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THE EDWARDS AQUIFER HABITAT CONSERVATION PLAN

RESOLUTION TO OVER 50 YEARS OF WATER DISPUTE

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INTRODUCTION

When we last came to you in 2008, the water and environmental stakeholders of South Central Texas were embarking on a grand and somewhat desperate attempt to find a solution to a dispute that had alternately raged and smoldered for over 50 years. *See* Gulley & Votteler, *Resolving ESA-Water Conflicts: The Edwards Aquifer Recovery Implementation Plan*, *TWR* #58).

The use of the Edwards Aquifer had inspired regional antagonism and open conflict in courts and the state legislature. It was a seemingly intractable dispute concerning whether pumping from the Aquifer should be regulated. The dispute included municipalities, industrial and agricultural users, environmental interests, as well as downstream water right holders with rights to surface water fed by Edwards Aquifer springs. Today, we can report that the framework for managing and potentially resolving this dispute, i.e., the Edwards Aquifer Habitat Conservation Plan, is in place and functioning — even in the face of a drought of similar to the one it was originally created to handle. It should be noted, however, that there has not yet been time to fully implement all of the components of the plan and that significant challenges remain. *See* Gulley & Cantwell, *The Edwards Aquifer Water Wars: The Final Chapter*? 4 Texas Water Journal 1 (2013).

As discussed further below, in the early 1990s, obligations under the federal Endangered Species Act brought about state regulation which ended unrestricted water withdrawals from the Edwards Aquifer. In 2006-2007, the United States Fish and Wildlife Service (FWS) and the Texas Legislature brought together stakeholders from throughout the region to participate in a unique collaborative process to develop a plan to contribute to the recovery of federally-listed species dependent on the Edwards Aquifer. This process was referred to as the Edwards Aquifer Recovery Implementation Program.

THE EDWARDS AQUIFER

The Edwards Aquifer (Aquifer) is a unique groundwater resource, extending 180 miles from Brackettville in Kinney County to Kyle in Hays County. *See* **Figure 1** (page 2). It is the primary source of drinking water for over two million people in south central Texas and serves the domestic, agricultural, industrial, and recreational needs of the area. The Aquifer is the source of the two largest springs remaining in Texas — the San Marcos Springs and the Comal Springs. These springs feed the San Marcos River and the Comal River, which are tributaries to the Guadalupe River that provides freshwater inflow to San Antonio Bay.

Drought of Record

"Drought of record" is defined as follows in Texas administrative law under 30 TAC §297.1:

> "The historic period of record for a watershed in which the lowest flows were known to have occurred based on naturalized streamflow."

Generally, this term refers to the drought that occurred in Texas from 1947 to 1957. By the end of 1956, 94% of Texas' 254 counties were classified as disaster areas. The State Water Plan and regional water plans are 50-year water supply plans designed to meet water needs during a recurrence of the drought of record. In some watersheds more recent droughts have exceeded the drought of record and are now the new planning standard for those watersheds.

A study published by the Texas Water Journal in 2011 by Cleaveland, et al, demonstrated using tree ring reconstructions of climate beginning in 1500 that droughts exceeding the 1947 to 1957 have occurred over regions of Texas.

The Water Report
(ISSN 1946-116X)
is published monthly by
Envirotech Publications, Inc.
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Eugene, OR 97402

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Subscription Rate:
$299 per year

Postmaster: Please send address corrections to
The Water Report,
260 North Polk Street,
Eugene, OR 97402

The Aquifer is a karst aquifer flowing through highly porous limestone. Pertinent to this discussion, the Aquifer is divided for regulatory purposes into two pools — the Uvalde Pool, under Uvalde County, and the San Antonio Pool under the remainder of the Aquifer to the east. Aquifer levels vary with rainfall, recharge, and the rate of groundwater withdrawals. Prior to regulation of the Aquifer in 1993, withdrawals from the Aquifer had increased from approximately 100,000 **a**cre-**f**eet (AF) in 1934 to a peak of 542,400 AF in 1989. The total water demand for the Edwards Aquifer region is projected to increase over 34 percent over the next 30 years.

Eight species that depend directly on water in the Aquifer, or water discharged from Comal and San Marcos springs, are listed as threatened or endangered under the federal Endangered Species Act (ESA). These species include: fountain darter; San Marcos salamander; San Marcos gambusia; Texas blind salamander; Peck's cave amphipod; Comal Springs dryopid beetle; Comal Springs riffle beetle; and Texas wild-rice. The San Marcos gambusia has not been seen since 1982 and may be extinct. *See* FWS, "*San Marcos & Comal Springs & Associated Aquatic Ecosystems (Revised) Recovery Plan*," 1996, at 28-29. Additional listing petitions have been filed pursuant to section 4 of the ESA with respect to other aquatic species that depend directly on water in, or discharged from, the Edwards Aquifer springs.

The primary threat to these aquifer-dependent listed species is the intermittent loss of habitat from reduced springflows. Springflow loss is the combined result of naturally fluctuating rainfall patterns and groundwater pumping across the region. Other threats include: invasive non-native species; recreational activities; predation; direct or indirect habitat destruction or modification by humans; and other factors that decrease water quality (FWS, 1996).

