EDWARDS AQUIFER
HABITAT CONSERVATION PLAN

2024 ANNUAL REPORT

SUBMITTED TO

U.S. Fish & Wildlife Service

PREPARED BY

The Edwards Aquifer
Habitat Conservation Plan Permittees

EAHCP
EDWARDS AQUIFER
HABITAT CONSERVATION PLAN

SUGGESTED CITATION

Edwards Aquifer Authority / Edwards Aquifer Habitat Conservation Plan Permittees. 2025. *Edwards Aquifer Habitat Conservation Plan: 2024 Annual Report*. March. San Antonio, TX. Prepared with assistance from ICF, Austin TX.

ACCESSIBILITY STATEMENT

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ON THE COVERS

Front and back—emergent pennywort with seeding Texas wild-rice by S. Bauer.

EAHCP
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The Edwards Aquifer Habitat Conservation Plan Permittees with assistance from **ICF**

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EDWARDS AQUIFER HABITAT CONSERVATION PLAN

2024 ANNUAL REPORT SUMMARY

The Edwards Aquifer Habitat Conservation Plan (EAHCP) is a regional plan to protect 11 species associated with the Edwards Aquifer while helping to ensure its stability as a regional water supply.

EAHCP
EDWARDS AQUIFER HABITAT CONSERVATION PLAN

INSIDE ▶

Overview of activities and accomplishments in 2024, the 12th year of EAHCP implementation.

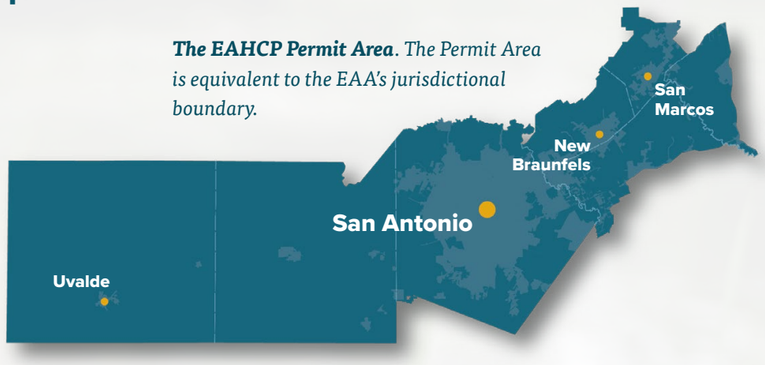
Overview of the Edwards Aquifer Habitat Conservation Plan (EAHCP)

The ***Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan*** **(EAHCP)** was approved by the **U.S. Fish & Wildlife Service (USFWS)** as a regional plan to protect eight federally listed and three non-listed species—termed Covered Species—associated with the Edwards Aquifer while helping to ensure its stability as a regional water supply.

After approval of the EAHCP, the USFWS issued an **Incidental Take Permit (ITP)** under the federal Endangered Species Act of 1973 to five cooperating Permittees: **Edwards Aquifer Authority (EAA)**, City of New Braunfels, City of San Marcos, Texas State University, and City of San Antonio acting by and through its San Antonio Water System Board of Trustees.

The **area covered by the ITP (Permit Area)** is bounded by EAA's jurisdictional boundary, which encompasses Uvalde, Medina, and Bexar counties and portions of Atascosa, Caldwell, Comal, Guadalupe, and Hays counties.

The EAHCP describes impacts that are likely to result from Covered Activities, identifies Conservation Measures to minimize and mitigate those impacts, and assures funding to implement those Conservation Measures and, more broadly, the EAHCP.



The EAHCP Permit Area*. The Permit Area is equivalent to the EAA's jurisdictional boundary.*

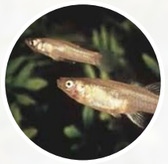
EAHCP Covered Species

Texas Wild-Rice
Zizania texana
ENDANGERED

Texas Blind Salamander
Eurycea rathbuni
ENDANGERED

San Marcos Salamander
Eurycea nana
THREATENED

Fountain Darter
Etheostoma fonticola
ENDANGERED



San Marcos Gambusia[1]
Gambusia georgei
EXTINCT

Comal Springs Dryopid Beetle
Stygoparnus comalensis
ENDANGERED

Comal Springs Riffle Beetle
Heterelmis comalensis
ENDANGERED

Peck's Cave Amphipod
Stygobromus pecki
ENDANGERED

Edwards Aquifer Diving Beetle
Haideoporus texanus
PETITIONED

Texas Troglobitic Water Slater[2]
Lirceolus smithii
NOT LISTED

Comal Springs Salamander[3]
Eurycea sp.
NOT LISTED

[1] The USFWS published a final rule on October 17, 2023, to delist San Marcos gambusia due to extinction. (Photo courtesy of Texas Parks & Wildlife Department.)

[2] The USFWS published its finding on November 28, 2023, that Texas troglobitic water slater is not warranted for listing.

[3] The petition to list the Comal Springs salamander was withdrawn in 2020.

Note: All 11 Covered Species will remain on the EAHCP ITP through the permit's duration regardless of changes to species status as determined by the USFWS.

EAHCP Implementation: Highlights of 2024

Program Management

- Program staff organized a total of 25 public meetings for EAHCP Committees (Implementing, Stakeholder, and Science), Work Groups (Budget, Science Committee Vacancy, and Comal Springs Riffle Beetle), and a Subcommittee (Conservation Measures).
- To support the Permit Renewal, Program staff worked with Permittees, Committees, EAA staff, and/or contractors to produce three modeling reports on future Edwards Aquifer conditions, memoranda on the Renewed HCP's Biological Goals and Objectives, and draft recommendations for the Incidental Take Assessment and Conservation Measures.
- The Edwards Aquifer Refugia Program was named the USFWS's Region 2 Team of the Year.

Springflow Protection

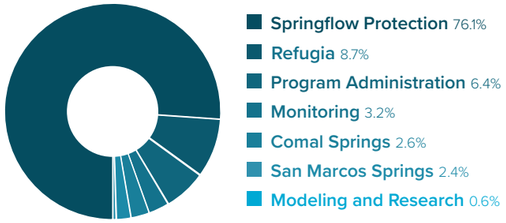
- Comal and San Marcos springflows remained below Condition M levels (130 cfs and 120 cfs, respectively) most of the year; aquatic restoration activities were restricted in accordance with Condition M. In fall, the USFWS approved limited aquatic planting restoration in the San Marcos River.
- The lowest daily average springflow recorded was 55 cfs for the Comal River on 6 days during October and December and 80 cfs for the San Marcos River on 9 days in November.
- For the third year in a row, conditions at the J-17 Bexar Index Well on October 1 triggered the Voluntary Irrigation Suspension Program Option (VISPO) for the following year. VISPO participants will not pump Edwards Aquifer water in 2025.

Habitat Restoration

- Texas wild-rice coverage was mapped July through August and was approximately 11,272 m^2.
- Due to extreme low springflow and exposure of previously wetted habitat, aquatic vegetation in the Comal Long-Term Biological Goals was mapped an additional two times and dissolved oxygen sensors were deployed. Vegetation within wetted areas remained relatively healthy despite the extreme conditions.
- The Landa Park Aquatic Complex bioretention upgrade, completed by the City of New Braunfels in 2023, was recognized by the Texas Recreation and Park Society for Park Development Innovations.

Fiscal Stability

Budget by Program Activity, 2024



The current financial projections and cost estimates for the EAHCP indicate an overall fiscally stable Program with an adequate budget for Program implementation in fiscal year 2025. The Program has a reserve balance of $9,156,929 and a cash balance of $20,010,647. There are adequate funds for the Program in fiscal year 2025.

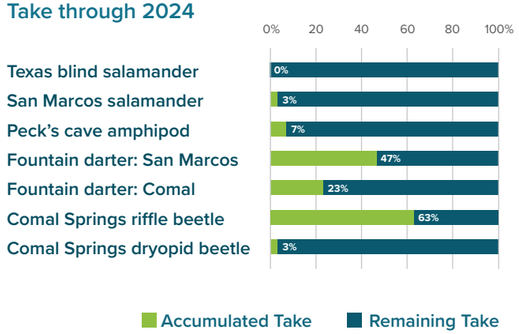
Incidental Take

Incidental take of listed species from Covered Activities is quantified annually and measured against the total take authorized by the ITP.

In the Comal Springs system, take totaled 41,197 fountain darters, 1,500 Comal Springs riffle beetles, 8 Comal Springs dryopid beetles, and 32 Peck's cave amphipods. The Comal invertebrate take was mostly due to severe drought conditions that reduced portions of occupied habitat.

In the San Marcos Springs system, take totaled 21,252 fountain darters and 36 San Marcos salamanders, primarily due to severe drought conditions that reduced portions of occupied habitat.

Covered Species Accumulated Take through 2024



Implementation of Conservation Measures

Conservation Measures are activities carried out by the Permittees in the Permit Area as part of EAHCP implementation. These measures encompass springflow protection, habitat conservation, and various supporting activities such as research and biological monitoring.

The tables at right summarize progress toward fulfilling the Conservation Measures. Implementation efforts are highlighted for 2024. As the EAHCP enters its 13th year of implementation, most Conservation Measures have either been fulfilled or are in an ongoing or maintenance phase.

All efforts to implement the Conservation Measures were conducted in accordance with the Permittees' approved annual Work Plans.

SPRINGFLOW PROTECTION

HABITAT CONSERVATION

SUPPORTING ACTIVITIES

Status Key and Abbreviations

Implementation Status

W	Working toward fulfillment
✔	Fulfillment expected or partially achieved
✔	Fulfillment achieved or implemented
M	Maintenance
O	Ongoing
I	Implemented when triggered
T	Triggered
–	No activity

Permittees

CONB	City of New Braunfels
COSM	City of San Marcos
EAA	Edwards Aquifer Authority
SAWS	San Antonio Water System
TXST	Texas State University

*2024 is the **12th year** of EAHCP implementation*

Springflow Protection Measures

		13	14	15	16	17	18	19	20	21	22	23	**24**	25	26	27
Aquifer Storage and Recovery Springflow Protection Program Enrollment	**EAA**	W	W	W	W	W	W	W	✔	✔	✔	✔	✔	W	W	W
Aquifer Storage and Recovery Springflow Protection Program Storage	**SAWS**	W	W	W	W	W	W	W	✔	I	I	I	I	I	I	I
Aquifer Storage and Recovery Springflow Protection Program Forbearance	**SAWS**	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Voluntary Irrigation Suspension Program Option Enrollment	**EAA**	W	W	✔	✔	✔	✔	W	W	✔	✔	✔	✔	W	W	W
Voluntary Irrigation Suspension Program Option Implementation	**EAA**	I	T	✔	I	I	I	I	I	I	T	✔ T	✔ T	✔	I	I
Regional Water Conservation	**EAA**	W	W	W	W	W	W	W	✔	–	–	–	–	–	–	–
Stage V Critical Period Management (San Antonio Pool)	**EAA**	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Stage V Critical Period Management (Uvalde Pool)	**EAA**	T	T	T	I	I	I	I	I	I	I	I	T	I	I	I

Habitat Conservation Measures

		13	14	15	16	17	18	19	20	21	22	23	**24**	25	26	27
Management of Public Recreation	**CONB, COSM, TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Designation of Permanent Access Points/Bank Stabilization	**COSM**	W	✔	M	M	M	–	–	–	–	–	–	–	–	–	–
Native Riparian Habitat Restoration	**CONB, COSM, TXST**	W	W	W	W	W	W	W	W	W	W	W	W	✔	M	M
Native Riparian Habitat Restoration (Riffle Beetle)	**CONB**	W	W	W	W	W	W	W	✔	M	M	M	M	M	M	M
Texas Wild-Rice Enhancement	**COSM, TXST**	W	W	W	W	W	W	W	W	W	W	W	W	✔	M	M
Aquatic Vegetation Restoration and Maintenance	**COSM, TXST**	W	W	W	W	W	W	W	W	W	W	W	W	✔	M	M
Aquatic Vegetation Restoration and Maintenance	**CONB**	W	W	W	W	W	W	W	W	W	W	W	W	M	M	M
Decaying Vegetation Removal and Dissolved Oxygen Management	**CONB**	T	T	T	T	I	I	I	I	I	T	T	T	I	I	I
Management of Floating Vegetation Mats and Litter	**CONB, COSM, TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Reduction of Non-Native Species Introduction and Live Bait Prohibition	**CONB**	O	O	O	O	O	O	✔	O	O	O	O	O	O	O	O
Monitoring and Reduction of Gill Parasites	**CONB**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Non-Native Animal Species Control	**CONB, COSM, TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Flow Split Management	**CONB**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Diversion of Surface Water	**TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Research Programs in Spring Lake	**TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Diving Classes (Spring Lake) and Boating (Spring Lake and Sewell Park)	**TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Management of Golf Course and Grounds	**CONB, TXST**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Prohibition of Hazardous Material Transport Routes	**CONB**	W	W	W	✔	–	–	–	–	–	–	–	–	–	–	–
Prohibition of Hazardous Material Transport Routes	**COSM**	W	W	W	W	W	W	W	W	W	W	W	W	✔	–	–
Management of Household Hazardous Waste	**CONB, COSM**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Minimizing Impacts of Contaminated Runoff	**COSM**	W	W	W	W	W	W	W	✔	–	–	–	–	–	–	–
Impervious Cover/Water Quality Protection	**CONB, COSM**	W	W	W	W	W	W	W	W	W	W	W	W	✔	–	–
Sessom Creek Sand Bar Removal	**TXST**	W	W	W	✔	–	–	–	–	–	–	–	–	–	–	–
Sediment Management	**COSM, TXST**	W	W	W	W	✔	–	–	–	–	–	–	–	–	–	–
Septic System Registration and Permitting Program	**COSM**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Impervious Cover/Water Quality Protection: Coal Tar Sealant Ban	**EAA**	W	W	✔	–	–	–	–	–	–	–	–	–	–	–	–

Supporting Measures

		13	14	15	16	17	18	19	20	21	22	23	**24**	25	26	27
Net Disturbance	**EAA**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Incidental Take	**EAA**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Refugia	**EAA**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Applied Research	**EAA**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Biological Monitoring	**EAA**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Water Quality Monitoring	**EAA**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Ecological Modeling	**EAA**	W	W	W	W	✔	–	–	–	–	–	–	–	–	–	–
Groundwater Modeling	**EAA**	W	W	W	W	W	W	W	✔	–	–	–	–	–	–	–

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List of Abbreviations

Abbreviation	Term
ac-ft	acre-foot
AMP	Adaptive Management Process
ASR	Aquifer Storage & Recovery
°C	degrees Celsius
cfs	cubic feet per second
COI	Certificate of Inclusion
CONB	City of New Braunfels
COSM	City of San Marcos
CSRB	Comal Springs riffle beetle
DAC	Dive Authorization Course
DOR	drought of record
EAA	Edwards Aquifer Authority
EAHCP	*Edwards Aquifer Habitat Conservation Plan*
EARIP	Edwards Aquifer Recovery Implementation Program
ESA	Endangered Species Act of 1973
FR	Federal Register
FMA	Funding and Management Agreement
ft msl	feet above mean sea level
ft^3	cubic foot
HAAP	Habitat and Angler Access Program funded by Texas Parks & Wildlife Department
HAZMAT	hazardous materials
HCP	Habitat Conservation Plan
IC	Implementing Committee
ITP	Incidental Take Permit
lbs	pounds
LTBG	Long-Term Biological Goal
m	meter
m^2	square meter
N/A	not applicable
Permit Area	area covered by the Incidental Take Permit
Permittees	EAA, SAWS, CONB, COSM, and TXST
Program	EAHCP Program
SAMP	Strategic Adaptive Management Process
SAWS	San Antonio Water System
SC	Adaptive Management Science Committee

Abbreviation	Term
SCUBA	self-contained underwater breathing apparatus
SH	Adaptive Management Stakeholder Committee
SSA	state scientific area
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks & Wildlife Department
TWR	Texas wild-rice
TXST	Texas State University
USFWS	U.S. Fish & Wildlife Service
USGS	United States Geological Survey
VISPO	Voluntary Irrigation Suspension Program Option
WAIVS	Watershed Aquatic Invasive Vegetation Suppression
yd^3	cubic yard

1 | EAHCP Background and Edwards Aquifer Conditions

CHAPTER OVERVIEW

- 2024 marked the 12th year of implementing the EAHCP, a regional plan to protect 11 species associated with the Edwards Aquifer while helping to ensure its stability as a regional water supply.
- This Annual Report fulfills the reporting requirements of the Incidental Take Permit, a federally issued permit that authorizes incidental take resulting from Covered Activities carried out by the EAHCP's Permittees: the Edwards Aquifer Authority, City of New Braunfels, City of San Marcos, Texas State University, and City of San Antonio/San Antonio Water System.
- The predicted El Niño rainfall did not transpire in the region; drought conditions persisted through 2024 with below-average rainfall and above-average temperatures.
- The San Antonio Pool of the Edwards Aquifer started the year in Stage 3 and decreased to Stage 4 in June. Scattered rainfall in the region offered some relief to the San Antonio Pool, and conditions alternated between Stage 4 and Stage 3 for summer through the end of the year, ending in Stage 4.
- The Uvalde Pool of the Edwards Aquifer started the year in Stage 3 and decreased to Stage 4 in March and Stage 5 in April, where it remained through the end of the year.
- Comal and San Marcos springflows remained mostly below 130 and 120 cfs, initiating Condition M of the Incidental Take Permit that limits restoration activities. The lowest springflow recorded in 2024 was 55 cfs in Comal on October 22 and 78 cfs in San Marcos on November 18.
- Comal Springs (USGS 08168710) average daily springflow was 112 cfs. Daily springflow started at 133 cfs on January 1 and ended at 65 cfs on December 31, and the lowest daily springflow was 55 cfs on 6 days during October and December.
- San Marcos Springs (USGS 0817000) average daily springflow was 112 cfs. Daily springflow started at 85 cfs on January 1 and ended at 81 cfs on December 31, and the lowest daily springflow was 80 cfs on 9 days in November.

The Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan (EAHCP[1]; RECON Environmental et al. 2012) was approved by the U.S. Fish & Wildlife Service (USFWS) as a regional plan to protect eight federally listed and three non-listed species (**Covered Species**[2]; **TABLE 1-1**) associated with the Edwards Aquifer while helping to ensure its stability as a regional water supply. After approval

[1] Abbreviations in this document are defined in the *List of Abbreviations* on page x.
[2] Terms defined in the *Glossary* appear in blue, bolded typeface on their first use in text or tables.

of the EAHCP, the USFWS issued an **Incidental Take Permit** (ITP) under the federal Endangered Species Act of 1973 (ESA). With an effective date of March 18, 2013, permit TE-63663A-1 (as amended January 21, 2015; Appendix A1) was issued to five cooperating Permittees:

- Edwards Aquifer Authority (EAA)
- City of New Braunfels (CONB)
- City of San Marcos (COSM)
- Texas State University (TXST)
- City of San Antonio acting by and through its San Antonio Water System (SAWS) Board of Trustees.

TABLE 1-1
EAHCP Covered Species

Common Name	Scientific Name	Federal Status	Springs System
Fountain darter	*Etheostoma fonticola*	Endangered	Comal and San Marcos
San Marcos gambusia	*Gambusia georgei*	Delisted due to extinction [a]	San Marcos
Comal Springs dryopid beetle	*Stygoparnus comalensis*	Endangered	Comal and San Marcos
Comal Springs riffle beetle	*Heterelmis comalensis*	Endangered	Comal and San Marcos
Peck's cave amphipod	*Stygobromus pecki*	Endangered	Comal
Texas wild-rice	*Zizania texana*	Endangered	San Marcos
Texas blind salamander	*Eurycea rathbuni* [b]	Endangered	San Marcos
San Marcos salamander	*Eurycea nana*	Threatened	San Marcos
Edwards Aquifer diving beetle	*Haideoporus texanus*	Not listed (petitioned)	Comal and San Marcos
Comal Springs salamander	*Eurycea* sp.	Not listed [c]	Comal
Texas troglobitic water slater	*Lirceolus smithii*	Not listed [d]	San Marcos

[a] The USFWS published a final rule on October 17, 2023, to delist this species due to extinction (88 Federal Register [FR] 71644–71682).

