and should be counted among the alternative irrigation systems available for specialized use because of soil and topographic conditions. Table B shows several treatments and the results that might be expected if such methods were used exclusively to address the stated concerns.

TABLE B -- Treatments of Concerns and Expected Results
Maricopa-Stanfield Watershed, Arizona

| CONCERN | TREATMENT | RESULTS |
|-----------------------|-------------------------|---|
| groundwater mining | Alternative systems/IWM | water use declines |
| irrigation efficiency | | reduce overuse ; correlate amount and timing to plant needs |
| groundwater quality | | lowers deep percolation potential |
| sustain agriculture | | higher farm income, lower water cost |

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Measures were evaluated for effectiveness in promoting water conservation, water application efficiency, and environmental effects. Also, the measures were evaluated as to their completeness in solving the problems, effectiveness in alleviating the problems, efficiency or cost effectiveness, and public acceptability.

Of the two alternatives, only Alternative 2 had the potential to treat the problems and help the Sponsors fulfill their goals. IWM is effective only in combination with reorganizing to graded or level basin systems and no reorganized systems should be utilized without IWM. The practices are therefore interdependent. Alternative systems, such as, sprinkler and drip/trickle have the same high potential for desired results as graded or level basins systems but because of cost they are generally used under extraordinary soil and topographic conditions.

These alternatives were discussed during the public scoping meeting and have been made available for comment to various local, county, state, and federal agencies, and special interest groups during the planning process. Other considerations taken into account during formulation included the Sponsors' prediction of a high percentage of farmer participation, and successful system reorganizations in the nearby Eloy, New Magma, and Hohokam irrigation districts.

DESCRIPTION OF ALTERNATIVE PLANS

The alternative plan, Alternative 2, has the potential to solve or improve the identified problems. This alternative, along with the future without project alternative are described as follow:

ALTERNATIVE 1 - No Project Action (Future without Project) Groundwater

pumpage/mining will continue at high rates and irrigation inefficiencies will continue.

Approximately 13,500 ac./ft of water will not be conserved for future uses. It is assumed that economic and market conditions will remain unchanged and, because of the costs involved, no improvements in the systems on the remaining 5,000 acres of cropland will be made. While no

land is projected to be abandoned, the potential for abandonment will increase in the future if a project is not implemented. Crop diversity, including a switch to vegetables may be delayed in the future, and the amount of small grain grown may increase.

ALTERNATIVE 2 - Onfarm Irrigation System Improvement (Future w/ Project) This alternative includes reorganizing sloping irrigation systems on about 13,500 acres of cropland by the installation of a mix of level basins, uniformly graded furrow systems, and/or alternative irrigation systems. To reorganize sloping systems into basin or uniformly-graded systems, this alternative will include precision land leveling on about 13,500 acres; the installation of impervious water conveyances, such as about 625,000 linear feet of concrete lined ditch; and approximately 700 appropriate water measuring and control structures. For areas where highly permeable soils, steep slopes, or very rough topography call for alternative irrigation systems, this alternative will include the installation of sprinkler, drip, or trickle irrigation systems

Regardless of the system, this alternative will include the initiation of irrigation water management and other appropriate plant, pest, and nutrient management regimens on an estimated 13,500 acres.

The estimated total cost of this alternative, including engineering, project administration, and technical assistance is \$8,310,500. The PL-566 cost would be \$5,616,250 including \$4,613,250 financial assistance, \$75,000 project administration, and \$928,000 technical assistance. Local share would total \$2,492,050 which includes local project administration costs of approximately \$8,000. Operation, maintenance, and replacement costs are estimated to be \$73,000 yearly and would be a local cost.

EFFECTS OF ALTERNATIVE PLANS

Alternative 1 - No Action, Future Without Project

Groundwater mining/availability: Under present conditions, loss of irrigation water through deep percolation and seepage leads to increased pumpage of groundwater. In the future without a project, reduced pumpage mandated by the groundwater code might be handled by producers resorting to increased acreage of small grains rather than growing diverse crops. In addition, this situation could lead to land abandonment.

Irrigation efficiency: Under present conditions, the average amount of water used on an acre cotton is about 65 acre-inches and 42 acre-inches on an acre of wheat. Crop yields average a little over 2 bales/acre for cotton and about 2 tons/acre for wheat. In the future without project, neither irrigation efficiency nor yields are projected to change appreciably.

Alternative 2 would allow irrigation efficiency to be improved to an average of 75 percent. Higher efficiencies may be obtained on highly responsive soils. Water use on some soils, however, could actually increase and yields actually decline in the years immediately following irrigation system reorganization. This is probably due to the surfacing of subsoils during the land leveling process. The project sponsors believe that irrigation efficiencies of 75 percent are representative of field conditions in and around the Maricopa-Stanfield Irrigation District. Generally, however, the maximum obtainable irrigation efficiency combined with IWM will provide the best opportunity for the highest net incomes.

Groundwater quality: Under present conditions, the average amount of water used for an acre of cotton is nearly 65 inches, and on wheat, a little over 42 inches per acre. Over-irrigation plus seepage from such conveyances as unlined or broken ditches lead to deep percolation of water into the vadose zone. Deep percolation increases the potential for soluble substances to be carried into groundwater supplies. The situation is not expected to change appreciably in the future without a project.

Under future with project conditions, Alternative 2 would implement system reorganization and initiate improved irrigation efficiency which will decrease the average water use by 10 to 15 acre-inches per acre, or more, depending on the irrigation system. Under future with project conditions, Alternative 2 would implement irrigation system reorganization which would allow producers to institute sound soil, water, plant, nutrient, and pest management practices and reduce the amount of water currently needed to grow an acre of crop by an estimated average of 1 acre-foot/acre per year, based on projected acreage.

Also, while lessening the potential for land abandonment, reduced pumpage would slow the suspected mixing of poor and good quality water. Also, the reduction in the amount of water applied per year would reduce the potential to leach agricultural chemicals via deep percolation.

Economics/sustainable agriculture: Under present conditions, loss of irrigation water through deep percolation and seepage contributes to lower yields, higher production costs, and, along with the lack of sound cultural management programs, hinders the diversification of crops. Projections for the future without a project are that yields, hence, returns, versus production costs will not improve appreciably.

Under future with project conditions, Alternative 2 would implement irrigation system reorganization allowing producers to institute sound soil, water, plant, nutrient, and pest management practices to improve family income, achieve positive local, regional, and national

economic effects. This would retain the regional agricultural economy and lessen the potential for land abandonment.

Important farmland: Under future with project conditions, the design of reorganized systems in Alternative 2 would result in a net loss of 325 acres as an estimated 850 acres would be converted to use for field road and ditch bank and about 525 acres would be reclaimed from ditch and road uses. Future potential for land abandonment would be less.

Crop yield, soil quality: Under present conditions, yields reflect the conditions under which the crops are grown, and, except for changes in acreage of the respective crops, would not change appreciably under future without project conditions.

Under Alternative 2, future with project conditions, crop yields on responsive soils could improve significantly depending on the treatment applied. With implementation of management practices, good soil quality would be maintained and poor soil condition corrected

Cultural resources: Under present conditions cultural resources are subject to continuing degradation from plowing and other cultivation activities. Under Alternative 1, this would not be expected to change.

Under future with project conditions, Alternative 2 would make possible the identification and evaluation of cultural resources, assessment of significance and condition, and where necessary, avoidance or other forms of mitigation including data recovery.

Wildlife habitat: Over the last decade the cropping pattern has contained up to 90 percent cotton, 10 percent wheat, and four percent roads and ditchbanks. In the future without project, the projected acreage and cropping pattern are similar but the amount of wheat will be nearly doubled. There is no designated critical habitat.