In Texas, a severe drought which lasted from the late 1940s through most of the 1950s is referred to as the "drought of record" (*see* sidebar). In 1956, the Edward Aquifer's Comal Springs ceased to flow for 144 days, and the fountain darter population in the Comal Springs system was extirpated. Fountain darters were successfully reintroduced into the Comal River in the mid-1970s from the San Marcos Springs. The drought of record serves as a reference point when engaging in water planning for severe conditions.

EDWARDS AQUIFER DISPUTES: A BRIEF HISTORY

Use of groundwater in Texas is governed by the common law Rule of Capture. In *Houston & Texas Central Railway Co. v. East*, 81 S.W. 279 (1904), the Texas Supreme Court adopted this English common law rule that the owner of the land may pump unlimited quantities of water from under his land regardless of the impact that action may have on his neighbors' ability to obtain water on their own land. Demonstrating the extent of this principle, in 1954 the Texas Supreme Court relied on the Rule of Capture to allow a major spring in West Texas to dry up due to groundwater pumping. *Pecos County Water Control and Improvement District No. 1 v. Williams*, 271 S.W.2d 503 (Tex. Civ. App.-El Paso 1954, writ ref'd n.r.e.).

Edwards Aquifer HCP

Local Management

Groundwater Decisions

In the 1950s, Texas began the movement toward local management by groundwater conservation districts. The Edwards Underground Water District (EUWD) was created in 1959. Until 1993, however, withdrawal of groundwater from the Edwards Aquifer remained largely unregulated. In 1988, EUWD, pursuant to an express grant of authority, prepared a Drought Management Plan which did include a limited amount of regulation related to conservation measures. Otherwise, EUWD was not authorized to regulate or manage withdrawals from the Aquifer.

Prior to 1993, efforts to bring about regulation of Aquifer withdrawals remained unsuccessful. In 1989, a suit was filed asking the court to declare that the water in the Aquifer is an underground river, and, thus, under Texas law, owned by the State. *Guadalupe-Blanco River Authority v. Royal Crest Homes*, No. 89-038 (22nd Dist. Ct., Hays County, Tex. June 15, 1989). In 1992, while this case was still pending, the Texas Water Commission determined that the Edwards Aquifer was an underground river and, thus, subject to state regulation. This determination was overturned by a state district court. *McFadden v. Texas Water Comm'n*, No. 92-05214 (Dist. Ct., Travis County, Tex. 1992).

Edwards Aquifer Authority

Sierra Club v. Babbitt

In 1993, the decision regarding an ESA lawsuit filed by Sierra Club resulted in the Texas Legislature's creation of the Edwards Aquifer Authority and the regulation of withdrawals from the Aquifer. *Sierra Club v. Lujan*, No. MO-91-CA-069, 1993 WL 151353 (W.D. Tex.) (subsequently *Sierra Club v. Babbitt*). On February 1, 1993, the court in *Sierra Club v. Babbitt* held that FWS's failure to develop and implement a recovery plan that identifies springflow levels at which "take" and "jeopardy" (*see* sidebar) occurs for the species in Comal and San Marcos springs violated the ESA. The court ordered FWS to determine within 45 days the springflows at which "take" and "jeopardy" occur for the fountain darter, the Texas blind salamander, and other listed animal species. Springflow levels at which Texas wild-rice would be damaged or destroyed were to be determined. The court also ordered FWS to determine the minimum springflow required to avoid destruction or adverse modification of critical habitat defined for any ESA-listed species.

FWS "Take" Determinations

Response of US Fish and Wildlife Service to the Decision in *Sierra Club v. Babbitt*

In response, on April 15, 1993, FWS filed its "take" determinations ("*Springflow Determinations Regarding 'Take' of Endangered and Threatened Species*") with the Court. On June 15, 1993, FWS filed with the court its "jeopardy" and "adverse modification" determinations — "*Springflow Determinations Regarding Survival and Recovery and Critical Habitat of Endangered and Threatened Species*."

With respect to its determinations, FWS acknowledged that the numbers reflected FWS's best professional judgment and that, because insufficient data were available, it had taken a conservative approach in making these estimates. FWS recognized that the court's order required it to make its estimates in the absence of a specific project or action. Accordingly, it had to make assumptions regarding the duration, timing, extent, and impacts of possible actions.

Fountain Darter Flows

FWS estimated that "take" and "jeopardy" or "adverse modification" of critical habitat would occur when springflows fell below the flow rates, expressed in **c**ubic **f**eet per **s**econd (cfs), as shown in **Table 1.** FWS estimated that flow levels could be reduced to 150 cfs without resulting in "take" of the fountain darter if effective control of the giant ramshorn snail could be accomplished. With effective ramshorn snail control and the ability to control the timing and duration of low springflows, FWS also found that flow levels could be reduced to 60 cfs for short time periods, during certain times of the year, without jeopardizing the continued existence of the fountain darter.

