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WASTEWATER MANAGEMENT PLAN. COLORADO RIVER AND TRIBUTARIES, TEX--ETC(U)
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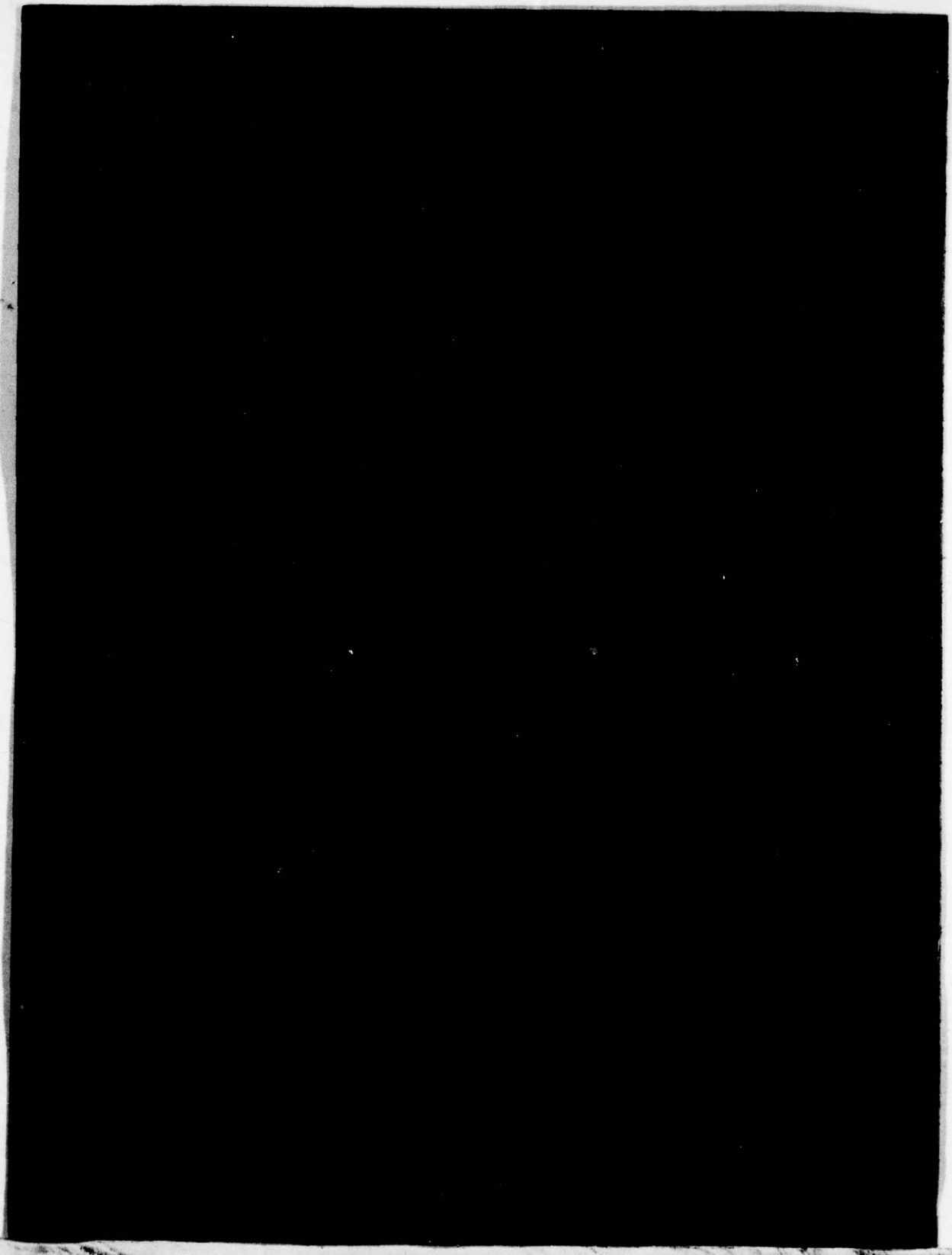

WASTEWATER MANAGEMENT PLAN. COLORADO RIVER AND TRIBUTARIES, TEXAS.

SUMMARY.

Prepared by

THE GOVERNOR'S PLANNING COMMITTEE

Office of the Governor
Texas Water Development Board
Texas Water Quality Board
Texas Water Rights Commission
Texas Parks and Wildlife Department
Railroad Commission of Texas
Texas State Department of Health
Texas State Soil and Water Conservation Board
U. S. Department of the Interior
U. S. Department of Housing and Urban Development
U. S. Environmental Protection Agency
Farmers Home Administration
Lower Colorado River Authority
Colorado River Municipal Water District
Central Colorado River Authority
Upper Colorado River Authority
Capital Area Planning Council
Alamo Area Council of Governments
Central Texas Council of Governments
Concho Valley Council of Governments
Houston-Galveston Area Council
Permian Basin Regional Planning Commission
South Plains Association of Governments
West Central Texas Council of Governments
Nine General Public Members

Honorary Members

Congressman J. J. Pickle
Congressman John Young
Congressman Omar Burleson
Congressman O. C. Fisher

Study Management By

U. S. ARMY CORPS OF ENGINEERS, FORT WORTH DISTRICT

Consulting Engineers

TURNER, COLLIE & BRADEN, INC.

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(12) 50p.

TEXAS WATER DEVELOPMENT BOARD

HARRY P. BURLEIGH
EXECUTIVE DIRECTOR

P.O. BOX 13087
CAPITOL STATION
AUSTIN, TEXAS 78711

AREA CODE 512
475-2201

301 WEST 2ND STREET

August 17, 1973

IN REPLY REFER TO
TWDBD

Colonel Floyd H. Henk
District Engineer
U. S. Army Corps of Engineers
Fort Worth District
Post Office Box 17300
Fort Worth, Texas 76102

Dear Colonel Henk:

The Corps of Engineers, in accordance with its responsibilities, has furnished the Governor's Planning Committee a report on a Wastewater Management Plan for the Colorado River and Tributaries, Texas. The report consists of a Summary Volume, the Basin Plan (Volume 1), the Basin Plan Appendix (Volume 2), the Technical Appendix (Volume 3), and Institutional Arrangements (Volume 4).

The report was formally considered by the Governor's Planning Committee at an August 15, 1973 meeting. You and members of your staff attended and presented the report to the Committee. The report was unanimously adopted by committee members in attendance with the Environmental Protection Agency representative abstaining. The EPA member indicated that the report would be officially approved after receipt by EPA from the Governor of Texas.

This Committee adopted report has been furnished to the Texas Water Quality Board. In accordance with EPA guidelines and State statutes, the Texas Water Quality Board will hold a public hearing on the Plan August 24, 1973. The Plan will then be considered by the Texas Water Quality Board at a September 11, 1973 special meeting. If approved by the Texas Water Quality Board, the Plan will be forwarded to Governor Briscoe with the recommendation that it be transmitted to the Environmental Protection Agency in fulfillment of basin planning requirements for the Colorado River as provided for in the Federal Water Pollution Control Act Amendments of 1972.

Sincerely,

Harry P. Burleigh

Harry P. Burleigh
Chairman
Governor's Planning Committee

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SECTION I - INTRODUCTION

Purpose of the Summary Report.

This volume of the Colorado River Basin Wastewater Management Plan serves as a summary and review of problem areas, study objectives, suggested alternative methods of solutions, recommended plans, general environmental assessment of the plan and a means of implementation of the plan. The salient features of Volumes 1, 2, 3, and 4 of the report are summarized in a condensed manner to facilitate the reader's comprehension of the report thrust.

Authorization.

In response to concern expressed by local citizens about the quality of the waters of the Colorado River Basin, this study was authorized by resolution of the Committee on Public Works of the House of Representatives adopted July 29, 1971 as follows:

> "Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports on Colorado River and its tributaries, Texas, submitted in House Document No. 361, Seventy-First Congress, Second Session, with a view to determining the feasibility of regional water supply and wastewater management facilities including measures for water quality control, wastewater collection, purification, and/or reuse."

Study Objectives.

The original objective of the study was to develop a wastewater management plan for the Colorado River Basin, Texas, in accordance with requirements of the Environmental Protection Agency(EPA) 3c grant program which is prescribed in the Federal Register 18 CFR 601.32 and 601.33. The intent of the original plan was to provide a high quality renovated water for many purposes and to protect and enhance the water quality of Basin lakes and streams. The study was also intended to include an overall plan for the Basin and more detailed plans for areawide planning

areas to be designated by the Governor. Both plans were intended to meet certification requirements of the EPA and the Department of Housing and Urban Development for the processing of applications for grants for construction of treatment systems. The study direction guidelines emanated from the legislative authorities contained in the Federal Water Pollution Control Act of 1965 (as amended). The original study schedule called for the completion of this study on 1 July 1973.

In October 1972, during the formative period of the study, the Congress enacted the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), hereinafter called PL 92-500. Passage of PL 92-500 resulted in the issuance of new guidelines and study parameters which had a direct influence on the study orientation and required reorientation of the original objective. The production of a basin plan and areawide plans which would be approvable by the EPA could not be achieved within the original time frame and funding constraints. PL 92-500 altered the concept of areawide plans to provide that this service would only be prepared for areas having urban-industrial concentrations or other factors which have substantial water quality control problems. The need for areawide plans in the Colorado River Basin, under the provisions of PL 92-500, has not been determined. However, PL 92-500 still requires submittal of a basin plan. The approval of a basin plan by the EPA is the cornerstone for the construction grant program. Consequently, the reoriented objective of the study was the development of a basin plan which would meet EPA requirements as defined by PL 92-500. This basin plan is part of the State's Continuing Planning Process, which is also a requirement of PL 92-500. Prior to actual construction of treatment facilities, additional planning as required by Section 201 (facilities plans) or Section 208 (areawide plans) will be necessary. The areawide plans that were formulated under the original objectives of the study will provide much of the data that are necessary for this future planning effort.

Study Management.

In recognition of the vast geographic scope of the Basin and the intensive coordinative efforts that would be required with governmental units at all levels, the Governor of the State of Texas designated a planning committee to guide the planning effort. This committee, called Planning Committee: Colorado River Basin Water Quality Management Study, was composed of representatives from various Federal, State,

regional, and local governmental units plus local representatives of the general public.

Prior to initiation of the study, existing legislative and administrative requirements concerning EPA planning grant funds dictated that the investigation be predicated on a 50-50 effort sharing basis. In compliance with these requirements, various members of the Planning Committee agreed to provide cooperative effort to the study in the amount of 50 percent of the total study effort. A Plan of Study was prepared to serve as a guide for the coordinated execution of the investigation and document the input to the study effort that was agreed to by the various members of the Planning Committee. This Plan of Study was coordinated with and accepted by the Governor's Planning Committee in May 1972. Funds were released to initiate the study on 22 May 1972, and work on the plan was undertaken.

