Biodiversity Protection: Implementation and Reform of the Endangered Species Act (Summer Conference, June 9-12) 1996

6-11-1996

The Enigma of the Blind Salamander and Groundwater Pumping: Lessons from the Edwards Aquifer, Texas

Charles R. Shockey

Charles R. Shockey, *The Enigma of the Blind Salamander and Groundwater Pumping: Lessons from the Edwards Aquifer, Texas*, *in* BIODIVERSITY PROTECTION: IMPLEMENTATION AND REFORM OF THE ENDANGERED SPECIES ACT (Natural Res. Law Ctr., Univ. of Colo. Sch. of Law 1996).

THE ENIGMA OF THE BLIND SALAMANDER AND GROUNDWATER PUMPING: LESSONS FROM THE EDWARDS AQUIFER, TEXAS

Charles R. Shockey
Assistant Chief
Wildlife and Marine Resources Section
Environment and Natural Resources Division
Department of Justice
Washington, D.C.

BIODIVERSITY PROTECTION:
IMPLEMENTATION AND REFORM OF THE
ENDANGERED SPECIES ACT

Natural Resources Law Center
University of Colorado
School of Law
Boulder, Colorado

June 10-12, 1996

THE ENIGMA OF THE BLIND SALAMANDER AND GROUNDWATER PUMPING: LESSONS FROM THE EDWARDS AQUIFER, TEXAS

By Charles R. Shockey [1]

I. Summary

For the past five years, litigation over protection of endangered and threatened species in the Edwards Aquifer region of Texas has provided a fascinating case study of why people either love or hate the Endangered Species Act (ESA), 16 U.S.C. §§ 1531-44. The controversy has grown for 40 years over competing uses of a limited water resource, which initially began as a battle over state water rights, then escalated to a full-blown war over the ESA in 1991. The opening phase of ESA litigation finally ended on May 17, 1996, but not before a series of legal detours into the Voting Rights Act, the Department of Defense Base Closure and Realignment Commission Act, state constitutional law, federalism, abstention, and a variety of other side shows, including law suits to enjoin a catfish farm. New rounds of ESA litigation have commenced, raising challenges under sections 4, 7, and 9 of that Act. If 1996 stays as dry as it has thus far, the new litigation could prove the old Texas aphorism that "whiskey's for drinking but water's for fighting."

I would like to use the ESA litigation over the Edwards Aquifer to focus on a rather unusual judicial application of the section 9 prohibition against the unlawful "take" of a listed

---

[1] This paper represents the personal views, opinions, and analysis of the author and is not attributable in any way to the United States or the Department of Justice.

species, then explore how the Supreme Court's 1995 opinion in the Sweet Home case might apply to future ESA litigation over pumping limits and water rights in the Edwards. First, let me provide some background on the Edwards Aquifer, the ESA-listed species of concern, and the litigation that has developed to date.

A. The Geographical--Hydrological--Biological Setting [2]

The Edwards Aquifer is an underground aquifer, about 175 miles long, covering 3,600 square miles and underlies parts of 15 counties in South-Central Texas. The aquifer has been designated as the sole-source aquifer for the City of San Antonio, Texas, and provides most of the potable water supply for more than 1.5 million people, including the nation's ninth largest city and the surrounding areas. Historically, Texas, alone among the 50 states, has not regulated withdrawal of underground water. That policy may, or may not, change as a result of the ESA litigation.

The aquifer generally declines in elevation as the formation moves from the hills of West Texas to the eastern coastal plain and the Gulf of Mexico. The exact movement of water through the limestone and dolomite composition of the aquifer is largely undefined, but most water in the Edwards accumulates from flows of surface streams in the recharge zone to the north and west that feed the aquifer. Water either is pumped from the aquifer

---

[2] This description of the Edwards Aquifer and its ecosystem is taken from the Amended Findings of Fact and Conclusions of Law entered by the district court in Sierra Club v. Babbitt, No. MO-91-CA-069 (W.D.Tex. May 26, 1993). The court's original Findings of Fact and Conclusions of Law, issued on February 1, 1993, but superseded by the May 26 amended findings and conclusions, are published in 36 Env't Rep. Cas. (BNA) 1533-58.

or is discharged eventually at the two of the largest springs in the Southwest, San Marcos Springs in the City of San Marcos, Texas, and Comal Springs in City of New Braunfels, Texas, which both are located in the Guadalupe River Basin.

The aquifer itself, with its subterranean caves and caverns, is home to the mysterious and rather bizarre-looking Texas blind salamander, an endangered species, while San Marcos and Comal Springs provide the unique and exclusive habitat for four other federally listed endangered and threatened species: the fountain darter, an endangered fish found at both springs; the San Marcos Gambusia, an endangered fish not seen since 1982 and believed now to be extinct; the threatened San Marcos salamander, found at San Marcos Springs; and Texas wild rice, an endangered plant located in the San Marcos River. Each species, to a significant extent, depends for its survival upon an adequate and continuous natural flow of fresh water through the aquifer that exits at the two springs.

The rates of springflow are influenced by the levels of water in the Edwards, along with the local aquifer recharge, especially at San Marcos. The several spring openings at Comal are located at an elevation of approximately 612 to 619 feet above mean sea level (msl). If the water level of the aquifer, as measured by an index reference well in nearby San Antonio, drops below 619 feet, the springs begin to dry. Once it drops below 612 feet, the springs stop flowing altogether, as occurred for two months in July, 1956. At San Marcos, the springs are

located at a lower elevation of 575 feet msl, where they feed Spring Lake, home of Ralph, the World-Famous Diving Pig, at Aquarena Springs. San Marcos Springs has never gone dry in recorded history. Both springs systems feed adjacent lakes then, in turn, the Comal and San Marcos Rivers, tributaries to the Guadalupe and Blanco Rivers, which run southeasterly through several surface reservoirs and empty into San Antonio Bay near Victoria, Texas, and the Gulf of Mexico.

Recharge to the aquifer is highly variable, depending on weather conditions, ranging from a low of 46,000 acre feet per year (afy) in the driest year to more than 2,000,000 afy in wet years. To date, 1996 is proving to be one of the two or three driest years in the 20th Century in terms of rainfall and recharge to the aquifer.

Water is removed from the Edwards by discharge through wells, movement between underground formations, or discharge through springs. Much of the controversy surrounding the Edwards Aquifer concerns whether water should be withdrawn by pumping for a variety of competing human uses, including: irrigation for agriculture, largely in Uvalde and Medina Counties to the West; withdrawal for municipal, industrial, and military use, primarily in San Antonio and surrounding Bexar County; or springflow discharge at San Marcos in Hays County and New Braunfels in Comal County, where the waters feed into the Guadalupe and Blanco Rivers and, if not otherwise intercepted, the Gulf of Mexico.

Pumping from the Edwards has increased dramatically as San Antonio and surrounding regions have grown, from 30,000 afy near the turn of the century to more than 500,000 afy in recent years. In 1956, after a seven-year drought of record, Comal Springs dried up completely for two months, while San Marcos Springs recorded its lowest flow of 46 cubic feet per second (cfs). The minimum average daily from Comal Springs is roughly 200-250 cfs, while flows at San Marcos average roughly 100-125 cfs, with much less variably than at Comal.

Pumping from the Edwards prior to 1956 averaged 219,000 afy and reached 321,000 afy during that year when Comal Springs went dry. In comparison, pumping during the late 1980s averaged 468,000 afy and reached 540,000 cfy in 1989, when the springflow at Comal again slowed considerably. Texas has operated under the unregulated rule of "capture" for groundwater rights for over a century. While the State of Texas has created a regional agency, the Edwards Underground Water District, with limited powers to regulate water quality from the aquifer, the EUWD has lacked the regulatory authority to prevent anyone from withdrawing water in unlimited volumes from the aquifer. Attention on the problem of unregulated pumping was riveted in 1991, when a catfish farm operator named Ronnie Pucek drilled artesian wells in San Antonio that flowed at rates equal to about one-third of the entire amount of water consumed by other one million residents of the City.

When Comal Springs went dry in 1956, the resident population of fountain darters died. (An earlier population had been largely decimated in 1951 when State Parks and Wildlife personnel applied highly toxic rotenone to eliminate resident fish so that the rivers could be stocked with bass and trout for sport fishing to support a recreational fishery). In the late 1970s, after flows at Comal had been restored, a fishery biologist from Southwest Texas State University in San Marcos reintroduced some darters from the San Marcos population to the Comal ecosystem. Since that reintroduction, both populations of fountain darters have generally stabilized, as the species can be maintained and bred in captivity without difficulty. FWS sees little chance of removing them from endangered status, however, without the means to regulate aquifer withdrawals and ensure continuous springflow to provide a suitable natural habitat.

The other ESA-listed species have not fared as well, with the gambusia at San Marcos not observed since 1982 and Texas wild rice susceptible to damage from predators and recreational tubing during the increasingly frequent periods of low flow in the San Marcos River. Little is known about the two salamander species, neither of which has been bred with any success by FWS in captive propagation programs. The San Marcos salamander, once thought to inhabit both aquatic ecosystems, now is believed to exist only at San Marcos. The underground Texas blind salamander is known to exist only because individual members of the species sporadically surface from the aquifer through spring openings or artesian

wells. By the time they pop to the surface near Spring Lake in San Marcos, they are severed entirely from their natural habitat and can exist only in captivity as bizarre-looking creatures with hooded protrusions in place of eye sockets.

The five species have been listed as endangered or threatened under the ESA since the 1970s. In 1982, under the authority of ESA § 4, FWS designated San Marcos Springs and River as critical habitat for four of the species, the fountain darter, San Marcos gambusia, San Marcos salamander, and Texas wild rice. (The extent of the Texas blind salamander's habitat, being subterranean, is unknown). Comal Springs was not designated as critical habitat.

In 1984, FWS adopted a recovery plan for these four species under section 4(f) of the ESA. The single greatest threat to these aquatic species was identified as the loss of natural springflow, resulting primarily from excessive water withdrawals from the aquifer for human consumption. This threat was particularly acute because no mechanism has existed under Texas law to regulate pumping from an underground aquifer--the rule of "capture" still prevailed under state law. The FWS recovery plan called upon water users to develop a region-wide plan to restrict pumping, but did not specify either minimum springflows or aquifer levels that FWS felt must be maintained to protect the species. Other threats to the species identified in the recovery plan included predation and contamination of the springs and river habitat from surface pollution. An additional concern that

later emerged from overdrafting of the aquifer was the prospect of hydrogen sulfide intruding into the aquifer across a "bad-water line" located on a geologic fault near the two springs. This threat becomes most pronounced during times of low flows in the aquifer and springs.

