

THE SIX-STATE HIGH PLAINS-OGALLALA AQUIFER  
AREA STUDY\*: 1979-1982

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We appreciate the opportunity to participate in your 25th Annual New Mexico Water Conference and to bring you up-to-date on a project of vital importance to your state. The Six-State High Plains-Ogallala Aquifer Regional Study, which encompasses parts of New Mexico, Texas, Oklahoma, Colorado, Kansas, and Nebraska, is nearing midpoint of a 42-month study period, to culminate in July, 1982 with a report to Congress and the U.S. Department of Commerce on available means for maintaining the economic vitality of the vast irrigated agricultural economy of the High Plains area in the face of declining reserves of groundwater and energy resources.

I would like to first bring you greetings from our firm's President, Mr. Harvey O. Banks, and Vice President, Mrs. Jean Williams, whom many of you know and have worked with in the past. Harvey serves as Project Director and Jean as Project Manager for the High Plains Study.

I brought along a few figures to review with you the basic purpose, objectives, organization, and content of our study. The

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\* The High Plains Study is being conducted for the U.S. Department of Commerce, Economic Development Administration in accordance with Public Law 94-587 (90 Stat. 2943). A general contracting team made up of Camp Dresser & McKee Inc., as prime contractor, Arthur D. Little, Inc. and Black & Veatch, acting as the High Plains Associates, has lead responsibility for the study under the policy guidance of the High Plains Study Council, composed of representatives of the six participating states.

study was authorized by Congress in 1976 by P.L. 94-587 (Figure 1). The enabling legislation authorizes a total of \$6 million for a three and one-half years study. Study objectives identified by Congress are shown in Figure 2. The Congressional intent and its implementation by the U.S. Department of Commerce Economic Development Administration, the designated administering federal agency, has been for a strong state participation and policy guidance role in the High Plains Study from its outset. In response to that intent, a High Plains Study Council composed of the Governors of the six study states, citizen representatives appointed by the Governors, and a representative of EDA, has been established. Additional policy guidance for the conduct of the High Plains Study from the High Plains Study Council is also shown in Figure 2.

The basic organization for the High Plains Study is illustrated in Figure 3. This is a very large and complex study, involving many interests and participants. A total of more than 200 direct study participants are represented by the organizations shown in Figure 3.

The study is further organized into eleven major regional study elements, being conducted by members of the general contractor team, and three broad state research elements being carried out in each of the six study states. These research activities are illustrated in Figures 4 and 5. Another major component of the study specifically required by the enabling legislation is the consideration of possible water supply augmentation to the High Plains area through

Figure 1

PUBLIC LAW 94-587--October 22, 1976 (90 STAT. 2943)

Sec. 193. In order to assure an adequate supply of food to the Nation and to promote the economic vitality of the High Plains Region, the Secretary of Commerce (hereinafter referred to in this section as the "Secretary"), acting through the Economic Development Administration in cooperation with the Secretary of the Army, acting through the Chief of Engineers, and appropriate Federal, State, and local agencies, and the private sector, is authorized and directed to study the depletion of the natural resources of those regions of the States of Colorado, Kansas, New Mexico, Oklahoma, Texas, and Nebraska presently utilizing the declining water resources of the Ogallala aquifer, and to develop plans to increase water supplies in the area and report thereon to Congress, together with any recommendations for further congressional action. In formulating these plans, the Secretary is directed to consider all past and ongoing studies, plans, and work on depleted water resources in the region, and to examine the feasibility of various alternatives to provide adequate water supplies in the area including, but not limited to, the transfer of water from adjacent areas, such portion to be conducted by the Chief of Engineers to assure the continued economic growth and vitality of the region. The Secretary shall report on the costs of reasonably available options, the benefits of various options, and the costs of inaction. If water transfer is found to be a part of a reasonable solution, the Secretary, as part of his study, shall include a recommended plan for allocating water in an equitable fashion, taking into account existing water rights and the needs for future growth of all affected areas. An interim report, with recommendations, shall be transmitted to the Congress no later than October 1, 1978, and a final report, with recommendations, shall be transmitted to Congress not later than July 1, 1980. A sum of \$6,000,000 is authorized to be appropriated for the purposes of carrying out this section.

