

**Programmatic Assessment:
Proposed Rules 31 TAC Chapters 701, 702, 703, 705, 707, 709, 711**

Part 2

Prepared for
The Edwards Aquifer Authority

By

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2.4.5 Regulatory Analysis of Major Environmental Rules (§2001.0225)

When required, this regulatory analysis is to be incorporated into the fiscal note required by §2001.024. Nonetheless, the Programmatic Assessment will cover the required topics. The requirements are:

- Identify the benefits of the rule, including reduced risks to human health, safety or the environment.
- Identify the costs the rule will cause state agencies, local governments, the public and the regulated community.
- Describe the benefits and costs in as quantitative a manner as possible, but include a qualitative description when a quantitative description is not feasible or is inadequately descriptive.
- Describe reasonable alternatives considered by the agency and give the reasons for rejecting those alternatives in favor of the proposed rule.
- Identify the data and methods used to perform the analysis.
- Explain if the rule specifies a single method of compliance and, if it does, explain why performance-oriented, voluntary, market-based, or other flexible approaches were rejected.
- Provide the information in a manner that a reasonable person could identify the impacts of the proposed rule.

“Costs” are defined broadly in the rule to include any significant adverse direct or indirect effect, quantifiable, or nonquantifiable that may result from the implementation of the rule. These include adverse environmental consequences that may not be quantifiable or lend themselves to being expressed in economic terms. “Benefits,” conversely, are any favorable effects.

2.4.6 Fiscal Impact on State and Local Units of Government (§2001.024)

The EAA’s regulatory program will have fiscal effects on state and local governments during each of its first five years of operation. To the extent feasible, we will estimate fiscal effects annually by unit of government and category of revenue or expense. The scope of the fiscal note is as follows:

- The additional estimated cost to the state and to local governments expected as a result of enforcing or administering the rule.
- The estimated reductions in costs to the state and to local governments as a result of enforcing or administering the rule.
- The estimated loss or increase in revenue to the state or to local governments as a result of enforcing or administering the rule.
- If applicable, that enforcing or administering the rule does not have foreseeable implications relating to cost or revenues of the state or local governments.

The operations of the Authority will create government revenues through fee collections and government spending through the Authority's budget. We will estimate the Authority's revenues and expenses for each year of the analysis.

Most of the area's water suppliers are units of state and local government. These organizations will experience changes in revenues and costs as they adapt to the regulatory program in some or all of the following ways:

- Costs of acquisition of water rights
- Costs of contested case hearings to the parties, including the Authority
- Costs of acquiring or developing nonaquifer water supplies
- Costs of developing water treatment facilities for nonaquifer water
- Revenues from higher water rates to cover the additional costs and to encourage conservation
- Costs of fees on aquifer users to fund the operation of the Authority and the purchase of withdrawal rights to reduce them to prescribed limits

The effects of the regulatory program on the regional economy and employment will include changes in the taxes and fees collected by state and local government. To the extent changes in the economy translate to changes in population growth, the program may affect the cost of state and local government programs in the region. We will model these economic effects and use them to project changes in public revenues and the cost of public facilities and services.

2.4.7 Public Benefit and Cost Note (§2001.024(a)(5))

This assessment is required for all rules, and is perhaps the broadest requirement. It is to include:

- The public benefits expected as a result of adoption of the proposed rule
- The probable economic cost to persons required to comply with the rule

Estimates of public benefits and costs are required for each of the first five years that the rules will be in effect. The Programmatic Assessment will go further than the statutory requirements and consider effects until 2010 for two reasons. First, many of the effects of

these rules may not become evident to the regulated community for almost five years. Second, an important goal of this regulatory program, which is not considered in this first Programmatic Assessment, is to reduce the permitted cap to 400,000 AFY. But this mandate need not be met before 2008. When we assess the rules reducing permitted withdrawals to 400,000 acre-feet per annum, we will need to consider the cumulative effect of all the rules.

We interpret benefits to include economic and environmental benefits. Those who must comply with the regulatory program include all persons who withdraw water from the aquifer and the customers of water utilities who draw from the aquifer—essentially all persons, businesses, and households within the Authority's boundaries. (We are also required to consider environmental costs of the regulatory program.) Therefore the APA is requiring a very broad economic cost-benefit analysis and an analysis of environmental benefits for each of the first five years the program is in effect.

2.4.8 Programmatic Assessment and Subsequent Authority Actions

Among the objectives of the assessment are the following.

- The development of a database that characterizes existing conditions in areas most directly affected by the Authority rules.
- Identification of important trends and activities that will influence future conditions, independent of the rules
- The development of models that provide reliable quantitative predictions of hydrologic and economic effects of major Authority rules.
- Identification of other predictive techniques that appear central to rulemaking.

The Programmatic Assessment will establish the foundation for rule-specific, statute-specific regulatory analyses. The database, futures analysis, models and techniques will collectively provide a common basis for the specific regulatory assessments required by the APA. The Authority's staff and board may use the results of the Programmatic Assessment to make the threshold decisions required by the Government Code. The Authority may consider the Programmatic Assessment in rulemaking, and in selection of alternatives. The Programmatic Assessment may be helpful to the Authority in developing its nonregulatory programs.

The Programmatic Assessment will provide much of the analysis and the findings necessary to prepare the Notices of Proposed Rules and the Final Order Adopting Rules the Authority plans to issue in 2000. In some cases the Authority will conclude that the effects of a rule will be of a magnitude below the threshold at which an assessment is required. This section will also discuss the circumstances when specific assessments are not required.

Authority staff reviewed the draft Programmatic Assessment and provided comments to the Assessment Team, who considered them, either in the context of a revised Programmatic Assessment or in the formal rules assessment documents described in Section 2.5. The Programmatic Assessment will be available for public review at the Authority's offices and other places throughout the region.

2.5 Issues Considered Outside the Scope of the Rulemaking Assessments

A full evaluation of all possible economic, environmental, social, and human effects that could result from EAA rulemaking would exceed the scope of any assessment that could be performed in a realistic time period. The Authority's rulemaking assessment will specifically not address the following issues:

Litigation. History shows the rules will be controversial and may lead to litigation. The costs and effects of possible litigation will not be considered.

No-action scenario. Rules on withdrawal limits and other rules have different implications for the future than a no-action, or unconstrained future, scenario in which there are no Authority regulations. The Authority will identify an Unconstrained Future for purposes of comparison to the effects of the regulatory program, but will not otherwise consider the costs and benefits of not acting.

Cost of water supply alternatives. The menu of water-supply alternatives potentially available to the region is large. Adopting some of them might generate effects of sufficient magnitude to also require extensive analyses of economic and environmental costs and benefits. The Authority will limit its consideration of such alternatives to the adopted Comprehensive Management Plan and to effects, such as those of regulating marketplace transfers or providing reuse credits that directly derive from the rules. We will not evaluate effects such as those arising from construction and operation of water-supply projects.

Equity issues. Certain classes of stakeholders will claim that they have been burdened with a disproportionate share of the sacrifice required to maintain spring flows. The rulemaking assessment will attempt to predict and quantify the economic effects on various sectors under several aquifer-management scenarios. Social issues that may arise out of economic effects will not be assessed.

Takings impact assessment. In *Glenn & JoLynn Bragg vs. Edwards Aquifer Authority et al.*, No. 04-99-00059CV, the Fourth Court of Appeals decided that a takings impact assessment was not required as part of the Authority's rulemaking process. As a result, any issue raised by the Texas Private Real Property Rights Act will not be considered in this assessment.

Effect on Small and Micro Businesses. The Authority has concluded that, because it is not an agency of statewide jurisdiction, that the requirements to assess the impact of the rules on small businesses under §2006, Texas Government Code are not applicable to its rulemaking process.

2.6 Public Involvement and Access to Other Information

As part of this assessment, we identified stakeholders in the Authority's rulemaking process, and issues they have raised previously. See Appendix **STAKEHOLDERS**. We met informally with representatives of municipal water suppliers, agricultural interests, environmental interests and downstream interests to provide for the further "scoping" of issues. Additional opportunities for public comment will occur during the 30-day period after

the rules are published in the *Texas Register* and at the public meeting the Authority will hold to discuss these rules.

Paper copies of the appendices that form a part of this report are available for review from 8:00 a.m. to 4:30 p.m. at the Authority's office.

Table 2.6
Index of Appendices

Appendix	Description
REGION	Information on existing and projected conditions in the Edwards Aquifer Authority area.
AQUIFER	Brief description of aquifer hydrology and use.
BIOLOGY	Information on the biological aspects of the aquifer and EAA area.
PROGRAMS	Description of important components of the Authority's comprehensive water management process.
ORGANIZATIONS	Documents, rules, and position statements relative to a number of other governmental, regulatory, and political entities.
RULEMAKING	Overview of the Authority's rulemaking process, and of the preliminary draft rules that have been prepared for discussion.
CODE	A copy of the Applicable sections of the Texas Government Code.
STAKEHOLDERS	Information on aquifer management issues that have been raised by various interest groups.
QUALIFICATIONS	A list of the qualifications and specific experience of each participant in the assessment.
MATRIX	The Authority's most recent list of permit applications, water claims and potential outcomes of the permitting process.
DEMANDS	A summary of State Water Plan information on the demands for and shortages of water in the Edwards Aquifer Authority area.
SUPPLIES	A summary of State Water Plan information on water supply alternatives for an area that includes the Edwards Aquifer Authority area.
GWSIM	Brief description of GWSIM model, and detailed presentation of results obtained for this assessment.
SURFACE	Extracts of information regarding the GSA4 model as described in the SCTWAC 1998 assessment.
EDSIM	Brief description of EDSIM model, and detailed presentation of results obtained for this assessment.
IMPLAN	Brief description of IMPLAN model, and detailed presentation of results obtained for this assessment.
SAFE	Brief description of SAFE model, and detailed presentation of results obtained for this assessment.
RATES	Information obtained regarding water utilities and rate structures in the EAA area.

2.7 Key Personnel Qualifications and Experience

The qualifications and experience of personnel are documented fully in Appendix *QUALIFICATIONS*. A brief summary for each, along with their primary responsibilities, is included below.

2.7.1 Dr. Ronald T. Luke

Ron Luke, President of RPC, has worked as an economist, planner and policy analyst since completing undergraduate studies at Harvard University in 1970. Continuing his studies at Harvard, Dr. Luke earned masters and doctoral degrees in Public Policy from the John F. Kennedy School of Government. He also earned a law degree from the University of Texas Law School.

For the past 22 years, Dr. Luke has conducted economic analyses and policy studies throughout the United States in the environmental protection, water and mineral resource development, tort litigation, and real estate markets. He has testified as an expert witness before state and federal courts, administrative agencies, and legislative committees. These projects include the development of population, economic, and water demand projections for the Birmingham Water Works Board; development of damage estimates for under-delivery of irrigation water from New Mexico to Texas from 1954 to 1989 in the Pecos River basin for the Attorney General of Texas; and the preparation of studies and testimony regarding demographic, financial, and policy issues regarding long-range water-supply alternatives before the U.S. Army Corps of Engineers for the Denver Water Board as well as a similar assignment for the City of Newport News.

2.7.2 Dr. Lee Wilson

Dr. Lee Wilson, president of Lee Wilson and Associates, a water resource and environmental consulting firm based in Santa Fe, New Mexico, has nearly 30 years of experience in environmental and resource conservation issues. In his career, Dr. Wilson has worked on more than 300 projects related to surface and ground water quality and quantity. These projects include water-supply master planning for water authorities and municipalities, design of a statewide program for monitoring groundwater quality, evaluation of water-quality effects of various activities, and design of major wellfields. For the past 16 years, his firm has served as a contractor to the U.S. Environmental Protection Agency, responsible for performing environmental assessments and ecosystem restoration studies.

In addition, Dr. Wilson has provided expert testimony and other services related to environmental and regulatory issues. He is currently serving as expert on municipal water supply planning and environmental injury for the State of Nebraska in its U.S. Supreme Court case regarding the North Platte Decree. He has also provided expert advice for water rights, water rates, and water-quality cases for clients ranging from major corporations to environmental and other citizen groups. For this project, Dr. Wilson coordinated and wrote the results of all quantitative assessments, was the lead author regarding permitting assessments and alternatives, and managed the hydrogeological investigations. Dr. Wilson

earned his B.A. at Yale University in 1964 and a Ph.D. in geology at Columbia University in 1971.

2.7.3 Dr. Lonnie Jones

Dr. Lonnie Jones is a professor in the agricultural economics department at Texas A&M University. Dr. Jones' focus is in resource economics and development. He received his B.S. in Agricultural Education from Stephen F. Austin University, M.S. in Agricultural Economics from Louisiana State University and a Ph.D. in Agricultural Economics from Ohio State University. His research is concerned with economic development and natural resource use and planning, with emphasis on agricultural issues, impacts on rural economies, and water- and land-use issues in agricultural and urban areas. Dr. Jones has teaching responsibilities in undergraduate and graduate courses pertaining to quantitative analysis, economic development of rural areas and special problems in input-output analysis. For this project Dr. Jones used IMPLAN and SAFE, economic models developed by himself and others, to estimate the secondary impacts on local economies and the region.

2.7.4 Dr. Bruce McCarl

Dr. McCarl is a professor of Agricultural Economics at Texas A&M University. He received his B.S. in Business Statistics at the University of Colorado in 1970 and earned his Ph.D. in Management Science from Pennsylvania State University in 1973. His recent research efforts have largely involved policy analysis (mainly resources and government programs) as well as the proper application of quantitative methods to such analyses. Dr. McCarl teaches a graduate course in applied mathematical programming and applied risk analysis. His research focus includes production and resource economics and policy. For this project, he used EDSIM, a linear programming model he had earlier developed, to estimate the effects of assumed water allocations and pricing on planting decisions and farm income.

2.7.5 Steven M. Mobley

RPC Principal Steve Mobley has extensive experience with both environmental and financial projects. Mr. Mobley graduated from the University of Texas at Austin with an economics degree in 1977. Following his undergraduate work, he earned his M.B.A. from the Columbia University Graduate School of Business in 1980. Since 1995, Mr. Mobley has worked with RPC, specializing in economics and public policy consulting on health care, environmental, and tort issues. For this project, his primary responsibility is financial impact analysis in the EAA region and project coordination.

2.7.6 Mitch Wilson

Mitch Wilson, of Research and Planning Consultants, consults on a wide variety of environmental issues, including habitat conservation plans, wetland delineations, site remediation, water quality and litigation support. Mr. Wilson also served for eight years as the vice president of environmental health and safety at Mobley Environmental Services, Inc., where he earlier worked as environmental compliance manager for a subsidiary involved in hazardous waste services. Before that, he was a lab manager there and at a

commercial environmental lab. Mr. Wilson conducted most of the biological research that formed the basis for the determinations of environmental effects of the different scenarios examined. He graduated cum laude from Ohio State University in 1977 with a degree in zoology.

2.7.7 Tom Van Zandt

Mr. Van Zandt has 25 years of experience in the field of environmental management. He has managed or participated in EIS, environmental assessment and permitting projects dealing with deepwater ports, lignite mines, power plants and transmission lines, hazardous waste facilities, airports, pipelines, highways, railroads, and commercial/residential developments, among others. He served as Environmental Assessment Project Manager for the Texas FasTrac High Speed Rail proposal, directing the efforts of a multi-disciplined assessment team and serving as FasTrac's principal environmental witness during the State hearings on the franchise competition. He has served as Project Manager for Environmental Impact Statements for a proposed railroad relocation and freeway project in Lubbock, Texas, and highway projects in Austin, Tyler, Coppers Cove and Laredo.

As Director of Hicks & Company's NEPA/Transportation Program, he is responsible for environmental assessments and studies throughout Texas and other southwestern states. He has testified in trials and administrative hearings as an expert in environmental assessment methods, wetlands regulation, environmental justice, and other topics. He is a member of the State Bar of Texas and has authored numerous reports, articles, and presentations on many aspects of environmental law and management. Mr. Van Zandt functioned as contract manager for this project. Mr. Van Zandt graduated from the University of Texas at Austin in 1966 with a degree in government. He then earned a law degree from the University of Texas in 1970. In 1974, he earned a masters degree in Water Resources Management from the University of Wisconsin.

