

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

Part 1

Prepared for

The Edwards Aquifer Authority

By

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1. Executive Summary

1.1 Introduction

In 1993, the Texas Legislature passed the Edwards Authority Act (“the Act”), which created the Edwards Aquifer Authority (“EAA”, or “Authority”). The Act mandates that the Authority restrict and reduce the withdrawals of groundwater from the Edwards Aquifer, which is the primary water supply for more than 1.5 million Texans in and near San Antonio. The primary aim of the Act is to ensure that the region complies with the federal Endangered Species Act, a law that protects endangered and threatened species that rely on aquifer-fed spring flows for their habitat. The Authority’s initial rules will limit permitted withdrawals to 450,000 acre-feet per year (AFY), which is less than needed for existing and future municipal, industrial, and irrigation purposes.

The Authority is in the process of adopting rules to implement the Act. Under Texas law, the Authority must complete several assessments specified in the Government Code. The assessments are intended to help the Authority to choose among policy options and to disclose the effects of the rules to the public. This report is a Programmatic Assessment of the initial rules prepared by the Authority’s Rules Assessment Team. The Authority invites the public to review and comment on this document so the Authority’s Board of Directors can make decisions based on the best available information.

The following Proposed Rules have been submitted to the Board, and assessed by the Assessment Team.

- 31 Texas Administrative Code Ch. 701: General Provisions
- 31 Texas Administrative Code Ch. 702: General Definitions
- 31 Texas Administrative Code Ch. 705: Jurisdiction of the Authority
- 31 Texas Administrative Code Ch. 707: Procedure before the Authority
- 31 Texas Administrative Code Ch. 709: Fees
- 31 Texas Administrative Code Ch. 711: Groundwater Withdrawal Permits, except Subchapter J (Aquifer Storage and Recovery Projects) which has been reserved for future consideration, and Subchapter N (Groundwater Trust) which has been reserved for future rulemaking.

In making the findings contained in the Programmatic Assessment and reported in this Executive Summary, the Assessment Team interviewed representatives from major stakeholder groups, used quantitative models to estimate certain economic and environmental effects, and evaluated regulatory alternatives. The results are reported in the Programmatic Assessment as follows:

- Chapter 2. Introduction
- Chapter 3. Proposed Rules Subject to this Assessment
- Chapter 4. Alternatives

- Chapter 5. Quantitative Basis for Programmatic Assessment
- Chapter 6. Effects of Proposed Rules on Existing Users
- Chapter 7. Indirect Effects of Proposed Rules

The principal direct effects of the proposed rules are: (1) to limit withdrawals from the Edwards Aquifer, which will leave many users (especially municipalities) short of water and therefore facing increased costs to acquire replacement supplies; (2) to increase fees paid by users of Edwards water; and (3) to create a marketplace that will function primarily to cause abandonment, retirement, and transfer of irrigation rights.

1.2 Summary of Findings Required Under Texas Government Code

§2001, §2006, and §2007 of the Texas Government Code define assessments that a governmental entity of the State of Texas may need to consider in the process of making rules. Whether a particular assessment is required depends on the type of agency adopting the rule, the authority under which the rule is being adopted, and the magnitude of the effects attributable to the rule in the first five years of its effective date.

§2001 of the Texas Government Code defines a “major environmental rule” and states that an agency must assess a proposed rule’s effects on local employment, its fiscal impacts, and its public benefits and costs. It must then include the results of such assessments in the Notice of Proposed Rulemaking. The Authority’s General Counsel has made the following findings that prompted the assessments conducted by the Assessment Team.

- The provisions of §2001, requiring a Local Employment Impact Statement (LEIS), a Fiscal Note, and a Public Benefit and Cost Note, apply to the Authority.¹
- The Authority is subject to the requirement of §2001.0225 regarding Regulatory Analysis of Major Environmental Rules.² While some of the proposed rules may be major environmental rules, none meet the criteria listed in §2001.0225(a)(1)-(4) that trigger a regulatory analysis.^{3 4}
- The Authority is not a covered governmental entity subject to the provisions of §2006, entitled Actions Related to Small Businesses.⁵
- The Authority is a covered governmental entity under §2007, entitled Governmental Action Affecting Private Property. However the rule is not a covered governmental action under this section.⁶

¹ Covered Governmental Entity Determination, Local Employment Impact Statement, by Darcy Alan Frownfelter, May 30, 2000. Separate documents for 31 TAC Chs. 701, 702, 705, 707, 709, and 711.

² Covered Governmental Entity Determination, Regulatory Impact of Major Environmental Rules, by Darcy Alan Frownfelter, May 30, 2000, Separate Documents for 31 TAC Chs. 701, 702, 705, 707, 709, and 711.

³ Finding of No Major Environmental Rules, Regulatory Impact Analysis of Major Environmental Rules, by Darcy Alan Frownfelter, May 30, 2000. Separate documents for 31 TAC Chs 701, 702, 705, 707, 709, and 711.

⁴ Finding of No Exceedance or General Law Rulemaking, 31 TAC Chapter 711, by Darcy Alan Frownfelter, May 19, 2000.

⁵ Covered Governmental Entity Determination, Small Business Effects Statement, by Darcy Allan Frownfelter, May 30, 2000. Separate documents for 31 TAC Chs 701, 702, 705, 707, 709, and 711.

⁶ Covered Governmental Entity Determination, Small Business Effects Statement, by Darcy Allan Frownfelter, May 30, 2000. Separate documents for 31 TAC Chs 701, 702, 705, 707, 709, and 711.

These findings by the Authority's general counsel are not reproduced in the Programmatic Assessment, but were the basis for the scope of the Programmatic Assessment. Having performed the assessments required under §2001, the Assessment Team has made the following general findings:

- Chapters 701, 702, 705 will have no effects on local employment, no fiscal effects, and no public benefits and costs that are independent of their role as being part of the larger rules package. Findings to this effect are presented in Section 1.3.
- Chapters 707, 709 and 711 will have effects on local employment that are summarized in Section 1.4.
- Chapters 707, 709 and 711 will have fiscal effects that are summarized in Section 1.5.
- Chapters 707, 709 and 711 collectively have public benefits and costs that are summarized in Section 1.6.

§2001 of the Texas Government Code requires that a rule's impacts be stated for each of the first five years it is in effect. Where it was possible to make reasonable estimates by year, we have done so. In some cases, the timing of the impact depends on the pace of administrative processes. In these cases, we have estimated an average annual effect. Such effects may occur early or late in the five-year period, or even after the five-year period. In all cases, we have estimated the total impact after all effects have had time to work their way completely through the economy. Since many effects of these rules will be slow to develop, it is possible that we have overstated both the positive and negative effects during the initial five-year period. Many benefits occur after the five-year period and are stated here to enable an understanding of the facts considered in adoption of the rules.

1.3 Chapters 701 (General Provisions), 702 (Definitions), and 705 (Jurisdiction)

The adoption of the proposed rules covering general provisions, general definitions, and general jurisdiction will have no effects that require separate assessment under the Texas Government Code. Adoption of these rules is simply a prerequisite to proposal and adoption of other rules by the Authority.

- In general, we might expect a rule to possibly have effects if it imposes compliance obligations on any person or otherwise regulates the use of water resources. These particular proposed rules have absolutely no implications for regulation and compliance. No one can reasonably expect to experience any change in circumstances solely from adoption of the Staff Recommended Proposed Rules covering general provisions, general definitions, and general jurisdiction.
- Because we found no effects from these proposed rules, we find that it is unnecessary and without purpose to spend public resources in an attempt to

⁶ Covered Governmental Entity Determination, Texas Private Real Property Preservation Act, by Darcy Alan Frownfelter. May 30. Separate documents for 31 TAC Chs 701, 702, 705, 707, 709, and 711.

increased costs. Ratemaking decisions within each municipality could result in increases to specific users, with some sectors paying higher or lower rates than residential users.

The proposed rules will assist in creating a marketplace that is expected to result in the net transfer of water rights from agricultural to municipal use, and the net decrease in economic activity associated with agriculture. These land-use changes, and any resulting changes in employment, spending, or population have the potential to change property and sales tax revenues to local governments. If population declines, costs for local public services will decline. Local government property tax revenues may increase if a leased water right is determined to be taxable property. Local property taxes may also be affected by shifting land from irrigated cropland to dry farming or pasture. Local sales tax revenues and user fees could decline if population or economic activity declines.

1.5.2 Fiscal Effects of Chapter 707

The proposed Chapter 707, entitled “Procedure before the Authority,” contains procedural rules that enable the Authority to interface with the regulated community through board meetings, filings, notifications, hearings, and permitting processes. This chapter, by itself and with the proposed rules for Chapters 709 and 711, generates the administrative costs of the Authority’s procedures associated with its permit program. These proposed rules determine in part the Authority’s annual expense budget, estimated to average approximately \$9,500,000 per year for each of the first five years that the rule is in effect. This sum includes the costs of contested case hearings, which are discussed next.

Subchapter G of Chapter 707 establishes the procedure for an applicant or permittee to contest a proposed permit. Table 1.5.2-A shows the estimated cost to all parties of a typical contested case. The estimates represent an average of very large, expensive cases, which may be expected to be appealed as well as small, simple cases that may be settled through negotiation. The San Antonio Water System (SAWS), with approximately one-third of claims to total withdrawals, is expected to contest many of the other applications. Previous rules resulted in parties filing approximately 500 protests. Table 1.5.2-B shows an estimate of total costs to all parties, assuming that the same number of challenges to proposed permits are made under these proposed rules. Most of these costs are expected to occur in the first two years the rules are in effect.

| Table 1.5.2-A | | | | | | |
|---|----------------------|---------------------|------------------|-------------------|--------------------|---|
| Estimated Cost of a Typical Contested Case Hearing | | | | | | |
| (In \$, except fact witness time in hours) | | | | | | |
| | Attorney Fees | Witness Fees | ALJ* Cost | Staff Cost | Total Costs | Applicant/ Fact Witness Time (hours) |
| Rate/hour | 180 | 150 | 70 | 40 | | |
| SAWS | 4,500 | 1,800 | 700 | 240 | 7,240 | |
| Other Applicants | 10,000 | 1,500 | | | 1,500 | 20 |
| General Manager | 4,500 | 1,500 | 700 | 720 | 7,420 | |
| Total cost per hearing | 19,000 | 4,800 | 1,400 | 960 | 26,160 | 20 |

| Table 1.5.2-B Estimated Cost Of All Contested Case Hearings (\$ In 000s) | | | | | | |
|--|---------------|--------------|-----------|------------|-------------|---|
| | Attorney Fees | Witness Fees | ALJ* Cost | Staff Cost | Total Costs | Applicant/ Fact Witness Time (hours) |
| SAWS | \$ 1,125 | \$ 450 | \$ 175 | \$ 0- | \$ 1,750 | |
| Other Applicants | 2,500 | 375 | 0- | 0- | 2,875 | 5000 |
| General Manager | 1,125 | 375 | 175 | 180 | 1,855 | |
| Total | \$ 4,750 | \$ 1,200 | \$ 350 | \$ 180 | \$ 6,480 | |

*ALJ = Administrative Law Judge. Source: Agatha Wade of SAWS, Steve Walthour of EAA, Ed Vaughn, Private Attorney.

The cost to each of the 35 municipal utilities affected by these proposed rules will vary considerably and cannot be estimated precisely at this time. The cost to the City of San Antonio to obtain the SAWS permit (the largest by a factor of six or seven) may be as much as about \$2,000,000. The amount each utility spends to get a withdrawal right would logically be correlated with the amount of water at stake. Under this theory, the next two largest municipal entities, Bexar Metropolitan Water District and New Braunfels Utilities, may each incur costs in the range of \$100,000 to \$500,000. The two next largest, Uvalde and Alamo Heights, may each incur costs in the range of \$50,000 to \$100,000. Smaller utilities may each incur costs of \$50,000 or less.

The fees paid to the State Office of Administrative Hearings (SOAH) to conduct the hearings are assumed to equal the costs to state government to hold the hearings. If the fees are more or less than the costs incurred by the state, these proposed rules could cause a net fiscal impact at the state level.

Other subchapters in Chapter 707 impose administrative burdens on the applicants and permittees, including the municipal utilities. Proposed rules that create administrative burdens, either by themselves or in conjunction with other proposed rules, are found in the following subchapters:

- Chapter 707 Subchapter D: Requirements to File Applications and Registrations
- Chapter 707 Subchapter E: Requirements for Applications and Registrations
- Chapter 707 Subchapter F: Actions on Applications and Registrations by the Authority
- Chapter 707 Subchapter G: Contested case hearings on Applications

Chapter 6 of the Programmatic Assessment discusses the forms required to be filed and estimates the time and expenses to complete them. The total administrative burden will vary from one or two person-days per year for small utilities, irrigators, or industrial users to several person-months for large utilities.

Because the procedures in Chapter 707 will implement limits on authorized withdrawals for most applicants, in accordance with the rules in Chapter 711, all effects of Chapter 711 may be considered effects of the proposed rules for Chapter 707. The ultimate number of withdrawal rights issued, as well as the compensation offered under Chapter 711, is affected by the substantive and procedural standards established in Chapter 707.

The Act required the declaration of historical use required by these proposed rules to have been filed before the effective date of these proposed rules. Thus these proposed rules impose no additional burden on an applicant to make that filing.

1.5.3 Fiscal Effects of Chapter 709

The proposed Chapter 709 establishes the procedures to levy and collect aquifer-management fees and special fees for permit retirement. Provisions of Chapters 707 and 711 determine the revenue requirements these fees satisfy. The revenue requirements will depend on the budgets adopted by the Authority and by the market price of permit applications the Authority causes to be abandoned through voluntary compensation. Chapter 709 implements the provisions of Article 1, §1.29 of the Act and determines what share of the costs of aquifer management each class of aquifer user will pay.

The Programmatic Assessment estimates fees using detailed assumptions and a mathematical model. The assumptions include:

- Estimates of the Authority's operating budget for each of the next five years.
- The division of withdrawal rights between irrigators and other aquifer users.
- The costs of the contested case hearings process described in the discussion of Chapter 707 impacts.
- Estimates of the amounts needed to buy down permit applications in voluntary transactions so that only the Authority only issues initial regular permits for 450,000 acre-feet. We will assess any effects of a mandatory retirement, if necessary, as part of the assessment of Chapter 715, Subchapter H, relating to Regular Permit Retirement Rules.

