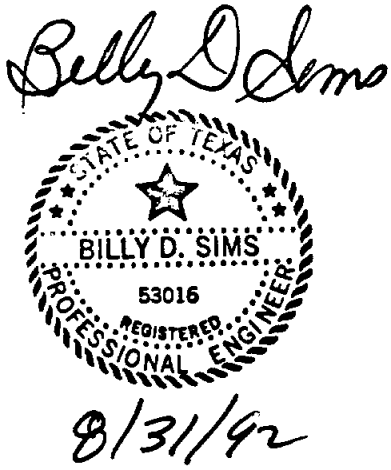
ANGELINA AND NECHES RIVER AUTHORITY

WATER CONSERVATION PLAN

August 1992



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INTRODUCTION

In order to ensure a reliable potable water source to the public in a cost effective method, several entities within Nacogdoches County approached the Angelina and Neches River Authority (ANRA) asking them to provide a study of the possible solutions to meet regional water needs. These sixteen political entities would like to know if the public interest would be served by a consolidation of efforts and resources within the county. As a part of these efforts undertaken by ANRA, the following information was developed:

A. existing water use data

B. projected future water use

C. suggested water supply alternatives

D. possible funds available for regional water concepts

E. the best method for administration and control of any regional water project.

As part of this study and recognizing the need to conserve the existing water resources and prepare for any unforeseen water shortfall created by an unusual demand, ANRA decided to prepare and adopt an official Water Conservation and Drought Contingency Plan. Also, the possible need for funding a regional water project through financial assistance from the Texas Water Development Board or Water Loan Assistance Fund necessitates the adoption and implementation of a water conservation and drought contingency plan. These requirements were set forth in the 69th Texas Legislature in 1985 by House Bill (HB) 2 and Joint Resolution (HJR) 6. The Texas voters approved an

amendment to the constitution on November 5, 1985.

PURPOSES AND GOALS

Any political sub-division wishing to gain loan assistance to construct a regional water project must implement an approved water conservation and drought contingency plan. The development of this plan was begun with the purpose of gaining approval of the plan as soon as possible in order to facilitate any water supply projects that might be developed as a result of the regional water study.

This plan when adopted by ANRA and the owners and/or operators of the regional water project will serve as an example for all political sub-divisions that participate in the regional water project through the purchase of water.

In addition, the goals of this plan are outlined below:

1. To comply with guidelines set forth by the Texas Water Development Board and the Texas Water Commission for water conservation and drought contingencies.
2. To establish achievable goals for long term per capita water use reduction, specifically to reduce the per capita water use 7.5% by 2000, 12.5% by 2010 and 15% for 2020.
3. To provide practical ideas for the reduction of water consumption under everyday conditions.
4. To develop a plan that will ensure water conservation and preservation of water resources.

5. To outline steps to deal with possible water shortage conditions of varying degrees.

UTILITY INFORMATION

There are presently no public water suppliers operating under the proposed regional concept in Nacogdoches County. As part of the investigation of alternatives for developing a regional water supply, the participants will determine the agency which could best administer the project. This agency may be one of the existing entities or one as yet unformed. Regardless, the utility information for the controlling agency is not available under the regional concept. However, a survey and compilation of the participants data is provided below. A comprehensive evaluation will be conducted after a project and the participants are identified. Appendix A includes a detailed break down of population and water use estimates for the different entities involved in the regional water study. A summary of that information, along with preliminary projected population and water use figures, is provided below:

Year	Population	Water Use
1960	28,046	1,736,615 GPD
1970	36,362	5,099,674 GPD
1980	46,786	10,141,564 GPD
1990	54,753	11,379,843 GPD
2000	64,276	14,207,695 GPD
2010	73,580	29,062,102 GPD
2020	83,561	32,273,537 GPD

* This number incorporates 12.0 MGD included in the Texas Water Development Board projections for steam generated electricity.

PUBLIC INVOLVEMENT

The different participants each hold regularly scheduled monthly meetings. These meetings are open to the public. ANRA will take steps to ensure that the controlling agency will adopt this policy of open meetings. These meetings allow the public to express their concerns and influence the decision making process.