Table 1
FWS 1993 DETERMINATION OF MINIMUM SPRINGFLOWS NEEDED TO PREVENT TAKE, JEOPARDY, OR ADVERSE MODIFICATION OF CRITICAL HABITAT

Species	*Take*	*Jeopardy*	*Adverse Modification*
Fountain darter in Comal	200 cfs	100 cfs	100 cfs
Fountain darter in San Marcos	60 cfs	50 cfs	150 cfs
San Marcos gambusia	100 cfs	100 cfs	60 cfs
San Marcos salamander	50 cfs	N/A	100 cfs
Texas blind salamander	100 cfs	60 cfs	N/A
Damage and Destruction			
Texas wild-rice	100 cfs	100 cfs	100 cfs

While the ESA does not prohibit the "take" of plants determined to be threatened or endangered, the conditions putting these plants in jeopardy must still be determined. FWS estimated that sufficient damage and destruction of Texas wild-rice would occur at 100 cfs to cause jeopardy. However, FWS estimated that short-term reductions in flow levels below 100 cfs might avoid jeopardy for Texas wild-rice if: exotic species could be effectively controlled; an aquifer management plan was implemented to control timing and duration of lower flows; and the status of the species improved throughout its historic range.

Edwards Aquifer HCP

Withdrawal Cap

Reductions Required

Historic Use

Water Costs

ESA Terms

Under the ESA, the "**take**" of a threatened or endangered species is defined as: "To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering."

ESA Section 10(a)(1)(B) allows for permits for the "**incidental take**" of threatened or endangered species, defined as a take which "results from, but is not the purpose of, carrying out an otherwise lawful activity." Application for an **Incidental Take Permit** is subject to certain requirements, including preparation by the permit applicant of a species conservation plan, generally known as a **Habitat Conservation Plan (HCP)**.

Source: US Fish & Wildlife "*Endangered Species Glossary*" www.fws.gov/ENDANGERED/esa-library/pdf/glossary.pdf

Response of the Texas Legislature to the Decision in *Sierra Club v. Babbitt*

The court in *Sierra Club v. Babbitt* also made clear that it would entertain motions for further injunctive relief if the Texas Legislature did not develop a regulatory system to limit withdrawals from the Aquifer to protect listed species. Subsequently, in May 1993, the Texas Legislature passed Senate Bill 1477 (SB 1477) creating the Edwards Aquifer Authority (EAA). It authorized the EAA to issue permits and regulate groundwater withdrawals. SB 1477 directed EAA to initially cap the permits that could be issued at 450,000 AF annually. However, SB 1477 also required EAA to limit withdrawals to 400,000 AF by December 31, 2007, by proportionally reducing issued permits or by purchasing and retiring issued permits. The Texas Legislature required that the cost of reducing withdrawals or permit retirement to get to the 450,000 AF cap was to be borne solely by the Aquifer pumpers. SB 1477 § 1.29(a)(1). The cost of retiring the water rights to get from 450,000 to 400,000 AF was to be borne equally by Aquifer pumpers and downstream water rights holders. *Id*. at 1.29(a)(2).

While SB 1477 set specific pumping caps, it also required EAA to issue permits with minimum pumping rights based on historic use and guaranteed specific withdrawal rights for qualifying use. When the applications were submitted, EAA determined that the minimum permitted rights created by the Legislature totaled at least 549,000 AF, well above the 450,000 acre-foot pumping cap. Further, EAA had not addressed the requirement to ensure minimal continuous flow that SB 1477 required be done by the end of 2012. The Legislature attempted to address these problems in 2003 and 2005, but was not successful.

Thus, in 2007, the withdrawal cap issue was unresolved. Meanwhile, the cost of an acre-foot of Edwards' water had risen to over $5,000/AF. The total cost to the Aquifer pumpers of buying down permits from 549,000 AF and retiring permits to get to 400,000 AF was estimated to be $745 million. The costs to downstream surface water users responsible for one-half of the cost of retiring permits to get from 450,000 to 400,000 AF was an additional $125 million. SB 1477 further required EAA to adopt a Critical Period Management Plan to reduce pumping during droughts and to implement and enforce measures by December 31, 2012 to ensure "minimum continuous spring flows" to protect the listed species to the extent required by federal law.

THE EDWARDS AQUIFER RECOVERY IMPLEMENTATION PROGRAM

In late 2006, FWS brought together stakeholders from throughout the region to participate in a "**r**ecovery **i**mplementation **p**rogram" (RIP) to develop a plan to contribute to the recovery of ESA-listed species dependent on the Edwards Aquifer. RIPs are multi-stakeholder initiatives, developed with FWS input, that seek to balance water use and development with the recovery of ESA-listed species. To achieve this balance, the stakeholders develop a comprehensive document that outlines: program goals; activities; timelines; measurements of success; and roles of the participants. RIP participants then execute an agreement to implement the activities outlined in the program document.

Meanwhile, with the deadline looming to reduce the permitted withdrawals to 400,000 AF and water costing in the thousands of dollars per acre-foot, the Texas Legislature once again tried to resolve the problem. In May 2007, the Texas Legislature passed Senate Bill 3 (SB 3), which raised the pumping cap to 572,000 AF and adjusted the critical period management requirements established by EAA in its regulations. SB 3 also directed the EAA and certain other state and municipal water agencies to participate in an Edwards Aquifer RIP (EARIP) and to prepare a FWS-approved plan by 2012 for managing the Aquifer to preserve the listed species at Comal Springs and San Marcos Springs. The Legislature directed that the plan must include recommendations regarding withdrawal adjustments during critical periods that ensure that ESA-listed species associated with the Edwards Aquifer will be protected, including during conditions as severe as the drought of record.