In 1984, 1989, and 1990, as little rain fell in the region, the population continued to grow and pumping increased, causing springflows dropped significantly and posing a threat to the five listed species. In 1989, the Sierra Club and the Guadalupe-Blanco River Authority (GBRA) sent notices of intent to sue under ESA § 11(g) to 40 different federal agencies and 950 individual pumpers, including the largest single pumper, the City of San Antonio. The Sierra Club and GBRA alleged that overdrafting of the aquifer compelled consultation by each federal agency under ESA § 7 regarding the impact of federal programs on the species and also alleged violations of the ESA § 9 prohibition against "take" of a listed wildlife species. They further alleged that FWS had not properly adopted and implemented recovery plans for the species under ESA §s 4(f).

Rains fortuitously preserved the springflow and aquifer levels in 1989 and 1990. In May, 1991, however, the Sierra Club and GBRA filed suit in Midland, Texas, 300 miles to the West of San Antonio. They alleged that FWS, and FWS alone, had violated ESA § 4 by failing to implement the recovery plan and ESA § 9 by causing a "take" of listed species. No ESA § 7 claim was pled, nor was any pumper alleged to have "taken" a listed species. Why

GBRA, which had opposed the designation of critical habitat ten years earlier? If water is not pumped by the farmers in the West of by San Antonio, it flows through the springs and feeds the Guadalupe and Blanco Rivers, where it is captured by GBRA for sale back to . . . San Antonio.

A dozen parties moved to intervene, including the Cities of San Marcos and New Braunfels and several smaller water districts as plaintiffs, while the City of San Antonio, major industrial pumpers, and several farmers intervened as defendants. The State of Texas sought to do join the fray on both sides on behalf of three separate state agencies, but the court aligned the State as only a defendant.

After a four-day bench trial in November, 1992, the court (Hon. Lucius D. Bunton, III) entered judgment for the plaintiffs on February 1, 1993, holding that FWS in fact had violated both ESA § 4 by failing to implement its recovery plan and ESA § 9 by causing the "take" of the listed species. How exactly did FWS inflict this "harm" on the species? By failing to inform the public of the minimum springflows required to protect the species. Presumably, once the people of Texas were informed by the Federal Government of the needs of the endangered fish and salamanders, they would trip over one another in their rush to turn off the pumps, stop their excessive withdrawals from the aquifer, and agree to flush only when absolutely necessary.

While the judgment was entered against FWS, the court rather paradoxically also found that "fountain darters are 'taken'

(within the meaning of 16 U.S.C. § 1538(a)(1)(B)," not due to FWS malfeasance, but "as a result of withdrawals from the Edwards Aquifer, whenever the Comal springflow drops to some (as-yet) undefined springflow or range of springflows greater than 100 cfs." The court ordered FWS to specify and publish the minimum springflows and aquifer levels needed to prevent both "take" and "jeopardy" of the five species at Comal and San Marcos Springs and, further, to adopt and implement recovery plans adequate to ensure that those levels would be met, even in a repeat of a drought of record. The court also directed one state agency, the Texas Water Commission, to prepare a plan to maintain the FWS minimum springflow levels and invited the plaintiffs to seek further relief if the State of Texas, whose legislature was then its biennial session, did not soon have in effect a regulatory system to limit withdrawals from the Edwards to meet ESA requirements.

The newly appointed Secretary of the Interior, Bruce Babbitt, decided to negotiate a settlement with the plaintiffs through an amended judgment, rather than pursuing an appeal. The Amended Judgment, entered on May 26, 1993, removed any reference to FWS as the cause of the "take" of listed species, although the court retained all of its findings that "take" of the species in fact had occurred. The defendant-intervenors pressed their appeal, which the Fifth Circuit dismissed, concluding that the Amended Judgment did not bind those parties or have any

preclusive effect in future legal challenges. Sierra Club v. Babbitt, 995 F.2d 571 (5th Cir. 1993).

The final Amended Judgment and dismissal of the appeal, it turned out, were not the end of the case, merely a way-station for protracted post-judgment proceedings. The Texas Legislature did enact legislation in 1993, creating the new Edwards Aquifer Authority (EAA) to replace the EUWD and delegating powers to an appointed board to regulate pumping from the aquifer. That legislation was blocked from going into effect, however, because the Department of Justice refused to preclear the law under the federal Voting Rights Act, finding that the use of an appointed board at the EAA to replace the elected members of the EUWD had the effect of diminishing the voting rights of minority citizens.

The Sierra Club, meanwhile, moved for additional relief from the district court, which appointed a monitor to draft new plans to limit pumping, if needed to protect the species. The Sierra Club also sought to amend its complaint, first to add new claims against five federal agencies, including the Base Realignment and Closure Commission, which was considering whether to close or curtail operations at the four major military bases in San Antonio which are the single largest source of jobs in the region and which employ more Hispanics than any other employer in the Southwest. The court refused to allow the plaintiff to expand the scope of the litigation fully one year after final judgment, but later did allow an amended complaint in April, 1995, to bring new claims against the state TWC for failing to regulate pumping

while the fate of the EAA and EUWD were being resolved. The Fifth Circuit overturned that ruling by writ of mandamus in June, 1995. The Texas Legislature by then had enacted corrective legislation in May, 1995, to cure the Voting Rights Act problem by converting the EAA to an elected board. Before the EAA could commence operations, however, a state court in Medina County issued an injunction, concluding that the EAA legislation violated the Texas Constitution on seven different grounds. An appeal of that case is pending before the Texas Supreme Court.

The Sierra Club, meanwhile, continued to press for additional relief from Judge Bunton throughout 1994 and 1995, including the adoption by the court of new plans that would regulate pumping from the aquifer, notwithstanding their earlier representations to the Fifth Circuit that this ESA lawsuit was limited to securing information from FWS, not establishing limits on pumping by water users. By February, 1996, when FWS completed its revised recovery plans for the five species, the Fifth Circuit decided that it was time for this litigation to end, and it ordered Judge Bunton to complete the ministerial actions necessary to terminate the case, which he did on May 17, 1996.

Thus ends phase I. The Sierra Club already has filed a new lawsuit against the U.S. Department of Agriculture under ESA § 7, seeking to compel formal consultation with FWS over the impact of all USDA programs in the region and to enjoin crop subsidy payments to farmers in Bexar, Medina, and Uvalde Counties. That case is set for trial before Judge Bunton in July, 1996.

The State of Texas has sued FWS in Waco, Texas, asserting (similar to Sweet Home) that FWS and the Sierra Club have misapplied the ESA § 9 definition of "harm" as a form of "take" through habitat modification in connection with pumping from the Edwards.

The Sierra Club filed a lawsuit against the National Biological Service (NBS) in February, 1996, alleging the NBS failed to comply with ESA § 7 consultation requirements by proposing to close the San Marcos Hatchery and Technology Center, which is used as a refugium for maintaining populations of the ESA-listed species during period of low springflow and conducting research on the biological requirements of the species. Judge Bunton has entered a preliminary injunction requiring that facility to continue existing operations, and the case is set for trial on June 18, 1996.

The Sierra Club is expected to file new lawsuits in June, 1996, against pumpers and federal agencies to restrict their pumping and any federal programs that support or allow pumping.

The state court litigation over the fate of the EAA and EUWD was argued to the Texas Supreme Court in March, 1996, with a decision expected later this year.

Somehow, the Texas blind salamander and its four ESA-listed companions have hung on while the lawyers in Austin effectively deforested the Pacific Northwest habitat of the northern spotted owl by converting vast numbers of trees to paper on which the war over the Edwards Aquifer water is being waged.

II. The Endangered Species Act

The ruling by Judge Bunton in Sierra Club v. Babbitt that FWS (or at least someone) violated ESA § 9 by committing an unlawful "take" of fountain darters and other species raises a number of questions regarding the evidentiary basis for proving a "take." To say, as Judge Bunton did, that FWS "harmed" the species by failing to provide sufficient information to the people of Texas is an unusual application of that term. That ruling occurred in early 1993, more than a year before the Supreme Court's opinion in the Sweet Home case, which brought the definition of "harm" as a form of "take" through habitat modification into focus. I next examine the statutory and regulatory provisions, then consider the manner in which other courts have applied the "take" definition under ESA § 9, citing most of the leading, published decisions in the area.

A. The Section 9 Prohibition Against "Taking"

1. <u>The Statutory "Take" Prohibition</u>: Subject to limited exceptions, "it is unlawful for any person subject to the jurisdiction of the United States jurisdiction to--* * * (B) take endangered species within the United States or the territorial sea of the United States; (C) take any such species on the high seas; * * * or (G) violate any regulation pertaining to such species...."

2. <u>What Constitutes a "Take?"</u>:

a. The Statutory Definition of "Take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19).

b. The Regulatory Definition of "Harm" -- U.S. Fish and Wildlife Service ("FWS") regulations further define "harm" to mean "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3.

c. The Regulatory Definition of "Harass" -- "Harass" is defined by FWS as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering." 50 C.F.R. § 17.3.

3. **Exceptions to the "Take" Prohibition** -- In several instances, the ESA carves out exceptions to the prohibition against the "take" of listed species. These include permits issued by the Secretary for scientific research purposes or to enhance propagation or survival of affected species. 16 U.S.C. § 1539 (a)(1)(A); 50 C.F.R. § 17.22. In addition, and of greater interest, is the FWS's "incidental take" authority. In general, FWS may permit taking that otherwise would be prohibited if the taking is incidental to and not the purpose of carrying out of an otherwise lawful activity. This provision is designed to resolve conflicts between development pressures and endangered species protection. Any person may apply for permit. ESA § 10(a)(1)(B), 16 U.S.C. § 1539(a)(1)(B); 50 C.F.R. § 17.22.

An applicant for incidental take permit must develop and submit conservation plan that outlines: the impact that will likely result from taking; steps applicant will take to minimize and mitigate such impacts and funding available to implement such steps; and alternative actions applicants considered and reasons alternative are not being used. ESA § 10(a)(2)(A), 16 U.S.C. § 1539(a)(2)(A).

The Secretary (FWS), after public comment, may grant a permit if he finds that: the taking will be incidental; the applicant will minimize and mitigate impacts of taking; the applicant will ensure adequate funding for conservation plan will be provided; and the taking will not appreciably reduce likelihood of survival and recovery of species in the wild. ESA

§ 10(a)(2)(B), 16 U.S.C. § 1539(a)(2)(B). See, e.g., **Mt Graham Red Squirrel v. Espy**, 986 F.2d 1568 (9th Cir. 1993); **Friends of Endangered Species, Inc. v. Jantzen**, 760 F.2d 976 (9th Cir. 1985).