The Planning Committee furnished historical and projected data in the fields of economics, land use, water quality flows and standards, water resources, water rights, oil and gas field operations, environmental sciences, and basic data on existing and future wastewater treatment systems throughout the Basin. The Committee also organized and implemented the non-Federal part of the public involvement program.

The Corps of Engineers had the responsibility for study management and administration for development of alternatives and conceptual designs and for correlation of all information and recommendations into a report. In this capacity, the Corps of Engineers performed a planning service for the State of Texas. The method of work effort correlation between the Planning Committee and the Corps of Engineers is shown graphically in Figure 1.

Public Participation.

Public involvement in the Colorado River Basin Wastewater Management Study was accomplished through the use of public meetings, workshops, brochures, newsletters, individual contacts, news releases, and the Governor's Planning Committee.

Three public meetings were held--two in July 1972 co-sponsored by the Corps of Engineers and the Planning Committee and one in August 1973 sponsored by the Texas Water Quality Board(TWQB). The July 1972 meetings were held to explain the purpose of the study and its method of performance and accomplishments. The August 1973 meeting was held to obtain approval from the citizenry of the Basin Plan adopted by the Governor's Planning Committee.

During the course of the investigation, each community in the Basin which had treatment systems in operation was visited, for a total of 76 communities. Sixteen workshops were held throughout the course of the study in which every community with wastewater treatment facilities in the Basin was invited to attend. These workshops, which were held in ten different cities throughout the Basin, provided a medium for exchange of communication regarding local problem areas as well as providing local interests with the opportunities to express a preference for proposed treatment systems that were considered during the course of the study.

The study brochures and newsletters received Basinwide distribution during the study and the individual contact program provided opportunities for direct public participation. In this particular phase, the study management team brought the involvement program to the public and obtained their ideas and desires during the course of official data-gathering trips and technical inspections and visitations.

The public's ultimate voice in the planning process was that of the Governor's Planning Committee, which tied the public participation program together and furnished the study team with current evaluations and the views of the public.

Study Output.

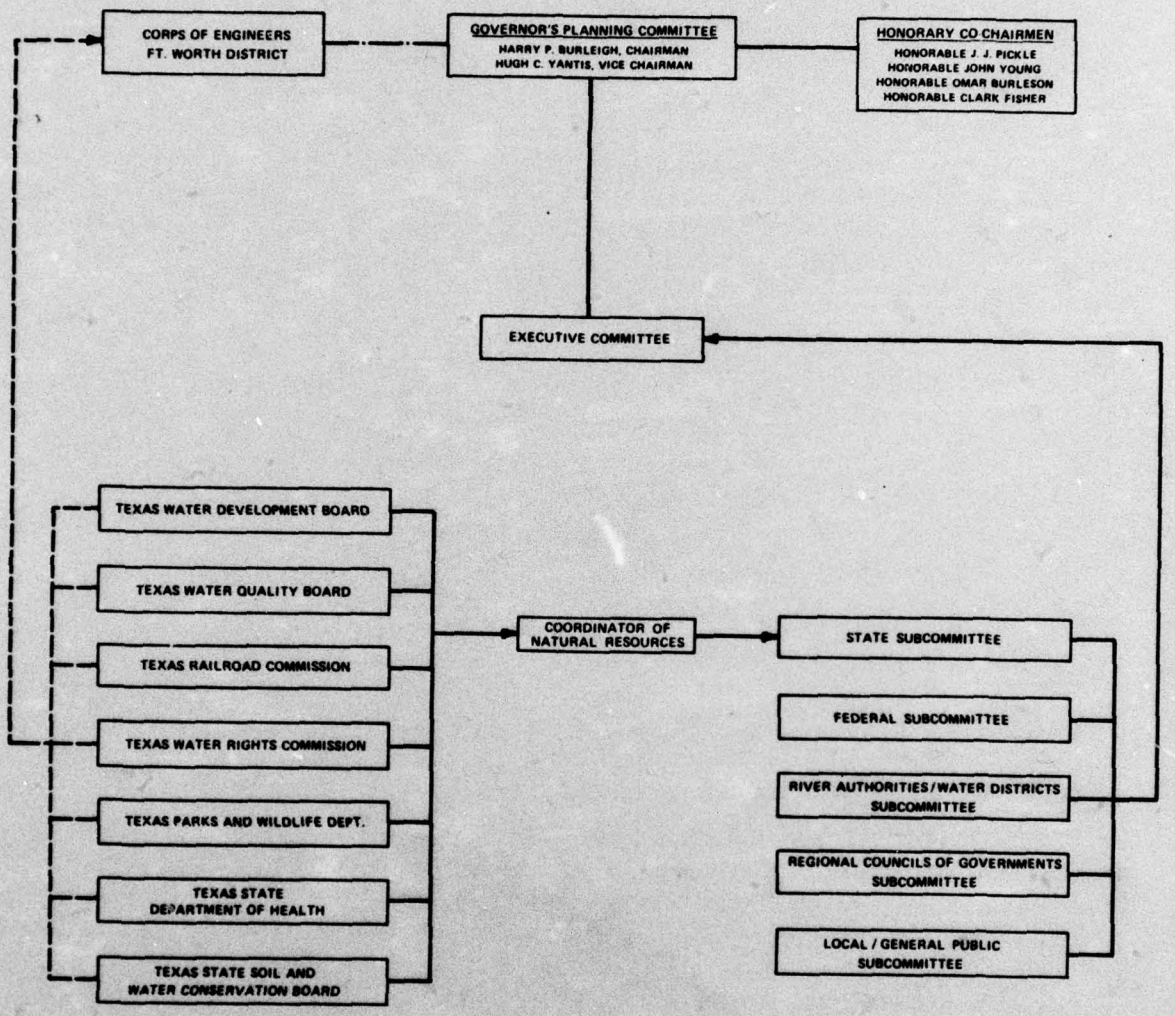
The study has produced this summary report and Volumes 1, 2, 3, and 4, which are the necessary documents required for Basin Plan approval by the EPA. Other products of the study are Volumes 5, 6, and 7, which contain the areawide planning efforts. These volumes are to be published at a later date and are not required for approval of the Basin Plan. Information contained in these volumes will provide extensive data for further planning efforts of the grant program under Sections 201 and 208 of PL 92-500. The four volumes included in the initial publication can be summarized as follows:

Volume 1 — Basin Plan. This volume presents the plan which offers the most cost-effective strategy to meet stream water quality in the Colorado River Basin for the period 1970-2020. The plan will also comply with the provisions of PL 92-500.

FIGURE I

WASTEWATER MANAGEMENT STUDY
COLORADO RIVER BASIN, TEXAS

A FEDERAL, STATE AND LOCAL STUDY



Volume 2 — Basin Plan Appendix. This volume provides methodology and rationale for population projections, segmentation and waste load allocations, discharger ranking, and development of priority lists. Discusses return flows, mathematical modeling techniques, and selected State water quality regulations and proposed standards. Presents public participation records.

Volume 3 — Technical Appendix. This volume presents cost estimation data, land disposal methodology, design treatment rationale, wastewater treatment process efficiencies, base data and bibliography, a glossary of terms and water usage parameters.

Volume 4 — Institutional Arrangements Appendix. This volume presents institutional arrangements for the design, construction, operation, and maintenance of recommended systems.

SECTION II - STUDY AREA

Location.

The Colorado River Basin, Texas, extends from the Texas-New Mexico State line to the central Texas Gulf Coast. The Basin traverses 540 air miles in Texas and covers an area of about 40,000 square miles. The Basin includes all or portions of 62 counties in the State, and has a total area in the State of Texas which is approximately 6,000 square miles more than the total combined area covered by the States of Connecticut, Delaware, Maryland, Massachusetts, New Jersey, Rhode Island and the District of Columbia. The Basin shown in Figure 2, represents approximately 15.2 percent of the State's total area. The Colorado River system with approximately 890 river miles of discernible main stem consists principally of the main stream and six major tributaries. These tributaries are Pecan Bayou, Beals Creek, the Concho River, the San Saba River, the Llano River, and the Pedernales River.

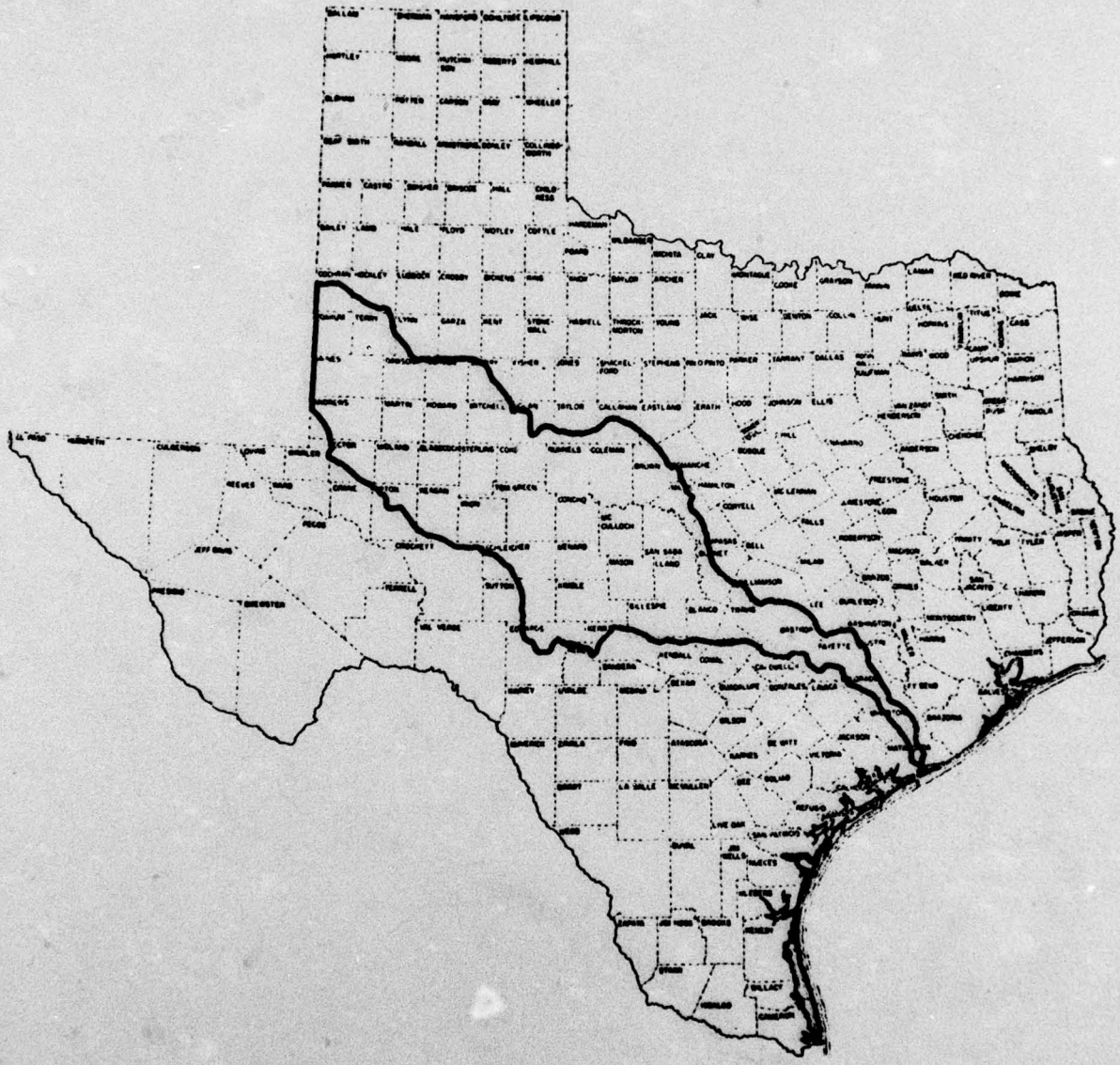
Climate and Rainfall.