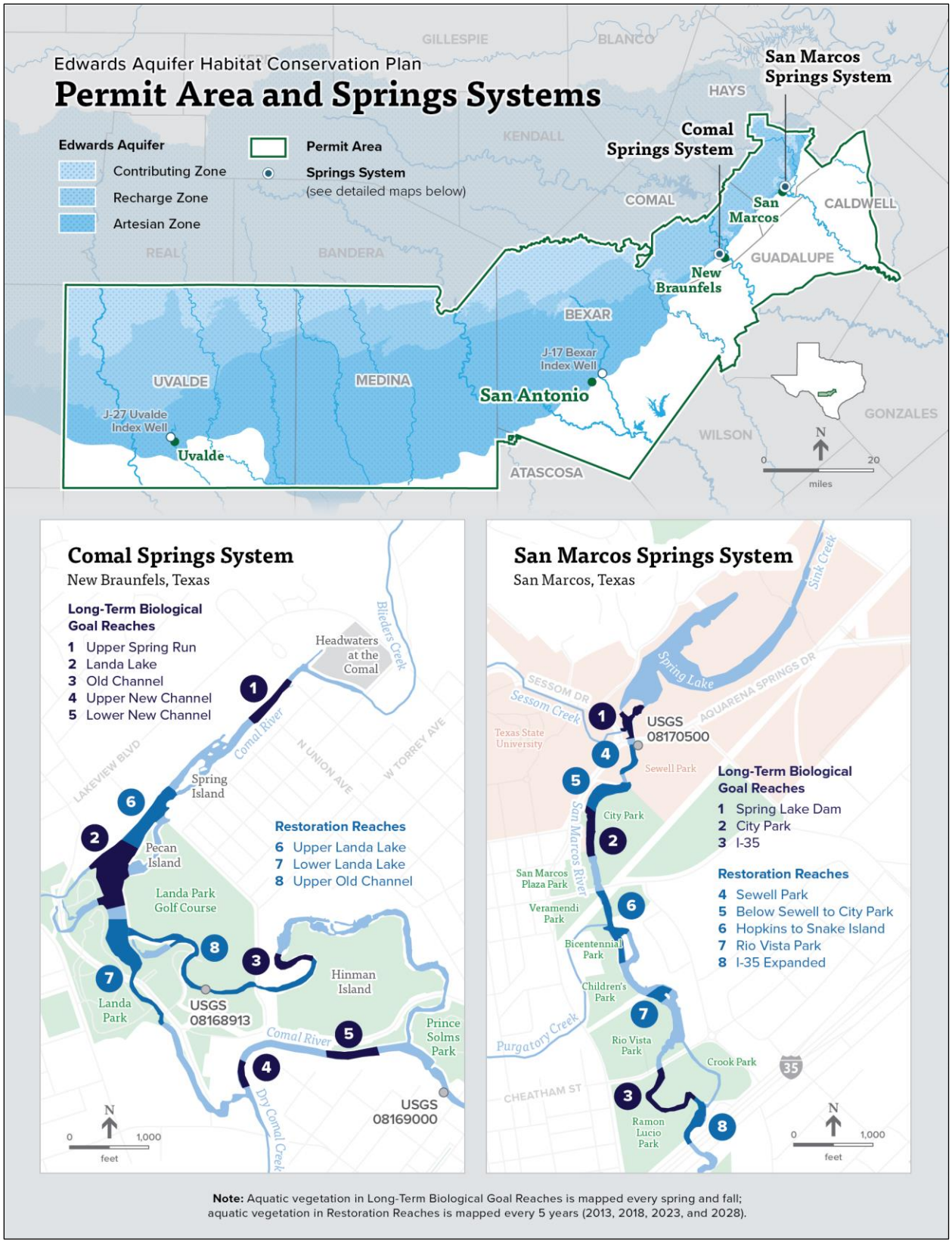
[b] The USFWS changed the scientific name for this species from *Typhlomolge rathbuni* to *Eurycea rathbuni* in 2021 (86 FR 67352–67360).

[c] The petition to list the Comal Springs salamander was withdrawn in 2020.

[d] The USFWS published its finding on November 28, 2023, that this species is not warranted for listing (88 FR 83368–83377).

The area covered by the ITP (Permit Area) is bound by the EAA's jurisdictional boundary—i.e., the area where pumping from the Edwards Aquifer is regulated by the EAA. This boundary encompasses Uvalde, Medina, and Bexar counties and portions of Atascosa, Caldwell, Comal, Guadalupe, and Hays counties (**FIGURE 1-1**).

FIGURE 1-1
EAHCP Permit Area



Note: Aquatic vegetation in Long-Term Biological Goal Reaches is mapped every spring and fall; aquatic vegetation in Restoration Reaches is mapped every 5 years (2013, 2018, 2023, and 2028).

Pumping, or groundwater **withdrawal**, is one of many **Covered Activities** that may lead to **incidental take** of a Covered Species. The EAHCP describes impacts that are likely to result from those Covered Activities; identifies **Conservation Measures** to minimize and mitigate those impacts; and ensures funding to implement those Conservation Measures and, more broadly, the EAHCP. Amendments and clarifications made to the EAHCP and its supporting documents since ITP issuance are summarized in Appendix A2.

1.1 Annual Reporting and Monitoring Requirements

The ITP requires that by March 31 of each year, an Annual Report for the preceding year is submitted to the USFWS Ecological Services Office in Austin and to the USFWS Southwest Regional Office in Albuquerque. As specified by Condition U of the ITP, this report "will document the Permittees' activities and permit compliance for the previous year, thus documenting progress toward the goals and objectives of the Edwards Aquifer Recovery Implementation Program (EARIP) Habitat Conservation Plan (HCP) and demonstrating compliance with the terms and conditions of this incidental take permit."

This document serves as the Annual Report for 2024, the 12th year of EAHCP implementation.

TABLE 1-2 identifies the ITP's content requirements for the Annual Report and provides a reference to a chapter, section, or appendix where that content can be found in the 2024 Annual Report.

TABLE 1-2
EAHCP Annual Report Requirements and Associated 2024 Annual Report Reference

Requirement per Incidental Take Permit Condition U	Annual Report Reference
EAA permitted withdrawals	Appendix B
Reference well levels	Appendix C5
Springflows at Comal and San Marcos springs	Appendix C1, Appendix C3
Aquifer recharge	Appendix C3
Aquifer discharge from wells and springflow	Appendix C1, Appendix C3
Critical period management reductions	Section 1.2
Water quality data	Appendix C4, Appendix F2
Location of sampling sites	Appendix F
Methods for data collection and variables measured	Appendix F
Frequency, timing, and duration of sampling for the variables	Appendix F
Description of the data analysis and who conducted the analysis	Appendix F
Adaptive management activities undertaken during the year	Section 6.2
Expenditures by the EAA on implementation activities	Section 5.2
Proposed activities for the next year	Chapter 2
Report on the status of implementation of minimization and mitigation measures and their effectiveness	Chapter 2
Interim updates and final copies of any research, thesis or dissertation, published studies, or relevant news stories accomplished in association with the EARIP or EAHCP	Chapter 7 and Appendix N

Requirement per Incidental Take Permit Condition U	Annual Report Reference
Description of species-specific research and management actions undertaken with specific reference to the Biological Goals and Objectives identified for each species	Appendix F, Appendix G
Any changes to the Biological Goals and Key Management and Flow-Related Objectives of the EAHCP and the reasons for such changes	N/A–no changes to report for 2024
Any changes to the objectives for the monitoring program	N/A–no changes to report for 2024
Effects on the Covered Species or Permit Area	Appendix J
Evaluation of progress toward achieving the Biological Goals and Objectives	Chapter 3 and Appendices F2, F3, and F4
Any recommendations regarding actions to be taken	Chapter 2

Abbreviations

EAA = Edwards Aquifer Authority; EARIP = Edwards Aquifer Recovery Implementation Program; N/A = not applicable

1.2 Edwards Aquifer Management, Conditions, and Springflows

The EAA declares a **critical period** based on declining groundwater levels or diminished springflow at four locations:

- J-17 Bexar Index Well in the San Antonio Pool
- J-27 Uvalde Index Well in the Uvalde Pool
- Flows measured at Comal Springs
- Flows measured at San Marcos Springs

Withdrawal reductions are put into place for users withdrawing groundwater from whichever pool or springflow triggers the reduction. The purpose of these mandatory reductions is to stabilize water levels and springflow until rainfall replenishes the aquifer. Reductions are announced when thresholds are triggered, but are applied for purposes of permit compliance only at year-end based on the number of days in a stage or stages. Appendix B lists all **EAA groundwater withdrawal permits.**

At the beginning of 2024, drought conditions persisted, leading to mandatory reductions for both the San Antonio Pool (J-17 Bexar Index Well) and Uvalde Pool (J-27 Uvalde Index Well).

- **TABLE 1-3** shows stages and withdrawal reductions for the San Antonio Pool in 2024. Water levels measured at the J-17 Bexar Index Well started at Stage 3 in January and fell to Stage 4 in June. Scattered rainfall in the region offered some relief to the San Antonio Pool, and conditions alternated between Stage 4 and Stage 3 for summer and fall. J-17 Bexar Index Well ended the year in Stage 4.
- **TABLE 1-4** shows stages and withdrawal reductions for the Uvalde Pool in 2024. Water levels measured at the J-27 Uvalde Index Well started at Stage 3 in January, decreased to Stage 4 in March, fell to Stage 5 in April, and remained in Stage 5 through the end of the year.

TABLE 1-3
Stages in the San Antonio Pool, 2024

Stage	Withdrawal Reduction	Days in Stage	Duration Dates	Actual Required Reduction [a]
Stage 3	35%	24	01/01 – 01/24	2.29%
Stage 2	30%	69	01/25 – 04/02	5.65%
Stage 3	35%	64	04/03 – 06/05	6.12%
Stage 4	40%	15	06/06 – 06/20	1.63%
Stage 3	35%	9	06/21 – 06/29	0.86%
Stage 4	40%	24	06/30 – 07/23	2.62%
Stage 3	35%	29	07/24 – 08/21	2.77%
Stage 4	40%	25	08/22 – 09/15	2.73%
Stage 3	35%	2	09/16 – 09/17	0.19%
Stage 4	40%	105	09/16 – 12/31	11.47%
Total	-	**366**[b]	-	**36.33%**

[a] Although reductions are announced whenever thresholds are triggered, compliance with required reductions is assessed at year-end for annual pumping levels based on the number of days in a stage or stages; this column shows those calculated reductions.

[b] 2024 was leap year and had 366 days.

TABLE 1-4
Stages in the Uvalde Pool, 2024

Stage	Withdrawal Reduction	Days in Stage	Duration Dates	Actual Required Reduction [a]
Stage 3	20%	69	01/01 – 03/09	3.77%
Stage 4	35%	27	03/10 – 04/05	2.58%
Stage 5	44%	270	04/06 – 12/31	32.45%
Total	-	**366**[b]	-	**38.80%**

[a] Although reductions are announced whenever thresholds are triggered, compliance with required reductions is assessed at year-end based on the number of days in a stage or stages; this column shows those calculated reductions.

[b] 2024 was leap year and had 366 days.

Rainfall remained below historical averages throughout 2024, resulting in below-average recharge and springflow. The most recent available recharge data in the Edwards Aquifer (2023) estimate total recharge at 147,000 acre-feet (ac-ft)—substantially lower than both the mean annual recharge of 683,000 ac-ft and the median annual recharge of 535,000 ac-ft for the period of record (1934–2023), excluding additional interformational flows. The 10-year rolling average recharge for 2014–2023 was 550,000 ac-ft, highlighting the prolonged drought impacts on recharge levels. The estimated total springflow for 2023 was 151,200 ac-ft. Available rainfall and recharge data are included in the 2023 Hydrological Reports (Appendix C).

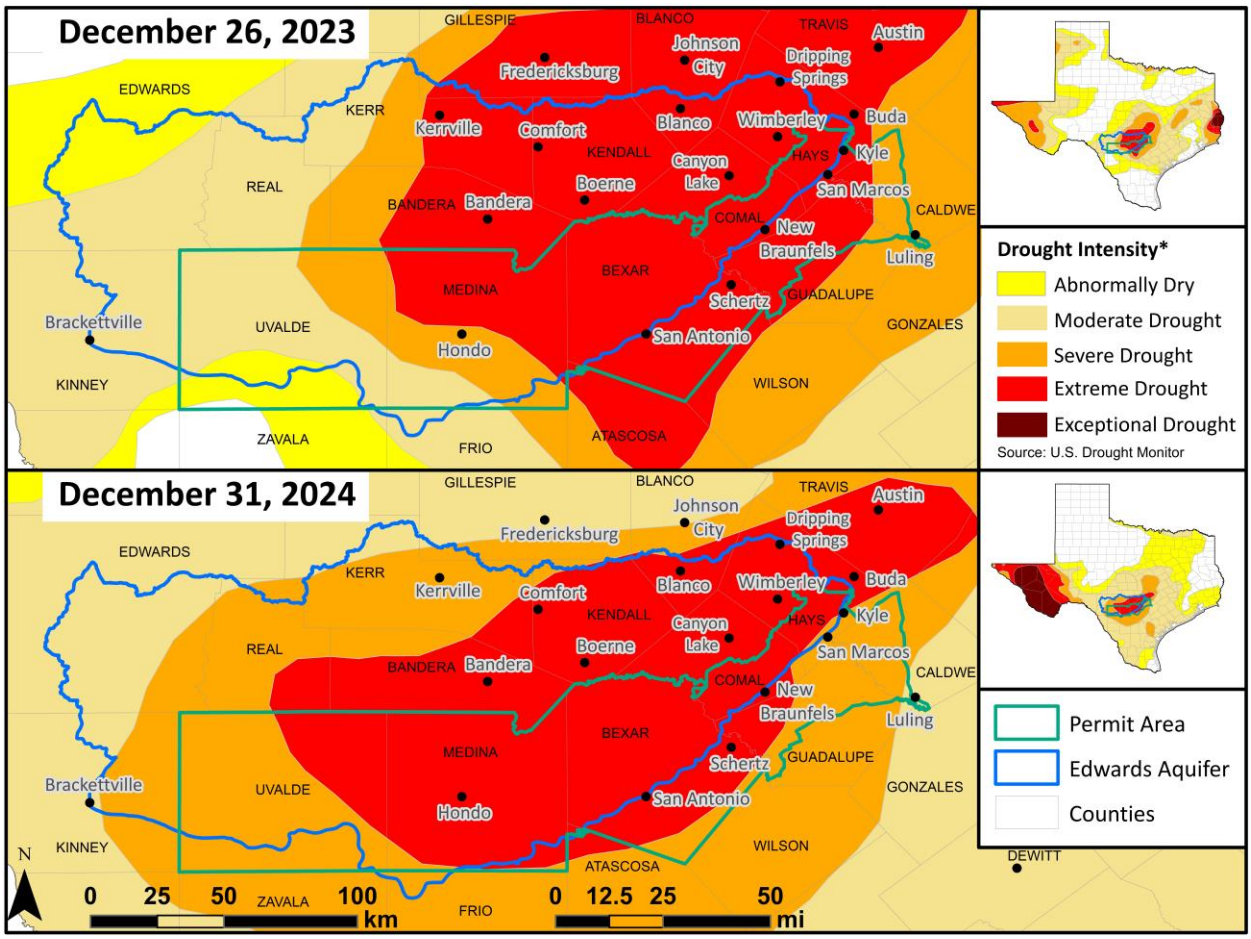
The U.S. Geological Survey (USGS) monitors springflow at Comal Springs and San Marcos Springs using two gages located downstream in the **Comal River** at New Braunfels and the **San Marcos River** at San Marcos.

In early 2024, discharge at both springs was well below average, reflecting ongoing drought conditions. A brief increase in flow occurred following rainfall in late January and February, temporarily improving conditions. However, springflows gradually declined in summer through the end of year as dry conditions persisted.

Comal Springs and San Marcos Springs started 2024 with Condition M of the ITP in place that limited aquatic restoration activities when flows are below 130 cubic feet per second (cfs) in the Comal River and 120 cfs in the San Marcos River. Rainfall in late January and February increased springflow in both springs systems above the Condition M thresholds listed above, and Condition M restrictions were lifted on February 2. Flows then decreased such that Condition M was initiated again in Comal on May 28 and in San Marcos on June 27 and remained in place for both Comal and San Marcos springs systems through the rest of the year (Appendices D1–D4).

Drought conditions across the region persisted through the end of the year, leading to further declines in aquifer levels. On the annual Voluntary Irrigation Suspension Program Option (VISPO) trigger date of October 1, 2024, the water level at the J-17 Bexar Index Well recorded a level below 635 feet mean sea level (ft msl). This triggered VISPO forbearance program for 2025, meaning that 41,795 ac-ft of enrolled water in VISPO agreements will not be pumped, reducing the rate of aquifer decline, as was the case in 2024 and 2023. **FIGURE 1-2** compares Texas drought on December 27, 2023, with conditions on December 26, 2024. *The U.S. Seasonal Drought Outlook* expects drought conditions to persist into 2025 (National Oceanic and Atmospheric Administration National Weather Service Climate Prediction Center 2024).

FIGURE 1-2
Texas Drought Conditions in December 2023 and December 2024



Source: U.S. Drought Monitor 2024.

2 | Conservation Measures

CHAPTER OVERVIEW

- Conservation Measures are activities carried out by the Permittees in the Permit Area as part of EAHCP implementation and encompass habitat protection, flow protection, and various supporting activities (e.g., biological monitoring). Tables in this chapter show 2024 compliance actions undertaken by Permittees to fulfill Conservation Measures. These efforts were carried out according to approved annual Work Plans. As the EAHCP enters its 12th year of implementation, most Conservation Measures have either been fulfilled or are in an ongoing or maintenance phase.
- San Marcos and Comal springflows remained below Condition M levels (120 cfs and 130 cfs) for most of the year; restoration activities were limited in accordance with the Condition M restrictions of the Incidental Take Permit. In fall, the USFWS approved limited aquatic restoration in the San Marcos River.
- On October 1, 2023, and October 1, 2024, the water level at the J-17 Bexar Index Well was below 635 ft msl, which triggered the Voluntary Irrigation Suspension Program Option forbearance program. As a result, a total of 41,795 ac-ft of water in the program's agreements were not pumped in 2024 and will not be pumped in 2025.
- The EAHCP covered additional take in San Marcos for 2024 aquatic vegetation restoration projects implemented by Texas State University and funded separately from the EAHCP. These were (1) a project funded through Texas Parks and Wildlife Department focusing on aquatic vegetation restoration downstream of Cape's Dam, and (2) a project funded by Texas State University focusing on non-native aquatic vegetation maintenance in Spring Lake and the upper San Marcos River.
- In February, the City of San Marcos approved and adopted an ordinance prohibiting single-use beverage containers and limiting cooler size in the San Marcos River within portions of City parks adjacent to the San Marcos River. The city is evaluating additional methods to reduce impacts from increased aquatic recreation.
- The Landa Park Aquatic Complex bioretention upgrade, completed by the City of New Braunfels in 2023, was recognized by the Texas Recreation and Park Society for Park Development Innovations.
- Edwards Aquifer Refugia Program was named the USFWS's Region 2 Team of the Year.

Conservation Measures are activities carried out by the Permittees in the Permit Area as part of EAHCP implementation. These measures encompass habitat protection, flow protection, and various supporting activities such as biological monitoring. **TABLE 2-1, TABLE 2-2,** and **TABLE 2-3** list Conservation Measures by topic and show the overall implementation status of each measure within the context of the permit term.

TABLE 2-1

Springflow Protection Measures–Implementation Status

Conservation Measure and Permittee	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ASR Springflow Protection Program Enrollment–EAA	W	W	W	W	W	W	W	✔	✔	✔	✔	✔	W	W	W
ASR Springflow Protection Program Storage–SAWS	W	W	W	W	W	W	W	✔	I	I	I	I	I	I	I
ASR Springflow Protection Program Forbearance–SAWS	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
VISPO Enrollment–EAA	W	W	✔	✔	✔	✔	W	W	✔	✔	✔	✔	W	W	W
VISPO Implementation–EAA	I	T	✔	I	I	I	I	I	I	T	✔ T	✔ T	✔	I	I
Regional Water Conservation–EAA	W	W	W	W	W	W	W	✔	-	-	-	-	-	-	-
Stage 5 Critical Period Management (San Antonio Pool)–EAA	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Stage 5 Critical Period Management (Uvalde Pool)–EAA	T	T	T	I	I	I	I	I	I	I	I	T	I	I	I

Abbreviations ASR = Aquifer Storage & Recovery; EAA = Edwards Aquifer Authority; SAWS = San Antonio Water System; VISPO = Voluntary Irrigation Suspension Program Option

Status Key

W	Working toward fulfillment
✔	Fulfillment expected or partially achieved
✔	Fulfillment achieved or implemented
I	Implemented when triggered
T	Triggered
-	No activity

TABLE 2-2

Habitat Conservation Measures–Implementation Status

Conservation Measure and Permittee	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Management of Public Recreation–CONB, COSM, TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Designation of Permanent Access Points/Bank Stabilization–COSM	W	✔	M	M	M	-	-	-	-	-	-	-	-	-	-
Native Riparian Habitat Restoration–CONB, COSM, TXST	W	W	W	W	W	W	W	W	W	W	W	W	✔	M	M
Native Riparian Habitat Restoration (Riffle Beetle)–CONB	W	W	W	W	W	W	W	✔	M	M	M	M	M	M	M
Texas Wild-Rice Enhancement–COSM, TXST	W	W	W	W	W	W	W	W	W	W	W	W	✔	M	M
Aquatic Vegetation R&M–COSM, TXST	W	W	W	W	W	W	W	W	W	W	W	W	✔	M	M
Aquatic Vegetation R&M–CONB	W	W	W	W	W	W	W	W	W	W	W	W	M	M	M
Decaying Vegetation Removal and DO Management–CONB	T	T	T	T	I	I	I	I	I	T	T	T	I	I	I
Management of Floating Vegetation Mats and Litter–CONB, COSM, TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Reduction of Non-native Species/Live Bait Prohibition–CONB, COSM	O	O	O	O	O	O	✔	O	O	O	O	O	O	O	O
Monitoring and Reduction of Gill Parasites–CONB	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Non-Native Animal Species Control–CONB, COSM, TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Flow Split Management–CONB	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Diversion of Surface Water–TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Research Programs in Spring Lake–TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Diving Classes (Spring Lake) and Boating (Spring Lake/ Sewell Park)–TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Management of Golf Course and Grounds–CONB, TXST	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Prohibition of Hazardous Material Transport Routes–CONB	W	W	W	✔	-	-	-	-	-	-	-	-	-	-	-
Prohibition of Hazardous Material Transport Routes –COSM	W	W	W	W	W	W	W	W	W	W	W	W	✔	-	-
Management of Household Hazardous Waste–CONB, COSM	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Minimizing Impacts of Contaminated Runoff–COSM	W	W	W	W	W	W	W	✔	-	-	-	-	-	-	-
Impervious Cover/WQ Protection–CONB, COSM	W	W	W	W	W	W	W	W	W	W	W	W	✔	-	-
Sessom Creek Sand Bar Removal–TXST	W	W	W	✔	-	-	-	-	-	-	-	-	-	-	-
Sediment Management–COSM, TXST	W	W	W	W	✔	-	-	-	-	-	-	-	-	-	-
Septic System Registration and Permitting Program–COSM	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Impervious Cover/WQ Protection: Coal Tar Sealant Ban–EAA	W	W	✔	-	-	-	-	-	-	-	-	-	-	-	-

Abbreviations EAA = Edwards Aquifer Authority; CONB = City of New Braunfels; COSM = City of San Marcos; DO = dissolved oxygen; R&M = restoration and maintenance; TXST = Texas State University; WQ = water quality

Status Key

W	Working toward fulfillment
✔	Fulfillment expected or partially achieved
✔	Fulfillment achieved or implemented
M	Maintenance
O	Ongoing
I	Implemented when triggered
T	Triggered
-	No activity

TABLE 2-3
Supporting Measures–Implementation Status

Conservation Measure and Permittee	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Net Disturbance–EAA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Incidental Take–EAA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Refugia–EAA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Applied Research–EAA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Biological Monitoring–EAA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Water Quality Monitoring–EAA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Ecological Modeling–EAA	W	W	W	W	✔	-	-	-	-	-	-	-	-	-	-
Groundwater Modeling–EAA	W	W	W	W	W	W	W	✔	-	-	-	-	-	-	-

Abbreviation EAA = Edwards Aquifer Authority

Status Key

W	Working toward fulfillment
✔	Fulfillment achieved or implemented
O	Ongoing
-	No activity

Biological Monitoring for San Marcos Salamander
San Marcos Salamander occurs in the eastern spillway below Spring Lake Dam. Biological monitoring efforts track habitat conditions and salamander densities relative to Long-Term Biological Goals, focusing on maintaining silt-free habitats, stable spring flows, and recreation control while addressing seasonal and discharge-related variability.