ANRA will encourage and support the formation of Neighborhood Involvement Committees for the individual communities. Also, they will sponsor the formation of a Regional Involvement Committee with representatives from the communities served by the regional water supply project. This committee will address the needs of the communities and help achieve the maximum benefit for the residents from capital improvements.

WATER CONSERVATION PLAN

EDUCATION AND INFORMATION:

ANRA will promote water conservation by providing information to the public concerning ways to conserve water. They will prepare a monthly newspaper advertising program in the area newspapers which will educate individual water users in water saving methods. ANRA will also recommend activities to promote public awareness of the water conservation programs among those who might not read the newspaper. These activities may include:

1. An initial fact sheet, newsletter or other correspondence explaining the new water conservation and drought contingency programs.

2 .Two mail-outs, bill stuffers, door hangers, door-to-door distributions or other direct distributions of written water conservation material.

3. One other educational activity, such as (a) direct distribution of material, (b) a school education program, (c) printing water conservation tips on water bills at least quarterly, (d) a public speaking program for civic groups or (e) another activity that provides information directly to the public.

In addition to the newspaper articles, ANRA may develop and provide at least one additional literature item annually. This item could be provided to all customers, including those who do not receive the local newspaper.

In addition, ANRA could provide information about water conservation and drought contingency programs to all new customers when they apply for service.

SUGGESTED WAYS TO SAVE WATER:

A. **Bathroom:**

1. Take a shower instead of filling the tub and taking a bath. Showers usually use less water than tub baths.

2. Install a low-flow shower head which restricts the quantity of flow at 60 psi to no more than 3.0 gallons per minute.

3. Take short showers and install a cutoff valve or turn the water off while soaping and back on again only to rinse.

4. Do not use hot water when cold will do. Water and energy can be saved by washing hands with soap and cold water; hot water should only be added when hands are especially dirty.

5. Reduce the level of the water being used in a bathtub by one or two inches if a shower is not available.

6. Turn water off when brushing teeth until it is time to rinse.

7. Do not let the water run when washing hands. Instead, hands should be wet, and water should be turned off while soaping and scrubbing and turned on again to rinse. A cutoff valve may also be installed on the faucet.

8. Shampoo hair in the shower. Shampooing in the shower takes only a little more water than is used to shampoo hair during a bath and much less than shampooing and bathing separately.

9. Hold hot water in the basin when shaving instead of letting the faucet continue to run.

10. Test toilets for leaks. To test for a leak, a few drops of food coloring can be added to the water in the tank. The toilet should not be flushed. The customer can then watch to see if the coloring disappears in the bowl within a few minutes. If it does, the fixture needs adjustment or repair.

11. Use a toilet tank displacement device. A one-gallon plastic milk bottle can be filled with stones or with water, recapped, and placed in the toilet tank. This will reduce the amount of water in the tank but still provide enough for flushing. (Bricks which some people use for this purpose are not recommended. They crumble eventually and could damage the working mechanism, necessitating a call to the plumber). Displacement devices should never be used with new low-volume flush toilets.

12. Install faucet aerators to reduce water consumption.

13. Never use the toilet to dispose of cleansing tissues, cigarette butts, or other trash. This can waste a great deal of water and also places an unnecessary load on the sewage treatment plant or septic tank.

14. Install a new low-volume flush toilet that uses 4.0 gallons or less per flush when building a new home or remodeling a bathroom.

B. Kitchen:

1. Use a pan of water (or place a stopper in the sink) for rinsing pots and pans and cooking implements when cooking rather than turning on the water faucet each time a rinse is needed.

2. Never run the dishwasher without a full load. In addition to saving water,

expensive detergent will last longer and a significant energy saving will appear on the utility bill.

3. Use the sink disposal sparingly, and never use it for just a few scraps.

4. Keep a container of drinking water in the refrigerator. Running water from the tap until it is cool is wasteful. Better still, save both water and energy by keeping cold water in a picnic jug on a kitchen counter to avoid opening the refrigerator door frequently.

5. Use a small pan of cold water when cleaning vegetables rather than letting the faucet run.

6. Use only a little water in the pot and put a lid on it for cooking most food. Not only does this method save water, but food is more nutritious since vitamins and minerals are not poured down the drain with the extra cooking water.