B. Judicial Interpretations of "Take"[3]

1. Cases Findings Actions That Constitute a "Take"

a. Palila v. Hawaii Department of Land and Natural Resources, 471 F.Supp. 985 (D.Haw. 1979), aff'd, 639 F.2d 495 (9th Cir. 1981) (Palila I) (action of state constituted a taking where state permitted feral sheep and goats to destroy habitat essential to endangered palila bird); 649 F. Supp. 1070 (D. Haw. 1986), aff'd, 852 F.2d 1106 (9th Cir. 1988) (Palila II) (upheld habitat modification portion of FWS's harm definition, but ruled that state agency again committed "take").

b. **Sierra Club v. Yeutter**, 926 F.2d 429 (5th Cir. 1991), aff'd **Sierra Club v. Lyng**, 694 F. Supp. 1260 (E.D. Tex. 1988)(enjoined Forest Service timber practices following documented dramatic decline in red-cockaded woodpecker colonies directly traceable to lumbering practice); see also **Sierra Club v. Glickman**, ___ F.3d ___ (5th Cir. 1995)(emphasizing nature of judicial review of "take" and "jeopardy" claims).

---

[3] For a thoughtful analysis of ESA § 9 "take" claims in light of the Sweet Home ruling, see Steven P. Quarles, et al., **Sweet Home** and the Narrowing of Wildlife "Take" Under Section 9 of the Endangered Species Act, 26 Env't L. Rep. 10003-17 (Jan. 1996). Mr. Quarles and his co-authors of that article represented the timber industry respondents in Sweet Home Chapter of Communities for a Great Oregon, 115 S.Ct. 2407 (1995), and their analysis, while comprehensive, should be read in that light.

c. **Defenders of Wildlife v. Administrator, EPA**, 882 F.2d 1294 (8th Cir. 1989), aff'g in part, rev'g in part, 668 F.Supp. 1334 (D.Minn. 1988)(EPA registration of strychnine for use as rodenticide held a "take" where necessary pre-condition for use leading to secondary poisoning of ESA-listed species).

d. **Seattle Audubon Soc. v. Evans**, 952 F.2d 297 (9th Cir. 1991) (habitat destruction leading to individual owl deaths may constitute "take" under ESA, but not under Migratory Bird Treaty Act).

e. **United States v. Billie**, 667 F. Supp. 1485 (S.D. Fla. 1987) (ESA "take" prohibitions apply to on-reservation hunting activities of Indians where chief shot and later consumed endangered Florida panther).

f. **United States v. Glenn-Colusa Irrigation Dist.**, 788 F.Supp. 1126 (E.D.Cal. 1992) (order permanently enjoining water district from diverting water through defective intake pipes that resulted in death of endangered Sacramento River winter-run chinook salmon).

g. **Forest Conservation Council v. Rosboro Lumber Co.**, 50 F.3d 781 (9th Cir. 1995) (allowing citizen suit to challenge to harm regulation based on prospect of imminent threat to northern spotted owl).

h. **Marbled Murrelet v. Pacific Lumber Co.**, 880 F.Supp. 1343 (N.D.Cal. Feb. 27, 1995), aff'd, No. 95-16504 (9th Cir. May 7, 1996) (enjoining timber harvest found to result in

"take" of marbled murrelet nesting habitat, including future "harm" resulting from habitat modification which significantly impairs breeding behavior of nesting birds).

2. Cases Where Actions Did Not Constitute "Take"

a. Pyramid Lake Paiute Tribe of Indians v. United States Dep't of Navy, 898 F.2d 1410 (9th Cir. 1990) (evidence did not establish that diversion of water actually caused spawning problems for endangered cui-ui fish species).

b. American Bald Eagle v. Bhatti, 9 F.3d 163 (1st Cir. 1993) (no violation absent evidence that deer hunt on state lands actually caused harm to bald eagles).

c. Nat'l Wildlife Fed'n v. Burlington N. R.R., 23 F.3d 1508 (9th Cir. 1994) (corn spilled by railroad on tracks in grizzly bear habitat was localized in nature and did not cause significant habitat modification or impact).

d. Nat'l Wildlife Fed'n v. National Park Service, 669 F. Supp. 384 (D. Wyo. 1987) (insufficient evidence of injury to establish "take" from National Park Service plan designed to reduce conflicts between humans and grizzly bear at Yellowstone campsite).

e. Morrill v. Lujan, 802 F.Supp. 424 (S.D.Ala. 1992) (habitat modification caused by beach development did not constitute "harm" to Perdido Key beach mouse because no showing that actual injury would occur to mouse).

f. United States v. Hayashi, 22 F.3d 859 (9th Cir. 1993) (9th Cir. 1993) (court construed term "harass" under

Marine Mammal Protection Act not to include "reasonable steps" to deter porpoise from "normal behavior" of eating fish or bait off fisherman's line).

III. The Supreme Court's Sweet Home Opinion

On June 29, 1995, the Supreme Court issued its ruling in Sweet Home Chapter of Communities for a Great Oregon v. Babbitt, 115 S.Ct. 2407 (1995), upholding the facial validity of the FWS regulation defining "harm" as a form of "take" under ESA § 9. The case did not involve the application of that regulation or the definition of "harm" to any particular set of circumstances, but instead "whether the Secretary exceeded his authority under the Act by promulgating the regulation." 115 S.Ct. at 2409. As a result, while the Court upheld the regulation as a valid interpretation, the majority opinion, reflecting the views of six Justices, concluded that the "difficult questions of proximity and degree" of harm resulting from particular actions "must be addressed in the usual course of the law, through case-by-case adjudication." Id. at 2418.

The Court found that the ESA's text provided three reasons to uphold the Secretary's and FWS's interpretation, id. at 2412, namely that harm "means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including

breeding, feeding, or sheltering." Id. at 2410, citing 50 C.F.R § 17.3.

First, the ordinary, dictionary definition of "harm" is "'to cause hurt or damage to: injure.'" Id. at 2412. "In the context of the ESA, that definition naturally encompasses habitat modification that results in actual injury or death to members of endangered or threatened species." Id. at 2412-13. The Court rejected the dissent's proposition that Congress intended to limit "harm" to "direct applications of force against protected species." Id. at 2413.

Second, "the broad purpose of the ESA supports the Secretary's decision to extent protection against activities that cause the precise harms Congress enacted the statute to avoid." Id., citing Tennessee Valley Authority v. Hill, 437 U.S. 153 (1978)(discussing comprehensive nature of statutory protection). Given that broad congressional purpose, the Court found the Secretary's regulation to be reasonable. Id. at 2414.

Third, the legislative history surrounding 1982 amendments to the ESA confirmed that Congress understood ESA § 9 to prohibit "indirect as well as deliberate takings." Id. While the FWS regulatory definition of "harm" may not have been compelled as the only reasonable interpretation of the ESA § 9 "take" term, the Court found it to be a permissible interpretation deserving judicial deference. Id. at 2416.

Justice O'Connor, while concurring in the majority opinion, wrote separately to emphasize her two understandings that, first,

"the challenged regulation is limited to significant habitat modification that causes actual, as opposed to hypothetical or speculative, death or injury to identifiable protected animals." Id. at 2418 (O'Connor, J., concurring). "Second, even setting aside difficult questions of scienter, the regulation's application is limited by ordinary principles of proximate causation, which introduce notions of foreseeability." Id.

The concurring opinion of Justice O'Connor raises several examples worth noting, in terms of applying the concept of proximate causation from tort law to the ESA § 9 context. These examples, however, are not so easy to reconcile. First, she indicates that a landowner who drains a pond on his/her property, killing endangered fish in the process, likely would commit an unlawful take. Similarly, to raze the last remaining breeding ground of the piping plover, precluding reproduction and injuring the individual living bird, would constitute a take in her view.

In contrast, she finds it inconceivable that a farmer whose fertilizer is lifted by a tornado, as an intervening event, and deposited in a distant wildlife refuge, killing or injuring protected species, would be liable, given the attenuated nature of the causal link between farming and the resultant death to the species. Yet those facts arguably are no more implausible than EPA's decision to continue the registration of strychnine, which farmers then applied to kill rodents, some of whom were later consumed by bald eagles. The Eighth Circuit upheld the finding that EPA improperly committed a "take" in that case. Similarly,

Justice O'Connor questions whether a farmer who tills a field, causing erosion that leads silt to run-off into a river, depleting oxygen and injuring protect fish, would commit a take because the chain of causal events is not foreseeable. Yet, that type of scenario -- habitat modification through farming, forestry, and grazing -- is commonly recognized by biologists as one of the principal sources of threats to endangered Snake River salmon. As both the majority opinion and Justice O'Connor's concurring opinion conclude, these difficult determinations are best left to individual case adjudication and are not susceptible to broader regulatory findings.

IV. Lessons of Sweet Home for the Edwards Aquifer

As discussed above, Judge Bunton's initial finding in Sierra Club v. Babbitt was that FWS had committed an unlawful take in violation of ESA § 9 by failing to identify and publish for the benefit of water users the minimum springflows and aquifer water levels required to protect the five ESA-listed species. At the same time, he implied, in what must be considered obiter dictum, that excessive human pumping was the principal cause of the actual "harm" that he found had occurred to fountain darters and other protected species. Any future challenge alleging that a "take" of Edwards-dependent species, however, must be examined in light of the Supreme Court's ruling in Sweet Home.