The Basin climate is generally mild varying from subtropical along the Gulf Coast to semiarid in the northern reaches of the Basin. Summers are usually hot and the winters mild except for occasional severe cold temperatures in the upper Basin. The average annual rainfall is 28 inches. Average annual runoff ranges from 350 acre-feet per square mile near the mouth of the Colorado River to less than 50 acre-feet per square mile in the vicinity of Robert Lee. The prevailing winds are from the south or southeast, except during portions of the winter months when winds come from the north over most of the Basin.

Physiography.

As the Basin crosses the State it extends across three basic physiographic provinces--the Great Plains, North Central Plains and the Gulf Coastal Plain. In the Southern High Plains of the Great Plains, the area rises gently from 2700 feet on the east to more than 4000 feet along the New Mexico Mexico border. Most of this portion of the Basin (approximately 6,400 square miles) contributes no runoff to the Colorado River. East of this escarpment, the surface topography of the Basin is characterized by the low rolling hills of the North Central Plains. The Basin topography

FIGURE 2
LOCATION MAP
COLORADO RIVER BASIN, TEXAS



LEGEND:

BASIN BOUNDARY

below the North Central Plains consists of the rugged features of the Edwards Plateau, featuring steep hills and numerous streams, and the Gulf Coast Plain which is moderately hilly in the northwest portion below Austin and generally flat and featureless near the coast.

Geology.

The geology of the Basin was of prime importance in the study because all wastewater treatment techniques were considered during the investigation. In this regard, the geology is a significant factor in the construction of facilities, as well as in the feasibility determination in land application techniques for wastewater treatment.

The general surface geology of the Basin, like most of Texas, reflects a variety of complex strategraphic and structural controls. The High Plains consists primarily of the Phorine formation (Ogallala sand and gravel). In and contiguous to the Balcones fault zone, Pre-Cambrian granites, gneiss and schist occur in the area of the Llano Uplift, and intrusive rocks are exposed. Sedimentary formations of the Cambrian, Ordovician, Pennsylvanian, Permian and Triassic systems outcrop in the Central Texas Section. Cretaceous (Commanche series) formations control the Edwards Plateau, while the Gulf Coastal Plain is comprised of Cretaceous (Gulf Series), Eocene, Pliocene, Miocene, Oligocene and Quaternary formations.

Population.

The 1970 population of the Colorado River Basin was 834,747, which was 7.4 percent of the State population. During the preceding decade, the Basin growth was about 7.5 percent, which is considerably lower than the 16.9 percent growth experienced in the State and 13.3 percent experienced in the nation. Total Basin population is projected to increase twofold by the year 2020, with 95 percent of this growth projected to occur in the Austin and Midland-Odessa urban areas. This projected population growth is predicted at a slower rate than that expected in overall State growth for the study period.

The bulk of the Basin population is located in the cities of Austin, San Angelo, Midland, Odessa, Big Spring and Brownwood, with the population density of the Basin, as a whole, only 20 people per square mile. In many counties, particularly in the upper portion of the Basin, most of the population is located in one or two towns per county.

Historical trends and projected tendencies indicate that the migration from agricultural areas to urban areas will continue. However, this migratory trend seems to be slowing as the rural density approaches a minimum saturation.

Economic Development.

In the upper reaches and coastal area of the Basin, major gas and oil fields have been the basis for an economy predominately founded on the petrochemical industry. In the central region of the Basin, cattle ranching and other agricultural pursuits have been the mainstay of the economic picture. In the upper Basin, irrigated farming has played a significant role in the economy. In the City of Austin, the necessary support activities for the State Capitol and the State University have been the mainstays of the economic stability of that region.

Substantial growth is projected for high-water use industries. Agriculture land use in the Basin is projected to remain stable, but irrigated acreage will decline to about one-fourth the present acreage by year 2020, mainly because of the projected depletion of ground water supplies in the upper part of the Basin.

The lower Basin is characterized by agricultural endeavors interspersed with oil-producing activities throughout the area. Large areas of this reach are being irrigated for rice production, and surface water seems adequate for future use.

SECTION III - WATER QUALITY PROBLEMS

Present Conditions.

There are at present comparatively few significant water quality problems in the Basin. Stream imbalance by disproportionate amounts of secondary effluent and quality degradation by mineral salts from natural sources and oilfield operations are the most pressing concerns. Other sources of stream contamination, storm runoff, industrial discharges, land disposal operations, irrigation return flows, and lakefront contamination can all be found to some degree in the Basin. These other sources are insignificant when compared with problems caused by effluent-dominated streams and mineral salt contamination.

Many reaches of the Colorado River and tributaries in the upper Basin (above the Highland Lakes) are either intermittent or have frequent periods of minimal flow. As a result, many streams become heavily effluent-dominated, with subsequent degradation through parts of the year. Beals Creek below Big Spring and Pecan Bayou below Brownwood are examples. Beals Creek has experienced oxygen concentrations as low as 1.6 mg/l, and a 50 percent probability value of 6.5 mg/l can be demonstrated statistically. The minimum measured dissolved oxygen concentration recorded in Pecan Bayou was 4.5 mg/l. These actual values compare with 5.0 mg/l minimum values for noneffluent-dominated streams as contained in the water quality standards proposed by the State in April 1973.

The other significant source of stream contamination in the Basin is the non-point in-flow of mineral salts into waters of the upper Basin. The primary problem area on the main stem lies between Lake J. B. Thomas Dam and the Winchell monitoring station, a distance of about 300 miles. Mean annual flow weighted averages of chlorides in this reach of the Colorado River vary from almost 800 mg/l at the upper end to about 300 mg/l at the lower end, and individual samples have been recorded up to 48,000 mg/l. These values far exceed the U.S. Department of the Interior recommended permissible chloride level for domestic raw water sources which is 250 mg/l. Studies to date are not conclusive with regard to the origin of this pollution (man-made or natural). An investigation of oilfield operations was made for this study, however, the overall chloride problem is too complex to be considered in detail for this report. The U.S. Army Corps of Engineers has recently

initiated a comprehensive investigation specifically designated to locate and identify significant sources of natural salt contamination, and the Railroad Commission of Texas is continuously investigating the extent of pollution due to oilfield operations. The results of these investigations should be incorporated into the next update of the State's Continuing Planning Process.

Present municipal and industrial wastewater treatment practices in a large measure account for the relatively pollution-free condition of the Basin. All municipal wastewater plants in the Basin are designed to give secondary treatment, and about 65 percent of these plants either irrigate with all effluent, irrigate seasonably with some discharge, provide ponds for total evaporation of effluent, or sell the effluent for industrial purposes. Thus, most of the Basin cities are already meeting the national goal of no discharge of pollutants and will need only to add hydraulic capacity in conjunction with acceptable operation and maintenance procedures to maintain this status. Less than one third of the 98 industrial operations with wastewater permits are permitted to make discharges to surface waters, and only 65 percent of these recorded a stream discharge during the period of study.

Anticipated Future Water Quality Problems.

Water quality problems from municipal sewage discharges will follow the pattern of population growth. The Austin area is projected to experience most of the Basin population growth and will thus require the greatest investment to prevent future problems. The Midland-Odessa area is also a high-growth area, but few problems are expected since wastewater is not discharged to surface streams. As treatment plant effluent requirements become more stringent over time, the effects of storm runoff will have a much more apparent effect on surface water quality. Potential problems from storm runoff have been identified for the cities of Austin, San Angelo, and Brownwood. High population growth rates, particularly for Austin, will compound whatever pollution is presently contributed from these sources.

At this time the water in the Highland Lakes above Austin is of good quality, but steps must be taken to control existing and future sources of pollution. The major increase in population in this area will occur adjacent to the lakes where numerous lakeside developments are in existence. These developments are projected to have substantial population increases. Many of the homes adjacent to the lakes are not

permanent homes but are second homes occupied during weekends, summer months, or for vacations. People are attracted to this area for recreation and retirement; therefore, the water quality of the lakes is of the utmost importance. The lakes are also a source of municipal drinking water and are used extensively for direct contact recreation.

The major water quality problem in the Highland Lakes area is one of possible septic tank contamination. The absence of central sewage systems make septic tanks a necessity, and the residents are concerned about pollution of shallow water well supplies used for each residence since the underlying granite rock makes the cost of deep wells almost prohibitive. There are indications that septic tank absorption fields are not operating properly due to the low permeability (0.20 to 0.63 inches per hour) of this area. The rise in coliform bacteria in the lakes which has been experienced is an indication of future problems.

Due to the septic tank problems and the importance of the lakes to the area, this study recommends the construction of collection and treatment systems for areas adjacent to the Highland Lakes. All recommended treatment plant designs for this area utilize secondary treatment and use of chlorinated effluent for irrigation of golf courses, parks and agriculture or tertiary treatment with a high chlorine residual before discharge to surface waters.

SECTION IV - ALTERNATIVES

When the Plan of Study was coordinated with and accepted by the Governor's Planning Committee in May 1972, one of the conditions for EPA certification was that the plans developed would conform to the joint EPA-HUD "Water Quality Management Planning Guidelines," dated January 1971. Under those guidelines, consideration and evaluation of various alternatives were required in Basin planning. Those alternatives are briefly discussed below:

a. Treatment of the Wastewater. This alternative considers the different methods of treating the wastewater before it enters the receiving surface water or ground water.

b. Relocation of Discharge Points. This alternative considers relocating discharge points to take advantage of unused stream assimilative capacity. This would also consist of regionalization of treatment facilities.

c. Diversion from Basin. This alternative considers exporting wastewater to an adjacent Basin.

d. Flow Regulation. This alternative considers release of reservoir water during periods of low natural river flow to dilute or disperse wastewaters which would be continually entering the river.

e. In-stream Modification. This alternative considers in-stream aeration and mixing by mechanically adding to the supply of oxygen available in the receiving stream, for waste stabilization.

f. Water Reuse. This alternative considers reuse of wastewaters for industrial or agricultural purposes.

g. Control of Wastewater Quantities Through Zoning and/or Planned Growth Both for Type and Amount of Expansion. This alternative considers zoning or planned growth for controlling the quantity and quality of wastewater originating from specific areas.

h. Combinations of the above. This alternative consists of combinations of any one alternative with one or more other alternatives.