Under future with project conditions a slight, short-term detrimental effect on the habitat value of individual cultivated fields might occur during the construction phase. Wheat acreage is predicted to remain at present values. The reorganization of irrigation systems would cause an increase in field-edge habitat and the opportunity to establish permanent wildlife plantings. Reorganization will make a more diverse cropping pattern probable in the future which might lead to a more diverse population of animals.

Threatened and endangered species: Under present conditions, no protected plant or animal species are known to inhabit the project area. No protected species are expected to inhabit the area in the future whether a project is undertaken or not.

Alternative 2 is not expected to affect any protected species, even those animals which are wide ranging and could wander into the project area.

Social effects: Under present conditions, several years of major insect infestations coupled with a slow agricultural economy has created difficult conditions for producers in the project area. Practices that have positive effects for the sustainability of Arizona farming are needed by Arizona farmers. Practices which decrease the total costs of production including the reduction in the amount of water required to produce a crop and reduce labor expenses will allow agriculture to continue to produce food and fiber for the nation.

Reducing the threat to groundwater supplies has become important to both rural and urban dwellers throughout the State. By law, farmers must operate under agricultural general permits

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for best management practices. Severe financial consequences are associated with losing the general permit and having to buy an individual permit. Producers live under the threat of additional regulations to protect the aquifer. For an estimated 72 farm operations (and their associated families and their employees), all of these various pressures raise the level of stress. Future without project is not expected to change appreciably.

Under future with project conditions, reorganization of irrigation systems and the implementation of sound soil, water, plant, nutrient, and pest management practices would reduce the potential for the leaching of agricultural chemicals to groundwater, improving income, and retaining the rural way of life for farmers in the district.

Civil Rights Implications: Under neither present conditions nor future with project conditions does the Natural Resources Conservation Service propose any policy actions which will negatively and disproportionately affect the operations of the estimated 3 protected class owner/operators. An effort will be made to inform the estimated 1 limited resource farmer in Maricopa-Stanfield Irrigation District of the watershed project to ensure their equal participation in project benefits.

There is the potential to reduce the number of farm workers (predominantly Hispanic) employed for the purpose of field irrigation especially on the largest operations. Conversations with the project sponsors, however, have indicated that the majority of field irrigators would be moved to other more important farm activities and no net loss of jobs would occur.

RISK AND UNCERTAINTY

The degree of risk and uncertainty involved in the project elements was considered throughout the planning process. No actions involving threats to life or health are proposed.

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In project formulation, the risk centered around selecting locally acceptable land treatment practices to address the amount of water used for irrigation and in estimating the effectiveness of the practices to reduce problem causes. Although significant benefits in terms of water savings and crop responses are predicted in the Pinal AMA Cooperative Agricultural Study completed in October 1986 there is uncertainty in predicting the benefits of improved irrigation systems over a range of different field conditions especially slope and soil types. The response of crops in terms of water use and yield can vary greatly over a small area.

As stated in the Pinal AMA Technical Report, response data used in the study are general and are not intended to be used on any individual farm. On an individual basis, an economic analysis will help a farmer make an informed decision on whether or not to invest in irrigation system improvements. For any individual farmer, decreases in water use and the increases in yield will depend on his own unique circumstances.

Uncertainty is a characteristic of future conditions and their relationship of those conditions to project effectiveness. Such conditions or changes that might cause a reduction in the project's effectiveness include a reduction in voluntary participation, catastrophic weather phenomena, out-of-the-ordinary disease or insect infestations, changes in land use, changes in individual financial status, changes in the agricultural economy, changes in government programs or funding levels, or a massive increase in the amount of nonagricultural groundwater pumpage. Any such situation could cause changes in the rates of land treatment application, groundwater depletion, land subsidence, etc.

Other uncertainty involves the possibility of hidden archeological resources, the location of which might not be suspected until the installation of certain earth-disturbing practices. There is a risk that the cost of the project will be affected because of actions taken to recover the information contained in these resources.

COMPARISON OF ALTERNATIVE PLANS

The plans displayed in Table C are the most realistic alternatives that could be selected as the recommended plan. Table C is presented so the effects of candidate plans may be compared against the future without project condition.

RATIONALE FOR PLAN SELECTION

Increased water cost, pumpage-reduction requirements, and the need for a long-term supply of good quality water are strong incentives for farmers to reorganize their onfarm irrigation systems. Available funds and credit for irrigation system reorganization are limited and PI-566 cost-sharing is necessary to install water conservation measures and sustain agricultural production while protecting the quality and quantity of the groundwater resource. With those ideas in mind, Sponsors chose Alternative 2 as the selected plan. Feasible land treatment measures were selected because of their ability to satisfy most of the needs discussed in the section dealing with problems and opportunities.

The selected alternative meets national and state objectives to conserve water. It also meets the Sponsors' objectives to conserve water and protect its quality by lessening the potential for the leaching of nutrients and chemicals via deep percolation. It also meets Sponsors' objectives to maintain agricultural productivity and retain the agricultural economy of the region.

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TABLE C -- Summary and Comparison of Candidate Plans
 Maricopa-Stanfield Watershed, Arizona

| Effect | Future w/o Project | Alternative 2 (Recommended) |
|--|--------------------------------------|---|
| Measures | -- | 13,500 acres leveling; 592,800 linear ft. water conveyance.; 700 water control structures; 13,500 acres soil. water. plant. nutrient. and pest mgt. |
| Total Project Cost | \$0 | \$8,310,500 |
| PL-566 share | \$0 | \$5,616,250 |
| Other share | \$0 | \$2,694,250 |
| National Economic Development Account | | |
| Beneficial annual | -- | \$1,108,100 |
| Adverse annual | -- | \$ 759,800 |
| Net beneficial | -- | \$ 348,300 |
| Benefit-Cost Ratio | | 1.5:1.0 |
| Environmental Quality Account | | |
| Threatened & endangered species | none | none |
| Wildlife habitat | poor quality | slight improvement |
| Cultural resources | potential to degrade | much reduced potential to degrade |
| Visual effect | no change | no effect |
| Groundwater quality | | |
| Change in rate of mixing | no change | reduced |
| Change in chemical leaching | no change | reduced |
| Important farmland | no change, potential for abandonment | <3% reduction due to system reorg. reduced pot. for abandonment |
| Other Social Effects Account | | |
| Avg. irrigation application | | |
| cotton | 65 acre-inches | 51 acre-inches |
| wheat | 42 acre-inches | 34 acre-inches |
| Avg. irrigation efficiency | | |
| cotton | > 30% | 75% |
| wheat | >30% | 75% |
| Net change in rate of application | no change | -1.0 af/ac/yr |
| Groundwater mining | reduced by law | reduced voluntarily |
| Soil quality/crop yield | no change | improved |
| Agricultural economy | declining | sustained to improved |
| Minorities, aged, etc. | fewer jobs, lost jobs | retain jobs |
| Risk to health, safety | no change | no change |
| Standard of living | declining living stndrd. | retain to improve |
| Ag Labor | decline of agriculture | possibility of decrease with greater efficiency |
| Regional Economic Development Account | | |
| Beneficial effect (average annual) | | |
| Region | -- | \$1,433,200 |
| Adverse effect (average annual) | | |
| Region | -- | \$ 826,800 |

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CONSULTATION AND PUBLIC PARTICIPATION

AGENCY CONSULTATION

Agency consultation and public participation were integral to all phases of planning and environmental evaluation.

In July 1996 the Sponsors provided Arizona's single point of contact, the Arizona Department of Commerce, with a notification of application for federal PL-566 assistance from USDA, Natural Resources Conservation Service to undertake a water quality/water conservation project in Maricopa-Stanfield Watershed. No comments were received as a result of this process.