Table 1.5.3 shows the results of the model runs. Assuming an average cost of \$700 per acre-foot to achieve such abandonment, the aquifer management fee proposed in Subchapter D of Chapter 709 will cost each municipal utility about \$30.00 to \$38.00 per year per acre-foot of permitted withdrawals. The cost will likely be at lower end of the cost range in the early years of the five-year period, rise to the high end of the range by the middle of the five-year period, and fall to the middle of the range thereafter. The first-year estimate assumes that virtually no permits have been issued and that the budget requirement is divided among a relatively large number of interim authorizations. The sharp increase in the second year assumes interim authorizations in excess of permit amounts, full compensation costs, but minimal water marketing. The final year reflects all necessary water marketing and a larger share of permits held by the nonirrigation sector. Assuming that an acre-foot of water supplies 2.4 households for a year, the additional revenue per household collected by a municipal utility to pay the fees is also shown.

| Year | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------|-------|-------|-------|-------|-------|
| Fees/acre foot permitted | 28.90 | 31.16 | 33.32 | 33.05 | 33.09 |
| Portion required for compensation | - | 5.65 | 6.04 | 5.99 | 6.00 |
| Revenue requirement/household/month | 0.03 | 0.07 | 0.10 | 0.14 | 0.17 |
| Portion for compensation/household | 1.00 | 1.08 | 1.16 | 1.15 | 1.15 |

1.5.4 Fiscal Effects of Chapter 711

Chapter 711 defines the types of permit the Authority will issue under its groundwater management program. The most significant provisions are found in §711.172 of Subchapter G, which implements the reductions in permitted withdrawals from the aquifer as required by §1.16 of the Act. The withdrawal rights of well owners are determined by a series of calculations that consider maximum use, historical use, and the duration of use. Subchapter G has both direct and indirect effects on the municipalities in the Edwards Aquifer Authority region. Subchapter J, entitled Aquifer Storage and Recharge Projects, has not been considered in this assessment.

1.5.4.1 Direct Fiscal Effects of Subchapter G

Chapter 6 explains how aquifer users with different historical withdrawal patterns will fare under these rules. Table 1.5.4.1-A is an excerpt from Chapter 6 that shows the different hypothetical cases pertinent to municipal users. These hypothetical cases cover the range of scenarios pertinent to utilities currently relying on the aquifer. Each case assumes a maximum historical use of 1,000 acre-feet. A specific user can take the hypothetical case which best fits it and multiply the results for that case by the user's actual withdrawals expressed in thousands of acre-feet.

| | |
|---|--|
| Each case is intended to reflect a different type or pattern of water withdrawal from an Edwards well. The case labels are intended to be descriptive and have no rulemaking significance. Withdrawals are assumed to be beneficially used. The historical period AFY = acre-feet per year. | |
| Case C Steady use. | Municipal user whose use varied little during the historical period. During the historic period, annual withdrawals were 800 AFY in one-third of all years, 900 AFY in one-third of all years, and 1000 AFY in one-third of all years, for an average of 900 AFY. |
| Case D Growing use. | Growing municipal user that withdrew 700 AFY in the first year of the 21-year historical record and which increased that withdrawal by 15 AFY in each subsequent year to a total of 1,000 AF in the final year. This is an average of 850 AFY. Case D represents, on a small scale, many of the major water systems in the region. |

| | |
|----------------------------------|--|
| Case E Recent growth. | Municipal user that began after the start of the historic period, and had its highest use at the end of the period. An example might be a large resort. Specifically, first use occurred in year 5 at 650 AFY. This continued for 8 years. In year 13, use increased to 1000 AFY and stayed at that level (for example, because a second golf course was opened). Average use for the 17 years of operation was 835 AFY. |
| Case F Municipal use reduced. | Municipal user who withdrew 1,000 AFY in each of the first 15 years of the 21 year historical period, but only 200 AFY in subsequent years due to switch to surface water that conserves Edwards water. This equates to an average of 771 AFY for 21 years. |
| Case H Five-year use. | Municipal user who installed a well and began operation in the 17 th year of the historical period with a withdrawal of 200 AFY and increased the withdrawal by 200 AFY in each subsequent year of the historical period. Average use for the five years was 600 AFY. |
| Case I One-year use. | Municipal user who installed a well and began operation midway in the 21st year of the historical period. When adjusted to a full year of operation, withdrawal would have been 1,000 acre-feet. |

The model assumes that maximum historical beneficial use of groundwater without waste for all users of the aquifer will be proven through the administrative procedures of Chapter 707 to be 625,000 acre-feet per year. Under this assumption, each of the hypothetical users described above would receive permit amounts shown in Table 1.5.4.1-B below. The model further assumes that (1) Year 5 demand for the user will be 100 AFY higher than maximum historical use, and (2) the user's growth in demand by Year 25 will be an additional 400 acre-feet/year. The model projects the user in each hypothetical case will need to secure additional water supplies as a result of the permitting process implemented by Subchapter G.

| | User | Year 5 Demand Forecast | Historical Maximum | Avg. Historical Use | Permit Amount | Additional Supplies Needed For | | |
|----|---------------|------------------------------|-----------------------|---------------------------|------------------|--------------------------------|--------|-------|
| | | | | | | Replace- ment | Growth | Total |
| C. | Steady use | 1,100 | 1,000 | 900 | 900 | 106 | 500 | 606 |
| D. | Growing use | 1,100 | 1,000 | 850 | 850 | 159 | 500 | 659 |
| E. | Recent growth | 1,100 | 1,000 | 835 | 835 | 175 | 500 | 675 |
| F. | Reduced | 1,100 | 1,000 | 771 | 771 | 143 | 500 | 743 |
| H. | Five-year use | 1,100 | 1,000 | 600 | 750 | 265 | 500 | 765 |
| I. | One-year use | 1,100 | 1,000 | 1,000 | 720 | 295 | 500 | 795 |

The impact of the rules on different classes of municipal users will vary according to their patterns of use during the historical period. The tables and ranges of estimates that follow cover the ranges represented by the hypothetical cases described above. Those with relatively higher needs for future additional supplies will fall at the high end of the range, while those with lower needs will fall at the low end.

Generally, a municipal user may (1) acquire additional Edwards supplies in the open market, (2) acquire supplies from other sources, or (3) a combination of both. Table 1.5.4.1-C shows the estimated capital cost to acquire additional water supplies in total dollars per household. Table 1.5.4.1-D shows the cost per household per month. These estimated costs

assume amortization of the capital cost over 30 years, plus the utility's operating and maintenance expenses.

| Supply Source | Capital Cost per Household for Capacity Acquired |
|------------------------|--|
| Edwards--low case | 250 |
| Edwards--high case | 320 |
| Non-Edwards--low case | 1,580 |
| Non-Edwards--high case | 2,000 |

| Supply Source | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|------------------------|--------|--------|--------|--------|--------|
| Edwards--low case | 0.30 | 0.60 | 0.90 | 1.20 | 1.50 |
| Edwards--high case | 0.44 | 0.88 | 1.32 | 1.76 | 2.20 |
| Non-Edwards--low case | 2.00 | 4.00 | 7.00 | 9.00 | 11.00 |
| Non-Edwards--high case | 3.00 | 6.00 | 9.00 | 12.00 | 15.00 |

Most utilities will find it difficult to acquire non-Edwards water supplies during the first five years the rules are in effect. To that extent, the above analysis shows larger five-year financial impacts than most users will actually experience. Actual capital expenditure patterns will vary among utilities, but in all cases expenditures are assumed to be offset by debt financing that is then recovered through the rate structure as debt service becomes due.

Limiting permitted withdrawals to 450,000 acre-feet per year will result in higher average aquifer levels, which will reduce the cost to municipalities to lift the water. On average, this is expected to save a municipality and its customers \$.05 per month per household during any year of the first five years of the rule's effect in which the regulatory program achieves the 450,000 acre-foot withdrawal cap.

As an alternative to spreading increased costs over existing households, a utility could generate revenues from impact fees. Builders of new houses and commercial buildings would pay for the relatively high increases in system costs they cause through an impact fee assessed as part of a meter fee on a new house. For a utility that secures additional supplies from the aquifer, the fee would be about \$500 per tap. For a utility that secures all of its supplies from non-Edwards sources, the fee would be about \$3,000 per tap. Such a fee structure would reduce the additional monthly revenue requirements from existing households to less than \$1.00 per household in the case of the Edwards supplies, and to less than \$4.50 per household in the case of non-Edwards supplies. A utility could also use a combination of impact fees and increased charges to existing customers to generate the needed revenues. The impact of different water rates may affect the distribution of new development in the region. This would have indirect economic and fiscal effects that have

not been evaluated in this Programmatic Assessment and cannot be predicted without in-depth knowledge of future ratemaking policies throughout the region.

1.5.4.2 Other Fiscal Effects of Chapter 711

The Programmatic Assessment estimates the direct loss of income in the agriculture sector as a result of the withdrawal restrictions in Subchapter G. The estimates are based on a model called EDSIM. IMPLAN, an input-output model, was then used to calculate the change in employment, regional output, and other key economic variables as if all of the effects occurred in Medina County. These results were then used as inputs in a model called SAFE (Small Area Fiscal Effects), which was first applied in this Programmatic Assessment. SAFE calculates the expected change in government revenue for a given change in economic activity. Because the model assumed all of the effects occur in Medina County, the results on a percentage basis are a conservative estimate of what the impact might be in Uvalde or any other county. The results show less than a 1% reduction in all major categories of government revenues. Because the results of an artificial concentration of effects in a small county failed to show a significant impact, it was not necessary to further assess a proportionate share of the total share of impacts on the other counties.

Subchapter M imposes a duty on the Authority to install and maintain meters on irrigation wells and a duty on municipalities and industrial users to install and maintain their own meters. Assuming that half of the Authority's 628 irrigation meters are replaced during the first five years after the rules are implemented, the Authority would spend an average of \$31,400 annually. Each municipal utility and industrial user is expected to spend an average of \$50 per meter owned during each of the first five years of the program.

1.6 Public Benefit and Cost Note

1.6.1 Introduction

§2001.024 of the Texas Government Code requires an agency to assess the public benefits and costs of a rule for the first five years that rule will be in effect. The Assessment Team has concluded that the parties who stand to benefit from or experience costs related to the rules proposed in Chapter 711 fall into three broad categories:

- Irrigators who depend on the Edwards aquifer.
- Municipal and industrial users of the aquifer.
- Persons who have an interest in sustaining spring flow at Comal Springs and San Marcos Springs, either for reasons related to the threatened and endangered species' habitat or because of their claim to the use of downstream water.

Most of the public benefits and costs from the proposed rules for Chapters 707 and 709 are the result of the proposed rules for Chapter 711, which will result in the issuance of permits that, for many existing users, will be less than historical maximum withdrawals. Chapter 711 depends on Chapter 707 for the procedures to issue permits and otherwise deal with the regulated community, and on Chapter 709 for the fees to implement the objectives of the statute.

1.6.2 Chapter 707 (Procedure before the Authority)

The proposed rules for Chapter 707 contain the procedural rules for holding board meetings, for the filing, content and processing of applications for all types of permits issued by the Authority, for notice of Authority action, and so forth. For the most part, these procedures are similar to those of other Texas agencies. The direct public costs and benefits of the proposed rules for Chapter 707 during the next five years arise from the specific administrative procedures that will be used in the process of issuing the permits, especially the procedures for contested case hearings that would resolve issues when the Authority or another party contests claims made by an applicant.

1.6.2.1 Public Benefits of Chapter 707

The procedures require that applications be granted only upon the showing of convincing evidence of historical beneficial use of Edwards Aquifer water. The public as a whole derives benefits to the extent that these procedures provide for legitimate denial of applications not based on historical use. Legitimate denials of applications represent a pro-rata benefit to every other user of the aquifer. If the withdrawal of 100,000 acre-feet is legitimately denied through the contested case process, claims on withdrawal rights will be reduced at a much lower total cost to the public than if those same claims had to be bought at market value.

A benefit also presumably exists because contested cases will be heard in Austin, and perhaps elsewhere, under the jurisdiction of the State Office of Administrative Hearings (SOAH). This venue may be perceived as more objective and impartial than if the Authority were to contract for local hearing officers and conduct its hearings in the county where the historic water use occurred that is the subject of a permit application.

1.6.2.2 Public Costs of Chapter 707

The more significant public costs of Chapter 707 will occur during the issuance of the initial regular permits, especially if an application is contested by another party, or if the Authority itself challenges an applicant's claims. Under §707.611 of the proposed rules, the burden in a contested case hearing is on the applicant to establish by convincing evidence his historical use. This burden of proof will fall on some applicants who could not have foreseen the need for convincing records of their water withdrawals during the historical period.

Time and effort will be required to complete the contested case process. There may be costs for attorneys and other experts. In the alternative, legitimate water rights may be lost through settlement negotiations motivated by a desire to avoid such costs. The procedures may have a disproportionate effect on small users for whom contested case hearings can represent a large material cost relative to the value of the permit. Conversely, economic advantages may accrue to large users, such as municipal water purveyors, who stand to gain if individual applications are denied in whole or part, with the result that there is less competition for the 450,000 AFY of total rights to be issued.

The Authority has quantified the cost of the contested case hearings in the Programmatic Assessment for those proposed rules. The average contested case will cost about \$26,000. Of this amount, the applicant will spend nearly one-half; and the rest will be

approximately evenly distributed between the parties bringing a contest and the Authority. The lower costs for the nonapplicants reflect the assumption that parties involved in many contested cases will achieve economies of scale, compared to individual applicants who will be involved only in their own individual cases. The portion of these costs that is likely to fall on local governments is discussed in the Fiscal Note regarding the proposed rules for Chapter 707.

Assuming that a total of 250 applications go through the contested case process (which may be low given that approximately 500 applications were protested under previously adopted and now voided rules), the total public cost will be about \$6.5 million. The cost of these proceedings per case is estimated in Table 1.5.2-A in the Fiscal Note regarding the proposed rules for Chapter 707. Most of these costs are expected to occur in the first two years.

One factor affecting the overall cost is that contested cases will be heard under the jurisdiction of the State Office of Administrative Hearings (SOAH). It is expected that SOAH hearing dockets will be clogged, resulting in slow processing of the cases. Hearings in Austin increase time and travel costs for persons who appear at hearings but reside in the Authority's area. Travel time and expenses may deter some fact witnesses from offering important testimony.

