Water for People and the Environment

A Regional Conference for South Texas and the Border

Sponsored by the Lone Star Chapter of the Sierra Club, in partnership with
Christian Life Commission
Environmental Defense
League of Women Voters of Texas
Pro-Tex
National Wildlife Federation
Texas Committee on Natural Resources
Texas Impact
Texas Wildlife Association

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PROCEEDINGS
Mercedes Conference "Water for People and the Environment"
October 26, 2002

Overview: Ken Kramer, Lone Star Chapter, Sierra Club

Ken Kramer, PhD. has been director of the Lone Star Chapter of the Sierra Club since 1989. Kramer has served on an LCRA advisory committee in the development of its water management plan and was a stakeholder in the TWDB's process for developing recommendations for the state water plan. He holds a Ph.D. in political science from Rice University and a B.A. in history from Texas Lutheran University.

This conference is an activity of the Texas Living Waters Project. The project partners include National Wildlife Federation, Environmental Defense and the Lone Star Chapter of the Sierra Club.

The goals of the Texas living waters project include:

1.Ensure adequate water for people and environmental needs
2.Reduce future demand for water and foster efficient and sustainable use of current water supply
3.Educate public and decision makers about impact of wasteful water use and the opportunities for water conservation
4.Involve citizens in the decision making process for water management.

Public Outreach activities include:

1. Statewide and regional water conferences
2. National Wildlife Federation Video – "Water for Life" is available at http://www.texaswatermatters.org
3. Presentations to organizations (contact Erin or Jennifer at 512/477-1729 to set up a date)
4. Educational materials

The context of the Project and Conference includes:

1. a focus on Texas
2. a focus on water quantity
3. a linkage to state and regional water planning

Meeting Environmental Water Needs: Water for Fish & Wildlife
Moderator: Terri Morgan, Christian Life Commission

The Rev. Teri Morgan directs the Ecology and Special Projects for the Christian Life Commission, Baptist General Convention of Texas. She holds degrees from the University of Texas, Vanderbilt University, and Brite Divinity School, Texas Christian University. Her ministry at the Christian Life Commission is focused on ethical and policy concerns around environmental degradation, legislative advocacy, and social justice. She is the founder and President of Partnership for the Environment, a non-governmental international development agency. Morgan is a Partner of the National Evangelical Environmental Network and an advisory member of the Soil and Water Stewardship Committee of the National Association of Conservation Districts (USDA).

Protecting Riparian Ecosystems
David Blankinship, U.S. Fish & Wildlife Service

David Blankinship is with the U. S. Fish & Wildlife Service and is currently the senior Wildlife Biologist for the Lower Rio Grande Valley and Santa Ana National Wildlife Refuges. He has a B.S. in wildlife management from Texas A&M and a M.S. in biology from Texas A&I. David grew up in McAllen and has been working with the wildlife and wildlife habitat of South Texas and Northeastern Mexico for 46 years.

The purpose of the Lower Rio Grande Valley National Wildlife Refuge is to establish a wildlife corridor along the Rio Grande River to connect remnant tracks of habitat. River flow is essential for maintaining habitat along the Rio Grande. Water quantity is more important for the maintenance of wildlife habitat along the river than water quality.

The wild animals and plants of the Rio Grande Valley are well adapted to drought. In times of drought there are no visible signs of impacts of the drought on wildlife in the Rio Grande Valley. For example in times of drought salamanders will burrow into the ground and coat themselves with mucus to survive until the rains return. Frogs will also burrow into the ground to survive. Waterfowl will move to an area with better conditions in times of drought. To survive drought plants will go into a dormant state and will be come lush in wet years.

Long-term alterations of habitat by humans result in the most significant impacts on wildlife. Long-term alterations of habitat make it difficult for ecosystems to survive drought conditions. Brush clearing has had a major impact on the wildlife of the Rio Grande Valley. Brush clearing has resulted in isolated islands of habitat. These islands restrict wildlife movement and limit food availability for wildlife.

Falcon Dam, which has eliminated the flooding on the Rio Grande, has resulted in gradual changes in the habitat along the river. The Montezuma Cypress has had difficulty surviving the changes in the water regime. Cedar elm is also dying throughout the Rio Grande Valley due to the lowering of the water table and lack flooding.

Resacas created by past floods are now filling in with vegetation. This process creates wildlife habitat. Since flooding has been eliminated no new resacas are being created and thus the whole process of creating new habitat has been interrupted. Lack of water also makes restoration and revegetation effort difficult.