PRELIMINARY REVIEW copies of the plan/EA were distributed for review to local NRCS technical specialists, cooperating agencies, and other agencies and groups having technical interest in this project. Discussions and informal comments will be considered for incorporation into the DRAFT plan/EA.

The following agencies and groups were invited to participate during any or all of the planning process including and during review of documents:

U.S. Government

Environmental Protection Agency

Department of Agriculture

Agricultural Research Service
Water Conservation Lab
Agricultural Stabilization and Conservation Service
Cooperative Extension, Pinal County office
Farmers Home Administration, state and county offices
Forest Service Regional Office, Albuquerque, NM.

Department of Defense

U.S. Army Corps of Engineers.

Department of Interior

Geological Survey
Bureau of Reclamation
Regional and Project (CAP) offices
Fish and Wildlife Service, Ecological Services
National Park Service
Western Archeological Center.

State And Local Government

State of Arizona

Arizona State Museum
Department of Agriculture
Game and Fish Department
Department of Commerce, Clearinghouse
State Historic Preservation Officer
State Land Department
Department of Environmental Quality
Department of Water Resources, state office
Pinal Active Management Area office.

Local units of government

Central Arizona Association of Governments
Pinal County.

PUBLIC PARTICIPATION

A public scoping meeting was held during March 1997. Meeting notices and scoping response sheets were published, posted, and mailed to landowners prior to the meeting. A supply of scoping response sheets was available at the meeting. Local participants were encouraged to give the sheets to acquaintances who might be interested in making their concerns a part of this project.

Among the groups and other interested parties invited to participate in planning and/or review the plan were the AZ Wildlife Federation, the Farm Bureau, the National Audubon Society, and the Sierra Club.

SUMMARY OF COMMENTS AND ACTIONS TAKEN

Comments received during state and local agency review of the INFORMAL REVIEW plan/EA were used to prepare the DRAFT plan/EA. Comments received during interagency/public review of the DRAFT plan/EA will be summarized for inclusion in Appendix A and will be used to prepare the FINAL plan/EA.

RECOMMENDED PLAN

PURPOSE AND SUMMARY

Alternative 2 is the recommended plan. Its purpose is to accelerate the conservation of agricultural water on irrigated cropland and save the water for additional future uses. The reduction of irrigation water used, in turn, reduces the potential for contamination of the groundwater resource by agricultural chemicals. The plan proposes to accomplish the Sponsors' objective of water conservation by financially and technically assisting irrigators plan and install such water saving conservation practices as land leveling, ditch lining or pipeline, structures for water control, and alternative irrigation systems. Additionally, the plan will provide for soil, water, plant, pest, and nutrient management practices necessary for the successful management of irrigation water and agricultural chemicals, the utilization of plant residues, and the control of wind erosion.

MEASURES TO BE INSTALLED

Land treatment practices: Alternative 2 will conserve water by providing accelerated financial and technical assistance to help farmers who are unable to install practices on their own. In the absence of a project, the ongoing program will continue but few improvements will be made on the land in the project area. Participation in the PL-566 project is voluntary so each landowner makes the final decision on land use and whether or not to enter into a long-term contract.

An average of approximately fourteen staff years of technical assistance for planning and installing land treatment will be needed by participants over the ten-year project. Participants will need between four and five person years of technical assistance the first two to three years during development of long-term contracts. The remaining assistance will be required during the next five to six years for planning and applying the practices, and for the final two-year establishment period of the project.

Within the limits set forth in this plan, financial assistance will consist of up to 65 percent of the cost of installing such enduring conservation practices as alternative irrigation systems, irrigation land leveling, irrigation water conveyance, and structures for water control.

Mitigation features: Mitigation features, if any, will consist of clearing or avoiding or data collection on sites that are encountered during the application of land treatment practices.

Mitigation procedures will be done according to the programmatic agreement for this project under the supervision of a professional archaeologist hired by NRCS and in consultation with ASM and SHPO.

PERMITS AND COMPLIANCE

Installation of the proposed measures will be performed in full compliance with all federal, state, and local laws and policies. No federal permits are required; however, individual landowners and/or operators will secure necessary local, county, or state permits as required for the installation of project measures.

COSTS

Tables 1, 4, 5A, and 6 show the estimated costs and benefits of land treatment practices, their average annual values, and the benefit-to-cost ratio of the recommended plan. The estimated total cost of the project is \$8,310,500. The total includes the following estimated costs

- 1) PL-566 financial assistance to apply land treatment practices is \$4,613,250. Non-PL-566 costs to apply land treatment practices is \$ 2,686,250.

- 2) PL-566 technical assistance to plan and apply land treatment practices and IWM is \$928,000. Technical assistance costs for planning and application include the direct cost of NRCS personnel to provide information, conservation planning, surveys, investigations and design, preparation of plans and specifications, and IWM.

TABLE 1 - Estimated Installation Cost
 Maricopa-Stanfield Watershed, Arizona
 (dollars) 1/

| Item | Unit | Non-Federal Land | PL-566 Costs | Other Costs | Total |
|-----------------------------------|-----------|------------------|------------------|------------------|------------------|
| Land Treatment-Accelerated | | | | | |
| land leveling | acre | 13,500 | 2,106,000 | 1,134,000 | 3,240,000 |
| ditch lining | acre | 12,670 | 2,100,000 | 1,130,800 | 3,230,800 |
| control structures | number | 700 | 407,250 | 219,250 | 626,500 |
| irrigation water mgt. | acre | 12,670 | | 107,700 | 107,700 |
| soil,pest,nutrient, mgt. | acre | 13,500 | | 94,500 | 94,500 |
| Subtotal | | | 4,613,250 | 2,686,250 | 7,299,500 |
| Technical Assistance | work year | 14.0 | 928,000 | ----- | 928,000 |
| Project Administration | work year | 3.0 | 75,000 | 8,000 | 83,000 |
| TOTAL LAND TREATMENT | | | 5,616,250 | 2,694,250 | 8,310,500 |

1/ Price Base 1997

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TABLE 4 - Estimated Average Annual NED Costs
 Maricopa-Stanfield Watershed, Arizona
 (dollars) 1/

| Item | Project Outlays | | | Total |
|----------------------------|-----------------------------------|------------|--------------------|---------|
| | Amortization of Installation Cost | OM&R Costs | Other Direct Costs | |
| Land Treatment-Accelerated | 686,700 | 73,000 | 0 | 759,800 |

1/ Price Base 1997, amortized 25 years, discount rate of 7.375 %

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TABLE 5A - Estimated Average Annual Watershed Protection Damage Reduction Benefits

Maricopa-Stanfield Watershed, Arizona
(dollars) 1/

| Item | Agricultural Related | Nonagricultural Related |
|-----------------------|----------------------|-------------------------|
| Onsite | | |
| Labor Savings | 325,100 | 0 |
| Offsite/Public | | |
| Water conservation | 783,000 | 0 |
| TOTAL | 1,108,100 | 0 |

Price Base 1997, amortized at 25 years; discount rate 7.375 %.

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TABLE 6 - Comparison of NED Benefits and Costs

Maricopa-Stanfield Watershed, Arizona
(dollars)

| Item | Average Annual Benefit | Average Annual Cost | Benefit Cost Ratio |
|----------------------------|------------------------|---------------------|--------------------|
| Land Treatment-Accelerated | 1,108,100 | 759,800 | 1.5 : 1.0 |

Price Base 1997, amortized at 25 years; discount rate 7.375 %.

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3) Project administration includes all administrative costs associated with the installation of planned practices, including the cost of administering long-term contracts, review of conservation plans, and supervision of practice application. The NRCS and the Sponsors will bear about \$83,000 in project administration costs. Cost breakdown by source of funds is estimated as follows: PL-566, \$75,000; Other, \$8,000.