SB 3 directed the Edwards Aquifer Authority to "cooperatively develop a recovery implementation program" through a facilitated, consensus-based process that involved input from FWS, other appropriate federal agencies and all interested stakeholders, including specified state agencies. The stakeholders in EARIP included: state agencies; local water resource authorities; water purveyors; environmental groups; municipalities; public utilities; and other individuals and groups interested in the Aquifer and the species residing in the Aquifer. Approximately 60-to-80 persons routinely attended the monthly meetings of EARIP and its Steering Committee, representing more than 39 stakeholder groups and individuals. The stakeholders met at least monthly, often twice a month. Including work group meetings, many Stakeholders were attending EARIP meetings on a weekly basis.

EARIP differed from other RIPs in several ways. The typical RIP involves federal land and/or federal agencies managing water (e.g., the operation of a dam) and the federal agencies contributing significant funding to the RIP process. EARIP, by contrast, did not involve federal land and federal agencies are not involved in managing the Aquifer. As for funding, SB 3 directed "EAA and the other stakeholders" to

Edwards Aquifer HCP

provide money to finance the activities of EARIP. While limited amounts of federal and state monies were eventually secured, EARIP stakeholders themselves remain the primary source of funding.

Another key difference between EARIP and other RIPs was the Texas Legislature's involvement in structuring the EARIP. While RIPs are typically voluntary associations, participation in EARIP was not entirely voluntary for some of the stakeholders. SB 3 required EAA and certain other state and municipal water agencies to participate in EARIP. Moreover, development of the program document in a typical RIP can take many years. The Texas Legislature, however, limited development time to less than five years. The Legislature also established specific tasks and deadlines for accomplishing these tasks.

EARIP Tasks & Deadlines

Specific EARIP tasks and deadlines set out in SB 3 included:

- Create a Steering Committee by September 30, 2007
- Hire a Program Manager by October 31, 2007
- Enter into a Memorandum of Agreement by December 31, 2007
- Appoint an expert Science Subcommittee by December 31, 2007
- The Science Subcommittee was required to submit to the Steering Committee and stakeholders initial recommendations on issues identified in SB 3 by December 31, 2008
- Establish a Recharge Facility Feasibility Subcommittee (no deadline)
- Enter into an implementing agreement to develop a program document by December 31, 2009

SB 3 called for the creation of a Steering Committee to oversee and assist in the development of EARIP. SB 3 § 1.26A(e). The Steering Committee of EARIP included twenty-six members representing environmental, water authorities and purveyor, industrial, municipal, public utility, state agencies, and agricultural interests related to the Edwards Aquifer. Twenty-one of the members of the Steering Committee were established in SB 3. The remaining five members were added by the Steering Committee to ensure a broad diversity of representation. In early 2008, some 39 stakeholder groups or individuals executed a Memorandum of Agreement with FWS setting out how the EARIP process would be conducted.

Specific Issue Work Groups

EARIP used small work groups and committees to examine and make recommendations regarding specific issues. The use of these groups proved very effective in facilitating resolution of complex or contentious issues in the decision-making process. A list of the various committees and work groups used by EARIP are set out in Section 1.7.1 of the HCP.

Each of the SB 3 mandates was met within the required timeframe and accomplished in the collaborative spirit the Legislature expected.

In the summer of 2011, EARIP, after much debate and compromise, accomplished the final task mandated by the Legislature: agreement on the Edwards Aquifer Habitat Conservation Plan.

THE EDWARDS AQUIFER HABITAT CONSERVATION PLAN

Elements of the Edwards Aquifer Habitat Conservation Plan

Habitat Protection

The term of the Edwards Aquifer Habitat Conservation Plan (HCP) is 15 years. The implementation of the HCP is divided into two phases. In the first phase, habitat protection measures to increase the viability of the species will be implemented immediately at Comal Springs and San Marcos Springs. These measures include: habitat restoration including replacement with native vegetation favored by the listed species; maintenance of dissolved oxygen through removal of decaying aquatic vegetation during low flows; sediment removal; predator control; and fountain darter gill parasite control. The HCP submitted to FWS can be found on the documents page of the EAA website: www.eahcp.org/files/uploads/Final20HCP.pdf.

Recreation Impacts

The minimization of the impacts of recreation at times of low flow will be aided by the creation of scientific study areas by the Texas Parks and Wildlife Department. *See* TPW Code § 81.501. Access to sensitive habitat, such as areas of Texas wild-rice, will be limited during such periods — as is the case during the current drought. Water quality measures include: an incentive program for low impact development; Best Management Practices; support for banning coal tar sealant for roads to avoid detrimental leaching; and expanded water quality monitoring.