Consideration of these alternatives resulted in the following findings:

1. Relocating wastewater discharge points to take advantage of unused stream assimilative capacity would violate the policy of the State of Texas on non-degradation of existing stream quality. The Diversion from Basin alternative was considered not desirable in terms of water quality enhancement or economics. Transfer of pollution problems from one Basin to another is not a solution to water quality objectives. In-stream Modification proved infeasible because of the prohibitive cost and its undesirability from several aesthetic standpoints. The reuse of untreated wastewater is not compatible with the policies of the State of Texas unless the wastewater is treated in accordance with the regulations of the Texas State Department of Health.

2. The enactment of PL 92-500 brought about an entirely new concept across the nation to eliminate all pollution of the nation's waters. Provisions of this law ruled out all alternatives that had been previously considered with the exception of the Treatment of Wastewater alternative, which is the only condition that meets the intent of the new law in relation to the control of domestic and industrial point sources of wastes. The combination of treatment with reuse or regionalization is considered as a treatment alternative, since treatment is the most essential component of the combinations. The control of wastewater quantities by zoning and/or planned growth is now part of the plan preparation, in accordance with 40 CFR Part 131 and is therefore not considered a Basin Plan alternative.

3. Based on the preceding evaluation, the treatment alternative, Alternative A, was selected for implementing the water quality requirements of PL 92-500. Different types of treatment systems such as biological systems, physical/chemical systems, and land disposal systems in combination with biological secondary systems or physical/chemical secondary systems were considered for domestic and industrial point sources of wastes. An evaluation of these treatment alternatives is shown in Table 1.

TABLE 1

EVALUATION OF TREATMENT ALTERNATIVES

Elements	Advanced Biological Systems			Physical/Chemical Systems			Land Disposal Systems
	Secondary	Best Practicable	Best Available	Secondary	Best Practicable	Best Available	No Discharge of Critical Pollutants
A. Environmental Quality							
1. Water Resource							
a. Effluent Quality	Approximately 90% removal of BOD and SS.	Approximately 95% removal of BOD and SS. Some removal of nutrients.	Approximately 98% removal of BOD and SS. High removal of nutrients.	Approximately 90% removal of BOD and SS.	Approximately 95% removal of BOD and SS. Some removal of nutrients.	Approximately 98% removal of BOD and SS. High removal of nutrients.	Of very high quality. Accomplishes no discharge objective. Recoverable waters suitable for M&I use.
b. Groundwater	Nitrates could detrimentally affect groundwater quality.	Suitability for higher uses negates recharge probability.	Suitability for higher uses negates recharge probability.	Nitrates could detrimentally affect groundwater quality	Suitability for higher uses negates recharge probability.	Suitability for higher uses negates recharge probability.	Positive recharge potential. Nitrates removed by plant uptake and/or percolation.
c. Streamflow (assuming discharges)	Degradation of stream quality. Possible eutrophic conditions.	Slight degradation of stream quality.	Acceptable for discharge. No degradation of stream quality.	Degradation of stream quality.	Slight degradation of stream quality.	Acceptable for discharge. No degradation of stream quality.	Reduction of stream flow possible. Flows from percolation or underdrains would not degrade stream quality.
2. Air Resource	Possible odors from primary and secondary processes.	Possible odors from primary and secondary processes.	Possible odors from primary and secondary processes.	Slight odors. Less than biological systems.	Slight odors. Less than biological systems.	Slight odors. Less than biological systems.	Aerosol potential small. Possible slight odors at secondary process.
3. Land Resource	Acreage requirements small relative to influent volume. Plant siting and zoning characteristics.	Acreage requirements small relative to influent volume. Plant siting and zoning characteristics.	Acreage requirements small relative to influent volume. Plant siting and zoning characteristics.	Acreage requirements small relative to influent volume. Plant siting and zoning characteristics.	Acreage requirements small relative to influent volume. Plant siting and zoning characteristics.	Acreage requirements small relative to influent volume. Plant siting and zoning characteristics.	Large acreages required for long periods of time. Potential reclaiming of semi-arid land. Increased productivity.

TABLE 1 (Cont'd.)

Elements	Advanced Biological Systems			Physical/Chemical Systems			Land Disposal Systems
	Secondary	Best Practicable	Best Available	Secondary	Best Practicable	Best Available	No Discharge of Critical Pollutants
A. Environmental Quality (Cont'd.)							
4. Biological							
a. Zoological	Usually little effect because systems sited near urban areas.	Usually little effect because systems sited near urban areas.	Usually little effect because systems sited near urban areas.	Usually little effect because systems sited near urban areas.	Usually little effect because systems sited near urban areas.	Usually little effect because systems sited near urban areas.	Could alter wildlife habitat characteristics causing movement of certain species (i.e., deer) if irrigation lands not currently available.
b. Botanical	Small effect on area adjacent to plant sites other than site preparation. Nutrients reaching stream could cause increase in aquatic plants.	Small effect on area adjacent to plant sites other than site preparation. Reduction of nutrients to stream; therefore, less chance for eutrophic conditions.	Small effect on area adjacent to plant sites other than site preparation. High reduction of nutrients; therefore, slight chance for eutrophic conditions.	Small effect on area adjacent to plant sites other than site preparation. Nutrients reaching stream could cause increase in aquatic plants.	Small effect on area adjacent to plant sites other than site preparation. Reduction of nutrients to stream; therefore, less chance for eutrophic conditions.	Small effect on area adjacent to plant sites other than site preparation. High reduction of nutrients; therefore, slight chance for eutrophic conditions.	If not currently irrigating, could require extensive clearing of land. Possible conversion of natural vegetation to crops or pasture lands.
5. Geological	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	Could affect rate of recharge of groundwater.
B. Social							
1. Manpower	Additional personnel may be required. Skilled operators may be available locally.	Additional personnel may be required. Highly skilled technical personnel may not be available locally.	Additional personnel may be required. Highly skilled technical personnel may not be available locally.	Additional personnel may be required. Skilled operators may be available locally	Additional personnel may be required. Highly skilled technical personnel may not be available locally.	Additional personnel may be required. Highly skilled technical personnel may not be available locally.	

TABLE 1 (Cont'd.)

Elements	Advanced Biological Systems			Physical/Chemical Systems			Land Disposal Systems
	Secondary	Best Practicable	Best Available	Secondary	Best Practicable	Best Available	No Discharge of Critical Pollutants
B. Social (Cont'd.)							
2. Aesthetics	System location usually affects direction of residential growth. System could achieve aesthetic harmony by physical or vegetative screening.	System location usually affects direction of residential growth. System could achieve aesthetic harmony by physical or vegetative screening.	System location usually affects direction of residential growth. System could achieve aesthetic harmony by physical or vegetative screening.	System location usually affects direction of residential growth. System could achieve aesthetic harmony by physical or vegetative screening.	System location usually affects direction of residential growth. System could achieve aesthetic harmony by physical or vegetative screening.	System location usually affects direction of residential growth. System could achieve aesthetic harmony by physical or vegetative screening.	System location could affect direction of urban growth. Could be used as a buffer or green belt.
3. Historical, Archeological and Cultural	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.	Any effects are dependent on recommended site. Specific investigations required prior to site selection. Care should be taken due to numerous known sites in Basin.

TABLE 1 (Cont'd.)

Elements	Advanced Biological Systems			Physical/Chemical Systems			Land Disposal Systems
	Secondary	Best Practicable	Best Available	Secondary	Best Practicable	Best Available	No Discharge of Critical Pollutants
B. Social (Cont'd.)							
4. Public Health	Acceptable MPN levels on all biological agents with exception of some viruses.	Acceptable MPN levels on all biological agents with exception of some viruses.	Acceptable MPN levels on all biological agents with exception of some viruses.	Acceptable MPN levels on all biological agents plus some deactivation of viruses.	Acceptable MPN levels on all biological agents plus some deactivation of viruses.	Acceptable MPN levels on all biological agents plus some deactivation of viruses.	Acceptable MPN levels on all biological agents plus total deactivation of viruses.
5. Political Acceptability	System presently utilized in most areas. No change from current State policy.	Degree of technical sophistication may require more intergovernmental coordination.	Degree of technical sophistication may require more intergovernmental coordination.	System not utilized in most areas, but acceptable in meeting current water quality objective.	System not utilized in most areas, but acceptable in meeting current water quality objective.	System not utilized in most areas, but acceptable in meeting current water quality objective.	System presently utilized in many areas. Acceptable to most Basin entities, especially in upper (semi-arid) Basin.
C. Economic Development	Additional employment required. Initiate proper management of resource.	Increase in skilled employment. Increase in value of streambank property.	Increase in skilled employment. Potential for industrial and/or municipal reuse; therefore, larger revenue potential. Increase water contact recreational opportunity. Increase in value of streambank property.	Additional employment required. Initiate proper management of resource.	Increase in skilled employment. Increase in value of streambank property.	Increase in skilled employment. Potential for industrial and/or municipal reuse; therefore, larger revenue potential. Increase water contact recreational opportunity. Increase in value of streambank property.	Increase in agricultural revenue per acre. Additional employment required.

TABLE 1 (Cont'd.)

Elements	Advanced Biological Systems			Physical/Chemical Systems			Land Disposal Systems
	Secondary	Best Practicable	Best Available	Secondary	Best Practicable	Best Available	No Discharge of Critical Pollutants
D. Technology							
1. Reliability and Flexibility	Generally reliable. Subject to occasional mechanical failure. Susceptible to shock or toxic loadings.	Generally reliable. Subject to occasional mechanical failure. Susceptible to shock or toxic loadings.	Generally reliable. Subject to occasional mechanical failure. Susceptible to shock or toxic loadings.	More reliable. Subject to occasional mechanical failure. Less susceptible to shock or toxic loadings. Adjustments in treatment processes readily accomplished.	More reliable. Subject to occasional mechanical failure. Less susceptible to shock or toxic loadings. Adjustments in treatment processes readily accomplished.	More reliable. Subject to occasional mechanical failure. Less susceptible to shock or toxic loadings. Adjustments in treatment processes readily accomplished.	Requires constant hydraulic infiltration. Finite renovation capacity of soil (life span). May require holding facilities during wet or cold weather.
2. Construction Effects	Temporary disruption. May change access to open spaces, resources and service. Disruption of traffic patterns and existing activities. Noise and dust from construction activities.	Temporary disruption. May change access to open spaces, resources and service. Disruption of traffic patterns and existing activities. Noise and dust from construction activities.	Temporary disruption. May change access to open spaces, resources and service. Disruption of traffic patterns and existing activities. Noise and dust from construction activities.	Temporary disruption. May change access to open spaces, resources and service. Disruption of traffic patterns and existing activities. Noise and dust from construction activities.	Temporary disruption. May change access to open spaces, resources and service. Disruption of traffic patterns and existing activities. Noise and dust from construction activities.	Temporary disruption. May change access to open spaces, resources and service. Disruption of traffic patterns and existing activities. Noise and dust from construction activities.	Possible disruption of rural setting, destruction of botanical elements and alteration of wildlife habitat.
E. Institutional Arrangements	No problems under recommended Institutional Arrangements.	No problems under recommended Institutional Arrangements.	No problems under recommended Institutional Arrangements.	No problems under recommended Institutional Arrangements.	No problems under recommended Institutional Arrangements.	No problems under recommended Institutional Arrangements.	No problems under recommended Institutional Arrangements.