INSTALLATION AND FINANCING

Framework for carrying out plan: The plan will be carried out within the framework of complete conservation plans/schedules of operation developed by individual farmers on land units they own or control. Conservation plans for this project will be developed with assistance from and be approved by NRCS. Among other items, the plans will contain an inventory of resource problems and the conservation land treatment and management measures that will provide solutions to those problems.

Implementation of the land treatment measures contained in the plans will be accomplished through long term contracts (LTC) between NRCS and the respective land user. Each LTC will be drawn up so as to effect installation and establishment of the practices within a period of from three to ten years.

Planned sequence of installation: Accelerated technical assistance to develop conservation plans and long-term contracts on individual farms will begin the first year after authorization. Land treatment practices will be installed according to the contracts over an eight-year period beginning as early as the first year after authorization. The practices will be installed through individual long-term contracts between the Natural Resources Conservation Service and an estimated maximum of 47 farm operations.

Funds for installing land treatment practices over the life of a contract are obligated at the time the contract is signed. The life of a contract may vary from three years to ten years. Each

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contract will include a two-year establishment and follow-up period after installation of the last contract practice.

Responsibilities: West Pinal Natural Resource Conservation District will provide technical leadership for the installation, operation, and maintenance of land treatment practices, and, jointly with NRCS, will develop a priority system for applications. The NRCD is a legally constituted subdivision of State government and has all authorities to implement the plan.

Insofar as surface water can be acquired, Maricopa-Stanfield Irrigation and Drainage District will coordinate work to complement the efforts of the PL-566 project and deliver adequate and accurate amounts of water to accomplish project goals.

Natural Resources Conservation Service will provide accelerated technical assistance for the planning, application, and follow-up of land treatment according to priorities set with Sponsors. NRCS will prepare and administer the long-term contracts, provide engineering designs, and perform annual status reviews during the life of the contracts.

Contracting: Contracts to install practices will be between NRCS and each participant. Long-term contracts will be based on plans/schedules of operation and will extend for a period of not less than three (3) nor more than ten (10) years, including a two-year establishment period following installation of the last cost-shared practice. Partial-farm contracts will be used when the cost-share limit will not allow total treatment of a problem area. LTCs should be signed within five years of the date on which the plan is approved.

Contracts will describe the practices to be installed, the year, the cost-share rate, and the estimated total cost. Non-cost-shared measures, such as IWM, will be required as a condition for PL-566 financial assistance where such measures are necessary for the planned project.

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Operation and maintenance requirements, provisions for inspections, modification, and enforcement will also be included in the contract.

No LTCs will be signed until the initial participation requirement is met. The requirement is that applications indicating the intent to carry out the planned land treatment measures must be received from the owners/operators of not less than 25 percent of the land in the problem area.

LTCs cannot be entered into on land within a unit that is under contract for conservation land treatment under another program.

Cost-share payments will be made by NRCS after an eligible unit of the practice has been completed and certified. The participant must file an application for payments.

All arrangements for installation of measures are the responsibility of individual landowners or operators.

No more than \$100,000 of cost-shared PL-566 funds may be paid to any one individual, family, corporation, or combination of these where the party has an interest in land, regardless of where the land is located.

All works of improvement will be installed in accordance with applicable local, state, and federal regulations with specific reference to NRCS standards and specifications found in the field office technical guide.

Real property and relocations: Landowners and/or operators will be responsible for the necessary landrights, permits, licenses, or water rights necessary to perform the planned work on land they control. The purchase of real property will be unnecessary and no relocations will result from this project.

Other agencies: No other Federal agencies are involved with the implementation of this plan.

Cultural resources: Project activities will occur only on lands that have been cultivated for several decades; however, there are instances within central Arizona where undisturbed subsurface cultural remains have been discovered beneath the plow zone in long-time cultivated fields. In particular, where land leveling and irrigation ditching are involved, a history of cultivation is no guarantee against the presence of intact cultural resources. To ensure that no significant cultural resources will be inadvertently damaged, NRCS will take into account the effects of project activities on historic properties on a contract-by-contract basis as stipulated in the "Investigations and Analysis Section", and as agreed upon with the Arizona State Historic Preservation Officer (Correspondence attached).

Financing: Federal financial assistance from NRCS for installing the eligible measures described in this plan will be provided at a rate of 65 percent under the authority of the Watershed Protection and Flood Prevention Act, PL 83-566, as amended (16 U.S.C. 1001-1008.)

On the land they control, individual land users will be responsible for their share of the cost of installing eligible land treatment practices and for the full amount of installing management practices. The extent of practices and schedule of installation will be detailed in the LTC.

Conditions for Providing Assistance: The plan is not a document for obligating PL-566 or other funds. Assistance furnished by NRCS in carrying out the plan is contingent upon

appropriation of funds for this purpose. The Sponsors will ensure full conformance with local, state, and federal laws and regulations.

All financial and technical assistance to landowners will be provided based on properly executed long-term contracts. Replacement or modification of permanent practices such as structures for water control, land leveling, and ditch lining which were previously installed with federal cost sharing will not qualify for financial assistance under the project unless they have exceeded the normal useful life with proper maintenance or are no longer adequate for proper system operation.

OPERATION, MAINTENANCE & REPLACEMENT (OM&R)

OM&R of land treatment practices installed through LTCs are the responsibilities of the landowner or operator. O&M requirements will be as set forth in the National Operation and Maintenance Manual 180-V of June 18, 1988, and amendments. Actual requirements for individual practices will be identified in each LTC and will remain in effect throughout the life of each installed practice. The West Pinal NRCD will encourage landowners to fulfill required O&M following conclusion of contracts. Replacement of enduring practices is not anticipated, but would include replacing measuring devices or ditch lining destroyed during ditch cleaning or farm operations. Technical assistance on land treatment items will be provided as needed.

Annual status reviews will be conducted on all LTCs by a qualified NRCS technician. These reviews will determine the need for O&M, as well as for modifications allowed under the contract's provisions.

**LIST OF PREPARERS FOR THE
MARICOPA STANFIELD WATERSHED PLAN/EA**

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INVESTIGATIONS AND ANALYSES REPORT

MARICOPA-STANFIELD WATERSHED

DRAFT

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PURPOSE

The purpose of this report is to present information, not necessarily in the plan, that supports the formulation, evaluation, and conclusions reached in the watershed plan/EA.

All project activities will take place entirely on previously cultivated farmland. Other than the resources discussed in the Project Formulation section of this report, no specific environmental resources will be significantly affected by this project.

The possibility of uncovering artifacts and areas left by prehistoric people is always a concern in central Arizona and will be subject to a Discovery Plan with procedures agreed to by the State Historic Preservation Officer. Project effects on other environmental resources such as air quality, surface water quality, visual quality, etc. will be insignificant. Environmental and environmentally-related concerns identified during public meetings or expressed as technical concerns by NRCS or other agencies follow:

AGENCY AND PUBLIC CONCERNS

Groundwater Mining: Groundwater depletion is the result of decades of pumping groundwater for agricultural and other uses. Regionally, this problem is outside the scope of the project. However, as with subsidence and earth fissuring, the effects of water conservation on the depletion problem will be beneficial.

Irrigation Efficiency: Improved irrigation water management (IWM) on project cropland is the formulation goal of the Maricopa Stanfield Watershed Project. Poor irrigation efficiency is central to many of the existing problems.

Earth Subsidence And Fissuring: These phenomena are occurring throughout the region as a result of the collapse of the dewatered aquifer. This problem is outside the scope of the project. However, project effects should be to slow the occurrence of these phenomena.