As an evidentiary matter, the Court's opinions make clear that any application of the "harm" definition through habitat modification must be based upon proof of "actual death or injury"

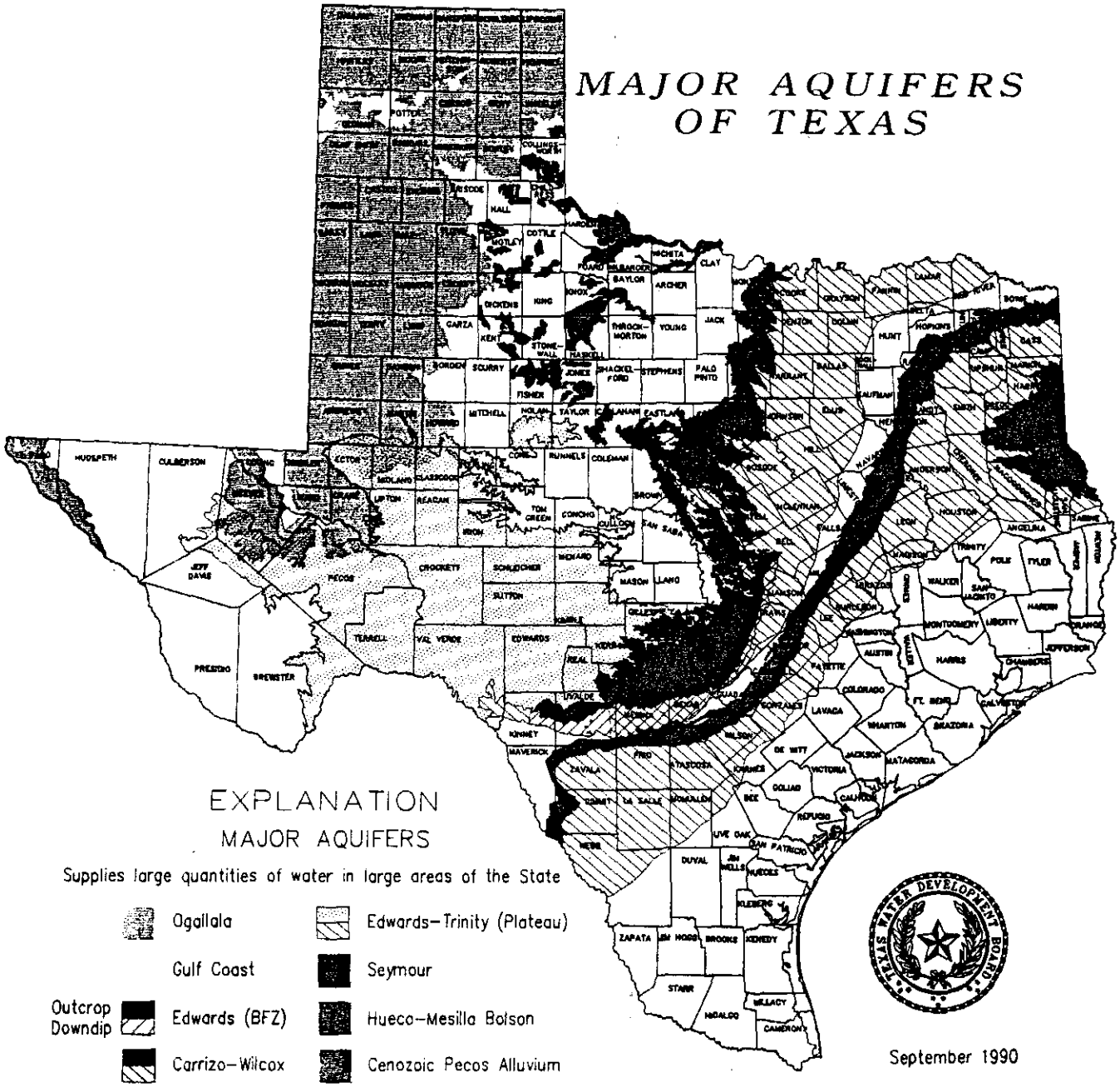
to specific, identifiable individual animals. At the first Edwards trial, there was no such proof, only testimony from some biologists that fountain darters (no more than one inch long) appeared "thin" when removed from Comal Springs in 1989 and 1990. No one testified as to discovery of a single dead or injured fountain darter. That type of proof might be required to satisfy the Supreme Court, based on the Sweet Home opinions. Whether, and to what extent, modification of the Comal Springs habitat could prove sufficient likely will receive its first test this month, as the Sierra Club is expected to seek file new actions against pumpers and move for injunctive relief to limit water withdrawals.

Another significant result of Sweet Home in the Edwards Aquifer context will be the emphasize on proximate cause. Many pumpers are far removed from the springs by 50-70 miles, and hydrologic evidence suggests that water moves slowly and in undefined patterns underground. Whether a plaintiff could prove that farmers in Uvalde and Medina Counties commit a "take" by withdrawing water for irrigation, resulting in the death or injury of a fountain darter at Comal Springs, poses at least a challenging evidentiary obstacle. Moreover, the Court emphasized the foreseeability of the action in terms of its impact on the species. Does the fact that the Sierra Club put all pumpers on notice as to its legal theory of causation provide sufficient evidence of foreseeability to hold a pumper liable? Further, given the fact that several thousand wells pump from the aquifer,

how does one attribute the take liability to any one pumper or group? Perhaps by class action? Finally, can drought be considered an intervening event, like the tornado? Or is it so commonplace in areas such as San Antonio that all are presumed to be aware of its existence and treat it as part of the environmental baseline?

I expect to have at least some initial answers to these questions before the end of the Summer of 1996, unless Mother Nature once again comes to the rescue by providing unexpected, massive rainfall to South-Central Texas in the next month. Stay tuned.

MAJOR AQUIFERS OF TEXAS



EXPLANATION

MAJOR AQUIFERS

Supplies large quantities of water in large areas of the State

- Ogallala
- Gulf Coast
- Outcrop Downdip
- Edwards (BFZ)
- Carrizo–Wilcox
- Trinity
- Edwards–Trinity (Plateau)
- Seymour
- Hueco–Mesilla Bolson
- Cenozoic Pecos Alluvium