Figure 2



## **OBJECTIVES**

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PL 94-587

- ASSURE ADEQUATE WATER SUPPLIES TO THE AREA
- ASSURE AN ADEQUATE SUPPLY OF FOOD TO THE NATION
- PROMOTE ECONOMIC VITALITY OF THE HIGH PLAINS REGION
- DEVELOP PLANS TO INCREASE WATER SUPPLIES IN THE AREA
- ASSURE CONTINUED GROWTH AND VITALITY OF THE REGION

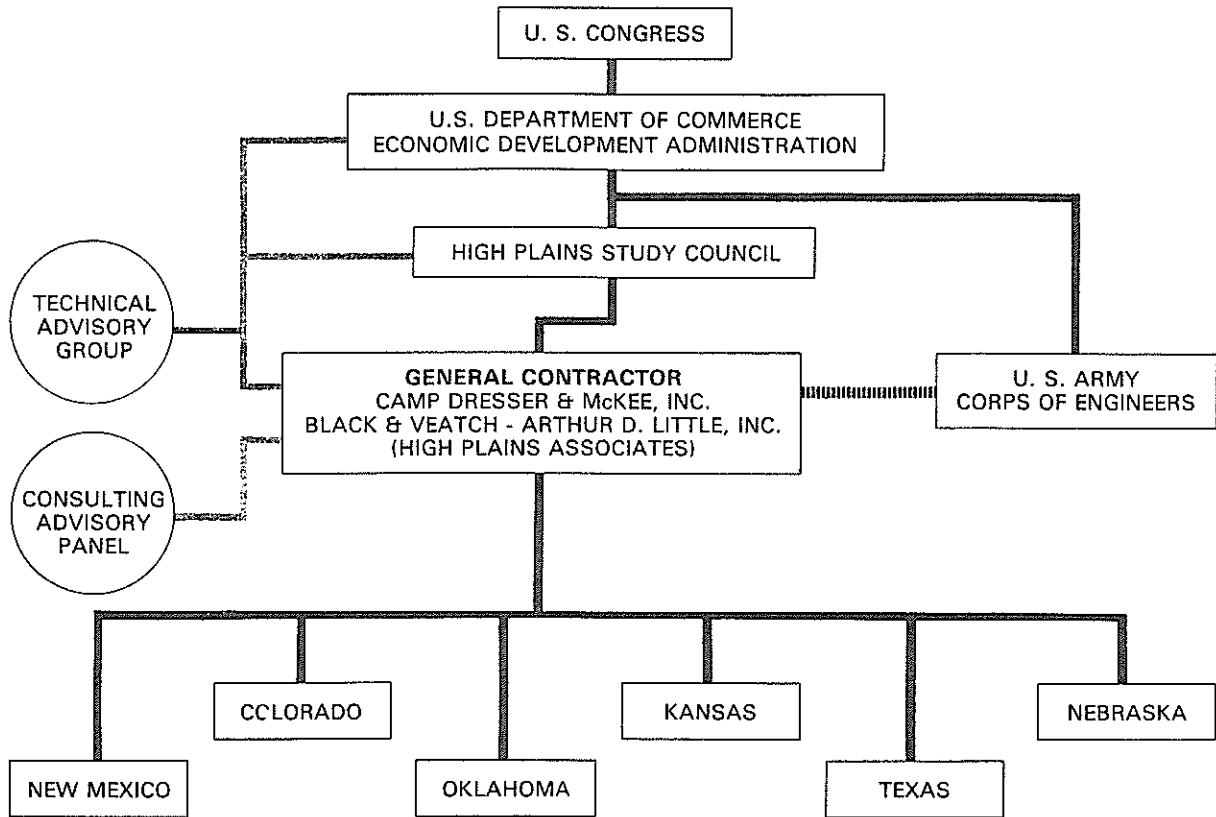
### **HIGH PLAINS STUDY COUNCIL**

- DETERMINE POTENTIAL DEVELOPMENT ALTERNATIVES FOR HIGH PLAINS REGION
- IDENTIFY AND DESCRIBE THE POLICIES AND ACTIONS REQUIRED TO CARRY OUT PROMISING DEVELOPMENT STRATEGIES