Groundwater Quality: In some areas of central Arizona, declining groundwater quality is thought to be the result of water of poor quality replacing good-quality water as the good is withdrawn. Generally, groundwater quality in the Maricopa-Stanfield area has stayed constant over the years. By slowing depletion, project action will forestall deterioration due to mixing. Improved irrigation efficiencies will reduce the amount of deep percolated water, reducing the potential for agricultural chemicals to be leached into the aquifer with that water.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), establishes a basic federal agency requirement to consider the impacts of federal or federally-assisted actions on significant cultural resources (historic properties). The uniform procedures for implementing Section 106 are found in Title 36 Part 800 of the Code of Federal Regulations (Protection of Historic Properties). In addition, NRCS-specific procedures for complying with Section 106 have been established in a Programmatic Agreement concluded with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers in 1994.

In order to initiate compliance with these authorities, NRCS conducted a review of the archaeological site files at the Arizona State Museum and the Arizona State Historic Preservation Office (SHPO). These sources indicate that there are on the order of 40 known archaeological sites within the exterior boundaries of the MSIDD; however, a clear determination of effect to these or other cultural resources is hampered for two reasons; 1) These records sources are very incomplete since most MSIDD lands have never been systematically inventoried for cultural resources; and, 2) it is presently impractical to assess impacts even to known sites since it remains uncertain as to which of the potential 47 cooperators in the MSIDD may actually choose to participate in the Maricopa-Stanfield project.

For these reasons NRCS has proposed, in consultation with the SHPO, to defer further Section 106 review pending identification of individual cooperators and the development of area-specific conservation proposals. At that time, further efforts to identify historic properties in the area of potential effect will be undertaken in consultation with the SHPO. A statement from the Arizona SHPO concurring with this proposal is appended.

Erosion: This has not been identified as a general problem throughout the watershed and will be handled on a site-by-site basis. Wind erosion is always a concern. For one thing, traffic safety suffers during the summer thunderstorm season, especially in the presence of large amounts of idle cropland. With no project cropland is abandoned leaving it as a weed pool and a source of blowing soil.

Important Farmland And Land Use Changes: The amount of cropped farmland will be reduced slightly due to the ditch and roadway space requirements of the reorganized irrigation systems. No changes in land use will result.

Upland Habitat: No permanent or native habitat will be disturbed. There is no designated critical habitat in the project area.

Threatened And Endangered Species: While protected animal species may fly or roam into the watershed, none have been identified as inhabiting it. The 1991 USFWS publication *Endangered and Threatened Species of Arizona and New Mexico*, with 1991 summer addendum, was consulted for information regarding federally-listed T & E species inhabiting the project area. The document did not list any threatened or endangered plant or animal species as inhabiting the immediate project area. Nor are any federally-proposed endangered and threatened species listed as inhabiting the project area.

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The area is within the historic range of the endangered Sonoran pronghorn, four endangered fish species, and two threatened fish species. None of these will be affected by the project. The peregrine falcon is a winter resident in central Arizona. Because this species prefers cliffs, water bodies and higher elevations, its occurrence over the project area is unlikely.

The 1996 Arizona Game & Fish Dept. publication *Wildlife of Special Concern in Arizona* was consulted for information regarding state-listed animal species that may occur in the project area. There exists favorable habitat for Gila monster and desert tortoise near the project. In 1982, both species were listed by Arizona as being in "jeopardy in the foreseeable future." In the 1996 edition of the AG&F publication, only the desert tortoise is listed. The desert tortoise and the Gila monster do inhabit desert areas surrounding the project, but inasmuch as both species prefer undisturbed desert, little danger to either individual animals or groups is expected.

If individual tortoises are encountered in the project area, the state environmental specialist or the area biologist will be contacted immediately. Other protected plant or animal species may exist in nearby areas of native vegetation. However, those uncultivated areas will not be affected by the project at hand.

Wetland Habitat: Wetland habitat is always an early technical concern; however, there is none in the area that will be disturbed by the project.

SOCIAL CONSIDERATIONS

Civil Rights Implications: Currently the socioeconomic assessment carried out during PL 83-566 planning is done as part of compliance with NEPA regulations and the WRC's Principles and Guidelines. This assessment anticipates, evaluates, and fully discloses the impacts of project action on the social aspects of a particular area.

Civil Rights Impact Analysis

There are estimated to be 3 protected-class operations that constitute 4 percent of the total operations. In compliance with Departmental Regulation 4300-4, Civil Rights Impact Analysis, protected-class operators have been identified in the project area and will be individually contacted about the project. Protected-class operators will have the same opportunity to participate in and benefit from this project. Furthermore, protected-class operators will not be negatively and disproportionately affected by any proposed policy actions implemented in connection with this project. This statement of no negative civil rights implications of proposed policy actions is further enhanced by the facts that:

- Discrimination is prohibited in USDA programs, and
- The Sponsors have agreed to conduct the program in compliance with the nondiscrimination provisions of civil rights laws and regulations as listed in item 11 of the Watershed Agreement.

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Groundwater Code: The development of central Arizona for irrigation agriculture in the early 1900s was carried out by private farming interests. Wells also were developed by the individual farmers who determined the amount of water pumped for irrigation. Large-scale pumping was begun during the 1930s and continued to increase through the '40s and into the '50s. Maximum withdrawals occurred during the '50s. State leaders recognized the need to manage Arizona's groundwater resource in the early '30s but legislators were unable to do anything for nearly two decades. In 1948, as a prerequisite for authorization of the CAP, the state legislature developed and enacted a law pertaining to critical groundwater areas. Even though it was a step in the right direction, the law did little to reduce the mining of groundwater.

Eventually, the state legislature enacted the Arizona Groundwater Management Act of 1980. That groundwater code provides for continual, mandatory conservation by all water users and distributors. The intent of the law is to reduce, through management practices and augmentative water, the total annual groundwater withdrawal over a span of forty-five years. The forty-five-year span is divided into five management periods. If management alone is not sufficient, ADWR is empowered to implement a program to purchase and retire groundwater rights. This extreme measure could begin during the third management period (2000-2010), but not before 2006.

The long-range management goal mandated by the Code for the Pinal AMA is the preservation of future water supplies for non-irrigation uses. Even so, as stringent the law is, it states that regulations promulgated for agricultural compliance must consist of reasonable, prudent long-term farm management practices. The interim goals for the AMA are to preserve the existing agricultural economies for as long as is feasible while allowing development of nonirrigation uses.

Per-acre groundwater allotments termed "water duties" have been assigned by the Arizona Dept. of Water Resources (ADWR) for the initial management period and are recomputed for each succeeding one. The success of water conservation efforts in Arizona is partly dependent on projects such as Maricopa-Stanfield which help individuals who would otherwise be unable to implement land treatment practices for irrigation water management. At best, any delays in practice application would delay achieving the objectives of Arizona's program. At worst, the abandonment of cropland and large-scale loss of livelihood would ensue. Neither is desirable to the State of Arizona.

Environmental Quality Act: In 1986, the Arizona legislature enacted the Arizona Environmental Quality Act (EQA), which was designed to protect both surface water and groundwater from contamination. The EQA designates the Arizona Dept. of Environmental Quality (ADEQ) as the agency for all purposes of the Clean Water Act and gives it the authority to take all actions necessary to administer and enforce the acts. Included is the authority to adopt, modify, or repeal rules.

In keeping with that empowerment is the mandate for the adoption by rule of agricultural general permits consisting of best management practices (BMPs) for regulated agricultural activities. These BMPs are to be the most practical and effective means of reducing or preventing the discharge of pollutants by regulated agricultural activities. Revocation of the agricultural general permit will require that the person obtain an individual permit.