Some water conservation measures also result in the loss on wildlife habitat in the Rio Grande Valley. Land leveling eliminates small wetlands that provide habitat for birds such as stilts and avocets. True riparian habitat now only exists right along the riverbanks and resacas. Irrigation canals function as corridors of riparian habitat. Canals with riparian vegetation provide quality habitat for wildlife. Irrigation districts do not want vegetation along canals since the vegetation makes it difficult to maintain the canals. As a result irrigation districts will clear the vegetation along the canal and thus eliminate quality habitat.

Also for the purpose of water conservation irrigation districts will bury irrigation canals to eliminate seepage and evaporation. The practice of burying canals also limits riparian vegetation. The decommissioning of reservoirs such as Delta Lake also results in a loss of wildlife habitat.

Mantaining Flows in the Rio Grande
Randy Blankinship, Texas Parks & Wildlife Department, Coastal Fisheries

Randy Blankinship works as the Lower Laguna Madre Ecosystem Leader for the Coastal Fisheries Division of the Texas Parks & Wildlife Department. He has masters and bachelors degrees in Wildlife and Fisheries Sciences from Texas A&M University in College Station. Randy has expertise in marine and estuarine ecosystems of the Texas Coast and has conducted research in the Rio Grande estuary.

The Rio Grande is an important estuary since there is no estuarine habitat for 100 miles north or south of the Rio Grande. Dams and diversions have significantly reduced flows into the estuarine section of the river.

Texas Park & Wildlife Department has studied the estuarine habitat of the Rio Grande. The study used otter trawls and bag seines twice per month from 1992 through 1997. Catch rates taper off in the warmer months. Striped Mullet and Gulf menhaden were common in the cooler months when flows were high and then tapered off in the warmer months when the flows were reduced. Catch rates of most species dropped significantly after the mouth of the Rio Grande closed.

The Mouth of the Rio Grande is an important nursery area for snook, which is rare for the Texas coast. Snook catch rates dropped after the mouth of the Rio Grande closed.

The Laguna Madre & Freshwater Inflow Needs
Walter Kittelberger, Lower Laguna Madre Foundation

Walter Kittelberger has as his mission the protection and preservation of the living resources of the Lower Laguna Madre and is willing to do anything within the laws of the United States of America to achieve that goal while serving as Chairman of the Lower Laguna Madre Foundation.

Texas Commission on Environmental Quality is supposed to be the stewards of the environment but I can tell you they are not. Just look at the Arroyo Colorado it is definitely not an example of how a steward would protect the environment.

The Laguna Madre is a hyper saline estuary but nonpoint runoff and waste discharge are polluting it and decreasing its salinity. The decrease in salinity has resulted in an invasion of manatee grasses into the Laguna Madre. Waste discharge from the Arroyo Colorado is also a major problem for this resource. Laguna Madre is a productive estuary and TCEQ permits a destructive shrimp farm to be constructed near it, which will discharge more contamination into the estuary. This is unacceptable!

<u>Meeting the Water Supply Challenge in South Texas: Providing Water for People and Fish and Wildlife</u>
Moderator: Ken Kramer

Avoiding Costly Projects Through Conservation
Myron Hess
Myron Hess is Legal Counsel in the Austin office of the National Wildlife Federation, where he concentrates on protection of wetlands and water resources. Hess has worked on environmental

law in private practice and for Texas Parks and Wildlife, with a focus on water quality and endangered species protection. He is a graduate of the University of Texas Law School and Texas A&M University.

Water conservation is saving water through efficient water use. Conservation is less expensive than new projects such as dams. The three water conservation issue areas include:

1. programs (measures to save water)
2. policy (legislative and rule changes needed)
3. potential (how much can we save)