7. Use a pan of water for rinsing when hand washing dishes rather than running the faucet.

8. Always keep water conservation in mind, and think of other ways to save in the kitchen. Small kitchen savings, such as not making too much coffee or letting ice cubes melt in a sink an add up in a year's time.

C. Laundry:

1. Wash only a full load when using an automatic washing machine (automatic washers require 32 to 59 gallons per load).

2. Use the lowest water level setting on the washing machine for light loads whenever possible.

3. Use cold water as often as possible to save energy and to conserve the hot water for uses which cold water cannot serve. (This is also better for clothing made of today's synthetic fabrics.)

D. **For Appliances and Plumbing:**

1. Check water requirement of various models and brands when considering purchasing any new appliance that uses water. Some use less water than others.

2. Check all waterline connections and faucets for leaks. If the cost of water is $2.00 per 1,000 gallons, one could be paying a large bill for water that simply goes down the drain because of leakage. A slow drip can waste as much as 170 gallons of water **EACH DAY**, or 5,000 gallons per month, and can add as much as $10.00 per month to the water bill.

3. Learn to replace faucet washers so that drips can be corrected promptly. It is easy to do, costs very little, and can represent a substantial savings in plumbing and water bills.

4. Check for water leakage that the customer may be entirely unaware of, such as a leak between the water meter and the house. To check, turn off all indoor and outdoor faucets. If the water meter continues to run or turn, a leak probably exists and needs to be located.

5. Insulate all hot water pipes to avoid the delays (and wasted water) experienced while waiting for the water to "run hot".

6. Be sure the hot water heater thermostat is not set too high. Extremely hot settings waste water and energy because the water often has to be cooled with cold

water before it can be used.

7. Use a moisture meter to determine when house plants need water. More plants die from over-watering than from being on the dry side.

E. **Out-of-Door Use:**

1. Water lawns early in the morning during the hotter summer months. Much of the water used on the lawn can simply evaporate between the sprinkler and the grass.

2. Use a sprinkler that produces large drops of water, rather than a fine mist, to avoid evaporation.

3. Turn soaker hoses so the holes are on the bottom to avoid evaporation.

4. Water slowly for better absorption, and never water in high winds.

5. Forget about watering the streets or walks or driveways. They will never grow a thing.

6. Condition the soil with compost before planting grass or flower beds so that water will soak in rather than run off.

7. Fertilize lawns at least twice a year for root stimulation. Grass with a good root system makes better use of less water.

8. Learn to know when grass need watering. If it has turned a dull grey- green or if footprints remain visible, it is time to water.

9. Do not water too frequently. Too much water can overload the soil so that air cannot get to the roots and can encourage plant diseases.

10. Do not over-water. Soil can absorb only so much moisture and the rest simply runs off. A timer may help, and either a kitchen timer or an alarm clock will do.

An inch and one-half of water applied once a week will keep most Texas grasses alive and healthy.

11. Operate automatic sprinkler systems only when the demand on the town's water supply is lowest. Set the system to operate between four and six a.m.

12. Do not scalp lawns when mowing during hot weather. Taller grass holds moisture better. Rather, grass should be cut fairly often, so that only 1/2 to 3/4 inch is trimmed off. A better looking lawn will result.

13. Use a watering can or hand water with the hose in a small area of the lawn that need more frequent watering (those near walks or driveways or in especially hot, sunny spots).

14. Learn what types of grass, shrubbery, and plants do best in the area and in which parts of the lawn, and then plant accordingly. If one has a heavily shaded yard, no amount of water will make roses bloom. In especially dry sections of the state, attractive arrangements of plants that are adapted to arid or semi-arid climates should be chosen.

15. Consider decorating areas of the lawn with rocks, gravel, wood chips, or other materials now available that require no water at all.

