



E-PARCC

COLLABORATIVE GOVERNANCE INITIATIVE

Syracuse University

Maxwell School of Citizenship and Public Affairs

Program for the Advancement of Research on Conflict and Collaboration

TEACHING NOTE

The Edwards Aquifer (“Aquifer”) case provides a historical review of one of the nation’s most contentious and controversial water conflicts and how this dispute was ultimately resolved. The case also affords students a unique opportunity to explore the rich legal, policy, and technical information contained in the case. The ultimate resolution of the Aquifer dispute through the Edwards Aquifer Recovery Implementation Program (EARIP) stakeholder process has multi-disciplinary teaching applications for other stakeholder water scarcity and natural resource problems. It can be used in classrooms by students studying public policy, law, and environmental and natural resource sciences as well as anyone learning about consensus building, negotiation, facilitation, and collaboration.

Case Summary

There are two parts to the Edwards Aquifer case. Part A provides a historical account of the Aquifer conflict among the three primary stakeholder groups that all use Aquifer water. These groups include: 1) the City of San Antonio, Texas (San Antonio) that pumps water from the Aquifer for its municipal and industrial needs, 2) agricultural interests west of San Antonio that also pump water from the Aquifer for farming, and 3) downstream interests that use water emanating from the Aquifer at Comal and San Marcos Springs. Part A provides the history of these groups’ attempts to resolve the Aquifer problem and the legal and policy developments that ultimately resulted in the stakeholder-driven process known as the EARIP. Students can use Part A to explore the legal and policy history and, using the information in the case, they

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can see how the stakeholders proceeded toward reaching consensus. The case includes four possible alternatives that the stakeholders could have pursued to find a solution. Part B describes how the EARIP stakeholders transitioned from a situation characterized by conflict and acrimony to establish a culture of trust and problem solving that they could use to achieve consensus. Students can examine these stakeholder insights, discuss how these stakeholders finally succeeded after a decades-long history of previous failures, and consider how they can avoid repeating history as they looked ahead toward implementing the agreed-upon plan.

Using the Case in a Classroom Setting

One week prior to class, students should receive Part A and the case questions provided below to be used for classroom discussion. The instructor may require students to write a case memo that addresses all or some of the Part A questions. After the class discussion for Part A is completed, the instructor can provide Part B and its associated case questions. As with Part A, the instructor can also require students to write a case memo that addresses Part B questions to generate and guide classroom discussion in subsequent classes. Suggested grading for this case includes 50 percent for classroom participation and 50 percent for case question write-ups.

Although the EARIP stakeholders selected Alternative 3 in Part A, there is no “correct” answer for this case. It is possible that the stakeholders could have chosen not to pursue a HCP or perhaps could have selected another alternative. The case is written to allow the instructor to use it in a number of ways such as: exploring the history of the Aquifer conflict; collaborative approaches for solving consensus-based water and natural resource problems; and multi-stakeholder processes and facilitation. To assist the instructor in teaching this case, a number of facts and central themes within the case narrative are included below.

Facts Central to Case Narrative

Senate Bill 1477 and the Edwards Aquifer Authority

The EARIP is different from past stakeholder efforts owing to the regulatory framework established and administered by the Edwards Aquifer Authority (EAA), a regional ground water management agency that regulates the use of the Aquifer. In 1993, the Texas Legislature passed Senate Bill (S.B.) 1477, creating the EAA to preserve and protect the Aquifer. By the time the EARIP began, more than a decade had passed since the passage of S.B. 1477. This gap gave the EAA the time it needed to develop into a regional Aquifer regulatory agency capable of administering a plan if the EARIP stakeholders developed one.

Senate Bill 3 and the EARIP

In 2007, the legislature passed S.B. 3 mandating the involvement of numerous stakeholders in the EARIP. This legislation required these stakeholders to submit a plan to the U.S. Fish and Wildlife Service (FWS) by the end of 2012 to maintain continuous minimum spring flow. The 2012 deadline kept the stakeholders accountable to develop and submit a plan by the statutory deadline. Provisions within S.B. 3 also created a regulatory water pumping framework within which the stakeholders could operate. The stakeholders were restricted from having a critical management plan that went below 320,000 acre-feet unless otherwise determined by the EARIP stakeholders. Additionally, the bill increased the pumping limit to 572,000 acre-feet.

Guaranteed Water for Agriculture and the Aquifer Water Market

S.B. 1477 established low-cost, guaranteed water for farmers. Farmers are guaranteed two acre-feet of water per acre of irrigated agricultural land and they pay two dollars for an acre-foot of water. Farmers are also allowed to sell or lease one acre-foot of their guaranteed water. This establishes an incentive for farmers to make money by selling or leasing this water to municipal and industrial users or to the EARIP stakeholders for spring flow. The general belief is that farmers are able to grow crops with just one acre-foot of water. This low-cost, guaranteed water, combined with the EAA regulatory framework, creates a water-trading market opportunity that the EARIP stakeholders used in their plan.