TEXAS WATER DEVELOPMENT BOARD

September 1990

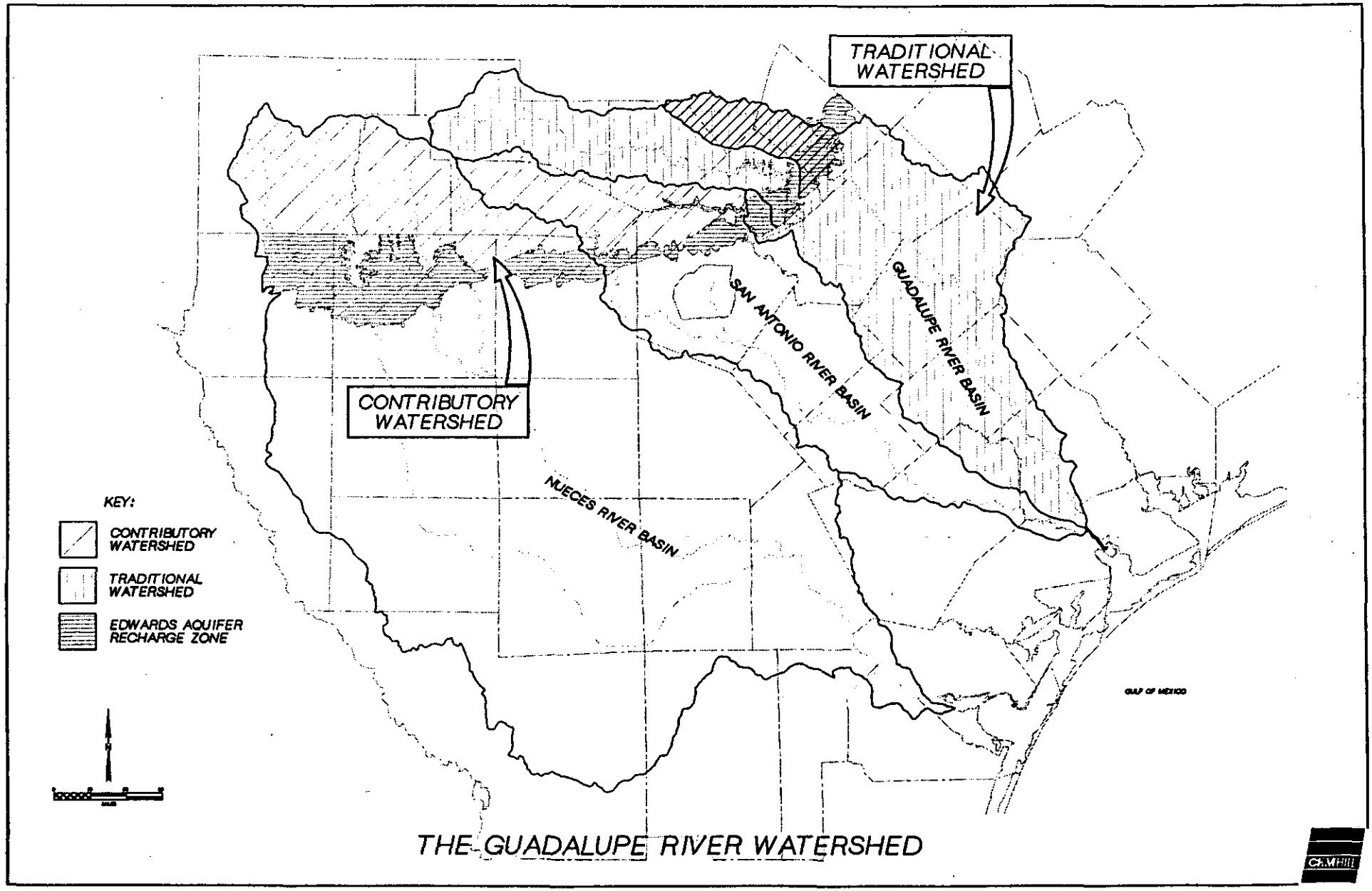
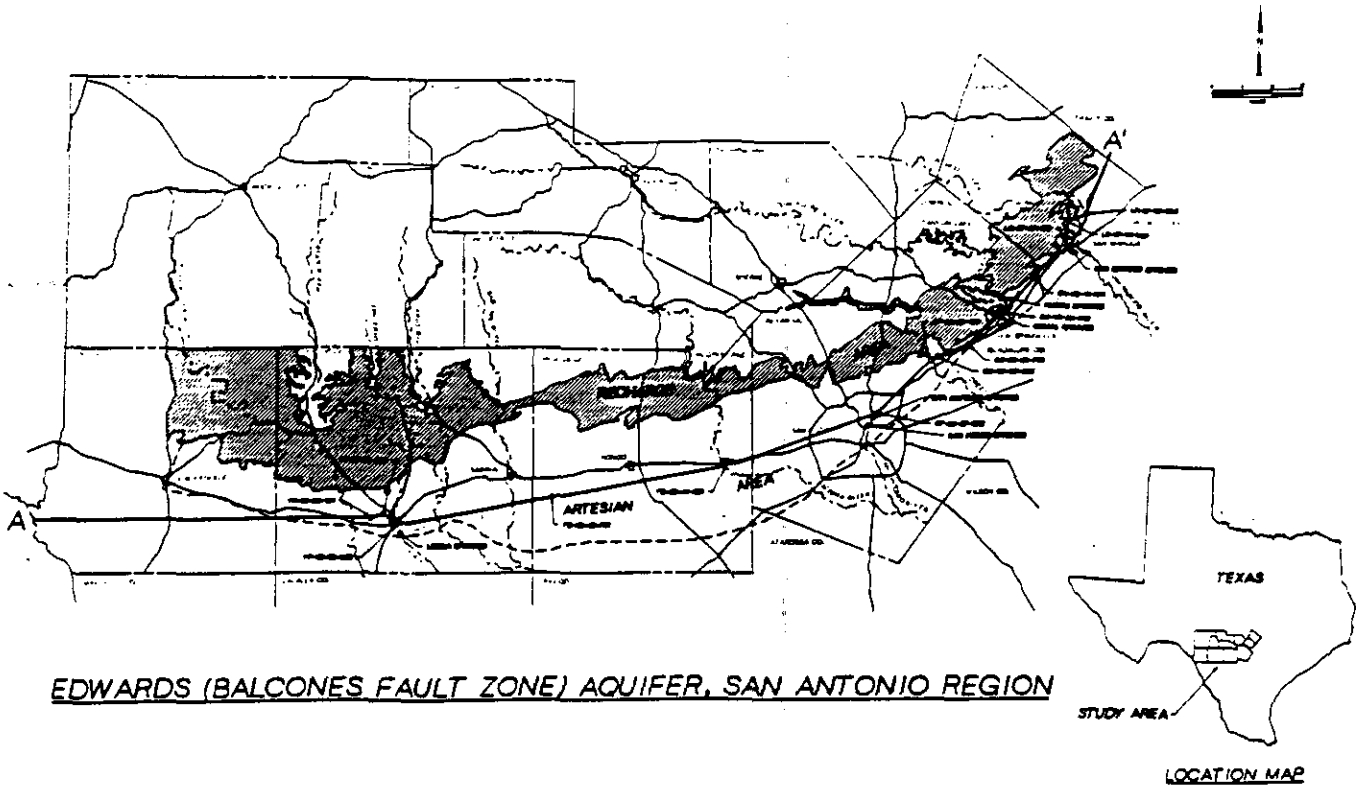
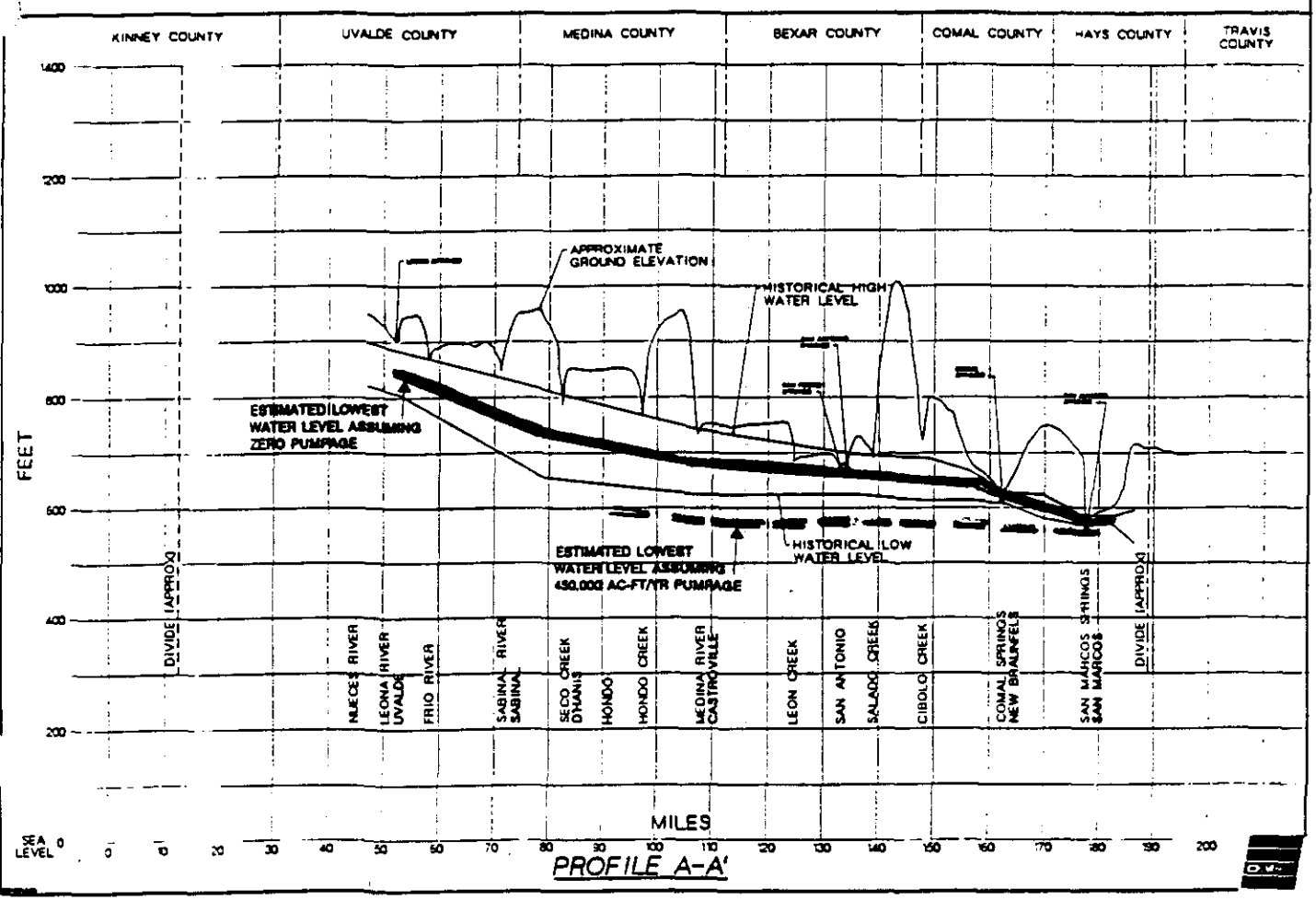

TRADITIONAL WATERSHED
CONTRIBUTORY WATERSHED
SAN ANTONIO RIVER BASIN
GUADALUPE RIVER BASIN
NUECES RIVER BASIN
GULF OF MEXICO
KEY:
CONTRIBUTORY WATERSHED
TRADITIONAL WATERSHED
EDWARDS AQUIFER RECHARGE ZONE
THE GUADALUPE RIVER WATERSHED
CH2MHILL