Minimum Streamflows

In addition, the HCP's Phase I includes a package of actions to ensure continuous minimum springflow during a repeat of the drought of record conditions. The flow protection measures include: a **v**oluntary **i**rrigation **s**uspension **p**rogram **o**ption (VISPO) during severe drought; a regional municipal conservation program; and the use of the San Antonio Water System's (SAWS') Aquifer Storage and Recovery (ASR) facility to store water to offset pumping during severe drought. The EAA Drought Plan includes response to successive stages of increasingly critical drought conditions and HCP Phase I incorporates additional emergency Stage V Critical Period Management cutbacks. *See* **Tables 2** and **3** (page 6).

Edwards Aquifer HCP

Adaptive Management

Biological Goals

ASR Use

Flow Objectives

Incidental Take Agreement

All of the measures are being evaluated through a comprehensive monitoring program and adjustments made through a robust adaptive management process. The adaptive management process includes an applied research program to test the assumptions underlying the biological goals and objectives. The research focuses on the biological effects of low flows on species and habitat. In addition, the existing MODFLOW model will be improved, and a mechanistic ecological model developed to evaluate all of the impacts on habitat.

In the HCP's Phase II, EARIP will implement any additional measures needed to achieve the biological goals. The decision regarding whether any additional measures are needed will be based on the best available science at that time and will rely heavily on information developed in the adaptive management process.

The HCP establishes a presumptive measure for Phase II of the HCP, should it be determined that additional measures are needed to achieve the biological goals. Should no other alternatives be agreed upon, the presumptive measure involves the continuation of the Phase I measures with the expanded use of the SAWS' ASR. In the event that expanding the availability of the ASR is unable to fully meet the additional springflow necessary to meet the minimum flow objectives, the balance of that minimum flow will be obtained through increased Stage V Critical Period withdrawal reductions.

The HCP also established long-term biological goals and objectives for each species. With respect to springflows, the minimum springflow objective is 45 cfs (monthly average) at Comal Springs and 52 cfs (monthly average) at San Marcos Springs. HCP § 4.1. These objectives are not to exceed six months in duration followed by 80 cfs (daily average flows) for three months. *Id*. Further, the long-term average springflow objective for Comal Springs is 225 cfs and, for San Marcos Springs it is 140 cfs. *Id*. Many of the other objectives are stated in terms of water quality and habitat. *See* HCP, Section 4.2.

The permittees for the HCP's Incidental Take Permit include the City of San Marcos, the City of New Braunfels, the EAA, Texas State University, and the City of San Antonio through the San Antonio Water System (SAWS). The understandings among the permittees as to how the HCP will be managed and implemented are set out in the Funding and Management Agreement. The implementation of the HCP will be overseen and managed by an Implementing Committee consisting of the applicants. Guadalupe-Blanco River Authority will be a non-voting member of that Committee. EAA will have primary responsibility for

Tables 2 & 3: Critical Period Triggers, Stages and Withdrawal Reductions at The San Antonio and Uvalde Pools

EDWARDS AQUIFER AUTHORITY

The following Critical Period triggers and percent reductions apply to all Municipal, Industrial and Irrigation users authorized to withdraw more than 3 acre-feet.

Table 2: San Antonio Pool

TRIGGER (based on 10-day average)	CRITICAL PERIOD STAGE I	CRITICAL PERIOD STAGE II	CRITICAL PERIOD STAGE III	CRITICAL PERIOD STAGE IV	CRITICAL PERIOD STAGE V
Index Well J-17 Level (MSL)	<660	<650	<640	<630	<625
San Marcos Springs Flow (CFS)	<96	<80	N/A	N/A	N/A
Comal Springs Flow (CFS)	<225	<200	<150	<100	<45/40*
Withdrawal Reduction	20%	30%	35%	40%	44%

Table 3: Uvalde Pool

TRIGGER (based on 10-day average)	CRITICAL PERIOD STAGE I	CRITICAL PERIOD STAGE II	CRITICAL PERIOD STAGE III	CRITICAL PERIOD STAGE IV	CRITICAL PERIOD STAGE V
Index Well J-27 Level (MSL)	N/A	<850	<845	<842	<840
San Marcos Springs Flow (CFS)	N/A	N/A	N/A	N/A	N/A
Comal Springs Flow (CFS)	N/A	N/A	N/A	N/A	N/A
Withdrawal Reduction	N/A	5%	20%	35%	44%

Definitions: (MSL) Mean Sea Level; (CFS) Cubic Feet Per Second

Adapted from Edwards Aquifer Authority website: www.eahcp.org/index.php/flow_protection/stage_v_critical_management_period

Edwards Aquifer HCP

managing the day-to-day activities related to the HCP and responsibility for the flow protection measures except for the SAWS ASR facility (for which SAWS will have responsibility). The cities of San Marcos and New Braunfels, and Texas State University will have primary responsibility for implementing the habitat measures within their respective jurisdictional boundaries.

Participant Approvals

Approval of the HCP

Starting on October 18, 2011, with the City of San Marcos, the HCP and its supporting documents was presented to the permittees for approval. Approval of the plan was unanimous by the San Marcos City Council and SAWS board. The City of New Braunfels passed the plan with only one vote in opposition. On October 24, 2011, the administration of Texas State University approved the plan.