TABLE 1 (Cont'd.)

Elements	Advanced Biological Systems			Physical/Chemical Systems			Land Disposal Systems
	Secondary	Best Practicable	Best Available	Secondary	Best Practicable	Best Available	No Discharge of Critical Pollutants
F. Resource Conservation	Small commitment of nonrenewable resources. Energy requirements for pumping, blowers, etc. are function of influent volume.	Small commitment of nonrenewable resources. Energy requirements for pumping, blowers, etc. are function of influent volume.	Small commitment of nonrenewable resources. Energy requirements for pumping, blowers, etc. are function of influent volume.	Chemical requirements would commit large quantities of nonrenewable resources. Total energy requirements higher than for biological systems.	Chemical requirements would commit large quantities of nonrenewable resources. Total energy requirements higher than for biological systems.	Chemical requirements would commit large quantities of nonrenewable resources. Total energy requirements higher than for biological systems.	Large land areas committed for long periods of time. Very high energy requirements for pumping, transmission, etc. Possible destruction of vegetation if irrigation not presently used.

SECTION V - ENVIRONMENTAL CONSIDERATIONS

Background Conditions.

The Colorado River crosses eight vegetative zones from the Southern High Plains in the upper Basin to the Coastal Prairies along the Gulf. Endangered plant species include six woody plant species, thirteen grasses and three forbes. Suitable habitat is provided for approximately 30 different animal species including deer, javelina, antelope, furbearers, squirrel, quail, turkey and dove. The known range of at least four rare and endangered mammals includes portions of the Colorado River Basin.

A diversified fish population can be found in the perennial streams and in deep pools where streamflows are low or non-existent. Several varieties of bass, catfish, sunfish, and crappie provide fishing opportunities wherever suitable water habitat is found. Tributaries popular for fishing include the branches of the Concho, the San Saba and the Llano Rivers. Many lakes, including E. V. Spence, San Angelo and the Highland Lakes are also used for recreational fishing. Three fishes are included in the tentative draft of "Rare and Endangered Texas Fishes." Instances of fish kills have been reported, with the most lethal being caused by an accidental discharge of insecticide near Austin.

Birds within the Colorado River Basin are also a diversified resource. Of significance are the estimated 500,000 waterfowl that annually pass through the Basin on their migration routes. The known range of many rare and endangered birds includes portions of the Colorado River Basin. Of particular interest is the Golden-Cheeked Warbler, a bird that builds its nest from the bark of the Ashe Juniper tree. Extensive land clearing has jeopardized the habitat of this bird.

Reptiles and amphibians are numerous within the Basin. A remnant population of alligators is found in the lower Basin in Hays and Colorado counties. Rare and endangered species include the American alligator, Houston toad, and the Texas blind salamander.

The Colorado River Basin has not yet been comprehensively surveyed and studied for archeological and historical sites. It has, in the past, yielded evidence of highly significant prehistoric and historic sites from nearly 1300 locations. Archeological sites in the Basin are predominately located near streams or rivers, indicating the value of water in previous cultures.

Evidence of the recreational use of the Basin's waters can be found in many forms; stream standards which designate recreation use for all segments in the Basin, increasing sales and rentals of boats and canoes, and State studies which indicate the potential for inclusion of a section of the Colorado River in a Statewide system of recreational waterways. Eleven State parks and numerous local parks are also found in the Basin.

Environmental Assessment of Basin Plan.

Implementation of the recommended Basin Plan will maintain existing Basin quality and result in improved water quality as more advanced treatment facilities are constructed to meet future discharge permit requirements. Since specific remedial measures are recommended for storm runoff or mineral salt pollution, stream and lake quality will be limited by these sources until such time as economical solutions can be found.

An evaluation of the environmental effects at and near the site of wastewater treatment facilities is summarized in Table 1. Since site locations are not identified in the Basin Plan, only representative effects are shown.

SECTION VI - PLAN IMPLEMENTATION

Implementation and Updating Responsibility.

Within the State of Texas, the agency or designated representative which holds responsibility for implementation and updating of water quality management plans is the TWQB. The State Continuing Planning Process was developed to satisfy the requirements of Section 303(e) of PL 92-500. The process will (1) provide for preparation of water quality management plans for all waters within the State; (2) establish phasing of plans to be developed during the period from June 1973 through June 1975; (3) provide a method of coordination of the State's Water Quality Management Plan with related State or local comprehensive plans or programs, including land uses and natural resources planning activities; (4) provide for coordination with neighboring States for planning concerning interstate streams; and (5) provide for the expansion of the existing water quality management program.

Funding.

It appears that Federal grant support for the construction of treatment plants will be centralized in the EPA. PL 92-500 directs and authorizes the EPA to provide grants for the construction of wastewater treatment plans, including interceptors, outfalls, and collector systems. The amount of the grant can be up to 75 percent of the construction costs as approved by the EPA. The Texas Water Development Board has the authority to provide State revenue bonds for water quality enhancement. This financial assistance is provided through loans effected by the Water Development Board's purchase of bonds issued by the borrowing political subdivisions. The main provisions are that the bonds must have a maturity date not exceeding 40 years from the date of issuance, and they must bear an interest rate equivalent to the weighted average interest rate on all bonds previously sold to obtain money for the Water Quality Enhancement Fund, plus one-half of one percent. Such financial assistance from the State can be extended only when the political subdivision cannot reasonably finance the project without State assistance.

Alternatives.

The following alternatives for implementation of the plans were evaluated:

Institutional alternative 1. The TWQB coordinates implementation of the plan directly with individual public agencies, with provision for regional implementation agencies if feasible in the future. This is the current situation, with the option of expanding existing agency jurisdictions and/or functions in the future.

Institutional alternative 2. The TWQB coordinates implementation with a compact authority consisting of the Lower, Central and Upper Colorado River Authorities and the Colorado River Municipal Water District. The compact would perform all wastewater functions of existing Basin organizations. Legislation would be required.

Institution alternative 3. The TWQB coordinates implementation with one of the river authorities to implement the plan for the entire Basin. This alternative would also require extensive legislation to expand present boundaries and/or authority of an existing agency.

Institutional alternative 4. The TWQB coordinates implementation with a compact composed of two major water districts in the Basin: the Lower Colorado River Authority and the Colorado River Municipal Water District.

Institution alternative 5. The TWQB coordinates the implementation functions through the Councils of Government in the Basin: South Plains Association of Governments; Permian Basin Regional Planning Commission; West Central Texas Council of Governments; Concho Valley Council of Governments; Central Texas Council of Governments; Alamo Area Council of Governments; Capital Area Planning Council; Houston-Galveston Area Council; and Middle Rio Grande Development Council.

Conclusions and Recommendations.

Alternative 1 was recommended to be the institutional arrangement for implementation of the plan. Specifically, the TWQB will function as the agency with sole responsibility for updating the Colorado River Wastewater Management Study on an annual basis as a minimum. Implementation of the proposals contained herein is also the overall responsibility of the TWQB. Understanding that it is the immediate responsibility of local Governments to implement such construction needs as will bring them

into compliance with the PL 92-500, it is the TWQB which has final responsibility for the quality of the water resource. Details of institutional arrangements, full discussion, and comparison of alternatives are in Volume 4 of the Basin Plan.

SECTION VII - CONCLUSIONS AND RECOMMENDATIONS

Conclusions.

PL 92-500 provided the overall guidance and objectives for this study and the Basin water quality plan recommended by the study participants. Objectives and goals of the law which are particularly applicable to the Basin Plan are paraphrased as follows:

Section 101. The objective of the law is to restore and maintain the nation's waters. It is the national goal that the discharge of pollutants be eliminated by 1985 and that, wherever attainable, an interim goal of water quality for propagation of fish and shellfish and for recreation in and on the water be achieved by 1983.

Section 301. Effluent limitations for public point sources shall be secondary treatment by 1977 and best practicable for non-public point sources unless more stringent measures are required to meet stream standards. Not later than 1983, public point sources treatment shall employ the best practicable treatment and non-public point sources shall provide the best available treatment. Provision is made for review and appropriate revision every five years.

Section 303 of the law requires establishment of a State Continuing Planning Process which, under proposed rules of the EPA, will consist of an annual State strategy, individual basin plans, an annual program plan. and reports which measure program performance. Basin plans such as the one presented in this report, are required as a minimum to provide: classification of stream segments as either water quality segments or effluent limiting segments; segment ranking; discharger rankings; a residual waste disposal plan; a monitoring plan; information regarding non-point sources; water quality standards to set effluent limitations and schedules of compliance at least as stringent as those required by Sections 301, 306, and 207; maximum daily loads for pollutants where effluent limitations of Section 301 will not achieve stream standards; and contain an inventory and ranking, in order of priority, of needs for construction of waste treatment works required to meet requirements for a phased improvement in effluent quality as specified in Sections 301 and 302. The Basin Plan has been developed with this phased objective for improvement in water quality in mind and also with the intention that the eventual water quality strategy will include the national goal of no discharge of pollutants into navigable waters.

It is concluded that the adoption of this Basin Plan (Summary Report, Volumes 1, 2, 3 and 4) will meet the requirements of the existing laws for the enhancement and preservation of the quality of the Colorado River Basin streams and lakes, and will conform to the national goal of no discharge of pollutants into navigable waters.

Recommendations.