Each year, Permittees undertake compliance activities to fulfill Conservation Measures; these activities are defined annually in Work Plans developed by the implementing Permittee and approved by the Implementing Committee (IC). Permittees' efforts to implement the Conservation Measures in 2024 were carried out according to these reviewed and approved Work Plans (Appendix E). **TABLE 2-4** **TABLE 2-5**, **TABLE 2-6**, **TABLE 2-7**, and **TABLE 2-8** summarize, by Permittee, all 2024 compliance activities and activities proposed for 2025. Additionally, **TABLE 2-9** summarizes activities by a non-Permittee, the Texas Parks & Wildlife Department (TPWD).

2.1 Edwards Aquifer Authority

TABLE 2-4
Edwards Aquifer Authority 2024 EAHCP Implementation and Proposed 2025 Activities by Conservation Measure

EAA 2024 Compliance Action	Proposed EAA 2025 Compliance Action	Annual Report Reference
Applied Research (EAHCP § 6.3.4) Conduct research to enhance understanding of the ecology of aquatic ecosystems and provide scientifically rigorous information needed to meet the Biological Goals and Objectives.		
A multi-year applied research project, the *Comal Springs Riffle Beetle Population Assessment,* was completed.	Begin applied research to evaluate a revised monitoring program for the San Marcos salamander.	Appendix F1
Refugia (EAHCP §§ 5.1.1, 6.4.2, 6.4.3, and 6.4.4) Fund USFWS operation and maintenance of two off-site refugia to house and protect adequate populations of Covered Species and expand knowledge of their biology, life histories, and effective reintroduction techniques.		
Species collections occurred, and standing stocks of species were maintained. Research activities focused on (1) mark and recapture of San Marcos salamander, (2) propagation strategies for Comal Springs dryopid beetle, (3) genetic assessment of CSRB, (4) evaluation of tagging methods for invertebrates, (5) genetic assessment of Peck's cave amphipod, (6) genetic assessment of Texas blind salamander, (7) genetic assessment of San Marcos salamander, and (8) assessment of reproductive triggers for San Marcos salamander using gene expression profiles.	Continue day-to-day operations and maintenance of refugia. Perform species collections to maintain standing stock numbers. Research activities will include continuation of selected 2024 research projects including (1) genetic assessment of San Marcos salamander and (2) genetic assessment of Texas blind salamander; additional 2025 research projects will include (3) developing tools to assess thermal tolerances of Covered Species, (4) genetic assessment of fountain darter, (5) assessment of photographic mark and recapture of San Marcos salamander, and (6) captive propagation of Peck's cave amphipod.	Appendix G

EAA 2024 Compliance Action	Proposed EAA 2025 Compliance Action	Annual Report Reference
VISPO (EAHCP § 5.1.2) Compensate irrigation permit holders for not pumping (a total combined volume goal of 41,795 ac-ft) from the Edwards Aquifer during certain drought conditions when the water level at the J-17 Bexar Index Well is at or below 635 ft msl on October 1 and ensure that the irrigation permit holders forbear from pumping 41,795 ac-ft during the following year.		
Edwards Aquifer levels at J-17 were below 635 ft msl on October 1, 2023, and **forbearance** was required in 2024. VISPO agreements totaling 41,795 ac-ft were held in 2024, and VISPO irrigation permit holders were compensated and refrained from making withdrawals that otherwise would have been authorized.	Edwards Aquifer levels at J-17 were below 635 ft msl on October 1, 2024, and forbearance will be required again in 2025. The total volume goal of 41,795 ac-ft in VISPO agreements will not be pumped. Throughout 2025, staff will continue to work on renewing VISPO agreements (totaling 3,161.351 ac-ft) that will expire on December 31, 2025, plus an additional 7,503.735 ac-ft of water owned by permit holders who have decided not to re-enroll in VISPO.	Appendix D5
Regional Water Conservation (EAHCP § 5.1.3) Conserve 20,000 ac-ft of permitted or exempt Edwards Aquifer water: 10,000 ac-ft will be held by the EAA in trust to remain un-pumped for the permit term, and the other 10,000 ac-ft will remain available for withdrawal by the participating entities.		
Final payment was made to SAWS for its leak repairs made in 2020. The City of Universal City, City of Uvalde, and SAWS contracts to conserve water have been fulfilled.	Although this Conservation Measure is fulfilled, EAA is working to identify alternatives to increase recharge, protect springflows, and control erosion using regenerative land management strategies, conservation easements, and other approaches.	N/A
Critical Period Management Program—Stage 5 (EAHCP § 5.1.4) Mandates a 44 percent reduction in the authorized groundwater withdrawal amount of EAA-issued groundwater withdrawal permits triggered when the 10-day average level at the J-17 Bexar Index Well drops below 625 ft msl, or if the springflows at **Comal Springs** decline below 45 cfs based on a 10-day rolling average, or below 40 cfs based on a 3-day rolling average, or when the J-27 Uvalde Index Well level drops below 840 ft msl.		
This Conservation Measure triggered in the Uvalde Pool when J-27 levels dropped below 840 ft msl on April 6 and remained below 840 ft msl the rest of 2024 due to extreme drought conditions. J-17 Bexar Index Well levels for the San Antonio Pool decreased close to 625 ft msl in summer and fall but remained above 625 ft msl. Therefore, Stage V for the San Antonio Pool did not trigger for 2024. Reductions are announced whenever thresholds are triggered, and the total annual reductions are calculated at year-end based on the number of days in a stage or stages.	This Conservation Measure will be enforced if triggered in 2025.	**TABLE 1-3** and **TABLE 1-4**

EAA 2024 Compliance Action	Proposed EAA 2025 Compliance Action	Annual Report Reference
Expanded Water Quality Monitoring (EAHCP § 5.7.2) Continue historical groundwater and surface water quality monitoring along with expanded water quality monitoring efforts to include groundwater and surface water sampling as necessary around Landa Lake, the Comal River, Spring Lake, and the San Marcos River.		
Implemented a water quality monitoring plan that was developed in 2020 and based on results of historical monitoring efforts. Expanded water quality monitoring included real-time network water quality monitoring; groundwater sampling for pharmaceuticals, personal care products, and sucralose; surface water sampling for nutrients; and sediment sampling.	Continue to implement the water quality monitoring plan as revised in 2020. Perform real-time network monitoring of water quality parameters as well as surface water, groundwater, and fish tissue sampling.	Appendix F2
Biological Monitoring (EAHCP §§ 6.3.1, 6.4.3, and 6.4.4) Monitor changes to habitat availability and population abundance of the Covered Species that may result from Covered Activities, collect data that can be used in the applied research studies, and provide data and information for ecological model development.		
Biological monitoring occurred as outlined in the EAHCP. Low-flow conditions triggered additional monitoring surveys in the San Marcos Springs system and in the Comal Springs system.	Continue biological monitoring as completed in previous years with vegetation mapping occurring in spring and fall only in **LTBG Reaches**.	Appendices F3 and F4
Groundwater Modeling (EAHCP § 6.3.2) Improve MODFLOW model to reduce uncertainty in the results for use during the Adaptive Management Process and to provide assurance/confirmation that modeling results for the Edwards Aquifer and springflows are more reliable and defensible.		
EAHCP groundwater modeling was completed in 2020. Since 2020, EAA modeling experts have collaborated with other modeling experts to evaluate future conditions of the Edwards Aquifer. In 2024, three reports were produced to summarize modeled future conditions for the Edwards Aquifer region.	EAA staff will continue to evaluate modeled future conditions for the Edward Aquifer.	Appendices F8–F10
Ecological Modeling (EAHCP § 6.3.3) Develop a predictive ecological model that evaluates, and quantifies the magnitude of, potential adverse ecological effects from Covered Activities in order to develop alternative approaches or mitigation strategies.		
Ecological modeling was completed in 2017.	No activities are proposed.	N/A
Impervious Cover and Water Quality Protection (EAHCP § 5.7.6) Assemble materials regarding the value of a ban on the use of coal tar sealants and work with local governments to explore and encourage the consideration of such a ban.		
Work was completed in 2015. The EAA continues to enforce its coal tar rules and serve as a resource for other local governments.	Continue to enforce the coal tar rules and serve as a resource for any local government that concludes future regulatory action is necessary.	N/A

EAA 2024 Compliance Action	Proposed EAA 2025 Compliance Action	Annual Report Reference
EAA ASR Springflow Protection (EAHCP § 5.5.1) Acquire 50,000 ac-ft of permitted Edwards Aquifer water through **leases** and **forbearance agreements** and maintain such leases on an annual basis for use in the SAWS ASR Program. If dual triggers are met (10-year rolling average recharge less than 500,000 ac-ft and J-17 below 630 ft msl), SAWS will reduce pumping by relying on water in ASR or other alternative supplies, subject to availability and infrastructure constraints.		
For 2024, EAA acquired a total of 50,000 ac-ft of water, of which 12,753.164 ac-ft were ASR leases and 37,246.836 ac-ft were ASR forbearance agreements.	Upon expiration of existing EAA ASR leases, future enrollments will become ASR springflow protection forbearance agreements consistent with the Interlocal Contract for the remainder of the permit term unless ASR is used. For 2025, EAA has acquired a total of 49,899 ac-ft of water, of which 11,486.018 ac-ft are ASR leases and 38,412.982 ac-ft are ASR forbearance agreements. This water will serve as forbearance water and will go un-pumped if the 10-year rolling average of the estimated annual recharge to the aquifer is equal to or less than 500,000 ac-ft.	N/A

Abbreviations

ac-ft = acre-foot; ASR = Aquifer Storage & Recovery; cfs = cubic feet per second; CSRB = Comal Springs riffle beetle; EAA = Edwards Aquifer Authority; ft msl = feet mean sea level; LTBG = Long-Term Biological Goal; N/A = not applicable; SAWS = San Antonio Water System; USFWS = U.S. Fish & Wildlife Service; VISPO = Voluntary Irrigation Suspension Program Option

2.2 City of New Braunfels

TABLE 2-5

City of New Braunfels 2024 EAHCP Implementation and Proposed 2025 Activities by Conservation Measure

CONB 2024 Compliance Action	Proposed CONB 2025 Compliance Action	Annual Report Reference
Flow-Split Management in the Old and New Channels (EAHCP § 5.2.1) Control flow entering the Old and New channels of the Comal River from Landa Lake to maintain optimal habitat conditions for the Covered Species under varying total flow conditions, as defined in Table 5-3.		
Continued to monitor flow rates in the Old and New channels of the Comal River. Operated the flow-control gates between Landa Lake and the Old Channel to meet the flow objectives in EAHCP Table 5-3. On October 22, the flow in the Old Channel temporarily decreased due to other CONB staff modifying the gate. The incident was quickly reported, and flow returned to prior conditions on October 23. Actions have been taken to prevent a recurrence. More information is available in Appendix H1.	Continue to monitor flow rates in the Old and New channels of the Comal River and operate the flow-control gates to meet the flow objectives defined in EAHCP Table 5-3.	Appendix H1

CONB 2024 Compliance Action	Proposed CONB 2025 Compliance Action	Annual Report Reference
Native Aquatic Vegetation Restoration and Maintenance (EAHCP § 5.2.2) Implement an Aquatic Vegetation Restoration Program (removal of non-native aquatic plant species, planting of target native aquatic plant species, and maintenance of restored areas) within key sustainable reaches of the Comal River system including Landa Lake, the Upper Spring Run area, and portions of the Old and New channels of the Comal River to improve habitat conditions for the fountain darter by increasing the amount of usable habitat and by improving the quality of existing habitat.		
Planted 5,382 native aquatic plants in the Landa Lake LTBG areas, totaling 385 m^2. The planted area within the Old Channel LTBG Reach totaled 650 m^2, planting 6,598 aquatic plants. Due to the implementation of Condition M on the Comal River system, aquatic vegetation restoration was restricted; accordingly, no plantings occurred in the Restoration Reaches of the Old Channel or Comal River. Removed 2 m^2 of non-native *Hygrophila* from the Comal River system. Monitored and maintained previously restored native aquatic vegetation stands.	Continue efforts to increase the coverage and density of target aquatic vegetation preferred by fountain darters for habitat as defined by EAHCP Tables 4-1 and 4-1-1. Continue aquatic vegetation maintenance activities in Upper Spring Run, Landa Lake, Old Channel, and New Channel LTBG and Restoration Reaches.	Appendix H2
Management of Public Recreational Use of Comal Springs and River Ecosystems (EAHCP § 5.2.3) Enforce recreation restrictions on the Comal River to limit recreation on Landa Lake, the Spring Runs in Landa Park, and the Old Channel of the Comal River along with extending take protection to commercial outfitting businesses that voluntarily participate in the COI Program.		
Continued to enforce CONB Code § 142-5, which restricts access to Landa Lake, the Spring Runs (except for the wading pool on Spring Run 2), and portions of the Comal River. CONB park rangers routinely patrolled Landa Park to enforce the ordinance. Informative signage was installed near bioretention sites constructed for Impervious Cover and Water Quality Protection (EAHCP § 5.7.6).	Continue to enforce CONB Code § 142-5 and educate Comal River recreation outfitters about participation in the COI Program.	N/A
Decaying Vegetation Removal and Dissolved Oxygen Management (EAHCP § 5.2.4) Monitor dissolved oxygen concentrations and related water quality parameters in Landa Lake and mitigate depressed dissolved oxygen levels (less than 4 milligrams per liter), regardless of the initiating circumstances.		
Dissolved oxygen monitoring activities occurred starting July 12 and continued through the end of the year due to below-average springflow conditions. On July 12, 2024, five dissolved oxygen loggers were installed in the Comal Springs system (three in Landa Lake, one in the Upper Spring Run, and one in the Old Channel). No non-routine mitigation measures were required.	Monitor dissolved oxygen concentrations in optimal habitat areas of Landa Lake and the Upper Spring Run if low-flow conditions are realized. Manage floating vegetation mats and remove decaying vegetation if it is negatively affecting dissolved oxygen concentrations.	Appendix H3
Control of Harmful Non-Native Animal Species (EAHCP § 5.2.5) Implement a non-native species control program that targets armored sailfin catfish, tilapia, nutria, and giant ramshorn snail.		
Removed 65 armored sailfin catfish, 698 tilapia, and 24 nutria from the Comal River system. Removal efforts of giant ramshorn snail have been discontinued due to the limited impact that removal has on its population.	Continue routine removal of target non-native species including tilapia, nutria, and armored sailfin catfish using proven and effective methods.	Appendix H4

CONB 2024 Compliance Action	Proposed CONB 2025 Compliance Action	Annual Report Reference
Monitoring and Reduction of Gill Parasites (EAHCP §§ 5.2.6 and 6.3.6) Monitor the gill parasite *Centrocestus formosanus* and its intermediate host snail, red-rimmed melania, and establish a reduction program.		
Performed water column cercaria (snail parasite larva) monitoring for *Centrocestus formosanus* as well as the parasitic *Haplorchis pumilio* in September 2024 at four established transects in the Comal River system. While both parasites were detected in 2024, the densities of both species have declined since peaking in 2022. More information and study results are available in Appendix H5.	Continue monitoring free-swimming cercaria in the water column at established transects.	Appendix H5
Prohibition of Hazardous Materials Transport across the Comal River and its Tributaries (EAHCP § 5.2.7) Prohibit the transport of HAZMAT on routes crossing the Comal River and its tributaries.		
HAZMAT transport prohibitions (CONB Code § 126-185) remained in effect, and notification signs remained in place and in good condition.	Maintain HAZMAT signage installed in 2016 and monitor for the presence of trucks carrying hazardous cargo on routes crossing the Comal River and its tributaries.	N/A
Native Riparian Habitat Restoration (Riffle Beetle) (EAHCP § 5.2.8) Implement a restoration program by removing non-native vegetation and planting native vegetation to improve the riparian zone along Spring Run 3 and the western shoreline of Landa Lake and to minimize sedimentation impacts.		
Removed non-native vegetation and planted native vegetation along Spring Runs 2 and 3 to increase the riparian buffer zone. Increased the density of native riparian vegetation along Spring Run 3.	Monitor and maintain previously restored riparian areas along Spring Runs 1, 2, and 3 and the western shoreline of Landa Lake.	Appendix H6
Reduction of Non-Native Species Introduction and Live Bait Prohibition (EAHCP § 5.2.9) Prohibit the introduction of domestic and non-native aquatic organisms, targeting bait species and aquarium trade species, and spread knowledge on the adverse impacts of aquarium dumping and use of non-native bait species.		
Educated residents and visitors about the **negative impacts** of aquarium dumping and use of specific live bait species. Continued to enforce CONB Code § 142-6.	Continue to educate residents and visitors about the negative impacts of aquarium dumping and use of specific live bait species. Continue to enforce CONB Code § 142-6.	N/A
Litter Collection and Floating Vegetation Management (EAHCP § 5.2.10) Remove litter and manage floating vegetation to enhance habitat for the Covered Species. This includes (1) dislodging vegetation mats that form on the water surface, particularly during **low flows**, to allow continued movement downstream and (2) removing litter from the littoral zone and stream bottom.		
Continued to dislodge floating vegetation mats in Landa Lake to minimize (1) oxygen consumption associated with decaying vegetation, (2) shading of restored aquatic vegetation, and (3) entrainment of floating vegetative material around the Landa Lake/ Old Channel flow-control gates. Removed litter along the banks of the Old Channel of the Comal River twice each month from May to September. Collected 1,188 7-gallon mesh bags of litter and 575 55-gallon bags of litter.	Continue efforts to remove litter and dislodge floating vegetation mats to prevent negative impacts on flow-control structures, aquatic Restoration Reaches, and Covered Species habitat.	N/A

CONB 2024 Compliance Action	Proposed CONB 2025 Compliance Action	Annual Report Reference
Management of Golf Course Diversions and Operations (EAHCP § 5.2.11) Develop and implement a Golf Course Management Plan that will include an Integrated Pest Management Plan designed to target techniques to protect water quality and minimize potential negative effects on the Covered Species. EAHCP § 2.3.4 also defines Covered Activities for irrigation and spring-fed pool diversions and operation.		
Continued to implement the existing Integrated Pest Management Plan and maintained vegetative buffers between the golf course and Landa Lake and the Old Channel of the Comal River to protect water quality. Diverted 138 ac-ft from the Old Channel for golf course irrigation and filling of the spring-fed pool per TCEQ permits, out of the 300 ac-ft authorization amount. Continued to maintain the spring-fed pool according to the 2003 Comal Ecosystem Management Plan.	Continue to update the Integrated Pest Management Plan as needed and maintain a vegetative buffer between the golf course and Landa Lake and the Old Channel of the Comal River. Continue withdrawals from the Old Channel for golf course irrigation and filling of the spring-fed pool per TCEQ permits, and continue to maintain the spring-fed pool according to the 2003 Comal Ecosystem Management Plan.	N/A
Native Riparian Habitat Restoration (Old Channel Improvements) (EAHCP § 5.7.1) Initiate a riparian restoration program to enhance the riparian zone along the Old Channel, the golf course, and near Clemens Dam.		
Addressed approximately 2,000 linear feet of shoreline including removal of non-native vegetation and the introduction of native vegetation along the banks of Landa Lake. Removed and/or treated 801 non-native trees within the riparian zone along the shores of Landa Lake and the Comal River. Also treated all observed non-native tree seedlings, re-emergent elephant ears, and other non-native littoral species throughout the riparian zone along Blieders Creek, Upper Spring Run, Landa Lake, and the Old Channel. Transplanted 115 native plants and distributed approximately 2.5 lbs of native seed into the riparian restoration areas along the shores of Landa Lake and the Comal River.	Continue to remove non-native vegetation along the banks of Landa Lake and the Comal River. Install erosion control berms, plant native vegetation, and disperse seed in areas where non-native vegetation is removed.	Appendix H7
Management of Household Hazardous Wastes (EAHCP § 5.7.5) Continue to implement a household hazardous waste program and enhance the program to generate additional participation by the public.		
Held three household hazardous waste collection events. Overall, recorded 1,138 cars/participants and collected 90,739 lbs of hazardous waste. The City of New Braunfels Fire Department conducts a year-round drop off program for unused and expired medication. Secured drop-off boxes are located at all municipal buildings and fire stations.	Hold three household hazardous waste collection events and continue city-sponsored year-round drug recovery and collection program.	N/A

CONB 2024 Compliance Action	Proposed CONB 2025 Compliance Action	Annual Report Reference
Impervious Cover and Water Quality Protection (EAHCP § 5.7.6) Expand criteria related to desired impervious cover, provide incentives to reduce existing impervious cover on public and private property in New Braunfels, and implement stormwater runoff best management practices around Landa Lake and the Spring Runs.		
Completed design of a 17-vehicle parking area with associated **bioretention basin** on Golf Course Road in Landa Park. Additionally, the Landa Park Aquatic Complex parking lot bioretention basin that was completed in 2023 was honored in 2024 by the Texas Recreation and Park Society for Park Development Innovations.	Complete construction of a 17-vehicle parking area with associated bioretention basin on Golf Course Road in Landa Park.	Appendices H8 and K1

Abbreviations

ac-ft = acre-foot; COI = Certificate of Inclusion; CONB = City of New Braunfels; HAZMAT = hazardous materials; lbs = pounds; LTBG = Long-Term Biological Goal; m^2 = square meter; N/A = not applicable; TCEQ = Texas Commission on Environmental Quality

Bioretention Basin Recognition
Completed in 2023, the bioretention basin at the Landa Park Aquatic Complex parking lot was honored in 2024 by the Texas Recreation and Park Society for Park Development Innovations.