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Economic Stability And Agricultural Sustainability: Augmentative water from the Colorado River is now being delivered to the state by the Central Arizona Project (CAP), built for Arizona by the Bureau of Reclamation. Reclamation provided eighty percent of the cost as a long-term loan. The other twenty percent was paid upfront by the citizens of Arizona. CAP water will be delivered only to irrigation districts and other water organizations that are legally able to contract for and distribute the water. Another requirement for receiving CAP water is that by the time of delivery, district distribution systems must consist of either pipelines or concrete-lined ditches to prevent seepage losses.

To meet those requirements, the Maricopa-Stanfield Irrigation & Drainage District (IDD) was formed by the local people. The IDD has constructed a distribution system of concrete lined canals and laterals capable of handling the CAP delivery rate. The system was financed with twenty percent of the cost being paid by the IDD and the rest being financed by the Bureau of Reclamation. Repayment was to be from water revenues, backed up by tax assessments levied by the IDD. For the past several years hard economic times have threatened to bankrupt the producers in the district and subsequently the district itself.

One of the sponsor goals is to retain the agricultural economy of the region. This will have the effect of maintaining a way of life for local farm families and the communities that depend on local sources of income. Social effects include:

- prolonging the rural setting and economy--both of which are desirable to nonfarmers and farmers alike,
- providing some measure of relief from feelings of anxiety in those who would not otherwise be financially able to reorganize their inefficient onfarm irrigation systems into efficient systems,
- avoiding the abandonment of cropland, a leading contributor of soil to life-threatening dust storms that plague central Arizona, particularly during the summer thunderstorm season,
- regaining a sense of community by those who care about water savings for other than economic reasons,
- enhancing the standard of living of producers who participate and commit themselves to the attainment of efficient irrigation water management,
- enhancing flexibility for producers who might otherwise fall victim to the need for greater crop flexibility during times of economic instability.

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PROJECT FORMULATION

The scope of the problems and opportunities in the Maricopa-Stanfield IDD have been determined from public participation in open meetings, information presented in the groundwater management plans developed by the Pinal AMA Division of the ADWR, information gathered during the Pinal AMA Cooperative Agricultural Study, and from records on file in the Casa Grande field office.

Identified Problems

Agricultural Water Management:

Water Supply -- Water supply problems center around the fact that Central Arizona Project water is essentially the only surface water available to this area. The irrigation district was formed to buy and distribute CAP water. The district are able to buy CAP water on an as-available basis but this source will never be able to supply all of the district's irrigation needs. Farmers in this area will continue to rely heavily on groundwater for their irrigation needs.

Three major strata contain the majority of the groundwater stored in the Eloy Subbasin of the Pinal AMA. These are deep basin-fill sediments designated Upper Alluvial, Middle Silt and Clay, and Lower Conglomerate. Of the three, the substantially dewatered Upper Alluvial stratum is the most productive, yielding upwards of 3,000 gallons of water per minute in areas where it has not been dewatered. The middle and lower strata still contain substantial supplies of water, but because of the fine sediments, well yields from the middle stratum are lower than the other two. Yields from the lower stratum rival the Upper Alluvial, but the water is less accessible.

Groundwater Overdraft -- Groundwater overdraft has been designated as one of the foremost problems throughout rural central Arizona. Continued depletion of this resource endangers future water supplies for municipal, industrial, and agricultural users. That scenario for a bleak future helped provide the impetus for passage of the Arizona Groundwater Management Act of 1980, which, among other things, created ADWR and mandated four 10-year and one 5-year groundwater management periods for each of the four AMAs in the state. The state entered the second 10-year management period on January 1, 1990. The third and fourth management periods will begin on January 1, 2000 and January 1, 2010, respectively. The final management period, the 5-year one, will run from January 1, 2020 through December 31, 2024.

For more than 35 years the average rate of decline in depth to groundwater has been in excess of five feet per year. Depth to groundwater in the vicinity of the project area varies from about 100 feet to about 400 feet. Since 1978 areas in proximity to the Gila River and the San Carlos distribution system have experienced a stabilization of the water level and, in some cases, a rise in water levels. This seeming remission in overdraft is considered by ADWR to be temporary and has been attributed to reduced pumpage, deepening of existing wells to lower-lying strata, recharge caused by seepage from the unlined distribution system, recharge from above-normal precipitation and water conservation.

Inefficient Irrigation Systems And Irrigation Water Management -- Onfarm irrigation systems were installed many years ago and designed to carry the relatively small output from individual wells. These deteriorating, outmoded sloping systems are unable to handle a sufficient amount of

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water for efficient irrigation. Even when irrigation water management is attempted the physical inadequacies of the systems severely limit the ability of the irrigators to achieve proper application efficiency.

Subsidence And Earth Fissuring -- In this area of the Basin and Range Province of Arizona, most of the earth subsidence taking place is informally referred to as pumping subsidence, which has been documented since 1948. Pumping subsidence has occurred extensively to one degree or other throughout central Arizona. One result of earth subsidence is a cracking of the earth causing fissures of varying length and depth.

Regionally, earth fissures appeared northeast of Picacho, about 25 miles southeast of the Maricopa-Stanfield Watershed, as early as 1927. Since that time fissures have appeared occasionally in the IDD, but have caused little damage to date. ADWR and other agencies have begun a program to monitor and evaluate subsidence throughout the Pinal AMA to the south.

It has been established that pumping subsidence can be stopped or severely slowed by suspending the withdrawal of all groundwater or by restricting pumpage to as close to the amount of recharge as is practicable. For irrigation agriculture, the second option is feasible and can be achieved by the use of irrigation techniques that supply the amount of water needed to produce a crop and by the growing of low water use crops.

Because earth fissures usually are directly related to land subsidence, a reduction in the withdrawal of groundwater will curtail the development of new fissures and will slow or stop the reopening, lengthening, and branching of existing fissures.

Other -- By emphasizing the proper management of irrigation water, a reduction in the amount of water used to irrigate crops will enable producers to reduce whatever potential contribution might be forthcoming from the leaching action of irrigation water. Success of IWM depends upon a properly designed and operated onfarm irrigation system, an adequate water supply, and replacement rates based on plant needs as determined by an appropriate method of soil moisture monitoring. Good irrigation water management can increase the overall irrigation efficiency by five to ten percent or more. The actual percent increase depends on the method of irrigation, the present efficiency and the skill of the irrigator.

Besides the potential of irrigation water management to reduce deep percolation, the concurrent implementation of conservation practices which stress plant, soil, nutrient, and pest management will give additional benefits including a reduction in the amount of groundwater pumpage, a reduced potential for land subsidence and earth fissuring, a reduced potential to leach other contaminants into the aquifer, and stable income from improved or sustained crop production.

Formulation Goals -- Based on the foregoing problems and conclusions, this project was formulated to assist the sponsors realize the following goals:

1. A reduction in the amount of groundwater used in the MSIDD.
2. Retention of the region's agricultural economy.

3. Maintenance of or improvement in agricultural productivity.

RTA Concept

To describe existing and post-project field conditions, the resource treatment applied (RTA) concept was used. A given RTA is a conceptual unit that not only will describe the existing field condition but also will describe potential treatments and future field conditions. By including costs and other information RTA can be used to estimate the effects of applied conservation practices on water use, crop yields, farm income, etc.

RTA classification was based primarily on interdependent, enduring conservation practices considered conducive to, and necessary for, sustained crop production and the protection of natural resources. In the classification process, such irrigation-related elements as type of system, appurtenances, length of run, and field gradient were the leading criteria and practice or nonpractice of irrigation water management was the indicator used for management needs.