At the November 7, 2011 meeting of EARIP, the Steering Committee recommended the HCP and the supporting documents receive final approval by the EAA Board of Directors. The EARIP's recommendation passed with one objection and one abstention. This vote marked a huge step forward for the region that had long seemed unattainable. The one stakeholder who objected did not object to the HCP itself but to the method of paying for its implementation.

Acting on the EARIP's recommendation, on December 13, 2011, the EAA Board of Directors voted to approve the HCP. However, by an 8-7 vote the Board also tabled a decision on the HCP-related Funding and Management Agreement (FMA). Disagreements were resolved over the next two weeks, however, and on December 28, 2011, the EAA Board of Directors approved the FMA by a vote of 15-0.

Record of Decision

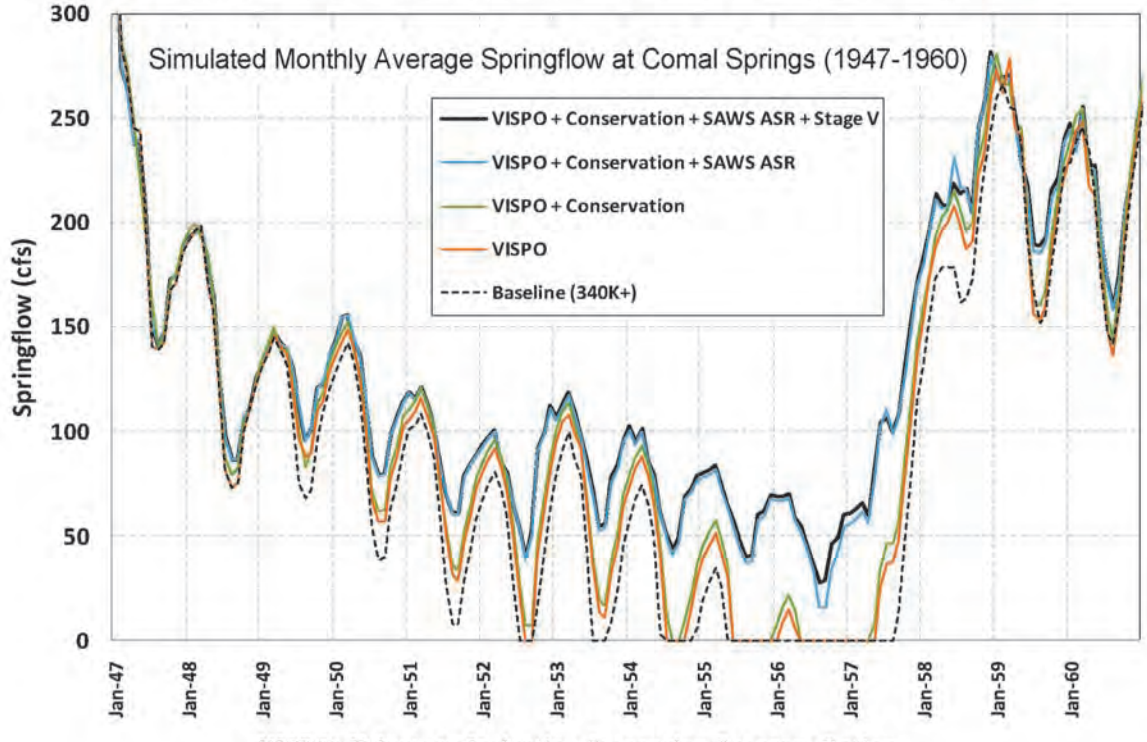
The HCP and supporting documents were submitted to FWS along with the Incidental Take Permit application on January 5, 2012. On February 15, 2013, the FWS issued its Record of Decision approving the issuance of the Incidental Take Permit and the HCP. 78 Fed. Reg. 11,218 (Feb. 15, 2013). While awaiting this decision, the Implementing Committee developed work plans and budgets for each task in the HCP and put a management structure in place to oversee the work. The preparatory work for actually implementing the HCP began in January 2012.

Flow Protection Modeling

Effectiveness of the HCP

The simulated effects of the flow protection measures on springflow have been modeled over the historical record — including a repeat of the drought of record — to assess whether they are capable of ensuring continuous minimum springflows. Simulated discharge rates covering the drought of record period at Comal Springs can be seen in **Figure 2**.

Figure 2:
Simulated Drought of Record Flows Under Various Management Regimes



Adapted from Edwards Aquifer HCP Section 5

Edwards Aquifer HCP

Minimum Springflow Modeling

The Phase I package of springflow protection measures provides substantial benefit to the listed species. It ensures minimum continuous springflow even during a repeat of the drought of record. Under current baseline conditions (without the HCP measures in place), modeling predicts that Comal Springs would cease to flow for 38 months during a repeat of drought of record conditions, and the springflows are predicted to be below 30 cfs (monthly average) for 54 months (**Table 4**). At San Marcos Springs, in the simulation of a repeat of the drought of record, the minimum flow would be 2 cfs, and springflows would be below 52 cfs (monthly average) for 20 months (**Table 5**).