2.7.8 Roy Frye

Mr. Frye is a certified wildlife biologist with 26 years of experience in the field of wildlife biology. He has researched and developed vegetation maps for the entire state of Texas. Mr. Frye has developed a wildlife habitat appraisal procedure and researched the management of wildlife by habitat units. He has extensive experience in bottomland hardwood ecology. In relation to this, Mr. Frye has researched and published numerous articles on assessing impacts to wildlife habitat from water development projects, including proposed reservoirs. This evaluation included potential impacts to the natural resources within the proposed project area and formulating recommendations on resource mitigation planning. Mr. Frye reviewed research and findings on environmental impacts of these rules. Mr. Frye graduated from Oklahoma State University with a degree in zoology in 1969. He then earned his masters degree in Wildlife Ecology from Oklahoma State in 1969.

3. Proposed Rules Subject to this Assessment

A set of proposed rules has been prepared by Authority staff and counsel, and approved by the Board to be assessed in this document. These “proposed rules” are summarized in the Rules Summary attached to the end of this chapter. Although not every reader will need the benefit of the entire table, it can serve as a condensed, sequential guide to the rules that are the subject of this assessment. Although virtually all of the proposed rules are necessary to implement the complete regulatory program, the proposed rules that have been the focus of the programmatic assessment are in boldface. These boldfaced proposed rules are directly responsible for the effects of these proposed rules that have been the focus of the programmatic assessment. Many readers will find the summary of Chapter 711, Subchapter G (Beginning on Page 17 of the Rules Summary), to be especially useful in understanding the water permitting allocation process that is most significant component of these rules. In the main body of this chapter, we have interpreted or clarified certain key definitions or addressed assumptions we have made.

- Section 3.1 provides information on some chapters that establish a legal foundation for more substantive rulemaking: Chapters 701, 702, and 705.
- Section 3.2 is a discussion of Chapter 707, entitled Procedure Before the Authority.
- Section 3.3 is a discussion of the fee rules found in Chapter 709.
- Section 3.4 is a discussion of the rules found in Chapter 711, titled Groundwater Withdrawal Permits.
- The final section in this chapter is a Summary of the Rules.

3.1 General Provisions, General Definitions, Rulemaking Procedures, Jurisdiction

The Edwards Aquifer Authority (Authority) has prepared the following Draft Proposed Rules. Their titles, and the dates referred to the Board from the committees responsible for developing them, are given below.

- 31 Texas Administrative Code Ch. 701: General Provisions, Referred by Legal Committee May 30, 1999.
- 31 Texas Administrative Code Ch. 702: General Definitions, Referred by Permits Committee, May 30, 2000
- 31 Texas Administrative Code Ch. 705: Jurisdiction of the Authority, Referred by Legal May 30, 2000.

In many respects, these rules are “boilerplate” language that is a necessary legal foundation for general rule making. In themselves, these rules do not regulate water resources nor establish compliance requirements. The aspect of these chapters that is most likely to draw comment is the definitions. The following terms include those identified by the assessment team that were defined by the Authority that appear to have a scope that could impose impacts, or that otherwise pose issues that are considered in this assessment.

- Beneficial use. “The use of the amount of water that is economically necessary for a purpose authorized by law when reasonable intelligence and reasonable diligence are used in applying the water to that purpose.”
- Exempt well. A well that produces 25,000 gallons of water a day or less for domestic or livestock use that is not serving a subdivision requiring platting. This term from the Act defines those wells that are exempt from metering and permit requirements.
- Groundwater withdrawal permit. This term is made self-evident through language in §1.15(b) of the Act. It is: “A permit issued by the authority pursuant to §1.15(b) of the Act authorizing the withdrawal of groundwater from the aquifer.” The significance of this term is that, when Chapter 711 relating to Groundwater Withdrawal Permits now proposed becomes effective, substantive withdrawals from the Edwards Aquifer will, for the first time, be regulated in accordance with a permit.
- Historical Period. This term, which is defined in the Act, is “The period from June 1, 1972, through May 31, 1993.” This is the period in which beneficial use of Edwards water is measured in different ways throughout the regulatory program. Water use that was developed during the period is, to various degrees, grandfathered in by the Act and corresponding rules. Water use after May 31, 1993, is not similarly protected.
- Initial regular permit. This term is made self-evident from language §1.16(d) of the Act and is “A groundwater withdrawal permit issued by the Authority pursuant to the Act, §1.16(d).” The word “Initial” is used in this sense as “being the earliest” as opposed to “interim.” All withdrawal permits issued by the Authority as part of its initial phase of permitting all users with appropriately documented historical use are initial regular permits.
- San Antonio Pool. “That part of the aquifer underlying the boundaries of the Authority, other than Medina and Uvalde County.”
- Uvalde Pool. “That part of the aquifer underlying the boundaries of the Authority and Uvalde County.”
- Well J-17. “State well number AY-68-37-203 located in Bexar County.” This is the index well for the San Antonio pool that is used to trigger decisions about aquifer management strategies for the protection of spring flows at Comal Springs and San Marcos Springs and to authorize certain withdrawals.
- Well J-27. “State well number YP-69-50-302 located in Uvalde County.” This is the index well for the Uvalde pool that is used to trigger decisions about aquifer management strategies for the protection of spring flows at Comal and San Marcos Springs.

3.2 Chapter 707: Procedure before the Authority

Rules proposed as 31 Texas Administrative Code Chapter 707 are titled Procedure before the Authority and were referred by the Board on October 4, 1999. Chapter 707 contains the procedural rules for holding Board meetings, filing applications and other notice requirements, documents, etc. For the most part, these procedures are similar to those of any other Texas agency. Under §707.610, the burden of proof in a contested case hearing is on the applicant to establish by convincing evidence that he is entitled to have an application for withdrawal granted. This codifies the requirements found in §1.16(d)(2) of the Act, which imposes a higher standard of proof than the preponderance of the evidence standard generally found in civil trials or Texas administrative hearings. This relatively high burden of proof falls on an applicant with historical use who historically could not have foreseen the need for convincing records.

Chapter 709: Fees

The Authority has prepared proposed rules for fees, which were referred to the board by the Finance Committee on May 30, 2000. 31 Texas Administrative Code Chapter 709 Fees contains the following Subchapters.

- Subchapter A: Definitions
- Subchapter B: Registration Fees.
- Subchapter C: Permit Application Fees.
- Subchapter D: Aquifer Management Fees.
- Subchapter E: Special Retirement Fees.

Several aspects of this chapter require examination.

Although §1.29(e) of the Act requires that agricultural users pay no more than 20% of the fee for municipal use, the Act does not define agricultural use. The definitions in §709.1 define agriculture narrowly as irrigation. Aquifer management fee rules contained in §709.19 set the fee for irrigators at 18% of the rate of nonirrigators. The definition of "agricultural use" is narrow and only includes irrigation. However, in the Special Retirement Fee rules addressing the retirement of permits by 2008 that will limit aquifer withdrawals to 400,000 acre-feet, no distinction is made between agriculture and nonagricultural use. All permittees pay an equal amount per acre/foot of permitted rights.

3.4 Chapter 711: Well Permits

The Authority has prepared the proposed permit rules, which were referred to the Board by the Permits Committee on May 31, 2000. The organization of this chapter into subchapters is found below. Subchapters A, G, and M are the focal points in Chapter 711 of our assessment.

- Subchapter A: Definitions
- Subchapter B: General Provisions

- Subchapter C: Exempt Wells
- Subchapter D: Interim Authorization
- Subchapter E: Permitted Wells
- Subchapter F: Standard Groundwater Conditions
- Subchapter G: Groundwater Available for Permitting, Proportional Adjustment, Equal Percentage Reduction
- Subchapter H: Abandonment and Cancellation
- Subchapter I: General Prohibitions
- Subchapter J: Aquifer Recharge, Storage, and Recovery Projects (not yet assessed)
- Subchapter K: Additional Groundwater Supplies
- Subchapter L: Transfers
- Subchapter M: Metering
- Subchapter N Groundwater Trust (reserved for prior rulemaking)

§711.172 in Subchapter G addresses the proportional adjustment of initial regular permits and defines some important terms, as discussed below:

- Historical average minimum – The minimum amount of groundwater that an applicant who operated the well three years or longer during the historical period shall be authorized to withdraw. The definition of maximum historical use goes on to define the term in the context of a calculation as “the number of years during the historical period inclusive of and after the date of initial installation of the well, irrespective of whether withdrawals may have been made in a year.” The minimum is calculated by dividing the total withdrawal during the historical period by the total number of years during the historical period that the well existed, irrespective of whether withdrawals were made in a year.
- Operate a well – The withdrawal of groundwater from a well for beneficial use.

“Operate a well” thus appears in the definition of maximum historical use and again in the definition of the term itself. For the purposes of calculating a historical minimum, all years from the date of first operation are included. For the purposes of calculating whether an applicant gets a historical minimum, only those years in which a well was operated would be counted. Thus, a well that existed during six years of the historical period but only operated for two years would not get a historical minimum.

The rule is not specific about how time periods are aggregated to constitute three years of operation. We understand that the Authority intends to treat any withdrawal for beneficial use in a given year as one year of operation irrespective of the length of time the well actually operated.

The computational steps of the proportional adjustment process in §711.172 are central to an understanding of the permitting program. The quantity of a permit, as measured in acre-feet per year, is heavily dependent upon an applicant's type of use and pattern of use over time. Section 6.1 contains an extensive discussion of this process, along with hypothetical cases of different types applicant for which a permit is calculated.

Attachment A

Rules Summary

Text appearing in boldface discusses the rules that are the focal points of the programmatic assessment.

Chapter 701: General Provisions

This chapter sets out the purpose of the rules: to implement the Act and other laws applicable to the authority and to set forth the administrative procedures to be followed in Authority proceedings. It also clarifies some stylistic and grammatical conventions and names the business office and mailing address.

Chapter 702: General Definitions

This chapter includes general definitions applicable to all chapters of the Authority's rules, all found in §702.1. Those most important to an understanding of the discussion that follows are repeated below:

"Beneficial use-The use of the amount of water that is economically necessary for a purpose authorized by law when reasonable intelligence and reasonable diligence are used for applying the water to that purpose."

"Domestic or livestock use-Use of water for drinking, washing, and culinary purposes; irrigation of a family garden or orchard the produce of which is for household consumption only; or watering of animals." A well used for these purposes may withdraw up to 25,000 gallons per day and is generally exempt from metering, permitting, and fee regulations, although most other aspects of the Authority's programs applies to these wells.

"Groundwater withdrawal permit"-A permit issued by the authority pursuant to §1.15(b) of the Act authorizing the withdrawal of groundwater from the aquifer." Groundwater withdrawal permits will specify the amounts and aquifer conditions under which certain amounts may be withdrawn by a particular permittee.

"Historical Period-The period from June 1, 1972, through May 31, 1993." This is the period during which beneficial use of Edwards water is measured in different ways throughout the regulatory program.

"Initial regular permit-A groundwater withdrawal permit issued by the Authority pursuant to the Act, §1.16(d)." Initial is used in this sense as "being the earliest" as opposed to "interim." All withdrawal permits issued by the Authority as part of its initial phase of permitting all users with appropriately documented historical use are initial regular permits.

"Medina Pool"- "That part of the aquifer underlying the boundaries of the Medina County."

"San Antonio Pool"-That part of the aquifer underlying the boundaries of the Authority, other than Medina and Uvalde Counties.

"Uvalde Pool"-"That part of the aquifer underlying the boundaries of the Authority and Uvalde County."

"Well J-17-State well number AY-68-37-203 located in Bexar County." This is the index well for the San Antonio pool that is used to trigger decisions about aquifer management strategies for the protection of spring flows at Comal Springs and San Marcos Springs, and authorize certain withdrawals

"Well J-27-State well number YP-69-50-302 located in Uvalde County." This is the index well for the Uvalde pool that is used to trigger decisions about aquifer management strategies for the protection of spring flows at Comal Springs and San Marcos Springs, and authorize certain withdrawals

Definitions for the following terms in 31 Tex. Admin. Code Ch. 702.1 are derived in their entirety from, and conform completely to, definitions in Section 1.03 of the Edwards Aquifer Authority Act of May 30, 1993, as amended:

- **Aquifer**
- **Augmentation**
- **Beneficial use**
- **Board**

- Commission
- Conservation
- Diversion
- Domestic or livestock use
- Industrial use
- Irrigation use
- Livestock
- Municipal use
- Order
- Person
- Pollution
- Recharge
- Reuse
- Well
- Well J-17
- Well J-27
- Withdrawal

These definitions create no new meanings and effectuate only those meanings already established for the Authority by the Texas Legislature. Economic impacts arising from the application of the definitions may need to be assessed when the Authority uses the terms in rules that do substantively regulate water resources, but it is not possible to identify impacts from the simple definition of the terms.

Definitions for the following terms in §702.1 simply consist of a reference to language contained in the Edwards Aquifer Authority Act of May 30, 1993, as amended, where such language introduces or makes self-evident a term that is associated with potential future actions by the Authority:

- Additional regular permit (term established through the effect of §1.18 (a) of the Act)
- Aquifer management fees (term established through the effect of §1.29 (b) and §1.29 (e) of the Act)
- Declarant (term made self-evident through the effect of §1.16 (a) of the Act)
- Declaration of historical use (term established through the effect of §1.16 (a) of the Act)
- Declaration (term established through the effect of §1.16 (a) of the Act)
- Emergency permit (term established through the effect of §1.20 (a) of the Act)
- Exempt well (term established through the effect of §1.33 (b))
- Existing well (term established through the effect of §1.14 (e) of the Act)
- Groundwater withdrawal permit (term made self-evident through the effect of §1.15 (b) of the Act)
- Historical period (term established through the effect of §1.16(a) of the Act)
- Initial regular permit (term established through the effect of §1.16 (d) of the Act)
- Interruptible (term established through the effect of §1.19 and §1.14 (f);
- Monitoring well permit (term established through the effect of 1.15 (b))

- New well (term established through the effect of §1.14 (e))
- Non-exempt well (term established through the effect of §1.31 (a) of the Act)
- Recharge recovery permit (term established through the effect of §1.15(b) of the Act)
- Registrant (term established through the effect of §1.33 (b) of the Act)
- Registration (term established through the effect of §1.33 (b) of the Act)
- Term permit (term established through the effect of §1.19 (a) of the Act)
- Water supply facility (term established through the effect of §1.11 (f) of the Act)
- Well construction permit (term established through the effect of §1.15 (b) of the Act)

These definitions create no new meanings and effectuate only those meanings already established for the Authority by the Texas Legislature. The principal purpose of the definitions is to benefit any interested person's understanding of Authority actions by providing direction to the sections in the Act that effectively define a given term. Economic impacts arising from the application of the definitions may need to be assessed when the Authority uses the terms in rules that do substantively regulate water resources, but meaningful effects cannot be discerned from the simple definition of the terms.

Definitions for the following terms are taken from the Texas Water Code

- Groundwater (defined in §35.002 (5) of the Texas Water Code)
- Surface water (defined in §11.021 of the Texas Water Code)
- Underground water (defined in §36.001 (5) of the Texas Water Code)

These definitions create no new meanings and effectuate only those meanings already established by the Texas Legislature. The nature of these fundamental terms is such that economic impacts from their definition and use are unlikely. Such impacts are certainly impossible to discern from the definitions taken alone. Economic impacts arising from application of the definitions may need to be assessed when the Authority uses the terms in rules that do substantively regulate water resources.

Definitions for the following terms in 31 TAC Chapter 702.1 simply provide the formal citation or reference that is intended when a particular short-form term is used for convenience.

- Authority officers
- Docket clerk
- General Counsel
- General Manager
- SOAH

These definitions are factually accurate and have no effect other than to simplify the rulemaking process. There does not appear to be any rulemaking context in which these definitions could have a substantive effect, but that conclusion will need to be verified in the process of subsequent rulemaking that uses the terms.