Overarching Themes Central to Case

Tragedy of the Commons

The management of the Aquifer operates under the common law rule of capture that unintentionally creates a classic “tragedy of the commons” problem whereby an individual gains something at the expense of his/her neighbor. The area’s continually growing human population and its increasing demands on the Aquifer have exacerbated the tragedy of the commons (Part A, Exhibit 2). Drought events further intensify this issue by making less water available. Droughts are common in the region and are typically only relieved by major flood events brought on by El Nino or a hurricane (Part A, Exhibit 1).

Federal Intervention and Collaboration

Stakeholders are fearful of federal intervention due to both Federal District Judge Bunton’s court decision in *Sierra Club v. Babbitt* and the perceived power of the ESA. It was that ruling that first placed the ESA program on the Aquifer. Stakeholder collaboration and FWS participation were necessary to solve the Aquifer problem. But establishing and maintaining

mutual trust among stakeholders was challenging given their litigious history of and prior failed attempts to find a solution.

Credible Science and Adaptive Management

Credible science was critical to the EARIP Steering Committee's decision making. Having third-party, independent peer review aided scientific credibility by providing an objective examination of the science in question. The adaptive management process that the EARIP HCP employs was necessary for the agreement between stakeholders at the time. Adaptive management allows for areas of scientific uncertainty to be resolved through additional scientific research during Phase 1 of the HCP. The stakeholders contracted with the National Academy of Sciences to assist them in the review of the science and with the adaptive management component of the HCP.

Part A Questions for Class Discussions / Case Memos

1) Why is the situation facing the EARIP stakeholders different from past attempts at solving this water scarcity problem? What are some of the key events that led to the current situation?

Answer

First Question - Why is the situation different?

Certain aspects of the current situation facing the EARIP stakeholders help them and other aspects make it more difficult from previous efforts. What works in the stakeholders' favor are that: 1) the EAA has had more than a decade to become operational as the Aquifer regulatory agency; 2) irrigated agriculture has enjoyed low-cost, guaranteed water that is protected by state law; 3) S.B. 3 mandates stakeholder involvement, a series of milestones with deadlines, and requires the EARIP stakeholders to complete and submit a plan to the FWS by 2012; and 4) the EARIP process is more robust and inclusive than previous efforts.

At the same time, however, the stakeholders' lack of trust and confidence from past failures at finding a solution works against them.

Second Question – What are some of the key events that led to this situation?

The key events that led to the current situation include: 1) the 1993 *Sierra Club v. Babbitt* decision that mandated the state to develop a plan to protect the threatened and endangered species at Comal and San Marcos Springs; 2) the 1993 passage of S.B. 1477 that created the EAA and provided low-cost, guaranteed water for irrigated agriculture; 3) the 2007 passage of S.B. 3 that mandated the stakeholders to develop a plan to provide minimum continuous spring flow by 2012; and 4) the extreme drought in the Aquifer region that occurred during the EARIP process which helped to spur stakeholder action. Although not mentioned in Part A, the area's

drought in 2011 was declared to be the worst one-year drought in Texas history and it continued throughout the EARIP process and into the implementation of the HCP.

2) Who are the major stakeholders and what are their interests?

Answer

The major stakeholder groups in the EARIP included the San Antonio itself, the agricultural communities west of the city, and the downstream interests that include the downstream water users, springs communities of New Braunfels and San Marcos, and environmental organizations. The primary interest of the agricultural community is to protect their guaranteed, low-cost water established in S.B. 1477 and to ensure the adequacy of the price paid for the one acre-foot of water as part of a water market. San Antonio wanted regulatory certainty in the pumping from the Aquifer, the necessary quantity of water for its residents and growing population, and a low, equitable cost to implement a plan. The downstream interests wanted to ensure continuous spring flow for water users, recreational springs users, and the threatened and endangered species in the event of a future drought of record. There was also another category that consisted largely of state and local regulatory agencies.

The table below provides a breakdown of all the stakeholders that signed the 2007 MOA, their classification around these groupings, whether they were a Steering Committee member, and additional specific information on their interests.

Stakeholder Classification	Stakeholder	Steering Committee Member	Additional Specific Interests
Agriculture	Texas Department of Agriculture	Yes	
	Guadalupe County Farm Bureau	Yes	
	Texas Farm Bureau		
	Gilleland Farms (Uvalde, Texas)		
San Antonio	San Antonio Water Systems	Yes	
	Alamo Cement company	Yes	
	Bexar County	Yes	
	Bexar Metropolitan Water District	Yes	
	City of Garden Ridge	Yes	
	CPS Energy	Yes	
	East Medina County Special Utility District	Yes	

	Regional Clean Air and Water Association	Yes	Representing rate payers and recharge and recirculation projects
	Carol Patterson		Representing rate payers and recharge and recirculation projects
	Greater San Antonio Chamber of Commerce		
	Larry Hoffman		
	Mary Q. Kelly		
Springs Communities	City of New Braunfels	Yes	Recreational use of the springs
	City of San Marcos	Yes	Recreation use of the springs
	New Braunfels Utilities	Yes	
	Comal County		
Downstream	Guadalupe-Blanco River Authority	Yes	
	City of Victoria	Yes	
	Dow Chemical	Yes	
	Guadalupe Basin Coalition	Yes	
	South Central Texas Water Advisory Committee	Yes	
	South Texas Farm and Ranch Club		
Environmental	San Marcos River Foundation	Yes	
	Texas Bass Federation	Yes	
	Texas Living Waters Project	Yes	
	Aquifer Guardians in Urban Areas		
	Dan Laroe		
	Greater Edwards Aquifer Alliance		
	Preserve Lake Dunlap Association		
Other	Edwards Aquifer Authority	Yes	
	Nueces River Authority	Yes	Concerned how recharge dams may change the amount of flow in the Nueces River
	San Antonio River Authority	Yes	
	Texas Commission on Environmental Quality	Yes	