16. Do not "sweep" walks and driveways with the hose. Use a broom or rake instead.

17. Use a bucket of soapy water and use the hose only for rinsing when washing the car.

PLUMBING CODES:

ANRA will encourage the adoption of standard plumbing codes, such as the guideline standards published by the Texas Water Development Board or the Standard Plumbing Code (1988 Edition) which regulate plumbing standards. ANRA will encourage a program for all service taps to be constructed by water supply personnel, They will also encourage a program requiring all new customers to submit data on water using devices that will be installed in proposed buildings. As a minimum, the plumbing fixtures should meet the following standards:

Tank-type toilets	- No more than 4.0 gallons per flush
Flush valve toilets	- No more than 4.0 gallons per flush
Tank-type urinals	- No more than 1.5 gallons per flush
Flush valve urinals	- No more than 1.5 gallons per flush
Shower heads	- No more than 3.0 gallons per minute
Lavatory and kitchen faucets	- No more than 3.0 gallons per minute
All hot waterlines	- Insulated
Swimming pools	- New pools must have recirculating filtration equipment

A service tap should not be provided to anyone who does not meet these requirements. ANRA will encourage all participants to amend the Plumbing Code to require 1.6 gallon per flush toilets in all new construction by 1995.

RETROFIT PROGRAM:

ANRA will encourage customers in existing buildings which do not have water saving devices to replace their old plumbing fixtures. An advertising program will help inform them of the advantages of installing water saving devices. ANRA will encourage local plumbing and hardware stores to stock retrofit devices and fixtures.

ANRA will prepare a program to ensure that existing customers and new water customers moving into existing homes are provided with a retrofit kit if the home has not been previously retrofitted. These retrofit kits will include as a minimum: a low-flow showerhead, a low-flow bathroom faucet aerator, a toilet dam and information on water conservation.

WATER RATE STRUCTURES:

ANRA will discourage any pricing structure that decreases the selling price of water as volume increases. ANRA will encourage a water rate structure which promotes further water conservation, such as a rate structure which includes existing rates with excess use fees. Because of the large variety of water users in the region, an excess use standard should be set up for each type of building to keep the system fair. A different excess use limit could be set up based upon the following:

A. Houses - based on number of bedrooms

B. Condominiums - number of each - 1, 2, and 3 bedrooms

C. Hotels - number of rooms

D. Restaurants and Clubs - square footage

E. Industrial - same for all industrial

F. Commercial - same for all commercial

When a customer applies for a tap, the excess use limit can be identified based on the above guidelines. Existing service connections will need to be identified on an individual basis to determine their excess use limit.

A study should be done to establish what the excess use limits would be for each type of customer. This study is important to keep the billing system fair. This study should be conducted as soon as a project and the participants are identified.

METERING:

The regional public water suppliers currently meter approximately 92% of the water used. ANRA will promote guidelines and a policy of testing all meters which appear to have abnormally high or low water usage. Incorporated in the Water Conservation Plan, ANRA will promote the following meter testing schedule:

A. Production meters - test once a year

B. Meters larger than 1" - test once a year

C. Meters 1" and smaller - test every ten years

ANRA will encourage and assist in the establishment of programs that identify any high or low rate users, and keeps track of all water use.

WATER CONSERVATION LANDSCAPING:

ANRA will encourage developers to plant low water using plants and grasses. The advertising program will include suggestions on landscaping and irrigation procedures which will save water and money. ANRA will encourage local nurseries, landscaping supply businesses and landscaping professionals to promote the use of water conserving landscaping techniques. ANRA will encourage water conserving landscaping practices in municipal and county areas where possible. Excess use fees are one way to encourage customers to save water outdoors. ANRA will encourage all participants to adopt an ordinance requiring all automatic landscape irrigation systems to be designed, installed and managed in accordance with the minimum water conservation standards established by the Texas Turf Irrigation Association.

LEAK DETECTION AND REPAIR:

Distribution system losses are defined as the difference between water production from well and treated water sources and the sum of all metered sales. These losses are primarily attributable to the following sources: 1) pipe losses due to leaking joints and broken mains; 2) unmetered supply points; 3) losses through fire hydrants as the result of periodic line flushing or fires; 4) the inaccuracies in metering devices. The current distribution losses for the participating water purveying entities of Nacogdoches County are estimated to be 20%.

ANRA will encourage the entities to establish or expand their leak detection programs to include:

A. Monthly water use accounting which compares water sales with water production, determining distribution system losses.

B. Monitoring water storage to identify abnormal reductions in water level, which could be caused by main breaks.

C. Visual inspection of water main easements and right-of-ways by meter readers and employees for conditions indicating leaks.

