Edwards Aquifer Authority
2026 Work Plan

2026 Edwards Aquifer Authority Work Plan Budget

EAHCP Section	Conservation Measure	Table 7.1	Estimated 2026 Budget[a]
5.1.1	Refugia	$1,678,597	$1,344,758
5.1.2	VISPO	$4,172,000[b]	$8,654,550[c]
5.1.3	RWCP	$493,250	$0
5.1.4	Stage V	NA	NA
5.5.1	ASR Leasing & Forbearance	$4,759,000	$5,651,894
	ASR O&M	$2,194,000	$0
5.7.2	Water Quality Monitoring	$200,000	$65,000
6.3.1	Biological Monitoring	$400,000	$755,774[d]
6.3.3	Ecological Model	$25,000	$0
6.3.4	Applied Research	$0	$275,000[f]
FMA §2.2	Program Management	$750,000	$1,672.632[e]
Total		**$14,671,847**	**$18,419,608**

a. Estimated annual work plan cost per Funding and Management Agreement § 4.4.
b. Dollars in Table 7.1 of the EAHCP were calculated from a volume goal of 40,000 acre-feet (ac-ft). The volume goal was amended to 41,795 ac-ft in 2019 and Table 7.1 dollars are no longer applicable.
c. On October 1, 2025, the VISPO program was triggered, resulting in suspension payments totaling $8,654,550.
d. Includes Critical Period Monitoring if required.
e. Additional monies needed for additional Professional Services expenses
f. Additional monies needed for additional Applied Research expenses

2026 Edwards Aquifer Authority (EAA) Work Plan and Funding Application Amendments

Amendment #	Date EAHCP Committee Approved	Conservation Measure Amended	Y/N Funding Application Change	Funding Application Change ($)	Date EAA Board Approved	Comments
0	5/22/2025	Original Work Plan	NA	NA	NA	Original Work Plan
0	10/9/2025	2026 Funding Application	NA	NA	11/11/2025	Original Funding Application
1	10/9/2025	ASR Leasing & Forbearance, VISPO, and Program Management	NA	NA	NA	Updated Work Plan with updated program activities and/or costs for ASR Leasing & Forbearance, VISPO, and Program Management
2	2/5/2026	Refugia	NA	NA	NA	Updated Work Plan for Refugia with known activities and updated 2026 research project costs
3	3/26/2026	Program Management	NA	NA	NA	Updated Work Plan to include monies needed for additional program expenses for Program Management
1	3/26/2026	Program Management	Y	$32,000	5/12/2026	Updated Funding Application to include monies needed for additional program expenses for Program Management
4	10/8/2026	Program Management and Applied Research	Y	NA	NA	Updated Work Plan to include monies needed for additional program expenses for Applied Research and Program Management
2	10/8/2026	Program Management and Applied Research	Y	$225,000	11/11/2026	Updated Funding Application to include monies needed for additional program expenses for Applied Research and Program Management

5.1.1 Refugia Program

Introduction

The U.S. Fish and Wildlife Service's (USFWS) San Marcos Aquatic Resources Center (SMARC) and Uvalde National Fish Hatchery (UNFH) will provide refugia, salvage, reintroduction, and monitoring services in fulfillment of the Refugia Contract (Contract # 16-822-HCP) between the Edwards Aquifer Authority (EAA) and the USFWS.

This annual work plan and associated cost estimate have been developed per the requirements of contract number 16-822-HCP for the Implementation of the Refugia Program under the Edwards Aquifer Habitat Conservation Plan (EAHCP). The tasks and subtasks that follow provide the details for the services to be performed in 2026, which provide for the maintenance of a refugia population of the Covered Species (Table 1), including salvage, propagation, and restocking of the species (if species-specific habitat triggers occur and species are extirpated), plus research conducted on the Covered Species.

Table 1: Eleven species identified in the EAHCP and listed for coverage under the ITP.

Common Name	Scientific Name	ESA Status
Fountain darter	*Etheostoma fonticola*	Endangered
Comal Springs riffle beetle	*Heterelmis comalensis*	Endangered
Comal Springs dryopid beetle	*Stygoparnus comalensis*	Endangered
Peck's cave amphipod	*Stygobromus pecki*	Endangered
Texas wild-rice	*Zizania texana*	Endangered
Texas blind salamander	*Eurycea rathbuni*	Endangered
San Marcos salamander	*Eurycea nana*	Threatened
Edwards Aquifer diving beetle	*Haideoporus texanus*	Petitioned
Comal Springs salamander	*Eurycea pterophila*	Petition Rescinded
Texas troglobitic water slater	*Lirceolus smithii*	Petition Rescinded

Long-term Objective

Background: Section 5.1.1 of the EAHCP requires the EAA to provide a series of refugia, with back-up populations, to preserve the capacity for these species to be re-established in the event of the loss of population due to a catastrophic event.

The concept of refugia is to house and protect adequate populations of the Covered Species and to conduct research activities to expand knowledge of their habitat requirements, biology, life histories, and effective reintroduction techniques. Actions and funding contained within this work plan will be limited to the Covered Species listed in the EAHCP and those associated species that have significant impact on the Covered Species such as predators, prey, competitors, pathogens, parasites; or on their habitat, including food, water, and shelter.

2026 Assumptions
As work plans are developed almost a year prior to implementation, it is possible that methods described herein will be contingent on the status of the current year's activities or authorization from the HCP process. If conditions change, this work plan may need to be amended to accommodate realized outcomes.

The following potential situations could necessitate methodology adjustments:

- Target numbers for standing and refugia stocks to be housed at both the UNFH and SMARC deviate from those established by the USFWS-EAA Refugia Contract (Contract # 16-822-HCP).
- Species capture rates fall short of historic values.
- Mortality rates of specimens held in captivity exceed historic values.
- Staff member vacancies occur at either of the two Service facilities during the performance period.
- A pandemic or other emergency prevents scheduled collections.

Target for 2026 (Deliverables and Methods by Task):

Task 1. Refugia Operations

Standing Stocks: USFWS staff will take all appropriate steps to collect and maintain standing/refugia stocks at their respective target captive population size to provide refugia for all the Covered Species. Table 2 contains the target species numbers.

Table 2. Target refugia numbers and census by species.

Species	Standing Stock	Refugia Stock	Salvage Stock	Anticipated SMARC census (Jan 2026)	Anticipated SMARC census (Dec 2026)	Anticipated UNFH census (Jan 2026)	Anticipated UNFH census (Dec 2026)
Fountain darter (Comal)	1000	1000†	2000	500	500	500	500
Fountain darter (San Marcos)	1000	1000†	2500	500	500	500	500
Texas wild-rice	430	430†	1500	215	215	215	215
Texas blind salamander	500	500†	500	250	250	60	80
San Marcos salamander	500	500†	500	250	250	250	250
Comal Springs salamander	500	500†	500	60	60	120	120
Peck's cave amphipod	500	500†	500	250	250	250	250
Comal Springs riffle beetle	500	500†	500	75	75	75	75
Comal Springs dryopid beetle	500	500†	500	*	20	*	20
Edwards Aquifer diving beetle	500	500†	500	*	*	*	*
Texas troglobitic water slater	500	500†	500	*	*	*	*

† Includes specimens within standing stock

*Catch rates and hatchery survival are uncertain given the rarity of the species.

Collection: The USFWS will collect Covered Species as required to reach and maintain target standing and refugia stock numbers as shown in Table 2. If possible, the USFWS will avoid collections during July and August when temperatures are high and flow is low, resulting in increased stress for priority species during collections, with the exception of Texas blind salamanders and San Marcos salamanders collected from the Diversion Spring net in Spring Lake. The USFWS will coordinate species collections with other ongoing HCP activities (e.g., Biological Monitoring Program) so that collections for refugia do not adversely impact other efforts. The USFWS will carry out species collections through a variety of passive and active collection methods and will minimize aquatic invasive species transfer by conducting collections in accordance with a Hazard Analysis Critical-Control Point Plan. The USFWS will document and report collection efforts to the EAA. The USFWS will distribute captured organisms between the SMARC and UNFH facilities to ensure redundancy and to expedite the obligation to establish and maintain two refugia populations at separate locations. The USFWS will hold all species in respective quarantine areas until their health has been assessed. Staff will incorporate quarantined organisms into the general refugia population once they have determined that such specimens are healthy and free from non-target species. The USFWS will share reports, including test results, produced as part of the quarantine process.

The following sections briefly describe planned 2026 collection, maintenance, and propagation efforts for each species.

Fountain Darters:

Collection: The USFWS will collect fountain darters from the San Marcos River and the Comal River in coordination with the Spring and Fall Biomonitoring events. This will be more efficient than separate collection events and will reduce habitat disturbance. For refugia purposes, USFWS staff will retain fountain darters collected by biomonitoring staff via drop nets. Staff will collect fish proportionally from the three sections of the San Marcos River: 1) Upper = Spring Lake, 2) Middle = Spring Lake dam to Rio Vista dam, and 3) Lower = below Rio Vista dam to Cape's Dam. The USFWS will thoroughly investigate unusual mortality events. The USFWS will include summary reports to the EAA as part of the monthly reports. Collections will target sufficient fish so to account for regular, expected mortality, such that the captive population should remain at or above the target.

Due to the detection of largemouth bass virus (LMBV) in Comal fountain darters throughout the Comal River, the USFWS will maintain all fountain darters from Comal River in quarantine facilities, in consideration of other species on the two stations. We have continued concern over higher mortality rates of incoming Comal fountain darters, as no root cause has been identified despite extensive testing and evaluation with the USFWS Fish Health Unit.

As part of quarantine procedures, the USFWS will send a subset of fish (maximum of 60 per river) to the Southwestern Fish Health Unit or equivalent facility for pathogen (bacteria, virus, and parasite) testing prior to incorporating collected animals into the general refugia population. The USFWS will follow standardized methods outlined within USFWS and AFS-FHS (2016) and AFS-FHS (2005) protocols and provide Fish Health reports to the EAA.

Maintenance: The USFWS will monitor water quality (i.e., temperature, pH, dissolved oxygen, total dissolved gasses) and record these data weekly. Staff will feed fountain darters a mix of live and frozen foods reared or purchased. The USFWS will rear zooplankton and amphipods in ponds and tanks for food. We do not generally examine food items for pathogens. However, if they are suspect and tested for pathogens, the USFWS will include all diagnostic results to the EAA within monthly reports.

Propagation: The USFWS will maintain standing and refugia stocks for each river to produce captive-bred fish for research purposes, as necessary and approved. Staff will maintain fish by their geographical collection location. If reintroduction is warranted, the USFWS will communally spawn subsets from each geographical location.

Texas wild-rice:

Collection: USFWS staff will collect Texas wild-rice tillers from San Marcos River segments (Figure 1), with a break during summer months when collected wild-rice does not fare well due to heat stress. Staff will target stands and genetic variants that are not already part of the refugia population or require supplementation in collections for SMARC and UNFH. The refugia populations will reflect the wild populations in both their respective proportion, based on the most recent Texas wild-rice survey data and genetic assessments of wild and refugia populations (2021 genetic assessment and Wilson et al. 2016). During tiller collection, the USFWS will record the geographic coordinates, area coverage, and depth of the stand or individual plant. USFWS staff will collect tillers by wading and SCUBA diving. The USFWS will consider georeferenced aerial imagery to help identify distinct TWR stands used for tiller collection.

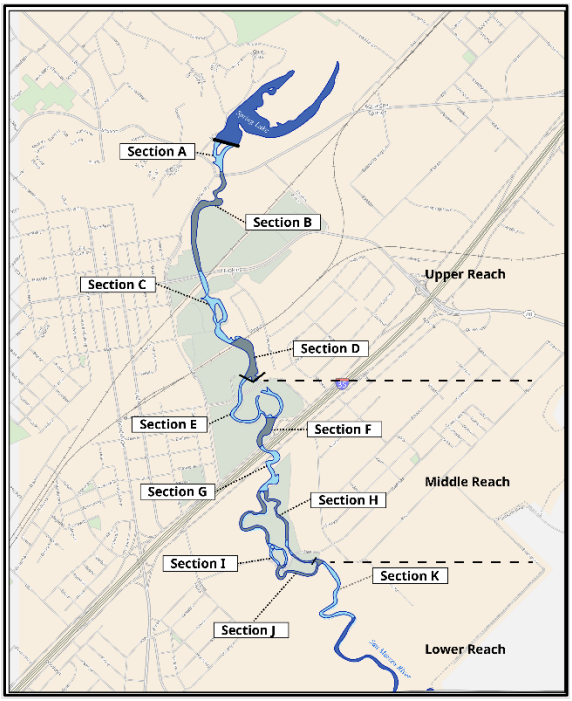


Figure 1. Letters define designated San Marcos River reaches where Texas wild-rice is collected for refugia populations.

Maintenance: USFWS staff will tag and maintain plants with their collection date and location information.

Propagation: USFWS staff will maintain plants to prevent sexual reproduction within the refugia population, unless EAHCP triggers occur. If reintroduction is warranted, USFWS staff will produce seeds and tillers from plants collected from each geographical location. During reintroduction, staff will transplant plants produced from seeds and tillers to their original source location, delineated by river section (Figure 1).

Texas blind salamanders:

Collection: USFWS will collect Texas blind salamanders using nets and traps. Staff will deploy traps quarterly for approximately 14 consecutive days with traps checked every 2-4 days to collect Texas blind salamander individuals from Primers Fissure and Johnson's well (Table 5). To avoid oversampling these habitats, staff will only collect 1/2 of salamanders observed from each of these locations during quarterly sampling events. Texas blind salamanders will be checked for tail clips and/or p-Chips to collect reoccurrence data. Staff will also collect salamanders from a driftnet on Diversion Springs in Spring Lake throughout the year during times when we are not actively trapping in caves and wells. We will retain all specimens from this site, under the assumption that any Texas blind salamander leaving a spring orifice that enters a stream or lake environment will ultimately succumb to predation. We will check these sites up to three times per week when applicable. Staff will transport all specimens alive and maintain them in the SMARC or UNFH refugia. Texas State University staff may check drift nets on Texas State University Artesian Well a few times a year for 14 consecutive days. Texas State University transfers live Texas blind salamanders to SMARC according to their permits, when appropriate. USFWS staff may periodically check nets on these sites when they are not being checked by Texas State University staff.

Health Testing: Texas blind salamanders are known to carry *Batrachochytrium dendrobatidis* (Bd), a fungal disease listed by Animal and Plant Health Inspection Service (APHIS) as a reportable exotic disease under the United States National List of Reportable Animal Diseases (NLRAD) as prescribed Title 9 of the Code of Federal Regulations (CFR) part 57. The NLRAD regulation means that the USFWS has a legal obligation to report detections of this disease. We also have a professional obligation to follow the USFWS Fish Health Policy, which includes an Exotic Disease Eradication Plan (713 FW 3). Project leaders at UNFH and SMARC have the responsibility to assist in the development, and comply with, site-specific aquatic animal cultural sanitation and decontamination plans covering the provision of the Fish Health Policy, including the exotic disease eradication plan.

As part of quarantine procedures, USFWS staff will swab all large Texas blind salamanders. If they are too small to be swabbed, then we will do a representative batch swab of group-housed salamanders once they are large enough to be safely swabbed. USFWS staff will process these samples at SMARC or other facility to screen for *Batrachochytrium dendrobatidis* (Bd, commonly referred to as chytrid fungus) and *Batrachochytrium salamandrivorans* (Bsal) prior to

specimen incorporation into the general refugia population. Staff will retain duplicate swabs for no more than 5 years in case further testing is warranted. Staff will hold all salamanders in quarantine for at least 30 days and until test results have returned. Previous tests of wild caught salamanders at SMARC (both Texas blind and San Marcos salamanders) have regularly tested positive for Bd. Positive testing for Bsal will be treated more cautiously as it has not yet been documented in North America. Staff would retain such salamanders in quarantine until further study and recommendations from FWS Fish Health.

Maintenance: USFWS staff will individually tag salamanders to retain information on collection location, date, and other life history events. Staff will monitor water quality and record data weekly. Staff will feed salamanders live and frozen foods, either reared or purchased. Staff will utilize culture systems to produce *Daphnia* on site.

Propagation: Staff will maintain standing and refugia stocks to encourage reproduction. Staff will maintain all progeny separately by generations. If reintroduction is warranted, an attempt will be made to produce offspring from adults collected at each geographical location and offspring will be reintroduced back to the geographic location once they are 30mm total length.

San Marcos salamanders:

Collection: USFWS staff will collect San Marcos salamanders in the Spring and Fall, avoiding breeding season and the hot summer months, from Hotel Springs, below Spring Lake dam (Eastern Spillway) and with SCUBA teams in Spring Lake (Table 5). Staff will check the drift net on Diversion Springs routinely and keep specimens from this location as need allows. We will avoid collections close to the HCP Biological Monitoring Program assessment events. Staff will transport all specimens alive and maintain these in the SMARC and UNFH refugia.

As part of quarantine procedures, USFWS staff will swab San Marcos salamanders for disease testing. If they are too small to be swabbed, we will do a representative batch swab of group housed salamanders once they are large enough to be safely swabbed. USFWS staff will process these samples at SMARC or other facility to screen for Bd and Bsal prior to specimen incorporation into the general refugia population. Staff will retain duplicate swabs in case further testing is warranted. Chytrid testing will occur in batches where groups of five swabs will be pooled for analysis. Staff will hold all salamanders in quarantine for at least 30 days and until test results have returned. Positive testing for Bsal will be treated more cautiously as it has not yet been documented in North America.

Maintenance: Staff will monitor water quality and record data weekly. Staff will feed salamanders live foods, either reared or purchased, mixed with purchased frozen food sources if necessary. Staff will utilize ponds and tanks to produce amphipods on site.

Propagation: USFWS staff will maintain salamander standing and refugia stocks to encourage reproduction. We will separate all progeny by generation. If reintroduction is warranted, staff will employ pairwise and group mating of adults from each geographic location to produce

offspring. Staff will initiate stocking to each geographic location once juveniles have reached 30 mm total length.

Comal Springs salamanders:

Collection: USFWS staff will collect Comal Springs salamanders monthly except July and August, from Spring Island and surrounding areas (Table 5) by hand, with dipnets, using snorkelers. Comal Springs salamanders are more difficult to collect than San Marcos salamanders and require more frequent collections to reach Standing Stock goals. We will coordinate with the HCP biological monitoring program to ensure to the degree practicable, refugia collections do not overlap with specific EAHCP long-term monitoring locales. If overlap is unavoidable, we will collect Comal salamanders at a rate of no more than 10% of salamanders observed in those specific locales per daily sampling trip. We will employ a SCUBA team for a portion of these collection efforts if necessary.

As part of quarantine procedures, USFWS staff will swab all large Comal Springs salamanders. If they are too small to be swabbed, we will do a representative batch swab of group housed salamanders once they are large enough to be safely swabbed. USFWS staff will process these samples at SMARC or other facility to screen for Bd and Bsal prior to incorporation into the general refugia population. Staff will retain duplicate swabs for no more than 5 years in case further testing is warranted. Chytrid testing will occur in batches where groups of five swabs will be pooled for analysis. Staff will hold all salamanders in quarantine for at least 30 days and until test results have returned. Clinically, the salamanders appear normal and do not have any lesions or signs of disease. Positive testing for Bsal will be treated more cautiously as it has not yet been documented in North America. Staff would retain such salamanders in quarantine until further study and recommendations from FWS Fish Health.

Maintenance: Staff will monitor water quality and record data weekly. Staff will feed salamanders live and frozen foods, either reared or purchased. Staff will utilize culture systems to produce *Daphnia* on site.

Propagation: USFWS staff will maintain salamander standing stock to encourage reproduction. We will separate all progeny by generation. If reintroduction is warranted, staff will employ pairwise and group mating to produce offspring. Staff will initiate stocking once juveniles have reached 30 mm in total length.

Comal Springs riffle beetle:

Collection: USFWS staff will collect Comal Springs riffle beetle for standing stocks five times a year from a variety of locations, including Spring Run 1, Spring Run 3, the Western Shore, and areas surrounding Spring Island (Table 5). Staff will collect riffle beetles from poly-cotton lures following EAHCP standard operating procedures (Hall 2016) and from wood, as needed. Staff will follow protocols established by the CSRB Work Group in 2019:

1. Staff will not sample the same spring orifice two times in a row.
2. Staff will collect all riffle beetle adults and larvae from lures.

The Comal Springs Riffle Beetle Work Group will evaluate standing stock numbers yearly. Additional collections for research purposes may be required outside of standing stock collections.

Maintenance: USFWS staff will maintain specimens by collection date and geographic area. Staff will hold Comal Springs riffle beetles within custom built aquatic holding units and feed them detrital matter and matured biofilms colonized on cotton lures, wood dowels, and leaf matter.

Propagation: USFWS staff will maintain Comal Springs riffle beetle standing stock in flowthrough tubes to encourage reproduction. If warranted, captive propagated larva will be reintroduced to each geographic area.

Peck's cave amphipod:

Collection: USFWS will conduct Peck's cave amphipod collection for standing stock seven times annually, if needed (Table 5). Staff will collect adult Peck's cave amphipods with drift nets and by hand at a variety of locations (drift nets: Spring Run 3, twice a year; Spring Island and associated Spring Island habitats: hand collection). EARP staff will avoid collecting the summer months.

Maintenance: Staff will maintain specimens by collection date within custom-built aquatic holding units and feed amphipods with commercial flake fish food.

Propagation: Propagation methods for this species are being developed as part of standard refugia operations.

Comal Springs dryopid beetle:

Collection: USFWS will conduct 10 dedicated collections for Comal Springs dryopid beetles, often coinciding with Peck's cave amphipod or Comal Springs salamander collections. Opportunistic collections will occur if dryopid beetles are present during Comal Springs riffle beetle lure checks. Dryopid beetles will be collected primarily through wooden lures and hand picking from submerged wood found in the Comal Spring system. If staff find dryopid beetles on poly-cotton lures used for Comal Springs riffle beetles, these will be retained (Table 5). We will potentially conduct two trapping events with bottle traps in Panther Canyon Well during the year as access to the well and staff time allows. Staff will check these traps weekly for a month.

Maintenance: USFWS will combine collected Comal Springs dryopid beetles, regardless of collection location. Staff will hold Comal Springs dryopid beetles within custom built aquatic

holding units and feed them detrital matter and matured biofilms colonized on cotton lures, wood dowels, and leaf matter.

Propagation: Propagation methods for this species are being developed as part of normal refugia operations and research projects.

Edwards Aquifer diving beetle:

Collection: Edwards Aquifer diving beetles have been collected in the past at the Texas State University Artesian Well and Diversion Springs. USFWS staff will accept Edwards Aquifer diving beetles during drift net checks at the Artesian Well when as Texas State University encounters them.

Maintenance: USFWS will combine collected Edwards Aquifer diving beetles, regardless of collection location. Staff will transfer captured specimens to the SMARC or UNFH and house them in custom-made aquatic holding systems. Edwards Aquifer diving beetles are predators; staff will feed them small invertebrates (e.g., ostracods).

Propagation: Propagation methods for this species are to be determined and will be conducted as part of normal refugia operations.

Texas troglobitic water slater:

Collection: Texas troglobitic water slaters are primarily found in Artesian Well on Texas State Campus. Recent research by Will Coleman (Texas State University) suggests that this is a deep aquifer species, rarely found at the surface. Mr. Coleman was unable to keep any alive, as all specimens he collected were injured. USFWS will continue to work with invertebrate experts to determine what might be the optimum way to collect this species. USFWS staff will deploy and check drift nets in the Artesian Well as Texas State University allows.

Maintenance: Staff will transfer captured specimens to the SMARC and house them in custom aquatic holding systems. Staff will feed Texas troglobitic water slaters detrital matter, matured biofilms colonized on cotton lures, and flake fish food to supplement their diet.

Propagation: Staff need to determine propagation methods for this species, to be conducted as part of normal refugia operations.

Table 5. A tentative schedule for all species sampling during 2026. Collections listed here are subject to change with extenuating circumstances such as weather and coordination with external partners. USFWS will notify EAA and partners of sampling dates as they become known or changed.

Edward's Aquifer Species Collection Plan 2026			
Date (month)	**Interval**	**Location**	**Target Species**
January	14 Consecutive days with traps checked 2-3 times a week	Rattlesnake Cave & Rattlesnake Well	Texas blind salamander
January	1-day sampling event, hand pick from downed wood	Landa Lake	Comal Springs dryopid beetle
January	1–3-day sampling event	Spring Island and Comal Springs	Comal Springs salamander
January	1-day sampling event	Spring Island	Peck's cave amphipods and Comal Springs dryopid beetle
January	3 days	Spring Lake, Eastern Spillway and Rio Vista dam	San Marcos fountain darters
January	3 days	Land Lake, Spring Island and Old Channel	Comal Springs fountain darters
February	14 Consecutive days with traps checked 2-3 times a week	Primer's Fissure & Johnson's Well	Texas blind salamander
February	Set lures	Spring Run, Landa Lake	Comal Springs dryopid beetle, Comal Springs riffle beetle, Peck's cave amphipod
February	1-day sampling event	San Marcos River	Texas wild-rice
February	1–3-day sampling event	Spring Island and Comal Springs	Comal Springs salamander
February	1-day sampling event	Spring Island	Peck's cave amphipod Comal Springs dryopid beetle
March	Collect Lures and reset	Spring Runs, Spring Island, Western Shore	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod

Edward's Aquifer Species Collection Plan 2026			
Date (month)	**Interval**	**Location**	**Target Species**
March	1-day sampling event, hand pick	Landa Lake	Peck's cave amphipod Comal Springs dryopid beetle
March	1–3-day sampling event	Spring Island	Comal Springs salamander
March	1-day sampling event, hand pick from downed wood	Landa Lake	Comal Springs dryopid beetle
April	Check 2 consecutive weeks	Rattlesnake Cave & Rattlesnake Well	Texas blind salamander
April	Collect Lures and check logs	Spring Runs, Spring Island, Western Shore	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod
April	1–2-day sampling event	Spring Lake and Eastern Spillway	San Marcos salamander
April	1-day sampling event	San Marcos River	Texas wild-rice
April	Throughout, coincide with bio-monitoring	San Marcos River	Fountain darters
April	Throughout, coincide with bio-monitoring	Spring Island and Landa Lake	Fountain darters
April	Drift net checked every 24-48 hours over two weeks.	Artesian Well	Texas troglobitic water slater, Edwards Aquifer diving beetle, Texas blind salamanders
May	14 Consecutive days with traps check 2-3 times a week	Primer's Fissure & Johnson's Well	Texas blind salamander
May	1-day sampling event	San Marcos River	Texas wild-rice

Edward's Aquifer Species Collection Plan 2026			
Date (month)	**Interval**	**Location**	**Target Species**
May	1–3-day sampling event	Comal Springs	Comal Springs dryopid beetle and Comal Springs salamander
May	Drift net, donated from bio-monitoring	Comal Springs	Peck's cave amphipod
May	Set lures	Spring Runs, Spring Island, Western Shore	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod
June	1-day sampling event, hand pick	Landa Lake	Peck's cave amphipod Comal Springs dryopid beetle
June	1–3-day day sampling event	Spring Island	Comal Springs salamander
June	Retrieve lures	Spring Runs, Spring Island, Western Shore	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod
July	14 Consecutive days with traps check 2-3 times a week	Rattlesnake Cave & Rattlesnake Well	Texas blind salamander
September	Check nets M and Th every week	Diversion Springs	Texas blind salamander, San Marcos salamander
September	2-day sampling event	Hotel Springs and Eastern Spillway	San Marcos salamander
September	1-day sampling event, hand pick	Landa Lake	Peck's cave amphipod Comal Springs dryopid beetle
September	1–3-day sampling event	Comal Springs	Comal Springs salamander
September	Set lures	Spring Runs, Spring Island, Western Shore	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod

Edward's Aquifer Species Collection Plan 2026			
Date (month)	**Interval**	**Location**	**Target Species**
October	14 Consecutive days with traps checked 2-3 times a week	Rattlesnake Cave & Rattlesnake Well	Texas blind salamander
October	Throughout, coincide with bio-monitoring	San Marcos River	Fountain darters
October	Throughout, coincide with bio-monitoring	Spring Island and Landa Lake	Fountain darters
October	Drift net, donated from bio-monitoring	Comal Springs	Peck's cave amphipod
October	Check nets M and Th every week	Diversion Springs	Texas blind salamander, San Marcos salamander
October	1-day sampling event	San Marcos River	Texas wild-rice
October	Retrieve Lures	Spring Runs, Spring Island, Western Shore	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod
October	1-day sampling event, hand pick from downed wood	Spring Runs, Landa Lake	Comal Springs dryopid beetle
October	1–3-day sampling event	Spring Island	Comal Springs salamander
November	14 Consecutive days with traps checked 2-3 times a week	Primer's Fissure & Johnson's Well	Texas blind salamander
November	1-day sampling event, hand pick	Landa Lake	Peck's cave amphipod Comal Springs dryopid beetle
November	Check nets M and Th every week	Diversion Springs	Texas blind salamander, San Marcos salamander

Edward's Aquifer Species Collection Plan 2026			
Date (month)	**Interval**	**Location**	**Target Species**
November	1–3-day sampling event	Comal Springs	Comal Springs salamander
November	Drift net, donated from bio-monitoring	Comal Springs	Peck's cave amphipod
November	Set lures	Spring Runs, Landa Lake	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod
December	Check nets Mand Th every week	Diversion Springs	Texas blind salamander, San Marcos salamander
December	1-day sampling event	San Marcos River	Texas wild-rice
December	Collect lures	Spring Runs, Landa Lake	Comal Springs riffle beetle, Comal Springs dryopid beetle, Peck's cave amphipod

Refugia Stocks:

Collection: Standing Stock numbers contribute to Refugia Stock numbers. Collections will continue until Standing stock targets are attained. If Refugia Stock triggers, outlined in the contract, are reached and Standing Stock are not at full capacity, USFWS will conduct special targeted collections to increase Standing Stock.