Other proposed rules impose administrative burdens on the regulated parties, including the municipal utilities. Proposed rules that create administrative burdens, either by themselves or in conjunction with the proposed rules for Chapters 709 and 711, are found in the following subchapters.

- Chapter 707 Subchapter D: Requirements to File Applications and Registrations
- Chapter 707 Subchapter E: Requirements for Applications and Registrations
- Chapter 707 Subchapter F: Actions on Applications and Registrations by the Authority
- Chapter 707 Subchapter G: Contested case hearings on Applications

Forms required to be filed, and an estimate of the time and expenses to complete them, are found in Chapter 6 of this Programmatic Assessment. The total administrative burdens will vary from one or two person-days per year for a small user to several person-months for the largest user.

The Act required the declaration of historical use required by these proposed rules to have been filed before the effective date of these proposed rules. Thus these proposed rules impose no additional burden on an applicant to make that filing.

1.6.3 Chapter 709 (Fees)

Chapter 709 contains proposed rules establishing fees to be charged by the Authority. Registration and application fees (Subchapters B and C) are extremely small (typically \$10 to \$35 per instrument filed) and do not have significant effects. Permit retirement special fees (Subchapter E) are unlikely to be charged within the next five years, and therefore have no public benefits and costs within the context of this Note. The principal effects of the

proposed rules for Chapter 709 arise from Subchapter D, which establishes aquifer-management fees that will be the principal source of revenue supporting the Authority's aquifer-management programs. The revenue requirements to be satisfied by these fees are determined by the proposed rules for Chapters 707 and 711. Revenue requirements will depend on the budgets adopted by the Authority's Board and by the costs to compensate for withdrawal reductions.

The Act specifies that agricultural users will pay no more than 20% of the aquifer-management fee for municipal use. The Act does not define agricultural use. The rule defines agricultural use as irrigation use.

1.6.3.1 Public Benefits of Chapter 709

Management of the Edwards Aquifer will require ongoing actions by the Authority, with a consequent cost in resources for staffing, operations, support services, and investment in specific projects or water rights. The Authority's expenditures will provide public benefits by furthering the following policy objectives of the Authority.

- To equitably and efficiently balance the needs and interests of all water users and affected stakeholders in the region.
- To accomplish the transition away from nearly total reliance on the aquifer as a water supply in a way that minimizes economic and social disruption.
- To facilitate the development of a regional water market to efficiently allocate water from the aquifer to its highest and best use.
- To prevent federal preemption of local management of the aquifer.

1.6.3.2 Public Costs of Chapter 709

The public costs of the proposed rules for Chapter 709 are principally economic costs, which have been quantified by the Authority in the Programmatic Assessment. Applicants for an initial regular permit are already paying fees. Fees levied on permit holders are expected to increase for the following reasons.

- Currently, nonirrigation fees are charged based on interim authorizations. The proposed rules will charge fees based on the quantity of water withdrawal rights, a smaller quantity. When the total quantity of acre-feet being charged fees decreases, the charge per unit of water right will increase.
- The Authority's budget will increase because of costs for contested cases and to pay compensation to reduce withdrawals in accordance with the proposed rules for Subchapter G of Chapter 711.

The estimates summarized below represent those costs significant enough to require public disclosure.

- For nonirrigators, annual Authority fees are projected to increase from the current \$18.50 per acre-foot of authorized withdrawals to between \$28.90 and \$33.32 per year for each acre-foot permitted.

- For irrigators, the proposed rules specify that fees will be 18% of the rate for nonirrigators. Under the same assumptions used above, the irrigator fee would increase from \$3.40 to between, or between \$5.20 and \$6.00.

In general, these costs are the unavoidable consequences of implementing the Edwards Aquifer Act. See the separate assessment of Chapter 711 for more details on the permit program.

Another effect of this rule is to ensure the collection of fees from all users. Holders of interim authorizations who have chosen not to pay the fees can expect enforcement actions for delinquent fees to increase.

There is a complex relationship between the fees that will be charged to permit holders to pay for the withdrawal reductions and the compensation those accepting reductions will receive. The relationship reflects several factors:

- All applicants with interim authorization status and permit holders will be charged aquifer management fees. Only those applicants who chose to be compensated will receive compensation.
- Compensation for those who partially or totally abandon applications will probably be financed with revenue bonds or through structured settlements to be paid out over a period of up to 30 years.
- Irrigators will pay lower fees than other users. This will encourage municipal or industrial users who acquire rights for future growth requirements to lease those rights to irrigators. Thus, municipal and industrial users will benefit both by avoiding fees and by receiving lease payments. Irrigators with the highest marginal productivity of water will be able to afford the lease payments and will benefit from the additional farm income.

1.6.4 Public Benefits and Costs of Chapter 711 (Groundwater Withdrawal Permits)

A primary near-term requirement of the Act, and consequently a focus of the proposed rules and this assessment, is for the Authority to issue not more than 450,000 acre-feet per year (AFY) of initial regular permits to withdraw water from the Edwards Aquifer. This is less than the historic maximum rate of withdrawal from the aquifer.

Most of the public benefits and costs from the proposed rules for Chapters 707 and 709 are the result of Chapter 711, and are discussed in this section of the Executive Summary. Minor effects result from the proposed rules for Chapter 707, which specifies the Authority's administrative procedures for its permitting program. More significant effects result from the proposed rules for Chapter 709, which specifies the Authority's fees. These effects are identified in separate assessments of the proposed rules for Chapters 707 and 709.

Chapter 711 contains proposed rules regarding the permits the Authority may issue. Most of these proposed rules are ministerial requirements associated with the issuance or abandonment of permits. The most significant public benefits and costs arise from the proportional adjustment process, specified in the proposed rules for Subchapter G, particularly §711.172. That subchapter sets forth how the Authority will reduce claims, based on historical maximum uses of water, so that the total withdrawals authorized by initial

regular permits does not exceed 450,000 AFY. Effects also arise from the proposed rules for Subchapter D, relating to interim authorizations; Subchapter E, regarding nonaquifer groundwater; Subchapter F, establishing permit conditions; Subchapter L, regarding transfers; and Subchapter M, regarding metering. Staff-recommended proposed rules for Subchapter J, regarding aquifer storage and recovery permits have not yet been assessed, and Subchapter N, relating to Groundwater Trust, is reserved for future rulemaking.

The procedures set forth in Subchapter G are based on amounts of Edwards Aquifer water that each permit applicant can demonstrate was used beneficially during the historic period, which is the 21-year period from June 1, 1972, through May 31, 1993. The procedure includes the following components:

- Applications filed for initial regular permits will be recognized in the maximum water withdrawn from the Edwards Aquifer and beneficially used on an annual basis during the historic period (maximum beneficial use). For irrigation users only, no less than two acre-feet per acre per year for the largest acreage irrigated with Edwards Aquifer water during the historic period is deemed to be the maximum beneficial use.
- A proportional adjustment will be made to the maximum beneficial use of applications. The size of the adjustment will depend on the outcome of the entire set of applications. The net result will be that an amount not to exceed 450,000 AFY of initial regular permits will be issued. For example, if the total of the maximum beneficial use recognized is 625,000 AFY, then the proportional adjustment factor will be 28%, so that permits will be issued at about 72% of the historic maximum use. The best available information indicates that the proportional adjustment factor will be in the range 25 to 30%.
- Applicants guaranteed a “minimum” amount by the Act will then receive what is known as a “step-up amount.” This amount will be the difference between the proportional adjusted amount and the minimum, if any. The minimums are: (a) the average quantity of water withdrawn from the Edwards Aquifer and beneficially used on an annual basis during the time a well was in existence during the historic period, and (b) for irrigation users only, two-acre-feet per acre per year for the largest acreage irrigated with Edwards Aquifer water during the historic period. Applicants whose minimum was less than the proportionally adjusted amount will not receive a step-up. Applicants who operated for less than three years during the historic period are not eligible for a step-up, regardless of their average use.
- The proposed rules calculate the proportional adjustment percentage by considering the cumulative total of maximum historical use that is recognized for all applicants. This value will only be known when every contested case has been finalized (including appeals, if any), and the historic maximum use for each applicant is determined. Initial regular permits will be conditioned to allow a final adjustment once all permits have been issued. Because of the step-up, the procedure will result in prospective permits totaling more than 450,000 AFY of withdrawal rights. To avoid issuing permits in an amount that exceeds 450,000

AFY in total, the Authority intends to use a voluntary buy-down process. Specifically, applicants will be offered compensation to waive some or all of applications. As discussed subsequently, the Assessment Team expects this voluntary program to be successful and assumes that about 50,000 acre-feet of applications will be purchased and waived to meet the 450,000 AFY ceiling in the Act.

- The proposed rules contain a mandatory compensation procedure for the step-up amounts to be used only if withdrawals cannot be reduced to 450,000 AFY through the voluntary process. Mandatory compensation is not assessed here because it is not expected to be necessary; and if it does prove to be necessary, the Authority can implement it only after adopting rules under Subchapter H of Chapter 715 (relating to Comprehensive Water Management Plan implementation). Mandatory compensation will be assessed as part of the assessment of that subchapter.
- Thus initial regular permits will be issued with a final determination of each applicant's historical maximum use and statutory minimum entitlement. Each permit will authorize a withdrawal of about 72% of the applicant's historical maximum use. Where applicable, each permit will acknowledge a step-up quantity that will be authorized for withdrawal on an interim basis, that that will be permanently authorized if the voluntary buy-down succeeds, and that will be purchased if the voluntary buy-down does not succeed. The Assessment Team expects the voluntary buy-down to succeed for reasons that include the following.
 - Large quantities of irrigation rights will be eligible for permitting. These privately held rights would be readily exchanged under marketplace incentives.
 - In accordance with the Act, irrigators cannot sell the base irrigation groundwater of each irrigator minimum in the regular marketplace. The primary market value for this prospective right would be for the applicant to abandon the claim, if sufficiently compensated by the Authority.
 - Where an application is contested, applicants may accept compensation for all or part of the application, thus saving the costs of proving up the application.
 - Presumably the Authority can be competitive in price in the voluntary marketplace.

As a first approximation, this procedure will result ultimately in issuance of permits authorizing approximately 150,000 to 200,000 AFY of irrigation withdrawal rights, and 250,000 to 300,000 AFY of municipal and industrial permits. Overall, these allocations will likely exceed the amount of water that has been historically withdrawn for irrigation in recent years, but will be less than current municipal and industrial demands.

The outcome of the adjustment for each applicant will depend on case-specific facts that establish the claim for the applicant. Quantification for a representative array of hypothetical applicants is presented in Chapter 6 and is the basis for many of the findings presented below.

1.6.4.1 Public Benefits of Chapter 711

The principal public benefits of the proposed rules for Subchapter G of Chapter 711 are:

- Increased spring flows and downstream uses from limitations of pumping.
- Increased compliance with federal endangered species mandates with consequent increase in regional confidence regarding aquifer management.
- Higher water levels in the aquifer.
- Increased assurance that aquifer water quality is maintained
- Reduced frequency of initial regular permits being interrupted during droughts, in accordance with rules that will be contained in Chapter 715 (relating to the Comprehensive Water Management Plan Implementation).
- Replacement of common law groundwater rights with statutory-based permitted rights.
- Creation of a marketplace for water rights, with consequent income for willing sellers of rights.
- Incentives for more efficient water use and management.

The other subchapters of Chapter 711 that have been assessed create benefits by establishing rules and procedures that disclose to the public the requirements for obtaining and exercising permits.

Spring flows and downstream uses. The Act was motivated in substantial part by the federal Endangered Species Act and by provisional evaluations of the U.S. Fish and Wildlife Service regarding the need to maintain spring flows at Comal Springs generally above 150 200 cubic feet per second (cfs) and always above 60 cfs and spring flows at San Marcos Springs above 100 cfs. The effects on spring flow of the proposed rules for Subchapter G in particular, and the entire rules in general, are among the impacts quantified in the Programmatic Assessment. The impacts were estimated using a computer model known as GWSIM, which provides results that are approximate and best interpreted in relative terms (that is, in terms of spring-flow differences between different regulatory scenarios, rather than as absolute estimates of flow).

Although more than 800,000 AFY of declarations have been filed with the Authority, and there have been historic years when withdrawals from the Edwards Aquifer exceeded 500,000 AFY, the current rate of withdrawals generally does not appear to exceed 450,000 AFY. For example, during the 10 years ending in 1998, which represent the period of largest population in the record, the withdrawals from wells of the type that will get permits averaged just over 400,000 AFY. Consequently, adoption of the proposed rules and enforcement of a withdrawal limit may cause little or no net change in spring flow. A conservative analysis has been made assuming that, during the next five years, in the absence of the proposed rules, pumping might reach 485,000 AFY. Under these assumptions the spring-flow benefit of the proposed rules is as follows.

- Spring flows at Comal Springs would average 30 cubic feet per second (cfs) greater with regulation than without. This is a difference of more than 20,000 AFY.
- The effect at San Marcos springs is much smaller, about 3.5 cfs, or about 2,500 AFY.
- The effects also are seen under extreme flow conditions. One comparison is how often Comal Springs stays above 200 cfs if a cap is in place, compared to current pumping at 485,000 AFY. The model projects flows would stay above 200cfs an additional 63 months of the 780-month simulation period, or eight percent more often.
- At the higher current pumping rate, Comal Springs would be dry 70 months more often, a difference of about nine percent.
- The minimum spring-flow at San Marcos would be about 10 cfs less with the higher withdrawal rate than with the 450,000-cfs limit.

A much more substantial benefit will occur after the five-year period or under much higher withdrawal scenarios for the next five years. When compared to a hypothetical future in which there would be no regulations, and withdrawals from the aquifer would be allowed to grow without limit, the effect of the proposed rules would be substantial. The following findings that are more fully documented in the Programmatic Assessment under assumptions of unregulated pumping in excess of 600,000 AFY.

- An unconstrained future would drop average Comal Spring flows to less than 30 cfs. This is nearly 120 cfs less than what would occur with a cap in place. The difference is more than 85,000 AFY.
- The effect of unregulated pumping at San Marcos Springs would be to drop average spring flows about 20 cfs.
- Comal Springs would be dry more than 67% of the time. The model used in the Programmatic Assessment probably underestimates this effect. This compares to the springs going dry 10% of the time with the cap in place. (Neither estimate considers the effect of critical periods, demand management, drought management, or spring-flow maintenance restrictions.)
- During a repeat of the drought of record, Comal Springs would be dry continuously, or almost continuously, for about 30 years.
- In the most severe drought, San Marcos Springs would be dry at the unregulated pumping rate.