Comal Springs

Table 4
COMAL SPRINGS DISCHARGE STATISTICS

SPRINGFLOW STATISTICS (Evaluated for 1947-2000)		SCENARIO			
		SB 3 assuming full pumping of the EAA permits	SB 3 assuming pumping of 381,000 AF of EAA permits annually	Phase I	Phase II
Minimum Monthly (cfs)		0	0	27	47
Minimum Rolling 6 Month Average (cfs)		0	0	39	54
Long-Term Average (cfs)		178	237	196	196
Number of Months Below	150 cfs	221	165	185	185
	120 cfs	157	128	127	125
	80 cfs	99	82	53	53
	45 cfs	62	56	7	0
	30 cfs	54	47	2	0
	0 cfs	38	36	0	0

Source: HCP Section 4.2

San Marcos Springs

Table 5
SAN MARCOS SPRINGS DISCHARGE STATISTICS

SPRINGFLOW STATISTICS (Evaluated for 1947-2000)		SCENARIO			
		SB 3 assuming full pumping of the EAA permits	SB 3 assuming pumping of 381,000 AF of EAA permits annually	Phase I	Phase II
Minimum Monthly (cfs)		2	5	51	52
Minimum Rolling 6 month Average (cfs)		12	14	53	55
Long-term Average (cfs)		153	160	155	155
Number of Months Below	100 cfs	121	113	114	114
	80 cfs	52	51	48	47
	50 cfs	19	17	0	0
	30 cfs	7	6	0	0
	10 cfs	3	2	0	0

Source: HCP Section 4.2

Protection Benfits

By contrast, with the implementation of the Phase I springflow protection measures, Comal Springs is predicted to have continuous springflow during a repeat of drought of record conditions. As set out in **Table 4**, the minimum springflow projected at Comal Springs for Phase I is 27 cfs (monthly average) and springflow only falls below 30 cfs on a monthly average for only two months over a simulated repeat of the drought of record. The long-term average springflows at Comal Springs is projected to decline to 196 cfs.

At San Marcos Springs, the simulated minimum monthly springflow for Phase I is 50.5 cfs. Springflow would fall below the flow objective of 52 cfs only twice during a simulated drought of record conditions. The long-term average springflows at San Marcos Springs is projected to decline to 155 cfs.

Edwards Aquifer HCP

Continuous Springflows

A study conducted by the River Systems Institute at Texas State University found that springflows at these levels will not appreciably reduce the likelihood of survival and recovery of the listed species over the first seven years of the HCP, even if a repeat of drought of record conditions were to occur during that time, so long as all recommended measures are implemented to restore and protect the habitat of the listed species. *See* Hardy, et al, *Evaluation of the Proposed Edwards Aquifer Recovery Implementation Program Drought of Record Minimum Flow Regimes in the Comal and San Marcos River Systems* (Dec. 28, 2010). The springflow protection measures ensure continuous springflows at both Comal and San Marcos Springs, offering significant improvements over the environmental baseline. The hydrograph found in **Figure 2** (page 7) shows a simulation of a repeat of the drought of record that compares the effects of the pumping cap and Critical Period reductions in SB 3 with the HCP measures at Comal Springs.

Low Flows & "Pulses"

Currently available information indicates that, if necessary, the presumptive Phase II measure will provide the necessary additional springflow to meet the minimum flow objectives necessary to attain the biological goals as currently defined. If the presumptive Phase II measure expanding the use of SAWS'ASR facility is implemented with an additional three percent EAA Drought Plan Stage V cutback, the minimum monthly average springflow at Comal Springs would be 47 cfs. The minimum monthly average springflow at San Marcos Springs would be 52 cfs.

The adaptive management process will include applied research to evaluate the impact of low flows on the listed species and their habitat. It will also evaluate the long term average flow requirement and the requirement for 80 cfs "pulses" during periods at minimum flow levels.

Funding Requirements

The EARIP developed a Funding and Management Agreement (FMA) which obligates the five incidental take permitees to implement the HCP. The FMA established the procedures and mutual commitments among the permittees for funding and management of the HCP and the adaptive management process. This FMA was executed only by the five incidental take permittees.

In addition to the HCP and FMA, the permittees entered into a Implementing Agreement (IA) with the FWS. The IA is an agreement that, among other things, "defines the obligations, benefits, rights, authorities, liabilities, and privileges of all signatories" to the HCP. *See* FWS, "*Habitat Conservation Planning and Incidental Take Permit Process Handbook*" (FWS Handbook), Nov. 1996 at 3-37. The decision to develop an IA is within the sole discretion of the FWS's Regional Director. *Id*.

HCP Costs

The Cost of the HCP

The annual cost of implementing the HCP is substantial. During the first seven years, those costs are estimated to average over $18.6 million per year. *See* **Table 6**. The municipal and industrial users of the Aquifer will bear almost all of the cost of implementing the HCP through increased Aquifer Management Fees (AMFs). AMFs are collected by the EAA, which will then be responsible for distributing the funds for the purposes of fulfilling the obligations of the HCP. Downstream surface water right holders, who benefit from the increased springflow from the Aquifer, will contribute $736,000 annually towards the cost of implementing the HCP.