Maintenance: USFWS will conduct maintenance in a similar manner described for standing stocks.

Propagation: Propagation for stocking is not anticipated during 2026.

Salvage Stocks:

Collection: If specific salvage triggers defined in the EAHCP are reached, the Refugia Program, in consultation with the EAA, will accommodate salvaged organisms no more than twice during the 12-year contract period. If triggers for multiple species are simultaneously reached, species collections during salvage operations will be prioritized based upon the perceived impacts of reduced river and spring flow and habitat degradation on Covered

Species (i.e. EAHCP triggers). Those species that are river obligate species (i.e., fountain darters and Texas wild-rice) or that occupy spring orifice and interstitial ground water habitats (i.e., San Marcos and Comal Springs salamanders, Peck's cave amphipods, Comal Springs dryopid beetles) are presumed to be affected first as flows decrease. Those that reside solely within the aquifer (i.e., Edwards Aquifer diving beetles, Texas troglobitic water slaters and Texas blind salamanders) are presumed to be affected subsequently. In May 2025, 1,600 fountain darters in the Comal River were salvaged during an extreme low flow event. The fountain darters were reintroduced in the fall of 2025 once spring flows increased and air temperatures decreased. After discussion with the EAA and USFWS Ecological Services, if spring flows were to return to dangerously low levels (~40 cfs) in the future, Comal Springs fountain darters will first be moved to more connected areas of the Comal River where there is better habitat available. If the spring flows continue to decline and the Comal River habitat declines further, fountain darters will then be salvaged if there is no other suitable habitat to relocate them to further downstream.

Maintenance: The Refugia Program will maintain organisms collected during salvage operations at the SMARC and UNFH for up to one-year or until their disposition is determined. The Refugia Program may suspend or terminate research if space is required for salvaged organisms. Research may also be suspended if personnel are directed to collect and maintain salvage stocks.

Propagation: Likewise, production of species would be limited to no more than twice during the 12-year contract period if species extirpation occurs. USFWS propagated species at the SMARC or UNFH would be held for up to one year or less if stocking is required. We may suspend or terminate research activities if space is required to house cultured species. Research may also be suspended if personnel are needed to reproduce, maintain, or stock progeny.

Construction/Renovation/Infrastructure/Facility:

The USFWS will report any non-routine maintenance for the program buildings to the EAA as they occur.

The USFWS will institute all reasonable and practical security measures to safeguard EAA refugia facilities, equipment, and species.

Staffing/Labor/Personnel:

The two Program Leads (Research and Husbandry/Collections) will mentor and train lower-graded employees, oversee facility maintenance and repair, develop, and implement budgets, and organize activities that relate to all contract activities. The program leads will manage, and coordinate research, propagation, culture, and field activities related to the refugia. The leads are expected to provide proper and efficient use of facilities and staff resources. These leads will work with the Center Director and the Deputy Director to ensure that contractual obligations are

met in a timely manner. In coordination with the Deputy Center Director, the EARP team will prepare all the written materials required for the reimbursable agreement reporting. Likewise, the EARP team will prepare oral presentations to be used as briefing statements, outreach presentations, internal reports, work summaries, and technical presentations at professional meetings. The two leads will continue to work and communicate regularly with partners, USFWS personnel and other researchers to meet USFWS and contract goals.

Under the direction of the Program Leads, biologists and biological science technicians, split between SMARC and UNFH, will assist with the collection, daily upkeep, maintenance, propagation, and research efforts for the ten species at the SMARC and UNFH. This includes maintaining culture and experimental production systems, keeping records along with entering, filing, and collating data. The biologists and technicians will also generate basic summary statistics and graphic analyses of data and document program accomplishments through the composition of Standard Operating Procedures (SOPs), reports, and manuscripts.

Permitting:

Both the SMARC and UNFH operate under the USFWS Southwest Region's Federal Fish and Wildlife Permit for Native, Endangered, and Threatened Species Recovery (number TE676811-0) and the Texas Parks and Wildlife Scientific Research Permits (SPR-0822-106).

Biosecurity:

Both the UNFH and SMARC will practice biosecurity procedures in Refugia and Quarantine areas and conduct appropriate biosecurity procedures on field equipment.

Husbandry Pilot Studies:

The EARP will continue refining PCA neonate exclusion and manual removal efforts started as a 2025 research project. The manual removal of neonates resulted in neonates that survived the procedure and are actively growing in the Refugia. Passive exclusion takes more time due to the 6+ weeks required for neonates to develop and exit the female's brood pouch. Only a single mortality of a gravid female was observed while they were in the passive exclusion housing. The brooding females' eggs showed evidence of development while held in the passive exclusion housings. Additional time is required to fully assess the success of allowing neonates to separate themselves from brooding females in the passive exclusion housings and additional manual removals of neonates is required to determine overall survival of the brooding female and the neonates post removal.

Task 2. Research

The Research Plan for 2026 will continue to focus on genetic assessments of covered species but will also investigate reproductive activity of wild fountain darters and thermal tolerances of multiple HCP species. Genetics assessments for the Texas blind salamander, San Marcos salamander and fountain darter (Comal and San Marcos) will be concluded in 2026. Wild fountain darters in the lower reaches of the San Marcos River were observed reproducing at higher temperatures than were observed stopping reproduction in the lab. Research in 2026 will reassess basic life history of fountain darters in warmer stretches of the San Marcos River. Additionally, the thermal tolerance equipment developed in 2025 will be used to test thermal minimum and maximum tolerances as well as thermal preferences of covered species. Determining thermal tolerances further inform collection strategies, identify stressors, and optimize refugia conditions.

The total cost for proposed 2026 research will not exceed the contractually agreed amount of $503,075. $405,705 of the Task 2 budget is dedicated to funding research. $97,370 is for operating costs (FWS 24% overhead). The following section describes the basic components of each of these proposed 2026 activities

Table 6. Updated table showing the level of knowledge for each covered species. Knowledge score is a gradient from 0 to 5, where 0 is complete lack of knowledge and 5 indicates the existence of documented procedures for that species. Species with knowledge scores of 5 in each category indicate the species is in complete refugia.

Species	Collection	Husbandry	Propagation	Genetics	Reintroduction
Fountain darter	5	4	3	3	3
Texas wild-rice	5	5	5	5	5
Texas blind salamander	4	5	4	3	1
Peck's cave amphipod	5	4	3	4	3
San Marcos salamander	5	5	4	3	3
Comal Springs salamander	5	5	3	3	1
Comal Springs riffle beetle	5	5	4	4	4
Comal Springs dryopid beetle	5	4	2	4	1
Texas troglobitic water slater	1	1	0	1	1
Edwards Aquifer diving beetle	1	0	0	0	1

Project 1:

Title: Testing thermal tolerances and preferences of current and future covered HCP species.
Species: *multiple*
Principal: USFWS
Overview: A few studies have investigated temperature tolerance in EAHCP covered species. Unfortunately, these studies do not use standard practices, are not very precise and have only investigated high temperatures. A variable temperature gradient prototype

was developed by the Huffman laboratory that allows for the stable establishment of a very precise and customizable temperature gradient to investigate thermal tolerances. The prototype was optimized in 2025. In 2025, the thermal minimum and maximum temperatures will be assessed for covered species using captive propagated individuals. The optimal preferred temperature will also be determined.
Budget: SCA Intern ($75,705) + USFWS support ($20,000) = $95,705
Benefit to the Refugia: Establishing thermal tolerances improves refugia housing conditions by determining the extent of acceptable fluctuation in water temperatures maintained by heater/chiller units, especially during extreme outdoor temperature conditions. Additionally, investigating the extent of each species thermal tolerances can provide information about how species may tolerate low flows and extreme temperature conditions in the wild.
Expected Results: A report will be presented to the EAA, and a peer-reviewed publication will be generated, if appropriate.

Project 2:

Title: Genetic Assessment of Texas Blind Salamanders and San Marcos Salamanders
Species: *Eurycea rathbuni and Eurycea nana*
Principal: Dr. Chris Nice and Dr. Kate Bell (Texas State University)
Overview: A fully functioning captive assurance population is representative of the wild population and reflects the genetic diversity and unique genotypes found in the wild. Additionally, captive propagation efforts should take into account the genetics of captive held individuals to maintain genetic diversity in the refugia to ensure captive propagation efforts do not result in a reduction in diversity of Fx progeny. Tail clips were collected from wild Texas blind salamanders in 2024 while encountered during collection events. These tail clips will be used to assess wild genetic diversity. Tail clips will be collected from standing stock and captive propagated salamanders in the refugia. All refugia salamanders will be uniquely tagged with p-chips so that individual genetic IDs will be available. High-throughput sequencing will be used to assess genetic variation of wild caught and Fx captive breed Texas blind salamanders.
Budget: TXST ($120,000) + USFWS support ($20,000) = $140,000
Benefit to the Refugia: A genetic assessment of Texas blind salamanders will determine if the standing stock in the Refugia are reflective of the wild population, provide individual genetic IDs to current Refugia standing stock, and inform captive breeding strategies if reintroduction of Fx were needed.
Expected Results: A report will be presented to the EAA, and a peer-reviewed publication will be generated, if appropriate.

Project 3:

Title: Fountain Darter Genetic Assessment
Species: *Etheostoma fonticola*
Principal: Dr. Chris Nice and Dr. Kate Bell (Texas State University)
Overview: A fully functioning captive assurance population is representative of the wild population and reflects the genetic diversity and unique genotypes found in the wild. Additionally, captive propagation efforts should account for the genetics of captive held

individuals to maintain genetic diversity in the refugia to ensure captive propagation efforts do not result in a reduction in diversity of Fx progeny. High-throughput sequencing will be used to assess genetic variation of wild caught fountain darters. Fountain darter mortalities from the 2024 seasonal collections will be used to inform this study. Additional fish may be collected, and non-fatal fin clip samples retained if specific sampling sites are underrepresented.
Budget: TXST ($60,000) + USFWS support ($20,000) = $80,000
Benefit to the Refugia: A genetic assessment of fountain darters will determine if the standing stock in the Refugia are reflective of the wild population, provide individual genetic IDs to current Refugia standing stock, and inform captive breeding strategies if reintroduction of Fx were needed.
Expected Results: A report will be presented to the EAA, and a peer-reviewed publication will be generated, if appropriate.

Project 4:

Title: Assessment of reproduction and other life history aspects of the fountain darter in a eurythermal reach of the San Marcos river
Species: *Etheostoma fonticola*
Principal: Dr. Tim Bonner (Texas State University)
Overview: Purpose of this study is to quantify basic life history (e.g., reproduction, diets, age groups, growth) of the endangered fountain darter in a eurythermal reach of the San Marcos River. Fountain darters are reported to be restricted to the upper reaches of the San Marcos and Comal rivers because of their dependence on narrow temperature ranges (stenothermal) associated with spring flow. Interestingly, fountain darters have been found further downstream in the San Marcos River and breeding in water temperatures that exceed previously determine reproductive limits. Consequently, quantifying life history of fountain darters that persist in higher water temperatures and comparing their life history to previously reported life history of fountain darters from stenothermal reaches would offer a unique opportunity to assess the influence of fluctuating water temperatures, and by extension, low spring flows, on fountain darter reproduction, growth, and survival under natural conditions. Study objectives will include 1) quantifying monthly estimates of gonadosomatic index (GSI), ovarian stage, and oocyte diameters, 2) assessing monthly stomach contents, and 3) estimating growth, age groups, and age-group survival using length frequency histograms. Additional objectives may include, time permitting, age estimates using otoliths and quantifying parasite load. Three to five females of reproductive length (>24 mm in total length) will be collected monthly from a single site on the San Marcos River near Martindale with seines. Collections to assess body condition will not exceed 60 fish from the San Marcos River. Fish will be anesthetized in MS-222 and fixed in 10% formalin. After two weeks, fish will be rinsed in tap water and preserved in 70% ethanol until dissected. On a separate collection date, up to 50 additional fountain darters will be captured with seines, measured to the nearest mm in total length, and released. The length data will be used to develop robust length frequency histograms informing age classes and cohorts. Water temperature sensors will be deployed in slackwater habitats, where female fountain darters will be collected, at the start and for the duration of the project for the purpose of obtaining high resolution water temperature data to overlay with ovarian development

and egg release.
Budget: TXST ($50,000) + USFWS support ($20,000) = $70,000
Benefit to the Refugia: This research will reassess what was understood of the basic life history of fountain darters and inform captive breeding strategies, wild collections and reintroductions/fish movement. This study will also inform if fountain darters can persist in higher water temperatures and lower flows than previously identified, informing salvage actions during low flow events.
Expected Results: A report will be presented to the EAA, and a peer-reviewed publication will be generated, if appropriate.

Project 5:

Title: Continuation: Assessing the effectiveness of using pictures for mark and recapture of San Marcos salamanders.
Species: *Eurycea nana*
Principal: USFWS
Overview: in 2023-2024, the EARP conducted a yearlong mark and recapture effort using pChip transponders in the San Marcos salamander. The study was very successful and produced information on recapture rates, movement, population demographics, and estimates of population size. 453 salamanders were tagged with pChips and over 3000 salamanders were collected during the study. Photos were taken of all salamanders collected during the study and 2025 work validated the efficacy of using photos as a "tagging" method to assess populations through capture-mark-recapture studies. Photo recognition software (Wild.ID) successfully identified p-chip tagged recaptured salamanders and identified additional recaptured salamanders that were not tagged; bolstering the available data to make population size estimates and assess movement between sampling locations. 2026 work will finish processing the remaining photos, run all photos through Wild.ID and finalize movement assessments and population estimates.
Budget: $20,000
Benefit to the Refugia: Population estimates can inform how many individuals are required to maintain in the Refugia to ensure the refugia population is representative of the wild population. Lack of movement between sites informs collection efforts, breeding strategies in the refugia and reintroduction plans.
Expected Results: A report will be presented to the EAA, and a peer-reviewed publication will be generated, if appropriate.

Task 3. Species Propagation and Husbandry

Development and refinement of SOPs for animal rearing and captive propagation: SMARC and UNFH will continue to refine SOPs for all species as needed for updates to reflect new protocols that are instituted for each species throughout the year. As new information becomes available about genetic management and improvements to captive holding and propagation practices, SMARC and UNFH will further develop draft Captive Propagation Plans for all species.

Task 4. Species Reintroduction

Reintroduction Plan for term of contract:
SMARC and UNFH continue to refine the Reintroduction Strategy as new information becomes available.

Reintroduction Plan for 2026: None

Any anticipated triggers being prepared for: Given current weather predictions, spring flows, and the Edwards Aquifer water level, no anticipated triggers are anticipated during the 2026 performance period.

Task 5. Reporting

5.1 Species specific Propagation plans (SOPs): Refine throughout year as needed
5.2 Species specific Genetic Management plans: Texas wild-rice, Texas blind salamander, San Marcos salamander, Peck's cave amphipod; contingent on when genetic study results are finished.
5.3 Species specific reintroduction plans: Refine as needed
5.4 2026 EAHCP Annual Program reporting– A year-end report of 2026 activities will be provided to the EAA no later than 1/31/2027.
5.5 Program reporting as required by ITP and TPWD. TPWD Scientific Research Permit Report will be filed July 31, 2026.
5.6 Descriptions and photographs of procedures from collections to restocking – Photographs and documentation of collection and restocking will be included in the monthly report to the EAA CSO along with the year-end report.
5.7 Summaries of any data analyses, research, or genetic analyses – Research projects and results of collection efforts will be provided to the EAA in the monthly reports, year-end documentation, and stand-alone documents (agreed upon by Center Director and HCP CSO).
5.8 Description of terms and conditions of any permits received – As permits are received, their contents will be conveyed to the EAA.
5.9 Monthly electronic reports to HCP CSO: A monthly report of all activities will be provided to the HCP CSO. We anticipate providing the report by the 10th of each month for the previous month's activities.

Task 6. Meetings and Presentations

Planning or coordination meetings:
- Yearly planning meeting with SMARC and UNFH staff
- Public meetings
  - EAA Board
    - End of year report
    - Present research results
  - Implementing Committee
    - End of year summary

- Stakeholder Committee
  - End of year summary
- Science Committee
  - Methods for research projects
  - Present research results
- Professional Scientific Meetings

Monitoring:
Monitoring will be conducted through progress reports and site visits to the refugia as well as through collaborative management by the EAHCP CSO.

Budget: The 2026 EARP budget remains within the Exhibit D budget with modifications to Task 1, Task 5 and Task 6. No funds were removed from or added to Task 2 as all Exhibit D funds are allocated to 2026 research projects. $75,132 from Task 5 and $11,057 from Task 6 were moved to Task 1 for a total increase of $86,189 to Task 1. The Exhibit D funding in Tasks 5 and 6 have historically been larger than required for EARP staff to meet program needs while Task 1 has required more funding to cover husbandry and collection activities on a yearly basis. Much of the extra funding required in Task 1 is to bring on interns/staff to carry out husbandry and collection duties after the EARP lost multiple staff members in 2025. The 2026 purchasing budget in Task 1 (i.e. food and life support systems) is reduced from previous years because the EARP has the required parts and equipment to finalize updated life support systems in Quarantine and Refugia spaces. The purchase budget will mostly be used to cover food, field gear, general husbandry equipment and system replacement parts.

US. Fish and Wildlife Service 2026		
Task	Description	2026 Work Plan Amounts
1	**Refugia Operations**	
	SMARC Refugia & Quarantine Bldgs	
	Equipment & Building Maintenance	$6,000.00
	Utilities	$10,500.00
	UNFH Refugia & Quarantine Bldgs	
	Equipment & Building Maintenance	$10,000.00
	Utilities	$30,000.00
	SMARC Species Husbandry and Collection	$93,000.00
	UNFH Species Husbandry and Collection	$260,000.00
	Student Conservation Association	$137,000.00

	Fish Health	$8,000.00
	SMARC Reimbursables	$50,276.00
	UNFH Reimbursables	$50,000.00
	Subtotal	$654,776.00
	Admin Cost Subtotal (24% Overhead)	$157,147.00
	Task 1 Total	**$811,923.00**
	Research	
	Partnered Research	
	Texas State University: Salamander Genetics	$120,000.00
	Texas State University: Fountain Darter Genetics	$60,000.00
	Texas State University: Fountain Darter GSI	$50,000.00
2		
	FWS Research and Support	
	FWS Salary	$100,000.00
	SCA Thermal Tolerance	$75,705.00
	Subtotal	$405,705.00
	Admin costs for Task 2 (24% Overhead)	$97,370.00
	Task 2 Total	**$503,075.00**
	Reporting	
	SMARC Staff	$6,000.00
	UNFH Staff	$6,000.00
5		
	Subtotal	$12,000.00
	Admin costs for Task 5 (24% Overhead)	$2,880.00
	Task 5 Total	**$14,880.00**
6	**Meetings and Presentations**	
	SMARC Staff	$7,000.00
	UNFH Staff	$5,000.00
	Subtotal	$12,000.00
	Admin costs for Task 6 (24% Overhead)	$2,880.00
	Task 6 Total	**$14,880.00**

Totals	**$1,344,758.00**

Projected (2026) Budget Summarized by Task:

Task 1: $811,923
Task 2: $503,075
Task 3: $0
Task 4: $0
Task 5: $14,880
Task 6: $14,880

Projected (2026) Subcontractor Expenses Summarized by Task

Task 1: Student Conservation Association: $137,000
Task 2: Texas State Salamander Genetics: $120,000
Task 2: Texas State Fountain Darter Genetics: $60,000
Task 2: Texas State Fountain Darter Gonadosomatic Index (GSI): $50,000
Task 2: Student Conservation Association Thermal Tolerance: $75,705
Task 3: $0
Task 4: $0
Task 5: $0
Task 6: $0

Timeline of 2026 Milestones

January	Subcontracted research awards executed
	2026 Specific Research Study Plans finalized
July	Submit and renew TPWD permit
September	Draft Research Reports
December	Draft Annual report

Literature Cited

AFS-FHS (American Fisheries Society-Fish Health Section). 2005. Model Quality Assurance/Quality Control Program For Fish Health Laboratories, 2016 edition. Accessible at: http://afs-fhs.org/bluebook/bluebook-index.php.

Hall, R (Edwards Aquifer Authority). 2016. 2016 Comal Springs Riffle Beetle SOP Work Group: Attachment 2: Existing CSRB Cotton Lure SOP. Available at: http://www.eahcp.org/index.php/administration/work_groups/2016_comal_springs_riffle_beetle_sop_work_group

Corbin, A. B. 2020. Population genomics and conservation of texas cave and spring salamanders (Plethodontidae: Eurycea). University of Texas, Arlington, Texas.

Lucas, L. K., Fries, Joe N., Gabor, Caitlin R., Nice, Chris C. 2009. Genetic variation and structure in Eurycea nana, a federally threatened salamander endemic to the San Marcos springs. Journal of Herpetology 43(2):220-227.

Wilson, W. D., J. T. Hutchinson, K. G. Ostrand. 2016. Genetic diversity assessment of in situ and ex situ Texas wild-rice (Zizania texana) populations, an endangered plant. Aquatic Botany 136:212-219.

USFWS and AFS-FHS (U.S. Fish and Wildlife Service and American Fisheries Society-Fish Health Section). 2016. Standard procedures for aquatic animal health inspections. In AFS-FHS. FHS blue book: suggested procedures for the detection and identification of certain finfish and shellfish pathogens, 2016 edition. Accessible at: http://afs-fhs.org/bluebook/bluebook-index.php.

5.1.2 Voluntary Irrigation Suspension Program Option

Long-term Objective:

The goal of VISPO is to enroll 41,795 acre-feet (AF) of permitted irrigation rights (base and/or unrestricted) that will remain unused in years of severe drought based on the USFWS approved 2019 amendment. Permit holders are enrolled in five-year and ten-year VISPO agreements and will be compensated based on the amount of water enrolled and the program selected. Permit

holders enrolled in 10-year agreements are paid a standby fee of $70.20/ac-ft per year every year of the term regardless of aquifer conditions and an additional fee of $210.60/ac-ft per year will be paid for each year when temporary pumping suspensions are required. Permit holders enrolled in 5-year agreements are paid a standby fee of $54/ac-ft per year every year of the term regardless of aquifer conditions and an additional fee of $160/ac-ft per year will be paid for each year when temporary pumping suspensions are required. On December 31, 2026, over 3,960.939 acre-feet in VISPO agreements will expire and those permit holders are currently being offered the opportunity to renew their VISPO forbearance agreements prior to their expiration.

If the water level at the J-17 index well in San Antonio is at or below 635 feet on October 1 of any year, program participants are contractually obligated to suspend the use of their enrolled water for the following year - beginning on January 1. On October 1, 2025, the J-17 index well was reported to be at 628 feet msl, therefore triggering suspension of use of enrolled water in VISPO by participating permit holders in year 2026. Annual VISPO payouts through 2025 are reflected in Table 5.1.2-1.

Table 5.1.2-1: VISPO Total Payout by Year

Year	Payment Type	Total Enrolled (AF)	Total
2014	Stand-by	22,388	$1,201,938
2015	Stand-by + Suspension	40,921	$8,677,262[a]
2016	Stand-by	40,921	$2,208,723
2017	Stand-by	40,921	$2,228,299
2018	Stand-by	40,921	$2,320,309
2019	Stand-by	39,646	$2,341,927
2020	Stand-by	39,803	$2,508,070
2021	Stand-by	41,795	$2,509,975
2022	Stand-by	41,795	$2,331,858
2023	Stand-by + Suspension	41,795	$9,987,533[b]
2024	Stand-by + Suspension	41,795	$8,936,926[c]
2025	Stand-by + Suspension	41,795	$8,654,550[d]
		Grand Total	$53,907,370

a. 2015 payment breakdown: Standby $2,169,315; Suspension $6,507,947
b. 2023 payment breakdown: Standby $2,509,975; Suspension $7,477,576
c. 2024 payment breakdown: Standby $2,252,077; Suspension $6,684,849
d. 2025 payment breakdown: Standby $2,183,760; Suspension $8,654,550

Target for 2026:

The total volume goal of 41,795 ac-ft in VISPO agreements will continue to be maintained and managed by EAA staff. Throughout 2026, staff will continue to work on renewing 29 VISPO agreements totaling 3,960.939 acre-feet that will expire on December 31, 2026. VISPO suspension payments will be made to program enrollees by March 1, 2026.

Budget:
Table 7.1:
$4,172,000

Estimated 2026 budget if Standby:
Standby: $2,183,760

Estimated 2026 budget if Suspension:
Suspension: $8,654,550

5.1.3 Regional Water Conservation Program

Long-term Objective:
Conservation measures will be implemented to conserve 20,000 acre-feet of water to reduce withdrawals from the Edwards Aquifer by 10,000 acre-feet. The concept is to reduce aquifer withdrawals by 10,000 acre-feet using a Regional Water Conservation Program (RWCP).

Several entities within the Edwards Aquifer Authority (EAA) jurisdictional area agreed to make Initial Commitments to the EAA Groundwater Trust to provide an immediate benefit to the aquifer and springflow. The EAA maintains contracts with three communities to conserve water under the RWCP through 2028. The City of Uvalde began implementing its toilet replacement program in 2013 to conserve 57.450 ac-ft of water. In 2014, the City of Universal City began implementing its leak detection program to conserve 163.684 ac-ft of water and in 2016, SAWS began implementing a five-year Leak Detection and Repair Program. The SAWS Leak Detection and Repair Program satisfies the total remaining RWCP goal for water committed into the EAA Groundwater Trust for the remainder of Incidental Take Permit (TE-63663A-1).

The estimated total savings of 20,053 ac-ft of conserved water was achieved from all three communities in 2020. One-half of the conserved water (10,027.13 ac-ft) has been placed in the EAHCP Groundwater Trust through the RWCP to remain unpumped through 2028.

Target for 2026:
None. This conservation measure was achieved in 2020 and 10,027.13 ac-ft has been placed in the EAHCP Groundwater Trust.

Budget:

Table 7.1:
$493,250

Estimated 2026 budget:
$0

5.1.4 Edwards Aquifer Authority Stage V Critical Period Management

Stage V Critical Period Management was developed to help decrease withdrawals and maintain adequate springflows at both Comal and San Marcos Springs during times of drought. On February 14, 2012, the Edwards Aquifer Authority (EAA) Board of Directors voted to amend its Critical Period Management (CPM) Program to include the new emergency Stage V. Implementation of Stage V results in a reduction of 44% to municipal, industrial and irrigation permit holders in both pools of the Edwards Aquifer who are authorized to withdraw more than 3 ac-ft per year. Stage V became effective as a rule on March 18, 2013 when the Incidental Take Permit was issued by the U.S. Fish and Wildlife Service.

2026 Implementation:

EAA staff monitors daily aquifer levels in both the San Antonio and Uvalde Pools of the Edwards Aquifer Region, and if at any time, the 10-day average for aquifer or springflow levels in either pool reaches the designated trigger for Stage V, the EAA General Manager will issue a Notice of Commencement for implementation in five newspapers within the EAA jurisdiction. Notice will also be posted at the EAA's office and on the EAA website. All affected permit holders will also be provided written notice of implementation of Stage V and the requirement to reduce pumping by 44%.