2.3 City of San Marcos

TABLE 2-6
City of San Marcos 2024 EAHCP Implementation and Proposed 2025 Activities by Conservation Measure

COSM 2024 Compliance Action	Proposed COSM 2025 Compliance Action	Annual Report Reference
TWR Enhancement and Restoration (EAHCP §§ 5.3.1 and 6.3.5) Identify areas of optimal habitat for TWR and target those areas for removal of non-native submerged aquatic vegetation species, conduct propagation and planting guided by the TWR LTBGs defined in EAHCP Table 4-10, and perform continual monitoring of new and existing stands.		
Existing stands of TWR were maintained by removing non-native aquatic vegetation in and around those stands and new TWR stands were planted. The EAHCP covered take associated with disturbances from vegetation removal and plantings for the TPWD-funded HAAP project in 2024. In total 1,159 TWR plantings were completed, with 77 TWR plants in the IH-35 LTBG reach completed by the EAHCP and 1,082 TWR plants primarily downstream of IH-35 and Cape's Dam completed by the HAAP.	Focus monitoring and maintenance efforts in reaches where planting goals have been achieved. Plant TWR and expand coverage in portions of the San Marcos River downstream of Cape's Dam.	Appendix I1
Management of Recreation in Key Areas (EAHCP § 5.3.2) Continue to implement recreation mitigation measures approved by COSM Resolution 2011-21, which include, but are not limited to, implementing buffer zones around designated recreation areas, developing and implementing a robust river education program, addressing the accumulation of silt in the river through watershed controls, reducing recreational impacts that harm the river (such as litter), and issuing COIs to river outfitters to extend protections of the ITP to those entities.		
The Conservation Crew continued efforts to educate river users and the public about the EAHCP, endangered species within the San Marcos River system, and river stewardship. The Conservation Crew also assisted with litter collection within and along the river, maintained TWR exclosures, and assisted with EAHCP Conservation Measures. Throughout the year, the Conservation Crew held 4,167 conversations with river users regarding the EAHCP and endangered species protection, removed 3,051 ft^3 of litter from the river, and removed 2,064 ft^3 of litter from riverfront parks. Continued to manage river recreation through the use of controlled river access (i.e., designated, stabilized river access points and restrictive fencing). Installed new signage throughout COSM riverfront parks explaining park rules and the new disposable container ordinance. Maintained existing EAHCP-related educational signage.	Continue to implement recreational management Conservation Measures and continue to educate river users on sustainable river use that is protective of Covered Species and their habitats. The Conservation Crew will also continue to perform litter removal and EAHCP project maintenance while patrolling the river and COSM riverfront parks.	Appendix I2

COSM 2024 Compliance Action	Proposed COSM 2025 Compliance Action	Annual Report Reference
Management of Aquatic Vegetation and Litter below Sewell Park (EAHCP § 5.3.3) Dislodge and/ or remove floating vegetation mats and remove inorganic litter regularly.		
Removed approximately 578 ft^3 of litter from within the San Marcos River between Spring Lake Dam and Stokes Park. Removed approximately 48 ft^3 of litter from the downstream portions of San Marcos River tributaries. Dislodged approximately 20,952 m^2 of floating vegetation mats in and around stands of TWR and native submerged aquatic vegetation from Spring Lake Dam to IH-35.	Continue efforts to remove litter and manage floating aquatic vegetation mats.	Appendices I1 and I3
Prohibition of Hazardous Materials Transport across the San Marcos River and Its Tributaries (EAHCP § 5.3.4) Designate routes for the transportation of HAZMAT that will minimize the potential for impacts on the San Marcos River and its tributaries.		
The City resumed efforts to define and designate HAZMAT transport routes that will be submitted to TXDOT and City Council for adoption.	Continue to work with the Texas Department of Transportation and COSM City Council for final approval of the HAZMAT routes.	N/A
Reduction of Non-Native Species Introduction (EAHCP § 5.3.5) Establish an education campaign targeted at reducing the introduction of non-native species and provide people with disposal sites for unwanted aquatic animals and plants to deter aquarium dumps into waterbodies.		
Spoke with visitors of the COSM's Discovery Center and utilized the City's webpage to educate the public about proper disposal of unwanted aquatic pets, such as aquarium fish. The COSM continued to offer the Pet Fish Drop Off and Adoption Program to provide an outlet for the public to give away unwanted aquarium pets. The aquarium pet donation drop-off location at the Discovery Center received 237 unwanted fish and made them available for adoption.	Continue existing efforts.	N/A
Sediment Management below Sewell Park (EAHCP § 5.3.6) Remove sediment from the San Marcos River between City Park and IH-35—efforts specifically targeted for TWR habitat. Funding for this measure has been transferred to the Impervious Cover and Water Quality Protection Conservation Measure (EAHCP § 5.7.6) per the Nonroutine Adaptive Management Process Proposal approved in fall 2017.		
No sediment removal activities occurred in 2024.	No activities are proposed.	N/A
Designation of Permanent Access Points and Bank Stabilization (EAHCP § 5.3.7) Stabilize banks and maintain a healthy riparian buffer in City Park, at the Hopkins Street underpass, Bicentennial Park, Rio Vista Park, Ramon Lucio Park, and at the Cheatham Street underpass using stone terraces and native vegetation along the riparian zone to include permanent access points to the river where possible.		
Continued strategy of focusing river recreation access to approximately 10 designated, hardened access points along the San Marcos River while restricting access to other areas along the river. This strategy aided in the protection of riverbanks and riparian vegetation as well as aquatic vegetation adjacent to restricted areas.	Continue the existing strategy. Monitor the condition of designated access points and restrictive fencing and perform maintenance as needed.	N/A

COSM 2024 Compliance Action	Proposed COSM 2025 Compliance Action	Annual Report Reference
Control of Non-Native Plant Species (EAHCP § 5.3.8) Develop and implement a non-native plant replacement program from Spring Lake downstream to the city boundary to remove and replace aquatic, littoral, and riparian non-native plant species.		
EAHCP covered additional take for non-native plant removal and native planting disturbance for non-EAHCP funded projects: HAAP (TPWD) and WAIVS (TXST). In total 5,860 m^2 of non-native aquatic vegetation were removed, 5,287 m^2 through the EAHCP and 573 m^2 through the HAAP-funded project. Effective June, large-scale non-native aquatic vegetation removal was suspended through the rest of 2024 due to Condition M disturbance restrictions. WAIVS maintained previously planted aquatic, littoral, and riparian areas. Planted native aquatic vegetation in select areas of the river as reviewed and approved by the USFWS to occur under Condition M. Planted a total of 9,293 individual native aquatic plants within the river, 3,898 plants through the EAHCP and 5,395 plants through the HAAP project. Performed initial and repeated treatments of non-native vegetation in the littoral and riparian zones of the river from Spring Lake to Stokes Park.	Continue to remove non-native vegetation and plant native aquatic and littoral vegetation. Aquatic plant restoration efforts will seek to achieve the long-term goals of native aquatic plant species as defined by the fountain darter LTBGs in EAHCP Tables 4-21 and 4-21-1.	Appendices I1 and I4
Control of Harmful Non-Native and Predator Species (EAHCP § 5.3.9) Implement a non-native species control program that targets the suckermouth armored catfish, tilapia, red-rimmed melania, and the giant ramshorn snail and conduct annual monitoring and maintenance to ensure continued control of invasive species.		
Removed 1,741 non-native fish from the San Marcos River system, totaling 1,012 lbs of removed biomass. Volunteers assisted with removal efforts by participating in two non-native species polespear tournaments.	Continue routine removal of tilapia, suckermouth armored catfish, and snails, and host at least two non-native species polespear tournaments.	Appendix I5
Native Riparian Habitat Restoration (EAHCP § 5.7.1) Restore riparian habitats with native species on COSM and TXST property and establish a program for private landowners to implement riparian restoration with the opportunity for reimbursement.		
Removed and treated invasive, non-native vegetation along the river across from the "Cypress Island" of Rio Vista Park, within Veramendi Park, and along Purgatory Creek. Performed monitoring and re-treatment of re-emergent non-native vegetation along the riparian zone between Spring Lake and IH-35 as well as along portions of San Marcos River tributaries. Planted native vegetation within the riparian zone primarily through volunteer efforts.	Continue maintenance of riparian areas from Spring Lake to Stokes Park. Continue to focus on restoration of public areas with volunteer groups.	Appendix I6

COSM 2024 Compliance Action	Proposed COSM 2025 Compliance Action	Annual Report Reference
Septic System Registration and Permitting Program (EAHCP § 5.7.3) Establish a registration, evaluation, and permitting program for aerobic and anaerobic septic systems.		
COSM continued to implement a septic system registration and permitting program. According to the San Marcos Environmental Health Department, no new septic systems were registered within the COSM's jurisdiction in 2024. Two septic systems were decommissioned in 2024 following connection of these residences to the City's sanitary sewer collection system.	Continue the septic system registration and permitting program (COSM Code § 86.152).	N/A
Minimizing Impacts of Contaminated Runoff (EAHCP § 5.7.4) Excavate and stabilize two areas for the construction of two water quality bioretention ponds in the vicinity of the San Marcos River.		
This Conservation Measure was fulfilled in 2020.	This Conservation Measure is fulfilled.	N/A
Management of Household Hazardous Waste (EAHCP § 5.7.5) Continue to expand the existing household hazardous waste program and offer collection locations available to the public.		
Accommodated, on average, 261 participants per month at the COSM household hazardous waste drop-off center and 49 customers per month at the reuse center. Collected and properly disposed of 221,561 lbs of household hazardous waste to help minimize potential for improper disposal.	Continue to operate the household hazardous waste collection facility to accept household hazardous waste from area residents. Increase participation rates and continue to enhance awareness of the impact of hazardous household waste on the environment, particularly on Covered Species habitat.	Appendix I7
Impervious Cover and Water Quality Protection (EAHCP § 5.7.6) Establish a program to protect water quality and reduce the impact of impervious cover based on recommendations from the *San Marcos Water Quality Protection Plan* (John Gleason LLC 2017).		
Planned the construction of Phase 2 of the Sessom Creek restoration project. Final engineering design was completed, and a solicitation for a construction contractor was released in December 2024.	Construction on Phase 2 of the Sessom Creek restoration project is anticipated to start in summer 2025 and will be completed by late fall 2025.	Appendix K3

Abbreviations

COI = Certificate of Inclusion; COSM = City of San Marcos; ft^3 = cubic foot; HAAP = Habitat and Angler Access Program; HAZMAT = hazardous materials; ITP = Incidental Take Permit; lbs = pounds; LTBG = Long-Term Biological Goal; m^2 = square meter; N/A = not applicable; TPWD = Texas Parks & Wildlife Department; TWR = Texas wild-rice; TXST = Texas State University; USWFS = U.S. Fish & Wildlife Service; WAIVS = Watershed Aquatic Invasive Vegetation Suppression

2.4 Texas State University

TABLE 2-7
Texas State University 2024 EAHCP Implementation and Proposed 2025 Activities by Conservation Measure

TXST 2024 Compliance Action	Proposed TXST 2025 Compliance Action	Annual Report Reference
TWR Enhancement and Restoration (EAHCP §§ 5.4.1 and 6.3.5) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM.		
See related discussion in **TABLE 2-6** and Appendix I1 of this Annual Report.	See related discussion in **TABLE 2-6** and Appendix I1 of this Annual Report.	Appendix I1
Management of Recreation in Key Areas (EAHCP § 5.4.2) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM.		
See related discussion in **TABLE 2-6** and Appendix I2 of this Annual Report.	See related discussion in **TABLE 2-6** and Appendix I2 of this Annual Report.	Appendix I2
Management of Vegetation (EAHCP § 5.4.3) Hand-cutting and a harvester boat will be used to manage aquatic vegetation in Spring Lake.		
Aquatic vegetation maintenance activities by trained volunteer divers accounted for 2,174 dives in Spring Lake. A total of 1,260 yd^3 of aquatic vegetation was harvested by boat in Spring Lake.	Continue programs outlined in the EAHCP and in the annual Work Plan.	N/A
Sediment Management in Spring Lake and Sewell Park (EAHCP § 5.4.4) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM. Funding for this Conservation Measure has been transferred to the Impervious Cover and Water Quality Protection Conservation Measure (EAHCP § 5.7.6) per the Nonroutine Adaptive Management Process Proposal approved in fall 2017.		
No sediment removal occurred in 2024.	No activities are proposed.	N/A
Diversion of Surface Water (EAHCP § 5.4.5) Reduce surface water diversions when flow is less than 80 cfs.		
TXST adhered to the surface water diversion guidelines set forth in Table 5-4 of the EAHCP (EAHCP § 5.4.5). TXST's diversion rates from Spring Lake (TCEQ permit 18-3865) and the San Marcos River (TCEQ permit 18-3866) did not exceed the diversion rates specified in Table 5-4 under the varying flow conditions.	Continue to reduce or cease the diversion of surface water as required.	N/A
Native Riparian Habitat Restoration (EAHCP § 5.7.1) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM.		
See related discussion in **TABLE 2-6** and Appendix I6 of this Annual Report.	See related discussion in **TABLE 2-6** and Appendix I6 of this Annual Report.	Appendix I6

TXST 2024 Compliance Action	Proposed TXST 2025 Compliance Action	Annual Report Reference
Sessom Creek Sand Bar Removal (EAHCP § 5.4.6) TXST and the COSM will conduct a study of sand and gravel bar removal options to determine which best minimizes impacts on the Covered Species. TXST will submit the study for review though the Adaptive Management Process and implement the actions coming out of that process.		
This Conservation Measure was fulfilled in 2016.	This Conservation Measure is fulfilled.	N/A
Diving Classes in Spring Lake (EAHCP § 5.4.7) Divers must show an understanding of the Covered Species and critical habitats in Spring Lake and the laws and regulations relevant to them. Divers must exhibit good buoyancy control, avoid contact with Covered Species and critical habitat, and maintain distance from the lake bottom. Training will be conducted for check-out dives and SCUBA classes.		
The Diving for Science Program (EAHCP § 5.4.7.1)—currently referred to as the Dive Authorization Course (DAC)—accounted for 223 supervised dives within Spring Lake in 2024. This is in addition to the 2,174 volunteer dives performed by DAC-certified divers for the purpose of vegetation and algal removal by hand in Spring Lake (see *Management of Vegetation* [EAHCP § 5.4.3] above). In total, 5,423 dives were permitted within the Spring Lake Dive Training Area as part of the TXST Continuing Education SCUBA Classes (EAHCP § 5.4.7.2). An additional 241 dives were permitted within the same area as part of the TXST SCUBA Classes (EAHCP § 5.4.7.3).	Continue the DAC and approval and tracking of diving in Spring Lake consistent with the protocols identified in the EAHCP and Spring Lake Management Plan.	N/A
Research Programs in Spring Lake (EAHCP § 5.4.8) Research in Spring Lake needs prior review and approval by the Meadows Center for Water and the Environment to assess impacts on the Covered Species, and researchers must be educated to limit take in situations where take cannot be avoided; individual permits from the USFWS may be necessary.		
Research projects occurred in Spring Lake, resulting in 58 research dives. Research-related dives and access were consistent with the protocols identified in the EAHCP and Spring Lake Management Plan and as approved by the Spring Lake Environmental Review Committee at the Meadows Center.	Continue to evaluate research programs for consistency with the protocols identified in the EAHCP and Spring Lake Management Plan.	Appendix I8
Management of Golf Course and Grounds (EAHCP § 5.4.9) Develop and implement a Grounds Management Plan, including an Integrated Pest Management Plan, that considers the appropriate application of environmentally sensitive chemicals to reduce negative impacts on neighboring ecosystems.		
Managed recreation fields consistent with the Grounds Management Plan and Integrated Pest Management Plan.	Undertake management activities consistent with the Grounds Management Plan and Integrated Pest Management Plan.	N/A

TXST 2024 Compliance Action	Proposed TXST 2025 Compliance Action	Annual Report Reference
Boating in Spring Lake and Sewell Park (EAHCP § 5.4.10) Restrict boating at Spring Lake to areas treated with the harvester; operators will enter and exit boats at designated access points, and all boats will follow standards for proper cleaning.		
Spring Lake Programs included approximately 7,048 glass-bottom boat tours (84,582 individuals on boat tours) and 484 canoe/kayak tours. All boating activities adhered to EAHCP protocol.	Continue existing programs in accordance with this Conservation Measure.	N/A
Reduction of Non-Native Species Introduction (EAHCP § 5.4.11) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM.		
See related discussion in **TABLE 2-6** of this Annual Report.	See related discussion in **TABLE 2-6** of this Annual Report.	N/A
Control of Non-Native Plant Species (EAHCP § 5.4.12) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM.		
See related discussion in **TABLE 2-6** of this Annual Report.	See related discussion in **TABLE 2-6** of this Annual Report.	Appendices I1 and I4
Control of Harmful Non-Native and Predator Species (EAHCP § 5.4.13) TXST extended its EAHCP obligations for this Conservation Measure in partnership with the COSM.		
See related discussion in **TABLE 2-6** of this Annual Report.	See related discussion in **TABLE 2-6** of this Annual Report.	Appendix I5

Abbreviations

ac-ft = acre-foot; cfs = cubic feet per second; N/A = not applicable; SCUBA = self-contained underwater breathing apparatus; TCEQ = Texas Commission on Environmental Quality; TWR = Texas wild-rice; TXST = Texas State University; USFWS = U.S. Fish & Wildlife Service; yd^3 = cubic yard

2.5 San Antonio Water System

TABLE 2-8
San Antonio Water System 2024 EAHCP Implementation and Proposed 2025 Activities by Conservation Measure

SAWS 2024 Compliance Action	Proposed SAWS 2025 Compliance Action	Annual Report Reference
SAWS ASR Springflow Protection (EAHCP § 5.5.1) SAWS will inject and store EAHCP groundwater in its ASR and, under certain drought conditions, forbear withdrawals from the Edwards Aquifer under its EAA-issued permits. This measure provides SAWS the ability to use this stored water to offset the volume of water forborne during a drought of record as defined for the SAWS ASR Program. The amount of forbearance during a 10-year repeat of the drought of record is no more than 126,000 ac-ft or 46,300 ac-ft annually as defined in the Interlocal Contract between EAA and SAWS.		
Use of ASR was not triggered; accordingly, there was no forbearance under the (1) EAA leases, (2) EAA forbearance agreements, or (3) SAWS forbearance of Edwards Aquifer pumping in 2024. In 2024, SAWS also did not make any "offset" recovery from the ASR to "offset" any forborne Edwards Aquifer pumping.	Enforce if triggered; withdrawals under SAWS Edwards Aquifer permits will remain un-pumped when the water level at the J-17 Bexar Index Well is less than 630 ft msl and the 10-year rolling recharge average of the Edwards Aquifer is at or below 500,000 ac-ft.	N/A
Phase II Expanded Use of the SAWS ASR and Water Resources Integration Program Pipeline (EAHCP § 5.5.2) The presumptive action for **Phase II of the EAHCP** involves the use of SAWS ASR with a planned construction of the Water Resources Integration Program Pipeline.		
The IC voted to approve the EAHCP Comprehensive Phase II Work Plan and a Nonroutine Adaptive Management Process Proposal in May 2019 that did not include the use of the SAWS Water Resources Integration Program as the presumptive Phase II Conservation Measure because it was not needed.	N/A	N/A

Abbreviations

ac-ft = acre-foot; ASR = Aquifer Storage & Recovery; ft msl = feet mean sea level; IC = Implementing Committee; N/A = not applicable; SAWS = San Antonio Water System

2.6 Texas Parks & Wildlife Department

TABLE 2-9
Texas Parks & Wildlife Department 2024 EAHCP Implementation and Proposed 2025 Activities by Conservation Measure

TPWD 2024 Compliance Action	Proposed TPWD 2025 Compliance Action	Annual Report Reference
TPWD serves as the state agency with primary responsibility for conserving, protecting, and enhancing the state's fish and wildlife resources. In this role, TPWD has the authority to establish a state scientific area (SSA) for "the purposes of education, scientific research, and preservation of flora and fauna of scientific or educational value" (Texas Parks & Wildlife Code § 81.501). Although TPWD is not a Permittee, it implements the following Conservation Measures as a signatory to the Implementing Agreement.		
San Marcos River State Scientific Area (EAHCP § 5.6.1)		
To minimize the impacts of recreation, TPWD has designated a 2-mile segment of the public waters of the San Marcos River as an SSA in the **San Marcos Springs** ecosystem (31 Texas Administrative Code § 57.910) to provide expanded protections to TWR. The COSM and TXST installed protective buoys around selected stands of TWR when flows decreased below 120 cfs. New signs and an exclusion barrier were installed in the eastern spillway in fall 2022 and have remained in place to protect TWR and San Marcos salamander habitat in the eastern spillway. In the summer, the eastern spillway protection zone was expanded further out into the river channel to protect TWR from elevated recreation and reduced wetted habitat. A map of the SSA protection zones is included within the annual take assessment.	Additional barriers will be added if low-flow conditions trigger the need for protection.	Appendix J
Comal River State Scientific Area (EAHCP § 5.6.1).		
No activities have occurred since a letter of clarification for EAHCP §§ 2.7, 5.2.2.2, 5.6.1, 5.8.3.1, and 9.1.1, relative to an SSA in the Comal Springs system, was sent to the USFWS on November 23, 2022, and the USFWS approved the clarification letter.	N/A	N/A

Abbreviations

cfs = cubic feet per second; COSM = City of San Marcos; N/A = not applicable; SSA = state scientific area; TPWD = Texas Parks & Wildlife Department; TWR = Texas wild-rice; USFWS = U.S. Fish & Wildlife Service

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3 | Biological Goals and Key Management Objectives

CHAPTER OVERVIEW

- Biological Goals and Objectives, key management objectives, and flow objectives (1) guide the Conservation Measures implemented under the EAHCP, (2) apply to Covered Species and their habitat in the Comal Springs system and San Marcos Springs system, and (3) are established in the EAHCP and subject to changes through adaptive management.
- Routine monitoring events were conducted in the Comal Springs system and in the San Marcos Springs system in April and October.
- Due to extreme low springflow and exposure of previously wetted habitat, aquatic vegetation in the Comal Long-Term Biological Goal Reaches was mapped in June and August. Vegetation within wetted areas remained relatively healthy despite the extreme conditions.
- Dissolved oxygen sensors were deployed in the Comal Springs system to monitor dissolved oxygen conditions.
- Texas wild-rice coverage was mapped July through August 2024 and was approximately 11,272 m^2.
- 2024 monitoring indicates achievement or progress toward achieving Biological Goals and Objectives, key management objectives, and flow objectives.