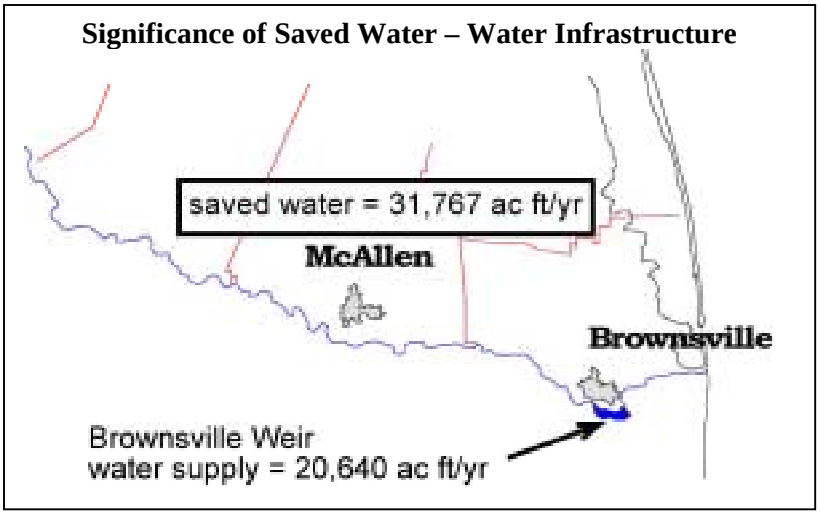
SB 1 divided the state into 16 water planning regions for the purpose of developing the State Water Plan. The regional water plans were driven by population growth. The State Water Plan projects that the Texas population will double to 40 million people in 2050.

The State Water Plan projects that irrigation water demands will decrease and municipal water demands will increase. Municipal demand growth will be enormous over the next 50 years. The current State Water Plan missed much of the potential for conservation to address these municipal water demands.

The National Wildlife Federation (NWF) studied the potential for water conservation by dividing the state into four climatic zones based upon precipitation. In the study NWF based the potential water savings on savings that resulted from water conservation measures implemented by El Paso and San Antonio, two cities located in some of the dry portions of the state. El Paso and San Antonio achieved a 37% reduction in water use through conservation measures. This 37% reduction could be achieved in other municipal areas throughout the state.

A 37% reduction in water use in Region M (South Texas) would save 32,000 acre-feet a year. A water savings of this scale would offset the need for the Brownsville Weir. The saved water could be left in the Rio Grande for fish and wildlife.

Statewide a 37% reduction in water use would result in an additional savings of 1.048 million acre-feet per year. Compare that figure to the 1.116 million acre-feet per year of water supply that would be developed with the proposed eight major dams in the State Water Plan that would cost billions of dollars. Substituting conservation programs for dam or other project construction would result in significant cost savings. Conservation is the least costly method of meeting water needs.



Agricultural Water Conservation
Eric Leigh, Texas Agricultural Extension Service

Eric Leigh has been working for the Texas Cooperative Extension in Weslaco and the Department of Agricultural Engineering of Texas A&M University since 1998. Eric has been involved in providing continuing education courses and instruction to irrigation districts here in the Valley and Texas for GIS development and database analysis. He was involved in the state water planning study for Region M, focusing on water supply issues related to agriculture and irrigation districts. He is currently working with the irrigation districts to evaluate water savings through rehabilitation. He holds a B.S. in Agricultural Systems Management from Texas A&M University.

The report titled *Potential Water Savings in Irrigated Agriculture for the Rio Grande Planning Region* was completed as a part of SB 1 regional water planning study for the Rio Grande Region (Region M) to determine the potential water savings in irrigated agriculture.

The report was authored by Guy Fipps, Professor and Extension Agricultural Engineer, Department of Agricultural Engineering, Texas A&M University.

A summary of the report is provided below.

Water Saving Potential in Irrigation Districts and On-Farm in Acre-Feet Per Year

Water Supply Condition	District Conveyance Efficiency Improvements	On-farm Practices and Methods	
		With district improvements	Without district improvements
Drought	159,631	174,537	105,029
Normal	210,944	226,178	142,852

Conveyance Efficiency Improvements are water savings from the reduction of transportation of water as well as operational and accounting water losses in irrigation districts. The improvements were calculated based on increasing conveyance efficiency from the current average of 70.8% to 90%.

On-farm Practices and Methods are water savings from the expansion of water measurements and management practices and irrigation technologies.

Other findings and conclusions are as follows.

Description of Districts

The nine largest districts (out of 28 active districts hold 72% of the 1.6 million acre-feet of agricultural water rights. The main distribution networks consist of 790 miles of canals, 124 miles of pipelines, and 76 miles of resacas. The secondary and tertiary networks consist of about 670 miles of canals and 1690 miles of pipelines. There are 552 miles of lined canals, 614 miles of unlined canals, and about 294 miles of canals with unknown lining status.