Use of the Basin Plan to provide guidance for the State pollution control programs requires the inclusion of recommendations on administrative matters such as priorities, schedules and monitoring programs as well as for construction of physical measures to abate or prevent pollution. The major recommendations are therefore summarized below:

a. Classification of stream segments provided by the TWQB is shown in Table 2. Most of the water quality segments shown on these exhibits are recommended for reclassification to effluent limiting. No evidence was found that stream standards could not be met for stream segments so reclassified. Table 3 is the segment ranking as developed by the TWQB. This ranking of segments was based on noncompliance and the degree of noncompliance of instream water quality with the respective proposed standards for the segment. The parameters used for ranking were pH, Total Dissolved Solids, Dissolved Oxygen, water use, population affected, and classification of the segment (water quality with data, water quality without data, effluent limitation). The two priority segments in the Basin are Pecan Bayou below Brownwood since under low flow conditions the flow is primarily treated sewage effluent and Lake J. B. Thomas since it is the primary source of surface water in the upper portion of the Basin.

b. Discharger rankings by stream segment and for the Basin and State as supplied by the TWQB are shown in Tables 4 and 5. Ranking of dischargers within the segment was based on their respective magnitude or contribution of the discharge to the total load(s) discharged to the segment. BOD loading and BOD concentration were the primary parameters used to rank municipal dischargers. Industrial dischargers were ranked using the following parameters: BOD loading, BOD concentration, COD loading, COD concentration and pH. The Statewide ranking reflects both quality and quantity of discharge as well as the stream conditions of the receiving segment.

TABLE 2

SEGMENT DESIGNATION AND CLASSIFICATION[1]
COLORADO RIVER BASIN

SEGMENT NO.	DESCRIPTION	APPROXIMATE LENGTH OF SEGMENT[2] (river miles)	CLASSIFICATION[4] W.Q.	E.L.
1401	Colorado River Tidal	22.8	X	
1402	Colorado River – above tidal to Tom Miller Dam, including Town Lake	274.8	X	
1403	Lake Austin	20.4	X[3]	
1404	Lake Travis	63.8	X[3]	
1405	Lake Marble Falls	6.2		X
1406	Lake Lyndon B. Johnson	21.4	X[3]	
1407	Inks Lake	4.2	X[3]	
1408	Lake Buchanan	17.4	X[3]	
1409	Colorado River – Lake Buchanan headwater to San Saba River confluence	48.8		X
1410	Colorado River – San Saba River confluence to E.V. Spence Reservoir (Robert Lee Dam)	236.3	X	
1411	E. V. Spence Reservoir	31.7		X
1412	Colorado River – FM 2059 near Silver to Lake J. B. Thomas (Colorado River Dam)	89.2	X	
1413	Lake J. B. Thomas	57.2	X	
1414	Pedernales River	123.2		X
1415	Llano River	110.62		X
1416	San Saba River	168.0		X
1417	Pecan Bayou – Colorado River confluence to Lake Brownwood Dam	57.0	X	
1418	Lake Brownwood	n.a.	X[3]	
1419	Lake Coleman	n.a.	X[3]	
1420	Pecan Bayou – above Lake Brownwood	n.a.	X[3]	
1421	Concho River – Colorado River confluence to fork in San Angelo, including South Fork to Lake Nasworthy Dam and North Fork to San Angelo Reservoir Dam	75.5		X
1422	Lake Nasworthy	6.1		X
1423	Twin Buttes Reservoir	17.6	X[3]	
1424	South and Middle Concho Rivers – above Twin Buttes Reservoir	73.8		X
1425	San Angelo Reservoir	13.7	X[3]	

[1] *Provided by the Texas Water Quality Board.*

[2] *In the case of reservoirs, length refers to old river channel.*

[3] *So classified due to lack of sufficient data.*

[4] *W.Q.–Water Quality Limited; E.L.–Effluent Limitation.*

TABLE 3

RANKING OF SEGMENTS
COLORADO RIVER BASIN

SEGMENT NO.	DESCRIPTION	RANKING	
		BASIN	STATE[1]
1417	Pecan Bayou – Colorado River confluence to Lake Brownwood Dam	1	15
1413	Lake J. B. Thomas	2	46
1402	Colorado River – above tidal to Tom Miller Dam, including Town Lake	3	56
1401	Colorado River Tidal	4	63
1412	Colorado River – FM 2059 near Silver to Lake J. B. Thomas (Colorado River Dam)	5	71
1420	Pecan Bayou – above Lake Brownwood	6	78
1410	Colorado River – San Saba River confluence to E. V. Spence Reservoir (Robert Lee Dam)	7	87
1404	Lake Travis	8	115
1403	Lake Austin	9	137
1408	Lake Buchanan	10	138
1407	Inks Lake	11	139
1406	Lake Lyndon B. Johnson	12	140
1419	Lake Coleman	13	144
1418	Lake Brownwood	14	145
1425	San Angelo Reservoir	15	146
1423	Twin Buttes Reservoir	16	147
1416	San Saba River	17	213
1415	Llano River	18	226
1405	Lake Marble Falls	19	240
1414	Pedernales River	20	249
1411	E. V. Spence Reservoir	21	265
1409	Colorado River – Lake Buchanan headwater to San Saba River confluence	22	266
1422	Lake Nasworthy	23	272
1424	South and Middle Concho Rivers – above Twin Buttes Reservoir	24	273
1421	Concho River – Colorado River confluence to fork in San Angelo, including South Fork to Lake Nasworthy Dam and North Fork to San Angelo Reservoir Dam	25	274

[1] *Source: TWQB computer printout entitled "Segment Ranking Report" dated May 14, 1973.*

TABLE 4

RANKING OF DISCHARGERS WITHIN SEGMENTS[1]

SEGMENT NUMBER	MUNICIPAL NAME	MUNICIPAL WCO NUMBER	INDUSTRIAL NAME	INDUSTRIAL WCO NUMBER
1401	No permitted discharges in segment.		1. CELANESE CHEMICAL CO.	00455-01
1402	1. AUSTIN (Govalle Plant)	10543-03	GIFFORD-HILL & CO., INC.[2]	01328-01
	2. COLUMBUS	10025-01	JOHN ROBERTS, INC.[2]	01258-01
	3. DEVELOPMENT ASSOC., INC.	11191-01	CAPITOL AGGREGATES, INC.[2]	00487-01
	4. AUSTIN-HORNSBY BEND PLANT	10543-04		
	5. ELGIN	10100-01		
	6. COLORADO CO. WC&ID No. 2 (Garwood)	10152-01		
	7. MANOR	11003-01		
	8. AUSTIN (Walnut Creek Plant)	10543-11		
	9. BASTROP	11076-01		
	10. GIDDINGS (South Plant)			
	11. WEIMAR	10311-01		
	12. LA GRANGE	10019-01		
	13. ELLINGER SEWER & WATER SUPPLY CORP.	10945-01		
	14. FAYETTEVILLE	10840-01		
	15. COUNTRY AIR, INC.	11040-01		
	16. SCENIC BROOK WEST, INC.	11021-01		
	17. GIDDINGS STATE BOYS SCHOOL	10456-03		
	WHARTON[2]	10381-01		
	SMITHVILLE[2]	10286-01		
1403	No known discharges in segment.		No permitted discharges in segment.	
1404	1. LAKEWAY MUD No. 1	10531-01	LONE STAR INDUSTRIES[2]	00641-01
1405	1. MARBLE FALLS WCID No. 1 (Marble Falls)	10654-02	No permitted discharges in segment.	
1406	No permitted discharges in segment.		No permitted discharges in segment.	
1407	No permitted discharges in segment.		SOUTHWESTERN GRAPHITE CO.[2]	00350-01
1408 & 1409	No permitted discharges in segments.		No permitted discharges in segments.	
1410	1. BALLINGER	10325-01	No permitted discharges in segment.	
	2. BANGS	10122-01		
	3. SANTA ANNA	10274-01		
	4. WINTERS	10320-01		
1411	No permitted discharges in segment.		No permitted discharges in segment.	
1412	1. MIDLAND (Main Plant)	10223-01	No permitted discharges in segment.	
	2. ODESSA	10238-01		
	3. BIG SPRING	10069-01		
	4. COLORADO CITY	10077-01		
	5. LORAINE	10430-01		
	6. SNYDER	10056-01		
	7. MIDLAND (Airport Plant)	10223-02		
1413	No permitted discharges in segment.		No permitted discharges in segment.	
1414	1. FREDERICKSBURG	10171-01	No permitted discharges in segment.	
1415	1. LLANO	10209-01	THE PACKS CORPORATION[2]	01391-01
	MASON[2]	10870-01		
1416	1. MENARD	10345-01	No permitted discharges in segment.	
	2. BRADY	10132-01		
1417	1. BROWNWOOD (Main Plant)	10565-01	ATCHISON, TOPEKA & SANTA FE RAILROAD YARD[2]	00739-01
	BROWNWOOD (Airport Plant)[2]	10565-02		
1418 & 1419	No permitted discharges in segments.		No permitted discharges in segments.	
1420	1. COLEMAN	10150-01	No permitted discharges in segment.	
	2. CLYDE	10149-01		
	CROSS PLAINS[2]	10434-01		
1421	MILES[2]	10138-01	No permitted discharges in segment.	
1422 – 1425	No permitted discharges in segments.		No permitted discharges in segments.	

[1] *Source: TWQB computer printout entitled "Discharger Ranking within Segment" dated May 15, 1973.*

[2] *Permitted dischargers, supposedly currently discharging, which were not ranked at this time due to insufficient Self-Reporting Data, no Self-Reporting Data, etc.*

TABLE 5

BASIN AND STATEWIDE RANKING OF DISCHARGERS

NAME	WCO	SEGMENT NO.	RANKING BASIN	RANKING STATE[1]
MUNICIPAL				
MIDLAND, City of (Main Plant)	10223-01	1412	1	34
COLEMAN, City of	10150-01	1420	2	36
AUSTIN, City of (Govalle Plant)	10543-03	1402	3	39
ODESSA, City of	10238-01	1412	4	44
COLUMBUS, City of	10025-01	1402	5	56
AUSTIN, City of (Hornsby Bend Plant)	10543-04	1402	6	69
DEVELOPMENT ASSOCIATES, INC.	11191-01	1402	7	77
COLORADO CO. WCID No. 2 (Garwood)	10152-01	1402	8	113
ELGIN, City of	10100-01	1402	9	115
MANOR, City of	11003-01	1402	10	136
BROWNWOOD, City of (Main Plant)	10565-01	1417	11	161
BIG SPRING, City of	10069-01	1412	12	170
AUSTIN, City of (Walnut Creek Plant)	10543-11	1402	13	192
BASTROP, City of	11076-01	1402	14	193
GIDDINGS, City of (South Plant)	10456-02	1402	15	204
BALLINGER, City of	10325-01	1410	16	269
WEIMAR, City of	10311-01	1402	17	271
BANGS, City of	10122-01	1410	18	275
LA GRANGE, City of	10019-01	1402	19	289
COLORADO CITY, City of	10077-01	1412	20	340
SANTA ANNA, City of	10274-01	1410	21	349
LORAINE, City of	10430-01	1412	22	355
SNYDER, City of	10056-01	1412	23	412
CLYDE, City of	10149-01	1420	24	432
ELLINGER SEWER & WATER SUPPLY CORP.	10945-01	1402	25	452
FAYETTEVILLE, City of	10840-01	1402	26	466
WINTERS, City of	10320-01	1410	27	475
COUNTRY AIR, INC.	11040-01	1402	28	481
MIDLAND, City of (Airport Plant)	10223-02	1412	29	530
LAKEWAY MUD No. 1 (Inn & Marina)	10531-01	1404	30	609
SCENIC BROOK WEST, INC.	11021-01	1402	31	610
GIDDINGS STATE BOYS SCHOOL	10456-03	1402	32	664
MENARD, City of	10345-01	1416	33	760
LLANO, City of	10209-03	1415	34	962
BRADY, City of (Main Plant)	10132-01	1416	35	975
MARBLE FALLS WCID No. 1 (Marble Falls)	10654-02	1405	36	1018
FREDERICKSBURG, City of	10171-01	1414	37	1028
INDUSTRIAL				
CELANESE CHEMICAL COMPANY	00455-01	1401	1	235