EXHIBIT P-1



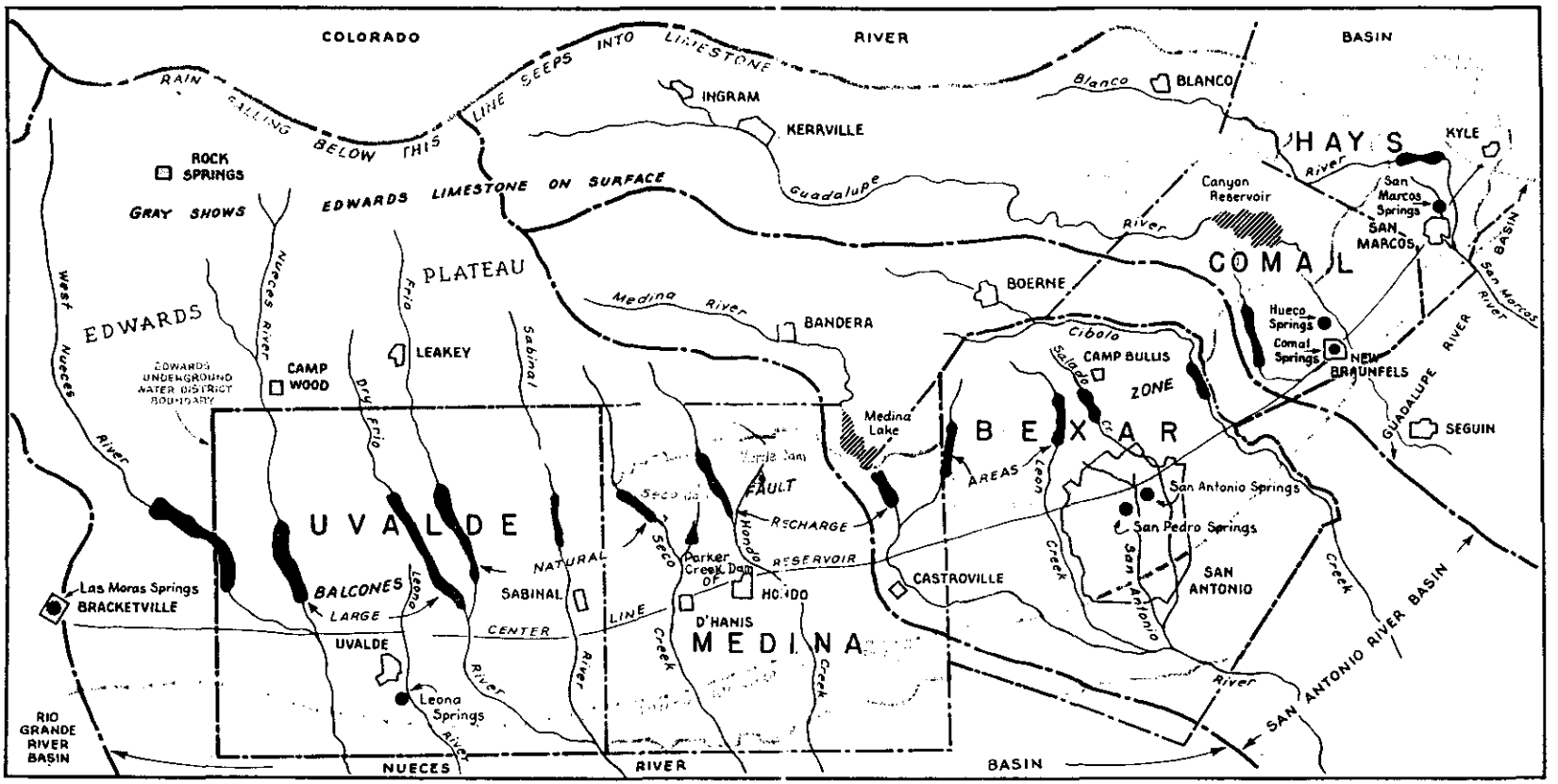
EDWARDS (BALCONES FAULT ZONE) AQUIFER, SAN ANTONIO REGION

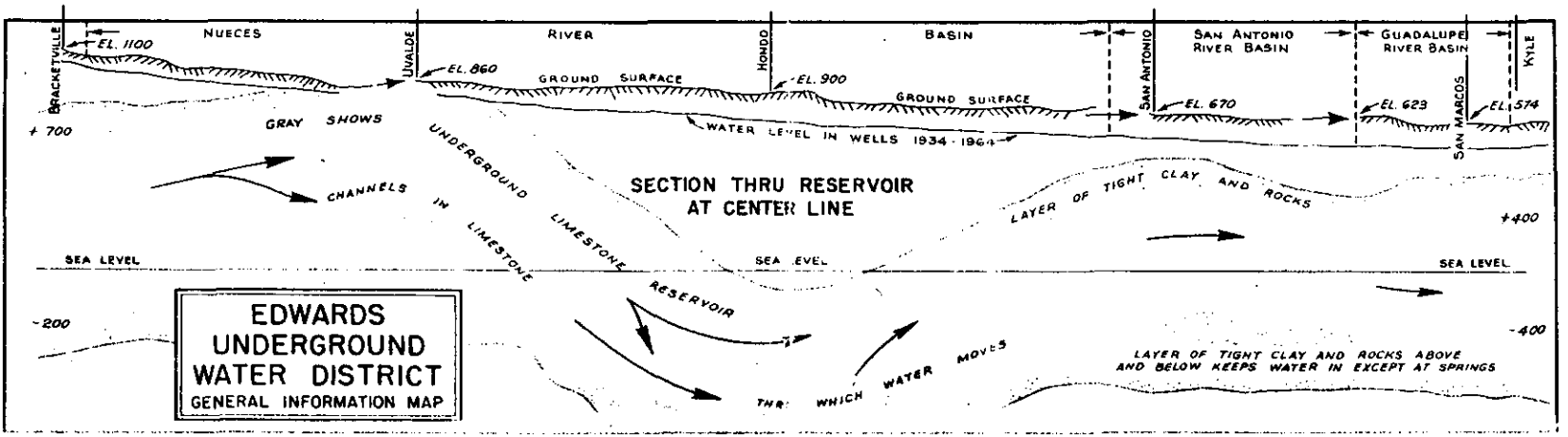
LOCATION MAP



PROFILE A-A'

EXHIBIT P-2





EDWARDS UNDERGROUND WATER DISTRICT

GENERAL INFORMATION MAP

EDWARDS AQUIFER

YEAR	TOTAL ANNUAL RECHARGE (ACRE-FEET PER YEAR)	TOTAL ANNUAL PUMPAGE (ACRE-FEET PER YEAR)	COMAL SPRINGS		SAN MARCOS SPRINGS	
			TOTAL ANNUAL FLOWS (ACRE-FEET PER YEAR)	MINIMUM DAILY FLOW (CUBIC-FEET PER SECOND)	TOTAL ANNUAL FLOWS (ACRE-FEET PER YEAR)	MINIMUM DAILY FLOW (CUBIC-FEET PER SECOND)
1934	179,600	101,900	228,080	NA	83,874	NA
1935	1,258,200	103,700	236,280	NA	92,429	NA
1936	909,600	112,700	260,070	NA	92,867	NA
1937	400,700	120,200	251,460	NA	87,439	NA
1938	432,700	120,100	248,360	NA	91,613	NA
1939	399,000	118,900	217,870	NA	69,674	NA
1940	306,800	120,100	201,830	NA	76,989	NA
1941	850,700	136,800	248,560	NA	132,778	NA
1942	557,800	144,600	252,960	NA	111,904	NA
1943	273,100	149,100	246,800	NA	96,332	NA
1944	560,900	147,300	250,830	NA	134,096	NA
1945	527,800	153,300	260,751	328	138,044	NA
1946	556,100	155,000	260,061	301	130,511	NA
1947	422,600	167,000	254,824	305	125,416	NA
1948	178,300	166,700	201,068	248	76,250	NA
1949	508,100	179,400	207,302	238	87,061	NA
1950	200,200	193,800	189,039	233	76,692	NA
1951	139,900	209,700	148,316	163	68,602	NA
1952	275,500	215,400	132,448	118	75,052	NA
1953	167,600	229,800	138,902	120	97,863	NA
1954	162,100	246,200	98,342	72	75,449	NA
1955	192,000	261,000	66,119	41	61,151	NA
1956	43,700	321,100	22,339	*0	47,564	**46
1957	1,142,600	237,300	103,384	34	110,300	65
1958	1,711,200	219,300	226,449	250	153,400	154
1959	690,400	234,500	226,988	274	116,000	127
1960	824,800	227,100	230,475	270	141,400	142
1961	717,100	228,200	241,712	294	138,260	142
1962	239,400	267,900	192,063	194	95,850	104
1963	170,700	276,400	150,288	125	78,710	76
1964	413,200	260,200	137,135	115	70,170	81

EXHIBIT P-9

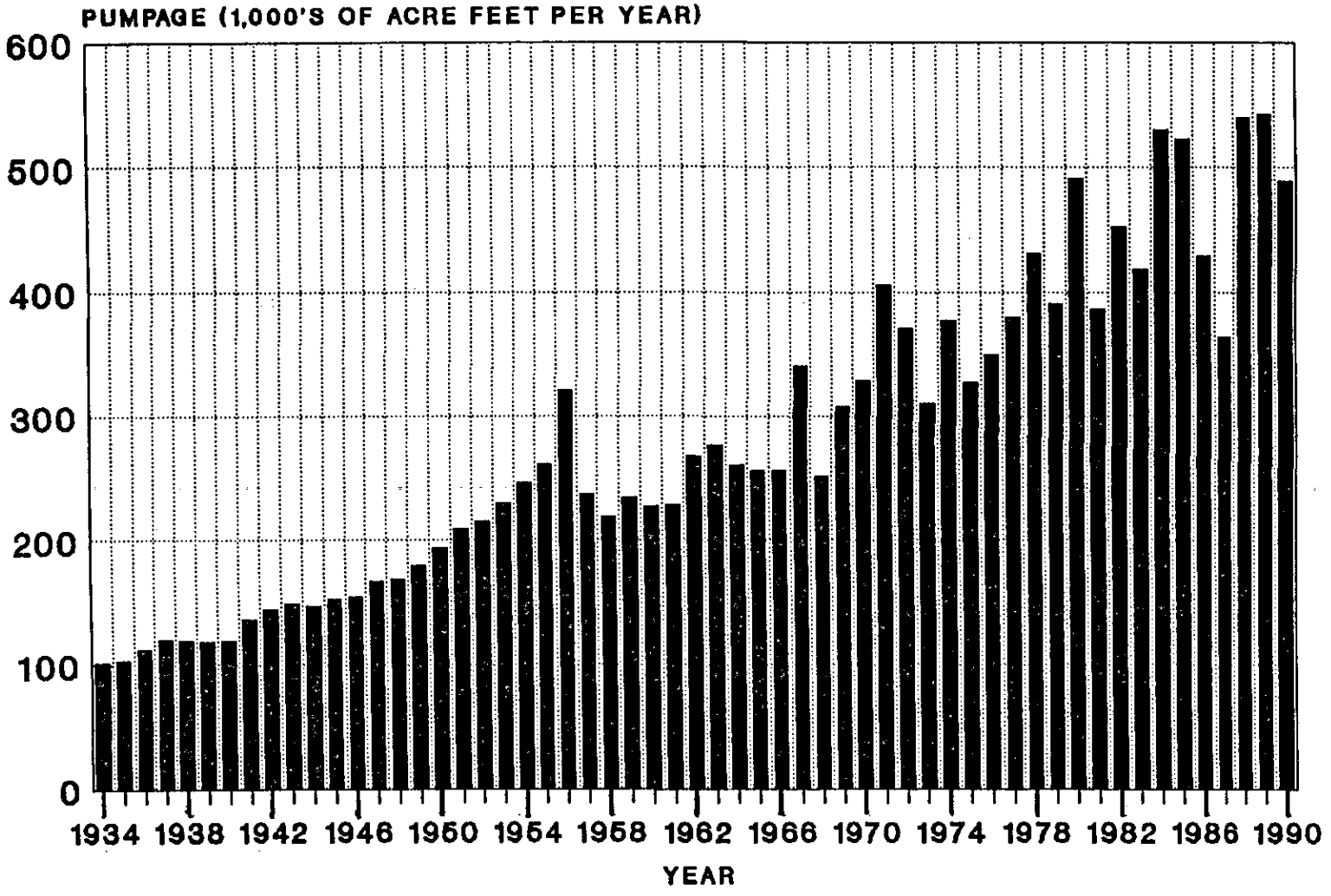
1965	623,500	256,100	188,582	194	123,000	95
1966	615,200	255,900	192,966	197	111,400	109
1967	466,500	341,300	131,042	42	77,650	78
1968	884,700	251,700	231,384	254	143,100	137
1969	610,500	307,500	210,543	201	117,800	122
1970	661,600	329,400	221,173	250	144,600	152
1971	925,300	406,800	158,975	92	91,830	94
1972	756,400	371,300	225,124	242	116,700	128
1973	1,486,500	310,400	279,239	312	158,200	159
1974	658,500	377,400	275,377	294	133,800	140
1975	973,000	327,800	286,183	350	170,100	174
1976	894,100	349,500	268,905	308	153,200	121
1977	952,000	380,600	282,831	326	161,600	126
1978	502,500	431,800	233,488	226	87,420	100
1979	1,117,800	391,500	287,724	338	144,900	135
1980	406,400	491,100	206,350	184	95,960	111
1981	1,448,400	387,100	228,686	270	131,000	117
1982	422,400	453,100	198,127	201	93,470	112
1983	420,100	418,500	171,102	171	106,300	108
1984	197,900	529,800	91,087	26	72,340	64
1985	1,003,300	522,500	184,463	184	132,000	120
1986	1,153,700	429,300	209,808	226	145,500	156
1987	2,003,600	364,100	264,506	317	183,500	182
1988	355,500	540,000	200,598	209	102,000	113
1989	214,400	542,400	117,433	62	72,530	80
1990	1,123,200	489,400	129,536	46	82,570	81

SOURCES: TOTAL ANNUAL RECHARGE – BULLETIN 50, EUWD, PREPARED BY USGS (ALL YEARS)
TOTAL ANNUAL PUMPAGE – BULLETIN 50, EUWD, PREPARED BY USGS (ALL YEARS)
COMAL SPRINGS TOTAL ANNUAL FLOWS – YEARS 1934–44 – URS/FORREST AND COTTON (1975)
COMAL SPRINGS TOTAL ANNUAL FLOWS – YEARS 1945–90 – H. D. STEPHENS, SUPERVISORY HYDROGEOLOGIST, WATER RESOURCES BRANCH, USGS, SAN ANTONIO, TEXAS
COMAL SPRINGS TOTAL ANNUAL FLOWS – YEAR 1990 – EUWD BULLETIN 50 AND USGS PROVISIONAL DATA
COMAL SPRINGS MINIMUM DAILY FLOW – 1945–89 – STEPHENS, USGS (SEE ABOVE)
COMAL SPRINGS MINIMUM DAILY FLOW – YEAR 1990 – EUWD BULLETIN 50 AND USGS PROVISIONAL DATA
SAN MARCOS SPRINGS TOTAL ANNUAL FLOWS – YEARS 1934–56 – URS/FORREST AND COTTON (1975)
SAN MARCOS SPRINGS TOTAL ANNUAL FLOWS – YEARS 1957–89 – USGS WATER DATA REPORTS
SAN MARCOS SPRINGS TOTAL ANNUAL FLOWS – YEAR 1990 – USGS WATER DATA REPORT AND USGS PROVISIONAL DATA
SAN MARCOS SPRINGS MINIMUM DAILY FLOW – YEARS 1956–89 – USGS WATER DATA REPORTS
SAN MARCOS SPRINGS MINIMUM DAILY FLOW – YEAR 1990 – USGS WATER DATA REPORT AND USGS PROVISIONAL DATA