Permit Holder Assistance:

The EAA provides an online Critical Period Calculator to assist permit holders in calculating CPM reductions as they apply to each individual permit holder's total authorized withdrawal amount throughout the year. EAA staff also assists permit holders through "one-on-one" customer service offerings as may be necessary.

Triggers:

The triggers for Stage V in the San Antonio Pool are as follows: the 10-day average at the J-17 index well in San Antonio falls below 625 mean sea level (msl); or the 10-day average at Comal Springs falls below 45 cubic feet per second (cfs); or the 3-day average at Comal Springs falls below 40 cfs. In the Uvalde Pool, Stage V is triggered when the 10-day average at the J-27 index well falls below 840 msl.

Reporting:

By rule, permit holders are required to report their annual groundwater use to the EAA by January 31 for all groundwater used the preceding year. Permit holders who use more Edwards groundwater than authorized annually are subject to enforcement action.

5.5.1 Edwards Aquifer Authority and San Antonio Water System Aquifer Storage and Recovery Work Plan

Section 5.5.1 of the Edwards Aquifer Habitat Conservation Plan (EAHCP) assigns acquiring leases of water permits for use in the San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR) to the Edwards Aquifer Authority (EAA). SAWS will operate the ASR infrastructure and retain control of day-to-day operations of the ASR facility related to EAHCP water injection and recovery. The EAA will ensure compliance with EAHCP requirements through management of the Interlocal Contract between the EAA and SAWS for the Use of the Twin Oaks Aquifer Storage and Recovery Project for Contribution to Springflow Protection, which became effective August 14, 2013. The contract outlines the responsibilities of both parties, including administration and implementation.

Long-term Objective:
The objective of SAWS Twin Oaks ASR (ASR now runs out of H_2O Oaks facility) system is to deliver 126,000 acre-feet of Edwards Aquifer groundwater. This water is best managed to offset pumping from Edwards Aquifer wells during a repeat of a drought similar to the drought of record and acquire an additional 50,000 acre-feet of agricultural, municipal, industrial groundwater withdrawal rights that will be unpumped during a repeat of the drought of record.

Target for 2026:
The ASR contract between EAA and SAWS will continue to be implemented. EAA is the agent for ASR enrollments and in year 2020 issued its final notice of availability of EAHCP groundwater to SAWS for injection resulting in the completion of the storage goal of 126,000 acre-feet. Effective in 2021, a total of 50,000 acre-feet of groundwater rights was secured by EAA staff to be used as forbearance water and will go unpumped during a repeat of a drought of record. Future water acquired by the EAA through contractual agreements will be necessary to maintain the 50,000 ac-ft balance due to expiring leases occurring annually. The 50,000 ac-ft balance will be utilized for forbearance purposes during a repeat of a drought of record as outlined in the EAHCP. During a drought of record, the stored ASR water may be used by SAWS to offset forbearance and the EAA will also forbear the use of the 50,000 acre-feet of groundwater under its control.

ASR Program:

Description of the SAWS ASR: The SAWS H_2Oaks ASR is an underground storage reserve in the Carrizo Aquifer in southern Bexar County. As a SAWS water management project, it is designed to store Edwards Aquifer water when demand is less than available supply. The stored water is returned to San Antonio for use when demand is high and Edwards supply is restricted by Critical Period Management and other drought-related limitations.

The capacity and capabilities of the SAWS ASR are such that it can be used to meet SAWS ratepayer expectations and, if operated as described in the EAHCP, will play a significant role protecting the Covered Species at Comal and San Marcos springs.

Operations: The EAHCP Program Interlocal Contract between the EAA and SAWS for the Use of the Twin Oaks Aquifer Storage and Recovery Project for contribution to Springflow

Protection, effective August 14, 2013, takes elements of the EAHCP's ASR flow protection strategy and places them into an operations contract.

Injection: Storage of EAHCP groundwater shall be at the discretion of SAWS and will be dependent on operating conditions. All EAHCP groundwater made available to SAWS before June 30th, 2020, was physically stored or credited as if stored, and will be used to meet any forbearance from the Aquifer should triggers defined in the Interlocal Contract occur in 2026.

Forbearance and Recovery: Forbearance of Edwards Aquifer pumping from certain wells will occur when the ten-year rolling recharge average is less than 500,000 acre-feet and the ten-day average of aquifer levels measured at the J-17 index well drop below 630 feet mean sea level (MSL). The annual amount of water to be recovered from the ASR during a repeat of the drought of record is outlined in Exhibits E & F of the Interlocal Contract. Changes to the Presumptive Forbearance Schedule outlined in Exhibit E may be approved as outlined in Section 5.3 of the Interlocal Contract. The total annual recharge for the Edwards Aquifer reported April 3, 2025 was 154,000 acre-feet, resulting in the 10-year recharge average of 554,340 acre-feet. The ten-day average of aquifer levels measured at the J-17 index well as of April 3, 2025 was 629.1 ft msl.

Leasing: In 2018, EAA staff began marketing long-term (ten-year) forbearance agreements with regional permit holders and in 2020 completed the enrollment goal for years 2021 through 2028. In 2026, the total amount of water available under long-term leases is 11,293.418 acre-feet and 38,513.982 acre-feet in forbearance agreements for a total of 50,000 acre-feet. On December 31, 2026, a total of 4 ASR leases in the amount of 601.400 acre-feet will expire and will be re-enrolled as a forbearance agreements by the end of 2026 and will be applied to the 2027 balance. EAA staff will continue to maintain and manage 50,000 acre-feet of groundwater withdrawal rights under leases and forbearance agreements. This water will remain unused during a repeat of drought of record conditions.

Monitoring:
The EAA will actively manage the Interlocal Contract with SAWS. Status reports and updates will be provided regularly to the Implementing Committee.

ASR Regional Advisory Group: Per Section 5.5.1 of the EAHCP, a 12-person SAWS ASR Regional Advisory Group will meet to advise SAWS as SAWS makes the decisions relating to the operation of the ASR facility relevant to the EAHCP. Membership on the Regional Advisory Group will include: four representatives from the San Antonio Water System, the EAHCP Program Manager; one representative each from the EAA, EAA permit holder for irrigation purposes, small municipal pumpers, the spring cities, environmental interests, industrial pumpers, and downstream interests.

Budget:

Table 7.1:	Estimated 2026 budget:
$4,759,000 – Lease Options	$5,651,894 – Lease & Forbearance Options
$2,194,000 – O&M	$0 – O&M
$6,953,000 – Total	$5,651,894 – Total

5.7.2 Water Quality Monitoring Program Strategy for Comal Springs and San Marcos Springs

This work plan details the sampling strategy and protocols for water quality monitoring in 2026 for the Edwards Aquifer Habitat Conservation Plan (EAHCP) (Section 5.7.2) implemented by the Edwards Aquifer Authority (EAA). Water quality monitoring of the Comal and San Marcos springs complexes and their associated surface waters has occurred since 2013 under implementation of the EAHCP. During this time period, the program has employed a variety of sampling strategies: stormwater, surface water, sediments, fish tissue, and passive samplers aimed at a range of environmental contaminants.

The water quality monitoring program underwent a formal review as part of the *National Academy of Sciences (NAS) Report 1* (2015) containing recommendations for EAHCP's Monitoring, Modeling and Applied Research programs, including the Expanded Water Quality Monitoring Program. Subsequently, a work group was formed in 2016 to assess recommendations presented in the NAS report. The result was a scope of work that was executed from 2017 – 2020.

Beginning in 2021, additional refinements to the program are being implemented. The primary changes from the previous implementation include discontinuing stormwater and passive sampling, adding surface water sampling, and modifying the analyte list. Table 1 presents an overview of the core activities comprising the EAHCP Water Quality monitoring program. Additionally, as needs arise, other water quality sampling activities may occur as developed through the EAHCP committees and included in the Annual Work Plan.

Target for 2026:
Water quality monitoring activities for 2026 include sampling activities for surface water, groundwater, and fish tissue in addition to operation of the real-time network. Specific actions for each sample type are discussed below. Analyte lists and maps follow this discussion. All samples will be collected following the EAA's *Field Sampling Plan* and analyzed by a NELAP accredited contract laboratory.

Groundwater sampling:

Groundwater samples will be collected from Spring 1, Spring 3, Spring 7 (Comal), Deep and Hotel (San Marcos) springs during the Spring and Fall under normal flow conditions (Figures A1 and A2). Groundwater samples will be collected by directly filling a bottle or using a previously decontaminated peristaltic pump with the intake portion of the pump placed in the spring orifice to minimize surface water contamination. Samples will be submitted to a contract laboratory for analysis of cations, anions, nutrients, metals, VOCs, SVOCs, herbicides and pesticides, bacteria, TOC, PCBs, and PPCPs. The analyte list for laboratory analyses along with the methods are shown in Table 4. During the collection event, field parameters will be collected that include dissolved oxygen, pH, conductivity, temperature, and alkalinity.

In addition to the biannual groundwater sampling, sucralose will be measured on a monthly basis at Spring 3 and Hotel, and PPCPs will be measured on an every other month basis at Spring 3

and Hotel. These samples will be collected by directly filling bottles at the source of spring flow. During the collection event, field parameters will be collected that include dissolved oxygen, pH, conductivity, and temperature.

Table 1. EAHCP Water Quality monitoring program core activities.

Sample Type	Activity
Surface water	Twice annual sampling in conjunction with Biological Monitoring activities
	Laboratory analyses are focused on bacteria and nutrients
	Locations include upper and lower stations at each spring system
Groundwater	Twice annual sampling in conjunction with EAA springs sampling activities
	Laboratory analyses are focused on geochemical analytes and industrial, commercial, and emerging contaminants. The analytes include cations, anions, nutrients, metals, VOCs, SVOCs, herbicides, pesticides, bacteria, TOC, PCBs, and PPCPs
	Locations include Spring 1, Spring 3, Spring 7 (Comal), Hotel, and Deep (San Marcos)
Sediment	Every other year sampling in even numbered years
	Laboratory analyses are focused on PAHs
	Locations include 6 San Marcos and 5 Comal stations
Fish Tissue	Every other year sampling in odd numbered years
	Laboratory analyses are focused on metals and PPCPs in two fish species
	Locations include upper and lower stations at each spring system
Real-time network	Continuous, telemetered measurements
	Analytes include temperature, dissolved oxygen, and conductivity
	Locations include 3 San Marcos and 3 Comal stations

Surface water sampling:

Surface water samples will be collected from upper and lower river stations at both systems. For Comal Springs, Landa Lake near Spring Island will serve as the upper location, and the lower station is downstream of the Old and New Channel confluence. In San Marcos, Spring Lake near Hotel spring will serve as the upper location, and the downstream location is located at the most downstream real-time water quality monitoring station. Samples at each location will be collected on a biannual basis during normal flow conditions in conjunction with the Biological Monitoring program (Spring and Fall). Water samples will be taken from flowing parts of the stream on the upstream side of the sample collector. A previously decontaminated Kemmerer or similar device will be used to collect samples at approximately mid-depth in the water column. Samples will be submitted to a contract laboratory for analysis of nutrients (Table 5). During the collection event, field parameters will be collected that include dissolved oxygen, pH, conductivity, and temperature.

Sediment sampling:

Sediment samples will be collected once from four locations within the Comal and six locations in San Marcos (Figures 1 and 2). Three samples will be collected at each sample site and composited into one sample for analysis. Sediment samples will be analyzed for the parameters shown in Table 6.

Real Time Instrument Water Quality Data Logging:

Continuous water quality monitoring stations will continue in 2026 at three locations in the Comal and three locations in San Marcos. The network consists of Insitu AquaTroll sondes measuring dissolved oxygen, conductivity, temperature, and turbidity (Sessom Creek only). Measurements are collected every fifteen minutes and telemetered in real-time.

Quality control procedures:

Field collection methods and quality control procedures for the discrete sampling types are guided by the EAA's Field Sampling Plan. The anticipated number of samples and field quality control samples sent for analyses in 2026 are shown in Table 2. Brief descriptions of the intent of the quality control tests are described below.

Table 2. Sample amounts for 2026 water quality activities.

Sample type	Field Samples	Equipment blank	DI blank	Lab duplicate	Field duplicate	Total samples
Groundwater	18	2	2			22
Sucralose	24		4		2	30
Surface water	10	2			4	16
Sediment	10				2	12

Both equipment blanks and DI blanks use reagent grade ASTM II deionized water to assess external contamination of environmental samples. Equipment blanks examine the contamination introduced through the sampling procedure. These are conducted by transferring the deionized water through equipment that has been decontaminated for field use. DI blanks consist of deionized water sent directly to the laboratory and are designed to examine sample containers and other laboratory contamination.

Lab and field duplicates are intended to assess the precision and repeatability of the analytical procedure and homogeneity of the environmental sample type. Laboratory duplicates consists of a single well-mixed sample split into two samples for analysis. Field duplicates consists of a second sample collected immediately after an initial sample.

Additionally, all laboratory quality control data including matrix spikes and surrogate blanks will be reported.

Monitoring:
A summary report presenting the 2026-year findings will be prepared by EAA staff and included in the EAHCP annual report. The report will include an evaluation of the analytical data and its quality, discussions of results, and a description and rationale for any deviations from the Work Plan described here. The report will be completed by March 2026.

Data collected as part of the 2026 EAHCP Water Quality monitoring program will be kept electronically with the EAA. Data from quality controlled discrete sample types (surface water, groundwater, sediment, and fish tissue) will be housed by EAHCP staff in delimited file types that include all discrete measurements from the program beginning in 2013. Quality controlled time series data associated with the real-time network are housed with existing aquifer time-series data by the EAA.

Cost Estimate:
Costs for laboratory analyses are shown in Table 3 and are based on estimates provided by commercial laboratories in 2023. Field supplies costs in Table 3 cover field collection and analysis equipment including calibration standards and Kemmerer device.

Table 3. Estimated 2026 EAHCP Water Quality monitoring program costs.

Sample type	Total samples	Cost per sample	Total Costs
Groundwater	22	$1,1174	$25,828
Sucralose	30	$232	$6,960
Surface water	16	$250	$4,000
Sediment	12	$200	$2,400
Field Supplies			$5,000
		Total	**$40,188***

*This amount does not include surplus monies made available for additional Water Quality Monitoring needs but will not exceed the $65,000 listed in the funding table on Page 2.

Sample location maps and analyte lists

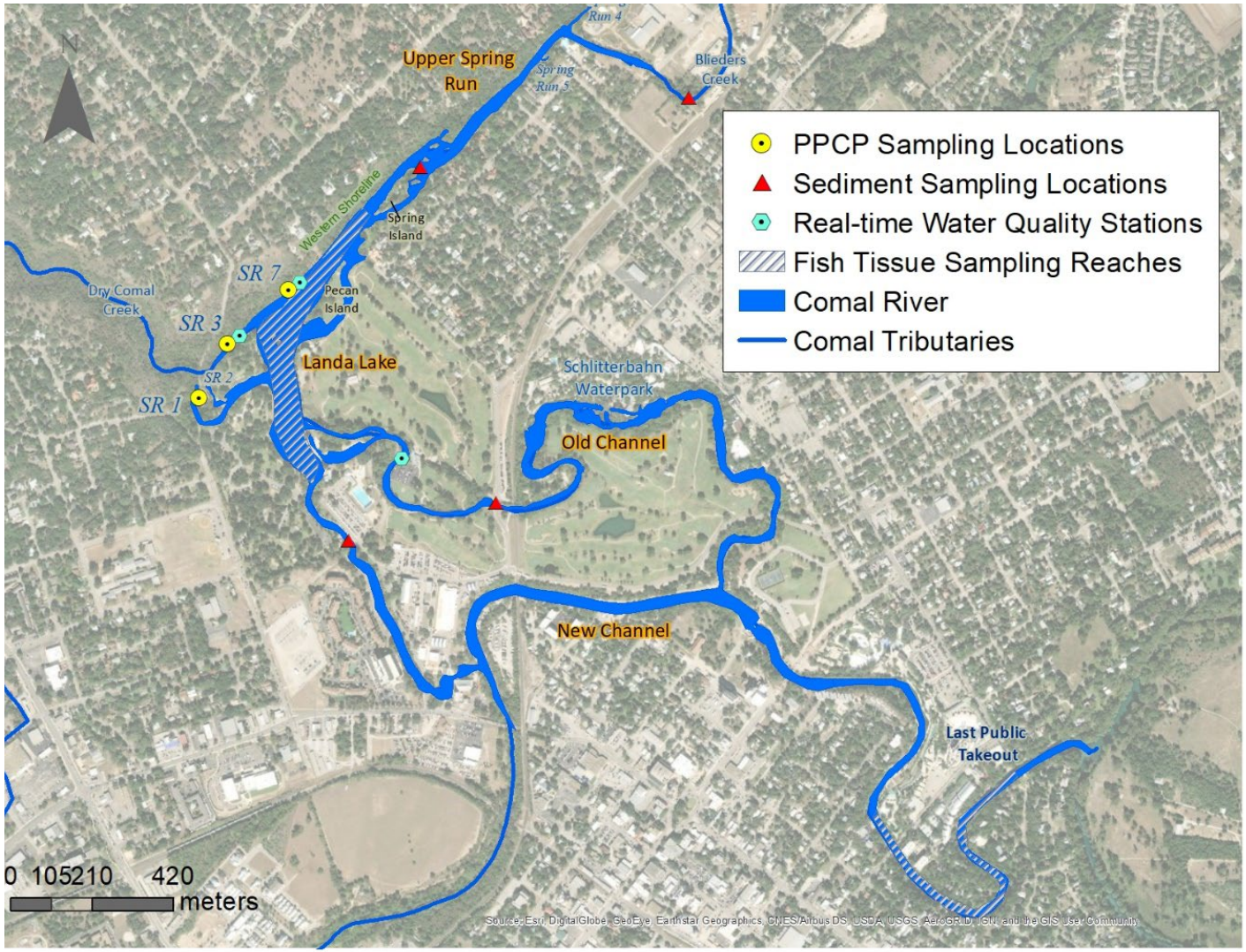


Figure 1. Water quality sampling locations for the Comal system.

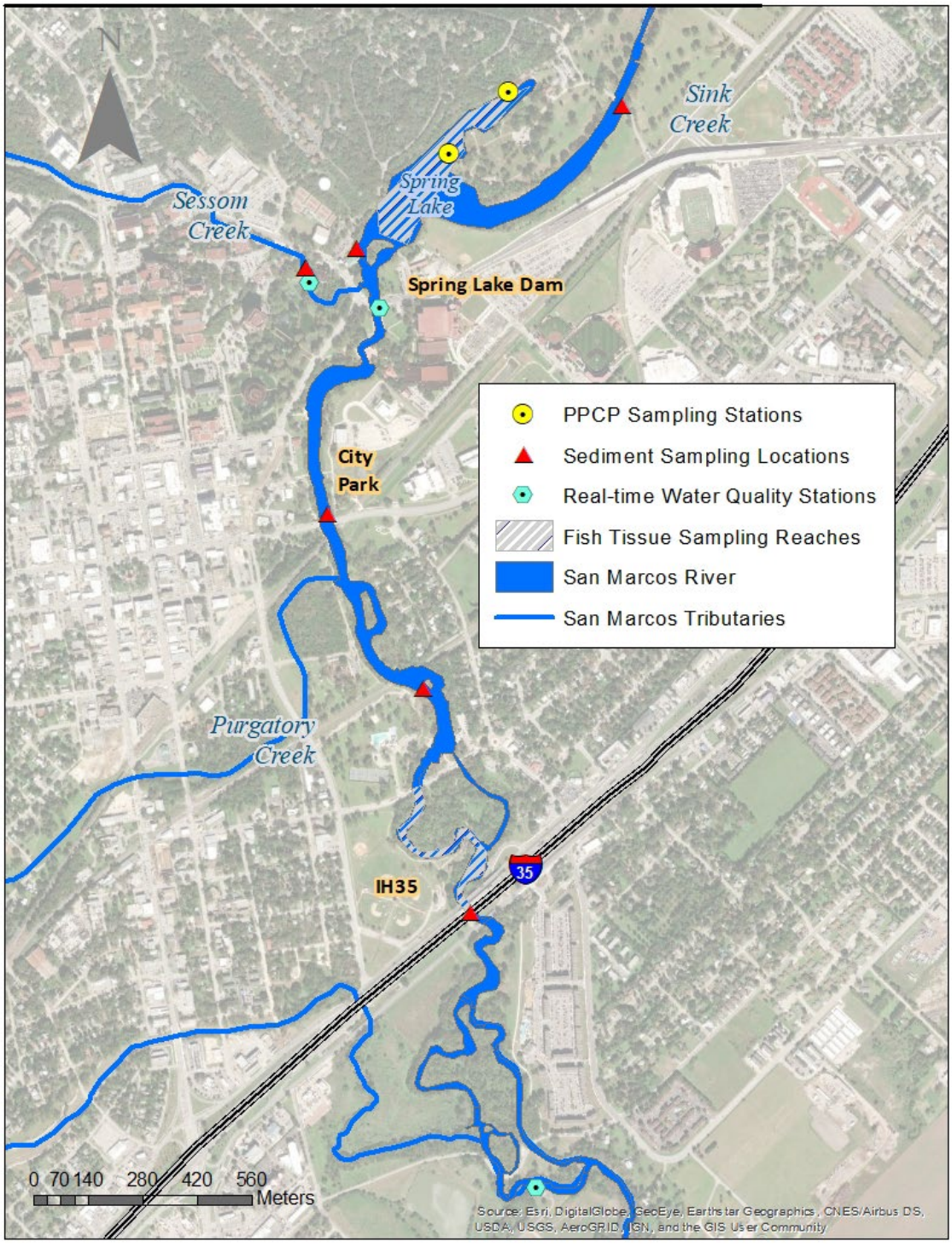


Figure 2. Water quality sampling locations for the San Marcos system.

Table 4. Analytical parameters for groundwater samples.

Analyses
Volatile Organic Compounds (VOCs)
Semi-volatile Organic Compounds (SVOCs)
Organochlorine Pesticides
Polychlorinated Biphenyls (PCBs)
Organophosphorous Pesticides
Herbicides
Metals (Al, Sb, As, Ba, Be, B, Cd, Cr (total), Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Tl, V, and Zn)
General Chemistry (GWQP) Total Alkalinity (as CaCO3), Bicarbonate Alkalinity (as CaCO3), Carbonate Alkalinity (as CaCO3); (Cl, Br, NO_3, SO_4, Fl, pH, TDS, TSS, Ca, Mg, Na, K, Si, Sr, CO_3,)), and Total Suspended
Phosphorus (total)
Total Organic Carbon (TOC),
Dissolved Organic Carbon (DOC)
Kjeldahl Nitrogen
Bacteria Testing (*E coli*)
PPCPs

Method	Method Description	Protocol
8260B	Volatile Organic Compounds	(GC/MS) SW846
8270C	Semivolatile Organic Compounds	(GC/MS) SW846
8081B	Organochlorine Pesticides	(GC) SW846
8082A	Polychlorinated Biphenyls (PCBs)	by Gas Chromatography SW846
8141A	Organophosphorous Pesticides	(GC) SW846
8151A	Herbicides	(GC) SW846
6010B	Metals	(ICP) SW846
6020	Metals	(ICP/MS) SW846
7470A	Mercury	(CVAA) SW846
300.0	Anions,	Ion Chromatography
340.2	Fluoride	MCAWW
365.4	Phosphorus,	Total EPA
9040C	pH	SW846
9060	Organic Carbon,	Total (TOC) SW846
SM 2320B	Alkalinity	SM
SM 2540C	Solids,	Total Dissolved (TDS) SM
SM 2540D	Solids, Total Suspended (TSS)	SM
351.2	Nitrogen, Total Kjeldahl	MCAWW
1694	PPCPs	LC-MS/MS

Protocol References:
EPA = US Environmental Protection Agency
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Table 5. Analytical parameters for surface water samples

Analyses
Soluble Reactive Phosphorous
Phosphorus (total)
Total Organic Carbon (TOC),
Dissolved Organic Carbon (DOC)
Kjeldahl Nitrogen
Nitrates and Ammonium

Method	Method Description	Protocol
365.4	Phosphorus,	Total EPA
9060	Organic Carbon,	Total (TOC) SW846
351.2	Nitrogen, Total Kjeldahl	MCAWW
445.0	Chlorophyll a	Fluorescence
8141a	Organophosphates	SW846
353.2	Nitrates	
350.3	Ammonia	

Protocol References:
EPA = US Environmental Protection Agency
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Table 6. Analytical parameters for sediment samples

Analytes
Benzo[a]anthracene
Chrysene
Benzo[a]pyrene
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Fluoranthene
Dibenz(a,h)anthracene
Indeno[1,2,3-cd]pyrene
Pyrene
Phenanthrene
Fluorene
Benzo[g,h,i]perylene
Anthracene
Acenaphthene
Acenaphthylene
Benzo[g,h,i]perylene

Carbazole
2-Methylnaphthalene
Naphthalene
Total Organic Carbon (TOC)

8270C - SVOCs GC/MS SW8310

9060 Organic Carbon, Total (TOC) SW846

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

6.3.1 Biological Monitoring Program for the Comal and San Marcos Aquatic Ecosystem

Long-term Objective:

Since 2000, the Edwards Aquifer Authority (EAA) has undertaken biological monitoring of the Comal and San Marcos spring systems. In 2013, the elements of the program were incorporated into the Biological Monitoring Program (BioMP) for the Edwards Aquifer Habitat Conservation Plan (EAHCP).

The purpose of the BioMP is "to monitor changes to habitat availability and population abundance of the Covered Species that may result from Covered Activities" (EAHCP § 6.3.1). The BioMP includes: (1) Comprehensive Sampling, (2) any triggered Critical Period Monitoring, (3) any high flow triggered monitoring (4) and any EAHCP-specific sampling required by Section 6.4.

Target for 2026:

The 2026 BioMP for the Comal and San Marcos aquatic ecosystems will continue to include Baseline and Critical Period Monitoring along with a Net Disturbance impact assessment and overall Take Determinations. The 2026 BioMP will continue to use the standard operating procedures adopted in 2016 because of the Biological Monitoring Work Group (EAHCP 2016)

in addition to what is noted in this document. These standard operating procedures were instituted for the BioMP beginning in 2017.

Monitoring:
Aquatic Vegetation Mapping: The contractor will conduct aquatic vegetation mapping in the four long-term monitoring reaches in the Comal Springs system and in the three long-term monitoring reaches in the San Marcos Springs system. The comprehensive mapping is conducted using a GPS unit with real-time differential correction with sub-meter accuracy.

Zebra Mussel Monitoring: The contractor will conduct zebra mussel monitoring using passive techniques in both the Comal and San Marcos rivers.

Texas wild-rice Mapping: The contractor will map all Texas wild-rice from Spring Lake downstream to the confluence of the Blanco River on an annual basis. The annual mapping will occur during the summer (July-August). The location of every stand of Texas wild-rice will be recorded using a GPS unit with real-time differential correction with sub-meter accuracy.

Fountain Darter Sampling: The contractor will conduct drop and dip netting and visual aquatic surveys with SCUBA during the Spring and Fall sampling events. Additional dip net sampling will be conducted during the Summer sampling event. Aquatic vegetation will be mapped in the reaches prior to drop and dip net activities.

Drop Net Sampling: Drop netting will be used to sample fountain darters in identified reaches of the rivers among dominant aquatic vegetation species that have been selected through stratified random sampling. Fountain darters will be identified, counted, measured, examined for condition, and returned to the river at the point of collection. Other fish will be identified and released, or preserved, and identified in a laboratory. Live rams-horn snails will be counted, measured, and destroyed. Exotic Asian snails and Asian clam will be identified, general abundance recorded, then destroyed. The number of crayfish and grass shrimp per drop net will be noted. Furthermore, vegetation species, vegetation height, vegetative areal coverage, substrate type, water depth, mean column velocity, velocity at 15 centimeters (cm) above the bottom, water temperature, conductivity, pH, and dissolved oxygen levels will be recorded for each drop net.

Dip Net Sampling: The contractor will conduct dip net timed surveys, as well as presence/absence surveys in specified sections throughout the spatial extent of both systems. Fountain darters collected by dip net monitoring will be examined for gill condition. Additionally, total length of collected individuals will be measured during timed dip net surveys. Timed surveys will be conducted in all habitat types up to a depth of 1.4 m, within each section, moving upstream during the sampling process with prime darter habitat receiving the most effort.