EAHCP § 4.1 details Covered Species Long-Term Biological Goals (LTBGs), key management objectives, and flow objectives, which are defined for individual springs systems (the Comal River and Springs and the San Marcos River and Springs) because of unique circumstances that define their occupied habitat. LTBGs provide the rationale behind the Conservation Measures, and Conservation Measures are the means for achieving the LTBGs, key management objectives, and flow objectives. Flow objectives were designed to ensure adequate water is available for the Covered Species over time and during a repeat of drought of record (DOR)–like conditions.

The Covered Species LTBGs, key management objectives, and flow objectives are subject to change under limited circumstances through adaptive management set out in the Funding and Management Agreement (FMA). The LTBGs, key management objectives, and flow objectives described below reflect the clarifications of, and/or amendments made to, the EAHCP through 2024. Biological monitoring results for Comal and San Marcos springs systems for 2024 are available in Appendices F3 and F4.

3.1 Fountain Darter

Fountain darter
Etheostoma fonticola
ENDANGERED

LTBGs for fountain darter in defined reaches of the Comal Springs and River (**TABLE 3-1**) and San Marcos River (**TABLE 3-2)** depend upon areal coverage of aquatic vegetation types and darter densities by vegetation type, which are used to estimate fountain darter numbers. The LTBGs seek to maintain fountain darter densities greater than or equal to an established baseline—i.e., the median density of fountain darters observed per aquatic vegetation type per springs system from 2002 to 2012 during the EAA Variable Flow Study monitoring and prior to issuance of the ITP.

Two key management objectives are used to achieve the fountain darter LTBGs: one associated with restoration of native aquatic vegetation and another associated with surface water quality. Work is being performed in each system to achieve the LTBGs through active non-native aquatic vegetation removal and subsequent native aquatic vegetation restoration and maintenance. Restoration activities have also been extended beyond the reaches defined for LTBGs to account for proportional expansion of submerged aquatic vegetation. These areas were established as Restoration Reaches through the Adaptive Management Process (AMP) in 2016 (**TABLE 3-1** and **TABLE 3-2**).

FIGURES 3-1 and **3-2** illustrate the area of aquatic vegetation mapped twice per year for LTBG Reaches in the Comal and San Marcos rivers, respectively. Restoration Reaches are mapped every 5 years; the most recent full-system mapping occurred in 2023. The variation in aquatic vegetation year to year illustrates the dynamic nature of these aquatic systems. As shown in these figures, substantial progress is being made to achieve areal extent requirements for both native and non-native aquatic vegetation.

The second key management objective addresses surface water quality as measured at the EAA Variable Flow Study water quality monitoring stations as well as temperature and dissolved oxygen as measured in representative study reaches. Surface water quality in the Comal Springs and River and San Marcos River is not to exceed a 10% daily average deviation from historical long-term average water quality conditions measured at the EAA Variable Flow Study monitoring stations. Instantaneous water temperatures in representative study reaches should be maintained below 25 degrees Celsius (°C) throughout each river. Similarly, instantaneous dissolved oxygen concentrations in representative study reaches should be maintained above 4.0 milligrams per liter.

In 2024, the maximum daily water temperature reached or exceeded 25°C at both EAHCP water quality stations in the San Marcos River. At Aquarena Springs Drive, the maximum daily water temperature reached 25°C for only 3 days (August–September) for a period of 0.25–1.25 hours per day. At the TPWD hatchery location, the maximum daily water temperature reached or exceeded 25°C for 98 days during May–September. Within those 98 days, time spent at or above 25°C ranged from 1.25 to 13.25 hours (mean = 6.27 hours; median = 6.75 hours). At the Comal Springs system EAHCP water quality stations, the maximum daily water temperature exceeded 25°C only at the Old Channel station. Maximum daily temperatures reached or exceeded 25°C at the Old Channel station for 172 days during the months of March–November. Within those 172 days, time spent at or above 25°C ranged from 1.0 to 10.75 hours (mean = 7.17 hours; median = 7.75 hours).

TABLE 3-1

Goals for Areal Coverage of Habitat within Long-Term Biological Goal and Restoration Reaches of the Comal Springs and River and the Associated Fountain Darter Densities for Each Aquatic Vegetation Type

Study Reach	Reach Type	Bryophytes	*Potamogeton*	*Ludwigia*	*Cabomba*	*Sagittaria*	*Vallisneria*
Fountain Darter Habitat (Aquatic Vegetation) Goal (m^2)							
Upper Spring Run	LTBG	1,750	0	25	25	850	0
Landa Lake Upper[a]	Restoration	5,500	0	25	250	250	0
Landa Lake	LTBG	3,950	25	900	500	2,250	12,500
Landa Lake Lower[b]	Restoration	500	0	50	125	100	22,50
Old Channel Upper[c]	Restoration	1,250	100	850	200	750	750
Old Channel	LTBG	550	0	425	180	450	0
New Channel	LTBG	150	0	100	2,500	0	0
Fountain Darter Median Density Goal (number/m^2)							
–	–	20	3.3	7	7	1	1
2024 median densities (number/m^2)	–	9.25	N/A	5.5	2.25	0	7.75

[a] Landa Lake LTBG Reach to downstream boundary of Spring Island.

[b] Landa Lake LTBG Reach to weir across from City of New Braunfels Park Office.

[c] Old Channel from LTBG Reach upstream to Landa Lake Dam.

Abbreviations

LTBG = Long-Term Biological Goal; m^2 = square meter; N/A = not applicable

TABLE 3-2

Goals for Areal Coverage of Fountain Darter Habitat within Long-Term Biological Goal and Restoration Reaches of the San Marcos River and the Associated Fountain Darter Median Densities for Each Aquatic Vegetation Type

Study Reach	Reach Type	*Ludwigia*	*Cabomba*	*Potamogeton*	*Sagittaria*	*Hydrocotyle*	*Zizania*
Fountain Darter Habitat (Aquatic Vegetation) (m^2)							
Spring Lake Dam	LTBG	100	50	200	200	50	700
Sewell Park	Restoration	25	25	152	25	10	1,100
Below Sewell to City Park[a]	Restoration	50	50	500	700	20	2,300
City Park	LTBG	150	90	1,450	300	10	1,750
Hopkins Street to Snake Island	Restoration	50	50	475	750	10	950
Cypress Island in Rio Vista Park	Restoration	50	50	150	50	0	350
IH-35	LTBG	50	50	250	150	50	600
IH-35 Expanded[b]	Restoration	50	100	250	450	50	450
Fountain Darter Median Density Goal (number/m^2)							
–	–	7	7	5	1	4	5
2024 median densities (number/m^2)	–	10	24.5	0.5	19.75	2	0.75

[a] Sewell Park to upstream boundary of City Park LTBG Reach.

[b] Immediately downstream of established IH-35 LTBG Reach to IH-35.

Abbreviations

LTBG = Long-Term Biological Goal; m^2 = square meter

FIGURE 3-1

Submerged Aquatic Vegetation Coverage of Selected Plant Species in the Long-Term Biological Goal Reaches of the Comal Springs System, 2013–2024

Species coverage data are from routine spring/fall biological monitoring mapping events. Long-Term Biological Goals are represented in the stacked bar at the far right of each chart.

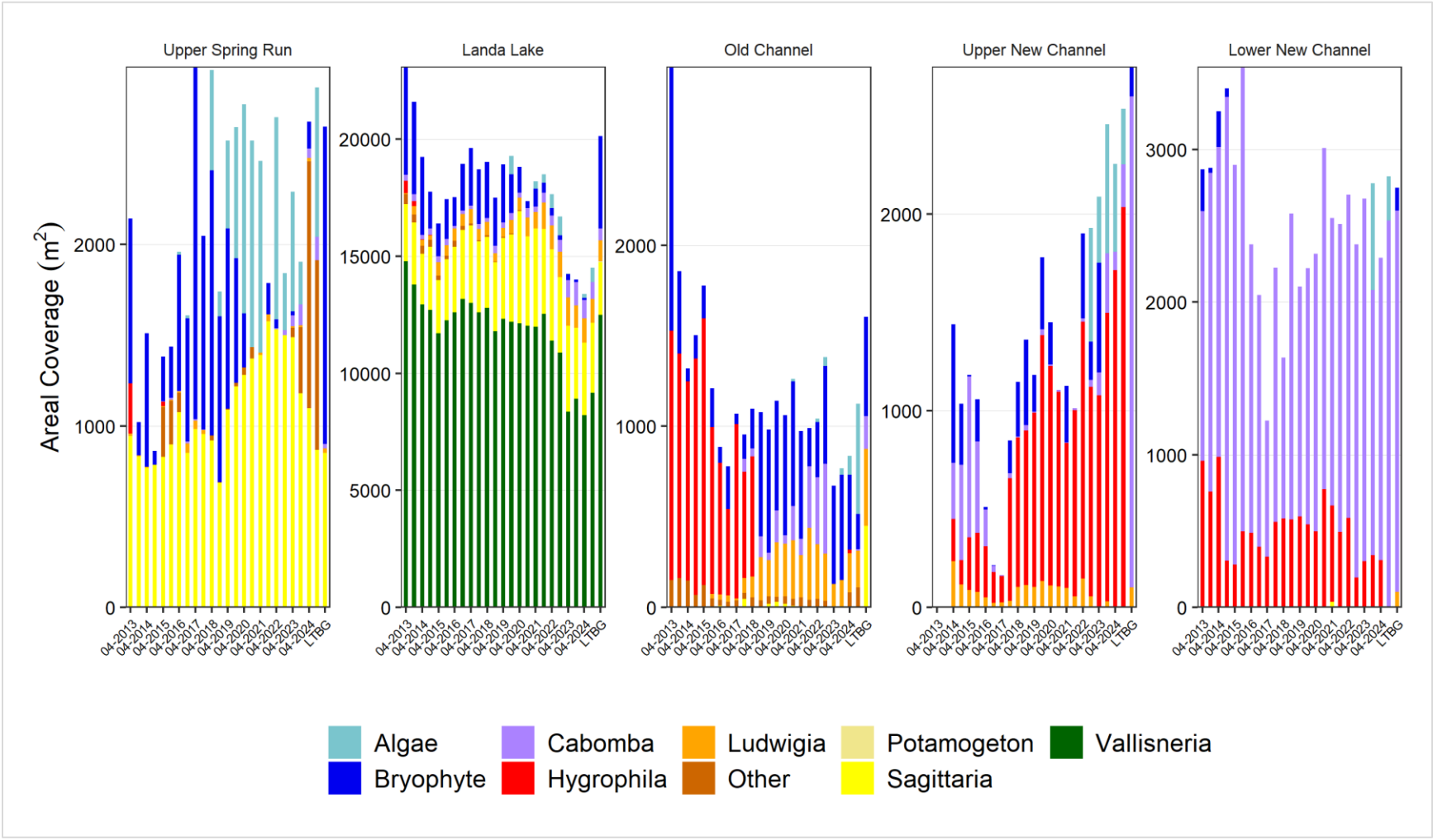
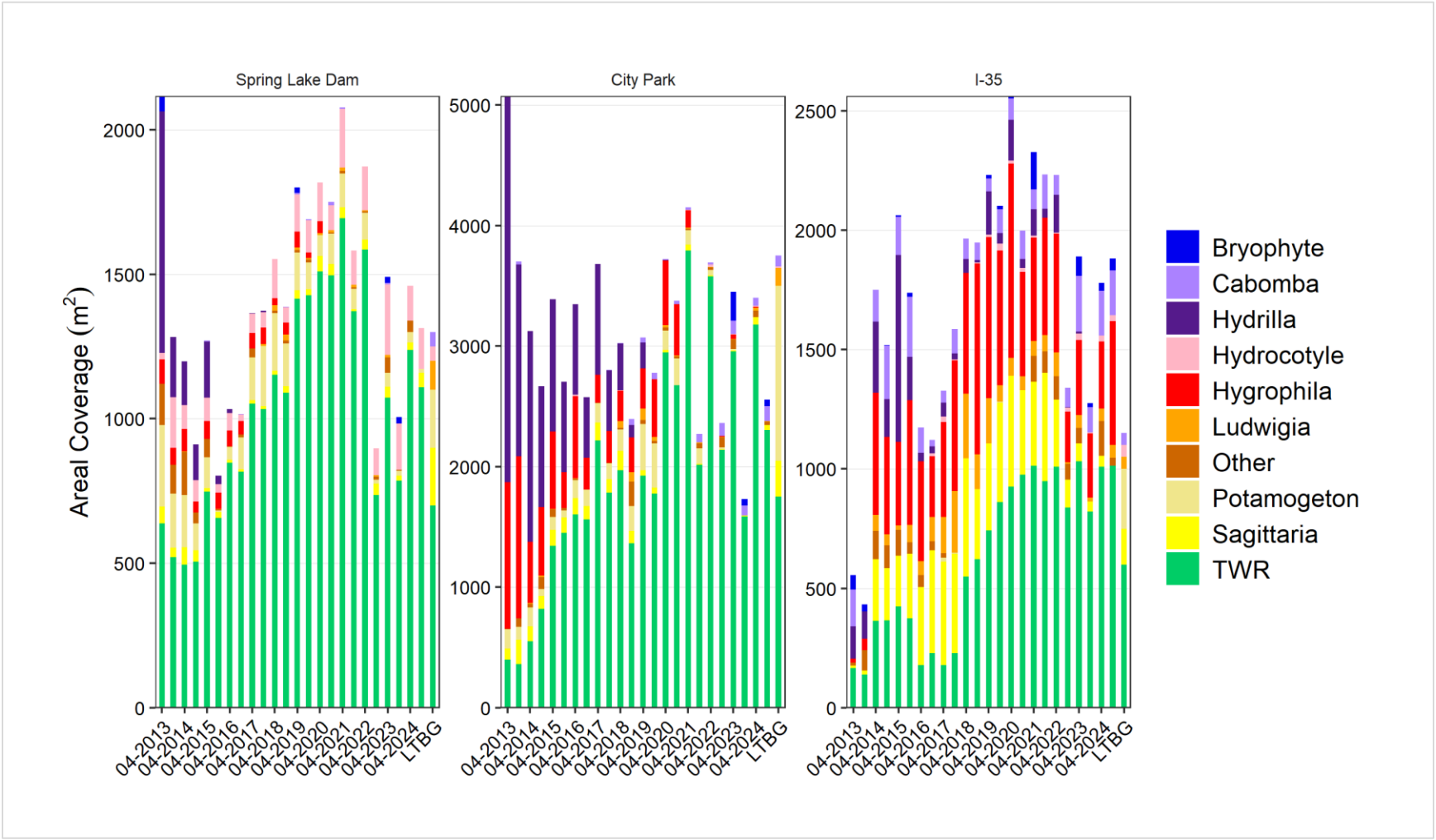


FIGURE 3-2

Submerged Aquatic Vegetation Coverage of Selected Plant Species in the Long-Term Biological Goal Reaches of the San Marcos Springs System, 2013–2024

Species coverage data are from routine spring/fall biological monitoring mapping events. Long-Term Biological Goals are represented in the stacked bar at the far right of each chart.



3.2 Comal Springs Riffle Beetle

Comal Springs riffle beetle
Heterelmis comalensis
ENDANGERED

LTBGs for the Comal Springs riffle beetle (CSRB) include habitat- and population-based goals (**TABLE 3-3**) that depend on key management objectives to maintain silt-free habitat in three sample reaches in Landa Lake: Spring Run 3, the Western Shoreline, and Spring Island. The habitat-based LTBG seeks to maintain silt-free habitat conditions via continued springflow, riparian zone protection, and recreation control. The population-based LTBG is maintaining CSRB median densities greater than or equal to those observed from 2006 to 2012 in the EAA Variable Flow Study. **FIGURE 3-3** compares the 2024 CSRB sampling results to the population-based LTBGs at each sample reach.

Key management objectives guide Conservation Measures listed in **TABLE 2-5** to restore riparian habitat and maintain water quality conditions for the CSRB. Active riparian habitat restoration occurs adjacent to spring openings in Spring Run 3 and along the western shoreline of Landa Lake to limit sedimentation following rainfall events. Historically, these locations have been identified as CSRB habitat. Spring openings continue to be monitored for water quality constituents measured in the EAA Variable Flow Study to ensure Edwards Aquifer water quality does not exceed a 10% daily average deviation from historical long-term average water quality conditions. Water quality monitoring results are described in **SECTION 3.1** and Appendix F2.

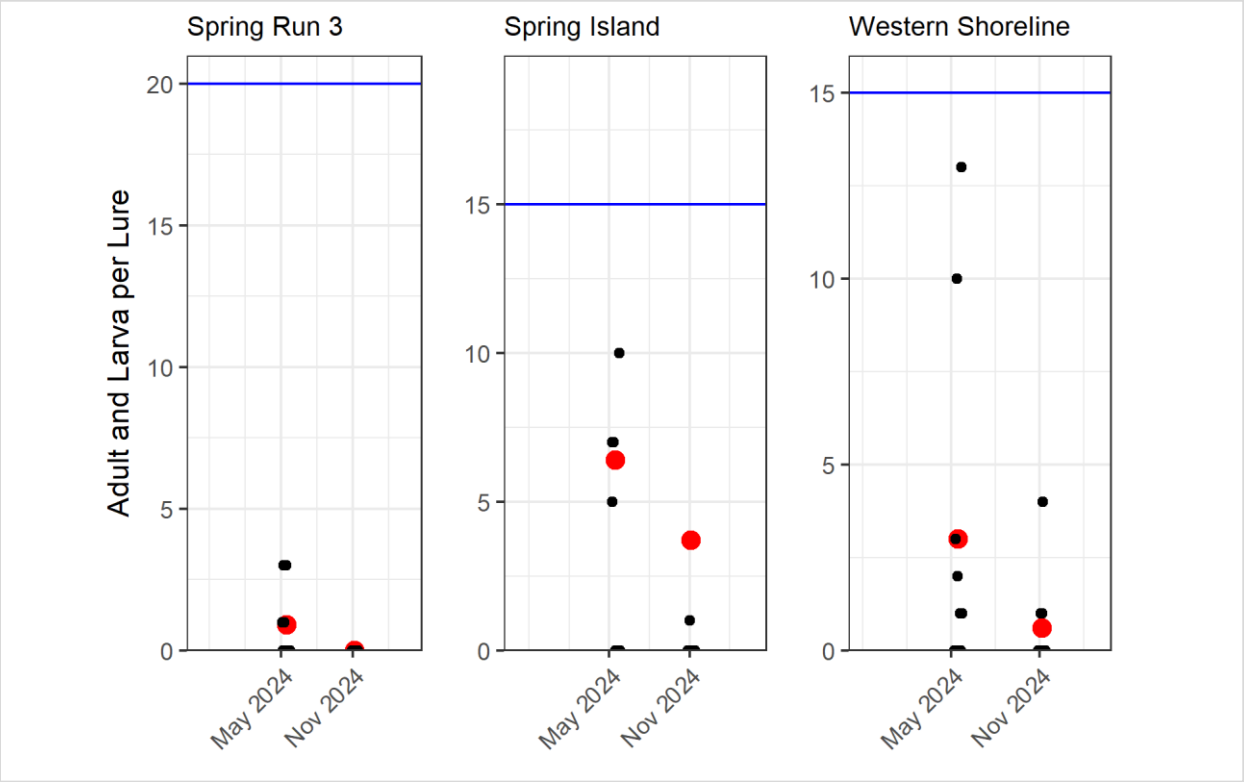
As noted by the National Academies of Science (2018), no quantitative assessments have been performed to establish the effectiveness of Conservation Measures in reducing sedimentation in the gravel and cobble substrates that are CSRB habitat.

TABLE 3-3
Comal Springs Riffle Beetle Long-Term Biological Goals

	Spring Run 3	Western Shoreline	Spring Island Area
Habitat	Silt-free gravel and cobble substrate ≥ 90% of each study area		
Density (# of individuals/lure)	≥ 20	≥ 15	≥ 15

FIGURE 3-3
Comal Springs Riffle Beetle Results from Cotton Lure Biological Monitoring in Landa Lake

Long-Term Biological Goals are displayed as a horizontal line. The seasonal averages of adults and larva per lure sampled in 2024 are displayed as red dots; some maximum values are not displayed.