KEY: NA = NOT AVAILABLE
*ZERO FLOW FROM JUNE 13 – NOVEMBER 3
**PARTIAL RECORD FOR 1956: MAY THROUGH DECEMBER DATA USED

11/6/92

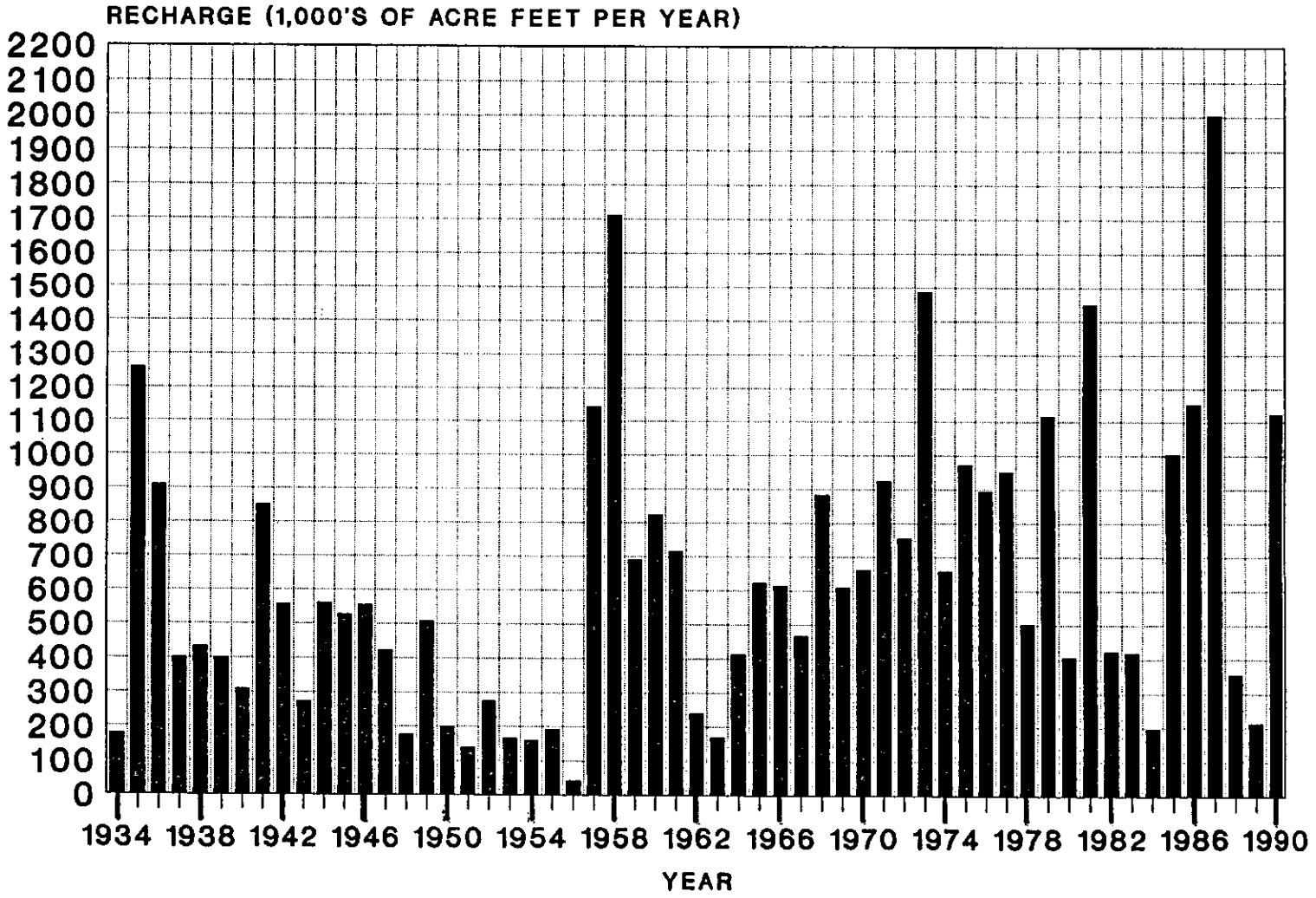
EDWARDS AQUIFER PUMPAGE
1934-1990



SOURCE: BULLETIN 60, EUWD.

EXHIBIT No. 1

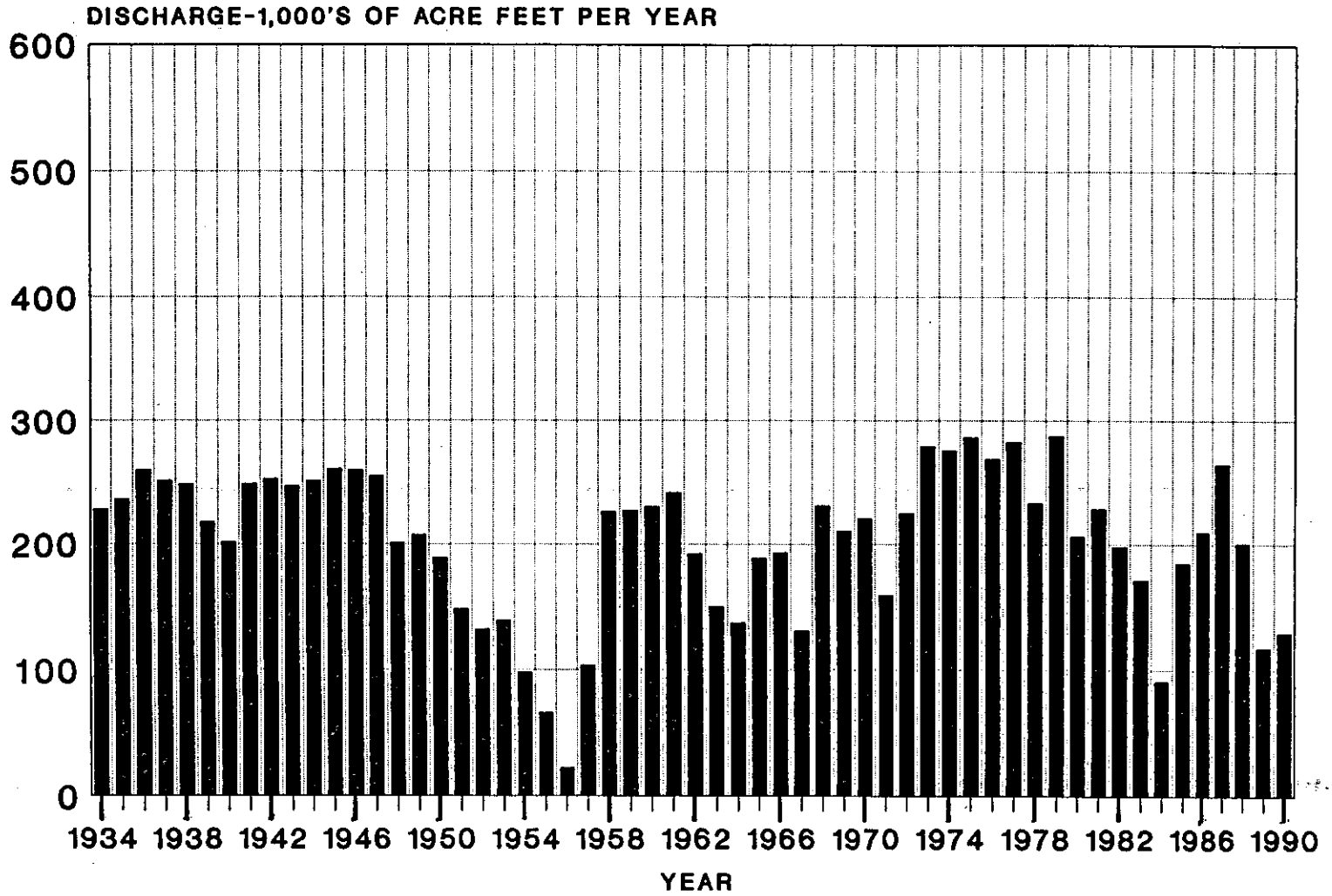
EDWARDS AQUIFER RECHARGE
1934-1990



SOURCE: BULLETIN 50, EUWD.