The RTA concept as used in this plan was described in the Pinal AMA Cooperative Agricultural Study to document the transformation of inefficient, poorly designed RTA units into well designed, highly efficient units. The data verifying the effects of land treatment practices and system reorganization on water use, crop yield, and labor were recorded by crop and individual RTA unit on conservation impact worksheets (CIW). CIW data were later summarized for use in the cooperative study and inclusion in the Field Office Technical Guide maintained by the Casa Grande field office.

A more detailed explanation of the RTA process and its use can be found in the Watershed Plan/Environmental Assessments for Eloy (1988), New Magma (1991), and Hohokam (1996)

In order to simplify planning for the Maricopa Stanfield Watershed Project several assumptions were made. They are:

1) The cropped land was divided into a) previously treated and b) not previously treated by use of aerial photos. Cropland without previous treatment is assumed to require further treatment in the same proportions as did the recently completed Hohokam Watershed Plan/EA.

2) The participation rate for the Maricopa Stanfield project was estimated at 45 percent. This is based on the estimated participation rate from previous land treatment watershed projects.

3) The antecedent watershed conditions are assumed to be the same in the Maricopa Stanfield Watershed as it was in the Hohokam Watershed (The similar watershed plan completed in 1996). These watersheds (irrigation districts) are within several miles of each other.

4) Land treatment practices to improve irrigation efficiency are the same in the Maricopa Stanfield Watershed as they were in the Hohokam Watershed. The data used in the documentation is extrapolated to the Maricopa Stanfield Watershed project.

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5) The numbers of needed practices (Table 1, p. 60) to be applied in the Maricopa Stanfield project is derived from and is based on the same proportions of practices (per acre) that were determined by careful analysis in the Hohokam watershed project/EA.

6) It is believed by the project sponsors that the use of this method adequately represents the current conditions and portrays the kinds of practices necessary to meet the formulation goal.

ECONOMICS

Conservation Land Treatment Practices

Costs

Unit costs for enduring practices were based primarily on 1997 costs of construction and materials used in the Casa Grande field office area. Per-acre practice estimates were derived from the most likely configurations which would result from converting RTAs 1 and 5 to 10, 12, and 14. The designs were based on field office records. Unit costs for irrigation water management and other management practices were based on costs developed for the Environmental Quality Improvement Program (EQIP) and approved by a multidisciplinary Local Work Group. Updates have been done using current average costs developed by the NRCS Casa Grande Field Office.

On a site specific basis, the various soil, water, plant, pest, and nutrient management practices, along with the enduring conservation practices essential in protecting the resource and in maintaining good soil condition, include the following:

Irrigation Land Leveling: consists of reshaping the land surface to planned grades. This forms the base for reorganizing irrigation system, particularly when the leveling is done using laser-guided equipment and the finished grade is relatively flat in all directions or uniformly sloped in direction of run. The purpose of the practice is to allow uniform and efficient application of water without causing erosion, loss of water quality (surface and subsurface water), or damage by waterlogging

Irrigation Water Management: consists of using crop monitoring and available scheduling technology based on knowledge of crop needs, the monitoring of soil moisture, and measurement of the water applied to determine water replacement applications that provide for the needs of the plants with neither excessive nor deficit irrigation to avoid water runoff and deep percolation.

Nutrient Management: includes managing the form (commercial, plant residue, animal waste), amount, placement, and timing of applications of plant nutrients in a way to achieve optimum forage and crop yields, minimize entry of nutrients to surface

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and groundwater, and to maintain or improve the chemical and biological condition of the soil.

Alternative Irrigation Systems: planned drip or sprinkler systems in which all necessary facilities, such as main lines, lateral lines, filters, pumping plant, and the like are installed so as to efficiently apply irrigation water (uniformly for sprinklers, directly to the root zone for drip) and maintain sufficient moisture for optimum plant growth without causing excessive water loss, erosion, reduction in water quality or, in the case of drip, accumulation of salts. Such systems are usually used under conditions where surface irrigation systems are less efficient or more expensive to install.

Pest Management: includes developing an environmentally acceptable pest management program which fosters the use of appropriate cultural, biological, and chemical controls, alone or in combination, to manage agricultural pest infestations.

Plant Management: includes a crop sequence which consists of growing an adapted sequence of crops to provide adequate organic residue for maintenance or improvement of soil tilth. Using crop residue and holding tillage operations to the very minimum needed to produce a crop are included to help reduce erosion, improve water use efficiency, improve water quality, improve wildlife habitat, and break reproduction cycles of plant pests and cultural practices which assist in the control of weeds, diseases, and insects, and provide sufficient crop residue for maintaining good soil condition.

Soil Management: includes conservation practices which result in soil conditions that allow air, water, and nutrients to be available for root development. Mechanical practices include the minimal use of tillage to lessen tillage-induced soil compaction. In addition, maintaining good soil condition requires incorporating more than one ton of crop residue per acre annually, plus two or more tons added at least once every three years.

Surface Irrigation System: a planned system to efficiently distribute water by surface means, such as furrows or borders. The purpose of surface systems is to convey and distribute water to the point of application without causing undue erosion, water losses, or reduction in water quality.

Water Control Structure: structures constructed in an irrigation conveyance system to control the direction or rate of flow, to measure the rate of flow, or to maintain a desired water surface elevation. These devices provide a means to regulate and measure water flowing within ditches or while flowing out of ditches onto the fields. These are not structures for controlling floodwater.

Water Conveyance: impermeable ditch lining or pipeline which provide an adequately-sized open or closed conduit to convey water to cropland. Consists of a fixed lining of nonreinforced concrete installed in a newly constructed field ditch or irrigation pipe consisting of plastic or concrete.

Project Evaluation

The primary offsite benefits of the project include 1). A reduction in the amount of groundwater used in the MSIDD 2) Retention of the region's agricultural economy and 3). Maintenance of or improvement in agricultural productivity.

Monetary Benefits were calculated for water conservation benefits and irrigation labor savings. The benefit to water conservation is the value of water saved over and above that which would be used under the future without project conditions [5.06 af/ac - 4.11 af/ac = .95 af/ac = Use 1.0].

Other onsite benefits to project participants include (1) the increase in yields due to irrigation water management and (2) an increase in the cultivation of higher value crops with an assured supply of water. Although significant, these monetary onsite benefits were not calculated. No other indirect or secondary benefits were calculated. No monetary benefits were calculated for water quality.

Average annual water conservation benefits due to plan measures are estimated to be \$783,000 based on HIDD charge of \$58 per acre-foot and irrigation labor savings total \$325,100. Total benefits are \$1,108,100. Average annual benefits for project evaluation equal \$753,762 which exceed the project costs of \$759,800 by \$396,600. The benefit-cost ratio is 1.5 to 1.0.

Procedures from the WRC's principles and guidelines were followed in evaluating costs and benefits. Costs and benefits were computed using *Lotus 1-2-3* spreadsheets. The project evaluation period is 25 years and was evaluated using an interest rate of 7.375 percent.

RELATIONSHIP TO LAND AND WATER PLANS, POLICIES, AND CONTROLS

The Maricopa-Stanfield Watershed project was given top priority ranking by the Arizona Department of Water Resources, the designated State agency for PL-566 approval. The ranking was done in conjunction with the Central Arizona Groundwater Conservation Study, a cooperative river basin study. Water conservation and effective water management put forth in the recommended plan will complement the Arizona Groundwater Management Act of 1980 and help the citizens of the state reduce the amount of groundwater being mined from its aquifers.

In addition, this project will complement Arizona's Nonpoint Source Water Quality Management Program shared between the Arizona Dept. of Environmental Quality and all other Arizona entities that have authorities and responsibilities regarding water quality. Statutory authority for this program is from the Arizona Environmental Quality Act of 1986 and the federal Clean Water Act as amended in 1987.