Conveyance Efficiency

The lined canals are in poor condition with an average condition rating of 6.4 on a 10-point scale. Measured seepage loss rates in 15 concrete canals were extremely high, ranging from 1.42 to 27.07

gal/ft2/day. The smaller canals had the highest seepage loss rates. The annual water loss from these canal segments range from 90 to 1220 ac-ft/mi/yr. High seepage losses in lined canals indicate that improper construction methods and materials are being used in the region, and that some districts have inadequate maintenance programs.

When classified by soil type, seepage loss rates measured in unlined canals were similar to those reported in scientific literature, and ranged from .20 to 5.84/ft2/day. The annual water loss from these canal segments ranges from 54 to 1037 ac-ft/mi/yr. There are at least 192 miles of concrete pipelines with mortar joints. Inflexible pipeline joints are likely to have high leakage rates.

Four spill loss and recovery sites were monitored and found to have spill rates ranging from 28 to 4684 ac-ft/yr. There are at least 34 major spill sites in the region.

On-farm

At least 33% of the area experiences frequent head problems, causing insufficient water volume at the field turn-out to allow for efficient furrow irrigation. Some estimates indicate that at least 50% of the area experiences occasional to frequent head problems. Currently, 54% of the water delivered in the region is under consistent water measurement or metering programs by district. On-farm, about 36% of the water applied in the region is through poly (or gated) pipe, and 30% is applied with high water management and/or improved irrigation technology.

General

Questions have been raised about the accuracy of the information districts use to estimate conveyance efficiency including metering at the river pumping plants. Uniform database formats and software are needed among districts to help support water measurement and district rehabilitation programs and to promote district accounting system modernization and integration with GIS.

To achieve the projected water savings, a comprehensive and integrated program is needed to addresses all aspects of water supply and use in districts. The Imperial Irrigation District's program with the Municipal Water District is one model to use in designing a program for the Rio Grande Planning Region.

Desalination - Unlimited Supply? A Tool in the Toolbox?
Bill Norris, NRS Consulting Services

Joseph W. (Bill) Norris, P.E. is a principal and founder of NRS Consulting Engineers. He provides water resources expertise for municipal and industrial entities throughout the Southwest, including the Rio Grande Regional Water Planning Group, and has been instrumental in the development of desalination technology in the area. He has a B.S. in Civil Engineering from Texas A&M and a M.S. in Environmental Engineering from Univ. Texas at Arlington.

Presentation Overview

1. Desalination Trends
2. Implementation Options
3. Cost Analysis

4. Implementation

Cost Factors in a desalination project include:

1. Degree of total dissolved solids
2. Power costs
3. Economies of scale
4. Location
5. Concentrate disposal

Freshwater treatment costs have increased as a result of the Clean Water Act. Brackish water costs have declined to the point that it is near the cost of treating freshwater and saltwater treatment has come down but is still higher than freshwater and brackish water treatment cost. Power costs are the most expensive

Assumptions in desalination include:

1. Facility will operate at 100% capacity
2. Brackish water averages 2,500 mg/l TDS
3. Project can be upgraded by module
4. Maintain < 500 mg/l TDS quality
5. Constant demand supplied
6. Water supply (rights) available

In the brackish reverse osmosis process inland brackish ground water is used. It can be blended with ground/surface water and has advantages over seawater. The brackish reverse osmosis process results in significant reduction in plant capital and operation and maintenance. Inland “brackish” groundwater has advantages over surface water since it is drought tolerant.

A typical water treatment plant produces half of its design capacity on any given day. A desalination/surface water plant should meet a portion of the City's base requirements, but the city will continue to use existing surface water plant to meet peak demand. Most treatment costs are fixed; the more water produced, the less the cost per gallon.

The blending of brackish water with brackish water reverse osmosis and fresh groundwater/surface water will reduce treatment costs, capital costs, and electrical costs and will increase yield. The cost estimate for brackish water reverse osmosis is $0.89 per thousand gallons.

All fresh, brackish, and salt water supplies are limited. The demand for water supplies is increasing and the supply is decreasing. We must utilize all sources within the balance of the environment and the economy. We must use diversification and conservation to need our water needs.

Luncheon Presentation: Community Organizing to Protect Water Quality
Lisa LaRocque & Alma Galvan, Project Del Rio

The purpose of Project Del Rio is to motivate students and people to be effective participants in their communities. To do this we have developed an environmental report card to determine people’s knowledge about environmental issues.

70% of those who took the environmental report card test said they knew a fair amount to a lot about environmental issues. Only 32% on average passed the report card when more detailed questions were asked about environmental issues.