In the absence of these proposed rules, Comal Springs eventually would be effectively eliminated as an important source of water and habitat, and San Marcos Springs would be severely affected. Avoiding this impact is a primary benefit of the proposed rules, albeit one that will become increasingly important beyond the five-year assessment period. However, by itself the permitted withdrawal cap of § 1.14(a) and (b) of the Act as

implemented in the proposed rules in Subchapter G does not meet the current minimum spring flow set by the U.S. Fish and Wildlife Service.

The downstream impacts of the proposed rules have been quantified in the Assessment Report of the South Central Texas Water Advisory Committee. The report indicates that a withdrawal limit of 450,000 AFY improves downstream conditions compared to a future in which there is no regulation. The proposed rules do not fully protect downstream water rights, especially on the Comal River, with the greatest impacts occurring during a repeat of a drought similar to the drought of record. The simulations also indicate that increases in spring flow resulting from a 450,000 AFY cap will be small compared to the overall water budget of the river system as it discharges into Guadalupe Bay. Thus, withdrawal limits imposed by the proposed rules will yield relatively small benefits to the coastal fish harvest and the bay and estuary ecosystems.

Compliance with state law mandates. Adoption of the proposed rules for Chapter 711 would be among the first concrete steps toward complying with state law mandates in the Act that created the Authority. Such compliance yields at least two benefits.

One benefit is that success of the Authority in making reasonable progress in rulemaking would likely make outside regulation, either by state or federal governments, unnecessary. The second benefit is certainty. The lack of a management mechanism to resolve controversies over the Edwards Aquifer has led to uncertainty regarding the water future of the region. The proposed rules are a necessary step in achieving certainty, because before one can manage water usage, it is necessary to quantify the initial rights of the aquifer users.

Aquifer Water levels. The GWSIM predictions of aquifer water levels do not provide accurate absolute values, but aquifer levels under alternative withdrawal rates can be compared in relative terms. For various index wells in the area, the difference in aquifer levels when pumping at 450,000 AFY and 485,000 AFY is more than 8 feet on average in Bexar County, and about 14-15 feet in Medina and Uvalde Counties. Using a rule of thumb that it costs 15 cents to lift an acre-foot of water an extra foot, and assuming a 10-foot average difference in aquifer levels, the cap would decrease total regional pumping costs by about \$675,000 per year. Compared to an unregulated level of future pumping of more than 600,000 AFY, the proposed rules would increase average aquifer levels by 45 to 55 feet, reducing pumping costs by about \$3,375,000 per year.

Aquifer Water quality. Some have argued that excessive withdrawals from the aquifer could cause migration of bad quality water into the aquifer. If this could occur, capping aquifer withdrawals helps prevent a future in which aquifer levels could decline below historic lows and worsen water quality.

Effects on critical periods. The Authority is in the process of developing Comprehensive Water Management Plan Implementation rules to be in Chapter 715. These rules will interrupt permitted withdrawal rates below 450,000 AFY during certain times, for example during drought critical periods. Because Chapter 711 rules will restrict withdrawals and increase aquifer water levels, the thresholds for implementation of Chapter 715 rules would be reached less frequently. This assessment assumes that regulation would occur during droughts even in the absence of permanent withdrawal limits.

Using Comal spring flows as an indicator, and assuming a threshold of 200 cfs, the Chapter 715 Comprehensive Water Management Plan Implementation rules that may result in interruption of initial regular permits would be triggered 8% less often with the cap in place than under current pumping levels. An assumed low discharge at Comal Springs of 60 cfs would be reached about 12% less often than in a scenario in which regulation is initiated during droughts in the absence of a permanent cap on withdrawals.

Definition of property rights. Upon completion of the Chapter 711 permitting process, owners of permitted wells will have initial regular permits quantifying their rights and responsibilities related to withdrawal of groundwater from the aquifer. Those who obtain permits will have marketable groundwater withdrawal permits that will be subject to the Act and the Authority's rules.

Creation of a marketplace. A marketplace in Edwards Aquifer initial regular permits will develop because the proposed rules will leave municipal utilities short of water for current and future needs. Acquisition of Edwards initial regular permits or leases of permits is likely to be the least expensive alternative for making up the shortage. For many irrigators, the sale or lease of permits will produce more income than use of the water for farming. The number of acre-feet of irrigation rights offered for sale will be determined by the price offered by municipal and industrial buyers. Another marketplace will develop as the Authority offers compensation to applicants to waive some portion of their application. In accordance with the Act, one-half the irrigation right is not subject to normal marketplace transfers. This base irrigation right is expected to be a primary target for the Authority's buy-down.

The EDSIM model was used to simulate the potential marketplace for both types of rights. For the proposed rules, EDSIM predicts that a total of 56,300 acre-feet per year of irrigation withdrawal rights will transfer to municipal and industrial users, and that the total annualized payment to the participating landowners, once all of the transfers have occurred and in each year thereafter, will be approximately \$4.6 million. Although the transactions will include both sales and leases, we assume the income effects of a lease and the investment proceeds off of an equivalent sale will be similar. If, as projected here, the imposition of a withdrawal cap motivates marketplace transfers of water rights from the irrigation to the municipal sector, then over time a greater share of the 450,000 AFY of authorized pumping would occur in the eastern part of the area, that is, near San Antonio and along the I-35 corridor. Based on the GWSIM model, concentrating pumping in the eastern part of the area would reduce average spring flows at Comal Springs by perhaps 10 cfs, and San Marcos Springs by 2 cfs, thus partially offsetting the overall benefits of the proposed rules. Aquifer water levels would be lower in the eastern area by about 3 feet, but would be higher in Medina County (3 feet) and Uvalde County (20 feet).

Incentives. As described under public costs, the proposed rules will increase the scarcity and cost of water. One beneficial consequence will be to place a high value on water, where no such value has existed before. Users will have a strong economic incentive to conserve water and use it more efficiently, and to support Authority programs for effective aquifer management.

1.6.4.2 Public Costs of Chapter 711

The principle public costs of the proposed rules for Subchapter G of Chapter 711 are as follows.

- Denial of certain applications for initial regular permits.
- Issuance of initial regular permits that will be less than the quantity of water needed for many applicants.
- Economic losses resulting from reduced irrigation.
- Net effect on regional welfare.
- Other public costs.

Denial of applications. The permitting process in Chapter 711 will determine applicants' rights to water prior to any proportional adjustment to meet the 450,000 AFY cap. Although the results of each case will depend on the facts of each case and cannot be assessed, certain claims will be denied in whole or part. Categories of such partial or complete denials include the following.

- Applicants who did not file their application in a timely manner, irrespective of whether they had beneficial use of Edwards water during the historical period.
- Applicants who might otherwise qualify for an initial regular permit, but who fail to present convincing evidence to support the application. The potential for this outcome may be increased because at the time historic use occurred, users did not know there would be a future need to have convincing records of the use.
- Any application that is based on beneficial use that predates June 1, 1972, or postdates May 31, 1993, will be denied (unless a post-May 31, 1993, well is recognized by the Authority as a replacement for an existing well).
- Applications that are based on withdrawals from an aquifer other than the Edwards Aquifer.
- Applications that are based on exempt wells, although exempt wells may continue to be used without a permit.

Some denials will lead to cessation of withdrawals and a need for affected applicants to acquire replacement supplies. Other denials will have no practical effect on the use of water by an applicant, but will deny the applicant a quantity of marketable water right.

Permit quantity less than need. Applications for more than 800,000 AFY of water have been filed with the Authority. Therefore, the withdrawal cap of 450,000 AFY will force the Authority to deny or reduce many applications. The impact on each individual applicant cannot be predicted, as every case has its own unique facts. The general impact on applicants has been evaluated in Chapter 6 of this document through use of hypothetical case studies that represent different patterns of water use. The results of this evaluation assume success in the voluntary buy-down and are as follows.

- Typical irrigation applicants will receive initial regular permits for two acre-feet per acre of irrigated land. Applicants who have averaged use at more than the irrigator minimum will receive permits to withdraw amounts equal to their historical average minimums. The 2-acre-feet per acre minimum for irrigators should be adequate for all farms in the area, with the exception of the most intensive multi-cropping operations in the western part of the area.
- Those municipal and industrial applicants with a historical average minimum will receive permits equal to their historic average use, which typically will be 80 to 90% of their maximum historical use. For most applicants, this will be less than historic use and, for applicants whose water demands are growing over time, even less compared to current and future needs.
- The remaining applicants who do not qualify for a minimum will receive permits for about 70-75% of their maximum historic use. For most such applicants, the permits will be less than current demands.

A working estimate is that the Authority will need to buy-down 50,000 AFY or more of approvable applications, in order that the remaining bona fide claims can be recognized in full while issuing no more than 450,000 AFY of initial regular permits.

Based on analyses in the Programmatic Assessment, the cost to buy-down the step-up amount is estimated to be approximately \$2.5 million per year for 30 years. The effect of passing this cost through to applicants or permittees is included in the estimates of aquifer management fees specified in Chapter 709. This cost is assessed separately, but also are included in the EDSIM model. By definition, most of those paying the fees will be those permittees who find the use of their rights to have a high value; therefore these persons will gain a net benefit from having a larger initial regular permit than otherwise would be the case, despite paying higher fees.

The voluntary compensation program may have an adverse effect in the future, when the Act requires the Authority to retire water rights in order to lower the cap from 450,000 AFY to 400,000 AFY. The lowest-cost withdrawal reductions may have already been realized in achieving the 450,000 AFY cap by compensating those who abandoned their applications. The permit rules for implementing the retirement plan have not yet been proposed by the Authority and will be assessed at that time.

Cost of lost agricultural activity. By increasing aquifer-management fees and reducing the supply of Edwards Aquifer water available for irrigation, the proposed rules will have a generally adverse impact on agriculture in the region. Effects will vary among individual permittees, each of whom will have his own reasons for deciding to continue irrigation (perhaps with some change in practices), to market their initial regular permit, to cease farming but hold onto his permit, or some combination of these. It is practical only to assess the general effects of the proposed rules on the overall irrigation economy (that is, the extent to which acreage may go out of production) and the net economic changes that result. In Chapter 6, these effects have been estimated using three models: EDSIM for direct effects on agriculture, IMPLAN for secondary or multiplier effects, and SAFE for fiscal impacts to local governments. The findings below are based on those models.

One input to the model input is that current irrigated acreage within the Authority's area is approximately 79,891 acres. The model calculates this will decline to 69,869 acres after the proposed rules take effect. The reduction is 10,022 acres, or 12.5% percent. The reductions result in part from marketplace transfers of irrigation rights and in part because the reduced water supply forces a reduction in irrigation activity.

The reduction in irrigation water use is 73,015 AFY or 27% percent, reflecting a change in cropping patterns to less intense irrigation as well as the shift to dryland farming noted above.

The estimated average annual income from irrigated farming is \$15,040,000. With the proposed rules in place, this declines to \$13,040,000. The annual income loss is \$2,547,000 or 16.3%.

A total of 500 acre-feet per year of irrigation rights are predicted to transfer within the agricultural community, presumably to very high-value vegetable crops. Another 56,300 AFY are expected to transfer to municipal and industrial use. The bulk of the transfers are from Uvalde and Medina Counties to Bexar County. Not all of these transfers will reduce irrigated acreage, since there will likely be some irrigation permittees who are not actively farming or who receive rights that exceed their actual needs.

The EDSIM model estimates marginal returns to land and fixed assets. The marginal return is defined as the return on the least profitable acre, that is, the next acre to be forced out of production. Average returns range from \$116 to \$174 per acre, with the highest returns occurring in areas where the costs to lift water are lowest. There is a somewhat greater return in Bexar County than Uvalde County, with Medina County being in between. With regulation, these returns drop as much as \$87 per acre. The drop is greatest in Bexar County, because the marketplace allows pumping there to increase as withdrawal rights transfer from the west, so that pumping lifts also increase.

One EDSIM outcome is an estimate of the variability in income that occurs between wet and dry years. This variability is a measure of the relative risks that farmers experience because of unforeseeable weather. With the proposed rules in place, the risk factor increases by 4.2%. This means that the restriction in water supply imposed by the proposed rules exposes irrigation enterprises to greater economic risks than if pumping were not constrained.

In summary, the proposed rules will adversely impact farmers who now use the most water and who will be most affected by withdrawal restrictions. They will tend to benefit persons who own farms where irrigation is no longer active and who can market their initial regular permit without any loss in income. The anticipated 16.3% decline in income will certainly be significant, but in pure monetary terms it will be offset in the region as a whole by payments to those who market their rights. Under the assumption that irrigators would charge an annual price of \$50 in excess of their irrigation profits to lease the water, EDSIM predicts annual income from water sales or leases to municipal and industrial users will be \$4,551,600, and many believe prices will be higher than that. Importantly, those payments do not necessarily flow to farmers, but to landowners, who are often different people and who may not even live in the region.

EDSIM and IMPLAN identified the following multiplier effects resulting from the agricultural losses described above.

- The proposed rules would reduce sales of irrigated crops by \$7.6 million per year, a loss of 25.3%. Most of this reduction is expected to be in cotton.
- Regional agricultural output would decrease from \$47.27 million to \$35.25 million.
- Employment in the agricultural community would decrease from 1,291 to 1,122, a loss of 169 jobs.
- Labor income in the agricultural community would decrease from \$17.15 million to \$12.45 million.

Results from the SAFE model are presented in the Fiscal Note for Chapter 711. Fiscal impacts of the proposed rules are projected to be very small.

Cost of replacing water supplies for municipal and industrial users. Most municipal water purveyors and some other users will end up with a smaller Edwards Aquifer supply than was withdrawn during the time of maximum historic demand. The significance of this effect of the proposed rules will depend on the circumstances of each user. The basic issue is whether or not the permitted supply is adequate to meet existing and projected needs, and whether or not the user can easily pass on increased costs. Some users have reduced their Edwards withdrawals over time, and for these a permit at less than historical maximum use may be adequate to meet current and foreseeable needs, or even to produce excess that can be marketed. This potential windfall is not assessed further.

For the vast majority of users, including almost all municipal utilities, the Edwards rights in their initial regular permits will be inadequate to meet existing needs. For many utilities, the permitted quantity will become increasingly inadequate as population and water demand increase in the future. The water-short users can be expected to invest in new water supplies. Based on information now available, such supplies are physically available. The issue is one of cost that is quantified in the fiscal notes.