EXHIBIT P-11

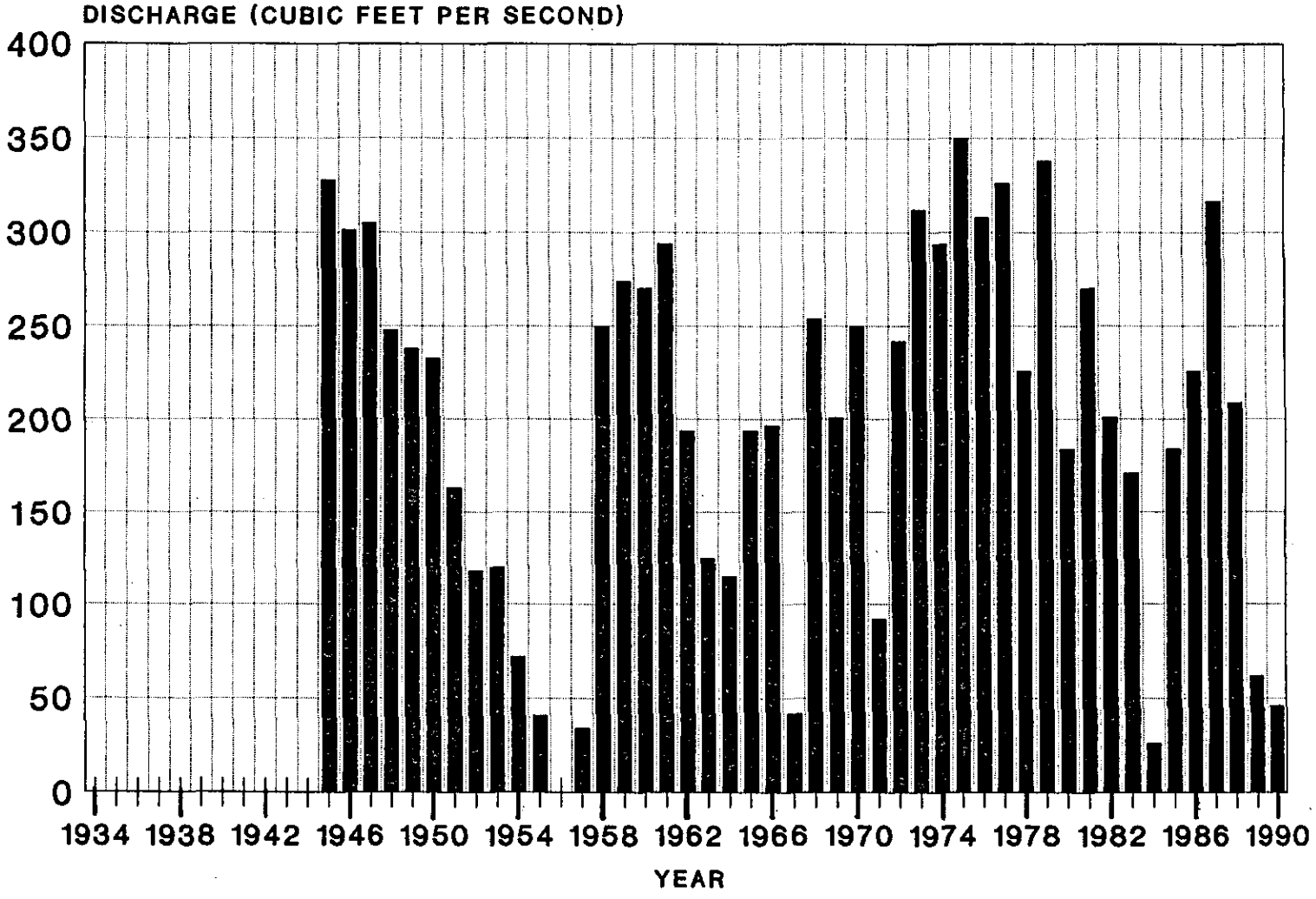
COMAL SPRINGS ANNUAL DISCHARGE
1934-1990



SOURCE: URS (1934-44); USGS (1945-90)

EXHIBIT P-12

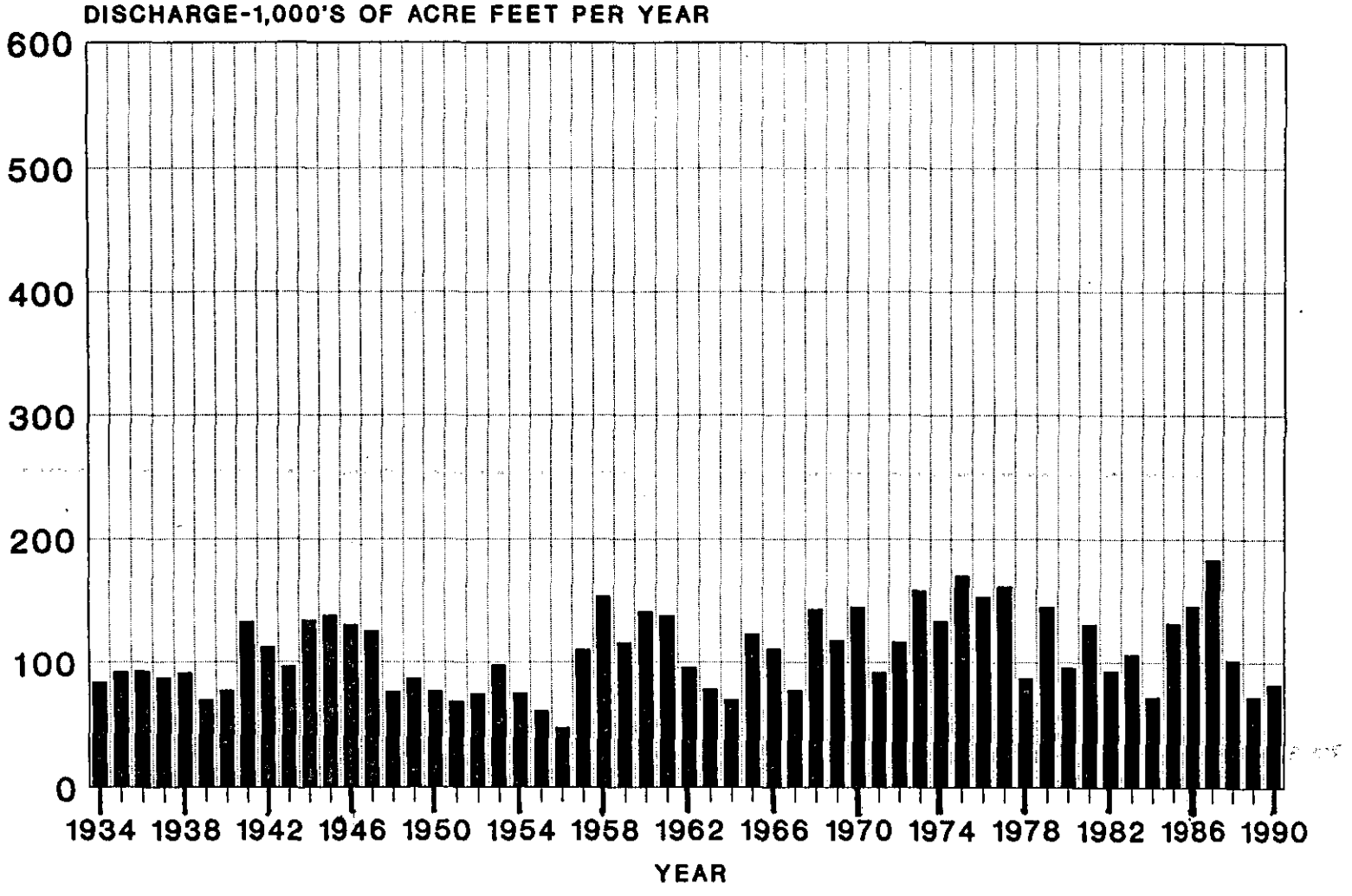
COMAL SPRINGS MINIMUM DAILY DISCHARGE
1945-1990



SOURCE: USGS.

EXHIBIT P-13

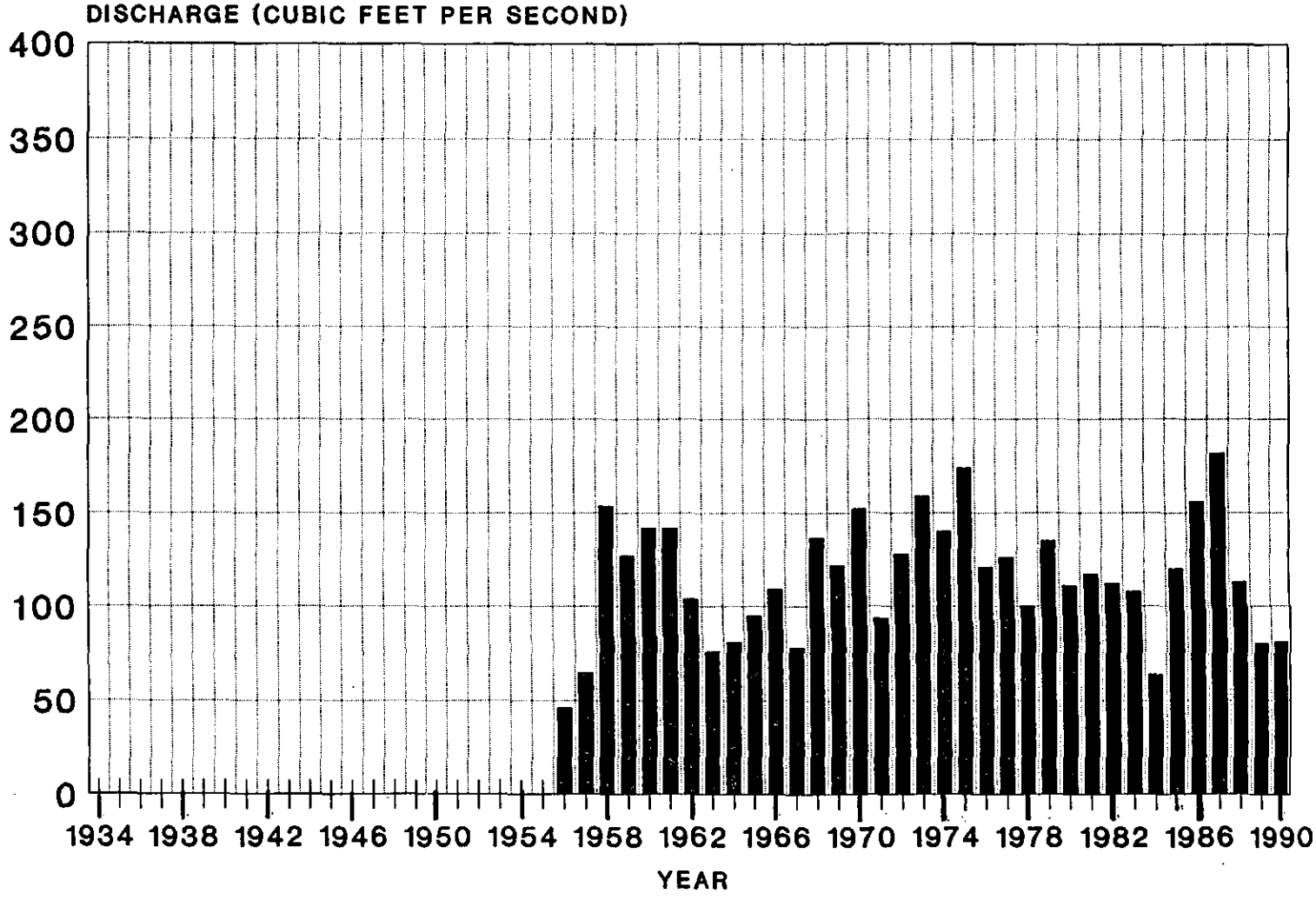
SAN MARCOS SPRINGS ANNUAL DISCHARGE
1934-1990



SOURCE: URS (1934-56); USGS (1957-90)

EXHIBIT P-14

SAN MARCOS MINIMUM DAILY DISCHARGE
1956-1990



SOURCE: USGS.

EXHIBIT P-15