D. An adequate maintenance staff which is available to repair leaks.

RECYCLING AND REUSE:

ANRA will promote ways to recycle the wastewater effluent within the region. They will assist in identifying projects, such as municipal or county irrigation, as a means to recycle the wastewater treated within the area.

INDUSTRIAL:

ANRA will encourage industries to participate in water conservation efforts. Areas of conservation which will be stressed include:

A. Setting conservation goals.

B. Implementing conservation practices and procedures.

C. Investing in facilities improvements which will increase industrial water conservation.

IMPLEMENTATION AND ENFORCEMENT:

ANRA will encourage that the Water Conservation Plan be enforced. The water suppliers could enforce the plan by the following methods:

A. Service taps could be refused to customers who do not meet the requirements of water conservation plumbing standards. (Employees of the water suppliers could be used to ensure that the plumbing fixtures that are proposed in the service tap application are installed in new buildings.)

B. Excess use fees should encourage replacing old plumbing fixtures which use large amounts of water. People will realize that replacing their fixtures will save them money on their water bill.

REPORTING:

Any project that receives loan assistance through the Texas Water Development Board or Water Loan Assistance Fund must submit an annual report to the Texas Water Development Board within sixty (60) days after the anniversary date of the loan closing. This report will address water conservation programs as follows:

1. Implementation status
2. Public response
3. Quantitative effectiveness
4. Identification of political subdivisions that contract for water from the TWDB funded project that have adopted water conservation plans as part of contract provisions with the project owner during the preceding year.

CONTRACTS WITH OTHER POLITICAL SUBDIVISIONS:

Any and all political subdivisions contracting for water from the owner of a project funded through the Texas Water Development Board must either:

1. Adopt the provisions of the owner's water conservation and drought contingency plan, or

2. Have a plan in effect that has been approved by the Texas Water Development Board. This plan must contain the same or similar water conservation provisions adopted by the owner.

DROUGHT CONTINGENCY PLANS

TRIGGER CONDITIONS:

Critical to the effectiveness of any drought contingency plan is the successful prediction of the onset of a drought. The following trigger conditions indicate when drought contingency measures will be put into effect. Trigger conditions will be set for mild, moderate, and severe conditions.

A. Mild Drought:

1. Average daily water use exceeds 90% of the system capacity for three (3) consecutive days.

B. Moderate Drought:

1. Average daily water use reaches system capacity for three (3) consecutive days.

2. Net storage in water reservoirs is continually decreasing on a daily basis such that a more serious problem may develop.

C. Severe Drought:

1. The imminent or actual failure of a major component of the system which would cause an immediate health or safety hazard.

2. Water demands exceed the system's capacity on two (2) consecutive days.

3. Water is being pumped from storage reservoirs and all replenishment of storage has stopped.

Prior to the completion of any regional water supply project, an agency will be identified that will be responsible for operating and maintaining that project. The available information does not currently allow the estimation or calculation of trigger conditions. As part of the operations plan, the controlling agency will identify the conditions at which water deliveries will be reduced in response to drought conditions.

DROUGHT CONTINGENCY MEASURES:

The owner will adopt a plan in which water can be partially or totally restricted as necessitated by the emergency.

A. A STEP I curtailment will restrict the use of water for outdoor sprinkling, watering of lawns, shrubs, driveways and washing automobiles within the region to certain days and to certain hours. These restrictions will remain in effect until the

emergency condition has passed. The lawn watering schedule could be limited to certain days and times, such as:

> On the odd dates of the month houses with odd numbered addresses will be allowed to water their lawns. On the even dates of any month the even numbered addresses will be allowed to water their lawns. Lawn watering will be allowed only between the hours of 4:00 AM and 8:00 AM or between the hours of 6:00 PM and 9:00 PM.

In addition, ANRA will discourage the waste of water. "Water waste" is defined as: (a) permitting water from landscape irrigation or other use to escape into gutters, ditches, streets, sidewalks and other surface drains; (b) failure to promptly repair a controllable leak due to defective plumbing after it is discovered; (c) recreational use of faucets, hoses and hydrants; and (d) other obviously wasteful uses.

B. A STEP II curtailment will totally ban the use of water for outdoor sprinkling, watering lawns, shrubs, driveways and washing automobiles. These restriction will remain in effect until the ban is lifted.