Definitions for the following terms in 31 Tex. Admin. Code Ch. 702.1 are conventional terms of a procedural nature that were constructed through consideration of similar language in the Government Code and/or in rules adopted by other agencies such as the Texas Natural Resources Conservation Commission and the State Office of Administrative Hearings:

- Applicant

- Application
- Contested case hearing
- Judge
- Party
- Permit
- Permittee
- Petitioner
- Pleadings
- Protestant

These definitions reflect common and accepted usage of procedural terms and/or are self-evident. While there does not appear to be any rulemaking context in which these definitions would have a substantive effect, economic impacts arising from application of the definitions may need to be assessed when the Authority uses the terms in rules that do substantively regulate water resources.

Collectively, every definition contained in draft proposed 31 Tex. Admin. Code Ch. 702 falls into one of the five categories listed above: defined in the Act; constructed directly from language in the Act; contained in statutes that post-date the act; factually accurate elaboration of a short-form word; conventional or self-evident procedural terms. In no case does a definition break substantive new ground with respect to the meaning of a word or phrase.

Chapter 703: Rulemaking Procedures

This chapter describes how the EAA will make rules pertaining to its regulatory program. §703.1 restricts the applicability of this chapter to its regulatory program, as opposed to its internal management or personnel policies.

§703.3 indicates that rules will be made in accordance with the Texas Administrative Procedures Act. §703.5 requires that a list of persons requiring advance notice of rulemaking be maintained and notified in advance of proposed rulemaking, although failure to provide advance notice of proposed rules does not invalidate any action taken or rule adopted by the Authority.

According to §703.7, the general manager must conduct public hearings on proposed rules if directed to by the board, if a hearing is requested by at least 25 persons, a governmental subdivision or agency, or an association having at least 25 members. The rules go on to describe the procedure for requesting a public hearing and for conducting them. They may be tape recorded, but are not recorded except as otherwise require in the Administrative Procedures Act.

§703.9 requires that, at least 30 days prior notice of the date and time of the meeting in different newspapers in a regional newspaper as well as four other newspapers circulated within the boundaries of the authority. Any such notice must specify particular details of the meeting and how and when written comments may be filed. The rules in §703.11 give the presiding officer guidance in directing commentors to limit or narrow their comments to pertinent, non-duplicative statements.

Rules regarding written comments are found in §703.13. Written comments must be filed no later than 30 days after the proposed rulemaking is published in the Texas Register, or prior to the adjournment of the last public hearing on the proposed rules, if any, whichever is later. The rules also specify format for written comments and a mechanism for the Board to extend the comment period.

§703.15 empowers an interested person to petition the authority and request the board to adopt a new rule or amend an existing rule. Each rule requested must be by separate petition, and specific information about each proposed rule is required, including an explanation of the rule's legal and factual basis, the injury to the petitioner from the current rules, if any; and b) the injury to the petitioner that could result upon failure to adopt the proposed rule. The board must consider such a petition within 60 days of its submission.

§703.17 gives the board the authority to conduct any number of information-gathering exercises prior to filing a proposed rule with the secretary of state. These include informal conferences, advisory committees or work groups of experts, representatives of the public, or employees.

Chapter 705: Jurisdiction

This very short chapter merely reiterates that the statutory power of the Authority relates only to groundwater within or withdrawn from the aquifer and not to surface water.

Chapter 707: Procedure before the Authority

This chapter addresses how the public interfaces with the Authority, including general and specific provisions for the filing and processing of registrations and applications for permits and other types of approvals and authorizations to be issued or granted by the Authority.

Subchapter A: §707.1

Subchapter A, consisting solely of §707.1, includes some routine definitions of proceedings and officers and directors.

Subchapter B: §§707.101-106

General provisions found in Subchapter B contain detailed procedures for the delivery and service of documents and management of documents by the docket clerk.

Subchapter C: §§707.201-208

Subchapter C includes §§707.201-208 set out general rules relating to the conduct of meetings, parliamentary procedures, and recording requirements. Members of the South Texas Water Advisory Committee, under §707.201 may request the chair to permit them to address the board on issues related to downstream water supply concerns.

Subchapter D includes §707.301-312 and is entitled "Requirements to File Applications and Registrations" and is applicable to any application, registration, or other approval filed with the Authority (§701.301).

§707.302 requires any person to submit a written application to the Authority on a form provided by the general manager. §707.303 specifies who may file an application, registration or declaration, and how owners of joint wells may choose a representative to act for them before the Authority. §707.304 codifies the statutory requirement that operators of non-exempt wells file an application for groundwater withdrawal permit. §707.305 addresses the requirements to file an application for a permit to construct or increase the capacity of an existing well. §707.306 sets out the requirements for all wells, both exempt and non-exempt, to be registered, while §707.307 grandfathered existing registrations in existence before the effective date of the rules. §707.308 is a requirement that all exempt well owners file an application for exempt well status. §707.309 is a requirement to file application for a permit to install a new meter or to modify an existing meter, and permits a mechanism in which an applicant can apply to use an alternative measuring method. §707.309 is a requirement that an existing meter on a well at the time these rules become effective must be filed with the Authority no later than 180 days after the rules become effective. §707.311 is a requirement that a declaration of historical use must have been filed with the Authority pursuant to §1.16(a) of the Act by December 30, 1996 for each non-exempt well, while §707.312 grandfathered existing declarations of historical use.

Subchapter E: §§707.401-428

Subchapter E is entitled Requirements for Applications and Registrations. §707.401 addresses contents required of all applications, such as name, type of entity, contact information, and signatures. §707.402 encourages persons with business before the authority to confer with the staff on any questions concerning the preparation of an application.

§707.403-404 specifies fees for applications and registrations of \$25 and 10, respectively, as well as a \$250 application fee for an agricultural conservation loan.

§707.405 addresses specific applications for Declarations of Historical Use. Applications for Initial Regular Permits must include such information as the specific amount of use in acre-feet for each type of use, the

rate of withdrawal, the method of withdrawal. Declarations of Historical Use must include a number of historical items. These include the following.

1. The total amount of water from the aquifer that was used from this well without waste during each calendar year of the historical period (a component for the calculation of Historical Average Minimum).
2. The maximum number of acres irrigated during any one calendar year of the historical period (the basis for the Irrigator Maximum).
3. The purpose for which the groundwater was used during each year of the historical period.
4. The amount of groundwater the applicant claims as the maximum beneficial use of water without waste during any one calendar year of the historical period.
5. The number and location of each well and the amount of water withdrawn from each well from each well during each year of the historical period.
6. The place of use of groundwater withdrawn from each well.
7. Contact information for any prior users or contract users, as well as the legal documents that established the legal right of the contract user to withdraw the groundwater from the aquifer for beneficial use;
8. Any facts that support an applicant's request for an equitable adjustment under §1.16(f) of the Act.
9. If the groundwater is to be sold on a wholesale or bulk basis, contact information and legal documents establishing the right of the groundwater to be sold, transported or transferred.
10. A separate Well Information Sheet prescribed by the general manager, along with a photograph of the well taken approximately 100 feet from the wellhead. If this information has been submitted to another groundwater district, then the comparable form may be submitted instead.
11. Any other information that the general manager may require.

§707.406 addresses the requirements for Applications for Additional Regular Permits and specifies that the Applications for Term Permit must include.

1. Name and contact information for the owner, if different from that of the applicant.
2. A clear statement that the Edwards Aquifer is the source of supply, and which aquifer pool will serve as the source of groundwater.
3. The proposed total amount of water to be used on an annual and monthly basis, stated in number of acre-feet.
4. The purpose of use, as well as the approximate amount to be used for each purpose. If the amount to be withdrawn and the amount to be used are different, the difference shall be specified. If the purpose is irrigation, then the number of acres to be irrigated shall be specified.
5. The maximum rate of withdrawal.
6. The method of withdrawal.
7. The proposed place of use of the water from each well.
8. A legal description of the location of any wells.
9. A map showing the location of each well.
10. A Groundwater Conservation Plan.
11. A Water Re-use plan.
12. A description of the meter or other device installed on the well to be used for measuring the amount of groundwater withdrawn from the aquifer.

13. A complete list of other permits applied for or issued by the Authority to the applicant.
14. Any other information that the general manager may require.

§707.407 addresses the content of an application for a term permit, which is similar to the application for an additional regular permit.

§707.408 addresses the content for an emergency permit, which are identical in most respects to an initial regular permit, except that a legal description, a groundwater conservation plan, and a reuse plan are not required. However, information establishing that the emergency permit is necessary to prevent the loss of life or severe, eminent threat to the public health or safety. Renewal requirements for an emergency permit are contained in §707.409. These are the same as required in the initial emergency permit, and must be filed before the existing emergency permit has expired.

§707.410 addresses the requirements for a well registration. In addition to the ownership, map, legal description, purpose of use, and amount and rate of withdrawal required in an Initial Regular Permit application, the registration must contain the following information about the well:

15. The three nearest wells within a quarter of a mile of the well and the names and the addresses of the owners of the nearby wells.
16. Any possible sources of contamination such as existing and proposed livestock or poultry yards, septic system absorption fields, or petroleum storage tanks.
17. The rate of withdrawal, in gallons per minute or cubic feet per second.
18. Depth of the well, of the cement casing, and other well specifications.
19. The size and type of pump.
20. The date of construction.

§707.411 addresses applications for new well construction permits. In addition to the registration information contained in §707.410, the application must contain the following information:

21. Proposed date of construction.
22. Identity of the well drilling contractor.
23. Legal basis of right to withdraw groundwater.

The requirements for meter registrations contained in §707.412. In addition to the requirements set forth in §707.401, the ownership, legal description, map, and purpose of use requirements described for an Interim Regular Permit are Required. A statement as to whether a well is exempt or a permitted well is required. Other requirements include detailed mechanical information about the meter, most or all of which would normally be found in the manufacturer's specifications. The date installed and the date last calibrated, as well as the name of the person who calibrated it, are also required.

§707.413 addresses the requirements for applications to install or modify meters. These duplicate the requirements of §707.412, except that the calibration and installation information is not required here.

§707.414 addresses the requirements to transfer interim authorization status and amend application for initial regular permit. When an interim authorization is transferred, the Authority proposes to require, in addition to the general requirements of §707.414, the names and contact information for the transferor and the transferee, and the owners, if different from the transferor and transferee. In addition, the following information is required:

24. Legal descriptions from which the authorization is transferred, and to which it is transferred.
25. The purposes of the use of the groundwater, both before and after the proposed transfer.
26. The proposed withdrawal amounts at the well to which the transfer is proposed.
27. The place of use of groundwater, both before and after the proposed transfer.
28. The proposed term of transfer.

29. A copy of the transfer agreement and any supporting documents.
30. Any other information the general manager may require.

§707.415 addresses applications to transfer and amend a permit. In addition to the information specified in §707.415, a application to transfer a permit must contain all of the requirements of §707.414, except that the last requirement, pertaining to any other information required by the general manager, is not required here.

§707.416 addresses applications for Exempt Well status. These requirements are similar to the well registration requirements found in §707.410, with a few exceptions. The information about maximum rate of withdrawal for the well registration is replaced, under these requirements, with a requirement to provide the maximum rate the well is capable of withdrawing per day, stated in gallons. In addition, there are the following requirements:

31. A statement regarding whether the well (or proposed well) is in a subdivision requiring platting under Chapter 711, Subchapter C of this title.
32. A copy of any plat if the well is located within or serves such a subdivision.
33. A statement as to whether the well does currently or proposes to serve a subdivision.
34. A description of water service to this property, if any. If there is none, the application must contain the distance from the property to the point of termination of the closest potable or non-potable water service line.

§707.417 addresses the applications for monitoring well operation permits. In addition to the name of owner, location, map, withdrawal amount, and depth information required in §707.401, applications for monitor well operating permits must include the following:

35. A clear statement of intended purpose of the monitor well, including a statement of whether monitoring is required by any other state agency, as part of a site investigation or remedial action plan, and whether the well is part of a monitoring well network.
36. A description of the method or device to be used to measure water depth and a description of the method or device used to measure water quality.
37. Any other information required by the general manager.

§707.418, 707.4181, 419, 707.420, and 707.421 are reserved for future rulemaking.

§707.422 addresses agricultural conservation loans that the Authority may make pursuant to Section 17.894 through 17.903 of the Texas Water Code. In addition to the general requirements found in §707.401, these requirements include the items typically found in a loan document, such as credit references, use of proceeds, description of the real property affected, and dealer's or manufacturer's invoice for equipment purchased. In the case of a refinancing of existing, equipment, an appraisal by a qualified appraiser approved in advance by the Authority must be conducted. Financial statements on the applicant, as well as representations and warranties regarding authorization, existence and authority appropriate for the borrower's form of organization are also required, as is any other additional information the General Manager deems necessary.

§707.424 addresses requirements for applications for declaration of abandonment of a groundwater withdrawal permit. An application for declaration of abandonment of a groundwater withdrawal permit must contain the information included in 707.401 along with names and addresses of owners, demonstration of non-use, and a description of the intent of the owner to discontinue permanently the permit.

§707.426 addresses the necessary elements for applications to cancel a groundwater withdrawal permit. These applications must include, along with the information in 707.401, the names and addresses of owners, and a detailed description of all facts demonstrating the non use of all or part of the permit and the facts showing the intent of the owner to discontinue permanently the related beneficial use.

§707.428 addresses the information required for applications to convert base irrigation groundwater. In addition to the information included in 707.401, the application must include the names and addresses of the

owners, a description of facts demonstrating that the groundwater subject to the permit has not been put to beneficial use in the past 10 years.

Subchapter F includes §707.501 through §707.519 and is entitled "Actions on Applications and Registrations by the Authority." §707.501-503 addresses how the Authority reviews an application or registration for administrative completeness. The general manager is required to review an application or registration for administrative completeness in 45 days, or ten days in the case of an emergency permit. The General Manager shall determine whether the application or registration is administratively complete based on whether it contains the necessary --information to:

38. Be sent to the docket clerk to be filed and maintained in the permanent records of the authority.
39. Enable the authority to conduct a technical review, if appropriate.
40. Allow the general manager to take or recommend action on the application, as appropriate.

Upon being determined administratively complete, the General Manager shall notify the applicant or registrant and forward the registration or application to the docket clerk. §707.503 addresses how the authority notifies the applicant of deficiencies, and allows the applicant 30 days from receipt of the notice to correct deficiencies. If such information is not received by the Authority within 30 days, the application is returned.

§707.504-506 describes the time requirements for completing the Authority's technical reviews. Technical reviews shall be completed within 90 days, or 20 days in the case of an emergency permit. An applicant will always have 30 days to provide additional information, which could serve to extend the standard 90-day technical review period. The technical review process carries with it the right for Authority personnel to enter private property upon reasonable notice for the purpose of inspecting, investigating, or verifying conditions or information in the application. Extensions to the time period may also be approved by the general manager if staff finds that the technical review cannot be completed within the prescribed time period.

Additional material necessary for a technical review is requested under the same mechanism as the administrative information in §707.503

§707.507 covers the content of a proposed permit and technical summary of groundwater withdrawal permits. The proposed permit or proposed denial of permit are to be drafted by the general manager and filed with the docket clerk and be available for public review and inspection. A denial must state the reasons for the denial.

A technical summary must contain the following information:

41. The applicant's name.
42. The location of each point of withdrawal.
43. The maximum beneficial amount of water that was used by the applicant during any one year.
44. The purpose or purposes of use.
45. Any equitable adjustment made pursuant to §711.94(f) due to the effect of participation in a federal program on the applicant's historical use of groundwater.
46. The maximum permit withdrawal amount stated in per annum and per month amounts.
47. The maximum rate of withdrawal for each point of withdrawal.
48. A description of any existing metering or measuring devices.
49. The place of use of groundwater.
50. Notice that the General Manager may modify the proposed permit, or seek additional information from the applicant, in the course of the Authority's proceeding on the application.
51. Any permit conditions
52. A statement that the applicant, any applicant for another groundwater permit, or any permittee holding a groundwater withdrawal permit may file a request for a contested case hearing on or before the 30th day after the date of publication of notice of proposed permit, authorization, approval or denial and technical summary in the Texas Register.

53. Any other information that the general manager determines to be appropriate.

If the application is for an initial regular permit, the general manager shall issue the proposed permit or denial and technical summary within 90 days following the effective date of these rules.

§707.508 is applicable for all applications other than groundwater withdrawal permits. Procedures for approval or denial are similar to those in §707.507, but the technical review is limited to the following information:

54. The applicant's name.
55. The location of each point of withdrawal.
56. The purpose or purposes of use.
57. The plan of use.
58. Any other information that the general manager determines to be appropriate.