[1] *Source: TWQB computer printout entitled "Statewide Ranking of Dischargers" dated May 15, 1973.*

c. Recommended permit requirements and compliance schedules for permit holders to meet stream standards and 1977 effluent objectives (at least secondary treatment for public facilities and best practical for non-public facilities) are shown in Tables VIII-4 to VIII-24 in Volume 1. Proposed NPDES Permit levels were established from EPA and State guidelines, with the more stringent requirement for each parameter being used. No permit conditions are shown for effluent used for land treatment except where the land treatment site is open to the public, such as golf courses and parks. In all cases the land treatment systems will have to meet the Texas State Department of Health regulations, so as to not pollute ground or surface water or cause a public health problem. Use of secondary treated effluent for irrigation is well known in Texas and the Texas State Department of Health, is well experienced in its regulation.

Compliance dates were determined by the city's Basin ranking and the time needed for construction. In all cases, the controlling date was to finish construction by 1 July 1977. The estimated construction cost for the metro areas were the costs of a plan chosen by city officials from at least nine alternatives on a basis of total present worth, political and social acceptability and quality of effluent. The plan for the non-metro towns was the most cost-effective of at least two alternatives. These plans have all been presented to the city or the Council of Governments.

New plants will be constructed on an as-needed basis as determined by the TWQB. Non-point sources of pollution are recognized and further study is recommended for control and treatment of storm runoff from the cities of Austin, San Angelo, and Brownwood. Studies are also recommended to isolate the sources of salt pollution in the upper Basin and to investigate solutions for its reduction or elimination.

d. Control of residual waste from municipal, industrial and other water or wastewater treatment or processing is recommended through the issuance of waste control orders by the TWQB and through its control of industrial and commercial solid waste disposal under the Solid Waste Disposal Act. Waste control orders and registration of industrial solid waste disposal sites will contain provisions that will require disposal in such a manner as to prevent entry of such waste into surface or ground waters. Enforcement of these provisions by the TWQB is now being practiced and will be continued.

e. Construction need codes utilized in the report are summarized in Table 6. Recommendations for construction of cost-effective public treatment facilities phased to meet the objectives of the law are shown in Tables 7, 8, and 9. The first four Basin 1977 construction priorities were determined by the State and the rest were determined on the basis of type of construction required (upgrade existing plant, expansion of plant, replace plant, etc.), discharge location (type of segment, segment ranking) and method of disposal (discharge or no discharge). The costs were determined the same as with the compliance schedule costs. The construction of facilities as shown is the alternative strategy recommended. Treatment plant discharge conditions which reflect alternatives selected by individual municipalities during the course of this study are shown below. This tabulation gives an indication of the number of cities (number in right-hand column) which can meet the 1985 national goal at an earlier date by eliminating discharge to surface waters.

	Number of Municipalities	
Objective or Goal	Treat and Discharge to surface waters	Treat and Irrigate or reuse by industry
1977 (Secondary)	58	66
1983 (Best Practical)	46	78
1985 (No Discharge of Pollutants Goal)	46	78

Members of the Governor's Planning Committee, including the agency having primary responsibility for water quality planning and enforcement for the State of Texas (the TWQB), have recommended that this Basin Plan be adopted as the water quality management plan for the Colorado River Basin, Texas. This recommendation is contained in the Planning Committee letter dated 17 August 1973 and bound at the front of this volume.

TABLE 6

CONSTRUCTION NEED CODE
for
PRIORITY LISTING TABLES

A. Construct conventional secondary facilities.

B. Modify existing secondary facilities.

C. Expand existing secondary facilities.

D. Initiate year-round irrigation practice.

E. Expand existing irrigation operation.

F. Provide effluent to adjacent irrigated areas.

G. Construct and operate irrigation disposal facilities.

H. Modify existing irrigation operation,

I. Partial filtration, phosphorus, ammonia-nitrogen and organic nitrogen reduction.

J. Total filtration, denitrification, and further phosphorus reduction.

K. Continue total irrigation.

L. Regionalized treatment.

M. Total filtration, phosphorus, ammonia-nitrogen and organic nitrogen reduction.

N. Denitrification and further phosphorus reduction.

P. Filtration.

Q. Construct conventional secondary facilities with total filtration.

R. Nitrification, denitrification and phosphorus reduction.

TABLE 7

BASINWIDE PRIORITY LISTING AND CONSTRUCTION NEEDS INVENTORY

1977 Objective

City or Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
San Angelo	1	A,K	$2,150,000	New 7.36 MGD secondary activated sludge unit to replace existing plant.
Goldthwaite	2	A,K	193,100	New 0.2 MGD secondary biological plant to replace existing plant.
Mertzon	3	A	76,000	New 0.05 MGD secondary biological plant.
LaGrange	4	A	358,500	Abandon the existing facility and construct a 0.50 MGD secondary activated sludge plant.
Brownwood	5	B,G	1,499,000	$300,000 renovation of existing system and a 520 acre irrigation system costing $1,199,000
Wharton	6	B,G	803,400	Addition of a parallel 0.3 MGD activated sludge secondary unit and the construction of an 189 acre irrigation facility to treat the effluent from the combined plants.
Ballinger	7	B,G	380,000	Renovation of the existing facility and the addition of a clarifier, chlorinator, preaerator and a 69 acre irrigation facility.
Austin Williamson Creek	8	C	121,600	Expansion of the 3.0 MGD secondary facility to a 4.5 MGD secondary facility.
Johnson City	9	B	42,300	Clean and repair Imhoff tank, drain and excavate oxidation ponds and fence the area.
Cross Plains	10	A,G	239,000	New 0.125 MGD secondary biological plant to replace the existing plant.
Big Spring Trickling Filter	11	C	1,118,000	Modification and expansion of existing 2.8 MGD trickling filter secondary treatment facility to a 3.5 MGD activated sludge secondary treatment facility.
Winters	12	A,K	223,000	New 0.25 MGD secondary activated sludge unit to replace existing plant.

TABLE 7 (Cont'd.)

City of Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
Austin				
Walnut Creek	13	A	$5,587,200	New 18.0 MGD secondary activated sludge plant.
Lakeway Area	14	A,K	639,900	New 1.1 MGD secondary biological regional plant to serve the Lakeway area and possibly the Hurst Creek area.
Point Venture	15	A,K	157,560	New .150 MGD secondary biological plant and abandon the .036 MGD plant in existence.
Lago Vista	16	A,G	846,000	New 1.0 MGD secondary biological plant and an irrigation system to further treat the effluent.
Denver City				
North Plant	17	B,K	54,200	Construct new primary settling pond and additional 2.8 acres oxidation ponds.
South Plant	18	B	61,500	Additional sludge drying beds and additional 4.5 acres oxidation ponds.
Seagraves	19	B,D	275,900	Replace existing 0.35 MGD Imhoff tank with new 0.35 MGD primary clarifier and digestion facilities.
Stanton	20	B,K	34,100	Replace existing 0.20 MGD Imhoff tank with a new 0.26 MGD preliminary treatment and digestion facilities additional 2.0 acres of oxidation ponds.
Coahoma	21	B,K	10,700	Additional 0.5 acre oxidation pond.
Plains	22	B,D	17,600	Additional 1.0 acre oxidation pond.
Sundown	23	B,K	12,930	Construct new preliminary treatment facilities for existing 0.14 MGD secondary facility.
Meadow	24	B,D	5,100	Construct new preliminary treatment facilities for existing 0.05 MGD secondary facilities.
Bastrop	25	A	358,500	New 0.50 MGD secondary activated sludge facility utilizing some of the existing components.
Pflugerville	26	A	109,620	New 0.09 MGD secondary biological plant and a 12.5 acre irrigation system.
Dripping Springs	27	A	95,200	New 0.07 MGD secondary biological plant.
Smithville	28	A	358,500	Abandon existing plant and construct a 0.50 MGD secondary activated sludge plant.

TABLE 7 (Cont'd.)

City or Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
Carmine	29	A	$ 76,000	New 0.05 MGD extended aeration secondary plant.
Odessa	30	C	1,116,000	Expansion of existing 6.0 MGD activated sludge facility to a 10.0 MGD activated sludge secondary treatment facility.
Bangs	31	A	157,000	New 0.19 MGD secondary biological plant to replace existing *Imhoff tank*.
Eagle Lake	32	G	228,200	Construction of an irrigation facility on 92 acres of land since the existing plant's effluent will not be suitable for 1977 requirements.
Elgin	33	G	244,600	Construction of an irrigation facility on 82 acres of land since the existing plant's effluent will not be suitable for 1977 requirements.
Weimar	34	G	116,300	Construction of an irrigation facility on 41 acres of land since the existing plant's effluent will not be suitable for 1977 requirements.
Volente Area	35	Q	276,000	New 0.26 MGD secondary biological plant and new 0.26 MGD filtration plant.
Jonestown	36	Q	191,000	New 0.15 MGD secondary biological plant and new 0.15 MGD filtration plant.
Hudson Bend	37	Q	162,500	New 0.12 MGD secondary biological plant and new 0.12 MGD filtration plant.
Manor	38	G	29,140	Construct irrigation facility on leased land in lieu of new STP.
Windy Point Area	39	Q	190,700	Construct new 0.15 MGD secondary biological plant and new 0.15 MGD filtration plant.
Trails End Road Area	40	Q	90,400	Construct new 0.05 MGD secondary biological plant and new 0.05 MGD filtration plant.
Bee Creek–West Area	41	Q	97,680	Construct new 0.055 MGD secondary biological plant and new 0.055 MGD filtration plant.
Bee Creek–East Area	42	Q	97,680	Construct new 0.055 MGD secondary biological plant and new 0.055 MGD filtration plant.

TABLE 7 (Cont'd.)