When asked if laws protecting water went too far most people, especially women, thought the laws did not go far enough. Laws that protect water were very important to most people.

We have developed an environmental participation rubric to measure community participation. The rubric includes: parity of skill, depth, vision, and interdependence. Parity of skill measures how and what is done to address the problem. Depth measures how much is known about the problem. Vision measures the degree to which there is a global understanding of the problem. Interdependence measures the degree of collaboration between various groups.

These elements determine the ability of communities to address environmental problems.

The Rio Grande/Rio Bravo: Challenges & Opportunities in Water Management
Co-Moderators:
Mary Lou Campbell, Lower Rio Grande Valley Sierra Club Group
Mary Kelly, Environmental Defense

Mary Lou Campbell is an environmental activist. She has worked on a host of subjects in her adopted home of the lower Rio Grande Valley. After moving to South Padre Island in 1970, she became active in supporting the Texas Open Beaches Act. She is Coastal Coordinator for the South Padre Island and Boca Chica area of Texas for the Lone Star Chapter. She serves as Secretary for the Region M Lower Rio Grande Valley Water Planning group and Conservation Chair for the Sierra Club's Lower Rio Grande Valley Regional Group.

Mary Kelley is Senior Attorney and Program Director for U.S./Mexico Border Initiatives at Environmental Defense. Prior to joining Environmental Defense this fall she was Executive Director of the Texas Center for Policy Studies for 12 years, and before that a lawyer in private practice representing citizen groups, landowners and local governments in environmental matters. Ms. Kelly has a B.S. in Chemical Engineering and obtained her law degree from the University of Texas. She has researched and published widely on Texas/Mexico water issues.

Water Use and Allocation in the Rio Grande Basin
Carlos Rubenstein, Texas Commission on Environmental Quality

Carlos Rubenstein received his Bachelors of Science degree in Biology from the University of Texas - Pan American, specializing in Public Health issues. He joined the Texas Water Commission/Texas Natural Resource Conservation Commission Region 15 office in 1989 where he served as Regional Solid Waste, Water Quality and Emergency Response Program Manager. In 2000 he was appointed to the position of Rio Grande Watermaster what is now the Texas Commission on Environmental Quality. He is responsible for the effectiveness of the region's compliance, enforcement and monitoring activities relative to Rio Grande water rights, water use, storage accounts and assessments.

According to the Regional Water Plan over the next fifty years population will more than double and urban water needs will double. Irrigation deficits would increase by at least 30% (from 2030 to 2050). The Region M water plan assumed the compliance of Mexico with the treaty that requires Mexico to provide 350,000 acre feet of water annually to the United States from certain tributaries of the Rio Grande.

According to the 1944 Water Treaty between Mexico and the United States, there is a process for Mexico to meet its water obligations to the United States in the event of extraordinary drought or serious accident to the hydraulic systems on the measured Mexican tributaries. Minute No. 234 of the treaty states "that in the event of a deficiency in a cycle of five consecutive years in the minimum amount of water allotted to the United States from said Mexican tributaries, …the deficiency shall be made up in the following five-year cycle, together with any quantity of water which is needed to avoid a deficiency in the aforesaid cycle…"

The U.S. water balance at Amistad/Falcon is currently 28.79%. This is the lowest balance ever in October. Agriculture in the Rio Grande Valley has suffered as a result of the water debt.

The Rio Grande has a unique water rights system. Under the Rio Grande system water is a stock resource, there is no time priority, and all irrigators carry the burden of water shortage. Also under the Rio Grande system municipal water rights are separate from and superior to irrigation. Diversions must be approved by the watermaster, and a report is required within five days of end of diversion.

Water rights for the rest of Texas water is a flow resource. First in time, first in right applies. The burden of water shortage is carried by junior water rights, including municipal junior water rights. No prior approval is needed to divert water after a right is acquired, and a report on the amount of water diverted is required at the end of the year.

Recommended strategies in the regional water plan for meeting municipal water needs in the Lower Rio Grande Valley include advanced water conservation programs, diversification of municipal water supplies such and reuse of reclaimed water for non-potable sources and groundwater development. Another strategy is the acquisition of additional Rio Grande supplies, which would require a direct reduction of available irrigation water rights.