§707.509 provides that all actions proposed by the General Manager be sent to the docket clerk, who shall then present it to the Authority for action and publication. §707.510 addresses how applications must be published. It applies equally to applications to transfer 1) interim authorization status and amend application for initial regular permit and 2) applications to transfer and amend permit in cases where the point of withdrawal is East of Cibolo Creek. The docket clerk must arrange for publication of notice of proposed action summary in the Texas Register, a newspaper of general circulation throughout the authority's jurisdiction, and at least five other newspapers within the jurisdiction of the Authority. The notice must advise of the proposed action by the Board within 60 days of publication, and state that a hearing may be requested within 90 days of publication in the Texas Register. The notice shall contain a description of the proposed permit, a brief summary of the technical description, and if the notice is for denial, a summary of the reasons for denial. The rule requires a statement that includes:

59. When and where the public can review the information.
60. A statement that the applicant, another applicant, or a permittee holding a groundwater withdrawal permit may request a hearing by filing a request for hearing with the docket clerk within 90 days of the notice in the Texas Register.
61. The notice must also contain a statement that the action will be presented to the Board within 60 days.

§707.511 gives an applicant the right to submit information required to comply with any changes in rules before final action is taken. §707.512 addresses withdrawal of applications. An application may be withdrawn with or without prejudice. For the purpose of this rule, "without prejudice" means that the applicant preserves the right to refile the application at a later date. If an applicant wishes to redraw without prejudice, the Executive Director must recommendation to the Board that the Authority either approve or deny the withdrawal without prejudice.

§707.513 addresses Board action on an application for an agricultural conservation loans, a variance from the comprehensive management plan, a decision regarding loss of exempt well status, and non-substantive permit corrections. In all of these circumstances, the applicant has no right to a contested case hearing. The rule allows for notice to the applicant, scheduling of the presentation to the Board, and public notice. Several similar matters may be consolidated into one action if doing so is efficient and will not injure any party. Public comment and an oral presentation by the applicant are also permitted under this rule.

§707.514 describes the procedure to be taken on applications with no requested Contested Case Hearings. The application is to be presented to the board in an oral presentation, limited to 15 minutes each.

§707.515 gives authority to the general manager to grant applications for new wells, exempt well status, meter modification, and applications to transfer authorization status or permits. The general manager may grant approval, following technical review, so long as the application meets all criteria and does not require interpretation of Authority policy.

§707.516 establishes the general manager's authority to make non-substantive corrections to a permit without formal amendment or public procedures.

§707.517 sets out procedures regarding the loss of exempt well status. If the Authority receives information from a person other than a well owner that the well no longer qualifies for exempt status, it must provide via notification the well

owner with an opportunity to demonstrate why the status should not be changed within 30 days. At the end of that period, the general manager may submit a proposed denial of exempt well status for Board action.

§707.518 empowers the general manager to issue an emergency permit, after the abbreviated review procedures found in §707.504(a) for a period not to exceed 30 days, and provides that the Board will consider the application at its next meeting and take action to rescind, grant, renew, or modify the permit.

§707.519 imposes a moratorium on consideration of any application for an additional regular permit until a final determination has been made on all applications for initial regular permits.

Subchapter G addresses contested case hearings on applications. §707.601 allows a contested case hearing for the following applications:

62. All withdrawal permits.
63. Aquifer recharge and storage permits.
64. Recharge recovery permits.
65. Applications to transfer and amend a permit when the new proposed point of withdrawal is transferred east of Cibolo Creek.
66. Applications to transfer interim authorization status, along with the related permit application, when the new proposed point of withdrawal is transferred east of Cibolo Creek.

§707.602 specifies who may request a contested case hearing. The applicant, an applicant for another withdrawal permit, or any permittee may request a hearing. §707.603 addresses the form and content of a request for a contested case hearing, and §707.604 specifies the deadline for filing such a request to be 90 days from the date of publication in the Texas Register.

§707.605 addresses the processing of the hearing request and allows written responses within 20 days of a board meeting. §707.606 addresses how the Board acts on the request and establishes the criteria for granting a contested case hearing. A contested case hearing shall be granted if it meets form and content requirements of §707.603, is filed by a person specified in §707.602, is timely filed, and is supported by competent evidence. §707.607 sets out document service obligations of the parties.

§707.608 delegates authority to conduct a contested case hearing is delegated to the State Office of Administrative Hearings and adopts the rules of practice and procedure contained in Title 1, Chapter 155 of the Texas Administrative Code. §707.609 describes the Authority's requirements to issue public notice of the hearing and to send certain documents to the administrative law judge, including a list of issues to be addressed, or limitations on issues to be addressed. §707.610 designates the general manager, the applicant, and the requestor of the contested case hearing as parties. Under §707.611, the burden of proof in a contested case hearing is on the applicant to establish by convincing evidence that he is entitled to have an application for withdrawal granted. §707.612 establishes a mechanism for requests for subpoenas to be approved by the Board, who will then request a subpoena from the judge.

§707.613 allows the judge to remand an application if requests for a contested case hearing have been withdrawn or a settlement has been reached. After such a remand, the application shall be uncontested and the applicant shall be deemed to have agreed to the action proposed by the general manager. §707.614 establishes procedures for a judge to certify a question to the authority and for the board to consider the question and issue a written decision. A question may be any issue that may impair a party's ability to present its case that needs clarification or interpretation.

§707.615 addresses the content for a proposal for decision after the hearing is completed, and allows a judge to recommend changes to the permit originally proposed. §707.616 allows waiver of the right to review and comment on the judge's proposal for decision. §707.617 addresses procedures for filing exceptions or briefs in response to the proposal for decision. §707.618 contains procedures for scheduling the Board consideration of the proposal, and allows the board, with proper notices, to consolidate related matters or to sever issues in a proceeding if it is efficient to do so and will not injure any party. Oral presentations to the Board are limited to 15 minutes by each party by §707.619. The board may under §707.620 order the judge to reopen the record for specific

issues under dispute. §707.621 requires the board to render its decision within 90 days, unless all parties have waived review. If they have, a decision can be considered by the Board in less than 30 days.

§707.622 establishes procedures for a party to file a motion for rehearing and for the Board to consider such motion. This rule also requires a motion for rehearing to be filed by a party as a prerequisite for appeal. §707.623 renders a decision final and appealable on the date a motion for rehearing is overruled. §707.624 requirements that an appeal be filed within 30 days of a final decision by the Authority and the contents of the administrative record in the contested case hearing. §707.625 requires that the person who appeals a decision must pay all costs of preparing a record.

Chapter 709: Fees

Subchapter A: §709.1

§709.1 contains the definitions used in this chapter. Significant among them are the following.

- Agricultural use-the use of water for irrigation use.
- Non-agricultural use-the beneficial use of groundwater withdrawn from the aquifer for any use other than irrigation use.

Subchapter B: §§709.3-7

Subchapter B implements §1.29(g) of the Act, allowing a \$10 registration fee on any registration application.

Subchapter C: §§709.9-13

Similarly Subchapter C implements § 1.29 (f) of the Act, allowing a \$25 permit application fee. Both sections contain an enforcement provision in the event of non-payment.

Subchapter D §709.15-27

Subchapter D addresses aquifer management fees. §709.15 states the purpose as establishing formulas and procedures for the calculation, assessment, billing and collection of fees as allowed by §1.11(f) and 1.29(b) and (e) of the act. §709.17 makes exempt wells exempt from the fees.

§709.19 requires the general manager to assess an aquifer management fee for the succeeding year by December 31 of each year based on aquifer use. Two users blocks are defined: agricultural, defined in Subchapter A as irrigation use, and non-agricultural. The acre-foot cost of groundwater within the user blocks must be the same for all users. The rule requires the general manager to determine the total volume of aquifer use as reported in the groundwater user's reports for non-agricultural users for the prior year. The operating revenue requirements for the following year are then divided by the volume of the non-agricultural use water to arrive at a unit cost aquifer management fee for non-agricultural use groundwater. The rule goes on to require that the aquifer management fee per acre-foot for agricultural use to be set at 18% of the non-agricultural use. As drafted, none of the revenue from agricultural use is available for the budget in the calendar year for which the aquifer management fee is collected. It cannot be predicted how much will be collected from agricultural users at the time of assessment because agricultural use numbers for the preceding year are not yet known. Thus, the amount collected for agricultural use in a given year is not available for use, for budgeting purposes, until the following year.

Under §709.21, all persons using groundwater under interim authorization status or any final groundwater withdrawal permit are required to pay the fees. An agricultural user is required to pay the fee based on actual usage for the past year, while non-agricultural users who have not entered into a user contract pay based on their maximum historical use during interim authorization status and total permitted volume once a permit is issued.

The rule requires that the general manager mail invoices to non-agricultural users by December 20 of each where, whereupon they immediately become due. Such an invoice, if it is for less than \$600, is delinquent if

not paid in full by March 1 of the following year. If an invoice is for \$600 or more, the user may elect to pay the fee in monthly installments. If the user elects to pay in monthly installments, the payment is delinquent if not received in the Authority's office by the last business day of each month in which a payment is due.

Agriculture users are required calculate their payment based on their groundwater use report and include payment in full, which is delinquent if not received in the Authority's office by January 31 of each year. No monthly payment option is available to agricultural users, nor is the Authority required to send notice to the agricultural users of the amount per acre-foot that they must remit.

This section also requires the general manager to assess a penalty of 5% of the then delinquent amount for each month the payment is late.

§709.23 limits the amount of fees that may be collected to an amount reasonably necessary for the administration of the authority as reflected in its annual operating budget.

§709.25 allows the general manager to enter into contracts with terms of one year or less with non-agricultural users in which the Authority pays a user to commit to use less groundwater than he would otherwise be authorized. The cost of such payments shall be assessed through aquifer management fees.

§709.27 adopts the calendar year as an effective period for the fee. §709.29 prohibits the expenditure of aquifer management fees for purchasing or operating a water supply facility. §709.31 allows the Authority to waive fees as part of a contract in which the authority may reimburse a person who becomes a creditor of the authority.

§709.33 empowers the general manager to suspend the processing of an application before the Authority or taking any other action authorized by law. §709.35 prohibits a person from withdrawing groundwater if the person or his predecessor in interest is delinquent in the payment of an aquifer management fee.

Subchapter E: §§709.50-74

Subchapter E addresses permit retirement special fees and establishes voluntary procedures to calculate, assess, bill, and collect permit retirement special fees. § 709.52 states that these rules are applicable to retirements that may be made to accomplish mandatory retirements that will be made to reduce permitted withdrawals to 450,000 acre-feet per annum to 400,000 acre-feet per annum. Downstream water rights holders in the Guadalupe River Basin may be assessed to reduce the permitted withdrawals to 400,000 acre-feet, except on contractual deliveries of water stored in Canyon Lake that may be diverted downstream of the San Marcos Springs or Canyon Dam.

§709.54 establishes the Groundwater Right Retirement Fund, and the requirement that permit retirement fees received by the authority shall be deposited and credited to this account. This fund and these fees may only be used to retire initial regular permits under the restrictions in this rule as well as those in §709.58. Any money collected but not necessary to retire initial regular permits shall be reimbursed to the payers of the fees. Under §709.56, the general manager must prepare a report to the Board and the executive director of the Texas Natural Resources Conservation Commission by year-end for each year from 2000 and 2007.

§709.60 addresses the allocation of permit retirement costs to reduce permitted withdrawals to 400,000 acre-feet and sets out that the cost to voluntarily retire any permits to reach the 400,000 acre-feet/year by 2008 will be borne equally by the downstream water right holders and the holders of initial regular permits.

Under §709.62, the permit retirement special fees shall be assessed by December 31 for each year beginning in the year in which the board has issued a final order disposing of all initial regular permits. The permit retirement special fees shall be based on a fixed amount per acre-foot, regardless of the number of acre-feet a given permit authorizes. In the budgeting process required by this rule, the general manager must determine the total amount of groundwater authorized pursuant to initial regular permits by November 20 of each year in which the board has issued a final order disposing of the initial regular permits. Not later than December 20th of each year, the general manager shall calculate the permit retirement special fees per acre-foot of groundwater authorized to be withdrawn.

§709.64 sets forth the requirement for persons authorized to withdraw groundwater to pay the retirement special fees. The authority must invoice these amounts by December 20 of the following year, which become due and payable immediately if the total retirement fee invoice is less than \$600 and is considered delinquent if not received by the March 1 of the next year. If the total annual retirement fee is more than \$600, a permittee may elect to pay the fee on a lump sum or in equal monthly payments. Such an invoice becomes delinquent if payment is not received in full within one year by the

following March 1, or if a monthly payment is not received by the Authority on or before the last working day of the month. After a 10-day grace period, a penalty of 5% of the then-delinquent amount shall be assessed for every month the invoice remains delinquent.

§709.66 requires that permit retirement special fees for the succeeding year by the TNRCC shall be in accordance with subchapter H of title 30, Texas Administrative Code, relating to financing the Rio Grande Watermaster Operation. This rule also requires the TNRCC to make adjustments necessary to ensure equitable adjustments between priority and non-priority users. §709.68 imposes an invoicing schedule and delinquencies on the TNRCC similar to those required under §709.64. §709.70 requires the authority to collect the retirement special fees invoiced by the TNRCC under the same Rio Grande Watermaster Operation rules.

§709.72 states that the effective period for all retirement fees shall be a calendar year.

§709.74 authorizes the general manager to suspend the processing of any application owned by a person who owes a delinquent fee, or to take any other action to enforce payment and collection of delinquent retirement fees. §709.76 prohibits a person who is delinquent in the payment of a retirement fee from withdrawing groundwater from the aquifer. This same rule prohibits persons or entities making contractual sales of water stored upstream from Canyon Dam from establishing a system-wide rate that imposes permit retirement fees on purchasers of upstream-stored water.

Chapter 711: Groundwater Withdrawal Permits

Subchapter A: §711.1

§711.1 is dedicated to definitions. The most significant definition is for waste, which is repeated in its entirety below:

- (6) **Waste --**
 - (A) Withdrawal of groundwater from the aquifer at a rate and amount that causes or threatens to cause intrusion into the reservoir of water unsuitable for agricultural, gardening, domestic or stock-raising purposes;
 - (B) The flowing or producing of wells from the aquifer if the water produced is not used for a beneficial purpose;
 - (C) Escape of groundwater from the aquifer to any other reservoir that does not contain groundwater;
 - (D) Pollution or harmful alteration of groundwater in the aquifer by salt water or other deleterious matter admitted from another stratum or from the surface of the ground;
 - (E) Willfully or negligently causing, suffering or permitting groundwater from the aquifer to escape into any river, creek, natural watercourse, depression, lake, reservoir, drain, sewer, street, highway, road, or road ditch, or onto any land other than that of the owner of the well, unless:
 - (1) such discharge is authorized by permit, rule, or order issued by the commission under Chapter 26, Water Code; and
 - (2) after discharge, the groundwater from the aquifer is beneficially used by the existing user, applicant or permittee making the discharge;
 - (F) Groundwater pumped from the aquifer for irrigation that escapes as irrigation tailwater onto land, other than that of the well owner, unless permission has been granted by the occupant of the land receiving the discharge;
 - (G) For water produced from an artesian well, "waste" has the meaning assigned by the Water Code, '11.205;
 - (H) Constructing, installing, drilling, equipping, completing, altering, operating, maintaining, or making withdrawals from a well without a required permit;

(I) Withdrawal of water that is substantially in excess of the volume or rate reasonably required for a beneficial use;

(J) Irrigation use of groundwater from the aquifer in a volume per irrigated acre that is so insufficient that a crop could not have been reasonably cultivated and produced.

Subchapter B: §§711.10-14

Subchapter B addresses general provisions. §711.110, in defining the purpose of this subchapter, restates part of the findings and declaration of policy found in §101 of the Act as well as the powers found in §108(a) of the Act.