	Texas Parks and Wildlife Department	Yes	
	Texas Water Development Board		
	Texas Wildlife Association		
	John M. Donahue, Ph.D.		

3) *What is the problem(s) facing the stakeholders?*

Answer

Ground water model projections in the event of another drought of record predict that Comal Springs would go dry for two to three consecutive years and the San Marcos Springs could go dry for the first time ever under current management of the Aquifer. Should such a drought occur, several threatened and endangered species would go extinct or be extirpated from one or both of the springs. The region does not have a federal permit, which creates the potential for more litigation, regulatory uncertainty, and the looming threat of federal intervention. Lastly, the stakeholders' lack of trust, history of past failures, and conflicts between individual stakeholders was a problem for the EARIP.

4) *Why is the 2007 MOA important?*

Answer

The development of the MOA was the first time in the EARIP process that the stakeholders worked together to solve the Aquifer problem and establish mutual trust. The MOA itself established a process by which the stakeholders would resolve conflict on issues and reach consensus. The stakeholders' development of a process to reach consensus ahead of solving the Aquifer problem proved to be a critical step that led toward their ultimate success.

Although not stated in the case, the FWS attended every EARIP stakeholder meeting solely in a support capacity. This helped to set the tone for how the federal government would work with the stakeholders. The FWS did not interject itself into the details of the MOA or how the stakeholders worked together. This restraint allowed the stakeholders to develop their own internal process to reach consensus without the direct federal government involvement. The FWS did, however, provide the stakeholders with guidance on the ESA and helped to assure the stakeholders that they were headed in the right direction.

5) *Which alternative should be pursued and why? How should the alternative be financed? What are the pros and cons of each alternative?*

Answer

First Question - Which alternative should be pursued and why?

Any of the alternatives can be pursued although the do-nothing alternative is highly susceptible to litigation. Ultimately, the EARIP stakeholders selected Alternative 3. What made this alternative so appealing was that it reduced pumping without going beyond the critical management set forth in S.B. 3 (stage 5 pumping reductions and 320,000 acre-feet pumping limit), while also reducing additional pumping through incentive payments. Alternative 3 also has the lowest up front cost. The incentives used in this alternative are:

- 40,000 acre-feet dedicated to the springs through voluntary irrigation suspension that makes payments to farmers for their water.
- 50,000 acre-feet stored in San Antonio Water Systems Aquifer Storage and Recovery Facility. This water is also purchased from farmers and dedicated to spring flow.
- 10,000 acre-feet saved through water conservation programs.

Second Question - How should the alternative be financed?

Funding the plan was controversial because San Antonio, agriculture, and downstream users had to decide how much money each of these groups would pay toward the HCP. In the end, the industrial and municipal users shown in Part A, Exhibit 4 paid for the majority of the \$261-million-dollar cost (\$17.4 million average cost over the course of the 15 year permit) of Alternative 3. San Antonio held the vast majority of this water as part of its permit. S.B. 1477 capped agricultural costs at \$2 dollars per acre-foot of water. Guadalupe Blanco River Authority representing the downstream interests agreed to pay approximately \$700,000 per year toward the cost of the plan.

The cost for Alternative 3 for each permit holder was calculated as follows: first, the \$261 million was divided by 572,000 acre-feet of water (total amount of water authorized for pumping), which equaled \$30.40 dollars cost per acre-foot of water. Because of the restrictions placed on agricultural interests (243,899 acre-feet of the 572,000 acre feet), which limited them to payment of \$2 dollars per acre-foot of water, they paid a maximum of \$487,789 (243,899 acre-feet multiplied by \$2). Therefore, agriculture and downstream users combined paid \$1.2 million (\$487,789 plus \$700,000) toward the plan per year and the municipal and industrial users paid the remaining cost of \$16.2 million per year. The cost to municipal and industrial permit holders (327,650 acre-feet largely held by SAWS) was \$49.48 dollars per acre-foot (\$16.2 million divided by 327,650 acre-feet).

The residential water rates (shown in Part A, Exhibit 5 and Part B, Exhibit 1) show a gradual increase in water rates for residential users without a large single-year rate increase expected in 2012 or 2013 upon completion of the HCP. This gradual increase was due to the relative low cost of Aquifer water as compared to the cost of other municipal water sources. In 2010, there was an increase in water usage for residential users that consumed lower amounts of water, as

shown by the rate structure decreasing from 7,481 gallons in 2010 to 5,985 gallons in 2011. (Note that these costs are not completely accurate as some details are not provided in this case; however, they do represent a close depiction of the actual costs between different users and are appropriate for student learning.)