Presence/absence surveys will be conducted by taking 4 dip net sweeps at 50 random sample site locations within the 4 representative reaches at Comal Springs (Upper Spring reach [5 locations], Landa Lake reach [20 locations], Old Channel reach [20 locations], and New Channel reach [5 locations]), and the 50 random sample site locations within the three representative reaches in

San Marcos Springs (Spring Lake Dam reach [15 locations], City Park reach [20 locations], and I-35 reach [15 locations]).

Visual Fountain Darter Survey: Visual aquatic surveys will be conducted using SCUBA in a fixed location in Landa Lake to identify fountain darters at depths deeper than conventional sampling methods allow.

Comal Springs Invertebrate Sampling: The contractor will conduct sampling for Comal Springs invertebrates during the Spring and Fall sampling events.

One drift net each will be placed over the main spring orifice of Spring Run 1, Spring Run 3, and Spring Run 7 at Comal Springs. All endangered invertebrates will be identified and counted in the field and returned to the orifice they were collected upon completion of the 24-hour sample period. All other invertebrates will be preserved and transported to an off-site laboratory for taxonomic classification. Coordination with the USFWS San Marcos Aquatic Resources Center (SMARC) will take place each time to assist with refugia collections when needed.

The Comal Springs riffle beetle (CSRB) cotton lure standard operating procedure, or a suggested (and EAHCP staff approved) alternate method, and quantitative survey methods will be utilized to conduct Comal Springs riffle beetle sampling in three locations (i.e., Spring Run 3, western shoreline of Landa Lake, and Spring Island area). Ten springs within each of the three locations will be identified for sampling by the contractor. If possible, the same ten springs from the previous year will be sampled.

The CSRB cotton lure standard operating procedure, cotton lure quantitative survey method, and recommendations generated during the CSRB workgroup describe the appropriate protocols for CSRB to be identified, counted, and returned to their spring of origin. Other spring invertebrates collected on the lures will also be noted including the Comal Springs dryopid beetle (*Stygoparnus comalensis*) and Peck's cave amphipod (*Stygobromus pecki*).

Salamander Visual Observations: The contractor will conduct salamander sampling during each Spring and Fall sampling event. Comal salamander surveys will be timed and conducted by observation from the surface or dive mask and snorkel at Spring Run l, Spring Run 3, Spring Island spring runs, and at the eastern outfall at Spring Island.

San Marcos salamander surveys follow the quantitative sampling method described in Nelson, J. (M.S. Thesis, Texas State University, 1993). Observations for the San Marcos salamander will be done by dive mask and snorkel or SCUBA for three, 5-minute timed surveys per area. San Marcos salamanders will be counted, measured and the overall substrate where they were found documented.

In both systems, sampling will require turning over rocks in the sample site for set periods of time in order to expose the salamanders and obtain a visual count. Whenever possible, all rocks will be returned to their original location. For this monitoring, salamanders will only be observed, and no collections will occur.

Comal Springs Discharge Measurements: The contractor will conduct discharge measurements on Comal Springs during the Spring and Fall sampling events. Discharge measurements will be conducted at Spring Runs 1, 2, and 3, Upper Spring Run Reach, and the Old Channel below Elizabeth Street and will be used to establish the contributions of each major spring run to total discharge in the river and to establish the relative proportion of water flowing in the Old and New Channels.

Water Quality Sampling: The contractor will maintain and download existing thermistors located throughout each system. Standard water quality parameters (water temperature, conductivity compensated to 25°C, pH, dissolved oxygen [mg/l], water depth at sampling point, and observations of local conditions) will be sampled during drop net sampling and fish community sampling activities.

Fixed Station Photography: The contractor will photo document each established, fixed station photograph site. Photographs involve an upstream, across, and downstream picture of the reach and capture key changes in the habitat in the reach.

Macroinvertebrate Community Assessment: The macroinvertebrate community assessment will be conducted using rapid bioassessment (RBA) protocol as described in "Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data." TCEQ RG-416. 2014. The RBAs will be conducted in 5 reaches in the Comal and 4 reaches in the San Marcos at the drop-net fountain darter sites. One composite sample will be collected from each reach (i.e. 9 samples total across both systems). Macroinvertebrate community assessments will be conducted during Comprehensive Sampling and Critical Period Monitoring events.

Fish Community Sampling:

SAN MARCOS SYSTEM—Fish will be sampled at two locations within Spring Lake associated with San Marcos salamander surveys (Big Riverbed and Hotel Area) and one location just upstream of the eastern spillway. Two different SCUBA techniques will be used to document the fish within the three locations, mesohabitat and microhabitat surveys. Three additional SCUBA survey locations will occur in the San Marcos River (Upper, Mid, and Lower), located in representative deep areas where seining has proven to be inefficient. The exact location of the SCUBA sampling within each section may change slightly based on conditions at the time of the sampling event.

In addition to SCUBA, fish in the San Marcos River will be sampled among five sites within three reaches (Upper: Sewell, Veteran's Park, Middle: Crook's Park, and Lower: San Marcos Wastewater Treatment plant and Smith property) via seines within wadeable habitats. Multiple seine hauls will occur along a river transect perpendicular to the flow. Within each seine haul, fish will be identified, measured, examined for disease, and native fish returned to the river. Exotics will be removed from the system as per scientific permit. In addition to fish data, habitat data will be collected for each seine haul including current velocity, water depth, substrate composition, in-stream coverage, climatic conditions, and mesohabitat type.

COMAL SYSTEM—Fish will be sampled at three locations within Lake via SCUBA surveys. In particular, one of the SCUBA survey locations in Landa Lake will be in the same as the ongoing fountain darter belt transect survey. In addition, SCUBA surveys will be conducted within the Upper Spring Run, Old Channel, and New Channel sections of the Comal River. Two different SCUBA techniques will be used to document the fish within the three locations, mesohabitat and microhabitat surveys..

In addition to SCUBA surveys, three locations (Upper Spring Run, New Channel, and Old Channel) will be sampled via seines among wadeable habitats to evaluate and track fish populations in the Comal River. Multiple seine hauls will occur along a river transect perpendicular to the flow. Within each seine haul, fish will be identified, measured, examined for disease, and native fish returned to the river. Exotics will be removed from the system per scientific permit requirements. In addition to fish data, each seine haul will include habitat measurements (i.e. current velocity, water depth, substrate composition, in-stream coverage, climatic conditions, and mesohabitat type).

EAHCP Habitat Baseline and Disturbance Determination: This determination is intended to fulfill Section M 1a and 2a of the Incidental Take Permit (ITP).

DOCUMENT BASELINE HABITAT CONDITIONS—The contractor will use January 1 of the contract year GIS mapping, biomonitoring data and other existing sources to establish occupied habitat for the EAHCP Covered Species. Specific to Item M (la and 2a) of the ITP, only occupied habitat within the Comal and San Marcos springs/river ecosystems will be included.

DOCUMENT EAHCP MITIGATION AREAL EXTENT PER PROJECT—The contractor will work with staff and contractors from the City of New Braunfels, City of San Marcos and Texas State University, coordinating through EAA staff, to describe in GIS map form, representing a snapshot in time on December 31 of the contract year, the areal extent of all direct EAHCP mitigation and restoration activities in the Comal and San Marcos springs systems.

If GIS files of the project/affected areas are unavailable, the contractor will either: l) map those areas directly with high grade GPS in real-time, or 2) use existing areal imagery to pinpoint and outline locations with subsequent, supplemental GPS ground truth mapping. The contractor will ensure that areas represented on all maps are representative of actual mitigation, not concept areas.

Assessment of Net Disturbance: The contractor will evaluate the baseline maps versus the EAHCP project maps and quantify the area of direct disturbance that may have potential effects from mitigation and restoration activities as described in Item M (la and 2a) of the ITP. The focus will be on quantifying the direct impacts (removal of non-native vegetation, etc.) via areal coverage of habitat, but will also describe potential indirect impacts (turbidity, etc.) qualitatively. This analysis will not extend beyond comparisons of areal coverage of occupied habitat.

Annual "Take" Estimate: The contractor shall estimate Take for each of the Covered Species utilizing the information generated by the BioMP, the information and guidance in Chapters 4 and 6 of the EAHCP, the Biological and Conference Opinion issued by USFWS, and any other

relevant information. The purpose of this Take estimation is to ensure compliance with Section H of the ITP.

Critical Period Monitoring: The Critical Period Monitoring component will be performed on both systems and be based upon established flow trigger levels for each system. The type and extent of sampling conducted is dependent on the respective trigger level and is designed to be duplicative of full biomonitoring sampling and will include species-specific sampling based on the flow triggers.

HIGH/LOW FLOW MONITORING—The contractor will conduct high flow Critical Period Monitoring only after the following triggering criteria are met:

a) The daily average flow exceeds 385 cubic feet per second (cfs) in the San Marcos aquatic ecosystem or 500 cfs in the Comal aquatic ecosystem (total flow through the ecosystem as measured at the USGS gauging station located immediately downstream of the ecosystem); and
b) After conducting a joint visual inspection of the aquatic ecosystem with the contractor, EAA staff determines that high flow Critical Period Monitoring is warranted and approved.

Before high flow Critical Period Monitoring is conducted, the sampling parameters must be recommended by the contractor and pre-approved by EAA staff, based on professional judgment, and may include any parameter from the full biomonitoring sampling, with the exception of gill net sampling.

The Comal and San Marcos springs systems flow-based triggers are associated with specific sampling parameters.

SAN MARCOS SYSTEM SAMPLING—Low flow Critical Period Monitoring for the San Marcos River triggers at 120 cfs, with Texas wild-rice vulnerable stand monitoring as described in Task 3 of the Comprehensive Sampling Program. Monitoring will occur at 5 cfs declines or a maximum of once per week. The first Full Sampling Event is triggered at 100 cfs, with subsequent declining Full Sampling Events triggering at 85, 60, 25, and 10-0 cfs for a total of five declining Full Sampling Events. In addition, two recovery Full Sampling Events would be conducted as the system rebounds from the low flow period. Between Full Sampling Events, habitat evaluations, per every 5 cfs decline, would be conducted again not to exceed weekly monitoring.

COMAL SYSTEM SAMPLING— Low flow Critical Period Monitoring for the Comal River triggers at 200 cfs. This triggers the first Full Sampling Event with 4 subsequent Full Sampling Events being triggered at 150, 100, 50, and 10-0 cfs, respectively. Two recovery Full Sampling Events are scheduled as the flows rebound and stabilize from drought conditions. The Comal system also has habitat evaluations scheduled between Full Sampling Events; however, at 10 cfs increments again not to exceed weekly observation. An additional component for the Comal system is the detailed riffle beetle habitat evaluation and spring orifice condition documentation that is triggered at 120 cfs and continued at 10 cfs increments during decline. Flow split

monitoring between the Old and New Channel will also occur during the riffle beetle evaluation and spring orifice condition documentation.

A review of historic flow records indicates that the lower the flow, the lower the chance an even lower flow event will occur, thus reducing the chances of a complete decline and recovery as outlined above. Typically, both systems rebound from drought conditions due to a tropical depression rainfall event or some other weather pattern that produces a large amount of rainfall over the watershed. Flows typically come up rapidly and require a period of stabilization before the collection of biological data is meaningful.

Gill Net Evaluation: In addition to the full sampling activities, the contractor will conduct gill net evaluations in the immediate vicinity of the fountain darter SCUBA surveys in Spring Lake and Landa Lake. The Spring Lake evaluation will be triggered at 85 cfs and lower triggers. The Landa Lake assessment will be triggered at 100 cfs and lower triggers. The survey is designed to examine exotic fish concentrations and stomach content analyses with respect to predation of listed species. The number of each species (native and non-native) collected in the gill net and the data will be recorded and converted to catch per unit effort.

Water Quality Grab Sampling: The contractor will collect water quality grab samples at the established triggers at 18 stations longitudinally distributed in the San Marcos system and 12 stations longitudinally distributed in the Comal system. The samples will be from the surface, mid-depth and near bottom.

EAHCP Low Flow Sampling: To protect the Covered Species, Chapter 6 of the EAHCP contains specific flow requirements for both systems that trigger sampling events. This sampling is in addition to the Comprehensive Sampling and Critical Period Monitoring components and consists of an increased frequency of sampling for aquatic vegetation, Texas wild-rice mapping, as well as additional sampling of fountain darters, Comal Springs riffle beetles, and salamanders.

Cost estimate:
Table 7.1:
$400,000

Estimated 2026 cost:
$755,774*

*Includes Critical Period Monitoring if required

6.3.3 Ecological Modeling

Long-term Objective:
The development of a mechanistic ecological model (Ecomodel) is assigned to the Edwards Aquifer Authority per section 6.3.3 of the EAHCP. The purpose of the Ecomodel is to evaluate potential adverse effects to Covered Species and their critical habitat, and to the extent such effects are determined to occur, quantify their magnitude, and develop alternate strategies.

Target for 2026:
No Ecological Modeling work is anticipated in 2026.

Budget:
Table 7.1:
$25,000

Estimated 2026 budget: *
$0

*There is no proposed budget for 2026.

6.3.4 Applied Research

Long-term Objective:
Applied research adds a valuable component to the EAHCP to better understand the ecological dynamics for all Covered Species.

Target for 2026:
Savings from past years will be applied to perform research to support a better understanding of existing Conservation Measures, EAHCP Covered Species, and other aspects of the EAHCP program. The San Marcos salamander study started in 2025 will continue into 2026 that is testing a new sampling methodology to assess population trends in the species. The study is being conducted at the recommendation of the EAHCP Biological Objective Subcommittee and should aid in the development of new Biological Objectives for the new Incidental Take Permit starting in 2028. The aquatic vegetation maintenance study will continue to occur concurrently with the San Marcos salamander study to aid in assessing the effects of Spring Lake aquatic vegetation maintenance efforts on the salamander and evaluating the habitat based EAHCP Biological Objective for the salamander.

The EAA will continue a study from 2025 that is using genetic information on the Comal Springs Riffle Beetle collected prior to the EA Refugia study (2024) to further evaluate the genetic history of the species.

A study on the Comal Springs Dryopid Beetle started in 2025 will continue and be completed by the end of 2026. The objectives of the study are to develop field sampling protocols that can reliably detect the beetle in Landa Lake and spring runs of the Comal system and evaluate analytical protocols that can effectively monitor changes in the beetle. The goal is to use the sampling and analytical protocols from this study to add a monitoring plan for the species into the EAHCP biomonitoring program.

The EAA will continue a contract from 2025 that is focused on environmental data management, specifically aimed to improve the organization and synthesization of the EAHCP biomonitoring data, making it easier to analyze and data share.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$275,000

FMA § 2.2 EAHCP Program Management

Section 2.2 of the Funding and Management Agreement (FMA) assigns "general management and oversight" of the EAHCP to the Edwards Aquifer Authority (EAA). Section 5.6.5 of the FMA allows the EAA to use EAHCP funds for administrative costs and employee salaries, so long as all incurred costs and salaries are 100% related to "general management and oversight" of the EAHCP.

Long-term Objectives:
To manage and oversee day-to-day operations and administration, in coordination with the Applicants, of the EAHCP; resulting in a valid and continued Incidental Take Permit (ITP) from the USFWS for designated Covered Activities.

Program Activities in 2026:
EAHCP staff will continue to coordinate and monitor habitat protection measures completed by the City of New Braunfels and City of San Marcos/Texas State University in their respective 2026 Work Plans. The springflow and supporting measures are described in this 2026 EAA Work Plan.

The EAHCP Program Manager will execute duties as assigned in the FMA and:

- Manage EAHCP day-to-day activities;
- Facilitate program correspondence with the USFWS;
- Manage program activities in support of a 2028 ITP renewal;
- Serve on the ASR Advisory Committee;
- Facilitate the Adaptive Management Process (AMP) for all Routine and Nonroutine decisions; and
- Facilitate and coordinate all meetings of the EAHCP Implementing and Stakeholder committees and possible Subcommittees and Work Groups as created by the Implementing, Science and Stakeholder committees.

EAHCP Chief Science Officer and support staff will continue the following activities:

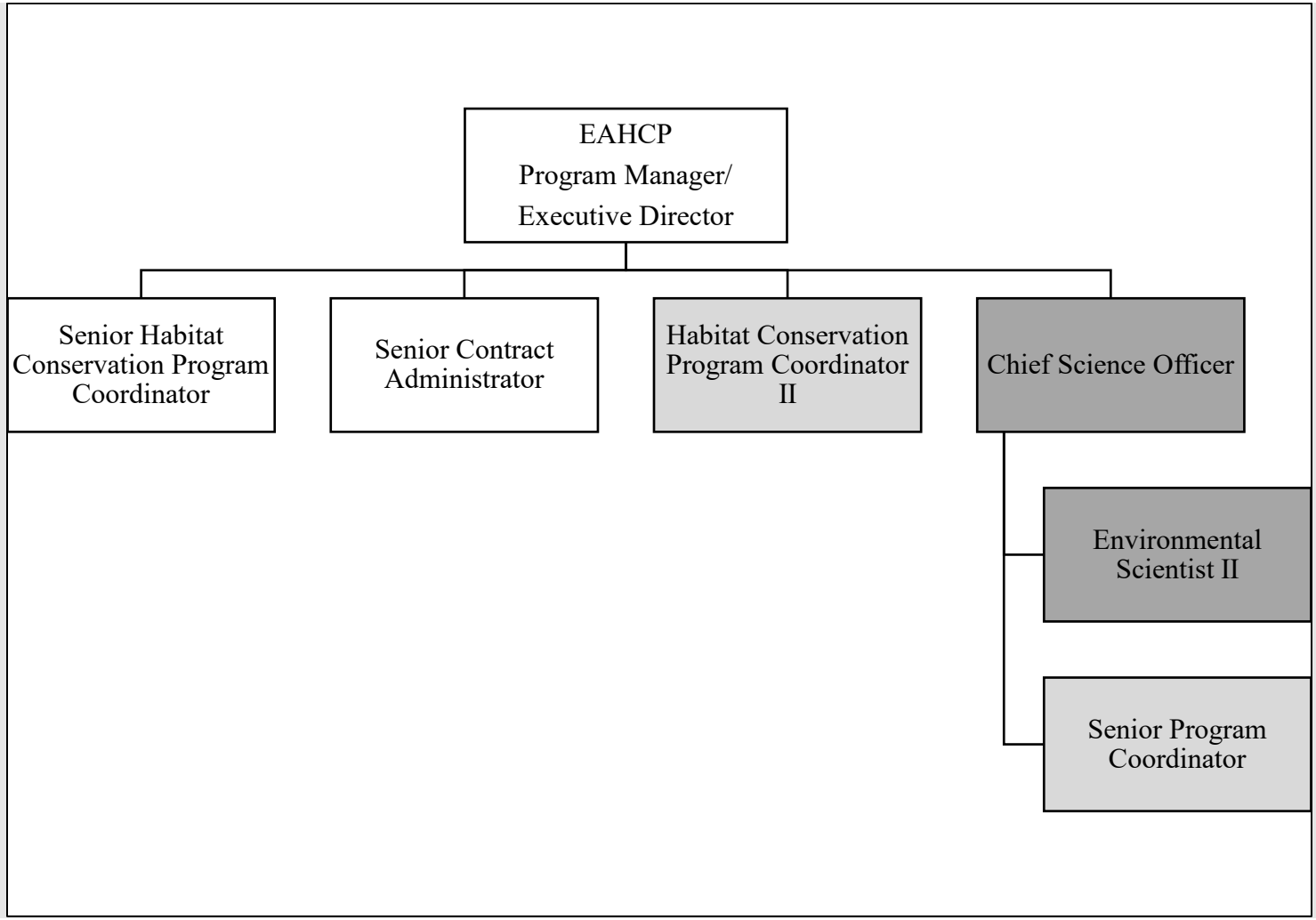
- Manage Refugia Work Plan activities including operations and research;
- Manage applied research;
- Manage biological monitoring;
- Manage and perform water quality monitoring;
- Update and maintain biological and water quality monitoring databases;
- Prepare for all meetings of the EAHCP Science Committee and EAHCP Implementing, and Stakeholder committees at the request of the Program Manager; and
- Prepare for all meetings of the Comal Springs Riffle Beetle Work Group, Research Work Group, and other possible Subcommittees and Work Groups as created by the Implementing, Science and Stakeholder committees at the request of the Program Manager.

EAHCP Administrative staff will continue the following activities:

- Oversee the City of New Braunfels and San Marcos/Texas State University Work Plan activities;
- Coordinate 2026 Work Plan and funding application amendments for the EAA, City of New Braunfels, and San Marcos/Texas State University;
- Coordinate the development of 2026 Work Plans and funding applications for EAA, City of New Braunfels, and San Marcos/Texas State University;
- Process City of New Braunfels and San Marcos/Texas State University reimbursement's from EAA for habitat protection measures;
- Procure and execute contracts for support measures and program administration;
- Oversee EAA contract tracking and compliance;
- Process EAA contractor's invoices for support measures and program administration;
- Coordinate and prepare for all meetings of the EAHCP Implementing, Science, and Stakeholder committees, (and possible Subcommittees and Work Groups as created by the Implementing, Science and Stakeholder committees);
- Coordinate and prepare correspondence with all EAHCP Implementing, Science, and Stakeholder committee members and Work Groups members under the direction of the EAHCP Program Manager;
- Prepare materials for all AMP activities consistent with Article 7 of the FMA and under the direction of the EAHCP Program Manager;
- Support the EAHCP Program Manager in correspondence to the USFWS including informational memorandums, clarifications, and amendments to the ITP and EAHCP;
- Participate in public outreach initiatives;
- Coordinate and publish the monthly EAHCP Steward newsletter and podcast;
- Maintain the content of the EAHCP website;
- Prepare and compile all Permittees' information for the annual report to USFWS; and
- Track and assist EAHCP Permittees with maintaining compliance with secondary implementation permits, such as: U.S. Army Corps of Engineers, Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, General Land Office, and Texas Historical Commission permits.

Staffing in 2026:
The EAHCP staff consists of the Program Manager, EAHCP Director, Senior Contract Administrator, Senior Habitat Conservation Coordinator, and Habitat Conservation Coordinator II. EAA funds the Chief Science Officer and the Environmental Scientist II positions. Two positions remain vacant but could be filled in 2026. The structure of the existing EAHCP staff positions and EAA-funded positions – **the Threatened and Endangered Species Team** - are illustrated in the chart on the next page.

Threatened and Endangered Species Team



Positions Paid from EAA General Budget
Vacant Position

Budget:

EAHCP Program Management Budget for 2026

Description of Expense	Estimated 2026 Costs
Salaries and Fringe Benefits	$ 710,653
Office Supplies	$ 1,500
Non-Capital Assets	$ 6,000
Meeting Expenses	$ 30,000
Conferences, Seminars, and Training	$ 22,000
Memberships	$ 5,000
Printing	$ 10,000
Hosting, SAAS and Support Agreements	$ 4,000
Professional Contracted Services	
Annual Report	$ 50,000
Historical/Archeological Consultation	$ 50,000
Permit Oversight	$ 50,000
Outreach/Newsletter	$ 45,000
Science Committee Compensation	$ 10,000
ITP Renewal	$ 598,479
Other	$ 80,000
Estimated 2026 Total	**$1,672,632**

Table 7.1:
$750,000

Estimated 2026 budget:
$1,672,632

City of New Braunfels

2026 EAHCP Work Plan

2026 City of New Braunfels Work Plan Budget

EAHCP Section	Conservation Measure	Table 7.1	Estimated 2026 Budget
5.2.1	Flow Split Management	$0	$0
5.2.2.1/ 5.2.2.3	Old Channel Aquatic Vegetation Restoration & Maintenance	$100,000	$100,000
5.2.2.2/ 5.2.2.3	Landa Lake/ Comal River Aquatic Vegetation Restoration & Maintenance	$50,000	$50,000
5.2.3	Management of Public Recreation	$0	$0
5.2.4	Decaying Vegetation Removal and Dissolved Oxygen Management	$15,000	$15,000
5.2.5/5.2.9	Non-Native Animal Species Control	$75,000	$40,000
5.2.6/ 6.3.6	Monitoring and Reduction of Gill Parasites	$75,000	$10,000
5.2.7	Prohibition of Hazardous Material Transport Routes	$0	$0
5.2.8	Native Riparian Habitat Restoration (Riffle Beetle)	$25,000	$10,000
5.2.10	Litter and Floating Vegetation Management	$0	$40,000
5.2.11	Golf Course Management	$0	$0
5.7.1	Native Riparian Habitat Restoration	$100,000	$50,000
5.7.5	Management of Household Hazardous Waste	$30,000	$40,385
5.7.6	Impervious Cover/ Water Quality Protection	$100,000	$609,715
	Totals	**$570,000**	**$965,100**

2026 City of New Braunfels Work Plan and Funding Application Amendments

Amendment #	Date EAHCP Committee Approved	Conservation Measure Amended	Y/N Funding Application Change	Funding Application Change ($)	Date EAA Board Approved	Comments
0	5/22/2025	Original Work Plan	NA	NA	NA	Original 2026 Work Plan
0	10/09/2025	2026 Funding Application	NA	NA	11/11/25	Original 2026 Funding Application
1	10/09/2025	5.7.6 Impervious Cover/Water Quality Protection	NA	NA	NA	Updated Work Plan with estimated costs for 5.7.6 Impervious Cover/Water Quality Protection
2	1/27/26	5.7.6 Impervious Cover/Water Quality Protection	NA	NA	NA	Updated Work Plan with estimated costs for 5.7.6 Impervious Cover/Water Quality Protection; net reduction of $62,395

5.2.1 Flow Split Management

Long-term Objective:
To sustain flow rates in the Old Channel of the Comal River that complement Old Channel aquatic vegetation restoration efforts, minimize channel scouring, and maximize the quality of fountain darter habitat.

Target for 2026:
Maintain flow rates in the Old and New Channels of the Comal River to meet objectives specified in the revised Table 5-3 of the EAHCP (**Table 1**).

Priority will be given to achieving target flow rates in the Old Channel and, secondly, to flow rates in the New Channel. City of New Braunfels staff will monitor streamflow conditions via USGS streamflow gages and operate the flow-control gates between Landa Lake and the Old Channel to achieve flow targets. Maintenance activities associated with the flow-control gates will be conducted as needed to ensure continued operability.

Table 1. EAHCP Table 5-3 (revised)

Total Comal Springflow (cfs)	Old Channel (cfs)		New Channel (cfs)	
	Fall, Winter	Spring, Summer	Fall, Winter	Spring, Summer
350+	65	60	280+	290+
300	65	60	235	240
250	60	55	190	195
200	60	55	140	145
150	55		95	
100	50		50	
80	45		35	
70	40		30	
60	35-40		25	
50	35-40		15	
40	30		10	
30	20		10	

Methodology:
The City of New Braunfels will manage the flow-split program according to flow rates specified in revised Table 5-3 (**Table 1**). A standard operating procedure has been developed by the City of New Braunfels to guide adjustments to the flow-control gates and to achieve flow-split targets. City of New Braunfels staff will monitor real-time streamflow conditions at USGS gages in the Comal River system and adjust the flow-control gates, as needed, to meet flow-split streamflow targets. The primary 48" culvert gate and the back-up culvert gates will be operated conjunctively to meet target flow rates. Floating vegetation and debris will be manually removed from the flow control gate and screen, as needed, to prevent blockages and flow restrictions. Vegetative material removed from the intake structure will be placed along the banks of Landa Lake and/ or returned to Landa

Lake. Floating vegetation is managed and funded under task of EAHCP § 5.2.10: Litter and Floating Vegetation Management. The flow control gates will be exercised routinely to maintain functionality of the gate.

Monitoring:
Monitoring of flow rates in the Old Channel, New Channel, and Comal River will be based on real-time streamflow data provided by the USGS gages in the Comal River. City of New Braunfels staff will monitor streamflow on a weekly basis, at minimum. Adjustments to the flow-control gate will be made on an as-needed basis to meet flow-spilt management objectives. City of New Braunfels staff will monitor the flow-control gate and intake screen on a regular basis to assess for vegetation build-up and debris that have the potential to restrict flow into the culvert between Landa Lake and the Old Channel.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$0

5.2.2.1/ 5.2.2.3 Old Channel Aquatic Vegetation Restoration and Maintenance

Long-term Objective:
To achieve native submerged aquatic vegetation (SAV) coverage goals for the Old Channel Long-Term Biological Goal (LTBG) and Old Channel Environmental Restoration & Protection Area (ERPA) reaches as set forth in the revised EAHCP tables 4.1 and 4.1.1, respectively. The overall intent of the aquatic vegetation restoration program is to increase and preserve the coverage of high-quality habitat for the fountain darter (*Etheostoma fonticola*).