§711.12 requires a permit from the authority for 1) the right to withdraw water from the aquifer (other than from exempt wells), 2) a well, whether it is built for withdrawal of water or monitoring of water quality, 3) a pump on a well, 4) a meter on a well, 5) the right to recharge water into the aquifer, or 6) the right to store water within the aquifer. In general, permits for wells, pumps and meters must be received before installation or major modifications. However, a permit to install a well is not necessary under this rule for an existing exempt and or non-exempt well. §711.14 allows withdrawals without a permit for interim authorization status wells and exempt wells.

Subchapter C: §§711.18-48

Subchapter C addresses exempt wells. §711.118 is a definitions rule that defines a number of terms used in the process of subdividing property for development. Under §711.20, a well qualifies for exempt well status if 1) it is capable of producing no more than 25,000 acre-feet per day or 2) it will be used solely for domestic or livestock use; and 3) it is not within or serving a subdivision requiring platting. Under §711.22, an exempt well owner does not have to comply with the terms of §711.12, the metering and reporting requirements of subchapter M of this chapter, file a declaration of historical use, or comply with Section 709, Subchapter D, relating to aquifer management fees. An owner cannot apply to obtain a groundwater withdrawal permit except under circumstances found in §711.48. Similarly, exempt wells cannot qualify for interim authorization status. §711.24 states that withdrawals from exempt wells are not included in the cap calculations under §§1.14(b) and (c) of the Act, which address only permitted withdrawals of groundwater. An exempt well must be registered under §711.26.

Under §711.28, a person who wishes to construct a new exempt well must first apply for and obtain an exempt well status determination and apply for and obtain a new well construction permit. Authorized uses for exempt wells are restricted to domestic and livestock uses under §711.30 and a production limitation of 25,000 gallons per day under §711.32.

§711.34 requires the platting of subdivisions, except in certain defined circumstances. The overall effect of the requirement and the exceptions is to require platting on all subdivisions with a city's city limits or extraterritorial jurisdiction that envision resale for normal suburban-type development, except for those subdivisions that occurred prior to June 28, 1996. Under an alternative we were asked to consider, any land subdivided prior to June 28, 1996 would not have to be platted if, when the final action is taken on exempt wells, the subdivision either does not have retail water service or if another municipal distribution system was intended to serve it within a year of the application for exempt well status. §711.36 is a definitional rule that defines a well with a subdivision requiring platting to be within the boundaries of a subdivision requiring platting. Under 711.38, a well serves a subdivision requiring platting if is connected to serve two or more service connections within the subdivision requiring platting, subject to certain exemptions for the housing of employees and relatives.

§711.40 allows an exempt well to maintain its exempt status if it maintains its historical exempt use and does not serve and is not envisioned to serve a subdivision in which it is located, while §711.42 allows a non-exempt well to revert to exempt status if the subdivision is vacated or cancelled. Under §711.44, a well loses its exempt status if it is not used for domestic and livestock use, if it is modified to be capable of producing more than 25,000 gallons per day, or if it begins to serve a subdivision requiring platting. §711.46 prohibits dual well status, while an alternative being considered allows exempt use from a non-exempt well if uses are separately metered. §711.48 addresses conversion of wells status and references the application procedures for such in Section §707.

Subchapter D includes §§711.60-74 and addresses interim authorizations. Under §711.60, a well qualifies for interim authorization if it was a producing non-exempt well from which the person owning the well timely filed a declaration and made withdrawals form the aquifer. Under §711.64, a person owning a well with interim authorization status my

continue to withdraw groundwater, while §711.66 codifies the requirements of 1.17 of the Act, which limits the withdrawals to maximum historical use and requiring compliance with other statutes and rules. §711.66 extends the termination date of the interim authorization status to the beginning of the next calendar year. §711.68 restricts the authorized uses of the groundwater to the uses designated in the application according to the categories of industrial, municipal, or irrigation use.

According to §§711.70-72, during a well's interim authorization period, the person may withdraw the lesser of maximum historical use, the amount set out in an initial regular permit proposed by the general manager, or an amount set out in a user contract entered into under §709.25 of this title. Furthermore, a well must otherwise be compliant with other standards and applicable law.

§711.74 is a provision that prevents an action taken by the board or general manager during the interim authorization period from becoming binding on either the Authority or the applicant with respect to any issue of fact or law that may arise in the application for a permit.

Subchapter E: §§711.90-118

Subchapter E addresses permitted wells. §711.90 sets out the permit categories: initial regular, additional regular, term, emergency, and aquifer recharge and storage permits, recharge recovery, well construction, and monitoring well permits. §711.92 authorizes beneficial use for three purposes: irrigation, municipal, and industrial.

§711.94 sets the requirements of beneficial use without waste. The declaration of beneficial use without waste inures to the benefit of the owner of the well and not a contract user, and allows the owner to claim the use in a declaration. The rule establishes a rebuttable presumption that irrigation of two acre-feet per acre constitutes beneficial use without waste, and that the irrigation of several crops does not by itself constitute waste. Also contained in this rule is a mechanism for different well owners who irrigated the same land to each declare a pro rata share of the use during the historical period, with the sum not to exceed two acre-feet per acre.

§711.96 addresses non-Edwards groundwater. Although groundwater from other aquifers may not be permitted by the Authority, the Authority may permit withdrawals of Edwards water from wells that withdraw from multiple aquifers. This rule allows the Authority to determine of how many acres could have reasonably been irrigated from the Edwards withdrawals, and then grant a permit for two acre-feet per acre.

§711.98 addresses initial regular permits. These permits are initial in the sense that they are the initial class of permits issued based on beneficial use of groundwater for the aquifer during the historical period.

This rule requires that the board issue a permit when certain facts are established by convincing evidence. These facts pertain to well ownership, location, compliance status, and timely filing of the required declaration, application fee, and other required information. The rule states that a permit shall be issued for an applicant's maximum historical beneficial use without waste during the historical period to the extent groundwater is available for permitting, but subject to proportional adjustment under the rules of Subchapter G to the extent groundwater is not available for permitting.

These permits are perpetual and transferable under certain conditions found in the rules of Subchapter L of this chapter. Initial regular permits may be retired under the retirement rules of Subchapter H of Chapter 715, the equal percentage reduction rules of Subchapter G of this chapter, and the springflow maintenance rules of Subchapter G of Chapter 715. Initial regular permits may be suspended under the groundwater trust rules of Subchapter N of this Chapter and the demand management rules of Chapter 715, Subchapter D. Interruption of the withdrawal rights is allowed by rules to manage drought, critical period, and springflow also to be found in Chapter 715. Permits may be abandoned under or cancelled pursuant to rules found in Subchapter H of this chapter. Chapter 715 rules have not been given to the Rules Assessment Team; thus we cannot evaluate the impact of this aspect of these rules. For the purpose of this programmatic assessment, we will assume that the aspects of Chapter 715 pertinent to these rules have no effect. We will assess their impact on these rules at a later time.

§711.100 addresses criteria for additional regular permits, which may only be issued after a final determination on all initial regular permits has been made and the board has issued an order stating that the Authority may accept applications for additional regular permits. The permitting criteria contained in this rule are similar to those for additional regular permits found in the previous section. §711.102 is a similar rule addressing term permits.

§711.104 addresses emergency permits, which are neither transferable, nor interruptible, and may not be issued for a term exceeding 30 days. Emergency permits must some special requirements as well as many, but not all of the criteria for other permits. Such a permit may only be issued when all other withdrawal amounts permitted have been exhausted, when no other source of water from a municipal distribution system is available, and when the permit is necessary to prevent severe, imminent threat to the public health or safety.

§711.105 and §711.106 address aquifer recharge and storage permits and recharge recovery permits, respectively.

§711.108 and §711.110 sets forth the criteria for well construction permits and monitoring well permits, respectively. These refer to construction standards and general compliance standards found in this rule and elsewhere in the Authority's rules.

§711.112 prescribes the content of groundwater withdrawal permits. Permits must contain the following:

67. Contact information on the permittee.
68. Contact information of an authorized representative
69. Permit category.
70. Term.
71. Purpose of use.
72. A maximum rate of withdrawal in gallons per minute.
73. Maximum volume of withdrawals by purpose in acre-feet by purpose on an annual basis.
74. Location of points of withdrawal and place of use.
75. Source of groundwater
76. Metering method or other measurement method.
77. Conditions for retirement of permits
78. Conditions for suspension of withdrawals
79. Conditions for interruption.
80. Conditions for renewal.
81. Reporting requirements.
82. Notice of limitations provided in the Act and these rules.
83. Standard groundwater withdrawal conditions set forth in Subchapter F of this chapter.
84. Any other appropriate conditions or information required by the Board.

§711.116 addresses the content of well construction permits, which must include:

85. Contact information
86. Information on rate of withdrawal
87. Legal description of the property
88. Mechanical information on the well, including pump size and other construction specifications
89. Reporting requirements
90. Notice of limitations provided in the Act and elsewhere in the rules
91. Any other information required by the board.

§711.118 is a very similar rule addressing the contents of monitor well permits.

Subchapter F: §§711.130-134

Subchapter F addresses standard groundwater withdrawal permit conditions to be a part of all groundwater withdrawal permits, according to §711.130-132. §711.134 sets out the standard conditions. These standard conditions are essentially requirements of permittees in rules found elsewhere in the Authority's rules, the act, and any other conditions as may in the discretion of the board be reasonable and appropriate.

Subchapter G: §§711.160-180

Subchapter G addresses groundwater available for permitting, and the alternative we have been asked to consider as a base case assumes a two-phase proportional adjustment. Its purpose, under §711.160 is to establish the amount of groundwater available for permitting, the procedures for making proportional adjustments under §1.16(e) of the Act, and procedures for implementing equal percentage reductions under §1.21(c) of the Act. §121(c) addresses an immediate reduction if more than 400,000 acre-feet of withdrawal rights are still in existence after January 1, 2008. Under §711.162, the subchapter is applicable only to groundwater withdrawal permits.

§711.164 establishes aquifer conditions in which the total withdrawals from initial regular permits and additional regular permits may not exceed 450,000 acre-feet.

§711.166 establishes criteria for issuing term permits. The amount of groundwater subject to being permitted under term permits is controlled by a board order issued pursuant to 711.102 and is not subject to the maximum established by §711.164. Term permits may only be used during the following aquifer conditions:

- (1) for wells within the San Antonio pool and within a county other than Atascosa and Medina counties, well J-17 is greater than 665 feet above mean sea level;
- (2) for wells within the San Antonio pool and within Atascosa or Medina counties, well TD 69-47-306 is greater than 685 feet above mean sea level; or
- (3) for wells within the Uvalde pool, well J-27 is greater than 865 feet above mean sea level.

§711.168 establishes an exemption from the withdrawal caps for emergency permits. When imminent threats to public health or safety are present, then the withdrawal cap may be exceeded to the extent of emergency permits. §711.170 establishes a similar exemption for monitor well permits, which allows sufficient quantities to be withdrawn to properly collect water quality samples.

§711.172 addresses the proportional adjustment of initial regular permits and defines some important terms. The discussion below defines some important terms.

- Historical average minimum--The minimum amount of groundwater that an applicant who operated the well three years or longer during the historical period shall be authorized to withdraw. The definition of maximum historical use goes on to define the term in the context of a calculation as "the number of years during the historical period inclusive of and after the date of initial installation of the well, irrespective of whether withdrawals may have been made in a year." The minimum is calculated by dividing the total withdrawal during the historical period by the total number of years during the historical period that the well existed, irrespective of whether withdrawals were made in a year.
- Operate a well-The withdrawal of groundwater from a well for beneficial use for any period of time in a year constitutes the operation of the well in that year
- Irrigator minimum--two acre-feet per acre of land actually irrigated during any one calendar year in the historical period.
- Maximum Historical Use (MHU)--the greater of an applicant's irrigator minimum or his maximum beneficial use without waste during any one calendar year. For applicants without a full year's use during the historical period, one shall be calculated assuming a full year's worth of operation.
- Proportional Adjustment Factor (PA Factor)--the ratio in which the numerator is the amount by which all maximum historical uses exceed 450,000 acre-feet/year and the total of all maximum historical uses. For example, if all maximum historical uses equal 600,000, then the PA-Factor would be $(600,000-450,000)/500,000$, or 25%.

- **Proportionally Adjusted Amount (PA-1 amount)**-The amount, in acre-feet/year, resulting from multiplying an applicant's maximum historical use by the PA-Factor and subtracting that product from the maximum historical use. In the case of a permit with a 1,000-acre/foot historical use, the illustration above would result in a adjustment of $.25 \times 1,000$, or 250, which is subtracted from the maximum historical use to result in a PA-1 amount of 750.
- **Step-up amount** -The difference between the irrigator minimum or the historical average minimum and the PA-amount, in the case of an applicant whose PA-amount is less than the greater of his average minimum use or his irrigator minimum. If an applicant in this example had a 950 acre-foot average historical minimum, which is greater than the PA-amount, then SUA calculation would be $950-750=200$.

Thus, the procedure for proportional adjustments, assuming maximum historical use is found to be greater than 450,000, is as follows:

- Calculate the PA-1 factor.
- Apply the PA-1 factor to each applicant's Maximum Historical Use
- Compare the PA-1 amount for each permit to each applicant's average historical minimum
- For all applicants whose average historical minimum is greater than the PA-1, amount, calculate and add a step-up adjustment by subtracting the PA-1 amount from the average historical minimum.

The sum of all resulting permits calculated according to the procedure in 711.172 must not exceed 450,000 acre-feet per annum. As is discussed extensively in Section 6.1, the claims to historical use will most likely arrive at a higher number. The Authority has two tools at its disposal: 1) to enter into market transactions with applicants to buy enough applications to meet the withdrawal limit, or 2) to not issue all or part of each applicant's step-up amount, which will result in issuing exactly 450,000 acre-feet under the mandatory reduction procedures of §711.176 below. The latter mechanism assumes mandatory reductions as a last resort, and depends on rules not yet assessed in Subchapter H (related to Regular Permit Retirements) of Chapter 715 for critical mechanisms. Because these rules are not available, and because we assume a voluntary buy-down of applications will be successful, we have not yet assessed mandatory equal percentage reductions.

Other aspects of §711.172 require the board to issue orders to make the proportional adjustment when they are called for, to include these the proportional adjustments in each final initial regular permit, and to account for all groundwater proportionally adjusted from each permit. If additional groundwater not attributable to recharge, storage, or recovery projects become available for permitting, then the proportionally adjusted amounts shall be restored through the inverse application of the method contained in the rules.

§711.174 is merely a reference to Chapter 715 Subchapter H rules, where the equal percentage reduction rules to accomplish the reduction to 400,000 acre-feet are to be included. We have not yet assessed the impact of this rule since it cannot be implemented without Subchapter H of Chapter 715.

§711.176 addresses groundwater withdrawal amounts for initial regular permits and reduction of step-up amounts and depends on Subchapter H of Chapter 715 for critical mechanisms to become operative. This rule gives the Authority a backstop mandatory reduction procedure in the event that it finds that market mechanisms are not successful in reducing the applications to be permitted to 450,000 acre-feet. Under this section, all applicants shall receive an initial regular permit authorizing withdrawal in the amount of the permit calculated according to §711.172 above, minus the step-up amounts (or some portion of the step-up amounts to the extent necessary to reach the amount of groundwater available for permitting in 711.164(a). As stated above, because Subchapter H of Chapter 715 is not available, and because we assume a voluntary buy-down of applications will be successful, we have not yet assessed mandatory reductions of step-up amounts. The effect of this rule will be assessed when Subchapter H of Chapter 715 is made available.

§711.178 addresses groundwater withdrawal schedules applicable to all regular permits and term permits. This requires a permittee to file a withdrawal schedule with the Authority by November 1 of the first year a permit has been issued. All regular permittees must provide a schedule of the monthly amount of water to be withdrawn in the succeeding year by month and point of withdrawal. If the General Manager determines that it does not, he shall return the schedule and

advise the permittee of the specific reasons for such a determination. The rule does not impose a deadline on the general to notify the applicant of such a notification. Amounts not used in one month may be carried forward to a future month by filing a revised schedule on a form not yet specified by the proposed rules. Penalties for non-compliance have not been developed yet.

§711.180 provides that the Authority shall pay compensation for the step-up amount and also depends on Subchapter H of Chapter 715. As such, we have not assessed the effects of compensation for mandatory reductions of step-up amounts.