Recommended strategies for meeting irrigation needs includes improvements to water conveyance and distribution facilities, more efficient on-farm use of water, and modification to TNRCC reservoir operating rule - completed in 2001. A low estimate for irrigation conveyance improvement costs would be $204,093,000. Some key components of the irrigation infrastructure, including pumping plants and canals, are 100 years old, outdated and in need of repair.
The Mexican Water Deficit issue has raised the question of the value of water. Based on the value of crops that could be produced, Texas A&M estimates that every ac-ft of water that we apply is worth $318 in gross agricultural sales. Considering total business sales, applied irrigation water is worth $652/ac-ft and 0.02 FTE jobs per ac-ft.

What next for 2002-2003?

Projected storage balances utilizing net changes per month per account based on 1997-2000 data and September 2002 starting balances indicate that US reserves at Amistad/Falcon would begin 2003 with approximately 26% storage capacity and remain at or below 25% for the next 12 months. Previous record low for January was 32.49% (2002). More that 103,000 acres of irrigated land are estimated to have been lost in Hidalgo and Cameron counties alone since 1992.

Mary Kelley
The United States-Mexico Water Dispute

Minute 307 and 308 are very important for understanding the U.S.-Mexico dispute. These minutes are short-term agreements between the U.S. and Mexico, which require drought management plans and conservation measures. These plans are critical to the future of the region.

There needs to be a better understanding of agricultural trends in the Rio Grande Valley. Particularly how NAFTA and urban development impact agriculture in the Rio Grande Valley. Most of the cities in the Rio Conchos Basin rely on groundwater. We need to examine what kind of conservation measures need to be analyzed in the Rio Conchos Basin.

Environmental water flows are critical for the economies in the Rio Grande Valley because they support nature tourism, which is a big industry along the border. We also need to reconnect the Rio Grande river segments in Texas and New Mexico. Increased releases from Elephant Butte Reservoir in New Mexico will play an important role in reconnecting these two river segments.

Sustainable Use of Water in the Rio Conchos Basin
Gerardo Jimenez, Biodesert A.C. - Chihuahua

Gerardo Jimenez is a Professor at the Universidad Juarez del Estado de Durango and the Universidad Autonoma Chapingo in Torreon, Coahuila. He is also a founder and member of the non-governmental organization, BioDesert, A.C., which works to preserve natural areas and protect the environment in the La Laguna region. Professor Jimenez is a sociologist, with a masters in Rural Development. He has done extensive studies of irrigation practices in the Rio Conchos basin.

Population increase in the Rio Conchos Basin is resulting in an increase in water demand, reducing the amount of water in groundwater aquifers. Improvements in water efficiency are needed in Chihuahua in both the agricultural sector and the municipal sector. Water lines lose 30% of residential water. Reuse of effluent would help to increase water use efficiency in the region.

The Rio Conchos needs flows for the environment, which in turn supports tourism and thus the economy. Water must be supplied for the environment and for ecological restoration.

Pressure from Texas is forcing Chihuahua to find new strategies for conservation and efficiency. Mexico must comply with the treaty, but other strategies must be implemented to address the water needs of Chihuahua and the Rio Conchos Basin.

Availability of Water, Over-Appropriation and the Treaty
Juan Minana Lohaz, S. de R.L. "Amistad-Falcon, Amistad-Falcon Users Association, Tamaulipas

Juan Miñana Lahoz is a representative of the Tamaulipas agricultural users on the Rio Bravo Basin Council. He is also President of the "Amistad-Falcon" Users Association, which represents all of the users of Irrigation 025, the "Bajo Rio Bravo" District. This district has more than 200,000 hectares of land, and is located in the municipalities of Rio Bravo, Matamoros, Valle Hermoso and Reynosa in the northern part of Tamaulipas.

Tamaulipas has suffered from lack of water. Because of 1955 restrictions on land use the cultivation surface increased in the Conchos Basin. Many illegal water uses occur in the in the Chihuahua Basin.

The Mexican federal government needs to revise the water use rule through the National Water Commission. Records and logs of water use in the Conchos Basin need to be kept. The equitable distributions of water funds need to be used to increase water efficiency in the Conchos Basin.