Target for 2026:

SAV restoration efforts in 2026 will include the planting and maintenance of target SAV species. **Figure 1** depicts the Comal River system and identifies individual Old Channel restoration reaches. SAV restoration goals for 2026, as well as the EAHCP long-term SAV coverage goals, for the Old Channel LTBG and ERPA reaches are specified by reach and vegetation type in **Table 2**. **Figure 2** details an additional buffer area in addition to the existing LTBG reaches where nonnative species will be removed to reduce the chance of nonnative species encroachment into the restoration and LTBG reaches. Efforts will also be made in 2026 to monitor for and remove re-emergent non-native *Hygrophila* from the Old Channel LTBG and ERPA reaches.

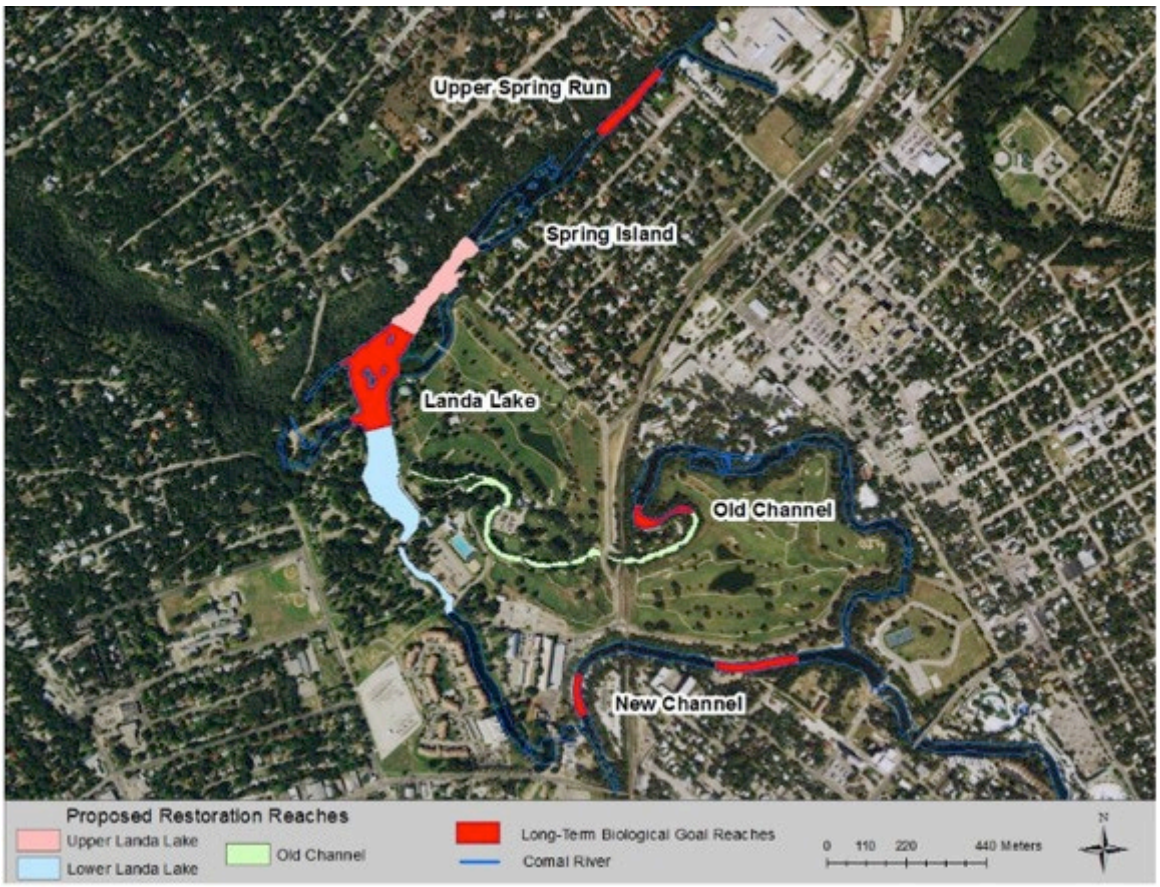


Figure 1: LTBG and restoration reaches for the Comal River System. The Old Channel ERPA restoration reach is shown in green and the Old Channel LTBG reach in red.

REACHES	SPECIES	Meters squared of aquatic vegetation (m^2)			HCP TERM TIMELINE *											TOTAL
		Current (2016)	Goal	Needed	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
LTBG Reaches																
Landa Lake	*Ludwigia*	474	900	426	75	75	75	105	35	35	30					430
	Cabomba	240	500	260	50	50	50	30	30	25	25					260
	Sagittaria	2,759	2,250	0												0
	Vallisneria	12,012	12,500	488	100	100	75	75	75	50	15					490
	Potamogeton	0	25	25	5	5	5	5	5							25
Old Channel	*Ludwigia*	7	425	418	75	75	75	75	50	50	20					420
	Cabomba	0	180	180	50	30	30	25	15	15	15					180
	Sagittaria	0	450	450	150	75	75	50	50	25	25					450
New Channel	*Ludwigia*	31	100	69		15	15	15	15	5	5					70
	Cabomba	2,397	2,500	103		20	20	20	20	15	10					105
	Sagittaria	0	0	0												0
Upper Spring Run	*Ludwigia*	1	25	24		5	5	5	5	5						25
	Cabomba	2	25	23		5	5	5	5	5						25
	Sagittaria	825	850	25		5	5	5	5	5						25
Restoration Reaches																
Landa Upper	*Ludwigia*	0	25	25			25									25
	Cabomba	150	250	100			25	35	20	10	10					100
	Sagittaria	50	250	200			50	50	50	25	25					200
Landa Lake Lower	*Ludwigia*	5	50	45			15	10	10	5	5					45
	Cabomba	100	125	25			10	10	5							25
	Sagittaria	7	100	93			25	25	25	10	10					95
	Vallisneria	24,500	22,500	0												0
Old Channel ERPA	*Ludwigia*	618	850	232	100	75			30	15	15					235
	Cabomba	119	200	81	25	25			25	10	5					90
	Sagittaria	591	750	159	75	25			35	15	10					160
	Vallisneria	715	750	0												0
	Potamogeton	73	100	27	10	10			5	5						30

*** Light grey shaded boxes with no numbers will still require aquatic gardening, plant propagation and supplemental plantings to support maintaining the goals and management objective over time. It is estimated that approximately 1/2 of the HCP annual budget for this mitigation measure would be needed each year to maintain these conditions from 2024 through 2027.**

ASSUMPTIONS:

1) Restoration efforts will proceed smoothly with no major setbacks or resets such as floods, culvert repairs, etc.

2) Anthropogenic factors such as recreational disturbances (swimming, wading and paddle boats), turbidity from swimming pools and urban runoff can be managed to provide the suitable water quality for aquatic plant growth.

3) Concurrent aquatic plant propagation, gardening, and maintenance will occur throughout the HCP timeline.

4) Non-native vegetation removal (and replacement with natives) will occur in certain areas (i.e. spring fed swimming pool, confluence with Blieder's creek, etc.) outside of the LTBG and Restoration reaches in order to assure that non-native plants don't reestablish.

5) Riparian restoration in the Old Channel is mandatory to accomplish the proposed goals.

6) No significant interuptions due to HCP Provision M.

7) Mapping to compare against goals will be conducted annually each Fall.

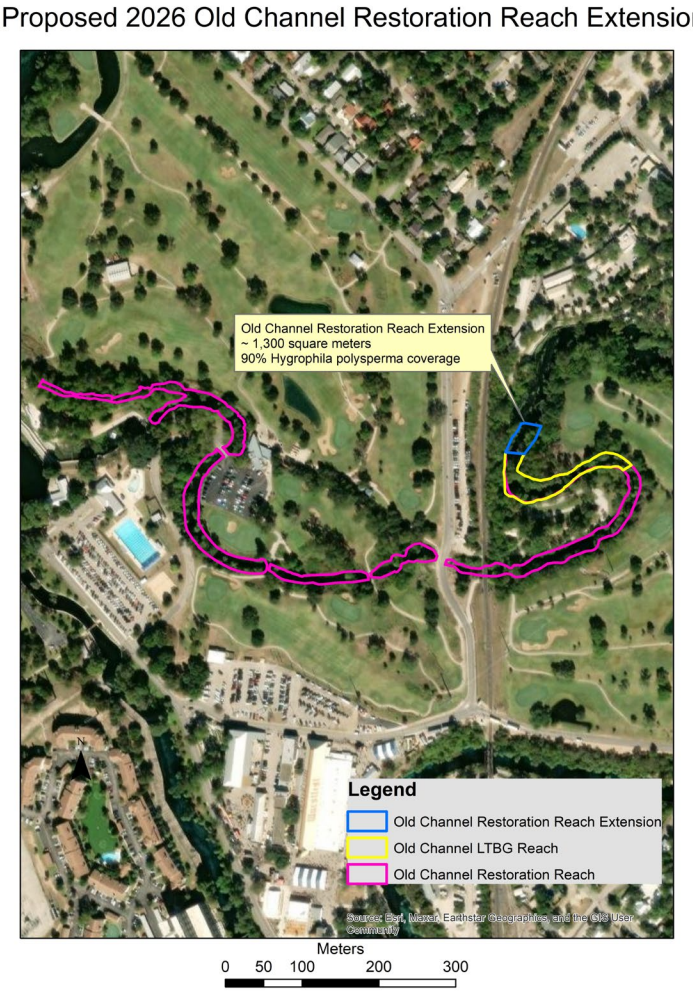


Figure 2: Restoration reach extension included with existing LTBG and restoration reaches for the Old Channel of the Comal River System.

Methodology:

Non-Native SAV Management:

Non-native SAV (i.e. *Hygrophila*) has largely been removed from the Old Channel between Landa Lake and the downstream limits of the Old Channel LTBG reach. SAV gardening will occur on a monthly basis throughout the Old Channel LTBG and Restoration reaches to identify and remove any re-emergent non-native SAV. Small, localized growth of non-native SAV will be removed by selective physical extraction of visible plant and root mass.

Native SAV Restoration:

Target SAV species will be planted within the Old Channel LTBG and ERPA reaches to increase the coverage of individual aquatic plant species per the annual restoration goals

set forth in **Table 2**. Individual plant species will be planted where space is available and in locations within the channel where light exposure, flow velocities, and substrate provide the most suitable conditions. Supplemental plantings of *Ludwigia* and *Cabomba* will be planted in existing restoration plots in the Old Channel LTBG and ERPA reaches, as necessary, to maintain existing coverage and/ or to replace any losses in coverage due to floods, natural competition, or other factors.

Ludwigia will continue to be propagated in-situ within Landa Lake to provide plant stock for 2026 restoration efforts. In-situ propagation of *Ludwigia* will be conducted by collecting stem cuttings from *Ludwigia* plants present within the Comal River system. The cuttings will be placed in pots filled with substrate collected from within the Comal River system. The potted cuttings will be placed in Mobile Underwater Plant Propagation Trays (MUPPTs) that will be situated in a shallow portion of Landa Lake and allowed to produce roots and plant mass in advance of planting. However, this will not be conducted so long as the Comal Springs system is under Provision M. While under Provision M, Ludwigia will be sprigged by hand in selected locations to minimize disturbance.

Cabomba typically thrives in deep, low-velocity areas and will be planted in the most suitable locations in the Old Channel LTBG and ERPA reaches. *Cabomba* will be planted using stem cuttings and/ or with individual rooted plants. Stemmed cuttings will be collected from the New Channel and/ or the Spring-fed pool where *Cabomba* is abundant. The cuttings will be bundled into fist-sized bundles wrapped with rubber bands to keep bundles together. The *Cabomba* cutting bundles are typically 12 to 32 inches in length and will be planted at a depth of 2/3 their length, if possible, in soft, silty sediment. This planting depth prevents *Cabomba* from loosening and floating away and ensures multiple nodes are buried to encourage maximum development of root structure. Rooted *Cabomba* will also be utilized for planting. Rooted plants will be dug up individually from areas where *Cabomba* is abundant. The rooted plants will then be planted individually into silty streambed substrate. Both the stemmed cuttings and rooted plants will be planted in a grid-pattern at 1ft centers.

Sagittaria coverage will be monitored throughout the year to determine the extent of natural expansion and whether planting will be required. *Sagittaria* will be planted only as needed, in the most suitable locations in the Old Channel LTBG and ERPA reaches and will be planted as transplants harvested from Landa Lake and in the Old Channel where dense *Sagittaria* stands exist. The leaves of the transplants will be trimmed prior to planting to decrease buoyancy and drag. A few *Sagittaria* plants can form a dense colony within several months. *Sagittaria* has been observed to be slightly tolerant of lower light levels allowing it to be planted in deeper water and in shady locations.

Competition between native plants has been observed in the Old Channel where *Potamogeton* and *Sagittaria* have encroached on and taken over *Ludwigia* and *Cabomba* stands, resulting in loss of *Ludwigia* and *Cabomba* coverage. To minimize the effects of competition and to promote the growth and spread of *Ludwigia* and *Cabomba*, prioritized plot areas will be established for these species. The plots will be established by first clearing an area of *Sagittaria* and then planting *Ludwigia/ Cabomba*. Plant material that is removed

during this activity will be collected and removed from the lake/ river. The plots will be maintained by removing *Sagittaria* that encroaches into the plots.

Following planting of native SAV, monthly gardening and maintenance will occur between March and October to assess health of plants and to identify and remove any non-native vegetation that is beginning to establish within planting areas.

Monitoring:
As discussed in previous sections, areas where non-native vegetation removal has occurred will be routinely monitored for the re-establishment of non-native vegetation. Planted areas will also be monitored to assess expansion, die-off, and competition by non-native species. Once native aquatic vegetation is established in an area, monitoring will be conducted on a less frequent basis.

Vegetation mapping in both the Old Channel LTBG reach and the Old Channel ERPA will be conducted to evaluate SAV coverage and to assess the progress of aquatic vegetation restoration efforts. Mapping is conducted by circling the perimeter of vegetation stands with a kayak equipped with a Trimble GPS unit. Mapping will occur in January, April, and October. The October mapping event will be used as a basis for assessing overall SAV coverage with respect to developing annual restoration goals for 2026 and subsequent years.

Budget:
Table 7.1:
$100,000

Estimated 2026 budget:
$100,000

5.2.2.2/5.2.2.3 Comal River/ Landa Lake Aquatic Vegetation Restoration and Maintenance

Long-term Objective:
To achieve native submerged aquatic vegetation (SAV) coverage goals for the Landa Lake, New Channel, and Upper Spring Run LTBG reaches and the Upper/ Lower Landa Lake restoration reaches as set forth in revised EAHCP tables 4.1 and 4.1.1, respectively. The overall intent of native SAV restoration is to provide high quality habitat for the Fountain Darter.

Target for 2026:
Efforts in 2026 will include the planting and maintenance of target native SAV. **Figure 2** illustrates the Comal Springs/ River ecosystem and identifies the Landa Lake, New Channel and Upper Spring Run LTBG reaches as well as the Upper/ Lower Landa Lake restoration reaches. The annual aquatic plant restoration goals for the Landa Lake, New Channel, and Upper Spring Run LTBG reaches and the Upper/ Lower Landa Lake restoration reaches are specified by reach and vegetation type in **Table 2**. In addition to planting the target native aquatic plants, continued efforts will be made in 2026 to monitor for the re-establishment of non-native *Hygrophila* in Landa Lake, New Channel, and Upper Spring Run LTBG reaches and the Upper/ Lower Landa Lake restoration reaches. Any identified *Hygrophila* will be removed from the lake/ river.

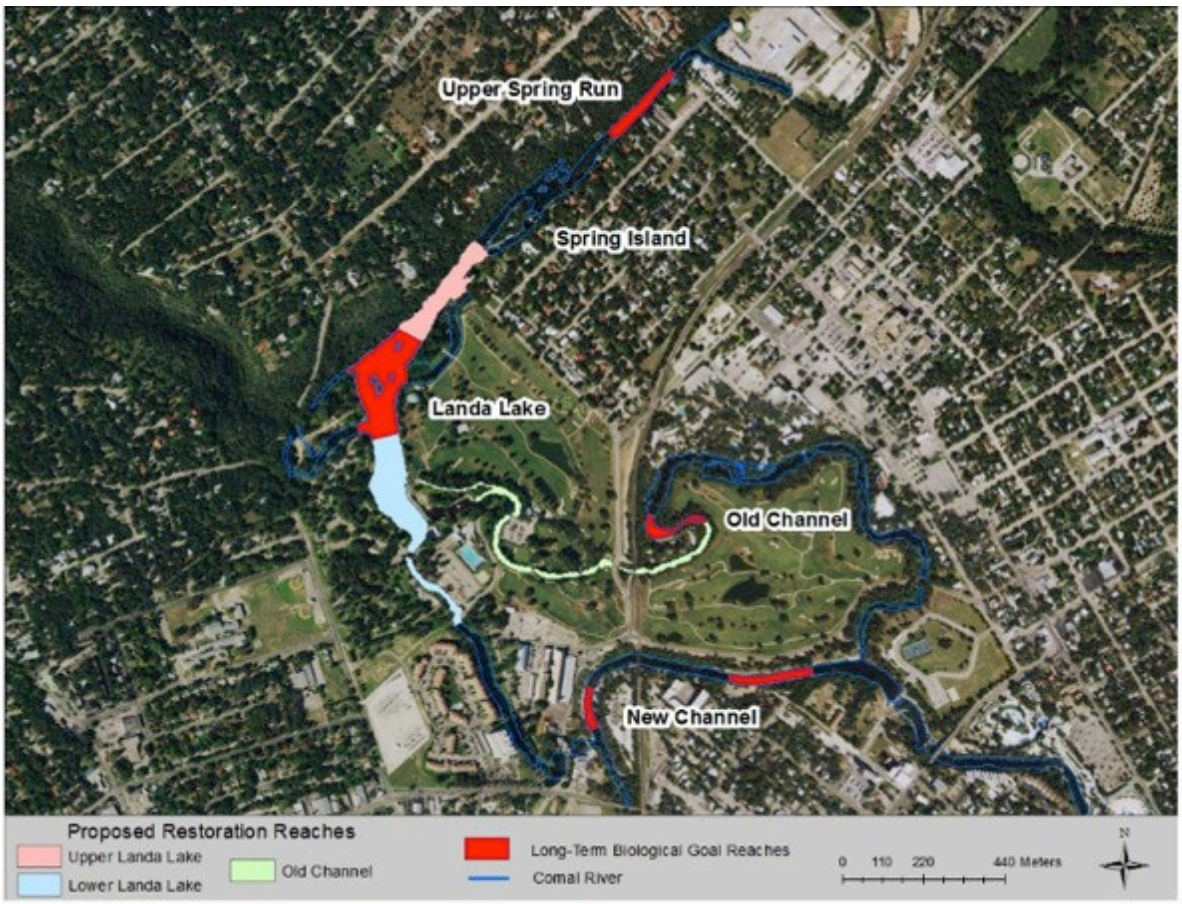


Figure 2: LTBG and restoration reaches for the Comal River System. The Upper and Lower Landa Lake restoration reaches are shown in light red and blue (respectively). The Landa Lake, New Channel, and Upper Spring Run LTBG reaches are shown in red.

REACHES	SPECIES	Meters squared of aquatic vegetation (m^2)			HCP TERM TIMELINE *											TOTAL
		Current (2016)	Goal	Needed	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
LTBG Reaches																
Landa Lake	*Ludwigia*	474	900	426	75	75	75	105	35	35	30					430
	Cabomba	240	500	260	50	50	50	30	30	25	25					260
	Sagittaria	2,759	2,250	0												0
	Vallisneria	12,012	12,500	488	100	100	75	75	75	50	15					490
	Potamogeton	0	25	25	5	5	5	5	5							25
Old Channel	*Ludwigia*	7	425	418	75	75	75	75	50	50	20					420
	Cabomba	0	180	180	50	30	30	25	15	15	15					180
	Sagittaria	0	450	450	150	75	75	50	50	25	25					450
New Channel	*Ludwigia*	31	100	69		15	15	15	15	5	5					70
	Cabomba	2,397	2,500	103		20	20	20	20	15	10					105
	Sagittaria	0	0	0												0
Upper Spring Run	*Ludwigia*	1	25	24		5	5	5	5	5						25
	Cabomba	2	25	23		5	5	5	5	5						25
	Sagittaria	825	850	25		5	5	5	5	5						25
Restoration Reaches																
Landa Upper	*Ludwigia*	0	25	25			25									25
	Cabomba	150	250	100			25	35	20	10	10					100
	Sagittaria	50	250	200			50	50	50	25	25					200
Landa Lake Lower	*Ludwigia*	5	50	45			15	10	10	5	5					45
	Cabomba	100	125	25			10	10	5							25
	Sagittaria	7	100	93			25	25	25	10	10					95
	Vallisneria	24,500	22,500	0												0
Old Channel ERPA	*Ludwigia*	618	850	232	100	75			30	15	15					235
	Cabomba	119	200	81	25	25			25	10	5					90
	Sagittaria	591	750	159	75	25			35	15	10					160
	Vallisneria	715	750	0												0
	Potamogeton	73	100	27	10	10			5	5						30

*** Light grey shaded boxes with no numbers will still require aquatic gardening, plant propagation and supplemental plantings to support maintaining the goals and management objective over time. It is estimated that approximately 1/2 of the HCP annual budget for this mitigation measure would be needed each year to maintain these conditions from 2024 through 2027.**

ASSUMPTIONS:

1) Restoration efforts will proceed smoothly with no major setbacks or resets such as floods, culvert repairs, etc.

2) Anthropogenic factors such as recreational disturbances (swimming, wading and paddle boats), turbidity from swimming pools and urban runoff can be managed to provide the suitable water quality for aquatic plant growth.

3) Concurrent aquatic plant propagation, gardening, and maintenance will occur throughout the HCP timeline.

4) Non-native vegetation removal (and replacement with natives) will occur in certain areas (i.e. spring fed swimming pool, confluence with Blieder's creek, etc.) outside of the LTBG and Restoration reaches in order to assure that non-native plants don't reestablish.

5) Riparian restoration in the Old Channel is mandatory to accomplish the proposed goals.

6) No significant interuptions due to HCP Provision M.

7) Mapping to compare against goals will be conducted annually each Fall.

Methodology:

Non-Native Vegetation Management:

Non-native SAV (i.e., *Hygrophila*) will be removed, as needed, to minimize competition with native SAV. Large-scale removal of non-native SAV will not be required in 2026 as non-native SAV has largely been eliminated from Landa Lake and the Upper Spring Run area. Restoration areas will be monitored for the re-establishment of non-native SAV. Small, localized growth of non-native SAV will be removed by selective physical extraction of visible plant and root mass.

Native SAV Restoration:

Target SAV species will be planted within the Landa Lake, New Channel, and Upper Spring Run LTBG reaches, as needed. Individual plant species will be planted in locations within the Lake/ river channel where light exposure, flow velocities, and substrate provide the best conditions for the individual plant types. Supplemental plantings of *Ludwigia* and *Cabomba* will be planted in existing restoration plots within the Landa Lake, New Channel, and Upper Spring Run LTBG reaches, as necessary, to maintain existing coverage or to replace any drastic losses in coverage due to floods, natural competition, or other factors.

Ludwigia will continue to be propagated in-situ within Landa Lake in order to provide plant stock for 2026 restoration efforts. In-situ propagation of *Ludwigia* will be conducted by collecting stem cuttings from *Ludwigia* plants that exist within the Comal River system. The cuttings will be placed in pots filled with substrate collected from within the Comal River system. The potted cuttings will then be placed in Mobile Underwater Plant Propagation Trays (MUPPTs) and placed in a shallow portion of Landa Lake and allowed to produce roots and plant mass. *Ludwigia* plants propagated in the MUPPTs, as well as *Ludwigia* cuttings, will be planted in suitable locations within the Landa Lake LTBG reach, as needed. Slightly more than the targeted coverage of *Ludwigia* will be planted to account for plant die-off.

Cabomba typically thrives in deep, low-velocity areas and will be planted in the most suitable locations in the Landa Lake LTBG and Upper Landa Lake restoration reach, as needed. *Cabomba* will be planted using stem cuttings. Stemmed cuttings will be collected from the New Channel and / or the spring-fed pool. The cuttings will be bundled into fist-sized bundles wrapped with rubber bands to keep bundles together. The *Cabomba* cutting bundles are typically 12 to 32 inches in length and will be planted at a depth of 2/3 their length, if possible, in soft, silty sediment. This planting depth prevents *Cabomba* from loosening and floating away and ensures multiple nodes are buried for production of good root structure. Rooted *Cabomba* will also be utilized and will be harvested from areas in the Comal River system where *Cabomba* is abundant. Significantly more than the targeted coverage of *Cabomba* will be planted in order to account for plant die-off.

Sagittaria will be planted only as needed in the most suitable locations in the Upper Landa Lake and Lower Landa Lake reaches. Due to its aggressive growth habit, observed natural expansion and existing coverage, it is not anticipated that *Sagittaria* will be planted in 2026 within any of the restoration reaches. If needed, *Sagittaria* will be planted as transplants harvested from Landa Lake. The leaves of the transplants will be trimmed prior to planting to decrease buoyancy and drag.

Potamogeton will be planted to increase coverage in the Landa Lake LTBG reach. *Potamogeton* will be planted using bare-root rhizomes that are harvested from the Comal River system.
Competition between native plants has been observed where *Vallisneria* and *Sagittaria* will encroach on and take over *Ludwigia* and *Cabomba* stands. To minimize the effects of competition and to promote the growth and spread of *Ludwigia* and *Cabomba*, buffers will be created around planted *Ludwigia* and *Cabomba* stands to the extent practicable. Any plant material that is removed during this activity will be collected and removed from the lake/ river.

Following planting of native SAV, gardening and maintenance will occur on a monthly basis between March and October to assess health of plants and to identify and remove any non-native vegetation that is beginning to establish within planting areas.

Monitoring:
Routine monitoring will occur to identify re-establishment of non-native aquatic vegetation. Planted areas will also be monitored to assess expansion, die-off, and competition by native and non-native aquatic plant species. Once native aquatic vegetation is established in an area, monitoring will be conducted on a less frequent basis.

Seasonal vegetation mapping in the Landa Lake, New Channel, and Upper Spring Run LTBG reaches and the Upper/ Lower Landa Lake restoration reaches will be conducted to evaluate SAV coverage and to assess progress of aquatic vegetation restoration efforts. Mapping is conducted by circling the perimeter of vegetation stands with a kayak equipped with a Trimble GPS unit. Mapping will occur in January, April, and October. The October mapping event will be used as a basis for assessing overall SAV coverage with respect to developing annual restoration goals for 2026 and subsequent years.

Budget:
Table 7.1:
$50,000

Estimated 2026 budget:
$50,000

5.2.3 Management of Public Recreation

Public recreational use of the Comal River ecosystems includes swimming, wading, tubing, boating, canoeing, kayaking, golfing, scuba diving, snorkeling and fishing. To minimize the impacts of incidental take resulting from recreation, the City of New Braunfels will continue to implement existing recreation control measures as specified in Section 5.2.3(1) of the EAHCP and will seek voluntary participation in the Certificate of Inclusion (COI) program from outfitters who facilitate recreation activities within the Comal River system.

Long-term Objective:
To minimize and mitigate the impacts of recreation on endangered species habitat within the Spring Runs, Landa Lake and the Comal River.

Target for 2026:
Continue to enforce existing restrictions that limit recreational access to Landa Lake, Spring Runs, and the Old Channel of the Comal River.

Inform river recreation Outfitters of the EAHCP COI program.

Methods:
The City will continue to enforce City Code Sections 86-4 and 142-5 that restrict recreational access to Landa Lake, Spring Runs, and the Old Channel. Trained Park Rangers will continue to patrol applicable areas to prevent illegal access to these waterbodies.

In 2021, a survey was distributed to local river outfitters to determine the local interest in participating in the COI program. Results of the survey concluded that there was minimal interest in the community to opt into the COI program along the Comal River. If any river outfitters are interested in participating in the program, the City will work in conjunction with EAHCP program staff to develop COI program documents and strategies.