City or Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
Old Ferry Road Area	43	Q	$ 90,500	Construct new 0.05 MGD secondary biological plant and new 0.05 MGD filtration plant.
Garwood	44	G	44,000	Construction of an irrigation facility on eight acres of land since the existing plant's effluent will not be suitable for 1977 requirements.
Gloster Bend Area	45	Q	112,000	Construct new 0.07 MGD secondary biological plant and new 0.07 MGD filtration plant.
Spicewood Beach Area	46	Q	104,920	Construct new 0.06 MGD secondary biological plant and new 0.06 MGD filtration plant.
Buffalo Gap Area	47	Q	72,300	Construct new 0.03 MGD secondary biological plant and new 0.03 MGD filtration plant.
Therman Bend Area	48	Q	72,300	Construct new 0.03 MGD secondary biological plant and new 0.03 MGD filtration plant.
Marshall Ford Area	49	Q	97,600	Construct new 0.055 MGD secondary biological plant and new 0.055 MGD filtration plant.
Cox Hollow Area	50	Q	83,200	Construct new 0.04 MGD secondary biological plant and new 0.04 MGD filtration plant.
Fredericksburg	51	C	358,500	Expand existing facilities by construction of a 1.0 MGD parallel contact stabilization unit.
Snyder	52	G	330,000	Construct a 158 acre irrigation facility.
White Bluff Area	53	Q	247,400	Construct new 0.22 MGD secondary biological plant and new 0.22 MGD filtration plant.
Buchanan Dam Area	54	Q	147,000	Construct new 0.10 MGD secondary biological plant and new 0.10 MGD filtration plant.
Loraine	55	G	61,000	Construct a 15 acre irrigation facility.
Spider Mountain Area	56	Q	168,980	Construct new 0.125 MGD secondary biological plant and new 0.125 MGD filtration plant.

TABLE 7 (Cont'd.)

City or Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
Tow	57	Q	$ 110,840	Construct new 0.07 MGD secondary biological plant and new 0.07 MGD filtration plant.
Wirth Haven Cove	58	Q	126,460	Construct new 0.08 MGD secondary biological plant and new 0.08 MGD filtration plant.
Negrohead Area	59	Q	125,250	Construct new 0.08 MGD secondary biological plant and new 0.08 MGD filtration plant.
Alexander Branch Area	60	Q	77,200	Construct new 0.036 MGD secondary biological plant and new 0.036 MGD filtration plant.
Maxwells Slough Area	61	Q	83,200	Construct new 0.04 MGD secondary biological plant and new 0.04 MGD filtration plant.
Jackers Cove Area	62	Q	83,200	Construct new 0.04 MGD secondary biological plant and new 0.04 MGD filtration plant.
Rocky Point Area	63	Q	56,530	Construct new 0.02 MGD secondary biological plant and new 0.02 MGD filtration plant.
Lion Mountain Area	64	Q	60,270	Construct new 0.023 MGD secondary biological plant and new 0.023 MGD filtration plant.
Clyde	65	G	89,000	Construct a 30 acre irrigation facility.
North Inks Lake Area	66	Q	105,000	Construct new 0.06 MGD secondary biological plant and new 0.06 MGD filtration plant.
Sherwood Shores Granite Shoals	67	Q	469,300	Construct new 0.55 MGD secondary biological plant and new 0.55 MGD filtration plant.
Kingsland	68a	Q	429,120	Construct new 0.50 MGD secondary biological plant and new 0.50 MGD filtration plant.
Kingsland Lake Area	68b	Q	191,000	Construct new 0.15 MGD secondary biological plant and new 0.15 MGD filtration plant.
Sunrise Beach	69	Q	336,000	New 0.35 MGD contact stabilization plant, advanced treatment facility, standby power generator and lift station.
Santa Anna	70	G	91,000	Construct a 29 acre irrigation facility.

TABLE 7 (Cont'd.)

City or Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
Backbone Mountain South Area	71	Q	$ 147,000	Construct new 0.10 MGD secondary biological plant and new 0.10 MGD filtration plant.
Sandy Creek Area	72	Q	147,000	Construct new 0.10 MGD secondary biological plant and new 0.10 MGD filtration plant.
Dry Creek	73	Q	147,000	Construct new 0.10 MGD secondary biological plant and new 0.10 MGD filtration plant.
Backbone Mountain North Area	74	Q	112,000	Construct new 0.07 MGD secondary biological plant and new 0.07 MGD filtration plant.
Walnut Creek	75	Q	104,920	Construct new 0.06 MGD secondary biological plant and new 0.06 MGD filtration plant.
Williams Creek	76	Q	112,000	Construct new 0.07 MGD secondary biological plant and new 0.07 MGD filtration plant.
Murchison	77	Q	63,960	Construct new 0.025 MGD secondary biological plant and new 0.025 MGD filtration plant.
Haywood	78	Q	69,900	Construct new 0.03 MGD secondary biological plant and new 0.03 MGD filtration plant.
Hoovers Valley	79	Q	57,810	Construct new 0.02 MGD secondary biological plant and new 0.02 MGD filtration plant.
Sterling City	80	A	95,500	Construct a new 0.106 MGD secondary biological plant.
Brownfield	81	A,K	627,500	Construct new 1.0 MGD activated sludge secondary plant.
Sand Springs	82	L,K	326,970	Regionalization with the Coahoma STP, consisting of force main system to Coahoma, and addition of a 0.12 MGD biological secondary treatment plant at Coahoma.
Rockspring	83	A	157,600	Construct a new 0.15 MGD secondary biological plant.
Lake Brownwood State Park	84	H	5,000	Increase the 0.3 acre spray irrigation field to 2.0 acres.
Marble Falls	85	A	44,500	Addition of a 0.23 MGD filtration plant.

TABLE [illegible]

[illegible] Area	Basin Priority	Construction Need Code	Construction Need Cost	[illegible]
[illegible]tonwood Shores	86	Q	$ 178,600	Construct new 0.15 MGD se[illegible] 0.15 MGD filtration plant.
Lometa	87	A	76,000	Construct a new 0.05 MGD secondary biolo[illegible]
[illegible] Richland Springs	88	D	22,500	Construct a storage lagoon for irrigation system.
Goldsmith	89	A	103,700	Construct a new 0.08 MGD biological secondary plant.
Garden City	90	A	74,700	Construct a new 0.03 MGD biological secondary plant and 1.0 acre holding pond.
Miles	91	G	8,100	Modification and a 1.3 acre expansion of the existing ponds and the addition of a 3.0 acre irrigation facility.
Whiteface	92	G	24,220	Construct new chlorination facilities for existing 0.075 MGD secondary treatment plant and new plastic lining for existing 3.0 acre oxidation pond.

TABLE 7 (Cont'd.)

City or Area	Basin Priority	Construction Need Code	Construction Need Cost	Type of Facility
Cottonwood Shores	86	Q	$ 178,600	Construct new 0.15 MGD secondary biological plant and new 0.15 MGD filtration plant.
Lometa	87	A	76,000	Construct a new 0.05 MGD secondary biological plant.
Richland Springs	88	D	22,500	Construct a storage lagoon for irrigation system.
Goldsmith	89	A	103,700	Construct a new 0.08 MGD biological secondary plant.
Garden City	90	A	74,700	Construct a new 0.03 MGD biological secondary plant and 1.0 acre holding pond.
Miles	91	G	8,100	Modification and a 1.3 acre expansion of the existing ponds and the addition of a 3.0 acre irrigation facility.
Whiteface	92	G	24,220	Construct new chlorination facilities for existing 0.075 MGD secondary treatment plant and new plastic lining for existing 3.0 acre oxidation pond.

TABLE 8

BASIN-WIDE PRIORITY LISTING
AND
CONSTRUCTION NEEDS INVENTORY

1983 Objective

City or Area	Basin Priority	Total Element Weight	Construction Need	
Austin Walnut Creek	1	73	C, I	$6,733,800
Austin Williamson Creek	2	68	A, I	4,282,000
Smithville	3	58	G	253,000
Bastrop	4	58	G	239,700
La Grange	5	58	G	225,800
Columbus	6	58	G	215,000
Pflugerville	7	58	G	32,990
Carmine	8	58	G	45,440
Dripping Springs	9	58	G	57,000
Fayetteville	10	58	G	31,600
Big Springs Trickling Filter Plant	11	54	G	1,555,000
Bangs	12	54	G	97,000
Austin-Govalle	13	53	I	3,107,400
Kingsland	14	49	R	299,000
Coleman	15	47	G	74,000
Llano	16	43	E	66,240
Volente Area	17	43	R	224,000
Rockspring	18	43	G	78,600
Jonestown	19	43	R	180,000
Hudson Bend	20	43	R	169,800
Windy Point Area	21	43	R	180,000
Trails End Road Area	22	43	R	121,000
Bee Creek - West Area	23	43	R	126,500
Bee Creek - East Area	24	43	R	126,500
Ole Ferry Road Area	25	43	R	121,000
Gloster Bend Area	26	43	R	137,800
Spicewood Beach Area	27	43	R	131,800
Buffalo Gap Area	28	43	R	104,400
Therman Bend Area	29	43	R	104,400
Marshall Ford Area	30	43	R	126,500
Cox Hollow Area	31	43	R	115,300
Marble Falls	32	42	R	223,500

TABLE 8 (Cont'd)

City or Area	Basin Priority	Total Element Weight	Construction Need		
Fredericksburg	33	41	H	$	282,000
White Bluff Area	34	41	R		213,000
Buchanan Dam Area	35	41	R		158,800
Spider Mountain Area	36	41	R		178,500
Tow	37	41	R		137,800
Wirth Haven Cove	38	41	R		142,800
Negrohead Area	39	41	R		142,800
Alexander Branch Area	40	41	R		110,000
Maxwells Slough Area	41	41	R		115,300
Jeckers Cove Area	42	41	R		115,300
Rocky Point Area	43	41	R		91,400
Lion Mountain Area	44	41	R		93,600
North Inks Lake Area	45	40	R		131,800
Sherwood Shores Granite Shoals	46	39	R		320,000
Sunrise Beach	47	39	Q, R		616,000
Backbone Mountain South Area	48	39	R		158,800
Lometa	49	39	G		56,100
Sandy Creek Area	50	39	R		158,800
Dry Creek Area	51	39	R		158,800
Backbone Mountain North Area	52	39	R		137,800
Walnut Creek Area	53	39	R		131,800
Williams Creek Area	54	39	R		137,800
Murchison Area	55	39	R		96,800
Haywood Area	56	39	R		104,400
Hoovers Valley Area	57	39	R		91,400
Goldsmith	58	35	G		17,600
Cottonwood Shores Area	59	32	R		180,000

TABLE 9

BASIN-WIDE PRIORITY LISTING
AND
CONSTRUCTION NEEDS INVENTORY
NO DISCHARGE OF POLLUTANTS
OBJECTIVE

City or Area	Basin Priority	Total Element Weight	Construction Need	
Austin				
Govalle	1	53	N	$2,623,000
Walnut Creek	2	53	N	2,733,100
Williamson Creek	3	53	N	2,678,200