Net effect of economic welfare. A well-established economic concept called regional welfare considers all dollars paid and received by all groups and their impact on consumers' costs and producers' incomes. Regional welfare is the most comprehensive measure of impact on the region as a whole that can be readily estimated from models such as EDSIM. During the first five years the rules are in effect they would reduce regional welfare from \$\$630,852,000 per year to \$619,552,000, a decrease of \$11,301,000 or less than 2%.

Other public costs. Some users, such as those with a military, commercial, industrial or institutional purpose, may not be able to pass the costs of additional water supplies on to their users. In most such cases, their demand for water is relatively stable and they do not need to plan for substantial growth. If this is so, then the effect of the proposed rules for Chapter 711 will be to cut their Edwards supply to about 70% to 70% of historical maximum use.

Some users may be able to accommodate this reduction through water conservation measures or simply because their need for water has diminished over time (as, for example, a

military base that has been downsized). Others will need to replace the lost supply, either by buying water from a major purveyor, or by entering the marketplace and buying Edwards water rights. Using assumptions similar to those employed in the assessment of municipal supplies, the typical cost of additional water for such users would increase by \$50 to \$100 per acre-foot used. This could be a large increase from a percentage standpoint (roughly 35%), but small compared to the welfare value of water, which EDSIM estimates at more than \$2,000 per acre-foot used.

If the cost increases do have a significant impact, it will be on businesses for which water is a significant component of their operating costs, but whose ability to pass such costs on to customers is limited by market factors. Such businesses could include golf courses, aquaculture enterprises, nurseries, and quarries in addition to irrigators.

The following public costs have also been identified.

- In accordance with Subchapter D, applicants' interim authorization amounts will be reduced to those contained in their proposed permits, inclusive of any step-up amount, beginning in the year following proposal of the permit by the Authority's General Manager. While this will reduce the fees paid by typical applicants, it also will reduce their withdrawal authorization, with effects comparable to that of the ultimate permit. For some applicants, this will come prior to resolution of contested issues, and it has the potential to reduce withdrawals to less than will ultimately be authorized. However, applicants may enter into a contract with the Authority that will allow withdrawals at a higher rate. The contract option is intended to have the effect of ensuring that withdrawals are not reduced except with the agreement of the applicant or the explicit decision of the full board following formal procedures. One effect of the rule will be to continue during the initial five-year period to continue to allow interim withdrawals in excess of 450,000 acre-feet per year until the permit process is completed.
- Subchapter E contains provisions that will limit the marketable water right for any applicant who has commingled his Edwards supply with a supply from another aquifer. The limit is intended to reflect actual use of Edwards water. This may be perceived by such irrigator applicants as denying them a full 2 AFAY Edwards water right for each acre of land that received Edwards water.
- Subchapter F, establishing permit conditions, makes withdrawals in every permit subject to future curtailments during drought, or as part of the equal percentage reduction to a total of 400,000 AFY of permitted withdrawals that the Act requires be accomplished by 2008. The rules that will effectuate such reductions or curtailments generally have not been proposed and will be assessed when they are completed in draft form.
- Subchapter L implements provisions of the Act that restrict the transfer of the base irrigation right, which is one-half the full right and thus typically 1 acre-foot per acre per year. However, provisions are included in the rule that will allow full marketplace transfer of base rights where they are offset by conservation, and a more limited transfer within the County of origin if the right is otherwise too restricted to be viable.

- The requirement to install meters in Subchapter M is an unavoidable cost to provide information necessary for enforcement of the rules and management of the aquifer and will impose an average annual cost of approximately \$50 per meter on all owners of permitted wells.
- The proposed metering rules in subchapter M require, as a permit condition that regulated aquifer users will generally have to spend time each year in reporting their use of water to the Authority. Typically this should require no more than a few hours per year for each well owned by a permit holder. This cost will be at least partially offset by the value of the data to the permit holder in making water-management decisions.
- With the proposed rules in place, the general expectation is that there may be fewer wells drilled in the Edwards in the future, and a reduced need for well-related services, such as installation and maintenance of pumps. This will reduce the level of business for suppliers of well and pump services.

Note that there are several aspects of the proposed rules that cannot be readily assessed because their probable effects are both uncertain and more than five years in the future. An example is the proposed rule that authorizes issuance of term permits. Because the nature and quantities of term permits are not known, there is little basis for assessing them. However, in general, issuance of term permits would tend to decrease spring flows and aquifer water levels during times when both are high, with presumed benefits from use of the water withdrawn.

1.7 Interaction with Future Events

These rules may interact with future rules to produce substantially different effects than those estimated in this Programmatic Assessment. When such additional rules are adopted, the Assessment Team will assess them and their cumulative impact.

Likewise, if circumstances that cannot reasonably be foreseen develop in the first five years of that the rules are in effect, the effects of these rules could be different. This assessment has considered a range of assumptions about future events that we believe represent the relatively rapid development of the rules' full effects. Many factors not assumed here, such as population growth in excess of what has been assumed, future government farm programs, exogenous economic shocks, extreme weather conditions, or court rulings that could vacate certain aspects of the Act, could result in an outcome that is outside the range of what has been considered here.

2. Introduction

In 1993, the Texas Legislature passed the Edwards Authority Act (“the Act”), which created the Edwards Aquifer Authority (“EAA” or “Authority”). The Act mandates that the Authority manage the withdrawals of groundwater from the Edwards Aquifer, which is the primary water supply for more than 1.5 million Texans in and near the San Antonio area.

A primary aim of the Act is to ensure that the region is compliant with federal and state law that protects endangered species that rely on aquifer-fed spring flows for their habitat. The mandate of the Act will limit withdrawals for municipal, industrial and irrigation purposes, will create a marketplace for exchange of the groundwater rights to the aquifer, and will force the growing population to look elsewhere for its future water supply.

The Authority is in the process of adopting rules to implement the Act. Under the Texas Administrative Procedures Act, these rules are subject to assessments that are intended to assist the Authority in choosing among its rulemaking options, and to disclose the effects of the rules to the public. This report is a Programmatic Assessment of one set of rules, specifically those that will issue withdrawal permits to existing users of the aquifer, limit withdrawals to 450,000 acre-feet per year (AFY), establish procedures for the permitting process, and set aquifer-management fees.

Chapter 2 introduces the Programmatic Assessment as follows:

- Section 2.1 provides a description of the region that is encompassed within, and affected by, the Edwards Aquifer Authority.
- Section 2.2 presents information on the Edwards Aquifer
- Section 2.3 provides information on the Endangered Species Act that motivated formation of the Authority and on the State Act that established the Authority. This section also has information on the Authority itself, including programs and planning activities that involve or relate to the Authority.
- Section 2.4 provides an overview of the Authority’s rulemaking program, the rule-assessment requirements of state law, and the role of this programmatic document in the assessment process.
- Section 2.5 lists issues considered outside the scope of the rulemaking assessments.
- Section 2.6 describes prior public participation in this assessment and other opportunities to participate in this rulemaking process, and advises readers how they access the appendices that have been prepared in support of this document.
- Section 2.7 identifies the persons who were primarily responsible for preparation of this document, and summarizes their qualifications.

2.1 Overview of the Region: Geography and Land Use, Economy, Demographics

This section summarizes findings regarding the existing conditions in the EAA region as a whole. For convenience, selected background data on conditions in the region as a whole, or the specific counties within the boundaries of the Authority have been assembled into Appendix *REGION*. The Appendix includes information on climatic conditions, agricultural resources, various indicators of economic activity, population trends (past and projected), surface water rights, and existing water use.

2.1.1 Geography and Land Use

The EAA Region is located in central to south central Texas, from the Texas Hill Country north of San Antonio to the flat coastal plain to the south and west. The region consists of eight counties: Atascosa, Bexar, Caldwell, Comal, Guadalupe, Hays, Medina, and Uvalde. All or parts of these counties lie within the boundaries of the Authority.

The Guadalupe, Nueces, and San Antonio River Basins, all of which are perennial streams with large contributions from spring flow, are partially located within the EAA's boundaries. The region encompasses 7,902 square miles, and reaches approximately 180 miles east to west and up to 40 miles north to south. For the purposes of presenting data on this region, we will include 100% of any county that lies partly within the region. Given the interdependencies of the aquifer and the outlying areas and the lack of sub-county data, this is a reasonable approach.

Figure 2.1.1-A
Edwards Aquifer Authority Boundaries

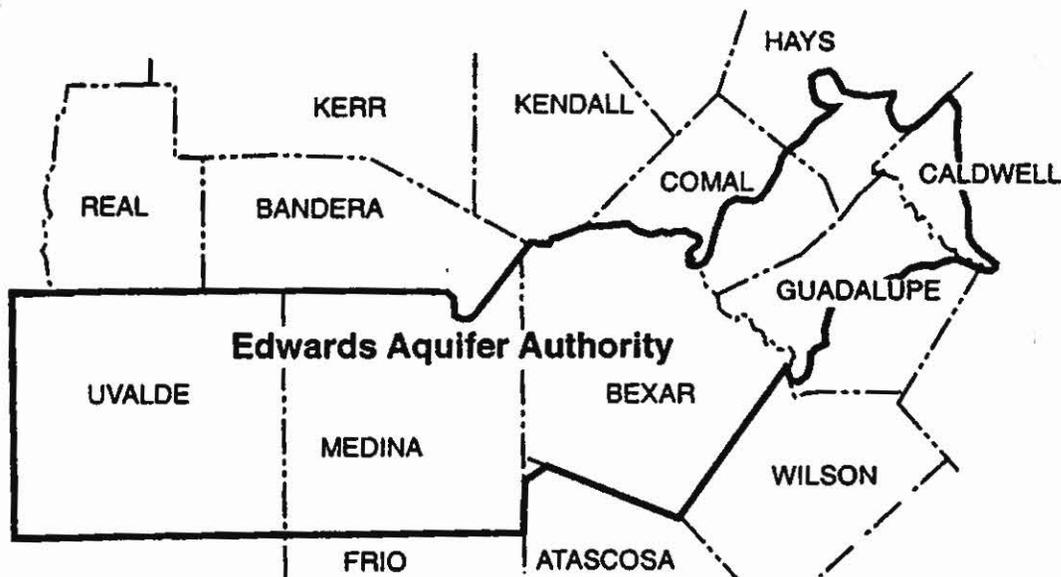
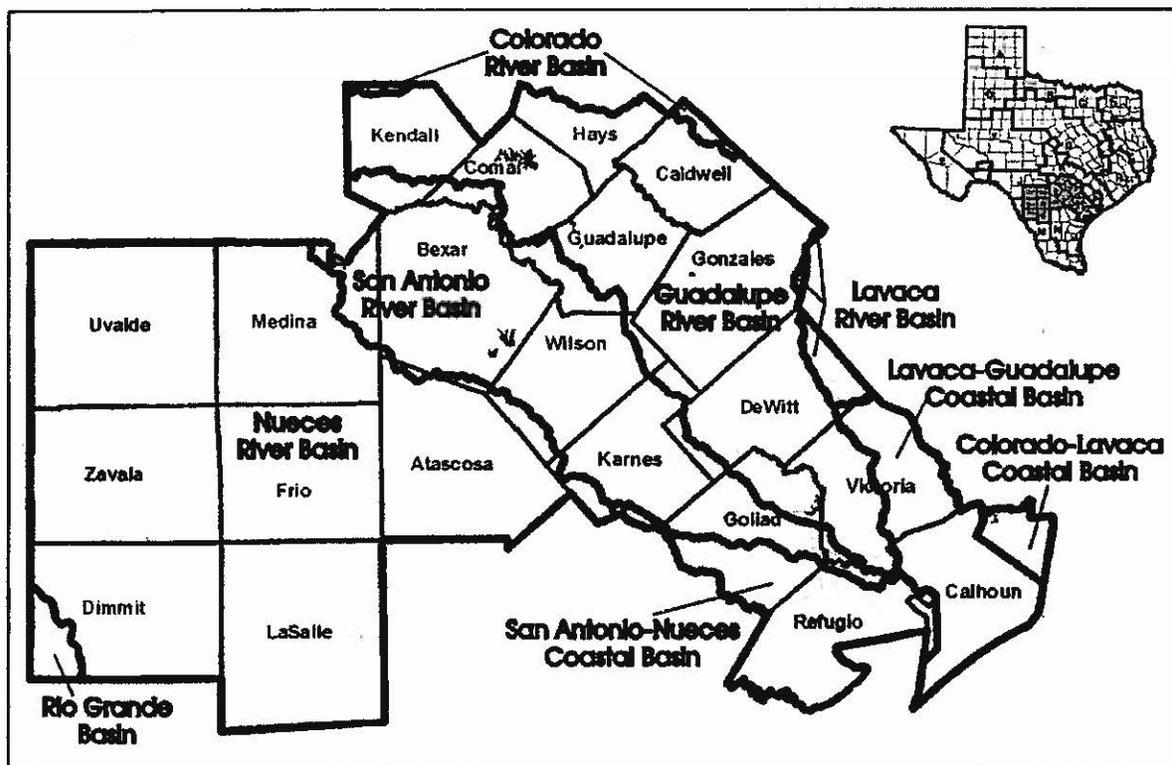


Figure 2.1.1-B is a map of the South Central Texas Region as defined by the State of Texas for water-planning purposes. Because it includes most of the EAA population, this area is interrelated with the Edwards Aquifer Region for many reasons. For example, reduced spring flow from Comal Springs has a direct effect on the availability of water guaranteed under existing rights to the flow of the Guadalupe River which are used by the rice industry along the Gulf Coast, the municipalities along the river, and industrial organizations. The Authority's mandate to maintain spring flows will benefit these downstream users.

As the region seeks out other water supplies to replace the Edwards water, the regional water planning efforts will be important to San Antonio. Many water supplies that have been identified as possibilities for San Antonio and other area communities involve downstream uses of Guadalupe River water and development of ground water from the coastal aquifers.

The interrelations between the Edwards Aquifer and the South Central Texas Region were deemed important enough by the Legislature that the Edwards Aquifer Authority Act, discussed in Section 2.3.1, requires that the South Central Texas Water Advisory Committee be represented by a nonvoting member on the Edwards Aquifer Authority Board of Directors.