3.3 Comal Springs Dryopid Beetle and Peck's Cave Amphipod

Comal Springs dryopid beetle
Stygoparnus comalensis
ENDANGERED

Peck's cave amphipod
Stygobromus pecki
ENDANGERED

LTBGs for Comal Springs dryopid beetle and Peck's cave amphipod depend on maintaining water quality conditions consistent with historical water quality conditions. They are not dependent on key management objectives explicitly identified in the EAHCP. Similar to other LTBGs related to water quality, water quality constituents measured in the EAA Variable Flow Study are not to exceed a 10% daily average deviation from historically recorded long-term average conditions. Water quality monitoring results are presented in **SECTION 3.1** and Appendix F2.

3.4 Texas Wild-Rice

Texas wild-rice
Zizania texana
ENDANGERED

TABLE 3-4 identifies the LTBGs and the 2024 coverage based on the annual summer survey for Texas wild-rice (TWR) in segments of the San Marcos River where EAHCP mitigation and management activities occur. The TWR LTBG is accompanied by three key management objectives and Conservation Measures to protect and restore TWR. The first focuses EAHCP TWR restoration and expansion efforts on high-quality habitat areas that are monitored annually, the second defines a minimum coverage of TWR during **low-flow conditions**, and the third includes activities to promote awareness of TWR during all flows and designated controls to limit the impacts of recreation during low flows.

High recreational use of TWR-occupied habitat occurs throughout the San Marcos River. Signs are placed throughout the river to educate users and promote protection of TWR. To reduce the impacts of recreation during low-flow conditions, rope exclosures were installed around select TWR stands in 2024 in accordance with EAHCP § 5.6.1 and in support of TWR LTBGs and key management objectives.

TABLE 3-4
Texas Wild-Rice Long-Term Biological Goals and 2024 Coverage

River Segment	Goal Areal Coverage (m^2)	2024 Areal Coverage (m^2)	Goal Percentage of Total Areal Coverage	2024 Percent of Total Areal Coverage
Spring Lake	1,000–1,500	133	N/A	1
Spring Lake Dam to Rio Vista Dam	5,810–9,245	9,582	83–66	85
Rio Vista Dam to IH-35	910–1,650	986	13–12	9
Downstream of IH-35	280–3,055	571	4–22	5
TOTALS	**8,000–15,450**	**11,272**	**100**	**100**

Abbreviations
m^2 = square meter; N/A = not applicable

3.5 San Marcos Salamander

San Marcos salamander
Eurycea nana
THREATENED

LTBGs for the San Marcos salamander include habitat- and population-based goals (**TABLE 3-5**) that depend on key management objectives to maintain silt-free habitat conditions through aquatic gardening of Spring Lake and limiting the impacts of recreation by using state scientific area exclusions at flows less than 120 cfs in the eastern spillway below Spring Lake Dam.

The habitat-based LTBG seeks to maintain silt-free habitat conditions in three sample reaches where the San Marcos salamander is known to live (the hotel area of Spring Lake, in the riverbed area of Spring Lake, and in the eastern spillway below Spring Lake Dam). This LTBG is achieved via maintaining springflow, riparian zone protection, and recreation control. The population-based LTBG seeks to maintain a median density of San Marcos salamanders greater than or equal to that

observed in these three sample reaches during monitoring from 2002 to 2012. **FIGURE 3-4** illustrates 2024 biological monitoring results compared with the LTBGs at each location.

FIGURE 3-4 also illustrates sampling and seasonal variability. Random square meter areas are selected within known habitat to spot San Marcos salamanders. Variability is inherent in this approach, and as seen in the hotel area, the number of individuals collected during one event may be very different from the next sampling event. Over the course of implementation, salamander densities have fluctuated but are generally within range of the LTBGs at all three sampling locations.

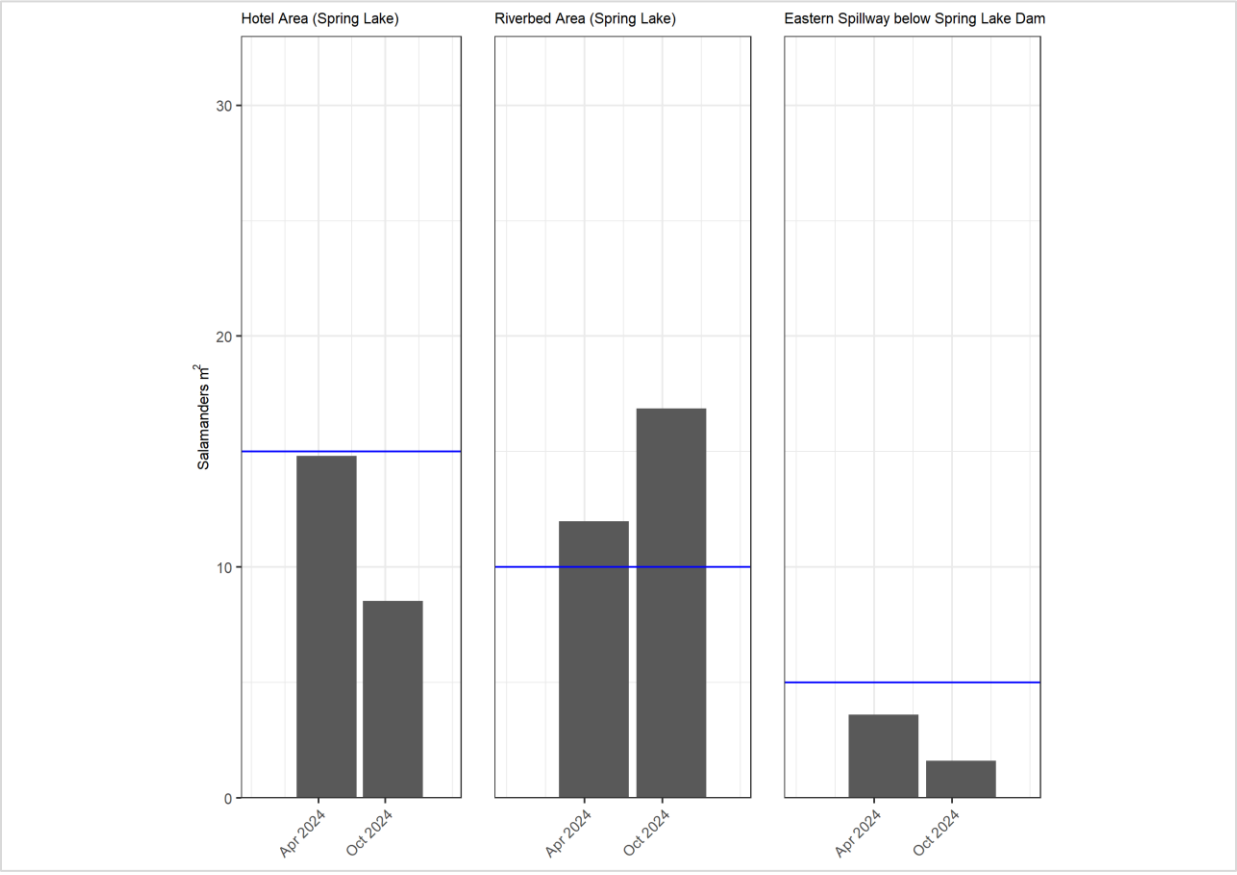
TABLE 3-5
San Marcos Salamander Long-Term Biological Goals

	Hotel Area (Spring Lake)	Riverbed Area (Spring Lake)	Eastern Spillway below Spring Lake Dam
Habitat	Silt-free gravel and cobble substrate ≥ 90% of each study area		
Density (# of individuals/m^2)	≥ 15	≥ 10	≥ 5

Abbreviation
m^2 = square meter

FIGURE 3-4
San Marcos Salamander Results from 2024 Biological Monitoring in the San Marcos River

Long-Term Biological Goals are displayed as horizontal blue lines.



3.6 Texas Blind Salamander

Achieving LTBGs for Texas blind salamanders depends on water quality constituents measured in the EAA Variable Flow Study. Water quality is not to exceed a 10% daily average deviation from the historical long-term average water quality conditions within the Edwards Aquifer as measured from the spring openings in Spring Lake. No specific key management objectives are listed in the EAHCP for the Texas blind salamander. Water quality monitoring results are presented in **SECTION 3.1**.

Texas blind salamander
Eurycea rathbuni
ENDANGERED

3.7 Flow Objectives

Flow protection Conservation Measures—Aquifer Storage & Recovery (ASR), VISPO, the Regional Water Conservation Program, and critical period management—were developed to achieve flow objectives. **TABLE 3-6** identifies the flow objectives included in the EAHCP. The long-term average flow objectives, based on the entire USGS flow record for each gage (dating back to the 1940s) have been met to date, while minimum flow objectives remain subject to hydrological variability and implementation of conservation measures. Groundwater modeling, which assumes DOR conditions, predicts that these measures can help maintain flow objectives, but future pumping levels will depend on continued implementation and prevailing conditions. In 2019, the overall VISPO goal was increased to 41,795 ac-ft, supporting modeled minimum springflow objectives at Comal Springs.

TABLE 3-6
Flow Objectives for All Covered Species–Comal and San Marcos Springs

Flow Objectives	Comal Springs	San Marcos Springs
Long-term average flow	Daily average of 225 cfs total **Comal discharge**	Daily average of 140 cfs total **San Marcos discharge**
Minimum flow	Daily average of 30 cfs total Comal discharge not to exceed a period of 6 months followed by average daily flows of 80 cfs for 3 months	Daily average of 45 cfs total San Marcos discharge not to exceed a period of 6 months followed by average daily flows of 80 cfs for 3 months

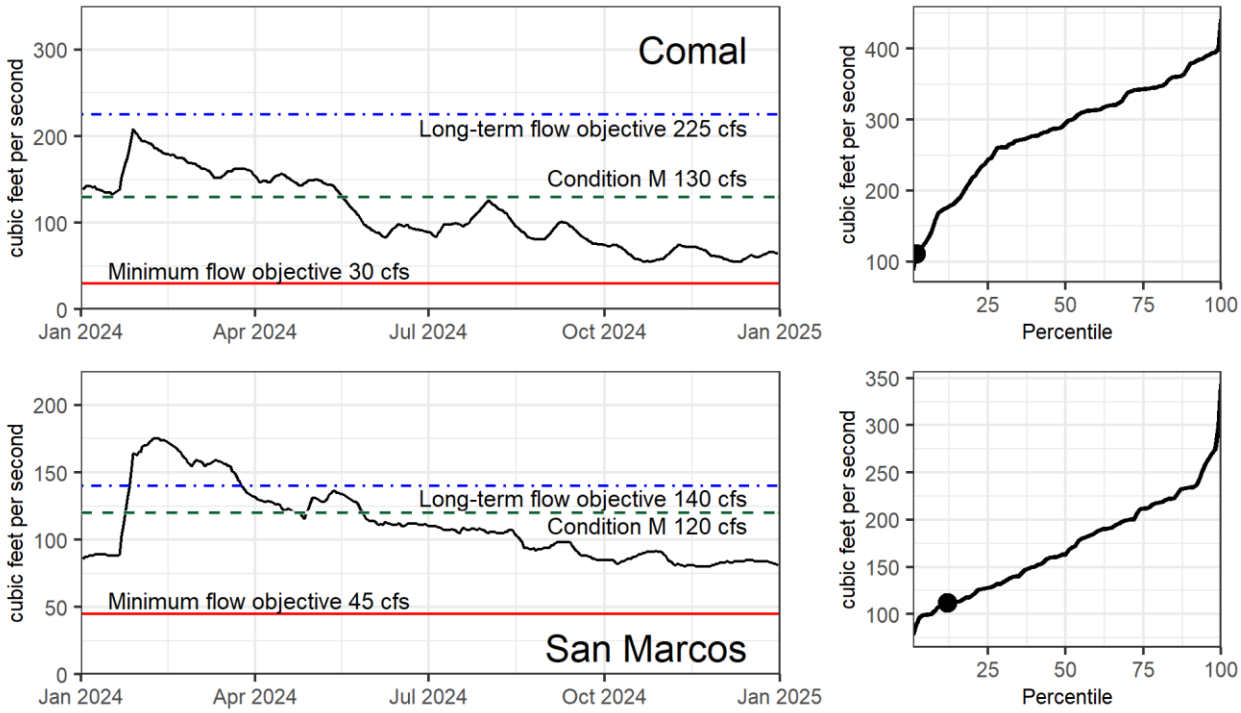
Abbreviation
cfs = cubic feet per second

FIGURE 3-5 illustrates daily average flows (plots on the left) and the average calendar year springflow as a percentile for the period of record (plots on the right) for the Comal and San Marcos rivers in 2024. Comal and San Marcos springflows started the year below Condition M levels (130 cfs and 120 cfs, respectively); restoration activities were limited in accordance with the ITP. Rainfall in the region recharged the aquifer and increased springflow at both springs systems to above Condition M levels and Condition M restrictions were lifted in February, then reinstated in summer as the region experienced below-average rainfall and above-average temperatures. The lowest daily average springflow recorded in 2024 was 55 cfs for the Comal River on 6 days during October and December and 80 cfs for the San Marcos River on 9 days in November.

FIGURE 3-5

Springflow Hydrographs for Comal and San Marcos Springs for Calendar Year 2024 (USGS 08168710 and USGS 08170000)

Plots on the left display daily average flow. EAHCP benchmarks are shown in colored straight lines. Plots on the right display percentile curves of average calendar year springflow for the period of record at the gage. 2024 average springflow is marked with a dot.



4 | 2024 Annual Take and Net Disturbance Estimates

CHAPTER OVERVIEW

- In the Comal Springs system, Covered Activities resulted in take of 41,197 fountain darters, 1,500 Comal Springs riffle beetles, 8 Comal Springs dryopid beetles, and 32 Peck's cave amphipods.
- In the San Marcos Springs system, Covered Activities resulted in take of 21,252 fountain darters and 36 San Marcos salamanders.
- Severe drought conditions reduced large portions of the occupied habitat, leading to habitat loss. Per Condition M of the Incidental Take Permit, restoration efforts were restricted from summer through the end of 2024 to limit additional disturbance. The USFWS approved planting of aquatic vegetation in select sections of the San Marcos River using methods that caused minimal disturbance.
- Minimization and mitigation activities resulted in a net disturbance of <0.5% of fountain darter occupied habitat in the Comal Springs system. In the San Marcos Springs system activities resulted in a net disturbance of <0.5% of fountain darter habitat and 0% of San Marcos salamander habitat.
- Aquatic recreation in the San Marcos River caused disturbance to submerged aquatic vegetation within the City Park Long-Term Biological Goal Reach. However, floating buoys, signage, and restrictive fencing helped protect and reduce impacts on vulnerable stands of Texas wild-rice and other aquatic vegetation in the Spring Lake Dam Long-Term Biological Goal Reach and other sections of the river.

Condition H of the ITP authorizes incidental take and explicitly defines the amount of incidental take authorized over the Permit Term. Condition M of the ITP limits occupied habitat disturbance, specifying that over any given year, no more than 10% of the occupied habitat of a Covered Species can be affected by minimization and mitigation activities intended to contribute to species recovery.

Both incidental take and net disturbance are evaluated on an annual basis and reported to the USFWS (**TABLE 4-1**). To calculate the total amount of take for 2024, incidental take associated with non-mitigation/restoration Covered Activities was characterized and quantified to the degree practical and added to the incidental take calculated from disturbed areas, or habitat loss. The detailed description of methodologies and species-specific results of the 2024 incidental take and net disturbance assessments are included in Appendix J.

The EAHCP measures take based on changes in occupied habitat in the San Marcos Springs and Comal Springs systems. While annual incidental take has generally followed long-term trends over the life of

the ITP, 2024 saw a significant deviation due to severe drought conditions and low springflow, which exposed previously wetted habitat and led to elevated take estimates.

In both systems, take was highest for fountain darters among all Covered Species, with notably elevated values in the Comal System. The 2024 fountain darter take estimate (41,197 individuals) was considerably higher than the 12-year average (185,482 individuals total), reflecting the extreme conditions and associated habitat loss. Similarly, take estimates for the Comal Springs riffle beetle were elevated compared to prior years, likely due to reduced spring discharge and prolonged low-flow conditions affecting critical microhabitats.

Fountain darter occupied habitat is an extensive area where Conservation Measures related to submerged aquatic vegetation support fountain darter resilience. However, low-flow conditions in 2024 were extreme, resulting in a pronounced decrease in occupied fountain darter habitat between spring and fall. In the San Marcos River, this effect was compounded by seasonal recreation impacts, which can contribute to habitat disturbance in already stressed conditions.

This decrease in wetted available habitat accounts for the majority of the fountain darter take in 2024. From 2014 through 2024, San Marcos fountain darter take each year on average was 21,296 individuals. As noted in **TABLE 4-1**, San Marcos fountain darter take in 2024—as measured by the reduction in habitat due to drought and recreation—was 18,553 individuals or approximately 87% of the total take for San Marcos fountain darter in 2024. **TABLE 4-1** also shows total take available for implementation of the EAHCP over the remaining Permit Term.

TABLE 4-1

Summary of 2024 Impacted Habitat, Net Disturbance, and Incidental Take for EAHCP Covered Species Compared against Maximum Permit Amounts

Covered Species per System	EAHCP Mitigation/ Restoration		EAHCP Measures/ Drought	Combined Impacted Habitat 2024 Total (m^2)	Incidental Take		2024 Incidental Take Total	Permitted Maximum Take	Accumulated Take to Date	Remaining Permitted Take
	Impacted Habitat (m^2)	Net Disturbance % of Total Occupied Habitat	Impacted Habitat (m^2)		EAHCP Mitigation/ Restoration	EAHCP Measures/ Drought				
Comal Springs System										
Fountain darter	380	<0.5%	540	920	570	40,627	41,197	797,000	185,482	611,518
Comal Springs riffle beetle	0	0%	227.3	227.3	0	1,500	1,500	11,179	7,036	4,143
Comal Springs dryopid beetle	0	0%	76.6	76.6	0	8	8	1,543	41	1,502
Peck's cave amphipod	0	0%	30.9	30.9	0	32	32	18,224	1,238	16,986
San Marcos Springs System										
Fountain darter	830	<0.5%	5,307.6	6,137.6	2,689.5	18,553.2	21,252	549,129	255,575	293,554
San Marcos salamander	0	0%	12	12	0	36	36	263,857	7,760	256,097
Texas blind salamander	0	0%	0	0	0	0	0	10	0	10
Comal Springs riffle beetle	0	0%	0	0	0	0	0	N/A	0	N/A
Comal Springs dryopid beetle	0	0%	0	0	0	0	0	N/A	0	N/A

Abbreviations

m^2 = square meter; N/A = not applicable

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5 | Program Management, Financial Report, and Committee Activities

CHAPTER OVERVIEW

- In 2024, EAHCP staff organized a total of 25 public meetings for EAHCP Committees (Implementing, Stakeholder, and Science), Work Groups (Budget, Science Committee Vacancy, and Comal Springs Riffle Beetle), and a Subcommittee (Conservation Measures).
- For the Permit Renewal process:
  - ICF and BIO-WEST revised a Biological Goals and Objectives memorandum with Committee input, incorporating additional Science Committee recommendations; the Implementing Committee approved the revised memorandum on April 11.
  - EAA modeling experts and consultants produced three reports on future Edwards Aquifer conditions to inform the preliminary incidental take assessment.
  - The Conservation Measures Subcommittee, formed in December 2023, met nine times in 2024 to review and recommend updates.
  - ICF and BIO-WEST drafted and refined memoranda summarizing the incidental take assessment and Conservation Measures recommended by the Subcommittee; both memoranda will be shared with Committees in spring 2025.
- The EAHCP Program is fiscally stable with a reserve balance of $9,156,929 and a $20,010,647 cash balance. There are adequate funds for fiscal year 2025.

5.1 Program Management

General management and oversight of the EAHCP is administered through the EAA pursuant to Section 2.2 of the FMA. EAA's responsibilities include facilitating the employment of the Program Manager,[3] who is responsible for managing the EAHCP Program (Program) and ensuring compliance with all relevant Program documents. Section 5.6.5 of the FMA allows for use of EAHCP monies to fund EAA administrative costs and employee salaries, so long as all incurred costs, including salaries, are not used (with certain exceptions) for the costs of non-EAA Permittees' employees or administrative costs relative to the EAHCP.

[3]Although referred to in the FMA as the *Program Manager*, the title for this position under the EAA organizational structure is *Executive Director—Threatened and Endangered Species*.

In 2024, full-time Program staff consisted of the Program Manager, Chief Science Officer (an EAA-funded position), Contract Administrator, Environmental Scientist (an EAA-funded position), and two Program Coordinators.

5.1.1 Management Activities and Special Projects

Program management activities performed in 2024 included coordination with Permittees in accordance with the ITP, Implementing Agreement, EAHCP, FMA, and other Program documents. Program staff coordinated IC, Adaptive Management Stakeholder Committee (SH), Adaptive Management Science Committee (SC), and Work Group and Subcommittee activities (see **SECTION 5.3**) and emailed monthly reports on EAHCP activities to all Committee members. To promote engagement and provide transparency, Program staff communicated activities to the public and stakeholders through the EAHCP website, *EAHCP Steward* newsletter, EAA's *News Drop Magazine*, and *EAHCP Conserve* newsletter (see **SECTION 5.1.3)**.

Several special projects were initiated, advanced, or completed in 2024. EAHCP staff continued the **Permit Renewal** for the EAHCP, a multi-year planning process to complete a major amendment of the ITP to extend the permit duration beyond its expiration in 2028. To support the Permit Renewal effort, a contractor (ICF) was selected in early 2022 following a competitive bid process. Appendices F5 and F6 include the Permit Renewal Work Plan and Schedule. In 2024, the EAHCP Program Manager, Program staff, and Permittees worked with ICF to evaluate future Biological Goals and Objectives, modeled future climate conditions, incidental take assessment methodologies, and proposed Conservation Measures. Recommendations and proposed changes for the EAHCP Program were summarized in a memorandum and reports that were reviewed by EAHCP staff, Permittees, the USFWS, and all EAHCP Committee members. The Biological Goals and Objectives memorandum and modeling reports are in Appendices F7–F10 and are also available on the EAHCP Permit Renewal website, eahcprenewal.org. Program staff also coordinated refugia activities with the USFWS at the San Marcos Aquatic Resources Center and Uvalde National Fish Hatchery.