Subchapter H: §§711.190-204

Subchapter H is entitled Abandonment and Cancellation. Its purpose, under §711.190 is to establish the circumstances under which a groundwater withdrawal permit may be cancelled or abandoned. All groundwater withdrawal permits shall be subject to abandonment and cancellation under §711.192-194.

§711.196 allows the termination of a permit when the groundwater to be withdrawn under the permit has not been used, and the owner's intent to discontinue permanently the beneficial use of all or part of the groundwater. The continued and unexplained nonuse of a permit for an unreasonable period of time creates a rebuttable presumption of intent to abandon. §711.198 allows the board to enter into agreed orders for abandonment. Under §711.200, the general manager may initiate proceedings to terminate a permit based on abandonment if he finds that some portion of the groundwater has been unused for an unreasonable period of time.

The remainder of the Chapter employs a 10-year standard of nonuse as grounds for cancellation without specifically ruling out shorter periods. §711.202 allows the Authority to cancel a permit in whole or in part if groundwater was not used under a permit during the ten-year period prior to the cancellation proceedings authorized by this subchapter. The years of nonuse only include years in which a permit was issued, so that this rule will have no effect during interim authorization. The rule exempts non-use for water and environmental conservation programs. §711.204 permits the general manager to initiate proceedings for abandonment when he finds that some portion of the groundwater has not been beneficially used for 10 years.

Subchapter I: §§711.220-234

Subchapter I, consisting of §§711.220-234, contains general prohibitions. §711.220 prohibits use of groundwater outside the Edwards boundaries and establishes the processing point as a place of use where water is incorporated into a commodity. §711.222 prohibits withdrawals from new wells, except where interim authorization status or a permit has been transferred. §711.224 prohibits construction, operation, or maintenance of a new non-exempt well, or operate such a well at a higher rate than the rate approved for the well in a permit. §711.226 prohibits construction operation or maintenance of an exempt well with an approved registration form on file with the Authority. §711.228 prohibit violations of the Act, the Authority's rules, or terms of permits. §711.230 prohibits waste prevention, while §711.232 prohibits pollution of the Aquifer. §711.234 establishes pollution, waste, and operation of a well at a higher rate of production than approved for that well.

Subchapter J: Aquifer Recharge, Storage, and Recovery Project (reserved)

Subchapter K: §§711.290-304

Subchapter K addresses additional groundwater supplies. Its purpose, found in §711.290, is to establish the procedures for the board to determine if there are additional groundwater supplies available from the aquifer under §1.14(d) of the Act, and its applicability, under §711.292, is to initial regular permits, additional regular permits, and recharge recovery permits. Some water management strategies are deemed to potentially provide a basis to determine if there are additional groundwater supplies available under §711.294, while three specifically would not provide a sufficient technical basis for finding additional supplies: conservation, reuse, and drought management plans.

§711.296 requires the general manager to prepare a report on November 30 of each year a report on additional water supplies that have studied or are being studied. The rule contains specific requirements for content, estimation of further supplies, and recommendations, including a reasoned analysis supporting any recommendation. The board may then, under §711.298 issue an order determining that additional supplies are available if the required studies have been completed and the general manager's report demonstrates that additional groundwater supplies are present. If such an order is issued, then the general manager is required under §711.300 to consult with appropriate state and federal agencies

and submit a consultation report to the board. The board may then issue an order permitting an increased withdrawal cap if it makes certain findings, the most substantive being that there will be no adverse impact on water quality, on springflows at Comal Springs and San Marcos Springs, or on the owners of initial regular permits.

§711.304 addresses the allocation of additional groundwater supplies. If the supplies are attributable to a recharge recover permit other than pursuant to §711.310, then the additional groundwater is allocated to the permittee holding the recharge recovery permit. For other supplies, the groundwater is allocated to restore on a pro rata basis any reductions from an applicant's maximum historical use in the following order of priority:

92. Retirements of initial regular permits made pursuant to §121(g) of the Act, relating to the reduction of the withdrawal cap to 400,000 and Chapter 715, Subchapter H, relating to permit retirements
93. Any Phase 2 proportionately adjusted amounts under §711.172(g)(8).
94. Any Phase 1 proportionately adjusted amounts under §711.172(g)(5).

Subchapter L: §§711.320-364

Subchapter L contains the rules for transfers. §711.320 and defines certain important terms. Key definitions important to understanding these rules are defined below.

- Base irrigation groundwater—the 50% portion of the groundwater withdrawal right that is not transferable from the place of use originally described in the initial regular permit.
- Conserved irrigation water—the amount of water conserved after water conservation equipment has been installed and subject to a final order by the Board designating it as groundwater pursuant to §711.340.
- Groundwater withdrawal amount—the total amount authorized under a regular permit or pursuant to interim authorization status.
- Restricted irrigation groundwater—the amount of base irrigation groundwater that is physically impossible of being placed to beneficial use at the place or purpose indicated in the regular permit or application for regular permit on which a final order has been issued.
- Transfer—a change in a regular permit or application of ownership, authorized person, point of withdrawals, purpose or place of use, maximum rate of withdrawal, or period of withdrawal.
- Unrestricted irrigation groundwater—the 50% portion of an irrigation permit or interim authorization status that is transferable as a matter of right to another place or purpose of use.
- Water conservation equipment—any physical device that reduces the use of groundwater required for irrigation purposes.

Under §711.322, Subchapter L is applicable to interim authorization status, all regular permits except term permits, recharge recovery permits, and monitoring well permits but does not apply to permit retirements, sale of groundwater under typical wholesale or retail supply contracts, or suspension of withdrawals under Comprehensive Water Management Plan Implementation. §711.324 prohibits the transfer of term, emergency, construction, and monitoring permits, the transfer outside the boundaries of the Authority, or the place or purpose of base irrigation groundwater. §711.326 restricts the transferability of aquifer recharge recovery permits to its ownership, purpose, and place of use.

§711.328 allows the transfer of ownership of the permit separately from the ownership of a place of use or point of withdrawal in most cases. Absent an express reservation, however, the permit shall be presumed to transfer with the underlying land. The rule further provides for the transfer of all or part of the permit to a different point of withdrawal or place of use, although no base irrigation groundwater may be transferred. Owners of wells qualifying for interim authorization status and permittees are authorized to make transfers consistent with this subchapter.

§711.332 addresses the term during which an interim authorization transfer or a permit may be transferred, essentially referring back to the term of the permit or the interim authorization status.

§711.334 authorizes unrestricted transfers of non-irrigation permits. §711.336 repeats the free transfer abilities for unrestricted irrigation groundwater.

§771.338 prohibits the transfer of base irrigation groundwater.

§711.340 allows the conversion of base irrigation groundwater to restricted irrigation groundwater under certain circumstances set forth in §711.342. This rule requires the board to grant such an application if it makes certain findings, the most substantive being that it is physically impossible to place the groundwater to beneficial use at the place of use identified in the initial regular permit or the application. Similarly, the board is required to grant an application of base irrigation groundwater to conserved irrigation groundwater if it makes certain findings, the substantive one being that groundwater from the aquifer will be conserved after the installation of water conservation equipment. Restricted irrigation groundwater withdrawal rights may be transferred to another place or purpose of use within the same county, and conserved irrigation groundwater withdrawal rights may be transferred without restriction as to place or purpose of use. It is conceivable that restricted irrigation groundwater withdrawal rights may be transferred to another purpose in the same county, at which time the existing withdrawal rights for that purpose are transferred out of the county.

§711.348 requires a transferee to file a notice of transfer of ownership within 30 days of the transfer and requires the general manager to execute the appropriate changes in the permit and Authority records. §711.352 requires the Board to approve an application to transfer and amend a regular permit or application for a regular permit if the Board makes certain findings, most of them regarding compliance with administrative requirements. The substantive findings of fact required under this rule for permits that are transferred west of Cibolo Creek to East of Cibolo Creek. For these transfers, the Board must find that the aquatic and wildlife habitat will be protected, that endangered and threatened species will be protected, that springflows of Comal Springs and San Marcos Springs will not be affected during critical drought conditions, and that continuous minimum springflows at these springs will be maintained at a level required by federal law.

§711.354 requires the Authority to maintain a database to record all transfers. §711.356 requires the transferor or transferee, or both, as appropriate to file the amended regular permit in the deed records of the county or counties in which the permit is transferred to and from within 30 days of issuance by the Authority. §711.358 establishes the effective date of a transfer as the date on which the Authority issues the final order. Under §§711.360, the transfer is subject to any other applicable law. §711.362 subjects a federal agency to the transfer approval requirements.

Under §711.364, the general manager has obligations to monitor the impact of the transfers as a matter of right and prepare a report to the board making findings and recommendations concerning such impacts.

Subchapter M: §§711.400-420

§711.400 establishes that Subchapter M applies to the owner of any well that takes groundwater from the aquifer, but does not apply to owners of exempt wells.

Under §711.402, the owner of a well must install and operate a meter that measures the amount and rate of groundwater taken from the well, unless the owner applies to the Authority for a Waiver of Duty to Install and Operate a Meter. Dual status wells must have separate meters for exempt and non-exempt withdrawals. Meters must be installed no later than six months after the rules are effective. Meters may not have an error of more than +/- 5 percent.

§711.404 describes the responsibilities of the owner to maintain and operate meters, and requires an irrigation well owner who transfers all or part of the well's water use to another use to reimburse the authority on a pro rata basis the installation and purchase cost of the meter, and to notify the Authority in writing to remove the meter pursuant to §711.412.

§711.406 describes the process of approval for meter installation and the specifications for meter design and performance.

§711.408 describes the registration process for pre-existing meters or alternative measuring methods. The owner of a meter must, within six months of the effective date of the rules, register the meter or method on a form provided by the Authority.

Under §711.410, the owner of a well must notify the general manager within seven days of suspecting that a meter may be inaccurate. The general manager may then conduct an investigation and approve the testing, repair, or replacement of the meter, at the owner's expense.

§711.412 describes the process by which a meter may be removed, modified, or disabled. The owner of a meter must give notice to the Authority of his intentions, and may not take action until the general manager has approved the notice in writing.

§711.414 requires that owners of wells must report meter results in an Annual Water Use Report by March 1st of each year.

Under §711.416, the Authority has the right to enter the land of the owner of a well to inspect the meter, or to perform maintenance or repair activities.

§711.418 states that no one may disable a meter or tamper with a meter's accurate measuring and recording capabilities.

§711.420 describes the measures of enforcement taken by the Authority if withdrawals are not metered in accordance with the above rules.

4. Alternatives

As part of the Programmatic Assessment, several alternative approaches to rulemaking were evaluated. Some of these represent conceptual alternatives that provide a context for evaluating the proposed rules. The conceptual alternatives are discussed as follows.

- Section 4.1 discusses the hypothetical “no action” alternative of no regulations at all.
- Section 4.2 discusses the actual future if the Authority does not adopt rules, namely that aquifer regulation would be undertaken by another government entity.
- Section 4.3 discusses the option of changing the authorized limit on withdrawals.
- Section 4.4 discusses the option of the Authority issuing all of its rules as a single package.

Additional alternatives represent actual substantive changes to specific rules that are now proposed. These alternatives are discussed in Section 4.5.

4.1 The Hypothetical Alternative of No Regulation

Presently, withdrawals from the Edwards Aquifer average close to 450,000 AFY. Therefore, a limit on withdrawals of 450,000 AFY by itself would not necessarily result in a reduction in water use compared to current conditions. Rather, what the cap does is to close the door to additional initial regular permits and increased permitted withdrawals unless and until studies show the cap can be lifted.

The “unconstrained future” is the alternative that represents what will happen without any rules. Edwards pumping would not be regulated, pumping would grow steadily over time, and aquifer water levels and spring flows would decline. **This alternative is exactly what the Act is designed to avoid.** It is considered here solely as a comparison to the proposed rules. Projecting future conditions without regulation and comparing that future to what will happen with regulation provides a better understanding of how things will change when and if the Authority adopts the rules described in Chapter 3.

The comparison is particularly useful in determining what the initial permitting regulations will bring in the way of benefits (for example, protecting spring flows), costs (for example, reduced water rations for many), and other changes (for example, creation of a water-rights marketplace). Discussing the alternative in no way implies developing the Edwards Aquifer without restriction is an available option. Indeed, the Authority’s statutory mandate to regulate withdrawals precludes such an outcome.

In Chapters 5, 6, and 7, two specific unconstrained conditions have been identified as illustrative to indicate a range of what could occur in the future. In one condition, the total demand for municipal and industrial pumping is assumed to increase by 20% over existing conditions. This is a worst-case estimate for the next 5 years, and more likely what might be

expected in a period of 10 years. Thus, actual conditions in the next five years are probably intermediate between this scenario and a scenario of continued pumping at existing levels. The second future condition increases M&I pumping by 50%, which might occur in a 20- to 40-year timeframe.

4.2 Actual Future if the Authority Does Not Regulate: Regulation by Others

The requirement to regulate Edwards pumping comes from the Texas Legislature through the Act. The Act was motivated in large part by a Federal court decision that ordered limits on pumping to protect endangered species (*Sierra Club v. Lujan*, MO-91-CA-069). The Authority must follow the legislative mandates (*Edwards Aquifer Authority v. Glenn Bragg*, No 04-99-00059CV), or the State of Texas or the court may regulate Edwards pumping.

Thus, the real alternative to regulation by the Authority is not an unconstrained future, but regulation by someone other than the EAA. Presumably such regulation would occur as a result of litigation that would handcuff the Authority or void the Act. If the State were the regulating agency, its rules would likely be based on the Act, and presumably the regulations would be similar to one or more of the alternatives now being considered by the Authority. If a Federal court imposes rules, those rules also probably would be comparable to the Act, because the Act itself is based on court decisions.

In our judgment, whether the Authority adopts rules the State imposes rules, or a court mandates rules, it is reasonable to expect, among other results, a near-term pumping limit of 450,000 AFY as specified by the U.S. Fish and Wildlife Service in *Sierra Club v. Lujan* and by the Texas Legislature in the Act. The effects of this limit should be broadly similar to those identified in this assessment.

The purpose of considering the alternative of outside regulation is to emphasize that the relevant assessment issues are in the details of *how* EAA regulation occurs and what happens as a result, not in *whether* regulation occurs. Many of the negative effects that this assessment attributes to the proposed rules in fact derive from the Act itself. Disclosing these effects is important even though the Authority cannot avoid them on its own. We cannot and do not speculate on possible alternative regulations that arise out of future litigation.

4.3 Procedural Alternative: Change the Authorization

During earlier rulemaking proceedings, some have commented that the Authority should move quickly to the 400,000 AFY cap that the Act imposes as of 2008. Others have indicated a desire for the Authority to adopt a cap higher than 450,000 AFY, a value that also could be adopted under the terms of the Act.

The Assessment Team concurs with a SCTWAC report, which stated in “[b]efore one can manage water usage, it is necessary to quantify the initial rights of the aquifer users. It is not possible to administer a plan or enforce limitations unless there is a base amount to work

against.”¹ Just getting the 450,000 AFY cap in place would be a tremendous accomplishment.

Nor does it seem plausible that Authority could avoid the adverse effects of limiting water use by raising the cap, as provided for in Section 1.14(d) of the Act. That provision allows an increase in the cap only after implementation of water-management strategies, a formal determination by the Authority that additional water is available, and consultation with appropriate state and federal agencies. While studies leading to strategies that may enable a higher cap are underway, it is not yet known whether raising the cap is a reasonable prospect. In large part this is because most of the possible strategies yield their greatest benefits during wet periods, whereas the adverse effects of a higher cap are arguably greatest during dry periods.

4.4 Procedural Alternative: Issue Rules Only when All Permit Conditions are Known

The rules identified in Chapter 3 of this document do not address every statutory responsibility of the Authority. One possible concern about the current approach is that the initial regular permits arising from Subchapter G of Chapter 711 will contain conditions that will make the permits subject to subsequent Authority rules and programs such as those that will implement the Comprehensive Management Plan (for example, cause certain withdrawals to be potentially restricted during droughts). Since the cross-referenced rules do not now exist, the conditions being applied to the initial permits are not fully stated.

In the judgment of the Assessment Team, it is acceptable that any rules proposed by the Authority may be incomplete, because there is no realistic prospect that the Authority could ever engage in a one-time, rulemaking process that would address every issue in a way that would never change. The issues are simply too complex and the environment too dynamic.