Figure 2.1.1-B
South Central Texas Region



2.1.2 Demographics

The regional water planning process now underway requires that locally developed, consensus-based population projections be developed for each area of the state. This effort, coordinated by the Texas Water Development Board, has resulted in population projections for the counties included in the EAA region found in Table 2.1.2-A. Table 2.1.2-B shows the average annual growth rates implied by these same projections.

| County | 1990 | 2000 | 2005 | 2010 | 2020 | 2030 |
|--------------------|------------|------------|------------|------------|------------|------------|
| Atascosa | 30,533 | 38,609 | 41,388 | 45,815 | 54,023 | 61,342 |
| Bexar | 1,185,394 | 1,474,512 | 1,558,948 | 1,776,965 | 2,130,820 | 2,491,291 |
| Caldwell | 26,392 | 39,023 | 40,601 | 46,976 | 54,590 | 60,314 |
| Comal | 51,832 | 79,378 | 99,701 | 106,558 | 144,869 | 187,464 |
| Guadalupe | 64,873 | 86,668 | 93,270 | 111,437 | 140,370 | 176,873 |
| Hays | 65,614 | 102,585 | 104,347 | 139,826 | 174,539 | 216,724 |
| Medina | 27,312 | 33,349 | 41,841 | 38,069 | 42,299 | 44,945 |
| Uvalde | 23,340 | 26,466 | 31,451 | 29,756 | 32,788 | 35,595 |
| Total | 1,475,290 | 1,880,590 | 2,011,547 | 2,295,402 | 2,774,298 | 3,274,548 |
| % Growth from 1990 | | | 7.0% | 22.1% | 47.5% | 74.1% |
| State of Texas | 16,986,510 | 20,864,933 | 22,369,770 | 24,537,142 | 28,792,302 | 32,774,869 |
| % Growth from 1990 | | | 7.2% | 17.6% | 37.9% | 57.1% |

Texas Water Development Board, 2002 State Water Plan, Population Projections by County.
<http://www.twdb.state.tx.us/popwuse/CountyPopulation.htm>

Based on these forecasts, through 2010 regional growth will average 2% year, with values of 3% or higher in Comal and Hays Counties and 1.3% or less in Medina and Uvalde Counties. Growth rates will decline slightly over time, but are still expected to average 1.7% in the decade 2020-2030 for the region as a whole.

| County | 1990-2000 | 2000-2010 | 2010-2020 | 2020-2030 |
|----------------|-----------|-----------|-----------|-----------|
| Atascosa | 2.4% | 1.7% | 1.7% | 1.3% |
| Bexar | 2.2% | 1.9% | 1.8% | 1.6% |
| Caldwell | 4.0% | 1.9% | 1.5% | 1.0% |
| Comal | 4.4% | 3.0% | 3.1% | 2.6% |
| Guadalupe | 2.9% | 2.5% | 2.3% | 2.3% |
| Hays | 4.6% | 3.1% | 2.2% | 2.2% |
| Medina | 2.0% | 1.3% | 1.1% | 0.6% |
| Uvalde | 1.3% | 1.2% | 1.0% | 0.8% |
| Total | 2.5% | 2.0% | 1.9% | 1.7% |
| State of Texas | 2.1% | 1.6% | 1.6% | 1.3% |

Texas Water Development Board, 2002 State Water Plan, Population Projections by County.

It is important to note that these projections were developed at the beginning of a regional water-planning process at a time when much less was known about regional water availability or cost. Additional information on projections, including information related to age, race, and ethnicity, are provided in Appendix *REGION*.

While the Texas Water Development Board's data does not furnish population demographics by race and ethnicity, the Texas State Data Center gives the following projections of population growth for the area. Projections in Table 2.1.2-C below are based on fertility, migration and mortality rates observed in the period from 1990-1998. Higher in-migration and fertility of the Hispanic population are expected to result in a larger Hispanic share of the population in the future.

| Table 2.1.2-C Population Projections by Ethnicity for the Study Area | | | | | | |
|---|--------|--------|--------|--------|--------|--------|
| | 1990 | 2000 | 2005 | 2010 | 2020 | 2030 |
| Anglo | 45.71% | 40.20% | 37.61% | 35.26% | 31.20% | 27.68% |
| Black | 6.13% | 5.77% | 5.53% | 5.29% | 4.74% | 4.13% |
| Hispanic | 46.82% | 51.75% | 53.94% | 55.66% | 58.60% | 60.35% |
| Other | 1.35% | 2.28% | 2.91% | 3.66% | 5.45% | 7.85% |

Texas State Data Center: Projections of the Population of Texas and Counties by Age/Sex and Race/Ethnicity for 1990-2030. <http://txsdc.tamu.edu/cgi-in/prjctn98.cgi>

2.1.3 Economy

Regional water demands are concentrated in two areas.

- An expanding urban area that includes the City of San Antonio and the corridor along Interstate Highway 35 through New Braunfels and San Marcos. This is one of the fastest growing areas in Texas. Most water supplies are currently met by withdrawals from the Edwards Aquifer (see Section 2.1.2).
- The area west of San Antonio in Uvalde and Medina Counties, where there is extensive irrigation of cropland using Edwards Aquifer water.

Under these rules, certain permitted withdrawals of regional water supply from the Edwards Aquifer may not exceed 450,000 acre-feet, which is lower than recent historical use. Future growth of the region will require additional water resources or conservation efforts, both of which will be more expensive than status quo. To understand future water supply and demand, it is necessary to understand the economy of the region.

Export sectors of the economy, broadly defined as those products and services that are bought with money from outside the region, are the most important determinants of a region's economy. Export sectors, for these purposes, can be headquarters of large corporations whose operations occur substantially outside of the service area.

In 1998 the San Antonio MSA had a civilian workforce of 773,804, representing over 90% of the EAA region's civilian workforce of 854,780. The projected continued urban growth in the San Antonio area and I-35 corridor will be associated with increased water demand for municipal and industrial purposes. Wage and salary employment, a somewhat more restricted measure of employment, is shown in Table 2.1.3.-A.

**Table 2.1.3-A
Trends in San Antonio MSA Wage and Salary Employment**

| Sector | 1999 | % of Employment | Change from 1998 | | Change from 1990 | |
|--------------------------------|--------------------------|-----------------|--------------------------|------------------|--------------------------|------------------|
| | Wage & Salary Employment | | Wage & Salary Employment | Average Growth % | Wage & Salary Employment | Average Growth % |
| Services | 233,600 | 33.3 | 14,800 | 6.3 | 87,900 | 6.1 |
| Trade | 169,900 | 24.2 | 4,200 | 2.5 | 38,300 | 3.2 |
| Government | 125,100 | 17.9 | (1,300) | (1.0) | 12,400 | 1.3 |
| Manufacturing | 53,000 | 7.6 | 1,100 | 2.1 | 7,700 | 2.0 |
| Fin., Ins., Real Estate | 47,200 | 6.7 | 1,300 | 2.8 | 7,200 | 2.1 |
| Construction | 37,700 | 5.4 | 1,600 | 4.2 | 15,700 | 7.0 |
| Trans., Comm., Util. | 32,500 | 4.6 | (100) | (0.3) | 9,800 | 4.6 |
| Mining | 1,800 | 0.3 | - | - | (100) | (0.7) |
| Total Wage & Salary | 700,800 | 100.0 | 21,600 | 3.1 | 178,900 | 3.8 |

San Antonio Economic Development Foundation. <http://saedf.dcci.com>

This region's urban economy is characterized by large government and service employers and comparatively few large manufacturers. Figure 2.1.3-B shows the largest employers in the San Antonio area with a significant export impact. Notably, only one manufacturer, Diamond Shamrock, appears on the list and due only to the location of its corporate headquarters in the city. Data of this type rarely lends itself to precise characterizations. There are certainly some employees in the tables who are dedicated to providing goods and services to the local economy, making a portion of the employer's output aimed at the local economy.

| Rank | Employer | Activity | San Antonio Employment |
|------|------------------------------|-------------------------|------------------------|
| 1 | U.S. Military | Defense | 71,591 |
| 2 | USAA | Insurance | 14,896 |
| 3 | HEB Food Stores | Groceries | 10,042 |
| 4 | SBC | Telecommunications | 6,678 |
| 5 | Ultramar Diamond Shamrock | Refining & marketing | 2,857 |
| 6 | West Telemarketing | Telemarketing | 6,000 |
| 7 | Southwest Research Institute | Applied Research | 2,623 |
| 8 | Citicorp | Customer service center | 2,300 |
| 9 | QVC Network | Order center | 2,000 |
| 10 | Boeing Aircraft | Aircraft Maintenance | 2,000 |
| | Total | | <u>120,987</u> |

Source: [http://saedf.dcci.com/demogra/hqcorp.htm#Major Employers & Major Corporate HQs](http://saedf.dcci.com/demogra/hqcorp.htm#Major%20Employers%20&%20Major%20Corporate%20HQs)
<http://saedf.dcci.com/demogra/emplomil.htm>

The military. By far the largest single export employer in the region is the military, in the government classification, with 71,581 of the region's 125,100 government employees. As of 1998, this total consisted of 40,293 active military employees and 31,298 civilians on five different military installations in San Antonio. The total direct impact is estimated at \$4.6 billion.¹ These are some of the largest Edwards water users in the region.

Tourism. Although difficult to capture in any single employment sector, the recreation and tourism industry has a very large influence on both the trade and service employment sectors of the economy. Because many area attractions rely on Edwards Aquifer water, the Aquifer affects trade and service sectors. San Marcos Springs, the Comal and Guadalupe Rivers, Sea World, the San Antonio Riverwalk and the San Antonio Zoo are all important users of the Edwards Aquifer. Fiesta Texas and numerous area golf courses, through either direct pumping or the purchase of city water, are dependent upon the Edwards for irrigation water. Visits to these attractions in addition to other locales such as the San Marcos Outlet Mall and the Alamo, which are not heavy water consumers, make the area a popular visitor destination. A very large convention industry has developed as a result of the diversity of attractions and activities available in the area.

Tourism attractions are affected by the issues surrounding the Edwards Aquifer spring flows in two ways.

- Certain attractions benefit from pumping restrictions and higher spring flows. The San Marcos and Comal River water recreation facilities are direct beneficiaries of higher spring flows since faster river water affords more exciting tubing,

¹ San Antonio Economic Development Foundation

canoeing, and rafting. Water recreation below Canyon Dam benefits indirectly from higher Comal Springs spring flow since higher spring flows result in more water stored behind Canyon Dam during the latter part of the summer available for release, which in turn results in more desirable River conditions.

- San Antonio attractions that use water from the Aquifer stand to be adversely affected by withdrawal restrictions. The two most notable water-dependent recreational attractions in San Antonio are the River Walk (Paseo de Rio) and Sea World. The River Walk is located on the San Antonio River, whose flow is enhanced by a mechanical system pumping water from the Edwards Aquifer into the river. Similarly, Sea World pumps substantial amounts of Edwards water for its needs. Regulation will affect these attractions just as they will any other aquifer user: they will experience higher costs and lower reliability from Edwards water. In response to this, plans are already underway to replace Edwards water with recycled water from other sources.

**Figure 2.1.3-C
1998 Travel and Tourism Impact for the Region**

| Tourist Impact | Bexar County | Hays County |
|-----------------------|---------------------|--------------------|
| Spending | \$3,110,325,000 | \$105,910,000 |
| Payroll | \$707,500,000 | \$17,980,000 |
| Employment | 56,600 persons | 1,200 persons |
| Local Tax Receipts | \$31,242,677 | \$1,560,000 |
| State Tax Receipts | \$185,516,250 | \$8,340,000 |

Source: San Marcos Convention and Visitors Bureau, Personal communication, 2000

Large service employers. As can be seen from Figure 2.1.3-A on the previous page, call-center and telemarketing operations represent some of the largest employers in the area. Boeing aircraft appears as the largest, but by no means only, service contractor to the area's military bases. These contractors, together with the considerable employment in the tourism industry, account for the very large service sector in the region.

Manufacturing. Manufacturing in the region employs some 60,000 people, of whom some 53,000 are in the San Antonio MSA. Table 2.1.3-D shows the 23 largest employers for whom a published estimate could be located.²

² Texas Directory of Manufacturers, 1999. This source provides a range, which we have converted to a mid-point estimate.

| Industry/Employer | Product | Employees |
|--|-----------------------------------|------------------|
| Motorola, Inc. | Telecommunications equipment | 3,000 |
| Miller Curtain Co. Inc. | Curtains & bedspreads | 3,000 |
| Sony Semiconductor | Electronic components | 3,000 |
| Ultramark Diamond Shamrock | Petroleum Refining & Marketing | 2,857 |
| Structural Metals, Inc. | Steel bars | 750 |
| Tyson Foods, Inc. | Poultry | 750 |
| Mission Valley Textiles | Home furnishings | 750 |
| Bausch & Lomb Inc. | Sunglasses | 750 |
| Coca-Cola Bottling Co. of the SW | Soft drinks | 750 |
| Fairchild Aircraft Inc. | Aircraft | 750 |
| Friedrich Air Conditioning Co. | Air conditioners | 750 |
| Lancer Corp. | Equipment | 750 |
| Levi Strauss & Co. | Jeans & jackets | 750 |
| Levi Strauss & Co. | Jeans & jackets | 750 |
| L & H Packing Co. | Boned meats and bone meal | 750 |
| Play By Play Toys & Novelties | Stuffed toys | 750 |
| Radio Cap Co, Inc. | Printing of caps, mugs, | 750 |
| VLSI Technology Inc. | Semiconductor integrated circuits | 750 |
| Clarke American | Check printing | 700 |
| KCI | Specialty Medical Products | 650 |
| Texace | Headwear Manufacturing | 380 |
| Alamo Group Texas | Agricultural equipment | 375 |
| Texas Jacobson Co. | Plastic molding | 375 |
| | | |
| Total Large Manufacturing employers | | 24,837 |

Finance, Insurance, and Real Estate. This sector contains two large export employers. USAA, San Antonio's second largest employer, employs almost 14,896 people, and Citibank employs 2,000. Both operations make intensive use of clerical labor, which has historically been in ample supply in the San Antonio workforce.

Transportation, Communication, and Utilities. This sector has benefited in recent years as SBC Communications relocated its headquarters to San Antonio, adding 6,678 jobs between 1990 and 1999.

Mining. Mining, which includes oil and gas, is a small employer but a major contributor to export earnings. The area has recently produced hydrocarbons with an estimated annual value of \$1.5 to \$2.0 million. At today's energy prices, the contribution would be even higher. These direct payments to oil and gas operators and royalty owners in turn create service sector revenue and employment.