Third Question - What are the pros and cons of each alternative?

Alternative 1: No Change

Pros: The limited cost to pumpers relative to the other alternatives.

Cons: Comal Springs would go dry for two years and the San Marcos Springs could go dry for the first time in recorded history in the event of another drought of record. If this occurred, there would be severe impacts to the threatened and endangered species, reduced flow into the Guadalupe River for water users in this basin, limited recreation at the springs in New Braunfels and San Marcos, all of which would have present severe economic consequences for these interests. Additionally, this alternative does not provide regulatory certainty for pumpers.

Alternative 2: CPM Pumping Restrictions

Pros: The continuous spring flow for federally-listed species, springs communities, and downstream water interests during a repeat of the drought of record. The only upfront cost to implement this alternative was the administrative costs for the EAA.

Cons: The pumpers would have to reduce their pumping output by 85 percent during Stage 1 of a drought, meaning 85,800 acre-feet per year. This would result in severe economic impacts to San Antonio and agriculture water users because there are no alternative water sources to replace the amount of water no longer available for pumping.

Alternative 3: VISPO, ASR, Conservation, and Stage V

Pros: The continuous spring flow for species, although at levels that require special management at the springs. Other appealing aspects of this alternative were that pumping reductions were no more restrictive than the S.B. 3 pumping cutback of 320,000 acre-feet and that it achieved additional cutbacks during drought through payments to farmers and saved water through conservation programs.

Cons: Potential impacts to recreation at the springs at these flow levels and less water going into the downstream basin. Additionally, this alternative costs \$261 million over the course of a 15-year permit.

Alternative 4: Expanded ASR with Associated Infrastructure

Pros: This alternative maintained spring flow during a repeat of the drought of record, although spring flows were maintained through direct injections of water into the ground near the springs.

Cons: The expanded use of San Antonio Water System's Aquifer Storage and Recovery, which required more water to be leased or purchased, thereby increasing the cost from \$439 million to over \$1 billion dollars over a 15-year permit.

6) What has been the role of Federal government in this process and how should it proceed in the EARIP?

Answer

First Question – What has been the role of the Federal government?

The major event that took place was Judge Bunton's court decision in 1993. Bunton required the State of Texas to develop a plan that would maintain continuous spring flow for the area's threatened and endangered species. Although not addressed in this case, there were other lawsuits during the mid-1990s where Bunton began managing the Aquifer through a federal court program because the state had yet to establish a way to protect the species involved. Ultimately, the Fifth Circuit Court of Appeals overruled Judge Bunton's attempt to manage the Aquifer, thus giving the state and the region additional time to develop a plan. The importance of the litigation highlighted the inherent conflicts between the 'rule of capture' and the ESA as well as the conflict between private property rights and the overall public interest.

Second Question - How should the FWS proceed?

The FWS assumed the role of an educator on ESA regulatory and legal standards that enabled the stakeholders to collaborate and find a solution that met their needs as well as the needs of the threatened and endangered species sufficient for the purpose of obtaining a federal permit. This approach was a paradigm shift in the region owing to Judge Bunton's previous rulings. A supportive FWS role was critical to the success of the EARIP process. Had the FWS taken a more direct, regulatory approach, it would likely have caused the process to fail. The FWS's regulatory responsibilities, such as issuing a permit for the EARIP HCP, occurred at the end of the process.

7) If you were Robert Gulley, how would you proceed as facilitator for the EARIP stakeholder negotiation?

Answer

Robert Gulley took the position as Program Director of the EARIP knowing that the process would likely fail and that he would be an easy scapegoat. Robert worked hard to gain the trust

of the stakeholders because they knew he was committed to helping them solve their problem and had tremendous dedication to the process. Robert's tips to facilitating a process like the EARIP include:

- Establish stakeholder trust through credibility and relationships.
- Maintain neutrality.
- Adhere to the processes, such as the MOA, to help them solve the problem.
- Help the stakeholders by providing them with the information they need so that they can make informed choices.
- Keep the process and discussions moving, organized, and on schedule.
- Provide leadership for the stakeholders when needed and give them the opportunity to serve as leaders so that they own the solution.

Part B Questions for Class Discussions / Case Memos

1) What does this case tell us about the role of collaborative governance in resolving a water scarcity problem?

Answer

The EARIP stakeholders held monthly meetings for more than five years and, in addition, the subcommittees and working groups held supplemental meetings. At each monthly stakeholder meeting, at least 50 people attended and as many as 40 stakeholder groups were present. This level of commitment and effort to the process demonstrated the desire and need for the stakeholders to assume a role and offer input into the solution.

The Aquifer is a shared resource used by many stakeholders, including farmers, San Antonio, Comal and San Marcos springs communities of the City of New Braunfels and City of San Marcos, as well as other downstream water users. Because they share this scarce supply of water, any agreement on a sustainable long-term solution could only be achieved through collaboration and consensus. A top-down solution to this problem would have been resisted by some or all of the stakeholders making it less viable over the long-term. Throughout the EARIP process, both the state and federal governments encouraged a stakeholder-driven solution via the passage of S.B. 3 and the FWS's efforts to help the stakeholders through the ESA permitting process.

