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Project Summary

Assessment of Potential Environmental Problems Concerning Water Availability

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This study analyzes national supply and demand and summarizes data on all water resources regions. Estimates of the potential for wastewater reuse and recycling are also presented. The technology for improving the water supply through augmentation and conservation is reviewed, and the most feasible implementation methods are discussed in detail. Three detailed studies of water sensitive regions presented in this report illustrate the regional nature of the issues, problems, and research needs. The areas are San Antonio, Texas, South Coastal area of Southern California, and the Yadkin-Pee Dee Basin in North Carolina and South Carolina.

This Project Summary was developed by EPA's Office of Exploratory Research, Washington, DC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

This study summarizes water supply and demand data for all water resources regions in the Nation, reviews the technology for water supply augmentation, presents evaluations of water resources in three widely different areas of the Nation, and analyzes issues, problems and research needs in water availability. Critical water problems facing the Nation include inadequate surface water supply and overdraft of ground water. There are other water related problems and potential problems in the Nation including pollution of surface and ground waters but the major concern is the inadequate, or marginally adequate, supply in many areas.

Water Use

Agricultural irrigation is the largest current water use in the Nation, and its percentage of total water used is projected to increase by the year 2000.

	Percent of Total Fresh Water Requirement	
	1975	2000
Agriculture	50.9	54.5
Steam Electric Power Plants	24.6	24.2
Manufacturing Industries	14.1	6.0
Domestic and Commercial	8.0	11.2
Minerals Industries	1.9	3 4
Other	0.5	0.7

Most of the agricultural use is in the Pacific Northwest, California, and Missouri regions. Cooling water for steam electric generating plants is the second largest requirement for fresh water with most of the demand in the Eastern States. Decreases projected in fresh water requirements for the steam electric and manufacturing industries are the results of projected increases in water recycling. It is estimated that fresh water supplied to manufacturing industries in the year 2000 will be used over 1 7 times and fresh water will be recycled over seven times by steam electric plants before it is discharged.

Water Supply

The two general methods of increasing the water supply are: (1) augmentation by increasing the quantity of water available to the user, and (2) conservation to reduce withdrawals and consumption. The following augmentation and conservation measures are evaluated in this study.

- Augmentation
  1. Desalination
  2. Wastewater recycling and reuse
  3. Brackish-saline water use
  4. Transfer and storage

5. Evaporation reduction
6. Vegetation management
7. Weather modification
8. Water rights
9. Icebergs

- Conservation
  1. Agricultural irrigation efficiency
  2. Crop switching
  3. Cooling water techniques
  4. Domestic and commercial conservation devices

Conclusions

It is concluded that conservation, wastewater recycling and reuse, desalination and improved conjunctive use of ground water and surface water supplies offer the most immediate potential for increasing water supplies on a nationwide basis. Other methods may be used in more localized areas and others may be more widely used after further research and development. The water supply situation in the following three water sensitive regions is evaluated in detail in this study.

- San Antonio, Texas. Ground water is presently the sole source of water supply for the urban sections in a five county area of South Central Texas that includes the City of San Antonio.
- South Coastal California. About two-thirds of the water supplies for this 11,000 square mile area in Southern California are imported from the Colorado River and Northern California with the other one-third supplied from ground water and local runoff.
- Yadkin-Pee Dee River Basin. Surface water and ground water from within this river basin are the source of supply for an 18,000 square mile area in North Carolina and South Carolina.

Information on major issues, trends and research needs in water availability for this study were collected from several sources including:

1. Recent reports and review on the National water situation including comments and critiques on Federal water policy and research activities.
2. Regional reports, many of which were prepared under the Federal Water Resources Planning Act.
3. Reports by various State agencies.
4. Discussions with local water agency personnel and others during the work on this project.
5. Informal discussions with knowledgeable persons in Washington, D.C. to solicit opinions on major issues, trends and research needs in water availability.

It is concluded that many of the problems and issues are regional in nature. The issues that exist in all regions of the Nation are limited or inadequate water supply and concern for water quality. Inadequate or marginally adequate water supply is a problem in many areas especially in the Western States. The unresolved question of water rights on Indian lands and Federal lands limits the allocation of existing water supplies in many areas in the West.

At the present time the most feasible methods of augmenting water supplies are conservation, wastewater reuse and conjunctive use of ground and surface water supplies. Research needs are also somewhat regionalized in nature. The most immediate research needs are those that will advance the most feasible means of augmenting supplies: conservation, wastewater reuse, water rights and institutional arrangements.

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The complete report, entitled "Assessment of Potential Environmental Problems Concerning Water Availability," (Order No. PB 83-226 035; Cost: $11.50, subject to change) will be available only from:
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