- EVALUATE THE LOCAL, STATE AND NATIONAL IMPLICATIONS OF THESE ALTERNATIVE DEVELOPMENT STRATEGIES OR THE ABSENCE OF THESE STRATEGIES.

Figure 3

HIGH PLAINS-OGALLALA AQUIFER REGIONAL STUDY

# STUDY ORGANIZATION



- DIRECTION AND REPORTING
- ▨ INTERACTION
- .- ADVISORY

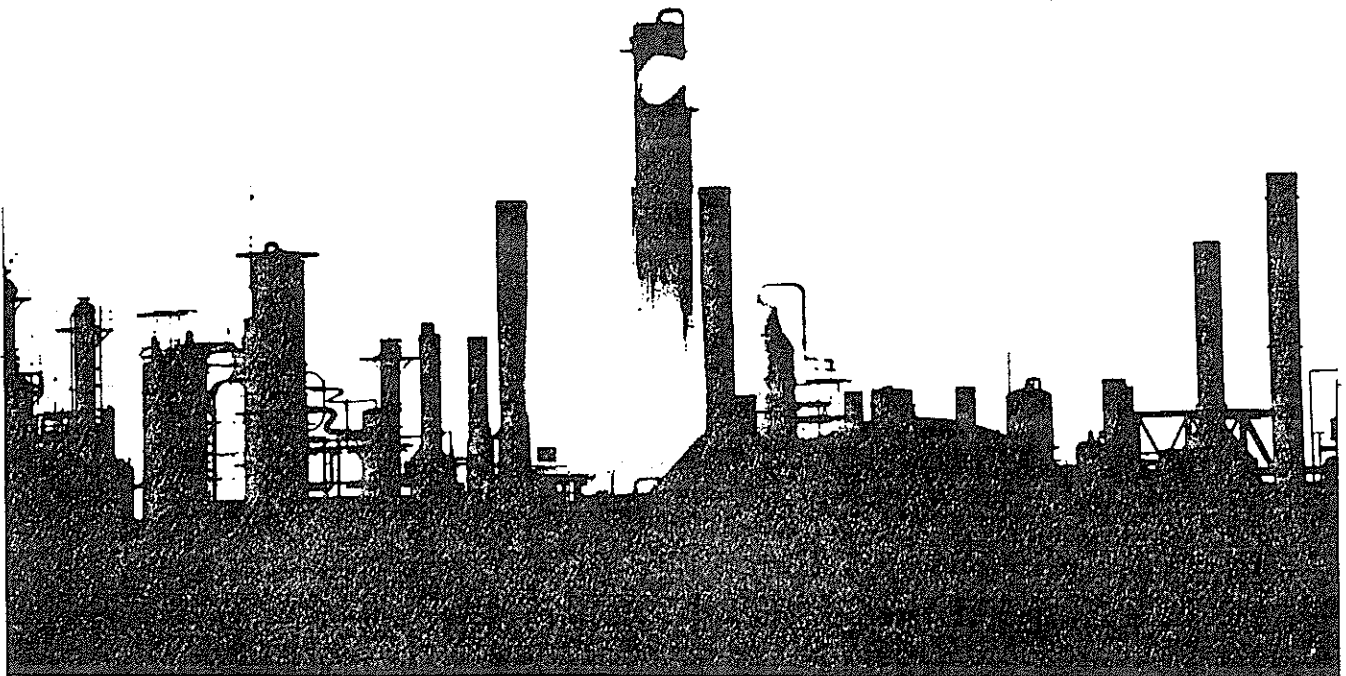
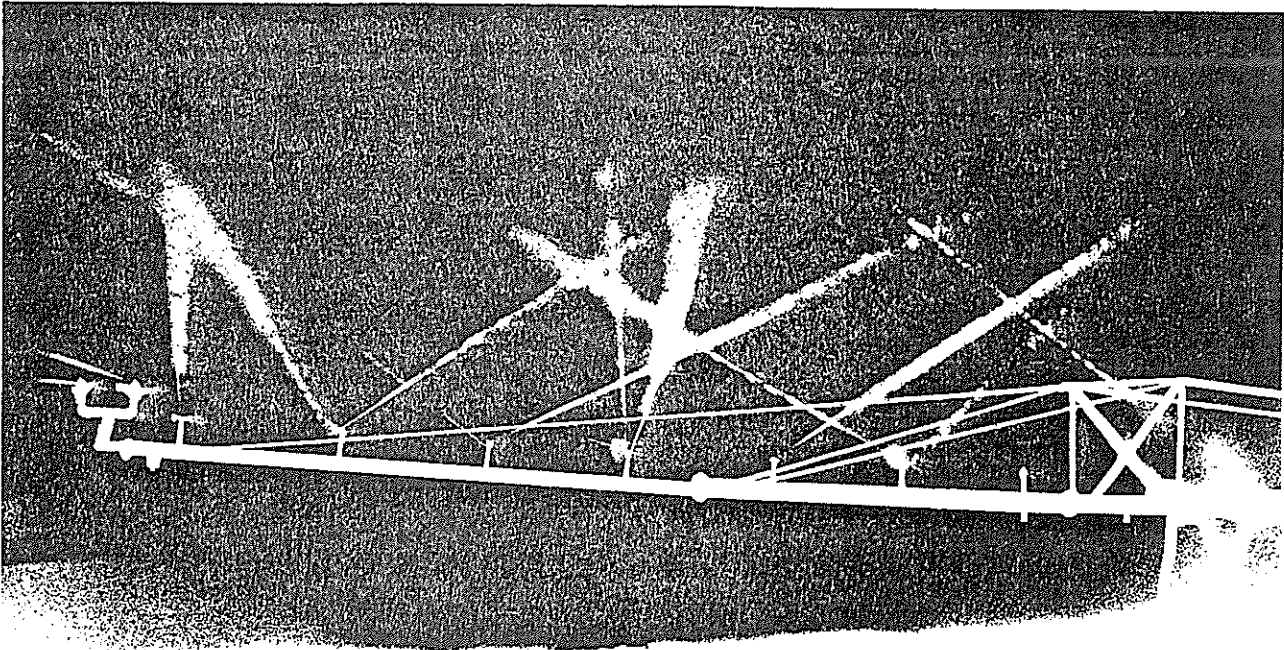