2) What does this case tell us about the role of science, third-party peer review, and adaptive management?

Answer

This case demonstrates both the role of and distinction between science and policy. Scientists were asked to develop the best available scientific information as part of the Science Subcommittee. The resulting scientific information was peer-reviewed by independent third

parties and provided to the Steering Committee, the regional policy makers, to use to make a consensus-based, policy decision. Such a peer review was critical to the process, given the complexity and controversial nature of the issue and it ensured the credibility of the science. Adaptive management allowed for the use of research to better understand the key areas of scientific uncertainty. There was enough uncertainty about some information and science during the EARIP process that a decision could not be made by the stakeholders during the time allotted under S.B. 3. Adaptive management allowed the stakeholders to conduct scientific research during Phase 1 of the HCP to better understand the information and science involved to allow for better decisions in Phase 2.

3) What are possible challenges facing the stakeholders in the HCP's implementation?

Answer

This question is important because the HCP has the potential for being unsustainable due to the contentious history and years of strained stakeholder relations. Additionally, a number of the original stakeholders that participated in the EARIP process retired once the HCP was completed. Many of these stakeholders lived through the historical conflict surrounding the issue and had been part of the solution. The loss of these stakeholders presents a challenge to the EAHCP as those individuals understood the difficulty in solving the problem characterized by decades of acrimony and conflict.

When combining the data from Part A, Exhibit 3 and data from Part B, Exhibit 2 (annual estimated Aquifer groundwater discharge and recharge) to compare the average total discharge versus the estimated recharge, it is clear that the Aquifer is losing water at a faster rate than is being replenished through recharge. For example, from 1990 to 2013, the average total discharge was 826,000 acre-feet and the estimated recharge was 761,000 acre-feet. During the period of the EARIP (2007 to 2013), the situation was much worse with an average total discharge of 757,000 acre-feet and an estimated recharge of 573,000 acre-feet. During these time periods, the 'mining' of water from the Aquifer suggests that the stakeholders will have to consider this information as they enter into the discussions for Phase 2 of their HCP.

Additional Resources

Video about the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan

http://eahcp.org/index.php/eahcp_video

Edwards Aquifer Habitat Conservation Plan

<http://www.eahcp.org/files/uploads/Final%20HCP%20November%202012.pdf>

Edwards Aquifer Final Environmental Impact Statement

http://www.fws.gov/southwest/es/Documents/R2ES/EARIP_HCP_FEIS.pdf

Edwards Aquifer Hydrologic Data Reports

<http://www.edwardsaquifer.org/scientific-research-and-reports/hydrologic-data-reports>

Adaptive Management: The U.S. Department of the Interior Technical Guide

<https://www.doi.gov/sites/doi.gov/files/migrated/ppa/upload/TechGuide.pdf>

Texas Legislature Lauds Success of Edwards Aquifer Recovery Implementation Program

<http://www.capitol.state.tx.us/BillLookup/history.aspx?LegSess=83R&Bill=HR1132>

<http://www.capitol.state.tx.us/BillLookup/history.aspx?LegSess=83R&Bill=SR526>

Edwards Aquifer Recovery Implementation Program Award from Secretary of Interior

http://www.fws.gov/southwest/es/Documents/R2ES/EARIP_PIC_AWARD_NR_012014.pdf

OPTIONAL EDWARDS AQUIFER SIMULATION

TEACHING NOTE

The Edwards Aquifer (“Aquifer”) simulation provides an opportunity for students to role-play and practice resolving an entrenched, complex regional water scarcity problem, involving the threat of possible federal intervention. This simulation also provides an opportunity for students to serve as the facilitator in the process to help guide the stakeholders to consensus. The skills developed through this simulation include consensus-building, negotiation, collaboration, joint-problem solving, competition, facilitation, and leadership.

Prior to Simulation

At least one week in advance of the simulation, provide students Part A of the Edwards Aquifer case to read. The simulation process and objectives should also be discussed when students receive the case. Students should prepare a write-up for Part A questions for submission the day of the simulation to ensure a thorough understanding of the case materials. Because of the complexity of the case and simulation, students can be provided with their assigned role and role-play materials when they receive the case. The student(s) that serve as the facilitator can be provided with this teaching note to help prepare for the simulation.

Day of Simulation

Six Stakeholder Process with a Facilitator Role

- Time required: 4 hours
- Six stakeholders’ roles (see attached below)
 - Agriculture interests in Uvalde and Medina counties (Western agriculture)
 - San Antonio Water Systems (City of San Antonio)
 - Guadalupe-Blanco River Authority (Downstream and recreational interests)
 - Edwards Aquifer Authority (Regional aquifer regulatory agency)
 - Environmental Advocacy Community (e.g., Sierra Club)
 - U.S. Fish and Wildlife Service (Federal agency responsible for administering the ESA)

Problem Stakeholders Must Solve

During a repeat of the 1950s drought of record, under current human demands and groundwater management, groundwater modeling suggests that Comal Springs will go dry for up to three consecutive years (it went dry for six months during the 1950s drought) and San Marcos Springs may go dry for the first time in recorded history—an event that would likely extirpate the federally-listed species from the two springs.