There are significant limits to what can be considered at this time. For example, Section 1.14(h) requires the Authority to ensure that by December 31, 2012, the continuous minimum flows of Comal and San Marcos Springs are sufficient to protect endangered and threatened species to the extent required by federal law. Initial permits must therefore be conditioned such that they are subject to this requirement. However, the earliest that such a program could be in place is 2002, assuming the Authority’s Habitat Conservation Plan is completed and approved by that time.

Thus, if it were necessary to issue permits only when all the permit-related rules and conditions are known in full, the permitting process could not begin for at least two more years. Even then, it could not be known for certain that every possible permitting issue had been addressed. The argument that everything must be known before anything can be done is a Catch-22 that would cause nothing to be done. On this basis, the Authority’s approach is reasonable.

¹ South Central Texas Water Advisory Commission, *1998 Assessment Report*, 1998

4.5 Substantive Alternatives to Specific Rules

In the process of assessing the rules that are identified in Chapter 3, the Rules Assessment Team gave consideration to two specific categories of alternative rules.

- The Authority, through its staff or Board, had developed alternative language for some specific rules.
- The Assessment Team, through its informal scoping process, identified alternative rulemaking concepts that were of interest to one or more stakeholder groups, especially regarding how fees are to be assessed and how the proportional adjustment process should take place.

With one exception, presented below, the results of our assessments are not reported here. There are two reasons for not reporting the assessments.

- The Authority's General Counsel has determined that none of the rules now proposed require a Regulatory Analysis of Major Environmental Rules. Under the Texas Government Code, such an analysis is the only procedure in which an assessment of alternatives is required. Consequently, all of the assessments of alternatives done by the team can be considered to be unofficial and informal.
- With the exception discussed below, none of the assessments identified any rulemaking alternatives with greater benefits or fewer costs than the rules that were being proposed.

The exception relates to the assessment of how the Authority can comply with two conflicting components of the Act: 1) the requirement that authorized withdrawals not exceed 450,000 AFY, 2) and the requirement to honor guaranteed minimum rights that are expected to sum to more than 450,000 AFY. The proposed rule described in Chapter 3 honors the minimums by granting step-up rights, and achieves the cap by a voluntary buy-down of applied for rights. The original proposal would have honored the minimums by making the step-ups "interruptible rights" which would not count toward the cap.

The Assessment Team compared these two concepts. Based on the comparison, the Authority staff recommended, and the Board agreed, to substitute a buy-down rule for the original proposal. It is that buy-down that is assessed formally and in detail in this document.

Because the initial assessment process did result in this one major change in the proposed rules, the differences between interruptible rights and a buy-down concept are briefly summarized below.

Concept of interruptible rights. Section 1.14 of the Act describes rights that are part of the 450,000 AFY cap as "uninterruptible" and specifies aquifer levels at which such rights can be fully exercised. Even at lower levels (that is, during critical drought periods), any essential uses of these rights are protected. The Act has a separate provision (Section 1.19) that authorizes permits with a limited term ("term permits"). The rights associated with term permits are referred to by the Act as "interruptible," apparently because they can only be used when water levels in the aquifer are high, and must be shut off completely below the

specified levels. The specific water level values set forth in the Act are as follows. (Msl = elevation above mean sea level.)

Table 4.5 Limitations on Use of Withdrawal Rights Under Alternative Staff-Recommended Proposed Rules		
Type of Permit/ Status of Right	Wells in Uvalde County	Wells in Eastern Counties
Initial regular permit, Uninterruptible right	No limit when well J-27> 845 ft msl	No limit when well J-17> 650 ft msl
Term permit, Interruptible right	Exercise only when well J- 27> 865 ft msl	Exercise only when well J- 17> 665 ft msl

The concept in the previously proposed rule was to proportionally adjust all applications down to the 450,000 AFY cap, and authorize the resulting withdrawal quantities as uninterrupted rights, then recognize any step-ups to the statutory minimums as interruptible rights with exactly the triggers identified above. (An additional trigger was also proposed for Medina County, where interruptible rights in that County could be used when the Hondo Index Well is greater than 685 feet msl.) Terms such as "Secondary," "Supplemental," or "Junior" have been used to categorize such interruptible rights.

The difference between the two alternatives can be summarized as follows.

- This assessment assumes that after applications are proportional adjusted down to 450,000 AFY, and then statutory minimums are recognized, a total of 500,000 AFY of potential withdrawal rights will exist.
- With the buy-down, Authority funds would be paid to willing applicants, who in turn would waive some or all of their prospective withdrawal rights. For the assumptions made, 50,000 AFY of waivers would be acquired. The remaining permits could be issued in full, with a total of 450,000 AFY of withdrawal rights. The Authority's aquifer management fees would be higher than would otherwise be the case, as the Authority budget would include funds for the buy-down.
- In comparison, under the rule that was previously proposed, a total of 500,000 AFY of withdrawal rights would be recognized, but 10% of this would be in the form of interruptible rights. For most applicants, this means that about 10% of their right would be interruptible. Applicants would have had the option of receiving compensation for the portion of their right that was not fully recognized.

Tradeoffs between interruptible rights and voluntary buy-down. A number of factors were considered that compare public benefits and costs from rules that implement a buy-down, compared to rules that authorize interruptible rights. These factors fall into three broad categories.

- 1) Several factors indicate that interruptible rights are of relatively low value to applicants.

- In the eastern part of the area, where use is mainly municipal, aquifer levels would likely be high enough so that interruptible rights could be used about 25% of the time. However, it would be impossible to predict very far in advance the times when the rights would be useable. The rights would be least available in dry periods, when the need for reliable water is greatest.
- The expected use of interruptible rights by municipalities would be either for aquifer-storage and recovery projects (for example, in wet years, Edwards water would be withdrawn and stored in the Carrizo aquifer, to be recovered during droughts) or as a supply to replace more expensive resources (for example, distant well fields would be shut down, saving pumping costs, when Edwards water was available in surplus).
- In the western part of the area, where use is mainly for irrigation, aquifer levels would likely be high enough so that interruptible rights could be used about 75% of the time. However, in many years it would be difficult to predict with certainty that interruptible rights would remain useable during an entire planting and growing season. The rights would be least available in dry periods, when the area's need for reliable water is greatest.
- In some years some irrigators might find interruptible rights sufficiently reliable to plan cropping decisions based on the assumed continued availability of such rights. However, many interruptible rights would likely be sold to municipalities, at a relatively low price.
- The Assessment Team was not able to identify any protocols that would allow interruptible rights to be made more reliable, as by scalping water from eastern areas of the aquifer when water levels are high, and recharging it in western areas for later recovery. Moreover, if such protocols do exist, their benefits could be achieved through the exercise of term permits.

2) Other factors indicate that all users of aquifer water would be as well off, or better off, with the buy down than with the interruptible rights concept. With respect to municipalities, considerations include the following.

- For a municipality, the advantage of the buy-down is that their entire statutory minimum would be in the form of an uninterrupted right, which would provide a higher value permit than one in which 10% of the statutory minimum was interruptible.
- While a buy-down would increase the fees charged to municipalities, it would save them the cost of replacing interruptible rights with firmer supplies. The Assessment Team judged that most municipalities would come out ahead, because the Authority's costs of acquiring waivers of applications would be less than a municipality's costs of acquiring alternative water supplies. This conclusion was based on calculations that resulted in a relatively low value for interruptible rights to a municipality.

With respect to irrigation, considerations include the following.

- For the irrigation community as a whole, the advantage of the buy-down is that the Authority would likely spend its funds on acquiring waivers of that portion of each irrigation permit that is not transferrable in the free market. In effect, the buy-down creates a customer for a right that is otherwise not readily marketable.
- Presumably, most of those individual farmers who would not be interested in marketing their base irrigation right would take that position because they can beneficially use their full withdrawal right for irrigation. These farmers would generally benefit by having a full 2 AFAY of withdrawal rights in the uninterrupted form, rather than have 10% as less reliable uninterrupted rights. This was shown in computer models (see Section 6.5) that indicate more irrigation income under the buy-down than with interruptible rights.
- For all irrigators, having their full statutory minimum in uninterrupted form would produce a larger quantity of rights that could be marketed at the highest market price.
- The irrigation community would pay a relatively small extra fee to pay for the buy-down, because the fee rules set the irrigation fee at only 18% of the municipal fee.

3) Other considerations include the following.

- Analysis showed that, because granting interruptible rights would actually permit aquifer withdrawals in excess of 450,000 AFY, there would be a greater adverse impact on springflows and aquifer water levels than under a buy-down approach.
- One specific consequence is that aquifer levels low enough to trigger drought restrictions on municipal withdrawals would occur 9% less often under the buy-down alternative.

Upon consideration of the effects above, stakeholder input was noticeably adverse to the concept of interruptible rights.

- Many stakeholders expressed concern about the concept of interruptible rights. Two primary objections were (as viewed by the stakeholders): a) the Act's guarantee of specific minimum water rights would be undermined, if a portion of those rights had limited value, b) the Act's limit of permitted withdrawal rights of 450,000 AFY would not be met. While the Assessment Team did not reach any conclusions regarding the merits of these concerns, it was evident that a proposed rule that offered applicants interruptible rights, rather than uninterrupted rights, and that authorized more than 450,000 AFY of total withdrawals, would be contentious.
- Based on the economic analysis of the buy-down, reported here in Section 6.1.2, stakeholders generally stated support or acceptance for the buy-down concept. The main concerns were that the Authority be able to implement the concept

effectively. Municipalities generally expressed concerns that the buy-down prices be kept as low as possible; irrigators had the opposite view.

- The only potential adverse effect of the buy-down would occur in the future, when the Authority implements the requirement of the Act to retire water rights in order to lower the cap to 400,000 AFY. With the previously proposed rule in place, the reduction to 400,000 AFY would be the first and only retirement that takes place. The retirement can come mostly from the base irrigation rights, which are not otherwise easily transferred and that are the target of the buy-down. Because the buy-down will reduce the supply of base rights, the cost of the retirement necessary to achieve a withdrawal limit of 400,000 AFY will be larger. The result would affect downstream interests that must pay half of the retirement costs.

Based on these considerations, the Assessment Team concluded that the public benefits of a buy-down are greater, and the public costs less, than the interruptible rights concept. The Team therefore concludes that the change made by the Authority, by which the buy-down approach replaced interruptible rights, has a net public benefit.

5. Quantitative Basis For Programmatic Assessment

The proposed rules will affect water use, hydrology and biology, and in turn cause economic, social, and environmental effects. The effects are diverse and complex. Since passage of the National Environmental Policy Act in 1969, extensive experience has been gained in attempting to predict the effects of government actions, with the result that we now know that methods do not exist to rigorously predict such complex effects. Instead, conclusions must rely largely on experience and professional judgment, and the assumptions on which they rely should be explicit.

Nonetheless, various quantitative tools can help to form these judgments. While the resulting predictions are usually approximate and subject to many qualifications, they can indicate the overall magnitude of many effects. Perhaps more important, quantifying the effects of different rule-making options makes it possible to compare them and discern the relative consequences of selecting among alternatives.

Chapter 5 briefly describes the quantitative data used in this assessment. Most interpretations and judgments that use the results are presented in subsequent chapters. The chapter is organized as follows:

- Section 5.1 summarizes Authority data regarding quantities of potential water rights associated with applications for EAA withdrawal permits and data on actual withdrawals.
- Section 5.2 provides information related to projected water demands on the Edwards Aquifer, including shortages that reflect imposition of a withdrawal cap.
- Section 5.3 provides information regarding the water-supply alternatives that may be relied on to meet projected shortages within the EAA boundaries.
- Section 5.4 discusses two hydrologic models that have been used to help predict the effects of the proposed rules.
- Section 5.5 discusses three regional economic models, and two procedures specific to this assessment, that have been used to help predict the effects of the proposed rules.
- Section 5.6 summarizes quantitative information regarding critical springflows that is used in assessing impacts to endangered species.

Caution with respect to use of information. In preparing this assessment, we have become aware of many differences among sets of data that concern the same subject. For example, in Section 5.1 of this assessment, we summarize a database of the Authority that indicates the prior, voided rules would have resulted in issuance of 485,165.4 AFY of permitted withdrawals (prior to any final reduction to 450,000 AFY). In Appendix GWSIM, we report on simulations that use a value of 484,803 AFY to represent the same quantity. This particular difference reflects the fact that the Authority database provided to us is not quite identical to the one that was relied on by the Texas Water Development Board when they developed inputs to the model named GWSIM.

As another example, the model named EDSIM that was developed many years ago by researchers at Texas A&M University has its own input data sets and methods for predicting aquifer conditions that are different from GWSIM and some of the Authority's databases. EDSIM also generates estimates of irrigation water use for year 1998 cropping patterns that are higher than Authority records would indicate for that year, in part because the model develops aggregate net values that reflect a composite of ten different climatic conditions rather than conditions specific to the 1998 climate. Another aspect of EDSIM is that its economic evaluations are based on long-term crop prices, not 1998 prices. Again, while the outputs are identified as specific to 1998, they are in fact a composite of probable conditions for that year rather than actual conditions. EDSIM also only considers crops irrigated with Edwards Aquifer water. Therefore, the results will not match published county statistics, which include irrigation from other aquifers, dryland crops, and poultry and livestock activities.

There are undoubtedly many other examples in this assessment in which numbers that represent a given assumption or effect may be somewhat different in different sections of the document. Most changes reflect one of two factors. In some cases the difference is one of method. In particular, computer models are typically designed to approximate generalized aggregate conditions, and there is no reason to expect that the results will accurately represent conditions in a particular year. In other cases, the difference is one of timeframe. Information related to the EAA area is dynamic and is updated regularly. A study made at one point in time will have used different inputs than a study performed earlier or later, and the resulting outputs may differ even if the methods used were identical.

In our judgment, while the differences in numbers occasionally may be distracting, they are not significant to the findings and conclusions of the assessment. All of the predictions made here are, at best, approximations of what will happen in the real world; and all are made to understand the magnitude of impacts, not the details. Further, because existing users will be affected according to their individual circumstances, the predictions are used to reach conclusions that are of generally applicability to categories of users rather than to individuals. In this context, modest differences in numeric inputs to or outputs from an analysis should make no difference in the predictions about the overall types and magnitudes of effects from the proposed rules. For these reasons, in the Programmatic Assessment we have not expended substantial energy to reconcile all the analytical tools, input data sets, and output values.

5.1 Permitting and Water-use Data

Section 5.1 summarizes two sets of data from the Authority files: records regarding permit applications and presumptions about the initial regular permits that will result (Section 5.1.1), and the actual history of water withdrawals from the aquifer (Section 5.1.2).

5.1.1 Authority Records Regarding Permit Applications and Potential Permitting Outcomes

Applications. Based on Section 1.16 of the Act, initial regular permits will be issued to existing users of Edwards groundwater who timely filed a declaration of historical use

stating the amount of water they withdrew from the aquifer during the historical period, and who by convincing evidence establish beneficial use of that water. A total of 1004 applications, asserting claims for 836,045 AFY of Edwards water, have been filed. More than 600 of the claims are for irrigation water for about 150,000 acres. Claims for municipal and industrial uses, however, exceed those for irrigation.

Presumptions of outcome. As part of its procedures under prior rules, in 1998 the Authority staff prepared a matrix that listed each application and staff's recommendation regarding a permit. The staff analysis is provided in Appendix *MATRIX*. The information in the appendix does not necessarily represent the permitting quantity that each applicant can now expect to receive, for at least two reasons:

- 1) The procedures used to recommend proposed permit quantities listed in Appendix *MATRIX* are from the voided rules, which differ from the rules now being proposed; and
- 2) Fact-finding for many applications is not complete, especially for applications that have been protested and that may require evaluation through a contested-case hearing.

Although the matrix is certain not to represent final permit quantities, at this time it is the only complete quantitative analysis of the applications pending before the Authority. Consequently, it is an important predicate for estimating how the forthcoming permitting process may impact applicants. The results have often been used by the Authority and others to illustrate one possible outcome of the permitting process, and specifically as a presumption of the overall quantity of permitted withdrawals that may be eligible for authorization by the Authority. The features of this important component of the Authority files are summarized below.