Monitoring:
Monitor the status of participating outfitters to comply with the minimum COI outfitter standards and requirements set forth in EAHCP § 5.2.3.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$0

5.2.4 Decaying Vegetation Removal and Dissolved Oxygen Management

Long-term Objective:
Maintain adequate dissolved oxygen (DO) levels within Landa Lake for the protection of the biological community, including the fountain darter. Minimize and mitigate oxygen consumption caused by decaying vegetation.

Target for 2026:
Collect DO data spatially throughout Landa Lake and the Upper Spring Run during low-flow periods (<100 cfs discharge at Comal Springs). Displace floating vegetation mats, as needed, that form on Landa Lake to prevent oxygen consumption by decaying vegetation (management of floating/ decaying vegetation will be funded and accomplished through the Litter and Floating Vegetation Management Conservation Measure [EAHCP § 5.2.10]). Remove decaying vegetation from Landa Lake and Upper Spring Run during low-flow conditions (<100 cfs), as needed, to mitigate low DO levels caused by low-springflow and decaying vegetation.

Methods and Monitoring:
Approximately four logging DO sensors (e.g., comparable to MiniDOT sensors available from Precision Measurement Engineering [PME Inc. Vista, CA] that have been used in prior years) will be installed in key documented Fountain Darter habitat areas in Landa Lake during periods when Comal Springs discharge decreases below 100 cfs. The sensor data will be downloaded, and the equipment will be cleaned routinely, as needed, to prevent fouling. The main objective of this data collection is to continuously monitor DO conditions during low-flow events and prompt DO mitigation activities.

Aquatic vegetation conditions and floating vegetation mats will be visually observed on a regular basis (i.e. weekly at minimum) to assess for signs of stress, die-off. Floating aquatic vegetation and dead aquatic vegetation has the potential to cause oxygen depletion from the decomposition of the vegetation itself and from reduced atmospheric reaeration. Should vegetation die-off be observed due to low-flow or if floating vegetation mats reach impactive levels (if mats cover >25% of the mid-lake area or if individual mats are >3 meters diameter), displacement or removal of the decaying vegetation or vegetation mats will take place within one week of identification as part of Litter and Floating Vegetation Management Conservation Measure (EAHCP § 5.2.10).

If low springflow conditions (<100cfs) occur and vegetation decay or low DO is evident, intensive displacement or removal of decaying vegetation will be implemented, as appropriate, under EAHCP § 5.2.10. Intensive refers to the frequency of vegetation mat management being more than once per week. Displacement and/or removal will be conducted in the least disruptive method tested to be effective, to limit any additional DO stress from stirring, turbidity, etc.

Budget:
Table 7.1:
$15,000

Estimated 2026 budget:
$15,000

*To be utilized only if low-flow conditions (<100cfs) are realized at Comal Springs.

5.2.5/5.2.9 Non-Native Animal Species Control

The City of New Braunfels will continue to implement a program to reduce non-native animal species in the Comal River system. The non-native animal species that will be targeted include the suckermouth armored catfish, sailfin catfish, tilapia, and nutria. Since this Work Plan has two components identified within the EAHCP, each component has been broken out to facilitate the development of the Work Plan and budgets.

Long-term Objective:
Reduce populations of non-native animal species to minimize their direct and indirect impacts to the Covered Species and the Comal River ecosystem.

Target for 2026:
Continue existing program to remove non-native invasive species, including tilapia, nutria, sailfin catfish and suckermouth armored catfish from the Comal River system utilizing removal methods proven successful in previous years. Continue to record counts and biomass of removed species per removal effort.

Methods:
Invasive species will be removed from Landa Lake and portions of the Comal River during routine removal sessions that will occur year-round.

Tilapia, sailfin catfish, and suckermouth armored catfish will be targeted throughout the Comal River system by divers with spears and spearguns. Upon removal from the water, all invasive fish will be eviscerated, in accordance with state laws, and disposed of. The carcasses will be measured (in inches) and weighed (in pounds). Total biomass of the removed fishes will be calculated. Total length of non-native fishes will also be measured to determine if, over time, the removal of adults affects target population demographics.

Box traps baited with carrots, sweet potatoes, and apples will be utilized to capture nutria. Traps will be placed in areas frequented by nutria (evident by slides, scat, chewed vegetation, lake-wall erosion and damage, and other observations). The traps will be checked in the late afternoon and again the next morning at approximately 7:30 am. Captured nutria will be euthanized. Removed nutria will be measured (in inches) and weighed (in pounds) prior to being disposed of**.**

Monitoring:
The non-native species removal program will involve obtaining and recording the following information:

- Date of removal.
- Number of hours worked.
- Type of species removed.
- Removal method.
- Number of individuals caught/speared.

- Total weight of individuals removed.
- Length of individuals removed.

The data provided will be used by CONB and EAHCP staff to generate catch per unit effort and to determine the effectiveness of the removal program.

The EAA Biological Monitoring program will also assess the status of non-native species populations and any impacts of non-native removal to the Covered Species.

Reduction of Non-Native Species Introduction and Live Bait Prohibition

Long-term Objective:
Minimize the introduction of non-native species to the Comal River system.

Target for 2026:
The City will enforce Ordinance No. 2019-42, City Code Section 142-4 and 142-6 enacted to control introductions of non-native aquatic organisms to the Comal River system.

Methods:
The City will uphold the ordinance prohibiting aquarium dumping and the use of non-native aquatic bait species.

Monitoring:
The EAA Biological Monitoring program and routine non-native removal sessions will detect the presence of newly introduced species.

Budget:
Table 7.1:
$75,000

Estimated 2026 budget:
$40,000

5.2.6/6.3.6 Monitoring and Reduction of Gill Parasites

Long-term Objective:
To assess the threat of the gill parasite (*Centrocestus formosanus*) and the intestinal fluke parasite (*Haplorchis pumilio)* on fountain darter populations by monitoring parasite cercariae concentrations in the water column.

Target for 2026:
Perform parasite water column cercariae monitoring at four established monitoring transects. Analyze monitoring data to determine the overall effect and potential threat of the gill parasite and *H. pumilio* to fountain darter populations.

Methods:
To quantify the concentrations of drifting parasite cercariae in the Comal River study area, the four transects (LL, OCR, RVP, and PI) that have been monitored during the previous five years will continue to be sampled in 2026.The monitoring will occur once in late summer of 2026 in order to remain consistent with timing of previous years' monitoring.

Figure 3 illustrates the parasite cercariae monitoring locations. The four sampling transects are considered locations that adequately represent the Comal Spring system and are efficient for long-term monitoring of drifting cercariae.

At each of the selected transect locations, 5-L water samples will be collected from six points that are distributed throughout the water column both horizontally and vertically. For each transect, three sampling stations will be established that are equally spaced across the stream channel perpendicular to flow. At each of these stations, two 5-L samples will be collected, one approximately 5 cm from the surface and one at 60% of the depth at that location. Samples will be collected using a modified livewell pump attached to a standard flow/depth measurement rod and buckets marked at the 5-L volume. At the time of collection, each water sample will be immediately treated with 5 milliliters (ml) of formaldehyde to kill parasite cercariae, thus facilitating their capture (live cercariae can wiggle through the filter device). Filtration will involve passing the sample through a specialized filter apparatus containing three progressively finer nylon filters, the final filter having pores of 30 microns. After filtration of each sample, the 30- micron filter containing cercariae will be removed from the filtration apparatus and placed in a Petri dish. Each sample will then be stained with Rose Bengal solution and fixed with 10% formalin, at which point the Petri dish was closed and sealed with Parafilm for storage. Cercariae on each filter will later be counted using high-power microscopy at the BIO-WEST laboratory.

Budget:
Table 7.1:
$75,000
Estimated 2026 budget:
$10,000

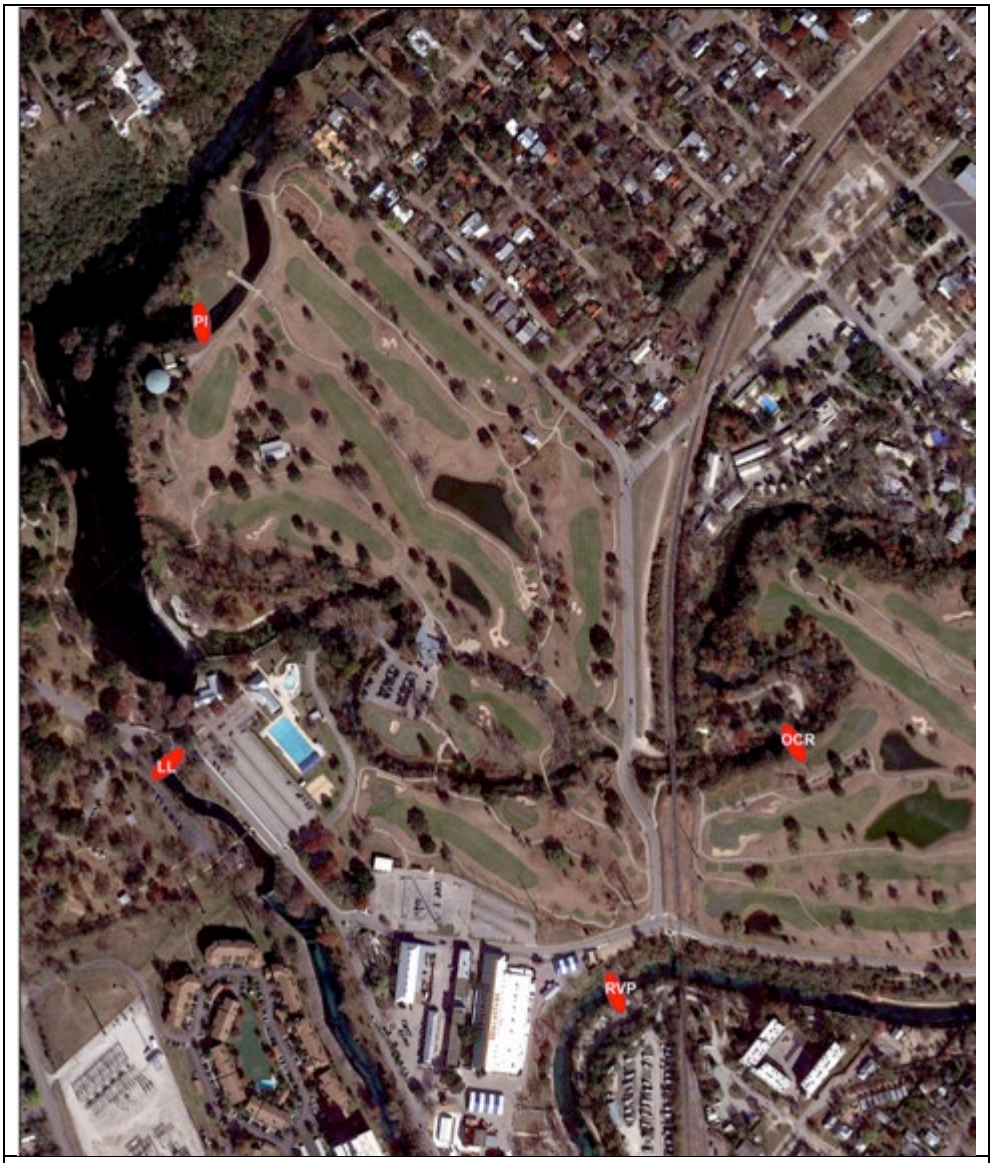


Figure 3. Parasite cercariae monitoring locations

5.2.7 Prohibition of Hazardous Materials Transport Across the Comal River and Its Tributaries

The City of New Braunfels will continue to prohibit the transport of hazardous materials on routes crossing the Comal River and its tributaries.

Long-term Objective:
To minimize the potential for accidental spills or releases of hazardous materials into the Comal River system that may cause negative impacts to the Covered Species.

Target for 2026:
Maintain existing HazMat transport signage and monitor for the presence of trucks carrying hazardous cargo on routes crossing the Comal River and its tributaries.

Methods:
City of New Braunfels Ordinance No. 93-7 effectively restricts the transport of hazardous cargo within Loop 337 and IH-35 and therefore, over roadways crossing the Comal River. Hazardous cargo route prohibition signage was installed in 2016 at key roadways near the headwaters of Landa Lake and the Comal River.

Monitoring:
Hazardous cargo restriction signage will be monitored and replaced/ repaired as needed. The City of New Braunfels Police Department will monitor for trucks carrying hazardous cargo on prohibited routes per City ordinance.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$0

5.2.8 Native Riparian Habitat Restoration (Comal Springs riffle beetle)

Long-term Objective:
Establish a healthy, functioning riparian area along Spring Runs 1, 2, and 3, and the western shoreline of Landa Lake to benefit the Comal Springs riffle beetle (*Heterelmis comalensis*). Establish native riparian vegetation to increase the stability of the bank, decrease erosion/ sedimentation and increase the amount of available food sources (i.e. course particulate organic matter) for the riffle beetle.

Target for 2026:

Monitor and maintain previously restored riparian areas along Spring Runs 1,2, and 3 and the western shoreline of Landa Lake. Plant additional native riparian plant species within the riparian buffer area, as needed, to increase the density of vegetative coverage in this area. Remove any re-emergent non-native vegetation and maintain sediment control berms. Replace/ maintain sediment control berms and install new berms, as needed.

Methods:

Monitoring/ Maintenance:

Monitor the riparian zone along Spring Run 3, Spring Run 2, and the western shoreline of Landa Lake twice/ year, once in late spring/ early summer (April-June) and once in the fall (October) to assess for the re-emergence of non-native vegetation and to monitor the status of native plants and erosion control berms.

Mechanically remove and/ or re-treat with approved herbicide any observed re-emergent, non-native invasive plants within the riparian zone along Spring Run 3 and along the western shoreline, as needed.

Plant supplemental native vegetation, as needed, to increase density of riparian buffer area. Native vegetation will be selected based on root structure, light requirements, drought tolerance, growth habits and deer-resistance. Candidate native plant species may include\ those in **Table 4**. Erosion control berms may be re-constructed, as needed.

Monitor the stability and condition of existing sediment capture berms located along the western shoreline of Landa Lake. Repair and replace failing berms and install new berms as needed to help capture sediment prior to reduce sedimentation in Landa Lake.

Table 4. Candidate riparian plantings

Sun Species	Shade Species
Turks Cap (*Malvaviscus arboreus var. drummondii*)	Turks Cap (*Malvaviscus arboreus var. drummondii*)
Frostweed (*Verbesina virginica)*	Frostweed (*Verbesina virginica)*
Yellow Bidens (*Bidens laevis)*	Emory Sedge (*Carex emoryi*)
Swamp Milkweed (*Asclepias incarnata*)	Boneset/ Mistflower (*Ageratina havanensis*)
Switchgrass (*Panicum virgatum*)	Elderberry (*Sambucus canadensis)*
Bushy bluestem (*Andropogon glomeratus*)	Giant spiderwort (*Tradescantia gigantean)*
Emory Sedge (*Carex emoryi*)	Texas aster (*Symphyotrichum drummondii texanum)*
Sweetscent (*Pluchea odorata*)	Red salvia (*Salvia coccinea*)
Yellow compass plant *(Silphium integrifolium radulum*)	Inland Sea Oats (*Chasmanthium latifolium*)
Texas bluebells (*Eustoma exaltatum*)	
Trees and Shrubs	
American Beautyberry (*Callicarpa americana)*	
Bald Cypress (*Taxodium distichum)*	
Bee Brush (*Eysenhardtia texana)*	
Black Walnut (*Juglans nigra)*	
Burr Oak (*Quercus macrocarpa)*	
Buttonbush (*Cephalanthus occidentalis)*	
Eve's Necklace (*Styphnolobium affine)*	
Fragrant Sumac (*Rhus aromatica*)	
Green Ash (*Fraxinus pennsylvanica)*	
Mexican Buckeye (*Ungnadia speciosa)*	
Mexican Plum (*Prunus mexicana)*	
Mountain Laurel (*Sophora secundiflora*)	
Possum Haw Holly (*Ilex ambigua)*	
Red Buckeye (*Aesculus pavia)*	
Red Mulberry (*Morus rubra)*	
Dwarf Palmetto (*Sabal minor*)	

Budget:

Table 7.1:
$25,000

Estimated 2026 budget:
$10,000

5.2.10 Litter and Floating Vegetation Control

Long-term Objective:
Minimize the impacts of floating vegetation mats and litter on aquatic vegetation and endangered species habitat in Landa Lake, the Spring Runs, and the upper portion of the Old Channel. Mitigate low dissolved oxygen levels in Landa Lake caused by decaying vegetation. Minimize shading of and negative impacts to aquatic vegetation caused by floating vegetation mats.

Target for 2026:
Dislodge floating vegetation mats and remove litter from applicable portions of the Comal River system to prevent negative impacts to flow control structures, aquatic vegetation, and endangered species habitat. In the event of low-flow conditions or receipt of depressed dissolved oxygen levels in Landa Lake, the removal of and/or increased efforts to dislodge floating vegetation mats will be initiated to prevent oxygen consumption by decaying vegetative material.

Methods:
Floating Vegetation Mat Management: Floating vegetation mats are commonly observed within Landa Lake and are composed primarily of macrophyte fragments, algae, bryophytes and terrestrial debris. The vegetation mats are naturally occurring and are the result of natural processes. Maintenance activities associated with floating vegetation mats in Landa Lake will involve dislodging floating mats and facilitating migration of the mats downstream of Landa Lake. Any litter found within floating vegetation mats will be removed prior to dislodging. Maintenance of floating vegetation mats will occur on a weekly basis between March and September and on an as-needed basis during the remainder of the year. Floating vegetation mats will be dislodged from flow control structures, the Three Islands area, fishing pier and other locations where vegetation mats accumulate and negatively impact native aquatic vegetation. Additional efforts to displace and/ or remove floating and decaying vegetation will occur during low-flow conditions (<100cfs) and/ or when low dissolved oxygen levels are observed to further mitigate impacts to dissolved oxygen and native aquatic vegetation.

Litter Management: (May 1st to September 30th). Litter pickup within the riparian zone along the Old Channel will occur on a bi-monthly basis (twice/ month) between May 1st and September 30th. Litter will also be removed from within the Old Channel to the extent that it can be removed with a 10ft trash grabber. Removed litter will be quantified and reported on a monthly basis.

Monitoring:
Monitor litter and floating vegetation mats in applicable areas on a weekly basis and more frequently if low-flow conditions occur. Dissolved Oxygen concentrations will be monitored by EAA and as part of the Decaying Vegetation Removal and Dissolved Oxygen Management Conservation Measure (EAHCP § 5.2.4). City staff will monitor contractor efforts and coordinate additional efforts when deemed necessary.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$40,000

5.2.11 Golf Course Management and Planning

The City of New Braunfels will implement their existing Integrated Pest Management Plan (IPMP) for Landa Park Golf Course. This process will incorporate public input and the Golf Course Advisory Board. The golf course IPMP will incorporate environmentally sensitive techniques to minimize chemical application, continue to improve water quality, and reduce negative effects to the ecosystem. Expanded water quality sampling targeted at Golf Course operations will be conducted as described in Section of 5.7.2 of the EAHCP.

Long-term Objective:
To manage the golf course and grounds in a way that minimizes negative impacts to the aquatic ecosystem in Landa Lake and the Comal River.

Target for 2026:
Continue to implement the IPMP and update as needed.

Methods:
The golf course and grounds will be maintained in an aesthetically pleasing, yet environmentally sensitive manner. It is the responsibility of the Golf Course Manager to maintain the course and grounds in accordance with the new IPMP. The IPMP describes chemicals and methods for controlling pests (i.e. insects, weeds, and other living organisms requiring control) on the golf course in a way that does not negatively impact water quality or endangered species.

Monitoring:
The EAHCP Water Quality Monitoring Program monitors surface water, groundwater, and fish tissue for a range of contaminants to collect information on the water quality of Comal Springs and associated surface waters.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$0

5.7.1 Native Riparian Habitat Restoration

Long-term Objective:
Increase the area and density of native riparian vegetation, reduce the coverage of non-native riparian vegetation, and prevent streambank erosion in areas immediately adjacent to the Comal River and Landa Lake to complement aquatic vegetation restoration efforts and to help protect water quality.

Target for 2026:
Remove non-native riparian vegetation from the banks of the Old Channel and along a portion of Landa Lake and plant native vegetation where non-natives are removed. The target work areas for 2026 are illustrated in Figure 5 and 6.

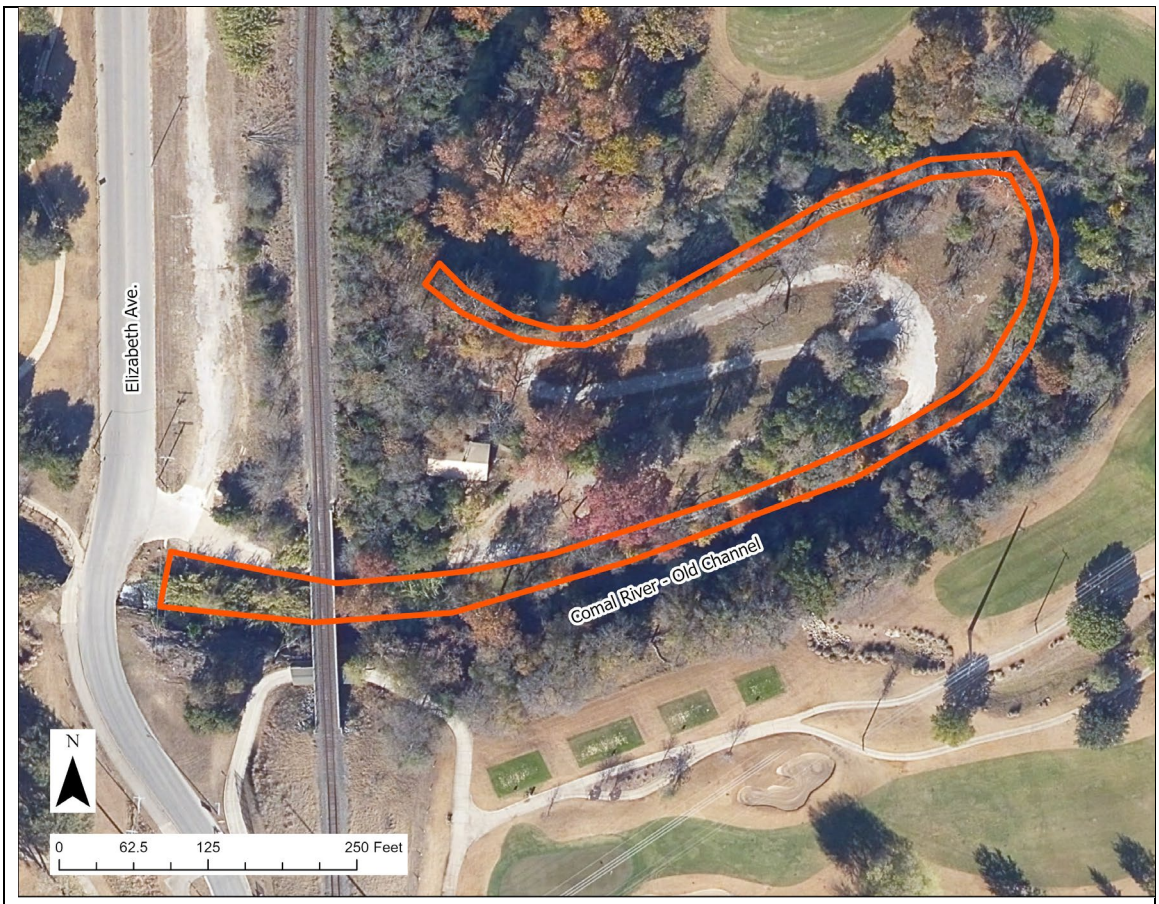


Figure 5. Location of 2026 riparian restoration, Schlitterbahn Employee Parking Area.

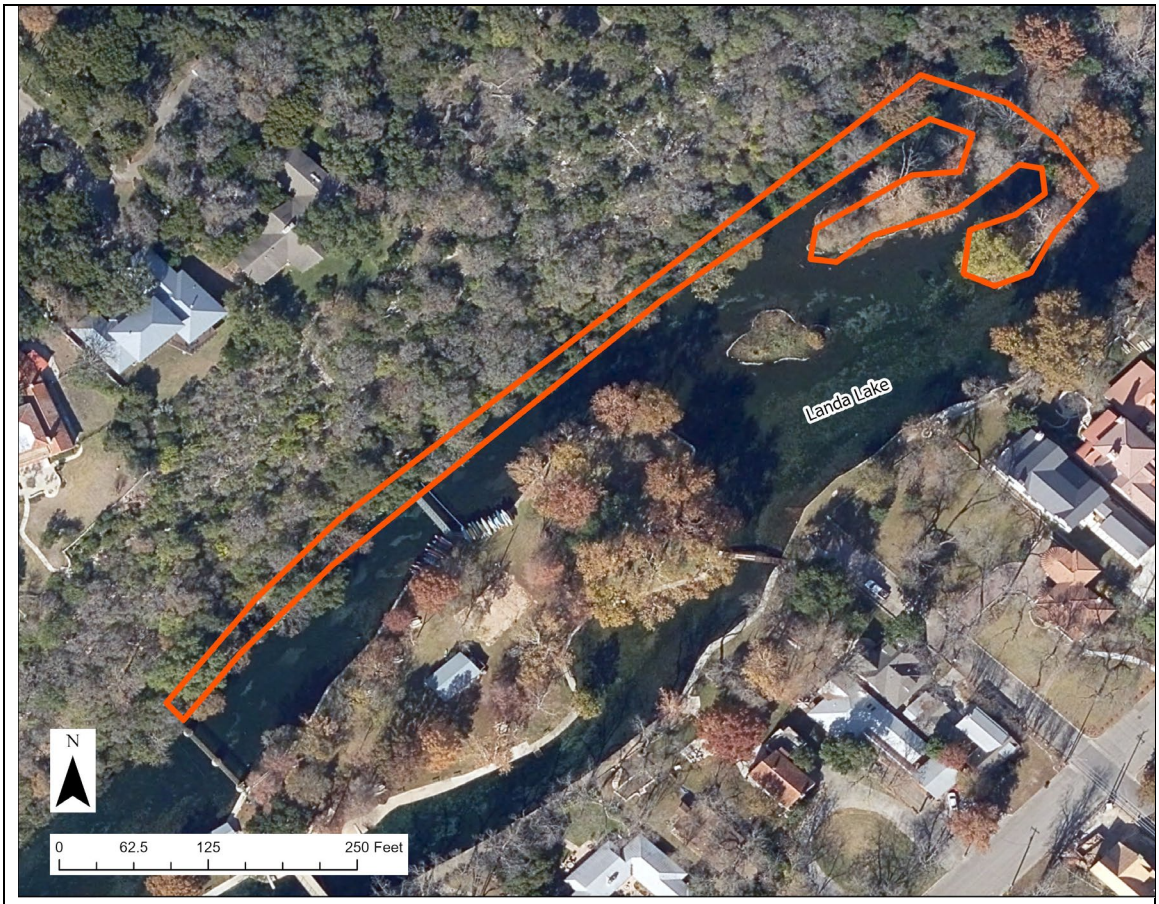


Figure 6. Location of 2026 riparian restoration, Spring Island and surrounding riparian area.

Monitor and maintain riparian areas where non-native riparian vegetation was treated/ removed in previous years to prevent re-establishment. Monitor and maintain previously planted areas to assess condition of riparian vegetation and promote the establishment/ growth of native vegetation. Plant additional native plants, and/ or grasses, as needed, to replace dead plantings or to vegetate bare areas. Maintenance of restored areas in Landa Park may include the installation of permanent fencing, as needed, to prevent disturbance of restored areas by park visitors.

Methods:

Invasive Species Management:

Non-native riparian vegetation will be treated with mechanical methods and/ or with use of an aquatic-approved herbicide. Elephant Ears will be treated in small sections to minimize overall herbicide usage and to minimize soil/ bank disturbance over large areas. Non-native trees will be cut and removed, and remaining tree stump treated with aquatic-approved herbicide.

Monitor areas where non-native plants were removed in previous years. Re-treat and remove re-emergent non-native vegetation.