Agriculture. Agriculture is the predominant land use in the nonurban areas of the state. 16.1% of the land in the region is dedicated to pastureland, 53.8% to rangeland and 15.4% to irrigated and dryland farming cropland. In recent years, recreational hunting use has become in many cases a more important source of income to ranchers than leasing grazing rights. Major dryland crops include cotton, corn, milo, wheat, sorghum and soybean.

**Table 2.1.3-E
EAA Region Farm Output (in 1,000's of \$)**

| County | Food Grain | Feed Grain | Cotton | Oil Crops | Vegetable | Dairy | Livestock, Poultry & Their Products | Total |
|-----------|------------|------------|--------|-----------|-----------|-------|-------------------------------------|---------|
| Atascosa | 510 | 2,082 | 90 | 12,600 | 578 | 364 | 30,633 | 46,857 |
| Bexar | 1,561 | 4,319 | 43 | 144 | 2,100 | 1,350 | 11,255 | 20,772 |
| Caldwell | 180 | 1,239 | 633 | 0 | 3 | 0 | 26,891 | 28,946 |
| Comal | 93 | 2,144 | 0 | 0 | 0 | 0 | 4,220 | 6,457 |
| Guadalupe | 3,720 | 8,480 | 38 | 72 | 37 | 250 | 15,468 | 28,065 |
| Hays | 701 | 492 | 20 | 0 | 501 | 0 | 4,641 | 6,355 |
| Medina | 1,350 | 13,120 | 2,730 | 906 | 2,975 | 700 | 19,602 | 41,383 |
| Uvalde | 1,070 | 6,768 | 3,109 | 0 | 15,565 | 0 | 22,494 | 49,006 |
| Total | 9,185 | 38,644 | 6,663 | 13,722 | 21,759 | 2,664 | 135,204 | 227,841 |

Source: Texas Agricultural Extension Service, <http://agextension.tamu.edu>

As average rainfall declines 3.37 inches from 27.45 to 24.08 inches in the 82 miles from San Antonio to Uvalde, irrigated farming becomes less of a business calculation and more of a necessity. Cotton, corn, wheat and sorghum are not always irrigated in the eastern part of the region, but nearly always are in the western part. Irrigated farming of vegetables is generally the most successful in Uvalde County because the lower average rainfall results in less unscheduled water on the crops, which can cause a number of problems that affect crop quality and yield. Vegetables grown include onions, celery, cucumbers, broccoli, spinach, and carrots. The mild winters allow for a virtually year-round growing season, and much of the irrigated land is cropped two or three times a year. Multiple cropping strategies are often complex; the economics are more than the simple sum of the different income components. For example, planting corn by itself may be marginally profitable, but its positive effects to the soil and the pest cycle will often make it worthwhile because of the benefits to the yield on subsequent vegetable crops.

Vegetable farming is integrated with vegetable processing and forms a major source of employment in the western part of the region. Unlike modern grain farming, vegetables are labor intensive to harvest and process. With a year-round growing season, Uvalde County in particular serves as home base for a farm labor population officially estimated in the 1997 Census of Agriculture at 743, but widely recognized as much higher. This casual farm labor population, many of whom between harvests travel outside the region for work, is largely underestimated due to a lack of government reporting by the employer. In addition, the local

workforce is usually supplemented by laborers from Mexico and other parts of South Texas; the migratory lifestyle of these workers and the illegal immigration status of many of them also contribute to the low, farm-labor workforce estimate. A plentiful, if unofficial, farm-labor force in the area contributes to the low wages commanded by these workers. Thus the agricultural economy of Uvalde County, and to a lesser extent Medina County, is historically based on two very important factors of production that are inexpensive in this area: labor and water.

Processing the vegetables is another important source of export employment in the area of vegetable sales. Canning and frozen food processing at time of planting will enter into forward contracts with farmers to buy their output at time of harvest at previously set prices. This contracting mechanism takes the considerable price risk out of the farmer's planting decision. Thus, selling prices are known with certainty, and costs and yield are relatively predictable with irrigation. The assurance of a ready market at a known price makes the substantial investment in an irrigated crop possible for many, and provides a comfort level in a decision to borrow or lend against a future crop. The relatively certain availability of a crop has also made possible the substantial investment required to build a processing facility.

These farmers and processors will face more uncertain decisions under regulated withdrawal, and their costs will go up to the extent of the fees they will be required to pay to the Authority. Likewise, the local businesses who sell to them, such as chemical and implement dealers, will see an impact to the extent that total acres planted are reduced by the impact of these rules. The potential impacts of more expensive and less certain water have understandably caused a great deal of concern in these communities.

Summary

A general characterization of the export-sector employment in this region is that much, but not all, of it is either labor intensive or benefits from knowledge of military operations and equipment. The area has traditionally been viewed as an attractive source of productive labor with a relatively low skill level. As Figure 2.1.3-F on the next page shows, the region as a whole lags the rest of the state in the common income measurements, unemployment, and poverty rate.

**Figure 2.1.3-F
EAA Region Income and Poverty Estimates By County**

| County | Per Capita Income (\$, 1996) | Median Household Income (\$, 1996) | Unemployment Rate (% 1996) | % of Persons Living Below Poverty Line (1996) | Poverty Rate Rank Among All Texas Counties |
|----------------|------------------------------|------------------------------------|----------------------------|---|--|
| Atascosa | 13,836 | 25,420 | 5.8% | 30.4% | 38 |
| Bexar | 20,592 | 29,815 | 4.5% | 20.4% | 135 |
| Caldwell | 14,736 | 26,604 | 3.9% | 30.0% | 42 |
| Comal | 22,983 | 37,595 | 3.3% | 11.8% | 232 |
| Guadalupe | 17,996 | 32,574 | 3.1% | 17.1% | 180 |
| Hays | 17,988 | 35,119 | 3.1% | 16.0% | 201 |
| Medina | 14,913 | 29,125 | 3.1% | 22.7% | 95 |
| Uvalde | 14,547 | 21,598 | 11.4% | 32.9% | 22 |
| Region Average | 17,199 | 29,731 | 4.8% | 22.7% | |
| State of Texas | 21,320 | 31,488 | 5.6% | 18.1% | |

Texas State Data Center, <http://txsdc.tamu.edu> and USA Counties 1998, <http://www.census.gov/statab/USA98/48/000.txt>

2.2 The Edwards Aquifer

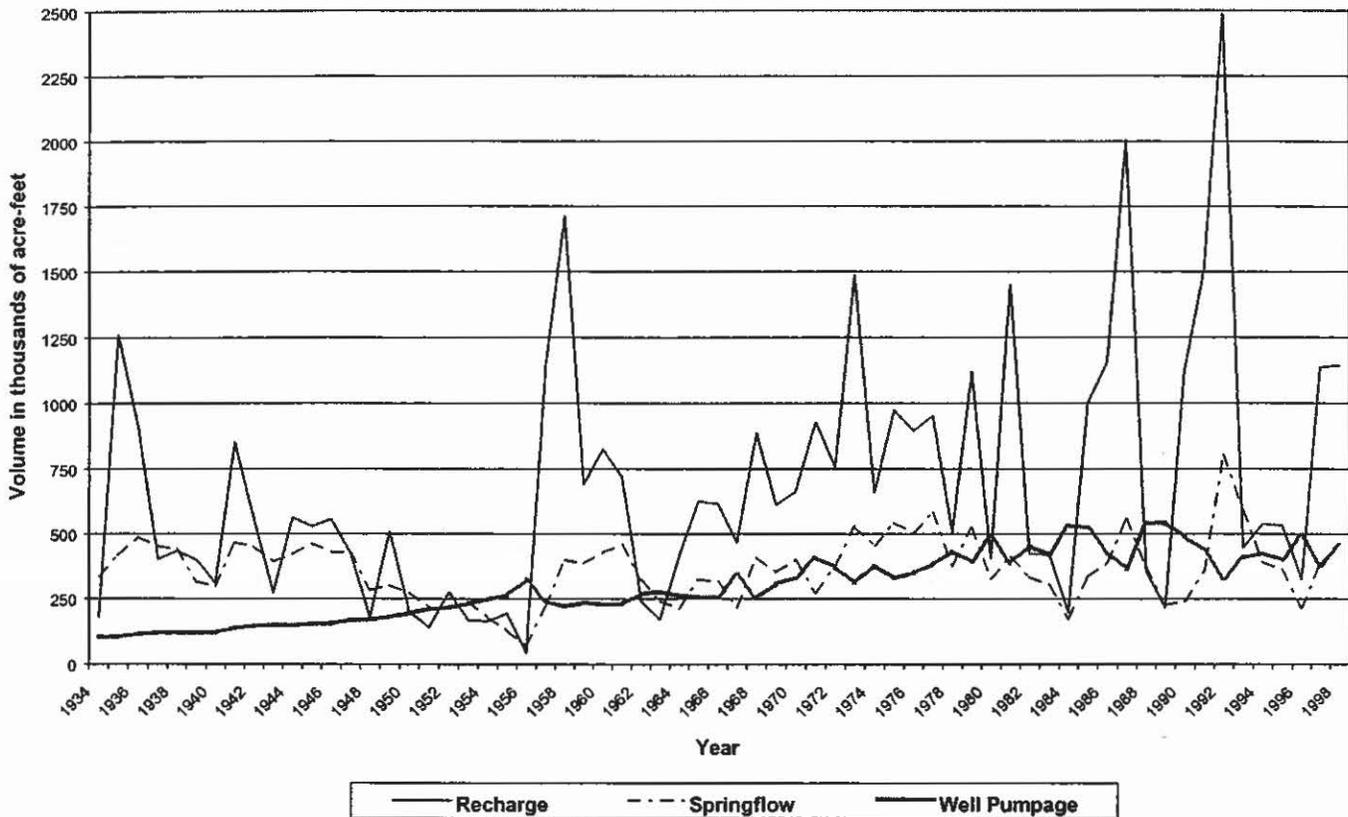
The Edwards Aquifer is a predominantly limestone formation that underlies a large area of south central Texas. In and near San Antonio, the Edwards is marked by numerous faults and fractures and extensive solution of the rock to form cavities. This results in one of the most prolific sources of underground water in the world—one that produces large quantities of excellent quality water at very low cost. The Edwards is the sole source of drinking water for 1.5 million Texans; the source of irrigation water for about 100,000 acres of cropland; the source of spring flows that support endangered species; and one source of water for downstream river basins, bays and estuaries.

Information on the hydrology of the aquifer, and the use of its water, is provided in Appendix *AQUIFER*. Figure 2.2 illustrates the major elements of the Edwards Aquifer water budget: recharge into the aquifer; and discharge from the aquifer through wells and through springs, the largest of which are San Marcos Springs (San Marcos) and Comal Springs (New Braunfels).

At the most fundamental level, springs flows increase when recharge is high and decrease as well pumping expands. Comal Springs ceased flowing in the mid 1950s, during a time of modest pumping but very low recharge. The springs have flowed since then, despite increased pumping, in substantial part because the quantity of recharge has been high. However, even short periods of heavy pumping or dry weather result in marked lowering of aquifer water levels and a reduction in spring flows. Conversely, the aquifer recovers quickly following rainfall events or reduced pumping rates. This rapid, almost river-like response to

weather and pumping is different from other aquifers, and makes management of the Edwards unique.

Figure 2.2
Edwards Aquifer Recharge, Springflow, and Well Pumpage



2.3 Government Regulation and Programs Regarding the Edwards Aquifer

The Edwards Aquifer has been the subject of an evolving regulatory effort to manage groundwater from the aquifer for a number of years. This section describes the major laws and organizations involved in this extensive effort.

2.3.1 The Endangered Species Act

Several species protected by the Federal Endangered Species Act (ESA) occupy aquatic habitats fed by Edwards Aquifer spring flows at Comal and San Marcos Springs (San Marcos). These species include:

- Fountain Darter (*Etheostoma fonticola*)
- San Marcos Gambusia (*Gambusia georgei*)
- Texas Blind Salamander (*Typhlomolge rathbuni*)
- San Marcos Salamander (*Eurycea nana*)
- Comal Springs Riffle Beetle (*Heterelmis comalensis*)
- Comal Springs Dryopid Beetle (*Stygoparnus comalensis*)
- Peck's Cave Amphipod (*Stygobromus pecki*)
- Texas Wild Rice (*Zizania texana*)

All of the above species are listed as endangered except the threatened San Marcos Salamander. An extended discussion of the species and their habitats, along with other biological features of the Edwards Aquifer area, is provided in Appendix *BIOLOGY*.

In 1991, the Sierra Club filed suit in federal court against the U.S. Fish and Wildlife Service (FWS) and others for failing to protect the endangered species that live in Comal and San Marcos Springs (*Sierra Club v. Lujan*, MO-91-CA-069). The court ordered the FWS to designate minimum spring flows required to ensure protection of the endangered species, and ordered the Texas Water Commission to prepare a plan to ensure that the springs would not fall below the FWS-determined minimums during times of drought.

One product of the litigation was a preliminary determination by FWS that the Endangered Species Act may be violated if flows at Comal Springs are allowed to drop below 200 cfs or flows at San Marcos Springs below 100 cfs. More severe threats to the endangered species can occur if lower flows occur over a sustained period. The lowest target flow designated by the FWS is 60 cfs at Comal Springs. (For more details, see Table 5.6.1-A. Information on uncertainties about the actual effect on endangered species at these flows is included in the discussion of the Habitat Conservation Plan in Appendix *PROGRAMS*.)

The Fish and Wildlife Service also determined that withdrawals from the aquifer should be reduced in two steps, first to 450,000 acre-feet per year (AFY), and in the long term to no more 400,000 AFY, and that additional reductions might be needed in drought periods. Virtually all management decisions regarding the Edwards are judged, at least in part, on the extent to which they protect spring flows from reaching or falling below the desired rates and accomplish the withdrawal limits specified by the FWS.

2.3.2 The Edwards Aquifer Authority Act

In response to the threat of federal regulation under the litigation described above, the Texas Legislature passed the Edwards Aquifer Authority Act in 1993. This legislation recognized that “the Edwards Aquifer is a unique and complex hydrological system, with diverse economic and social interests dependent on the aquifer for water supply.” It also created the Edwards Aquifer Authority to manage the aquifer in an area that includes all or most of Bexar, Comal, Hays, Medina, and Uvalde counties, as well as small parts of other counties.

Four mandates in the Act are of particular importance because they specify the rate at which water can be withdrawn from the Aquifer in order to maintain spring flows. All four mandates are related to requirements of the Endangered Species Act.