Sharing with Neighbors: the View from the Lower Rio Grande Valley
Ken Jones, Lower Rio Grande Valley Development Council

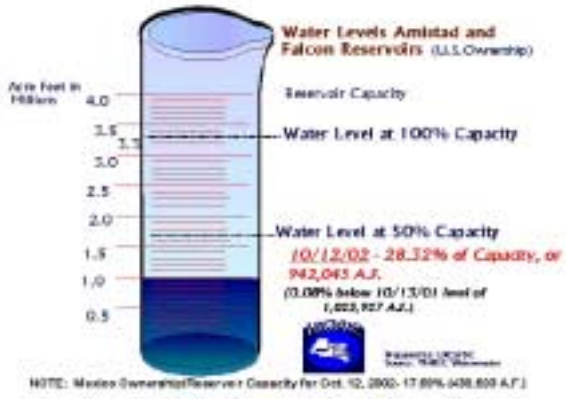
For copies of the State Water Plan call 512/ 936-0814.

Regional water supply issues include continued urbanization, irrigation water shortages, reliability of the Rio Grande reservoirs, preservation of agriculture, and external influences on supply from Mexico.

Regional planning considerations over the next 50 years include the following: population will more than double, urban water needs will double, irrigation deficits will increase by 30% from 2030 to 2050, and reservoir supply system will decline by 10% due to sedimentation.

Population will increase, resulting in increased demand for water in the Rio Grande Valley. The Region M Planning Group identified water supply needs for 48 out of 83 water user groups in the region. The total needs by 2050 are about 832,583 acre-feet a year. There are 39 urban and rural municipalities and 6 irrigation user groups with needs in 2050.

The estimated capital costs of recommended water management strategies for meeting needs over the 50-year planning horizon are about $930 million. Nonspecific strategies recommended to meet all municipal needs include additional or advanced conservation measures, nonpotable water reuse, and acquisition of additional Rio Grande water. The third strategy refers to redistribution by sale and purchase, of existing river supplies. The Planning Group also recommended local groundwater development.



The Planning Group recommended agricultural water conservation involving improvement of conveyance and distribution systems, improving on-farm water use efficiency by metering, volumetric pricing and pipes, and modification of Texas Commission on Environmental Quality rules for operation of the reservoir system.

The Planning Group recommended that the water supply form the Rio Grande be optimized by improving real-time monitoring of the river and its major tributaries in order to minimize the conveyance losses and to maximize use of those waters not accounted for by treaty between the U.S. and Mexico. The Planning Group also recommended controlling noxious weed vegetation on the Rio Grande to increase water supply. The Planning Group also recommended restoring the rivers historic channel between Fort Quitman and Presidio to increase flows reaching this planning.

The Planning Group also suggested that a surface water model be made available for the Rio Grande to help determine impacts of environmental flow needs

Water Planning 2006

The second round of regional water planning is now underway. The Texas Legislature enacted several new requirements for regional water plans in 2001, and previous components of the plans are being updated. Among the new requirements are the evaluation of impacts of selected water management strategies on key parameters of water quality and an evaluation of the impacts of moving water from rural areas. The plan must be developed consistent with long-term protection of the state's water resources, agricultural resources, and natural resources.

Interregional planning will explore possibilities of sharing water resources across regions and will include ground and surface water.

We can continue to expect increase demand/less water as well as implementation of drought management strategies. We can also expect irrigation shortages.

Closing Comments: Ken Kramer, Lone Star Chapter, Sierra Club

What can you do to help protect Texas water? The Texas Living Waters Project has developed a set of five principles for protecting Texas' water resources. The principles are to use existing water supplies efficiently, keep rivers flowing, protect wildlife habitat, use surface water and groundwater sustainably, and to save tax dollars. We would like as many organizations in Texas to sign on to these principles as possible. With your support, we will urge state, regional and local decision makers to develop, manage, and use Texas' freshwater resources in a way that benefits all of Texas.

For a copy of the Principles for Protecting Texas' Water Resources:
Go to http://www.texaswatermatters.org/ and download a copy of the principles or contact us via e-mail at lonestar.chapter@sierraclub.org, and we will send you a copy.

Additional Resources

Many of the speakers at the conference had PowerPoint presentations that provide more in depth information on some of the topics. They are posted on the Lone Star Chapter, Sierra Club website at http://www.texas.sierraclub.org/ChapterEvents/WaterConferences/proceedings.

The Texas Living Waters Project partners have developed a website called Texas Water Matters. It has recent articles about water issues around the state, information about the economic principles behind sound water planning, and specific information about water planning in your region as well as lots of other information on water. You can access it at http://www.texaswatermatters.org

The Texas Water Resources Institute has a website that covers a variety of water related issues. You can access it at http://twri.tamu.edu.