In fall 2022, the EAA was awarded an ESA Section 6 HCP Planning Assistance Grant through the Cooperative Endangered Species Fund to help fund the Permit Renewal process. The fund is administered through the TPWD, and funding was distributed in summer 2023 and covers a portion of Permit Renewal administrative costs through 2026. The first full year of reimbursed Permit Renewal activities was 2024; an annual report was submitted to the TPWD summarizing Permit Renewal activities.

5.1.2 Program Funding Applications and Work Plans

Program staff worked with Permittees throughout the year to reimburse and implement activities defined in annual Work Plans. **CHAPTER 2** summarizes these activities as amended and approved by the IC and EAA Board of Directors; 2024 Work Plans are included in Appendix E.

5.1.3 Outreach

Focusing on Reuse
Mark Enders, EAHCP Program Manager for the City of San Marcos, shows off the new Reuse at the River signs and his reusable cup. The EAHCP sign is just behind him.

The Program has several platforms to inform stakeholders about the Covered Species and the work performed to protect them. Each year Program staff work with a contractor to produce the *EAHCP Steward* newsletter and accompanying podcast, which are published every 2 months. The *EAHCP Steward* highlights collaborative efforts to protect the threatened and endangered species that inhabit the Edwards Aquifer and the Comal and San Marcos springs systems. Each newsletter features a story about a conservation activity, contractor, volunteer organization, or dedicated individual working to support and/or implement Conservation Measures or to protect the Edwards Aquifer. In 2024, six *EAHCP Steward* newsletters and podcasts were published covering a range of stakeholder- and public-interest topics such as the 2024 Permit Renewal activities, including climate change modeling and Conservation Measure development; the new disposable container ordinance in San Marcos; the naming of the Edwards Aquifer Refugia Program as USFWS's Region 2 Team of the Year; and San Marcos aquatic and riparian restoration, funded by the TPWD, TXST, and U.S. Army Corps of Engineers. The EAA also publishes a quarterly magazine entitled *News Drop Magazine* and a bi-monthly newsletter entitled *EAHCP Conserve*. In 2024, various articles in the *News Drop Magazine* summarized EAHCP progress on the Permit Renewal process and milestones achieved. *EAHCP Conserve*, which is distributed to groundwater withdrawal permit holders, focused in part on increasing participation of groundwater withdrawal permit holders in the ASR and VISPO Conservation Measures.

Additionally, Texas Country Reporter and Texas Monthly featured EAHCP non-native animal control contractor, Atlas, for its polespear tournaments that target non-native, invasive plecostomus and tilapia in the San Marcos River.

5.1.4 Permit Oversight

Each year Program staff work with two contractors to monitor and track the status of local, state, and federal permits necessary to implement Conservation Measures. A permit tracking matrix was maintained to monitor and track the status of permits. To ensure compliance with other local, state, and federal permit requirements, contractors also reviewed restoration plans, monitored construction projects, coordinated annual EAHCP activities with the Texas Historical Commission, and coordinated with the U.S. Army Corps of Engineers for Nationwide Permit No. SWF-2012-00240 for Sessom Creek Phase 2. The Texas Historical Commission and U.S. Army Corps of Engineers coordination letters are provided in Appendix K1–K3.

5.2 Financial Report

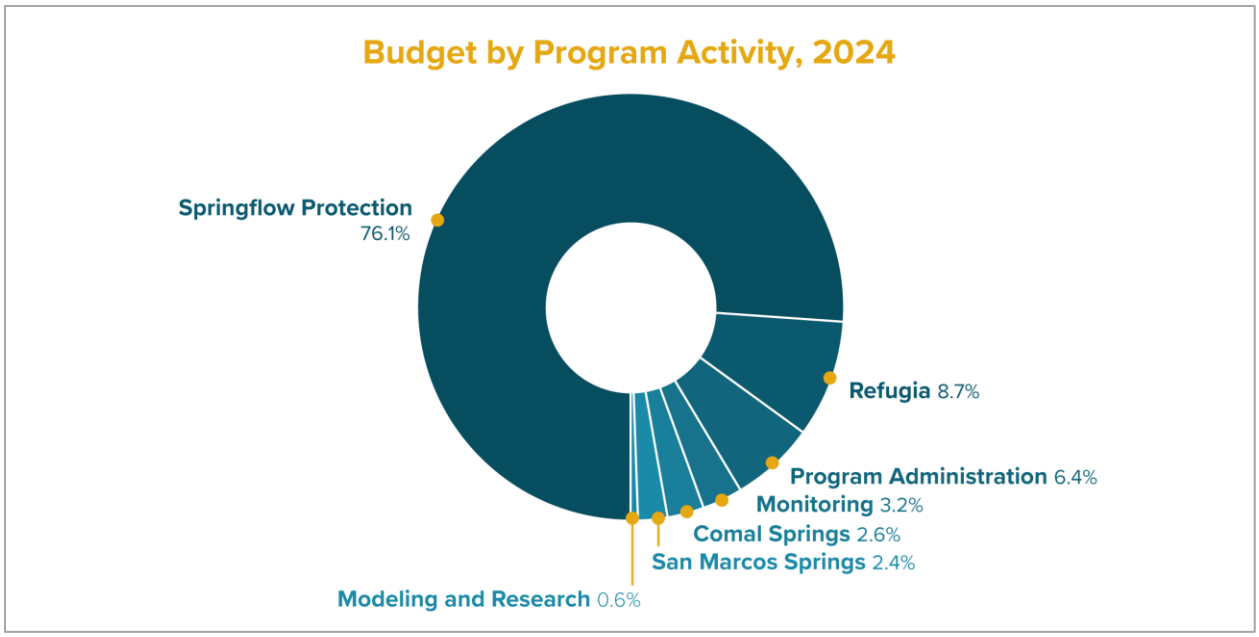
The current financial projections and cost estimates indicate an overall fiscally stable EAHCP with an adequate budget for the Program in fiscal year 2025. The Program is fiscally stable with a reserve balance of $9,156,929 and a $20,010,647 cash balance, as of December 31, 2024. If triggered by drought, ASR and VISPO forbearance payments are the largest expense. ASR forbearance did not trigger in 2024. VISPO triggered in October 2023 and October 2024, requiring the EAA to issue VISPO forbearance payments in 2024 and 2025.

Section 6.1 of the FMA specifies that the EAA Board of Directors approves each Permittee's Program Funding Application budget in the fall of the year prior to implementation. A Program Funding Application is the mechanism by which a Permittee requests funding to implement the Conservation Measures or other Program-related activities. The EAA Board of Directors approved the 2024 Program Funding Applications for Permittees at its meeting on November 14, 2023.

Amendments to the EAA, CONB, and COSM Program Funding Applications were approved by the EAA Board of Directors in 2024. Other transfers between various accounts for reclassification of expenditure needs were made but did not require approval from the EAA Board of Directors. The amendments and transfers are identified in the EAHCP Financial Report (Appendix L). The EAHCP Financial Report shows the EAHCP funding amounts for 2024 totaling $21,341,216.

FIGURE 5-1 reflects the 2024 EAHCP Program budget by EAHCP activity. The largest portion of the EAHCP budget in 2024 went to Springflow Protection Measures (VISPO and ASR). A significant portion of Program Administration funding in 2024 was set aside for the Permit Renewal. Permit Renewal expenses incurred in 2023 through 2026 will be reimbursed and covered up to $1,000,000 through the recently awarded HCP Planning Assistance Grant.

FIGURE 5-1
2024 EAHCP Program Budget by Program Activity



5.3 Committee Activities

Committee meetings throughout 2024 maintained accountability and transparency to the public in accordance with the following:

- The FMA
- *Operational Procedures of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program* (March 2012)
- *Parliamentary Rules of Conduct of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program* (March 2012)
- *Program Operational Rules for EAHCP Program Adaptive Management Stakeholder Committee Members and Participants* (Revised May 2022)
- *Operational Procedures of the Science Committee of the Edwards Aquifer Habitat Conservation Plan Program* (April 2014)

Agendas and notices for all meetings were emailed to a stakeholder listserv in advance of the meetings, and opportunities for public comment were provided at the beginning and end of every meeting. IC, SH, and SC meeting minutes and video recordings were posted on EAA Granicus System. Work Group and Subcommittee meetings were recorded and provided on their respective websites or to stakeholders as requested.

In total, eight IC meetings, three SH meetings, and three SC meetings were facilitated; of these, two were joint meetings of the IC and SH, and one was a joint committee meeting of the IC, SH, and SC (**TABLE 5-1**).

Additionally, Program staff organized the meetings of three Work Groups and one Subcommittee—Budget Work Group, SC Vacancy Work Group, CSRB Work Group, and the Conservation Measures Subcommittee.

TABLE 5-1
2024 EAHCP Committee Meetings

Date	Committee(s)	Actions, Reports, or Other Notable Items
February 1	IC, SH	▪ USFWS report on the proposed listing of toothless and widemouth blindcats, San Marcos gambusia delisting, 5-year reviews, and species status assessments ▪ Approved amendments to the 2024 CONB and COSM/TXST Work Plans and Funding Applications ▪ Reports on the Permit Renewal modeling process and Biological Goals and Objectives memorandum
March 7	SC	▪ Approved the 2024 and 2025 SC Chair and Vice-Chair ▪ Reports on the revised Biological Goals and Objectives, and temperature and rainfall projections for the Permit Renewal
March 28	IC	▪ Report on the 2023 EAHCP net disturbance and incidental take ▪ Approved submittal of the 2023 EAHCP Annual Report to the USFWS
April 11	IC	▪ Report on amendments to the 2024 EAA Work Plan and Funding Application ▪ Report on the SC's comments on the proposed Biological Goals and Objectives ▪ Approved the Biological Goals and Objectives memorandum for use in the Permit Renewal process
April 18	SC	▪ Report from the Permit Renewal Hydrological Modeling Team to the SC regarding modeled conditions and projections under consideration for the initial preliminary take assessment
May 23	IC	▪ Reports on Permit Renewal process and 2023 Edwards Aquifer groundwater use ▪ Report on revisions to the COSM Conservation and Drought Contingency Ordinance that reduced the number of COSM drought stages from five to three ▪ Approved amendments to the 2024 EAA Work Plan and Funding Application ▪ Approved the 2025 EAA, COSM/TXST, and CONB Work Plans
July 25	IC, SH	▪ Reports on Permit Renewal and Conservation Measures Subcommittee process ▪ Approved the SC Vacancy Work Group charge ▪ Report on recommended springflow simulations for the initial preliminary take assessment for the Permit Renewal
September 5	SC	▪ Reports on Permit Renewal process; San Marcos salamander monitoring request for proposals; and the USFWS's 5-year reviews, draft recovery plan, and Team of the Year Award ▪ Report on current EAHCP biological monitoring programs and process for developing program changes for the Permit Renewal
September 19	IC	▪ Report on recommended springflow simulations for the initial preliminary take assessment for the Permit Renewal
October 10	IC	▪ Report on Conservation Measures Subcommittee recommendations for the Permit Renewal ▪ Report on 2024 Budget Work Group ▪ Approved amendments to the 2024 EAA and CONB Work Plans and Funding Applications

Date	Committee(s)	Actions, Reports, or Other Notable Items
December 19	IC, SH, SC	▪ Report on SC Vacancy Work Group nomination, Dr. Perkin ▪ Approved Dr. Perkin to join the SC as fish conservation expert ▪ Report on Permit Renewal 2024 progress and next steps for 2025 ▪ Report on CSRB Work Group and applied research ▪ Approved amendments to the 2025 EAA and CONB Work Plans

Abbreviations

CONB = City of New Braunfels; COSM = City of San Marcos; CSRB = Comal Springs riffle beetle; EAA = Edwards Aquifer Authority; IC = Implementing Committee; SC = Adaptive Management Science Committee; SH = Adaptive Management Stakeholder Committee; TXST = Texas State University; USFWS = U.S. Fish & Wildlife Service

5.3.1 Implementing Committee

Implementation of the EAHCP is supervised by the IC to ensure compliance with the ITP, EAHCP, FMA, and other Program documents. Five voting members represent the five Permittees, and in 2024 one non-voting member from the Guadalupe-Blanco River Authority served on the IC. **TABLE 5-2** lists 2024 IC members.

In 2024 the IC met in person with a virtual option; eight meetings were in person at the EAA office in San Antonio, the Pauline Espinosa Community Hall in San Marcos, or New Braunfels City Hall. Meeting dates and action items are listed in **TABLE 5-1;** agendas and meeting minutes are provided in Appendix M1.

TABLE 5-2
2024 Implementing Committee Members

Committee Member	Entity	Alternate
Mark Enders [Chair]	City of San Marcos	Shaun Condor
Roland Ruiz [Vice-Chair]	Edwards Aquifer Authority	Marc Friberg
Greg Malatek [Secretary]	City of New Braunfels	Amy Niles
Donovan Burton	San Antonio Water System	Patrick Shriver
Robert Mace, Ph.D.	Texas State University	Carrie Thompson
Jonathan Stinson	Guadalupe-Blanco River Authority	Nathan Pence

5.3.1.1 EAHCP Budget Work Group

For the duration of the ITP, the Budget Work Group's two-part charge is to (1) collaborate with and inform the EAA budget process as it relates to the EAHCP, EAHCP reserve, and EAHCP Aquifer Management Fee and (2) address fiscal issues as they arise and are referred by the IC.

Members of the Budget Work Group for 2024 were Chair Robert Mace (IC), Marc Friberg (EAA designee), Myron Hess (SH), Benjamin Benzaquen (SAWS designee), and Adam Yablonski (SH). The Work Group met on August 28, 2024, to review and discuss the EAA 2025 budget process and to monitor the management of EAHCP revenue and expenses.

The Budget Work Group's report (Appendix M2) describes the current financial projections and cost estimates for the Program for fiscal year 2025. It acknowledges ASR and VISPO trends and notes that Aquifer Management Fee would increase by $2 per ac-ft in 2025, from $88 to $90 per ac-ft, and that the EAHCP budget portion would increase $10 per ac-ft, from $30 to $40 per ac-ft. The report recommends that the IC, EAA Board of Directors, and Program staff continue to monitor the potential drought of record and the impact it would have on the EAHCP reserve funds.

5.3.1.2 Conservation Measures Subcommittee

The Conservation Measures Subcommittee charge (Appendix M3) was approved by the IC on December 14, 2024. Membership includes IC and SH members charged with evaluating current and recommending future Conservation Measures for the Permit Renewal. Membership includes five IC and four SH members appointed by the IC, including Kimberly Meitzen (TXST), Mark Enders (COSM), Phillip Quast (CONB), Linda Bevis (SAWS), Marc Friberg (EAA), Daniel Large (Guadalupe-Blanco River Authority), and SH-appointed representatives Adam Yablonski (agricultural interests), Melani Howard (recreational interests), Myron Hess (environmental interests), and Kerim Jacaman (Bexar County interests). The Subcommittee met nine times in 2024 and focused on habitat restoration, springflow protection measures, refugia operations, and measures that contribute to the recovery of the Covered Species. The Subcommittee recommendations are summarized in Appendix M3.

5.3.2 Adaptive Management Stakeholder Committee

The SH's role is to consult with, advise, and make recommendations on adaptive management decisions (see **SECTION 6.2**); the design of studies related to the LTBGs and key management objectives; and any other matter at the request of the Program Manager or IC. The SH also coordinates with the IC to appoint members to the SC. The organizational makeup of the SH membership is addressed in Section 7.8.1 of the FMA. **TABLE 5-3** lists the 27 SH representatives, their affiliations, and their alternates as of the end of 2024.

In 2024 the SH met three times in person with a virtual option. Meeting dates and action items are listed in **TABLE 5-1**; agendas and meeting minutes are provided in Appendix M4.

TABLE 5-3
2024 Stakeholder Committee Members

Committee Member	Entity	Affiliation	Alternate
Kimberly Meitzen, Ph.D. [Chair]	Texas State University	Texas State University	Robert Mace, Ph.D.
Myron Hess [Vice-Chair]	Texas Living Waters Project	Environmental interest from the Texas Living Waters Project	Jennifer Walker
Patrick Shriver [Secretary]	San Antonio Water System	San Antonio Water System	Brandon Payne
Doris Cooksey	City Public Service Energy	City Public Service Energy	Emily Speed
Melani Howard	Appointed by Texas Parks & Wildlife Department	Recreational interest in the Guadalupe River Basin	Melissa Parker
Javier Hernandez	Edwards Aquifer Authority	Edwards Aquifer Authority	Omar Garcia
Bruce Alexander	East Medina County Special Utility District	Holder of an **Initial Regular Permit** issued by the Edwards Aquifer Authority for a retail public utility located west of Bexar County	No alternate named
Kevin Mayes	Texas Parks & Wildlife Department	Texas Parks & Wildlife Department	Shannon Love
Buck Benson	Barton Benson Jones PLLC	Holder of an Initial Regular Permit issued by the Edwards Aquifer Authority for industrial purposes	Shanna Castro/Paul Hunt
Ryan Kelso	New Braunfels Utilities	Retail public utility in whose service area the Comal Springs or San Marcos Springs is located	Michael Short
John Byrum	Nueces River Authority	Nueces River Authority	No alternate named
James Dodson	City of Victoria	Holder of a municipal surface water right in the Guadalupe River Basin	No alternate named
Phillip Quast	City of New Braunfels	City of New Braunfels	Amy Niles
Rader Gilleland	Gilleland Farms	Holder of an Initial Regular Permit issued by the Edwards Aquifer Authority for irrigation	Adam Yablonski
Kerim Jacaman	Bexar County	Bexar County	Renee Green

Committee Member	Entity	Affiliation	Alternate
David Heier	City of Garden Ridge	Holder of an EAA Initial Regular Permit issued to a small municipality (population under 50,000)	No alternate named
Cindy Hooper	Texas Commission on Environmental Quality	Texas Commission on Environmental Quality	Abiy Berehe
Mark Enders	City of San Marcos	City of San Marcos	Shaun Condor
David Villarreal	Texas Department of Agriculture	Texas Department of Agriculture	Addie Stone
Jason Ammermann	DOW Chemical	Holder of an industrial surface water right in the Guadalupe River Basin	Stephen Van Geffen
Brian Mast	San Antonio River Authority	San Antonio River Authority	Shaun Donovan
Gary Middleton	South Central Texas Water Advisory Committee	South Central Texas Water Advisory Committee	No alternate named
Carol Patterson	Regional Clean Air and Water	Edwards Aquifer region municipal ratepayers/general public	Kirk Patterson
Nathan Pence	Guadalupe-Blanco River Authority	Guadalupe-Blanco River Authority	Chad Norris
Ray Joy Pfannstiel	Guadalupe County Farm Bureau	Agricultural producer from the Edwards Aquifer region	Gary Schlather
Humberto Ramos	Guadalupe Basin Coalition	Guadalupe River Basin municipal ratepayers/general public	Mike Dussere
Rachel Sanborn	San Marcos River Foundation	Conservation organization	Virginia Parker

5.3.2.1 Science Committee Vacancy Work Group

The SC Vacancy Work Group reconvened in 2024 to recommend someone to fill a vacant SH-appointed position on the SC. The vacant SC position was previously held by TPWD's native fish expert, Megan Bean, who accepted a position with the USFWS overseeing implementation of the EAHCP. The SH approved the Work Group charge on July 25, 2024, and the Work Group met once on August 29, 2024. The Work Group unanimously recommended Dr. Josh Perkin, Associate Professor in the Department of Ecology and Conservation at Texas A&M University, to fill the vacancy. Dr. Perkin has extensive knowledge of the San Marcos and Comal systems and has researched non-native fish within the San Marcos River. The Work Group report includes the agenda, meeting minutes, presentation, and Dr. Perkin's curriculum vitae (Appendix M5). The report was provided to the SH at its December meeting and the recommendation was approved; Dr. Perkin will join the SC in 2025.

SH-appointed members included Kevin Mayes (TPWD), Rachel Sanborn (San Marcos River Foundation), Dr. Kimberly Meitzen (TXST), Patrick Shriver (SAWS), and Shaun Donovan (San Antonio River Authority). SC Vacancy Work Group materials are included in Appendix M5.

5.3.3 Adaptive Management Science Committee

The SC comprises 11 experts with technical expertise in one or more of the following areas: the Edwards Aquifer or its management, the Comal Springs and Comal River, the San Marcos Springs and San Marcos

River, the Covered Species, or experimental design and data. The SC serves as an independent scientific panel to advise, consult, and provide recommendations to the SH and IC. The SC members for 2024 are listed in **TABLE 5-4**.

In 2024 the SC met twice in person with a virtual option and participated in the December Joint Committee meeting. Meeting dates and action items are listed in **TABLE 5-1**; meeting materials are provided in Appendix M6. The SC reviewed the proposed Biological Goals and Objectives, and their comments were captured in a memorandum in Appendix M7.