- Maximum permitted withdrawals from the aquifer may not exceed 450,000 AFY. (This limit and the one below are specified by the U.S. Fish and Wildlife Service.)
- The withdrawals are to be reduced to 400,000 AFY by January 1, 2008.
- A withdrawal rate sufficient to achieve permanent protection of endangered species at San Marcos and Comal Springs, “to the extent required by federal law” is to be in place after December 31, 2012.
- During droughts, permitted withdrawals are to be reduced.

As a result of the Act, existing users of Edwards wells are in a transition to a future that will limit the extent to which the aquifer can meet current and projected needs.

2.3.3 The Edwards Aquifer Authority

The Edwards Aquifer Authority (“Authority” or “EAA”) was created by the Act in 1993. Following litigation delays, the Authority began operation in 1996. Litigation in 1996 (*Sierra Club v. City of San Antonio*, 112 F.d 789 5th Cir. 1997) led to a preliminary injunction in Federal Court ordering specific pumping restrictions. The Fifth Circuit overturned this action in 1996, on the logic that the Court should abstain from regulating the Edwards so that the Authority could have an opportunity to do its job. The U.S. Supreme Court refused to hear an appeal of the Fifth Circuit’s decision.

The Authority has adopted the following mission statement:

The Edwards Aquifer Authority is committed to manage and protect the Edwards Aquifer system to ensure the entire region of a sustainable, adequate, high-quality, and cost-effective supply of water, now and in the future.

The Authority has begun to use its expertise and judgment to design and enforce an aquifer-management program that balances the needs and interests of all water users and affected stakeholders in the region. Because of the intense competition for the available supply, the Authority’s program is certain to markedly change water-use practices over a large area. Among the groups it will affect are the following.

- Irrigators.
- Municipal users and industrial users within the Authority boundaries.
- Environmental and recreational interests associated with Comal Springs, San Marcos Springs and other smaller springs.
- Downstream water users in the Guadalupe River Basin.

Competition for Edwards water and the complexity of the aquifer have led to a long history of controversy and public debate over how the Edwards should be developed, used,

and managed. Among the issues and management concepts identified by the Authority are the following.³

Balance. Authority management must balance competing interests, based on conditions that may change yearly or even daily. The following are examples of the balances that must be struck.

- Balancing protection for important environmental resources such as endangered species, and the continued provision of a sustainable, adequate, high quality and cost-effective water supply.
- Balancing regulatory impacts on the various stakeholders—irrigators, municipal and industrial users, environmental and recreational interests, and downstream surface-water users.
- Balancing actions that prevent waste, conserve water and use it efficiently; increase recharge to the aquifer; and develop additional sources of water.

Conjunctive management. The Edwards is a complex system that should be viewed as an integrated surface water and groundwater resource⁴. The Authority's role is limited to Edwards groundwater. Other agencies have responsibilities for surface water and for other groundwater in the area. Coordination with the relevant agencies is thus essential. Within the structure of the Act, this coordination occurs particularly through the South Central Texas Water Advisory Committee (SCTWAC), which appoints a nonvoting member of the EAA's Board of Directors and which has certain review responsibilities with respect to Authority actions.

Transition. The Act mandates fundamental changes in water use and water management practices, not all of which can be accomplished at once. The Authority regards as its first priority the implementation of an efficient, effective, and equitable permit program to manage withdrawals of water from the Edwards Aquifer. To this end, it is necessary to implement rules expeditiously, with the understanding that revisions may be needed to improve aquifer management. Putting specific plans in place is next in line, including a Habitat Conservation Plan, and a Comprehensive Water Management Plan. Also important are rulemaking and other support for the development of a regional water market that is expected to become integral to managing the aquifer. The expectation is that a functioning market for Edwards withdrawal rights will allow users to obtain additional rights to satisfy increasing water demands, will promote efficiency, and prevent waste.

Technical issues. The Authority maintains an ongoing, extensive program that collects well meter readings, data about water level, water quality, precipitation and stream flows. An extensive research program is underway to test and demonstrate methods of augmenting the water supply, especially through enhancing recharge of the Aquifer. The Authority intends to assess relationships between aquifer pumping and recharge, water levels, spring flows, and risks to endangered species. Collectively these efforts are intended

³ (EAA, 1998; SCTWAC, 1998; EAA, 1999)

⁴ (TAP, 1990)

to improve management of the aquifer, better define triggers for withdrawal restrictions during droughts, and, potentially, to increase the withdrawal limits.

For further information on the Authority, refer to the Authority's Groundwater Management Plan (1998-2008). The Plan includes information regarding the Edwards Aquifer Authority. Its mission and function are described as well as general statistics about regional water resources and demand.

2.3.4 Authority Plans and Programs

Rulemaking. The Authority has outlined plans for a wide-array of rules to regulate and manage the Aquifer. This program is discussed in Section 2.4.

Comprehensive Water Management Plan. As required by the Act, the Authority is developing a water plan that includes conservation, development of future supplies and management of demand during droughts. The plan will investigate alternative technologies and mechanisms for providing financial assistance for alternative supplies, will include cost-benefit and environmental analyses, and will result in a long-term plan, with 5-year goals and objectives, for providing alternative supplies to the region. See Appendix *PROGRAMS* for further details.

Groundwater Management Plan. Senate Bill 1 (also called the Brown-Lewis Water Plan) was enacted by the Texas Legislature in 1997. It requires the development of 10-year groundwater-management plans by each underground water conservation district. These must be reviewed and certified by the Texas Water Development Board (TWDB) and are to include estimates of available ground water, ground water use, ground water recharge (including feasible recharge augmentation), and projected supply and demand. The Authority completed its plan in 1998, and considers it the first step in development of the comprehensive plan discussed above. See Appendix *PROGRAMS* for further details.

Habitat Conservation Plan. While not concurring with the FWS flow numbers, the Authority has initiated a Habitat Conservation Plan that, if approved, would have the effect (among others) of allowing flows below 150-200 cfs at Comal Springs provided that the effects of such reduced flows on threatened and endangered species are minimized and mitigated. To minimize and mitigate impacts, the plan will focus on its permit program, and Comprehensive Water Management Plan. The rules discussed in this assessment are thus one element of the Habitat Conservation Plan. See Appendix *PROGRAMS* for further details.

2.3.5 Other Plans and Programs

Regional Water Plan. Senate Bill 1 mandated the establishment of regional water planning areas and the appointment of members to an initial regional water-planning group by the TWDB. With technical and financial assistance from the TWDB, and in accordance with planning guidelines it developed, the regional water-planning groups are to prepare a consensus-based regional water plan by September 1, 2000. The TWDB will assemble the regional plans into a state plan by September 1, 2001. Region L, the South Central Regional Water Planning Area, includes all of the area within the Authority boundaries, and much of the Guadalupe River Basin.

The regional water plans are to project demands for water over 50 years and compare those demands to existing and feasible future supplies during drought-of-record and reduced-flow conditions. The social and economic effects of not meeting specific water supply needs are to be evaluated. The reconnaissance-level investigations of a broad array of water management strategies completed by the West-Central Study Area of the Trans-Texas Program in 1998 are expected to be a major source of input. See Appendix *PROGRAMS* for further details.

SCTWAC Assessment. The South Central Texas Water Advisory Committee (SCTWAC) is an advisor to the Authority that was created by the Act. In addition to members from counties within the Authority boundaries, members represent downstream areas in the Guadalupe, San Antonio and Nueces River basins. The Act requires SCTWAC to prepare a bi-annual report to assess the effect of aquifer management on downstream water rights. The next such report is due in the year 2000.

CREP Program. The Federal Crop Reserve Enhancement Program (CREP) would pay farmers to convert their land from irrigated cropland to nonirrigated grassland (pasture) for a period of up to 15 years. The Authority views this as a factor that could lead to retirement of all or part of the ground water rights associated with converted cropland at the option of the owners. For example, to the extent that farmers would want to lease their unused water rights, the compensation provided by the CREP program would add to the return that farmers get from lease payments. This might somewhat reduce the cost to the Authority of rights it may lease. Among the constraints to adopting this program is that as now configured it would not allow dryland farming on the converted acres.

2.3.6 Local Water-management Organizations

In addition to the planning that is being done by the Authority and State many local organizations also have responsibilities relating to water management. These include underground water districts, river authorities, water-supply development entities, and individual purveyors of water. Information on many such entities has been compiled as part of the SB1 planning process and the Authority's planning works. That information is summarized in Appendix *ORGANIZATIONS*.

In general, the other organizations have one or both of two characteristics. First, they are generally protective of the water resources for which they are responsible. As a result, meeting future water demands that would otherwise be supplied from the Edwards will not be simple. Second, notwithstanding these constraints, many plans are underway that will collectively address much or all of the existing and future demand that cannot be met from the Edwards. After years of discussion about a water future, the current environment is increasingly one of action.

While it is important for the Authority to be aware of other water-resource organizations, the responsibility for implementing the provisions of the Act rests almost completely with the Authority.

2.4 The Edward Aquifer Authority's Rulemaking Program

2.4.1 Authority's Rulemaking Program

The Texas Legislature created the Edwards Aquifer Authority to design and implement a regulatory program to manage withdrawals of underground water from the Edwards Aquifer. The Authority rules will need to implement the following objectives set forth in the Act:⁵

- To sustain the diverse economic and social interests dependent on the aquifer for water supply
- To protect terrestrial and aquatic life
- To protect domestic and municipal water supplies
- To protect the operation of existing industries
- To further the economic development of the state
- To implement all reasonable measures to conserve water
- To protect the water quality of the aquifer
- To protect the water quality of the surface streams to which the aquifer provides spring flow
- To achieve water conservation
- To maximize the beneficial use of water available for withdrawal from the aquifer
- To protect aquatic and wildlife habitats
- To protect species designated as threatened or endangered under applicable federal or state law
- To provide for in-stream uses, bays and estuaries

The most recent effort by the Authority to adopt formal rules was voided by a court decision. The Authority currently intends to begin formally proposing new rules in the year 2000, with the first rules being adopted before the end of the year.

The Edwards Aquifer Authority Rules presently in preparation are to constitute Title 31 of the Texas Administrative Code, Chapters 700-713. The sections and their titles that the Authority proposes to draft and potentially adopt are described in Table 2.4.1-A. Boldface sections are assessed in this Programmatic Assessment.

⁵ EAAA, Art. 1, Sec. 1.14

**Table 2.4.1
Organization of Proposed Rules Within 31 TAC**

| Section | Title |
|----------------|--|
| 701 | General Provisions |
| 702 | General Definitions |
| 703 | Rulemaking Procedures |
| 704 | Reserved |
| 705 | Jurisdiction of the Authority |
| 706 | Reserved |
| 707 | Procedure before the Authority |
| 708 | Reserved |
| 709 | Fees |
| 710 | Reserved |
| 711 | Groundwater Withdrawal Permits |
| 712 | Reserved |
| 713 | Water quality |
| 714 | Reserved |
| 715 | Comprehensive Water Management Plan Implementation |
| 716 | Reserved |
| 717 | Enforcement |

Sections 701, 702, 703, and 705 have been previously assessed by the Assessment Team and found to be without substantive effect. We have included them when necessary in this document to present a complete view of the rules structure and governance of the Authority. Our assessments will be published separately when the Sections are formally proposed for adoption.

Certain subchapters in Sections 707, 709, and 711 are the focus of this Programmatic Assessment. When necessary, certain definitions in Chapter 702 will be referenced. The specifics of these sections are discussed in Chapter 3 of this document. In many cases these rules contain references to other rules that have not yet been made available to the Rulemaking Assessment Team. We have not assessed any part of a rule that references a section not yet available and will consider its impact in the assessment of the referenced rule at a later time.

The current rulemaking effort is described in the *Rulemaking Guidance Manual* developed by the Authority. Appendix *RULEMAKING* is a step-by-step guide and flowchart prepared by the Authority that provides specific detail regarding most of the process described below. It also contains a description of the overall regulatory program as it now exists in draft form.

This Programmatic Assessment of the rules will serve as a source document upon which the specific assessment documents will draw. Most, but not all, effects will be quantified in the Programmatic Assessment, which will be supplemented over the course of the rules-assessment process to incorporate other sets of rules as they are passed on to us by the board. Authority staff has reviewed drafts of Programmatic Assessment and has provided comments to the Assessment Team, which considered them, either in the context of a revised

Programmatic Assessment or in the formal rules assessment documents described in Section 2.5.

While completing the Programmatic Assessment, the Assessment Team wrote regulatory assessments, which are documents addressing specific statutory requirements. Both the Rules Committee and the Board may amend the draft rules we assessed before they are published as Proposed Rules. Any such amendment may trigger a reassessment by the Assessment Team. Once proposed rules are published in the Texas Register, the public will have at least 30 days to comment on them. The Board will also hold a public hearing on the proposed rules. After the comment period, the staff will recommend final rules, which again will be subject to amendment by both the Rules Committee and the Board, and subject to reassessment. After all amendments have been made, the Board will adopt a Final Order Adopting Rules, which will order their publication in the *Texas Register*, whereupon they will become effective 30 days after publication.

2.4.3 Section 2001, Government Code

This section of the Government Code is commonly referred to as the Administrative Procedures Act (APA). It contains most of the procedures a state agency must follow in adopting administrative rules. It identifies several assessments agencies must complete to justify a finding of “no impact.” Beyond describing assessments, the APA deals with many other aspects of rulemaking such as notice and public hearings. The regulatory assessments are as follows:

- Local Employment Impact Statement (§2001.022)
- Regulatory Analysis of Major Environmental Rules (§2001.0225)
- Fiscal Impact on State and Local Units of Government (§2001.024(a)(4))
- Public Benefit and Cost Note (§2001.024(a)(5))

2.4.4 Local Employment Impact Statement (§2001.022)

The Texas Workforce Commission (TWC), formerly the Texas Employment Commission, is required to prepare a local employment impact statement whenever a state agency determines that a proposed rule may affect a local economy. The Authority is responsible for making the initial determination of whether a rule may affect a local economy. If the determination is that it will, the Authority must submit the proposed rule to the TWC 30 days before filing the Notice of Proposed Rules with the Secretary of State.

The General Counsel for the Authority has determined that the Authority is a covered governmental entity for the purposes of the section of the Code. Accordingly, an earlier draft of this Programmatic Assessment was submitted to the TWC. TWC responded with a letter stating there was no apparent basis to refute the findings of the earlier draft of this report.