Figure 4

HIGH PLAINS-OGALLALA AQUIFER REGIONAL STUDY



## RESEARCH TO BE CONDUCTED BY GENERAL CONTRACTOR

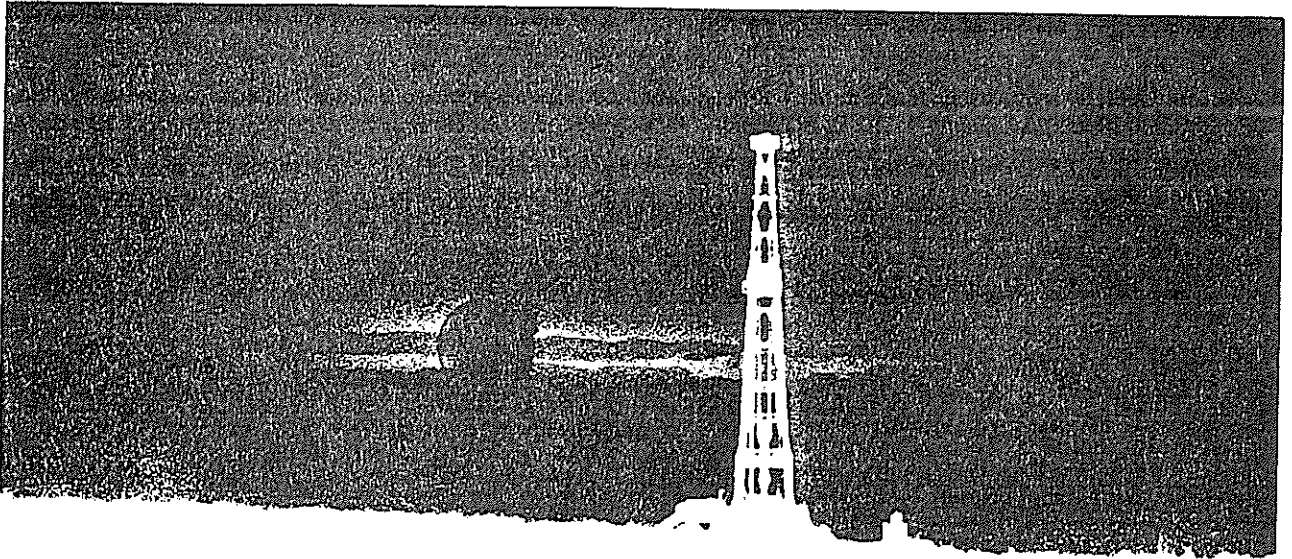
*To be coordinated with Federal, State and local plans and programs.*

### THE REGIONAL RESEARCH WILL ASSESS AND EVALUATE:

- B-1 INTERBASIN TRANSFERS - IN COOPERATION WITH CORPS OF ENGINEERS
- B-2 NATIONAL AND REGIONAL CHANGES IN COMMODITY PRICES, SHIFTS IN AGRICULTURAL PRODUCTION, CHANGES IN CONSUMER PRICES AND SHIFTS IN CONSUMER EXPENDITURES
- B-3 EFFECTS AND COSTS OF APPLYING ADVANCED AGRICULTURAL AND WATER MANAGEMENT TECHNOLOGIES TO ACHIEVE MORE EFFICIENT USE OF WATER
- B-4 ENVIRONMENTAL IMPACTS
- B-5 TECHNOLOGIES FOR AUGMENTING LOCALLY AVAILABLE WATER SUPPLIES AND COSTS
- B-6 LEGAL AND INSTITUTIONAL FRAMEWORK FOR IMPLEMENTING ALTERNATIVE DEVELOPMENT STRATEGIES
- B-7 CROP PRICE PROJECTIONS, ANALYSES OF TOTAL REVENUE AND COSTS FOR WIDE RANGE OF COMMODITY AND LIVESTOCK ENTERPRISE SITUATIONS
- B-8 ENERGY PRICE AND TECHNOLOGY
- B-9 IMPACTS OF TRANSITION TO DRYLAND FARMING
- B-10 REGIONAL POTENTIAL FOR NON-AGRICULTURAL DEVELOPMENT
- B-11 ALTERNATIVE DEVELOPMENT STRATEGIES

Evaluations of alternative development strategies will be reported to High Plains Study Council for consideration and recommendations to Secretary of Commerce.

Figure 5



## RESEARCH TO BE CONDUCTED BY THE STATES

### A-1 STATE AGRICULTURE AND FARM LEVEL RESEARCH

Project cropping patterns; agricultural output and output value; inputs and input costs; agricultural employment and income.

### A-2 ENERGY INDUSTRY IMPACTS

Project energy production; energy requirements for irrigation; employment; royalties and other income from energy industry; and water requirements.

### A-3 STATE WATER RESOURCES EVALUATION AND IMPACTS RESEARCH

A-3.a Evaluate intrastate water resource situation; project intrastate water supplies and demands under alternative development strategies.

A-3.b Project economic adjustments and socioeconomic and environmental impacts at the subregional and State level resulting from changes in land use and changes in supply and uses of water, energy and other sources under each alternative development strategy.