TABLE 5-4
2024 Science Committee Members

Committee Member	Entity	Expertise	Nominating Entity
Jacquelyn Duke, Ph.D. [Chair]	Baylor University	Stream Ecology–Riparian Ecohydrology	IC
Charlie Kreitler, Ph.D. [Vice-Chair]	LBG-Guyton Associates (Retired)	Hydrogeology–Groundwater Science	IC
Chad Norris, M.S.	Guadalupe-Blanco River Authority	Aquatic Biology–Aquatic Invertebrate Specialist	SH
Butch Weckerly, Ph.D.	Texas State University	Population Ecology–Experimental Design	SH
Tom Arsuffi, Ph.D.	Texas Tech University (Retired)	Aquatic Biology–Stream Ecology	IC
Janis Bush, Ph.D.	University of Texas at San Antonio	Plant Ecology–Experimental Design	SH
Conrad Lamon, Ph.D.	Statistical Ecology Associates LLC	Ecological Modeling	IC
Jack Sharp, Ph.D.	University of Texas at Austin	Hydrology–Hydrogeology	IC and SH
Nathan Bendik, M.S.	City of Austin	Salamander Conservation	IC
Jason Martina, Ph.D.	Texas State University	Aquatic Macrophytes	SH
[Vacant]	*[Vacant]*	Fish Conservation	SH

Abbreviations
IC = Implementing Committee; SH = Adaptive Management Stakeholder Committee

5.3.3.1 Comal Springs Riffle Beetle Work Group

The CSRB Work Group is charged with reviewing and providing input on monitoring the CSRB as part of EAHCP implementation. The Work Group members are Conrad Lamon (SC), Chad Norris (SC), Butch Weckerly (SC), David Britton (USFWS), and Tom Arsuffi (SC). The CSRB Work Group met on December 4 to discuss the preliminary results of the CSRB population study and the CSRB genetics study. The results from the multi-year CSRB population study are summarized in Appendix F1. CSRB Work Group materials are included in Appendix M8.

5.3.4 Other Work Groups

5.3.4.1 San Antonio Water System Aquifer Storage & Recovery Regional Advisory Group and Staff Work Group

The EAHCP and Interlocal Contract provide for continued discussion and interaction through two groups. The SAWS ASR Regional Advisory Group is a 12-person Regional Advisory Group that provides advice to SAWS regarding the implementation of the program. **TABLE 5-5** lists the members of the SAWS ASR Regional Advisory Group.

The second group, the Staff Work Group, consists of four SAWS staff members and four EAA staff members who provide advice to each agency regarding drought conditions, aquifer levels and springflows at Comal Springs, meteorology, and aquifer and springflow modeling.

Both groups met on November 21, 2024.

TABLE 5-5
San Antonio Water System Aquifer Storage & Recovery Regional Advisory Group 2024 Members

Appointee	Affiliation	Alternate
Donovan Burton	San Antonio Water System	Patrick Shriver
Robert Escobar	San Antonio Water System	Roger Placencia/Carl Krueger
Karen Guz	San Antonio Water System	Patrick Shriver/Roger Placencia
Roger Placencia	San Antonio Water System	Patrick Shriver
Roland Ruiz	Edwards Aquifer Authority	Marc Friberg
Rader Gilleland	Irrigator	Adam Yablonski
Bruce Alexander	Small municipal utility	No alternate named
Ryan Kelso	Springs Communities	Mike Short
Shannon Love	Environmental interest	No alternate named
Buck Benson	Industry	Summer Johnson
Chad Norris	Downstream interest (Guadalupe-Blanco River Authority)	Charlie Hickman
Scott Storment	EAHCP Program Manager	No alternate named

6 | Plan Changes and Correspondence

CHAPTER OVERVIEW

- No formal administrative changes occurred in 2024.
- The USFWS issued 5-year status reviews on the Comal Springs riffle beetle, Comal Springs dryopid beetle, and Peck's cave amphipod and recommended no changes to the status of these listed species; they will continue to be listed as endangered.
- On September 10, the USFWS released a draft recovery plan for the seven EAHCP Covered Species listed as threatened or endangered. EAHCP staff and ICF met with USFWS staff and discussed the draft recovery plan, and the EAHCP Program Manager submitted comments to the USFWS on the plan.
- The EAHCP Program Manager corresponded with the USFWS in 2024 regarding the triggering of the Voluntary Irrigation Suspension Program Option for 2025, Condition M aquatic restoration restrictions in the Comal and San Marcos springs systems when springflow decreased below 130 cfs (Comal) and 120 cfs (San Marcos), and a decreased flow event in the Old Channel of the Comal River on October 23.
- EAHCP staff and ICF met with USFWS staff multiple times in 2024 to discuss Permit Renewal considerations for Biological Goals and Objectives, undetermined Covered Species, modeled future conditions, and the proposed take assessment methodology.
- USFWS staff visited the San Marcos River on August 27 (93 cfs) and October 16 (86 cfs) to assess and approve proposed aquatic vegetation removal and planting sites in the San Marcos River while under Condition M restrictions. Approval was conditional per the sites and methodology reviewed; no formal correspondence was issued.

6.1 Administrative Changes

The EAHCP uses four categories of changes that are administrative in nature: annual report, informational memoranda, Clarifications, and Minor Administrative Amendments. Clarifications and Minor Administrative Amendments are defined in the EAHCP; the annual report and informational memoranda categories of changes were established in 2013 via a Program Manager memorandum to the IC.

The *annual report* can be used to report a change that is temporary or caused by current conditions, with the intent in the future to adhere to the HCP.

Informational memoranda can be used to report a change that was very minor and has not substantively affected the species or objectives and did not rise to the level of needing scientific consideration.

Clarifications are defined as changes that "do not change the substantive portions of any of the documents in any way but merely clarify and make more precise the provisions as they exist." The 2013 Program Manager memorandum noted above further defines Clarifications, noting that they are used when "the HCP is not clear on a specific issue and the issue could be interpreted differently depending on perspective [and] confirmation from USFWS [is needed] that the interpretation chosen … is accepted/agreed to by USFWS." Clarifications are implemented by submitting a proposed change to the USFWS for its approval within a requested 30-day period. According to the EAHCP, Clarifications must be provided in writing through a letter agreement or substituted plan documents between the Permittees and the USFWS.

Minor Administrative Amendments are defined as changes that do not make substantive changes to any of the provisions of the documents but which may be necessary to represent more fully the overall intent of the Permittees and the USFWS. The 2013 Program Manager memorandum noted above further defines Minor Administrative Amendments, noting that they are used when "the change is very minor and has no substantive [effect on] the species or objectives [and] could require some minimal level of justification, possibly scientific in nature." The process for executing Minor Administrative Amendments is more extensive than that used for Clarifications. Minor Administrative Amendments require submitting in writing to the USFWS a description of the proposed amendment, explanation of why the amendment is necessary or desirable, and an explanation of why the proposed amendment will not change the effects described in the EAHCP. These changes require public noticing and posting the proposed amendment on the EAHCP website for public comment. The proposed Minor Administrative Amendment must then be approved by the USFWS Field Supervisor, documented by written authorization within 30 days.

6.2 Adaptive Management Process

Article 7 of the FMA outlines the procedural steps and responsibilities of the Permittees for the AMP. It also identifies three AMP decisions the Permittees may make—Routine AMP, Nonroutine AMP, and **Strategic AMP** (SAMP) decisions. *Routine AMP decision*s are those involving ongoing, day-to-day matters related to the management and administration of existing Conservation Measures and Phase II Conservation Measures that do not require an amendment to the ITP. *Nonroutine AMP* decisions are those related to existing Conservation Measures but which are not Routine AMP decisions. *SAMP decision*s are decisions that relate to the selection of Phase II Conservation Measures that are to be implemented by the Permittees from 2020 through the end of the ITP (2028). No AMP or substantive changes were made in 2024.

6.3 Changed Circumstances

The EAHCP describes 12 changed circumstances that, if they occur during the permit term, would require responsive measures to address. No changed circumstances occurred in 2024.

6.4 Other USFWS Correspondence

Other memoranda, clarifications, or amendments not related to Conservation Measures or Biological Goals and Objectives as defined by AMP decisions may be necessary to address changes to the EAHCP, Implementing Agreement, FMA, or ITP.

USFWS issued 5-year status reviews on the CSRB, Comal Springs dryopid beetle, and Peck's cave amphipod and recommended no changes to the status of these listed species; they will continue to be listed as endangered (Appendices D6–D8). On September 10, the USFWS released a draft recovery plan for the seven species listed as threatened or endangered currently covered by the EAHCP (Appendix D9). USFWS draft recovery plan authors met with EAHCP, ICF, and BIO-WEST staff and discussed recovery plan components. The EAHCP Program Manager submitted a formal request to the USFWS to extend the original 60-day comment period (Appendix D10), and the USFWS complied and extended the comment period to end on December 12. The EAHCP Program Manager submitted comments prior to the closure of the comment period (Appendix D11). The EAHCP Program Manager issued formal correspondence to the USFWS on the following:

- Lifting of Condition M restrictions in the Comal and San Marcos springs systems on February 5 (Appendices D1–D2)
- Implementation of ITP Condition M restrictions in the Comal Springs system on May 28 (Appendix D3) and in the San Marcos system on June 27 (Appendix D4)
- Triggering of VISPO that will require VISPO forbearance payments to be issued in 2025 (Appendix D11)
- A decreased flow event in the Old Channel of the Comal River on October 23 (Appendix H1).
- Draft Recovery Plan comments (Appendix D11).

The USFWS staff made two site visits to the San Marcos River on August 27 (93 cfs) and October 16 (86 cfs) to review and approve proposed aquatic vegetation removal and planting sites in the San Marcos River. Approval was conditional per the sites and methodology reviewed; no formal correspondence was issued.

A decreased flow event occurred in the Old Channel of the Comal River on October 23. During this time, CONB staff accidentally suspended water flow from Landa Lake into the Old Channel while making minor repairs. The issue was quickly identified, and flow was restored to prior conditions within 24 hours. During the event, the Old Channel USGS gage #08168913 recorded a flow of 0 cfs; however, BIO-WEST staff observed that flow did continue during this time. The USGS equipment was exposed and not

properly submerged, rendering it unable to record the low-flow event. Post-event observations by BIO-WEST indicated that there was no vegetative die-off and no major impacts on fountain darter numbers.

Beginning in the fall, Program staff, ICF, and BIO-WEST met monthly with the USFWS and discussed Permit Renewal considerations for Biological Goals and Objectives, undetermined Covered Species, modeled future conditions, proposed take assessment methodology, and other factors related to the Permit Renewal process. Monthly meetings with the USFWS will likely continue in 2025 as recommended changes are refined for the Permit Renewal.

7 | Literature Review

Appendix N lists recent literature (e.g., journal articles, study reports, theses, and dissertations) related to the Covered Species, habitat, and other pertinent topics associated with the EAHCP. To coincide with the development schedule of the Annual Report, this review includes literature or news articles published or approved from December 1, 2023, to November 30, 2024, as well as any earlier literature not documented in a previous Annual Report. The literature search was accomplished by conducting online searches of academic databases (such as EBSCO and JSTOR); Google Scholar; TXST dissertations and theses; the EAA document library; USFWS permits; and local, regional, state, and national news outlets.

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8 | References

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Species of Interest

The species listed in the table below are managed by the EAHCP program or of interest through their relevance to EAHCP implementation activities.

EAHCP Species of Interest

Common Name	Scientific Name
Covered Species	
Comal Springs dryopid beetle	*Stygoparnus comalensis*
Comal Springs riffle beetle	*Heterelmis comalensis*
Comal Springs salamander	*Eurycea* sp.
Edwards Aquifer diving beetle (or Texas cave diving beetle)	*Haideoporus texanus*
Fountain darter	*Etheostoma fonticola*
Peck's cave amphipod	*Stygobromus pecki*
San Marcos gambusia	*Gambusia georgei*
San Marcos salamander	*Eurycea nana*
Texas blind salamander	*Eurycea rathbuni*
Texas troglobitic water slater	*Lirceolus smithii*
Texas wild-rice	*Zizania texana*
Submerged Aquatic Vegetation Species for Fountain Darter Habitat	
Carolina fanwort (or Cabomba)	*Cabomba caroliniana*
Creeping primrose-willow	*Ludwigia repens*
Delta arrowhead	*Sagittaria platyphylla*
Illinois pondweed	*Potamogeton illinoensis*
Mosses, liverworts, and allies	Bryophytes[a]
Texas wild-rice	*Zizania texana*[b]
Water celery	*Vallisneria americana*[a]
Whorled pennywort	*Hydrocotyle verticillata*[b]
Native Plant and Animal Species	
Grassleaf mudplantain	*Heteranthera dubia*
Toothless blindcat	*Trogloglanis pattersoni*
Widemouth blindcat	*Satan eurystomus*

Common Name	Scientific Name
Non-Native Animal Species Removed or Monitored	
Giant ramshorn snail	*Marisa cornuarietis*
Gill parasite (no common name)	*Centrocestus formosanus*
Intestinal fluke	*Haplorchis pumilio*
Nutria	*Myocastor coypus*
Red-rimmed melania	*Melanoides tuberculata*
Suckermouth armored catfishes (suckermouth and sailfin)	Loricariidae: *Hypostomus Plecostomus* and *Pterygoplichthys* spp.
Tilapia (or blue tilapia)	*Oreochromis* spp.
Zebra mussels	*Dreissena polymorpha*
Non-Native Plant Species Removed or Monitored	
Chinaberry	*Melia azedarach*
Chinese privet	*Ligustrum sinense*
Chinese tallow	*Triadica sebifera*
Elephant ear (or coco yam, or taro)	*Colocasia esculenta*
Giant reed	*Arundo donax*
Hydrilla (or water thyme)	*Hydrilla verticillata*
Indian swampweed	*Hygrophila polysperma*
Japanese honeysuckle	*Lonicera japonica*
Japanese privet (or Japanese ligustrum)	*Ligustrum japonicum*
Tapegrass (or eelgrass)	*Vallisneria spiralis*
Water hyacinth	*Eichhornia crassipes*
Water lettuce	*Pistia stratiotes*
Water sprite	*Ceratopteris thalictroides*
Watercress	*Nasturtium officinale*
White mulberry	*Morus alba*

[a] These species occur as habitat for the fountain darter in the Comal Springs system only.

[b] These species occur as habitat for the fountain darter in the San Marcos Springs system only.

Glossary

bioretention basin: A landscaped depression to collect on-site stormwater discharge from impervious surfaces such as roofs, driveways, sidewalks, and compacted lawns and filter it through a mixture of vegetation, soils, sand, and/or gravel that is designed to mimic volume-reduction and pollutant-removal mechanisms that work in natural systems.

Comal discharge: The volume of water passing a defined location in the Comal River; in the EAHCP, this location is often referenced at the USGS station number 08169000, which is below the confluence of the Old and New Channels of the Comal River.

Comal River: A 2-mile natural watercourse originating from the Comal Springs in New Braunfels, Texas, at Landa Lake to its confluence with the Guadalupe River in New Braunfels, Texas.

Comal Springs: A collection of artesian springs in New Braunfels, Texas, emanating from the Edwards Aquifer and creating the headwaters of the Comal River including areas of Landa Lake and Spring Runs that feed Landa Lake.

Comal Springs system: The aquatic area containing the Comal Springs, Landa Lake, and Comal River.

Conservation Measures: Projects or activities specified in Chapter 5 of the EAHCP, including avoidance, minimization, or mitigation actions, implemented by the Permittees to achieve Biological Goals and Key Management Objectives.

Covered Activities: Those activities identified in Condition L of the ITP and Chapter 2 of the EAHCP and performed by the Permittees within the Permit Area, including recreation, restoration, and management of groundwater pumping from the Edwards Aquifer, for which incidental take coverage has been provided over the permit term.

Covered Species: The 11 federally listed or petitioned species "covered" by the ITP and HCP and conserved and managed through the implementation of the EAHCP.

critical period: Generally, a period characterized by defined lower aquifer levels and which is primarily managed by the triggering of specific withdrawal restrictions from the Edwards Aquifer. Specifically, a *critical period* is defined in Section 702.1(52) of the EAA's rules to mean "[a]ny day of a calendar year when a critical period stage is in effect." A critical period is in effect when so declared by the EAA General Manager pursuant to Section 715.212 of the EAA's rules based on the aquifer level triggers found in Appendix Table 1 to Subchapter E, Chapter 715 of the EAA's rules.

curtail or curtailment: The act of reducing or restricting something. In the case of a forbearance agreement, the right to withdrawal under an EAA groundwater withdrawal permit would be reduced or restricted.

defined period of extreme drought, drought, drought conditions: In the EAHCP, the "springflow protection" Conservation Measures are based on the specific drought triggers that are tailored for each measure, except for the Regional Water Conservation Program, which has no drought triggers. These measures are designed to prevent springflows at Comal Springs and San Marcos Springs from being reduced below certain levels stated in the EAHCP during a repeat of the drought of record–like conditions. Reference to drought or extreme drought is in perspective of similar experiences.

drought of record: The drought of record occurred from 1951 through 1956 and is characterized by an average recharge for any 7-year period of less than 168,700 ac-ft as derived for the period 1950–1956. For the purposes of the SAWS ASR Program, Section 1.9 of the SAWS–EAA ASR contract defines the *drought of record* as "the period of time declared by the [EAA] General Manager pursuant to Section 3 [of the SAWS–EAA ASR contract] characterized as a period of lower than normal precipitation and recharge to the Aquifer resulting in a drought of record–like event as provided therein." Section 3(a) of the SAWS–EAA ASR contract provides that the EAA General Manager is to issue a "notice of commencement of a drought of record" when the 10-year rolling average of the estimated annual recharge to the aquifer is equal to or less than 500,000 ac-ft per annum.

Edwards Aquifer Authority Act: The Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended.

EAA groundwater withdrawal permit: An Initial Regular Permit or Regular Permit issued by the EAA.

forbearance: The complete curtailment of all or part of a right to make withdrawals under a specific EAA groundwater withdrawal permit.

forbearance agreement: As used in the SAWS ASR and VISPO, a contractual agreement whereby a groundwater withdrawal permit holder agrees to the complete curtailment of all or part of the permit holder's right to make withdrawals in the future under a specific EAA groundwater withdrawal permit when certain conditions—commonly referred to as *triggers*—are met in exchange for compensation.

incidental take: Unintentional taking of a species that results from, but is not the purpose of, carrying out an otherwise lawful activity. *Taking* is defined in the ESA as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting any threatened or endangered species.

Incidental Take Permit: A permit issued by the USFWS under Section 10a(1)(B) of the Endangered Species Act that allows permittees to proceed with an otherwise legal activity but which may result in "incidental take" of a listed species.

Initial Regular Permit: An EAA groundwater withdrawal permit originally issued by the EAA under Subsection 1.16(d) of the Edwards Aquifer Authority Act.

lease: As used in the SAWS ASR Program, a lease is a contractual arrangement to presently grant the exclusive possession of the right to make withdrawals from the Edwards Aquifer under an EAA groundwater withdrawal permit.

Long-Term Biological Goal Reach: River segments in both the Comal and San Marcos Springs systems that are specified in the EAHCP and hold quantitative goals associated with Covered Species habitat.

low flow(s), low-flow conditions: A period of springflow below the long-term average and the minimum averages identified in Tables 4-2 and 4-13 of the EAHCP. Low flow may also be specified as 130 cfs or lower at the Comal discharge and 120 cfs or lower at the San Marcos discharge based on Condition M in the ITP.

negative impacts: Generic term associated with impacts on the Covered Species and their habitat through reduced springflow, flood, contaminated runoff, excess recreation in protected areas, and other potentially threatening activities to the Comal Springs and San Marcos Springs ecosystems.

Old Channel of the Comal River: From Landa Lake, water flows into two channels, the original "old" channel and a "new" channel created in 1847.

Permit Renewal: Initiated in 2022 by the Permittees, this multi-year planning process is intended to complete a major amendment of the ITP to extend the permit duration beyond its expiration in 2028.

Phase I—EAHCP Implementation: Phase I of the EAHCP occurred between 2013 and 2020, during which the Permittees implemented the habitat restoration, springflow protection, research, modeling, monitoring, and refugia Conservation Measures required by the EAHCP and the ITP to determine their effectiveness in achieving the EAHCP Biological Goals and Objectives.

Phase II—EAHCP Implementation: Phase II of the EAHCP spans 2020–2028 and consists of continued implementation of existing, or modifications to existing, Conservation Measures, or implementation of new Conservation Measures that may be necessary to achieve the Biological Goals and Objectives in the EAHCP as a result of the SAMP.

Regular Permit: An EAA groundwater withdrawal permit issued by the EAA after August 12, 2008, resulting from the sale or amendment of an Initial Regular Permit or the consolidation of two or more such permits.

Restoration Reach: River segments in both the Comal and San Marcos rivers created out of the 2016 AMP to satisfy the EAHCP key management objective of proportionally expanding submerged aquatic vegetation restoration beyond the LTBG Reaches.

riparian: Land adjacent to a river or stream.

San Marcos discharge: The volume of water passing a defined location in the San Marcos River; in the HCP this location is referenced at the USGS station number 08170500, which is located in Sewell Park.

San Marcos River: A 75-mile natural watercourse originating from the San Marcos Springs in San Marcos, Texas, at Spring Lake to its confluence with the Guadalupe River near Gonzales, Texas.

San Marcos Springs: A collection of artesian springs in San Marcos, Texas, emanating from the Edwards Aquifer and creating the headwaters of the San Marcos River including areas of Spring Lake, Sink Creek, and Sessom Creek; generally refers to artesian springs in Spring Lake.

San Marcos Springs system: The aquatic area containing the San Marcos Springs, Spring Lake, and San Marcos River.

Strategic Adaptive Management Process: The SAMP formalized adaptive management during the transition from Phase I (2013–2020) to Phase II (2020–2028) of the EAHCP and the ITP as defined in Sections 7.13 and potentially 7.14 of the FMA. No SAMP decisions were needed during the transition from Phase I to Phase II.

trigger: To cause an event or situation to happen or exist. In the case of the VISPO, Critical Period Management Program, and SAWS ASR springflow protection programs, including the associated forbearance agreements, a trigger would be a condition that causes or requires the curtailment of all or part of the right to make withdrawals under a specific EAA groundwater withdrawal permit.

withdrawal: Taking groundwater from the Edwards Aquifer by or through human-made facilities, including pumping.

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EAHCP

EDWARDS AQUIFER
HABITAT CONSERVATION PLAN

The Edwards Aquifer Habitat Conservation Plan (EAHCP) is a regional plan to protect 11 species associated with the Edwards Aquifer while helping to ensure its stability as a regional water supply.

www.edwardsaquifer.org/habitat-conservation-plan