EFFECTS ON NATIONALLY RECOGNIZED RESOURCES

Certain federal policies and laws recognize specific types of resources. These policies and laws impose specific requirements for analysis of the effects of the recommended plan as shown in the following table:

**Effects of the Recommended Plan on Resources of National Recognition
Maricopa-Stanfield Watershed, Arizona**

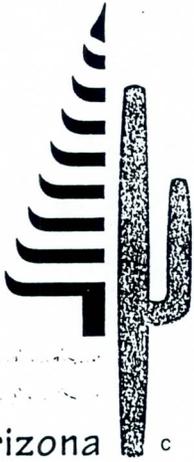
| Resources | Principal Sources of National Recognition | Measure of Effects |
|---|--|--------------------------|
| Air quality | Clean Air Act | No significant effect |
| Areas w/in coastal zone | Coastal Zone Mgt. Act | Not applicable |
| Critical habitat | Endangered Species Act | Not applicable |
| Cultural resources | Nat'l. Historic Preservation Act | No effect* |
| Farmland protection (Important farmland) | Farmland Protection Policy Act CEQ memo of 8/1/80 | No effect |
| Fish & wildlife habitat | Fish and Wildlife Coord. Act | Minimal effect |
| Flood plains | Executive Order 11988 | Not applicable |
| Groundwater quality | Clean Water Act of 1977 | Reduced deep percolation |
| Surface water quality | Clean Water Act of 1977 | No effect |
| Wetlands | Executive Order 11990 | Not applicable |

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* Assumes compliance with GM 420, Part 401, on a contract-by-contract basis.

Appendix A

Record of Comment



Arizona
State Parks

January 9, 1998

Gary Navarre, Cultural Resource Specialist
Natural Resources Conservation Service
3003 North Central Avenue, Suite 800
Phoenix AZ 85012-2945

RE: Continuing Section 106 Consultation on the Maricopa-Stanfield Watershed
Project; NRCS

Dear Mr. Navarre:

Thank you for continuing to consult with our office about the above referenced project.

Your letter indicates that because the assistance provided by NRCS for this watershed project will be delivered through long term contracts with individual private landowners over a period of years, the identification of the landowners cannot be known at this time. I agree that it is appropriate to consult with our office as cooperators become known, and to use the compliance procedures contained in the 1994 National Programmatic Agreement.

The useful summary information provided regarding the location of previously recorded cultural resources in the Maricopa-Stanfield Watershed Project area will be placed in the project file.

The efforts expended by NRCS in complying with the requirements of historic preservation for federally assisted projects is greatly appreciated. Please contact me at 542-7142 if you have any questions, comments, or concerns.

Sincerely,

Jo Anne Miller
Compliance Specialist/Archaeologist
State Historic Preservation Office

Jane Dee Hull
Governor

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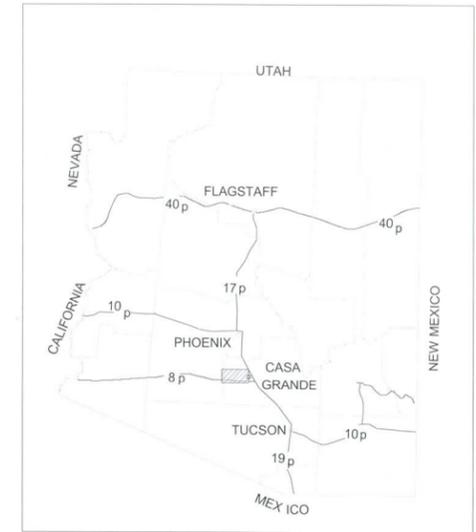
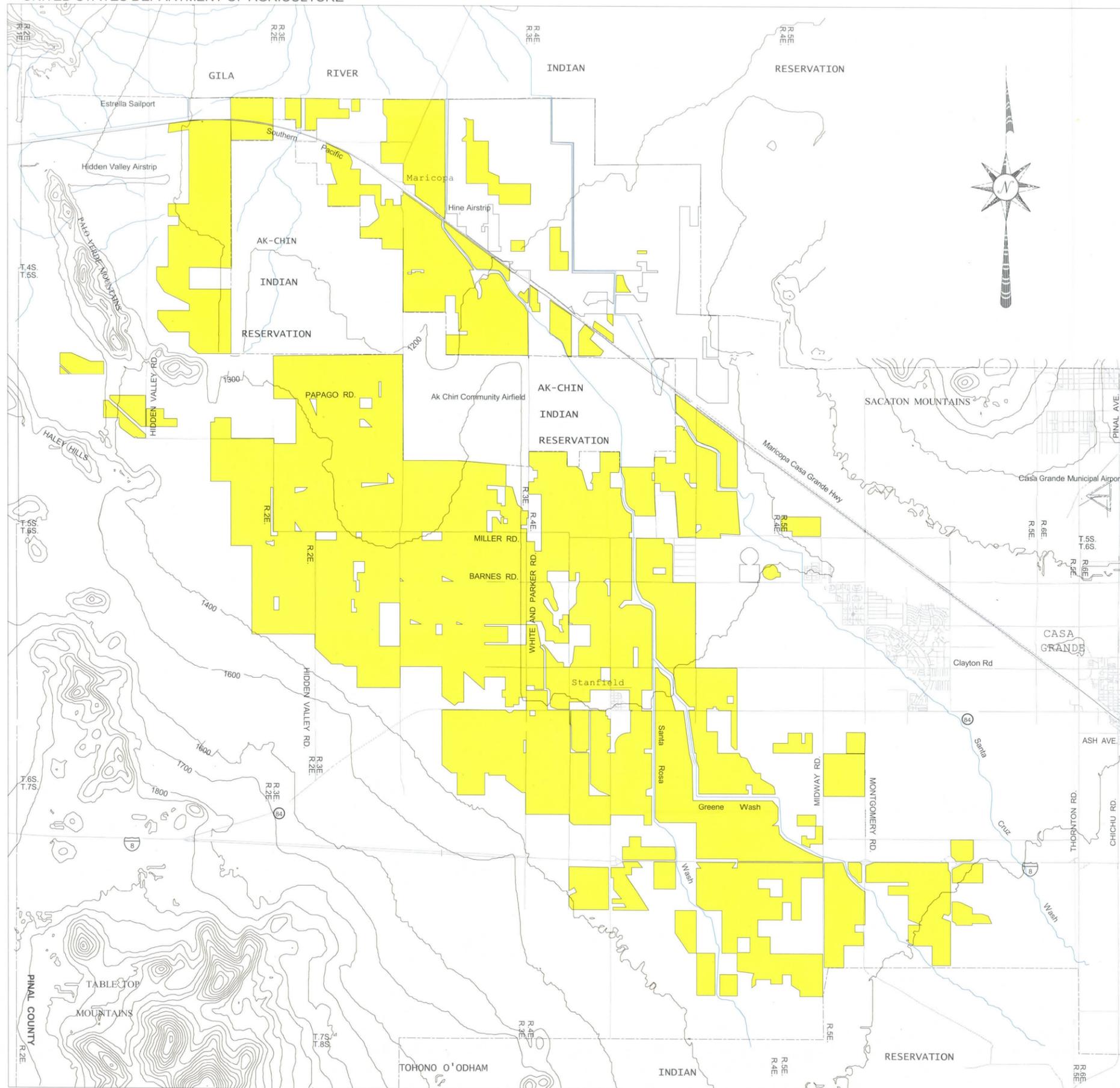
<http://www.pr.state.az.us>

General Fax:
602-542-4180

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602-542-4188

Appendix B

Project and Location Map



LOCATION MAP

LEGEND

DISTRICT LANDS

PROJECT MAP
MARICOPA - STANFIELD
IRRIGATION AND DRAINAGE DISTRICT