Native Plant Restoration:

Install sediment control berms in locations where non-native plants are treated/ removed. Native plants will be planted following the successful treatment/ removal of non-native vegetation and installation erosion control berms. Native plants will be selected based on sun exposure, proximity to the stream, growth habit, and ability to withstand deer browsing. Candidate native plant species may include those in **Table 5 and 6.**

Table 5. Candidate riparian plantings for Landa Lake Golf Course and Landa Park

Trees and Shrubs	**Herbaceous**
American Beautyberry (*Callicarpa americana)*	Coral Honeysuckle (*Lonicera sempervirens*)
Bald Cypress (*Taxodium distichum)*	Creeping Spotflower (*Acmella repens*)
Bee Brush (*Eysenhardtia texana)*	Emory Sedge (*Carex emoryi*)
Black Walnut (*Juglans nigra)*	Frog Fruit (*Phyla nodiflora*)
Burr Oak (*Quercus macrocarpa)*	Frostweed (*Verbesina virginica)*
Buttonbush (*Cephalanthus occidentalis)*	Horse Herb (*Calyptocarpus vialis*)
Elderberry (*Sambucus canadensis)*	Inland Sea Oats (*Chasmanthium latifolium*)
Eve's Necklace (*Styphnolobium affine)*	Switchgrass (*Panicum virgatum*)
Fragrant Sumac (*Rhus aromatica*)	Texas Lantana (*Lantana urticoides*)
Green Ash (*Fraxinus pennsylvanica)*	Turks Cap (*Malvaviscus arboreus var. drummondii*)
Mexican Buckeye (*Ungnadia speciosa)*	Water Willow (*Decodon verticillatus*)
Mexican Plum (*Prunus mexicana)*	White Boneset (*Eupatorium serotinum*)
Mountain Laurel (*Sophora secundiflora*)	Yellow Bidens (*Bidens sp.*)
Possum Haw Holly (*Ilex ambigua)*	Woodland Sedge (*Carex blanda*)
Red Buckeye (*Aesculus pavia)*	Zexmenia (*Wedelia acapulcensis var. hispida)*
Red Mulberry (*Morus rubra)*	
Dwarf Palmetto (*Sabal minor*)	
Soapberry (*Sapindus drummondii)*	
Sycamore (*Platanus occidentalis)*	
Grasses	**Forbs**
Buffalo Grass (*Buchloe dactyloides)*	Texas Bluebonnet (*Lupinus texensis)*
Eastern Gamagrass (*Tripsacum dactyloides)*	Purple Prairie Clover (*Dalea purpurea)*
Green Sprangletop (*Leptochloa dubia)*	Partridge Pea (*Chamaechrista fasciculata)*
Prairie Wildrye (*Elymus canadensis)*	Texas Yellow Star (*Lindheimera texana)*
Switchgrass (*Panicum virgatum)*	Gayfeather (*Liatris mucronata)*
Little Bluestem (*Schizachyrium scoparium)*	White Prairie Clover (*Dalea candida)*
Blue Grama (*Bouteloua gracilis)*	Lemon Mint (*Monarda citridora)*
Sideoats Grama (*Bouteloua curtipendula)*	Plains Coreopsis (*Coreopsis tinctoria)*
Curly Mesquite (*Hilaria belangeri)*	Indian Blanket (*Gaillardia pulchella)*
Indiangrass (*Sorghastrum nutans)*	Tall Goldenrod (*Solidago altissima)*

Table 5. Candidate riparian plantings for Landa Lake Golf Course and Landa Park

Trees and Shrubs	Herbaceous
Texas Cupgrass (*Eriochloa sericea)*	
Sand Dropseed (*Sporobolus cryptandrus)*	
Sand Lovegrass (*Eragrostis trichodes)*	
Big Bluestem (*Andropogon gerardii*)	
Cane Bluestem (*Bothriochloa barbinodis)*	
White Tridens (*Triden albescens)*	
Western Wheatgrass (*Pascopyrum smithii)*	
Bushy Bluestem (*Andropogon glomeratus)*	

Table 6. Candidate riparian plantings for Comal County Water Recreation District #1 Property

Trees	Perennials
American Sycamore (*Platanus occidentalis)*	Coral Honeysuckle (*Lonicera sempervirens*)
Bald Cypress (*Taxodium distichum)*	Creeping Spotflower (*Acmella repens*)
Eastern Red Cedar *(Juniperus virginiana*)	Emory Sedge (*Carex emoryi*)
Cedar Elm (*Ulmus crassifolia*)	Frog Fruit (*Phyla nodiflora*)
Burr Oak (*Quercus macrocarpa)*	Damianita (*Chrysactinia mexicana*)
Eastern Cottonwood (*Populus deltoides*)	Fall Aster (*Symphyotrichum oblongifolium)*
Retama (*Parkinsonia aculeata*)	Four Nerve Daisy (*Tetraneuris scaposa)*
Eve's Necklace (*Styphnolobium affine)*	Frogfruit (*Phyla nodiflora)*
Texas Redbud (*Cercis canadensis var. texensis*)	Texas Lantana (*Lantana urticoides*)
Anacacho Orchid Tree (*Bauhinia lunaroides*)	Turks Cap (*Malvaviscus arboreus var. drummondii*)
Mountain Laurel (*Sophora secundiflora*)	Horsetail Reed (*Equisetum hyemale)*
Texas Persimmon (*Diospyros texana*)	Meahly Blue Sage (*Salvia farinacea)*
American Sycamore (*Platanus occidentalis*)	Missouri Primrose (*Oenothera macrocarpa)*
	Orange Zexmenia (*Wedelia acapulcensis var. hispida*)
	Pidgeonberry (*Rivina humilis*)
	Rock Rose (*Pavonia lasiopetala*)
	Snake Herb (*Dyschoriste linearis*)
	Tropical Sage (*Salvia coccinea*)
Grasses	**Shrubs/ Understory Plants**
Woodland Sedge (*Carex blanda*)	American Beautyberry (*Callicarpa americana*)
Eastern Gamagrass (*Tripsacum dactyloides)*	Buttonbush (*Cephalanthus occidentalis*)
Lindheimer Muhly (*Muhlenbergia lindheimeri*)	Coralbean (*Erythrina herbacea*)
Bushy Bluestem (*Andropogon glomeratus)*	Elderberry (*Sambucus canadensis*)
Switchgrass (*Panicum virgatum)*	Evergreen Sumac (*Rhus virens*)
Little Bluestem (*Schizachyrium scoparium)*	Fragrant Mimosa (*Mimosa borealis*)
Sideoats Grama (*Bouteloua curtipendula)*	Fragrant Mistflower (*Ageratina havanensis*)
Inland Sea Oats (*Chasmanthium latifolium*)	Indigobush (*Amorpha fruticosa*)
	Kidneywood (*Eysenhardtia texana*)
Misc	Mexican Buckeye (*Ungnadia speciosa*)
Lindheimer Marsh Fern (*Thelypteris ovata*)	Palmetto (*Sabal minor*)

Table 6. Candidate riparian plantings for Comal County Water Recreation District #1 Property

Trees	Perennials
Maidenhair Fern (*Adiantum capillus*)	Possumhaw (*Ilex decidua*)
Beargrass (*Nolina lindheimeriana*)	Red Buckeye (*Aesculus pavia*)
Texas Sotol (*Dasylirion texanum*)	Skunkbush (*Rhus aromatica var. trilobata*)
Alamo Vine (*Merremia dissecta*)	Texas Sage (*Leucophyllum frutescens*)
Coral Honeysuckle (*Lonicera sempervirens*)	Yaupon (*Ilex vomitoria*)
	Yellow Bells (*Tecoma stans)*

Monitoring:
Previously restored riparian areas will be monitored for the re-emergence of non-native vegetation and success of native plantings. Sediment capture structures will be monitored for effectiveness. Monitor native riparian plantings for success. A riparian habitat assessment will be conducted in the spring and fall to evaluate the condition of the riparian zone.

Budget:
Table 7.1:
$100,000

Estimated 2026 budget:
$50,000

5.7.5 Management of Household Hazardous Wastes

Long-term Objective:
To minimize the potential for improper disposal of hazardous wastes and associated negative impacts to endangered species in the Comal River system.

Target for 2026:
Hold three household hazardous waste (HHW) collection events in New Braunfels. City of New Braunfels to continue prescription drug disposal program.

Methods:
Conduct three HHW collection events that incorporate an education and outreach component. The HHW events are coordinated by City's Solid Waste Division in conjunction with Comal County. The cost of each HHW event is approximately $40,000-$45,000 which includes event set-up and HHW disposal costs. The average cost of a HHW collection event is $40,385 based on HHW events held in 2023. The cost of the first two HHW events is shared evenly between the City and Comal County. The EAHCP program will fund the third event.

HHW collection events are held at the New Braunfels City Hall. Hazardous waste that is collected during the HHW collection events will be hauled off and disposed of by Clean Harbors.

The City is continuing to explore the feasibility of implementing a HHW drop-off facility that will accept HHW on an ongoing basis throughout the year. Currently, it is expected that a HHW drop-off facility will be opened within three years. The facility will likely be open to the public 1-2 days/ week for the drop-off of HHW.

The City of New Braunfels Fire Department will continue to implement a year-round prescription drug disposal program. The program, which uses a Single Use Disposal System (SUDS), will be available for residents to safely and securely dispose of expired or unwanted prescription and over-the-counter medication at no cost. SUDS are self-addressed, postage-paid large envelopes that will be available at eight city-owned locations. Once filled with unwanted medication, the envelopes are sealed and anonymously mailed to a disposal facility.

Monitoring:
The volume of hazardous waste collected and the number of participants for each HHW collection event will be documented.

Budget:
Table 7.1:
$30,000

Estimated 2026 budget:
$40,385

5.7.6 Impervious Cover/Water Quality Protection

Long-term Objective:
To reduce non-point source pollutant discharges to Landa Lake and the Comal River system.

Target for 2026:
The City, in coordination with the Landa Park Golf Course and CONB Parks and Recreation Department, will construct a bioretention basin and parking area located on Golf Course Road in Landa Park. This project is intended to address point and non-point source pollution and stormwater runoff that discharges into the old channel of the Comal River from Golf Course Road.

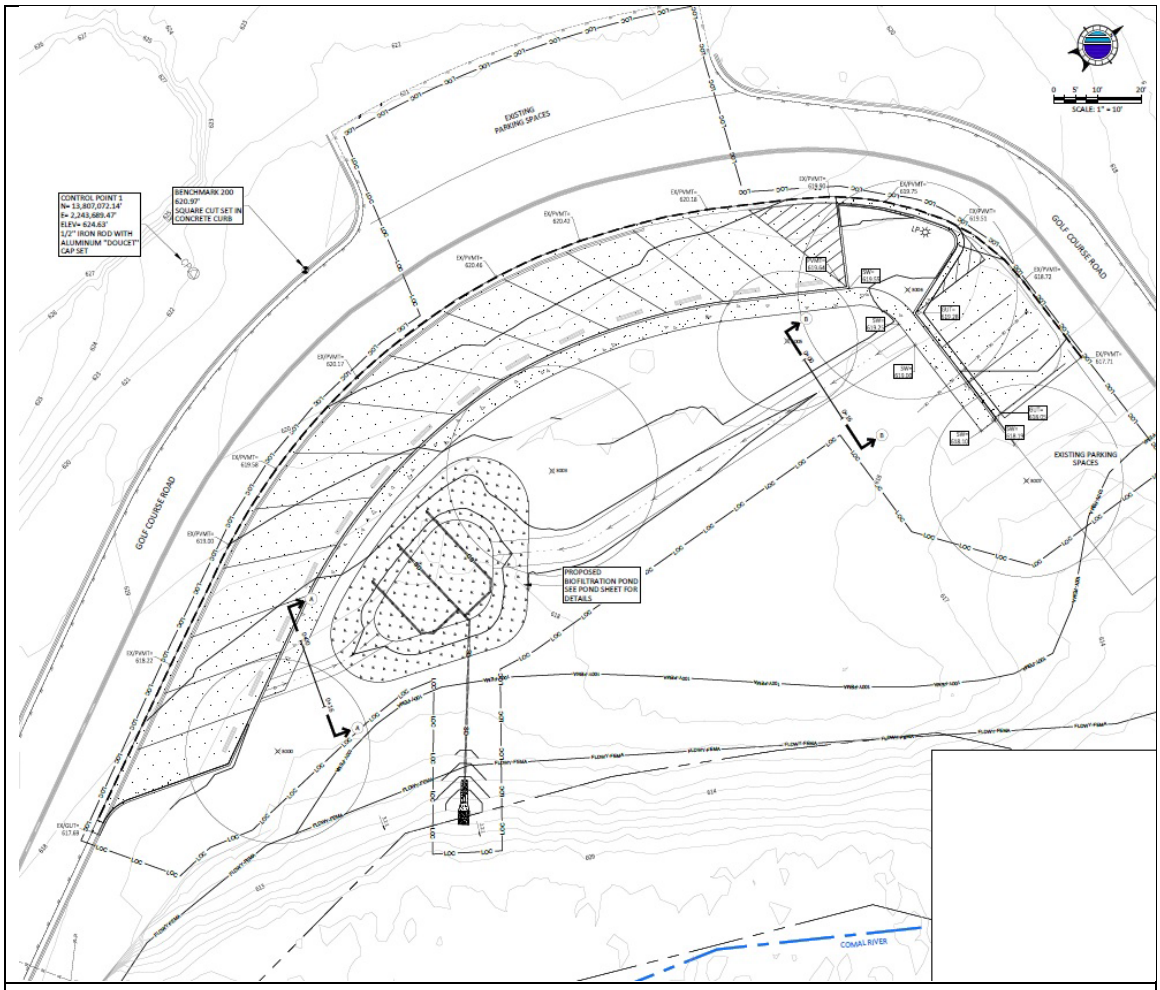


Figure 7. Excerpt from construction plans for the Golf Course Road biofiltration system.

Concurrently, the City will contract with an engineering firm to design the construction plans for a bioretention system to accept and filter stormwater from a parking area along Landa Park Drive, located in Landa Park. This system will address point and non-point source pollution originating from this parking area and will remove the pollutants prior to discharging into the new channel of the Comal River.



Figure 8. Location of proposed biofiltration system along Landa Park Drive

Methods:
The City will contract with a construction contractor to construct the bioretention basin and parking area on Golf Course Road in Landa Park. The City will also contract with an engineering firm to design the construction plans for a bioretention system to accept and filter stormwater from a parking area along Landa Park Drive.

Budget:
Table 7.1:
$100,000

Estimated 2026 budget:
$609,715[AB]
[A]$334,715 – Golf Course Road Biofiltration System Construction
[B]$275,000 – Landa Park Drive Biofiltration System Design

City of San Marcos/
Texas State University

2026 Work Plan

2026 City of San Marcos/Texas State University Work Plan Budget

EAHCP Section	Conservation Measure	Table 7.1	Estimated 2026 Budget
5.3.1/5.4.1	Texas wild-rice Enhancement	$100,000	$20,000
5.3.6/5.4.4	Sediment Management	$25,000	$0
5.3.8/5.4.3.1/5.4.12	Control of Non-Native Plant Species	$50,000	$225,000
5.3.3/5.4.3.2	Management of Floating Vegetation Mats and Litter	$80,000	$70,400
5.3.5/5.3.9/5.4.11/5.4.13	Non-Native Species Control	$35,000	$16,200
5.3.7	Designation of Permanent Access Points/Bank Stabilization	$20,000	$0
5.7.1	Native Riparian Restoration	$20,000	$40,000
5.3.2/5.4.2	Management of Recreation in Key Areas	$56,000	$65,000
5.7.6	Impervious Cover/Water Quality Protection	$200,000	$108,879 *
5.7.5	Management of HHW	$30,000	$30,000
5.3.4	Prohibition of Hazardous Material Transport	$0	$50,000
5.4.3.1/ 5.4.5,8,9/5.7.3,4	Unfunded Measures	$0	$0
	Total	***$616,000***	***$625,479***

*Funding needed to cover the EAHCP-portion of the construction cost for the Sessom Creek Stream Restoration Phase 2 project ($675,000) was approved by the Implementing Committee as part of the CoSM/ TXST 2025 EAHCP Workplan and Funding Application. The construction contract was awarded in March 2025 and construction commenced in May 2025. A portion of the funding previously approved and allocated for project construction in 2025 ($108,879) is being re-allocated to 2026 to fund remaining construction activities in 2026. A grant from TCEQ in the amount of $120,000 for the project and City contributions have significantly reduced project costs to the EAHCP.

2026 City of San Marcos/Texas State University Work Plan and Funding Application Amendment

Amendment #	Date EAHCP Committee Approved	Conservation Measure Amended	Y/N Funding Application Change	Funding Application Change ($)	Date EAA Board Approved	Comments
0	05/22/2025	Original 2026 Work Plan	NA	NA	NA	Original 2026 Work Plan
0	10/09/2025	2026 Funding Application	NA	NA	11/11/25	Original 2026 Funding Application
1	10/09/2025	5.7.6 Impervious Cover/Water Quality Protection	NA	NA	NA	Updated Work Plan with estimated costs for 5.7.6 Impervious Cover/Water Quality Protection
2	02/05/2026	5.7.6 Impervious Cover/Water Quality Protection	NA	Y	NA	Updated Work Plan with estimated “rollover” of $8,879 from 2025 to 2026 for 5.7.6 Impervious Cover/Water Quality Protection
1	02/05/2026	2026 Funding Application	Y	+$8,879	3/10/26	Updated Funding Application with estimated “rollover” of $8,879 from 2025 to 2026 for 5.7.6 Impervious Cover/Water Quality Protection

5.3.1/5.4.1 Texas Wild-Rice Enhancement and Restoration

Long-term Objective:
To achieve 8,000 – 15,450 m^2 of Texas wild-rice (TWR) in the Upper San Marcos River and to maintain existing and restored areas of TWR as required by the EAHCP.

Target for 2026:
Maintain at least 8,000 m^2 of TWR coverage, with a goal of maintaining existing TWR coverage (approx. 11,000 – 12,000m^2), within the Upper San Marcos River between Spring Lake and Stokes Park per EAHCP long-term goals for TWR (**Table 1**). Reduce negative impacts to TWR caused by encroachment of non-native floating and submerged aquatic vegetation.

Table 1. TWR long-term biological goals, or EAHCP Table 4-10.

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

*Represents a range of minimum long-term biological goal areal coverage over different flow conditions.
**Represents the percent of the total TWR coverage within that reach
***N/A is the goal reach percentage of total TWR coverage for Spring Lake as defined in EAHCP Table 4-10.

Methodology: Monitor TWR stands on an on-going basis in the Upper San Marcos River from Spring Lake to Stokes Park to detect the presence and expansion of non-native floating and submerged aquatic vegetation, including but not limited to *Hydrilla, Hygrophila, Nasturtium* and *Ceratopteris*. Remove, by-hand, non-native vegetation intermixed with and immediately adjacent to TWR stands. Should Condition M be in effect in 2026, non-native removal will be limited to areas within a 1-meter radius of TWR stands. Removed non-native vegetation will be captured and removed from the river. The removal, transport and disposal of non-native vegetation will be performed in accordance with Texas Parks and Wildlife Department (TPWD) Exotic Aquatic Vegetation Removal Permit provisions. TWR will be encouraged to expand naturally through the continued removal of non-native species within and around the perimeter of TWR stands.

Due to the current coverage of TWR within the San Marcos River (approximately 11,000 m^2), limited to no planting of TWR is anticipated to occur upstream of IH-35 in 2026. However, supplemental planting may be required if TWR coverage is significantly reduced as a result of flood scouring, low-flow conditions and/or river recreation activities.

TWR will be propagated from both tillers and seeds provided by U.S. Fish and Wildlife Service (USFWS) staff at the San Marcos Aquatic Research Center (SMARC). USFWS staff collect mature seeds from the panicle by gently pulling upwards until seeds are released. Mature seeds are plump, filled out, and either green or brown in color. Seeds are then placed in a plastic bag during collection, counted and potted within 3-6 months following collection. TWR seeds are placed on top of soil in 8-inch pots and covered with pea gravel to secure the seeds from floating

in the water. Seeds are spread out evenly within each pot, and gently pushed into the saturated soil and gravel mixture. Once TWR seeds have germinated they will be separated out and planted in a similar manner as TWR tillers. Tillers of TWR are hand-collected from floating vegetation mats or from fragments attached to mature plants within the river. TWR tillers are transported to the raceways located adjacent to the Texas State University Freeman Aquatic Biology (FAB) building and potted in soil that consists of a bulk mixture containing topsoil and mushroom compost. TWR tillers are planted in 8-inch pots with the soil being highly saturated with water so that the tillers can be inserted without causing damage to the roots. Density of fragments per pot is generally 3-5 individuals. The pots are placed into the FAB raceways with pumps generating a current through the newly planted fragments. Water in the raceways is sourced from a nearby Edwards Aquifer artesian well. Plants remain in the raceways until roots are established in the pots.

The process of planting begins by transporting potted TWR individuals from the FAB to a predetermined planting site in the river. A diver and a handler carry the plants to the designated section, and while the diver digs a hole in the substrate using a trowel, the handler gives the diver a pot of TWR. The contents are removed from the pot and inserted into the hole before returning the empty pot back to the handler for collection. The diver works downstream to upstream in a linear pattern of planting. Individuals are placed about 0.5 meters apart. This process is adjusted as needed to meet the varying conditions of each planting site.

Monitoring:
TWR, as well as non-native aquatic vegetation, is mapped and quantified at least twice annually in the Long-term Biological Goal Reaches (Spring Lake Dam, City Park, and IH-35 reaches) and all TWR are surveyed once a year in late summer as part of the EAA Biological Monitoring program.

Budget:
Table 7.1:
$100,000

Estimated 2026 budget:
$20,000

5.3.6/5.4.4 Sediment Management

The City of San Marcos (COSM) and Texas State University will partner to remove sediment from the river bottom in support of the native aquatic vegetation planting program from Spring Lake to IH-35.

Long-term Objective:
This activity has been suspended as the removal of sediment from the river in support of native aquatic restoration activities has proven to be both ineffective and cost-prohibitive. From 2013 to 2015, sediment removal from three of the six required sites resulted in the removal of only 158 m^3 of sediment, costing approximately $555,000. In 2017, an Adaptive Management Proposal to amend this conservation measure in the EAHCP was approved.

The Sediment Removal and Impervious Cover/Water Quality Protection are now combined into one conservation measure that seek to minimize inputs of sediment and other contaminated runoff in the Upper San Marcos River watershed. The primary focus is reducing erosion in and sediment transport from the Sessom Creek watershed which has historically contributed heavy sediment loads to the Upper San Marcos River.

The COSM will provide; (1) design of wastewater relocation and erosion/sediment control in Sessom Creek; (2) Sessom wastewater line rehab and relocation; and (3) construction of stormwater control (SWC) features and associated land management tasks that control erosion, minimize sedimentation, and reduce pollutants in the Sessom Creek watershed.

Target for 2026:
See discussion in Section 5.7.6 Impervious Cover/Water Quality Protection

Method:
See discussion in Section 5.7.6 Impervious Cover/Water Quality Protection

Budget:
Table 7.1:
$25,000

Estimated 2026 budget:
$0

5.3.8/5.4.3/5.4.12 Control of Non-Native Plant Species

Long-term Objective:
To decrease the density of non-native aquatic and littoral vegetation within and immediately adjacent to the upper San Marcos River to enhance fountain darter habitat by increasing the distribution of native aquatic flora as provided in the long-term goals set forth in the EAHCP submerged aquatic vegetation (SAV) non-routine adaptive management.

Target for 2026:
Non-Native Aquatic Plant Removal
Continue efforts towards the systematic removal of non-native SAV from within the Upper San Marcos River utilizing a "top-down approach". Non-native aquatic vegetation removal maintenance in 2026 will occur from Spring Lake downstream to Cheatham Street. This segment of river will be classified as a "Maintenance Zone" (**Figure 1,** shown in green). Additional SAV maintenance will occur downstream of Cape's Dam to Stokes Park to maintain areas previously restored as part of recent grand-funded efforts. The intent of the maintenance activity within this segment of river is to prevent significant re-growth of non-native submerged and floating aquatic vegetation where intensive SAV restoration has previously occurred and/or where native vegetation is currently predominant in order to limit competition between natives and non-natives and reduce negative impacts to natives caused by expansion of non-native species.

The segment of river between Cheatham Street and IH-35 (i.e. the EAHCP IH-35 Long-term Biological Goal reach) will be classified as a "Recovery Zone" (**Figure 1,** shown in yellow) and will be monitored and maintained more frequently than upstream Maintenance Zones to more fully remove any re-emergent non-native SAV in preparation for native SAV planting.

Intensive non-native removal will occur in the San Marcos River from IH-35 to Cape's Dam which will be classified as a "Work Zone" (**Figure 1,** shown in red). Intensive non-native removal in this segment will focus on bulk removal of *Hydrilla* and *Hygrophila*. This area was identified for bulk removal of non-native vegetation in the CoSM/ TXST 2025 EAHCP Workplan but was unable to be completed due to continuation of Condition M throughout 2025.

Native SAV Planting
The propagation and planting of native vegetation will be performed in accordance with Texas Parks and Wildlife Department (TPWD) Introduction of Aquatic Vegetation Permit provisions. Native SAV will be planted in areas where non-native SAV has been thoroughly removed and controlled. Native SAV planting in 2026 will be focused in the Recovery Zone between Cheatham Street and IH-35 (**Figure 1,** shown in yellow). Native SAV species to be planted include *Ludwigia repens, Cabomba caroliniana, Sagittaria platyphylla, Heteranthera dubia, Hydrocotyle, Myriophyllum heterophyllum* and *Potamogeton illinoensis.* Limited planting will also occur, as-needed, from Spring Lake Dam to Rio Vista Dam in areas where native SAV coverage has been reduced by flood scouring or other factors.

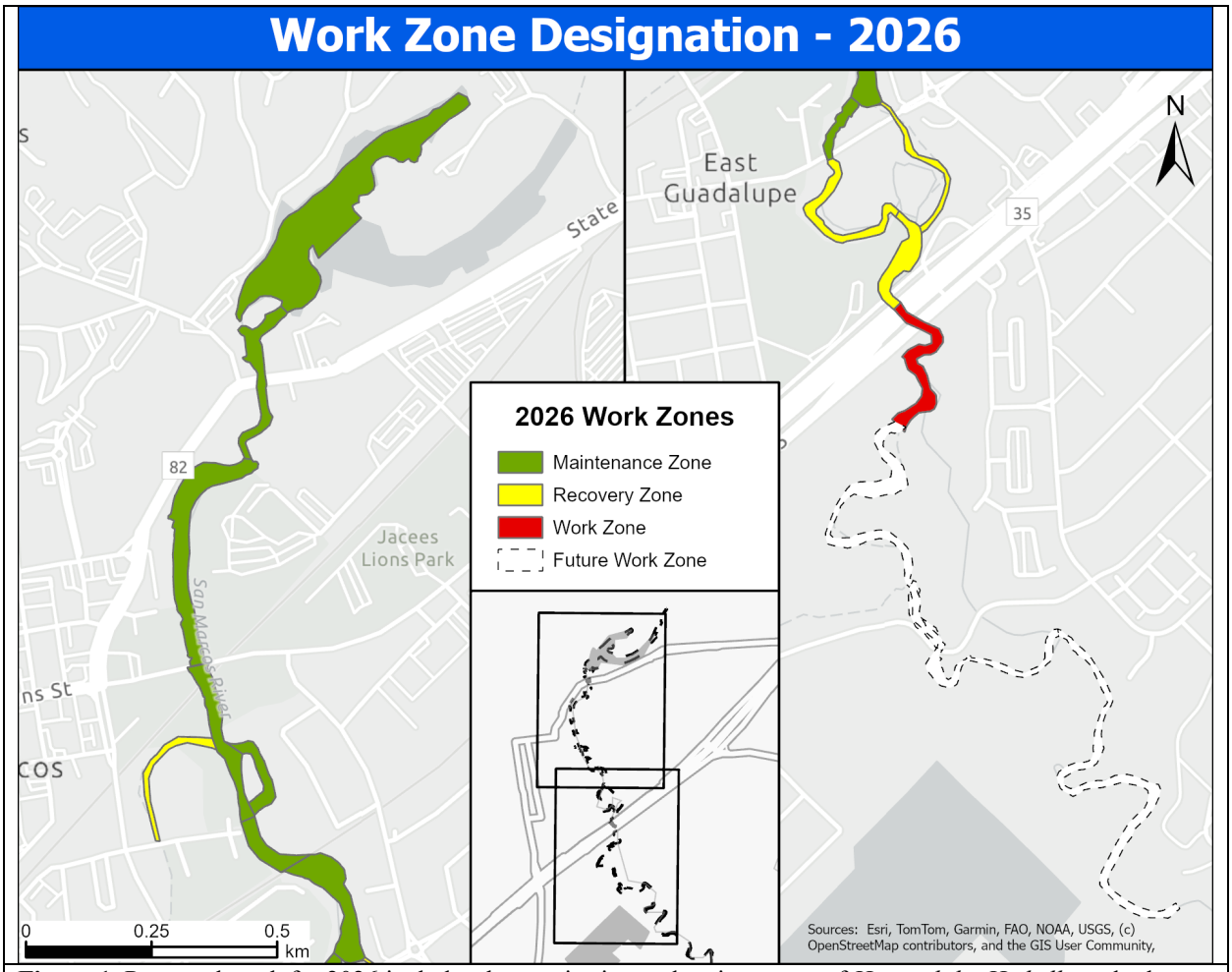


Figure 1. Proposed work for 2026 includes the monitoring and maintenance of *Hygrophila*, *Hydrilla* and other non-native floating and submerged aquatic vegetation from Spring Lake to IH-35 (shown in green) and an intensive non-native SAV removal "Work Zone" from IH-35 to Cape's Dam (shown in red). Native SAV is to be planted from Cheatham Street to IH-35 (the "Recovery Zone", shown in yellow).