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*Results of the State research will be used by the General Contractor in the regional and national analyses.*

interbasin water transfers. Some of the possible sources, routes and designations of water transfer potentials being investigated by the Corps of Engineers are illustrated in Figure 6.

The culmination of all state, regional and Corps studies will be the assessment of a set of alternative development strategies for the High Plains region, as adopted by the High Plains Study Council, and the projected effects of their implementation over the 40-year study period (to 2020). The development alternatives to be assessed are shown in Figure 7.

The end result of the High Plains Study is to be a final report by the states and the general contractors to the High Plains Study Council. On the basis of that report, the Council will make recommendations for needed actions to the Secretary of Commerce and to Congress. The study final products are illustrated in Figure 8.

The High Plains Study is proceeding on schedule, with strong leadership from the states and effective research direction by such qualified practitioners as your own Bob Lansford. We have enjoyed a very good working relationship with the states, and that can be attributed in large degree to people like Steve Reynolds who represent New Mexico on the High Plains State Liaison Committee.

Thank you again for the opportunity to participate in your 25th Annual Water Conference.



Figure 6

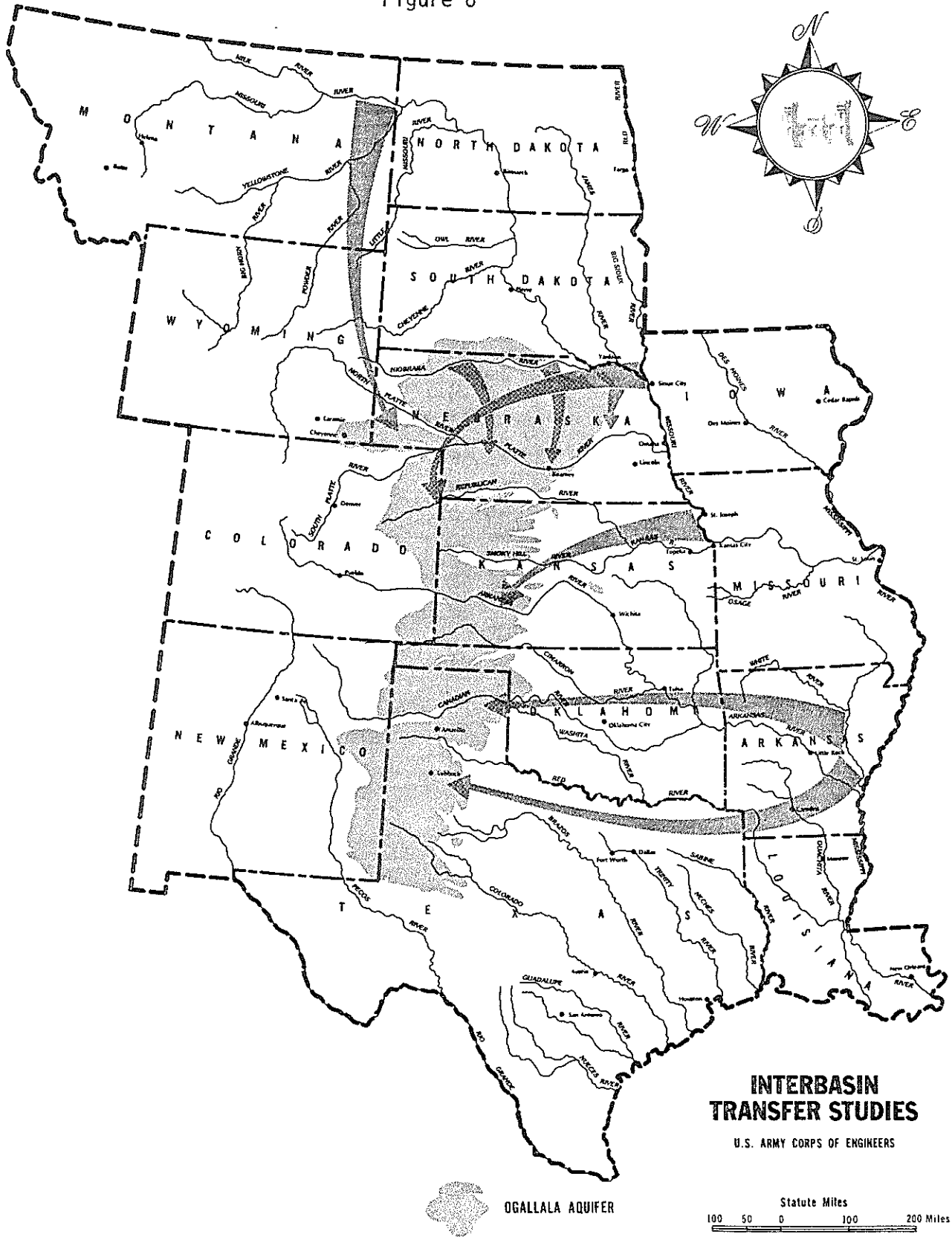


Figure 7

HIGH PLAINS—OGALLALA AQUIFER REGIONAL STUDY

## ALTERNATIVE DEVELOPMENT STRATEGIES

*These alternatives are not mutually exclusive. For a particular subregion, or combination of subregions, a mix of alternatives may be found to be the best solution to meet objectives.*

### \_\_\_\_\_ BASELINE \_\_\_\_\_

- CONTINUATION OF CURRENT LOCAL, STATE, FEDERAL POLICIES AND TRENDS; NO NEW STATE OR FEDERAL PROGRAMS

### \_\_\_\_\_ WATER RESOURCES ALTERNATIVES \_\_\_\_\_

*Alternatives are listed in order of increasing cost and increasing availability.*