Most agree that to protect the species during a repeat of the drought of record, minimum flows of 30 cubic feet per second (cfs) at Comal Springs and 50 cfs at the San Marcos Springs are required. Groundwater modeling demonstrates that significant pumping cuts are needed during severe drought conditions to achieve these flow targets. Given these modeling forecasts, how do the stakeholders reach consensus on a Habitat Conservation Plan (HCP) that meets the U.S. Fish and Wildlife Service (FWS) requirements?

What are the FWS requirements?

Upon receiving a permit application and a completed HCP in accordance with the requirements of Section 10(a)(2)(A) of the Endangered Species Act (ESA), the FWS must consider the issuance criteria described in Section 10(a)(2)(B) of the ESA to determine whether to issue the permit. All applicable criteria must be satisfied before a permit may be issued. Failure to meet any of the criteria means that the permit application must be denied.

The issuance criteria described in the ESA is as follows: 1) the taking of a threatened or endangered species must be incidental to an otherwise lawful activity; 2) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking; 3) the applicant will ensure adequate funding for the HCP; 4) the taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and, 5) the applicant will ensure that other measures the FWS may require as being necessary or appropriate will be provided.

Probably the most important consideration for FWS in deciding whether to issue a permit for an Edwards Aquifer Recovery Implementation Program (EARIP) HCP is whether the plan “will not appreciably reduce the likelihood of survival and recovery of the species in the wild.” This means that the stakeholders’ HCP should maintain continuous spring flows at the Comal and San Marcos Springs.

Step 1 – Stakeholder roles

- At the start of class, students should be divided into the six stakeholder groups.
- The students should be given 30 minutes to meet in their groups to discuss their stakeholder interests, preferred alternative, and funding plan for their preferred alternative.
- Students should appoint one or more spokespersons for each stakeholder group.

Step 2 – How to conduct consensus building using four alternatives in Part A of case

Stakeholder introductions

The facilitator, preferably a student, should begin by asking each stakeholder to briefly introduce themselves and provide any information they would like to share on their initial positions, preferred alternative, and proposal to fund their preferred alternative. Each stakeholder group should be allowed to critique or rebut the others' positions, alternatives, and proposed funding mechanism.

This process should be limited to approximately 30 minutes.

Discussion on four alternatives

The facilitator should then help the stakeholders reach consensus on selecting one of the four alternatives. This can be done by dividing the discussions into two separate parts: 1) selecting an alternative and 2) how to fund the alternative.

Selecting an Alternative:

Assuming a minimum flow of 30 cfs at Comal Springs and 50 cfs at San Marcos Springs are required to protect the species, what flow targets should be adopted for the selected alternatives?

(Note: The largely unspoken dispute throughout the history of the Aquifer was whether the pumpers could be made to protect downstream surface water flows for the Guadalupe River and the extent to which San Antonio Water Systems (SAWS), as the largest user of Aquifer water, should be able to rely on that water instead of seeking alternative non-Aquifer water supplies. The initial discussion affords the stakeholders an opportunity to use policy issues related to flows as a stalking horse to advance their positions on pumping cuts to benefit downstream interests and SAWS's desire to avoid developing alternative supplies while addressing some fundamental questions related to the role of science in water disputes. Alliances may be important here particularly with the environmental interests whose only interest is to protect the species through consistent flow levels. It was these scientific issues that sparked the most contentious debate in the EARIP - - before the issue of selecting an alternative was discussed.)

Each stakeholder should be asked to explain their position on the role that:

- scientific uncertainty should play in setting the flow target;
- the fact that the drought of record is believed to occur once every 50 years; and
- whether a refugia (fish hatchery facility that would hold species in captivity) could be developed to allow the species to be protected in the event that the minimum flows could not be achieved.

Each stakeholder should be encouraged to respond to the information advocated by other stakeholders. FWS can play an important role by reminding the stakeholders of what the standards are to approve a HCP.

This process should be limited to approximately 30 minutes.

How Can the Flow Targets Be Achieved?

The question boils down to whether:

- 1) The stakeholders will leave the decision on how to comply with the ESA to the Texas Legislature, a federal court, or the possibility that after 19 years, the politically-constrained Edwards Aquifer Authority may fulfill its statutory duty mandated by Senate Bill 1477 (alternative 1);
- 2) The problem will be solved through across-the-board pumping cuts (alternative 2);
- 3) The problem will be solved through a mixture of incentivized pumping cuts and regulatory-imposed pumping cuts (Alternative 3); or
- 4) The problem will be solved through incentivized pumping cuts (Alternative 4).

The facilitator should begin the discussion by asking the stakeholders to refrain from discussing the cost of a particular alternative or how the costs of an alternative will be shared until a decision on a preferred alternative is made. Issues the facilitator may wish to bring up include:

Alternative 1

- How is the legislature or a federal court likely to resolve the issue?
- If the matter ends up before the legislature, how is it going to look upon stakeholders who refused to agree to a deal?