C. The restrictions will be initiated by a notice of curtailment to the communities within the region, the posting of a notice of curtailment, and notifying the news media of the restrictions.

D. The ban will be terminated by a notice of termination as is done for the initiation of the curtailment.

E. The owner can amend, add, or delete any of these rules and regulations and shall notify the public at its regular meeting of these amendments, additions, or

deletions. Exceptions may include, but are not limited to: (a) health and safety uses of water; (b) commercial businesses that use water to maintain (but not expand) their primary business practices (e.g., commercial car and truck washes, nurseries, turf growers, water hauler, etc.); (c) public gardens and arboretums of national, state or regional significance where necessary to preserve specimens; and (d) watering at a minimum rate necessary to establish or maintain revegetation or landscape plantings required pursuant to law or regulation.

F. ANRA will encourage the political sub-divisions to adopt ordinances to ensure compliance with the rules and regulations governing drought conditions, and to establish penalties for non-compliance to include fines, imprisonment or both. In addition to the existing Drought Contingency Plan, ANRA will promote the adoption of the following drought contingency measures:

A. Mild Drought Contingency Measures:

1. Notify the public of a mild drought by posting notices and notifying news media of the drought condition.

2. Recommendation that water users look for ways to conserve water.

3. Advise the public of the "Trigger Conditions" daily.

B. Moderate Drought Contingency Measures:

1. Inform the public as mentioned above.

2. Enact the STEP I curtailment.

3. Advise the public of the "Trigger Conditions" daily.

C. Severe Drought Contingency Measures:

1. Inform the public as mentioned above.

2. Enact the STEP II curtailment.

3. Prohibit certain industrial and commercial water users which are not essential to the health and safety of the community from using water.

4. Advise the public of the "Trigger Conditions" daily.

INFORMATION AND EDUCATION:

Once "Trigger Conditions" and emergency measures have been established, the public will be informed of the conditions, and measures to be taken. The process for notifying the public includes:

A. Posting the "Notice of Drought" conditions.

B. General circulation to newspapers.

C. Notifying local radio stations.

The public will be informed about the drought contingency plan periodically through the education and information activities of the "Water Conservation Program."

TERMINATION NOTIFICATION:

Termination of the drought measures will take place when the "Trigger Condition" which initiated the drought measures have subsided, and an emergency situation no longer exists. The public will be informed of the termination of the drought measures in the same manner in which they were informed of the initiation of the drought measures.

ADMINISTRATION OF PLAN:

When the controlling agency is determined, they will be responsible for administering the drought contingency plan, and they will appoint someone to track conditions during periods of potential drought or water shortage.

DROUGHT CONTINGENCY ORDINANCE:

ANRA will encourage the political sub-divisions to adopt a standard drought contingency ordinance that (1) provides pre-assigned legal authority to implement any or all of the mandatory water use restrictions from the approved drought contingency plan whenever a specific trigger condition is reached, and (2) provides enforcement procedures and penalties for noncompliance with the restrictions. The sub-divisions need only to agree by resolution to implement the previously approved measures when an emergency occurs. Using a standard drought contingency ordinance will enable the sub-divisions to better educate the residents of actions that may be taken if an emergency occurs, thereby aiding in compliance with the restrictions if they are put into effect.

APPENDIX A

NACOGDOCHES COUNTY

WATER USE PROJECTIONS

TABLE 5

SUMMARY OF PROJECTED WATER USE
FOR NACOGDOCHES COUNTY

Year	Projected Water Use Without Water Conservation (mgd)	Projected Water Use With Water Conservation (mgd)
	AVERAGE DAY	
1990	11.38	11.38
2000	15.64	14.46
2010	17.50	15.31
2020	20.06	17.05
2040	25.83	21.05
	PEAK DAY	
1990	22.31	22.31
2000	30.23	27.96
2010	33.40	29.22
2020	36.97	31.43
2040	47.47	36.69

Notes:
1. Projections are based upon TWDB high population projections and average day per capita demands.
2. Projections do not include the projected 12.0 mgd for steam powered electricity generation.
3. Assumes 7.5% reduction due to water conservation by the year 2000, 12.5% for the year 2010, 15% for 2020, and 18.5% for 2040.