1. WATER DEMAND MANAGEMENT: Encourage users to practice conservation through application of proven technology; provide incentives for the farmer to conserve.
2. WATER DEMAND MANAGEMENT: Apply all advanced water and agricultural management technology on a broad scale, identifying any necessary constraints.
3. LOCAL WATER SUPPLY MANAGEMENT: Augment water supplies at local level with techniques such as artificial recharge, weather modification, land management, snow pack management, vegetation management, desalting, evaporation management, and others.
4. SUBREGIONAL INTRASTATE IMPORTATION SUPPLY MANAGEMENT: Augment local water supplies with interbasin transfers of surface water as available.
5. REGIONAL INTERSTATE IMPORTATION SUPPLY MANAGEMENT: Augment local water supplies with major interbasin transfers of water, possibly providing for expansion of irrigated acreages.

### \_\_\_ NON-AGRICULTURAL DEVELOPMENT ALTERNATIVES \_\_\_

6. NON-AGRICULTURAL ALTERNATIVES: Development and use of available resources for purposes other than agricultural production.



## STUDY FINAL PRODUCTS

- FOR THE STATES INVOLVED, THE REGION, AND THE NATION, THIS STUDY WILL EVALUATE THE EFFECTS OF CONTINUING EXISTING TRENDS AND POLICIES (“NO-ACTION”) AND THE EFFECTS OF IMPLEMENTING EACH OF THE ALTERNATIVE DEVELOPMENT STRATEGIES ON:
  - THE ECONOMY
  - THE ENVIRONMENT
  - THE QUALITY OF LIFE
- THE STUDY WILL ALSO DETERMINE:
  - THE COSTS OF IMPLEMENTING EACH OF THE ALTERNATIVE STRATEGIES
  - THE LEGAL, INSTITUTIONAL, FINANCIAL, AND ORGANIZATIONAL CHANGES NECESSARY TO IMPLEMENT EACH OF THE POSITIVE ALTERNATIVE STRATEGIES
  - THE CONSEQUENCES OF THE “NO-ACTION” OPTION COMPARED WITH THE RESULTS OF IMPLEMENTING POSITIVE ACTION ALTERNATIVE DEVELOPMENT STRATEGIES

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*These study results will provide the High Plains Study Council, Department of Commerce, the Congress, State Legislatures and others an informed basis for reaching decisions as to the future of the High Plains-Ogallala Aquifer Region.*