Alternative 2

- Should groundwater pumpers be required to protect surface water supplies?
- Can all sectors find and financially afford alternative water supplies?
- Should pumping cuts take into consideration the seasonal water needs of agriculture?

Alternative 3

- The critical period management plan implemented through Senate Bill 3 imposed less stringent cuts for agriculture in Uvalde County. Should this advantage be maintained?
- Should pumping cuts take into consideration the seasonal water needs of agriculture?
- Is the region better off allowing SAWS to delay finding alternative sources of water?
- Will the incentive programs destroy the water market? (In drought years, irrigated agriculture uses much, but not all, of its permitted water, particularly when it is required to reduce pumping. The rest is leased. Thus, a water market exists. Incentivized programs particularly if they are popular could use all the available water for the market.)
- What effect will the agricultural incentives have on support businesses in the supply chain?

Alternative 4

- Is there enough agricultural water to provide over 66,000 acre-feet water for an Aquifer Storage and Recovery project without impacting the agriculture economic sector?
- Does water leasing provide adequate assurances that the measures will be implemented?
- What is the contingency plan if the ASR cannot accommodate enough water?
- Does mixing HCP water with SAWS's water present problems? If so, can they be resolved?
- What does the region do to protect the federally-listed species until the needed infrastructure is permitted, rights-of way obtained, and constructed?
- Who owns and operates the infrastructure?

After discussions, the facilitator can use straw votes to test the stakeholder preferences. If consensus cannot be reached, the facilitator should strive for a 75 percent vote of the stakeholder groups, excluding FWS, in favor of an alternative and funding plan. A second vote can be taken among the class members without regard to the stakeholder group to which they were assigned.

This discussion should be limited to 90 minutes.

How Should Costs Be Shared?

This discussion consists of issues questions: 1) Have each stakeholder identify what factors should be considered with respect to the equities of how the cost of the selected alternative

should be shared by the stakeholder groups; and, 2) using those equities, what share should be applied to San Antonio, and agricultural, recreational, and downstream interests?

The equities may include:

- The benefits obtained from the availability of cheap water from the Aquifer;
- Free rider issues, which may shift depending on the alternative selected;
- Agricultural legislative benefits in the form of low cost water;
- The amount of water use; and
- Conservation efforts.

The allocation of costs is a deal-making exercise using the equities as tools in the discussion. The discussion may benefit from getting all of the equities on the table before the “horse trading” begins.

The discussion should be limited to approximately 60 minutes.

Step 3 – Post simulation

After the simulation is complete, approximately 30 minutes should be set aside to allow students to discuss how the consensus-building and negotiation processes went and to share insights into the process. This discussion can also take place during the subsequent class. Part B of the case should be provided for the next class discussion and case questions can be assigned for write-ups and to help guide the class discussion.

Suggested Grading

The case question write-ups can count as 40 percent of student’s grade and participation in the simulation can count as 60 percent.

Stakeholder Role 1: Agriculture interests in Uvalde and Medina counties

You are a farmer west of San Antonio representing the irrigated agricultural interests from Uvalde and Medina counties. Your overriding concern is to ensure that the legislatively mandated two acre-feet of water for every acre of irrigated land at a cost of two dollars for each acre-foot of water are maintained. Most farmers agree that only one acre-foot of water per acre of irrigated land is necessary for raising most economically-viable crops in the region. The remaining acre-foot of water can be leased or sold.

The two dollars per acre-foot fee cap is affordable although not the lowest fee in the state for agricultural water users. Unlike other pumpers, the fee is only charged for the actual amount of water used.

Your constituents' need for water is seasonal with most irrigation required between March and September. Across-the-board pumping cuts during the growing season can affect their ability to produce an economically-viable crop.

For the right price, you are open to considering voluntary suspension of some or all pumping during severe droughts or even leasing or selling water for storage in San Antonio Water Systems Aquifer Storage and Recovery as part of a HCP. Indeed, agricultural pumpers participated in such a voluntary suspension program instituted by the Edwards Aquifer Authority in 1997.

There are businesses in your community that support the agricultural industry that are concerned about how such suspensions or leases could impact them if agricultural production in the region is reduced.

You are also aware that, with increasing urbanization in Texas, agriculture may have less clout with the legislature, so you are wary of what may happen if the continuous minimum flow problem is not resolved and the legislature attempts to resolve the problem itself.

Historically, your agricultural constituents led the fight to preserve the 'rule of capture' and believe that they own the groundwater beneath their property.

Success Criteria for you will be:

1. Maintain the current protections of the two acre-feet of water per acre of irrigated land and the current Edwards Aquifer Authority fee cap at \$2 per acre-foot of water actually used;
2. Maintain all of the other benefits that agriculture has obtained over the years from the legislature, *e.g.*, pumping cuts do not apply to crops already in the ground.

Stakeholder Role 2: San Antonio Water Systems

You are a senior manager in San Antonio Water Systems (SAWS). You have worked for SAWS for the majority of your career and have been with the water utility through the litigation in the 1990s and the past attempts to resolve the Aquifer problem. As a representative of SAWS, you are the most important representative for the San Antonio's interests. The city is currently the 7th largest city in the country and is projected to add another million residents over the next 20 to 30 years.