Approval/denial. Staff recommended that 693 applications be approved and that 311 be denied. Among the reasons for recommending a denial were the following.

- Some applications were not timely filed.
- Some wells were installed after May 31, 1993, the cut-off date specified in the Act
- Owners of small domestic and stock wells are ineligible for permits because the Act makes them exempt from the permitting requirement; and
- Many applications were filed for wells that withdraw water from formations other than the Edwards.

Some other applications did not qualify because the applicant did not provide complete information, but applicants may in some cases remedy the problem by providing additional information.

Permit quantities. For those applications that staff recommends be granted, Appendix *MATRIX* contains the staff recommendations for the quantity that should have been approved under the previous rules. The basic results of the matrix can be summarized as three numbers:

- The maximum quantity that historical use indicates as the basis for an initial regular permit if withdrawals were not required by the Act to be limited to 450,000 AFY.
- The quantity, not to be set at less than the statutory minimums in the Act that would be permitted under a system of proportional adjustment.
- A quantity of claims that is unsupported and would be denied outright whether there is a cap or not.

The information in Appendix *MATRIX* is summarized in Table 5.1.1-A.

**Table 5.1.1-A
Staff Recommendations Regarding Permits in AFY Under Voided Rules**

User category	Permit if no cap	Permits at minimums	Denied
Irrigation	251,020.3	236,469.4	50,149.0
Industrial	53,887.4	26,236.6	34,261.8
Municipal	275,687.0	222,459.4	1,462.4
TOTAL	580,614.7	485,165.4	85,893.2

Based on the considerations below, the assessment team expects the estimates in Table 5.1.1-A are more likely to underestimate than overstate the potential claims facing the Authority.

- Staff recommended denial of the permit when the data in support of an application was insufficient to quantify the presumed benefits use even though there was little question that beneficial use actually occurred. In contested cases, at least some applicants will receive a permit for some quantity other than the zero value shown in the appendix. Such additions could add 20,000 AFY or more to the 580,000 total AFY shown in the “Permit if no cap” column. The total for the “Permit at minimums” column also would increase.
- Certain municipal withdrawals are commonly unaccounted for due to such reasons as fire flows and pipeline transmission losses. Staff treated unaccounted-for water as a nonbeneficial use. At least some of the unaccounted-for water will likely be proven as cases are contested. Rule of thumb estimates are that 8% or more of water is unaccounted for even in well-run municipal systems. Determining that this much unaccounted water is a beneficial use could add 20,000 AFY or more to the 580,000 total AFY shown in the “Permit if no cap” column. The total for the “Permit at minimums” column also would increase.
- Contested cases could result in changes in the other direction. For example, beneficial uses by some applicants may be smaller than staff assumes.

On balance, the adjustments to the matrices would probably make more additions to the permitted rights than deductions. Because many actual values will be determined through the contested-case process, it is not possible to resolve the uncertainty. Any estimate will be

approximate at best. Presenting the results in relatively round numbers is one way of suggesting to readers that the results are approximate. Our working assumption is that the total quantity of rights that would be permitted if there were no cap is perhaps 600,000 AFY. The total quantity of rights that would be permitted if there were a proportional adjustment to the statutory minimums is likely to be about 500,000 AFY. These estimates are probably in the middle of a reasonable range of what may come out of the permitting process.

5.1.2 Comparison to Actual Use

Table 5.1.2-A summarizes actual rates of Edwards withdrawals, as they have been estimated by or for the Authority. Table 5.1.2-B gives more detailed data on withdrawals, for the year 1998, which included a number of dry months. Both tables are taken from the Authority's 1998 Annual Hydrogeologic Report.

Table 5.1.2-A
Average and Maximum Rates of Withdrawals from the Edwards Aquifer
In Thousands of Acre Feet per Year (AFY).

	Irrigation	Municipal	Domestic+Stock	Industrial	Total
Average 1955-98	108.7	201.6	32.2	23.3	365.8
Median 1955-98	103	200.7	32.9	22.2	358.8
Average 1988-98	114.5	255.2	28.4	37.1	435.2
Median 1988-98	100.1	254.0	34.4	36.7	425.2
Maximum	196.2 (1989)	286.2 (1988)	49.9 (1993)	67.5 (1991)	(7361.2) (1989)

Data source: USGS and Edwards Aquifer Authority, 1999. Note: In 1997 and 1998, Authority data included some Edwards pumping from Atascosa and Guadalupe Counties that was not previously counted. Also, in 1995 the USGS revised the method of calculating domestic and livestock pumpage, which significantly decreased the estimates compared to prior years.

Table 5.1.2-B
Withdrawals and Discharges from Edwards Aquifer in 1998
In Thousands of Acre Feet per Year

County	Irrigation		Municipal/ Military	Domestic/ Stock	Industrial	Total Well Withdrawals	Spring Flow Discharge	Total
Bexar	12.5	a,b	240	8.8	24.4	285.7	26.7	312.3
Comal	0.2	b	3.5	0.3	11.7	15.7	255.7	271.4
Hays	0.02	b	9.3	0.8	1.9 d	12.0	157.6	169.6
Medina	43.0	b	6.6	0.9	0.8	51.3	0.0	51.3
Uvalde	75.6	b	6.1	2.3	2.9	86.9	24.3	111.2
Kinney	0.6	c	1.0	0.3	0.0	1.9	0.0	1.9
Total	131.9		266.5	13.4	41.7	453.5	464.3	917.7

Differences may occur due to rounding procedures. Data source: Edwards Aquifer Authority, and USGS 1999. "a" Includes Atascosa County. "b" Estimated from reports of Edwards Aquifer irrigators. "c" Estimated by USGS. "d" Includes Guadalupe County. These data suggest that actual rates of withdrawals from the Edwards Aquifer may not consistently exceed 450,000 AFY at this time. Since the high-demand years of 1988-89, weather conditions have been generally favorable to reduced demands, and substantial progress has been made in water conservation, resulting in a net decline in overall withdrawals. Also, the data prior to 1995 may have overstated domestic and stock withdrawals by 30,000 AFY or more.

The data also suggest that if permits were to be issued as shown in Table 5.1.1-A, the total irrigation allocation would exceed typical levels of use, whereas M&I supplies would be allocated less than current demands. In relative terms, the allocations would have a greater impact on existing use in the eastern counties, where M&I demands are concentrated.

5.2 Projections of Water Needs

5.2.1 Water Supply Shortages

The regional planning process has yielded extensive data on water-supply conditions in the EAA's jurisdiction. Of particular use to this assessment are projections of demands for municipal entities that currently depend on the Edwards Aquifer for at least part of their water supply. The regional study compared these demands to established supplies over ten-year increments through the year 2050. Almost every community is already in a shortage condition.¹ These shortages exist for at least two reasons:

- The regional plan assumed that only 340,000 AFY of Edwards water would be available in the future on a firm-yield basis. This was based on the expectation that withdrawals will eventually be capped at 400,000 AFY and that during critical periods further reductions of 15% can be achieved. In the plan, this supply was allocated to existing users in proportion to the assumed permit amounts shown in Appendix *MATRIX*.

¹ Large shortages are predicted for irrigation users as well. However, the consensus of the regional planning process is that water projects to meet irrigation demands are unlikely to be economically viable.

- The area is experiencing substantial growth. Since the 340,000 AFY is inadequate for current demands, the plan assumes that no new Edwards water will be available to satisfy growth. Irrigation transfers that have already occurred to municipalities do count as a municipal Edwards supply, as do any water projects already in development, but future transfers and projects are not counted.

Appendix *DEMANDS* summarizes regional planning forecasts for each individual water system that uses Edwards water, and indicates the shortage each can expect. Table 5.2.1-A is a summary of the forecasts, as modified through work on the Authority's Comprehensive Water Management Plan. The numbers in the table are for all demands, including those that are or will be supplied by known non-Edwards sources. By 2030, the regional need will be approaching 1 million AFY, and the gap between supply and demand will be 400,000 AFY.

Table 5.2.1-A
Projected Water Demand and Supply for the Edwards Aquifer Area
In Acre Feet per Year

	2000	2005	2010	2015	2020	2025	2030
Total Water Demand	785,046	796,339	807,632	830,136	852,639	886,783	920,927
Total Water Supply	535,962	535,918	535,836	535,836	535,797	528,151	520,506
Demand Balance	(249,084)	(260,421)	(271,757)	(294,300)	(316,842)	(358,632)	(400,421)

Most of the growth in demand is concentrated in Bexar County, which has more than 60 water providers within its boundaries. Demand in Bexar County alone already totals about 400,000 AFY and is expected to exceed 650,000 AFY by 2050. This is 310,000 AFY greater than the provisional estimate of Edwards Aquifer firm yield discussed above; assuming that entire yield could be developed in Bexar County.

It should be noted that regional planning is quite generalized and that the specific forecasts presented in Appendix *DEMANDS* may not be accurate for individual suppliers. For example, the San Antonio Water System projections of demands are less than those shown in the Appendix, because the utility believes its conservation program will result in lower per capita demands than those assumed in the regional plan. On the other hand, the estimates in the plan may underestimate demands for a given year, since most utilities build in new capacity ahead of demand. Therefore, if capacity comes through a major project, the project may be built 10 or more years in advance of need.

The projections are important because they demonstrate a large and growing demand for water concurrently with a regulatory program that will restrict one of the major supplies. When the permitting rules implement the Act, users must look elsewhere for their future supplies. It is generally assumed that the shortages will be addressed through a combination of new projects that enhance the use of Edwards water, marketplace transfers of Edwards

rights, and projects that use non-Edwards supplies, most of which are yet to be developed. Candidate projects are discussed subsequently.

5.3.2 Trends in Agricultural Water Use

Irrigation agriculture in the EAA area faces some uncertainties with or without Authority regulation of withdrawals from the aquifer. These uncertainties include the unknown future of federal programs that support the farming economy and the growing competition from Mexican agriculture facilitated by the North American Free Trade Agreement (NAFTA).

The assessment team considered making a projection of agricultural trends in the absence of regulation comparable to the projection of municipal water demands. However, factors such as potential federal legislation simply cannot be predicted, and trends in agricultural water use are not considered in this assessment. Our quantification of the effects of Edwards rules assumes that these rules are the only factors likely to bring change to the irrigation economy (see subsequent discussion of EDSIM and other models). If the assumption is wrong, the resulting EDSIM estimates will likely overstate impacts from EAA rules.

5.3 Water Supply Alternatives

5.3.1 Alternatives Identified in Regional Planning Process

The regional planning process has identified more than four dozen potential supply alternatives for the EAA area and downstream basins. A list of the alternatives considered, including quantities of potential supply and relative costs, is provided in Appendix *SUPPLIES*. The Appendix was developed based on information available as of early February 2000, and may not represent the current status of the regional plan. This quantification of supply is based on conditions during the drought of record and is therefore a quantity that is assumed to be reliably available.

Even recognizing that some of the alternatives may be mutually exclusive, the total quantity of water associated with the options is large — more than a million AFY in total. This suggests that the limits to meeting future water needs are less likely to reflect an absolute lack of water sources and more likely to be institutional (for example, addressing regulatory, water rights, environmental and other concerns associated with a particular supply) and economic (cost of water, treated and delivered).

Marketplace. With some exceptions at the high and low ends, the costs for the options run from several hundred dollars per acre-foot to several thousand dollars per acre-foot. The least costly options are water conservation and institutional exchanges of water, neither of which involve the construction of major treatment and transportation facilities. One of these options, the purchase or lease of Edwards water in the marketplace, would in effect be created by the proposed rules.

The marketplace alternative is estimated to provide 95,430 AFY for municipal use at a cost of \$50 to \$80 per acre-foot; any costs of pumping and treatment would be additional.

In the plan, the assumed quantity of rights is as set forth in Appendix MATRIX, but proportionally adjusted to the eventual 400,000 AFY cap with one acre-foot per acre of the irrigation right remaining appurtenant to the land. The lower estimate of cost is based on an amortized value assuming rights trade at \$700 per acre-foot. The higher estimate is based on current leasing prices.

Other options. In the regional analysis, other alternatives involving the Edwards include exchanges of reclaimed water for Aquifer water, recharge of the aquifer, and use of the water for storage and recovery in other Aquifers. These require building expensive facilities such as wastewater treatment plants and recharge systems. Moreover, the options involving recharge to the Edwards will not produce a lot of water, since the recharge occurs mostly in wet years, tends to flow out to the springs, and is not reliably available in a drought.

While the non-Edwards alternatives involve many concepts, the most typical involve use of Carrizo aquifer water or diverting river flows either through direct diversions, additional uses of existing reservoirs, or building new reservoirs. Very few of these would cost less than \$500 per acre-foot when all development, treatment, and transportation costs are considered. In its 1998 Water Resources Plan, the San Antonio Water System based its planning-level forecasts of future water supply costs on an average of \$724/AFY, which is the average of projects costs in the Trans-Texas Water Program Phase II report.

5.3.2 Alternatives over which the Authority has Jurisdiction

As part of its Comprehensive Water Management Plan, the Authority has investigated alternatives that are specific to enhancing the Edwards Aquifer and that could be developed by, or under the oversight of, the Authority. These are generally alternatives that involve recharge or withdrawals from the Edwards Aquifer. Table 5-2 provides information on these options.

On January 18, 2000, the board approved a technical memorandum containing narrative and quantitative descriptions of population growth, water demands, and potential groundwater supply solutions for the Edwards Aquifer Authority area. The ten groundwater options approved by the board generate approximately 196,000 acre-feet of water annually at a unit cost of \$491 per acre-foot. It is important to note, however, that a deficit still exists for the Edwards Aquifer Authority area under conditions similar to those of the drought of record. The ten recommended options along with yield and cost information are listed below.

Table 5.3.2
Recommendations for Water Management Options (1-5 Year Projects)

Edwards Aquifer Groundwater Supply Option	Sustained Yield (ac-ft/yr)	Unit Cost (\$/ac-ft)	Total Project Cost (Million \$)	Comments
EAA-05 (13): Transfer of Irrigation Pumpage to M&I (30-yr. Lease 50% of the Irrigation permits in Bexar Co.)	15,578*	94	44.0	*Yield based on proposed critical period management rules during drought
EAA-05 (14): Transfer of Irrigation Pumpage to M&I (30-yr. Lease 50% of the Irrigation permits in Medina Co.)	37,085*	94	104.7	*Yield based on proposed critical period management rules during drought
EAA-05 (15): Transfer of Irrigation Pumpage to M&I (30-yr. Lease 50% of the Irrigation permits in Uvalde Co.)	47,858*	94	135.1	*Yield based on proposed critical period management rules during drought
S-13B: Medina Lake-Irrigation Water Rights Reduction for Recharge Enhancement	9,873	159	21.6	
L-11: Exchange Reclaimed Water for Edwards Irrigation Water (Assume 1: 1 exchange)	10,300	743	44.49	
SCTN-01a: Aquifer Storage & Recovery (ASR) - Regional Option (use of the Carrizo-Wilcox by the Edwards Aquifer Region; annual costs for 30 years)	2,792	1,317	132.0	
G-30: Guadalupe River Diversion Near Comfort to Edwards Aquifer Recharge Zone via Medina Lake	3,902	2,079	76.88	
G-32: Canyon Lake Flood Storage Diversion to Recharge Zone via Cibolo Creek	1,009	10,471	114.58	
SCTN-06 (a): Edwards Aquifer Recirculation (unappropriated Guadalupe River flow at Lake Dunlap)	42,121	534	185.12	Now designated 1-5 yr option
EAA-02-(09) Recharge Enhancement from Type 2 Structures - Scenarios (01) - (08) Combined (maximum pool capacity)	25,650	1,274	427.08	Now designated 1-5 yr option
TOTAL	196,168	491	1,285.55	Unit Cost is weighted average

Thirteen additional options are recommended for inclusion with the caveat that additional study be conducted to determine yield, cost, and/or feasibility. These thirteen options involve brush management, weather modification, desalination, aquifer storage and recovery, ground water recirculation, and enhanced recharge. Estimates of cost and yield are not available for most options. Where estimates are available, the projects appear much more expensive than those listed in Table 5.3.2-A. Some of the thirteen projects may be in conflict with the Act.