Table 6: Annualized Implementation Costs — Years 1-7

Flow Related Measures	CPM Stage V	$0
	Use of SAWS ASR	
	Obtaining Water Leases	$4,759,000
	Share of SAWS O&M Based on Use	$2,194,000
	Regional Water Conservation Program	$1,620,679
	Voluntary Irrigation Suspension Program Option	$4,172,000
Habitat and Water Quality Measures	Comal Springs	$1,272,857
	San Marcos Springs	$1,295,143
Modeling and Research		$892,857
NFHTC Refugia		$1,678,597
Project Management		$750,000
Average Annualized Cost		$18,635,133

The decision regarding how to fund the implementation of the HCP was perhaps the most contentious one with which EARIP had to deal. Indeed, the use of the AMFs was not the first choice of EARIP because it did not generate any contributions from the irrigators that pump substantial amounts of groundwater directly from the Aquifer. These irrigators, who use about 30 percent of the water pumped from the Aquifer, will not share in the increased costs associated with the HCP because their AMFs are capped at $2/AF by state law (EAA Act §1.29(e)). In early 2011, bills were introduced in the Texas House and Senate on behalf of EARIP that would have allowed voters in the Edwards region to decide whether to pay for the HCP through revenues from a sales tax. None of the bills gained any real traction. At that point, serious discussions began regarding the use of AMFs and contributions from the downstream interests to pay for the HCP.

Edwards Aquifer HCP

"Consensus"

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The Decision-Making Process: How Was It Possible to Reach Consensus?

In SB 3, the Texas Legislature directed that EARIP develop its plan through a facilitated, consensus-based, stakeholder process. Accordingly, the Steering Committee conducted itself in a manner which regarded consensus as the absence of any vote in opposition to a decision. Although the rules established in SB 3 provided for consensus decision-making by a supermajority of 75 percent of the Steering Committee members, this option only needed to be relied upon twice during the six years of negotiations.

The key to consensus decision-making for EARIP was the stakeholders themselves. Throughout the process the stakeholders evinced a clear understanding that EARIP offered the last realistic chance for a regional decision rather than one imposed by a federal judge or the Texas Legislature. Furthermore, the final stages of the decision-making process played out against the backdrop of severe drought conditions that sharpened the realization that litigation was a likely alternative if they failed to come up with a plan to protect the ESA-listed species.

The process developed by the stakeholders also aided decision-making. The fact that the process was required to be an open and transparent process enabled the stakeholders to develop trust amongst themselves. Further, early in the process, the stakeholders agreed that no decision was final until all the issues had been resolved. This agreement encouraged the stakeholders to reach important interim decisions without fear that they would be bound by that decision if subsequent issues were not resolved in a manner acceptable to them. Moreover, the deadlines imposed by SB 3 kept the stakeholders focused on the issues before them and helped maintain momentum in the process. Frequently, when the stakeholders found themselves unable to reach consensus on an issue, they moved on the other issues with less controversy and returned later to the unresolved issue.

Finally, and most importantly, the stakeholders took ownership of the process. At several points in the process, EARIP was perilously close to impasse. At each of those points, one of the stakeholders would remind the others that they had come too far to let the process fail — soon thereafter a compromise was reached. Indeed, the first time that happened was really the defining moment for the EARIP.

CONCLUSION

IS HCP COMPLETION THE FINAL CHAPTER IN THE EDWARDS AQUIFER WATER WARS?

Perhaps the decades-old war over the use of the Edwards Aquifer is rapidly drawing to a close. We now have a regional consensus on how to use the Aquifer to protect the ESA-listed species in the spring systems. The solution incorporated in the HCP protects the listed species while recognizing the region's need for water from the Aquifer.

The requisite measures to ensure continuous minimum springflow levels are being implemented. To the extent refinement of these measures is needed because of the new science that will be developed during the adaptive management process, FMA sets out a process for resolving any disputes that may arise. With the issuance of the incidental take permit, protection exists against suits under the ESA regarding the use of the Aquifer so long as the Incidental Take Permit holders comply with the requirements of the permit. Control of the Aquifer is staying in the region rather than moving to a federal District Judge.

The completion of the HCP does not mean that all of the issues have been resolved. The region needs a more equitable funding mechanism — such as a regional sales tax. At very least, the region should be allowed to vote on such a tax as an alternative to the AMFs.

The permittees and stakeholders are now implementing the HCP, and it appears likely a robust adaptive management process will be needed. This will include a decision in year seven as to whether additional measures must be implemented. This decision has the potential to be contentious. EARIP, however, has taken steps to facilitate the decision-making process that includes an Adaptive Management Science Committee to advise the Implementing Committee and stakeholders and the independent National Research Council that is serving as the formal review body to "provide resolution of major scientific issues." The National Research Council also will determine whether the scientific record supports the specific findings regarding the need for additional measures. The stakeholder's experience in the open, transparent EARIP process should foster cohesive, productive conversations during implementation of the HCP.

The Edwards Aquifer Habitat Conservation Plan demonstrates what can be achieved by stakeholders who are committed to working through a process to obtain a compromise that they can all accept. There are many other intractable water disputes, some focused on endangered species and some not, that could benefit from a process similar to the one that resulted in an historic agreement for the Edwards Aquifer. The approach of EARIP to decision-making should be an asset to those who are prepared to try and resolve their disputes — instead of being satisfied with either temporary victories in courts and administrative agencies in ongoing battles, or perpetual stalemates.

For Additional Information:
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