As the largest consumer of Aquifer water, SAWS wants to ensure that San Antonio does not bear a disproportional share of any pumping cuts or if there are large pumping cuts that it would not be forced to acquire far more expensive non-Aquifer water to protect the city's water supply.

San Antonio Water Systems is concerned that agriculture is potentially a free rider with respect to any HCP costs because its fees have been fixed by the legislature. It is insistent that the downstream interests benefit from the additional spring flow caused by pumping cuts during drought and, must share in the costs of any HCP. Institutionally, SAWS still harbors ill-feelings towards the Guadalupe Blanco River Authority for its role in *Sierra Club v. Babbitt*.

Above all, SAWS wants to negotiate in a manner consistent with its image as the biggest dog in the fight. It is keenly aware, however, that the EARIP process was the *quid pro quo* for the increase in the pumping cap in Senate Bill 3 and that, accordingly, the legislature might not look favorably if SAWS was responsible for the failure of the process.

Success Criteria for you will be:

1. Ensure sufficient supply of low cost Aquifer water for its rapidly growing customer base;
2. Ensure its view of equity and fairness is reflected in the funding of the HCP (they believe other stakeholders should also help pay for a plan).

Stakeholder Role 3: Guadalupe-Blanco River Authority

You are a Vice President at the Guadalupe-Blanco River Authority (GBRA). You have worked for the river authority for ten years. A primary concern is ensuring that the springs do not go dry during a repeat of the drought of record as the springs are a significant contributor to surface water in the Guadalupe River basin that the river authority will provide to its customers. As such, GBRA wants to use the spring flow levels to impose pumping cuts that will result in increased surface water during severe droughts and, perhaps force SAWS to seek alternative water supplies - - perhaps through a joint project with GBRA.

GBRA was a major force in bringing about the compromise in 2007 that resulted in the raising the pumping caps and using the EARIP process to address continuous minimum flows issue. Accordingly, while GBRA is not averse to saber rattling, it is mindful of the possible political fallout if the dispute ends up in court or back in the hands of the legislature.

GBRA's position on continuous minimum flows makes it a logical ally with the environmental advocacy community and downstream interests.

Success Criteria for you will be ensuring that:

1. A significant level of continuous spring flow is maintained during drought;
2. Costs of the HCP should fall entirely on the pumpers.

Stakeholder Role 4: Edwards Aquifer Authority

You are the General Manager of the Edwards Aquifer Authority (EAA). You have been with the EAA as the General Manager for one year. Many of your predecessors who have served as General Manager typically have not stayed longer than two or three years in this position.

San Antonio has seven members on the EAA Board of Directors; the remaining eight members represent agricultural and recreational communities. Despite this plurality, San Antonio has not been successful in effectively cobbling together a majority to advance SAWS's interests. Historically, EAA has not accomplished many of the Senate Bill 1477 requirements.

EAA will likely be primarily responsible for an HCP should the stakeholders reach consensus on a plan.

Success Criteria for you will be ensuring that:

1. The HCP is a plan that the disparate interests on the EAA Board will support;
2. The costs of an HCP do not fall largely on pumpers. Such a result will cause political problems for its board members whose constituents will have to pay more for water.

Stakeholder Role 5: The Environmental Community

As a representative of the environmental community, your interest is protecting the federally-listed species and their habitats. It was this interest that caused Sierra Club to bring the original ESA litigation in federal court and to push Edwards Aquifer Authority to live up to the requirements of Senate Bill 1477.

The environmental community was not an active participant in Senate Bill 3 process and is very skeptical that the EARIP will succeed. They are willing to walk if they are ignored in the process, but they view the EARIP as the last best chance to obtain protection for the species. They have at least one ally in the EARIP process, the Texas Parks and Wildlife Department, which shares their views on species protection.

Success Criteria for you will be:

1. Obtaining adequate protection for the federally-listed species and their habitats.

Stakeholder Role 6: U.S. Fish and Wildlife Service

You are the manager for the local U.S. Fish and Wildlife Service (FWS) office that has responsibility for the Aquifer region. You are new to your position and recently transferred to Texas from Washington, DC. Your background is as a trained scientist and you have held ESA regulatory and scientific positions across the country.

Although you are new to the Aquifer issue, many of your staff have worked on this issue for decades and have differing views on how the FWS should approach the EARIP stakeholder process. Given your familiarity with the ESA and as a trained scientist, you can serve as a technical and ESA expert. Your agency was tasked by Judge Bunton after the *Sierra Club vs Babbitt* lawsuit to develop court mandated spring flow requirements. At the same time, you know that pursuing a HCP for the threatened and endangered species at Comal and San Marcos Springs is voluntary. FWS recognizes that it should walk a fine line with respect to its role in the EARIP to avoid the appearance of taking sides in a contentious process and to avoid interfering with what must be a voluntary process. Yet, it can only approve an HCP that meets all of the issuance criteria.

Success Criteria for you will be:

1. Ensure that the threatened and endangered species are protected;
2. EARIP stakeholders submit a HCP to your agency that meets the requirements of the ESA.