Non-Native Littoral Plant Removal

Perform monitoring and maintenance of the littoral zone of the upper San Marcos River system where non-native littoral plants have previously been treated and/or removed. The area designated for continued monitoring and maintenance will include the littoral zone within and the riparian zone immediately adjacent to Spring Lake and the San Marcos River between Spring Lake and Stokes Park. This includes maintenance of areas where littoral vegetation (i.e. elephant areas) was previously treated and/or removed as part of the United States Army Corps of Engineers (USACE) San Marcos Aquatic Ecosystem Restoration project and along the property located on the west side of the San Marcos River between IH-35 Frontage Road and Cape Street. Monitoring and non-native vegetation maintenance will also occur in downstream portions of San Marcos River tributaries (i.e. lower Sink Creek, Purgatory Creek, Willow Creek and Sessom Creek) where non-native vegetation may exist and contribute to the introduction and spread of those non-native species into the main stem of the San Marcos River.

Work completed under this task will focus on the treatment and/or removal of non-native littoral zone vegetation (i.e. elephant ears) and non-native vegetation within the riparian zone

immediately adjacent to the water's edge. Work under this task will not include treatment of non-native vegetation within the upper riparian zone which will be managed under EAHCP Task 5.7.1 Native Riparian Habitat Restoration.

Methodology:

Non-Native Aquatic Plant Removal

The removal, transport and disposal of non-native vegetation will be performed in accordance with Texas Parks and Wildlife Department (TPWD) Exotic Aquatic Vegetation Removal Permit provisions. Non-native floating and submerged aquatic vegetation will be removed by hand. Maintenance removal of non-natives is conducted by routinely monitoring and selectively removing re-emergent non-native submerged and floating aquatic vegetation within Maintenance Zones. These maintenance activities will be focused primarily within and immediately adjacent to native SAV stands and are intended to prevent re-growth and spread of non-native aquatic vegetation, reducing competition and negative impacts to native species. Removed vegetation will be immediately placed in a mesh bag or skiff and removed from the river. Intensive, bulk non-native SAV removal efforts within designated Work Zones will focus on the removal of larger, contiguous stands of non-native SAV (i.e. *Hydrilla* and *Hygrophila*). Divers will pull non-native SAV by hand and allow removed vegetation to drift downstream into a pre-placed seine and/or placed directly into a skiff or mesh bag. Any removed vegetation will be shaken to remove any trapped fauna, which will be returned to the river prior to the vegetation being removed from the river and disposed of at the COSM or Spring Lake composting facilities. Initial intensive removal efforts will be followed by multiple sweeps involving the thorough removal of roots, small plants, and tubers. This process will be repeated until no *Hydrilla* or *Hygrophila* re-growth is observed.

The "top-down" approach for non-native SAV involves the systematic removal of *Hydrilla* and *Hygrophila* from upstream to downstream to minimize the potential for non-native SAV to re-colonize downstream areas from upstream sources. Reaches that have been thoroughly cleared of large patches of these species for two or more years are considered "Maintenance Zones" while reaches in which large amounts of these species are being removed are designated as "Work Zones". A "Work Zone" in which all *Hydrilla* and *Hygrophila* have been thoroughly removed during the previous year are considered a "Recovery Zone". "Recovery Zones" may require additional effort over time to ensure the thorough removal of these species' root systems and tubers. *Hydrilla* tubers can remain viable for multiple years despite being buried over 12 inches beneath the sediment. The practice of removing non-native SAV from upstream to downstream helps to reduce labor hours spent gardening non-native SAV regrowth resulting from non-native plant fragments migrating downstream from upstream stands and reestablishing in denuded areas and actively competing with recently planted or established native SAV. This method also allows for increased natural expansion of native SAV in the absence of non-native SAV. Large homogenous stands of non-native SAV will be targeted within "Work Zones". Within "Maintenance Zones" non-native SAV will be removed primarily from within stands of established native SAV and monitored for regrowth.

Native Aquatic Plant Introduction:

The propagation and planting of native vegetation will be performed in accordance with Texas Parks and Wildlife Department (TPWD) Introduction of Aquatic Vegetation Permit provisions.

The planting of native SAV will occur once the designation of a Work Zone changes to a Recovery Zone, as this minimizes the potential and occurrence of non-native SAV regrowth. This is expected to take 3-6 months from when initial intensive removal is completed within a Work Zone, depending on the density and area of non-natives originally present at the site.

Efforts will focus on preservation of existing native SAV cover to allow for the natural expansion of those populations throughout the river system. Portions of the riverbed exhibiting minimal native SAV coverage will be planted with native SAV species best suited to local river conditions with a goal of establishing mixed native SAV stands. Native SAV species that will be utilized for planting include *Ludwigia repens, Cabomba caroliniana, Sagittaria platyphylla, Heteranthera dubia, Hydrocotyle, Myriophyllum heterophyllum* and *Potamogeton illinoensis.* Planting will not occur in areas commonly impacted by intense recreation.

Native SAV to be used for planting will be propagated at the raceways adjacent to the FAB at Texas State University. Fragments and tillers of native aquatic plants to be propagated will be collected by hand from floating vegetation mats or from fragments attached to mature plants in the river.

Native SAV will be planted using a team comprised of one or more divers plus one or more handlers depending on the river depth and location. A planting hole will be made in the substrate using a trowel and the handler will give the diver a pot of native SAV. The contents are removed from the pot and inserted into the hole before returning the empty pot back to the handler for collection. Diver will plant downstream to upstream in a linear pattern of planting. Individuals are placed approximately 0.25 meters apart and gardened as needed to encourage successful establishment. This process is adjusted as needed to meet the varying conditions of each planting site and species.

In addition to the planting of potted and rooted plants, cuttings of *Cabomba, Ludwigia, Heteranthera,* and *Potamogeton* will be directly transplanted into the substrate. This method is generally more cost-effective and results in less disturbance of the substrate and reduces downstream turbidity as a result.

Previous experience regarding plant establishment, as well as environmental conditions at the time of planting, will determine which native species will be planted in specific locations within the river. *Cabomba* and *Sagittaria* have generally exhibited greater success in finer substrates (silt) within areas of slower moving water. Both species can be planted in a range of water depths. *Ludwigia* has been planted in a wide variety of habitat types ranging from areas with shallow depths, high velocities over coarse substrates to areas with slack-water habitat over silt substrate to determine which habitat results in greatest rates of expansion and persistence. This species shows greater resilience in different flows and depths, if the substrate is appropriate, and is often used if other species fail to expand within a denuded area. *Potamogeton* is an additional species that has struggled to become established in several reaches, and its coverage decreases downstream of Cypress Island. Like *Ludwigia*, *Potamogeton* has been planted in numerous areas with varying substrate compositions in an attempt to determine the most suitable habitat type. It was observed to exhibit the best growth in the upper reaches with high flow and dense, coarse substrates (gravel/sand and clay). *Hydrocotyle,* like *Ludwigia,* can become a littoral species,

persisting in areas of very shallow water or even in moist areas along the water's edge. Therefore, these species will be utilized to replant river margins, areas exhibiting very shallow water depths and/or in areas that have been observed to become dewatered during low-flow conditions. *Heteranthera* and *Myriophyllum* will be planted, as needed, in test plots within the IH-35 long-term biological goal reach (LTBG reach) in order to evaluate and monitor successful establishment and growth habitats. The test plots will be chosen to offer differing habitat types (depths, substrate, and edge/corridor). *Heteranthera* and *Myriophyllum* individuals will be removed and counted from non-LTBG reaches. The removal sites will be tracked via GIS polygons. These individuals will be re-planted at the IH-35 LTBG reach. Planting sites will be tracked via GIS polygons and the number of individuals planted will be adjusted as needed.

Non-Native Littoral Plant Removal
The littoral zone within and the riparian zone immediately adjacent to Sink Creek, Spring Lake, the San Marcos River (between Spring Lake and Stokes Park) will be monitored on a monthly basis to assess for re-emergent non-native vegetation. Re-emergent elephant ears will be spot-treated with Clearcast aquatic herbicide (Imazamox-based) at a rate of approximately 6oz/ gallon of water with applications made using a hand-held pump sprayer. Re-emergent ligustrum and chinaberry trees in the riparian zone immediately adjacent to the waterway will be spot-treated with Aqua Star herbicide (glyphosate-based) using a hand-held pump sprayer and mechanically removed. Re-emergent Chinese tallow trees will be spot-treated with Vastlan herbicide (triclopyr-based) and mechanically removed.

Monitoring:
Aquatic Vegetation: Newly planted areas will be monitored routinely to evaluate plant establishment and re-emergence of non-native SAV. All planted areas will be gardened to remove re-emergent non-native vegetation and replanted with native SAV, as needed. All planting and removal areas will be monitored via quadcopter imagery and/or visual observation. SAV coverage is mapped at least twice annually within LTBG reaches through the EAHCP Biological Monitoring program. Mapping data will be utilized to evaluate coverage of both native and non-native SAV and the efficacy of SAV restoration efforts.

Littoral Vegetation: The littoral zone along the upper San Marcos River from Spring Lake to Stokes Park, as well as applicable tributaries, will be monitored on a monthly basis. Any observed re-emergent non-native vegetation will be re-treated and/or removed.

Budget:
Table 7.1:
$50,000

Estimated 2026 budget:
$225,000 ($195,500 for SAV restoration and $29,500 for littoral zone non-native vegetation management)

5.3.3/5.4.3.2 Management of Floating Vegetation Mats and Litter

Long-term Objective:
Minimize impacts of floating vegetation and litter on TWR, native SAV and endangered species habitat within the San Marcos River.

Target for 2026:
Management of Floating Vegetation Mats:
Dislodge floating vegetation mats within the San Marcos River, generally from Spring Lake Dam to IH-35, where accumulations have the potential to negatively impact TWR and native SAV.

Management of Litter:
Perform routine litter collection efforts to reduce litter accumulations in the Upper San Marcos River. Litter management efforts will include the routine removal of litter from the littoral zone, riverbed and water column of the San Marcos River from Spring Lake Dam to Stokes Park. Litter collection will occur twice weekly from Spring Lake Dam to IH-35 and once weekly from IH-35 to Stokes Park during the recreation season (June 1-Sept 15) and monthly during the off-season. Litter removal will also occur quarterly within the lower portions of several of the major tributaries to the upper San Marcos River (i.e. Sessom Creek, Purgatory Creek, Riverside drainage channel and Willow Creek).

Methodology:

Management of Floating Vegetation in the San Marcos River: Floating vegetation mats and accumulations observed within and covering TWR and other native SAV will be dislodged and allowed to float downstream. The effort required to mitigate damage and reduce negative impacts to TWR and native SAV associated with accumulation of floating vegetation mats typically increases during low-flow conditions and in areas with significant TWR coverage, as the floating vegetation effectively becomes trapped within stands of TWR as waters recede.

Management of Litter in the San Marcos River: Litter will be collected by underwater divers and/or non-motorized vessel from the substrate, water column, surface and littoral zone of the San Marcos River from Spring Lake Dam to Stokes Park. Litter collection will occur twice weekly from Spring Lake Dam to IH-35 and once weekly from IH-35 to Stokes Park during the recreation season (June 1-Sept 15) and monthly during the off-season. All collected litter will be removed from the river and disposed of properly.

Collect and remove litter on a quarterly basis from portions of four San Marcos River tributaries in the area immediately upstream of the confluence and where access is available (i.e. Willow Creek, Purgatory Creek, Riverside Drive Drainage Channel, Sessom Creek).

Monitoring:
Floating Vegetation Mat Mgmt: The San Marcos River from Spring Lake Dam to IH-35 will be monitored routinely to assess for the accumulation of floating vegetation on TWR and over

native SAV stands. The location and approximate areal coverage of removal floating vegetation accumulations will be tracked and reported.

Management of Litter: The volume of litter collected during each litter removal session will be tracked and reported.

Budget:
Table 7.1:
$80,000

Estimated 2026 budget:
$70,400 ($40,000 for floating vegetation mat management & $30,400* for litter removal)

*The total amount of the litter removal contract is $50,400, of which the City of San Marcos funds $20,000, to perform the full scope of litter removal work as described in the above section.

5.3.5/5.3.9/5.4.11/5.4.13 Non-Native Species Control

Long-term Objective:
Reduce populations of non-native, invasive species in the San Marcos River to minimize their impacts on Covered Species and the aquatic ecosystem.

Target for 2026:
Continue efforts to remove non-native fish and snail species from the San Marcos River system. The species targeted for removal will include suckermouth armored catfish, tilapia, and two snail species, *Melanoides* and *Marisa cornuarietis.* Minimize the potential for the introduction of other non-native species into the San Marcos River.

Methodology:
Contractor will use methods that have proven to be successful in removal of non-native species from the San Marcos River system from Spring Lake to Stokes Park. Methods for non-native fish removal will include spearfishing within the river and bowfishing & gill netting in Spring Lake. The quantity and weight of removed non-native species will be tracked and reported.

Host two annual volunteer non-native polespear tournaments to increase total removal, while saving costs and providing an educational awareness component. Ensure that all tournament participants adhere to means and methods that avoid impacts to native species and the ecosystem. Tournament participants will be given a packet of information and are required to sign liability waivers.

Effective removal of *Melanoides* and *Marisa cornuarietus* is accomplished by determining the locations of highest snail density and using dip nets to remove the snails during the polespear tournaments. These species are best controlled by diving several hours after sunset to hand-pick the snails from the substrate and SAV.

COSM will continue to uphold an ordinance prohibiting the dumping of aquaria into the San Marcos River (CoSM Code Sec. 58.037) and offer the CoSM Discovery Center Fish Drop Off and Adoption program to accept unwanted aquatic fauna from the general public.

Monitoring:
In order to monitor the reduction of overall non-native species abundance in the San Marcos River ecosystem, the contractor will track the number of individuals removed and compile the weights of the individual animals removed. This information may assist in determining overall effectiveness of this conservation measures impact of species population dynamics.

Budget:
<u>Table 7.1:</u>
$35,000

<u>Estimated 2026 budget:</u>
$16,200

5.3.7 Designation of Permanent Access Points/Bank Stabilization

Long-term Objective:

Provide access points along the river for recreational access. Maintain integrity of structures that serve to control bank erosion, protect TWR and other SAV and listed species habitat in the Upper San Marcos River.

Target for 2026:

Continue to direct and encourage river access to permanent stabilized access points located along the San Marcos River between the Spring Lake Dam reach and Ramon Lucion Park. Deter and minimize river access in locations between the permanent access points with dense riparian vegetation and/or fencing.

Monitoring:

River access points will be visually monitored by City staff on a regular basis. Additional repairs and maintenance to the access points will be performed on an as-needed basis.

Budget:

Table 7.1:
$20,000

Estimated 2026 budget:
$0

5.4.3.1 Management of Submerged and Floating Vegetation in Spring Lake

Long-term Objective:

Management of aquatic vegetation in Spring Lake through the use of the harvester boat and through hand-removal of vegetation around individual spring orifices by trained, authorized divers.

Target for 2026:

Manage nuisance floating aquatic vegetation in Spring Lake through use of the harvester boat. Manage submerged SAV and debris accumulations around select spring openings in Spring Lake with authorized, trained divers to maintain San Marcos Salamander habitat.

Methodology:

Management of Floating Aquatic Vegetation in Spring Lake:

The harvester boat will cut and remove approximately 15 to 20 boatloads of plant material a month from Spring Lake. The harvester clears the top meter of the water column, cutting vegetation from sections one, two, and three once a week. The harvested vegetation is visually checked by the driver for fauna caught in the vegetation. If the driver observes fauna, he/she will stop work and return the animal(s) back into Spring Lake if appropriate. Texas State employees and supervised volunteers are trained to recognize the Covered Species through the Diving for Science program (EAHCP § 5.4.7.1) and avoid contact with them. Vegetation mats are removed from zones four and five on an as-needed basis. The total area treated equals about nine surface acres.

Management of Submerged Aquatic Vegetation and Debris Accumulations around Spring Openings in Spring Lake: Each week approximately five springs will be gardened, with trained divers returning to garden the same springs every two to three weeks. During summer when algal growth has been observed to increase, the springs may be managed more frequently (up to four springs per day), primarily to remove algae. Texas State employees and supervised volunteers fin the area around the springs to remove accumulated sediment, and then clear a 1.5-meter radius around each spring opening in Spring Lake with a machete and by-hand. Over the next 1.5-meter radius around the spring opening, they shear vegetation to a height of 30 cm, and then to one meter over the following three-meter radius. Plant materials are not collected and removed, but rather carried away by the current. Cumulatively, approximately six meters of vegetation around each spring opening is managed. Mosses will not cut. The volume of plant material to be removed will vary by the amount of time between cuttings and season.

The Habitat Conservation Plan Manager for the COSM and TXST, in partnership with local non-profit organizations, will schedule volunteers for the cleanup of nuisance, non-native floating aquatic species such as water hyacinth and water lettuce from Spring Lake. Floating non-native vegetation will be collected by hand and shaken prior to removal from the river to dislodge any aquatic animal species caught in the plant. The collected vegetation will transported to the COSM disposal facility or Spring Lake compost area.

Budget:
Table 7.1:
$0

Estimated 2026 Budget:
$0

5.7.1 Native Riparian Habitat Restoration

Long-term Objective:
Establish a robust native riparian buffer along the Upper San Marcos River from the headwaters to City Limits to benefit the Covered Species by minimizing bank erosion and infiltrating/ filtering stormwater runoff. The riparian buffer will also help to minimize public river access which can lead to bank erosion and direct impacts to TWR and aquatic vegetation. A zone of prohibitive vegetation along the uppermost edge of the riparian buffer will be established to encourage river users to access the river via hardened access points. Private riverside landowner participation in this program will be encouraged and the EAHCP will provide the labor and plants as practical. EAHCP-funded contractor(s) will perform invasive removal and maintenance.

Target for 2026:
Monitor and maintain previously restored riparian areas along the San Marcos River from Spring Lake to city limits, and within select tributaries of the San Marcos River, to reduce non-native re-growth, encourage establishment of native vegetation and reduce the seed source of non-native vegetation within the riparian zone of the San Marcos River.

Plant native riparian vegetation, as needed, in areas where non-native vegetation has been adequately controlled and/ or where needed to establish vegetative coverage to control erosion and promote bank stability.

Plant native vegetation along the eastern shoreline of the slough arm of Spring Lake and along Sink Creek just upstream of Spring Lake (**Figure 2**) to increase plant density and expand the riparian buffer zone.

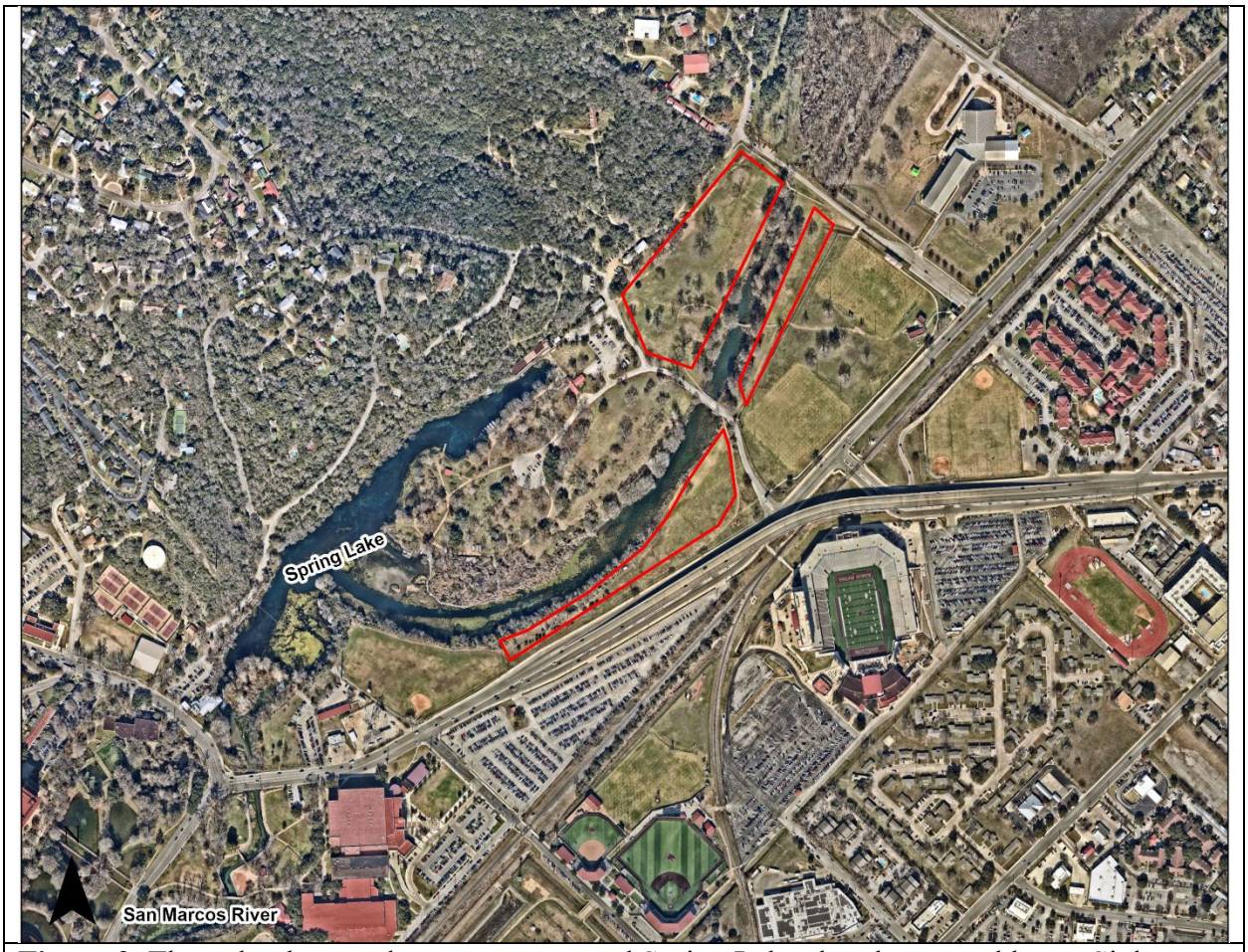


Figure 2. The red polygons denote areas around Spring Lake slough arm and lower Sink Creek identified for riparian restoration and riparian buffer expansion.

Methodology:

Manually remove and/or treat invasive, non-native vegetation and regrowth using a glyphosate/triclopyr herbicide mix to treat the stumps and/or roots. On upland trees, shrub stumps and root buttresses, Relegate **(**Triclopyr-based herbicide) is used. Relegate is mixed with glyphosate, Drexel Surf Ac 820 Surfactant and Turf Mark Blue, a blue dye. Roots are scraped and treated with herbicide mix then monitored for regrowth.

Planting of native vegetation will be performed along Sink Creek, slough arm of Spring Lake and as needed in previously restored areas by a contractor, City staff, TXST staff and/ or volunteers on an as-needed basis to expand the riparian zone and to promote bank stability and vegetative coverage. Candidate native plant species for planting will include, but not be limited to, Turks Cap, Inland Sea Oats, switchgrass, Eastern gamagrass, frogfruit, elderberry, beautyberry, buttonbush, American Sycamore, Bald Cypress and Pecan. Protective fencing may be required to be installed around individual plants or planting areas to promote establishment.

Monitoring:

Monitoring will occur throughout all previously restored riparian areas on a monthly basis to assess re-growth of non-native riparian vegetation. Re-treatment of re-emergent non-native vegetation will occur as needed.

Monitoring and maintenance will continue to be a mix of contract work funded by EAHCP and COSM staff, as well as through volunteer efforts. The City will continue to maintain riparian zone protection fences to prevent trampling and disturbance of the riparian vegetation.

Budget:
Table 7.1:
$20,000

Estimated 2026 budget:
$40,000

5.3.2/5.4.2 Management of Recreation in Key Areas

Long-term Objective:
To minimize the impacts of incidental take resulting from recreation which includes, but is not limited to swimming, wading, tubing, boating, paddle boarding, scuba diving, snorkeling and fishing.

Target for 2026:

1. Hire Conservation Crew members that will perform public outreach, recreation impact minimization efforts, and assistance with the removal of litter, floating vegetation mats and non-native vegetation. The fully staffed Conservation Crew (approx. 8-10 staff) will work approximately 15 hours/week from mid-May to September with a limited number of staff working prior to and after the peak recreation season.

2. Continue the implementation of the following recreational management goals:

a. Signage. Signs have been posted in kiosks at most of the river access points and along the Upper San Marcos River. Signs cover the rules of the river, educate the public on the importance of the resource and EAHCP project efforts.

b. Exclusion barriers will be installed within designated SSA areas when flows decrease below 120 cfs and TWR stands are vulnerable (primarily during the recreation season).

c. Posted maps showing trails, access points, and other amenities. River maps are at several locations along the upper San Marcos River between City Park and IH-35 as well as at the Discovery Center which serves as the trailhead to the San Marcos River.

d. EAHCP information and river stewardship tips have been included on the San Marcos Visitor Bureau's webpage. EAHCP brochures have been placed at the Tourist Information Bureau for visitors.

e. Park Rangers. Training materials covering the river flora and fauna are available for the park ranger training so they can help disseminate listed species information.

f. School Outreach. Implement an outreach program for San Marcos Consolidated Independent School District (SMCISD) so this information can be relayed to youth in San Marcos and indirectly to the parents. The San Marcos Discovery Center is a facility dedicated to public education and outreach regarding the San Marcos River. A local nonprofit, the Mermaid Society, is also promoting river awareness within the San Marcos community.

g. Coordinate with the Texas State University Outdoor Recreation center to help educate river users about endangered species and EAHCP restoration on the San Marcos River.

h. Continue to provide outreach at booths including Concert Series (Earth & Water), Passport SMTX, Business Expo, Mermaid Society events, San Marcos Sustainability Fair, and Don't Mess with Texas Litter Cleanup.

i. Continue to educate the public during volunteer planting days and public events.

j. Continue to educate the public engaged in water-based recreation on sustainable river behaviors that protect listed species and their habitats through interns and Conservation Crew program.

Document education/ outreach efforts, litter collection, EAHCP program assistance and other river recreation management activities conducted by the Conservation Crew and City/ University staff.

Monitoring:
Monitor recreational impacts to endangered species habitat within the San Marcos River on an on-going basis through visual observations and through EAHCP aquatic vegetation mapping. Adjust recreational management measures as needed to help minimize recreation impacts to endangered species and their habitat.

Budget:
Table 7.1:
$56,000

Estimated 2026 budget:
$65,000

5.7.6 Impervious Cover/Water Quality Protection

Long-term Objective:
Establish a program to protect water quality and reduce the impacts from contaminated runoff based on recommendations listed in the *San Marcos Watershed Protection Plan*.

Target for 2026:
Complete construction of Phase 2 of the Sessom Creek Stream Restoration project according to design plans that were completed in 2023. Construction of Phase 2 includes the construction of natural channel design elements and native plant restoration throughout approximately 565 linear feet of Sessom Creek from its confluence with the Windmill tributary upstream to the Loquat/Canyon Road intersection and 550 linear feet of Windmill Tributary (**Figure 2**).

In addition, the project will include wastewater collection system improvements within upper Sessom Creek to help minimize the potential for line failures and wastewater discharges. These improvements will be funded by COSM and will work in collaboration with the stream restoration and stormwater management practices to the maximum extent practical.

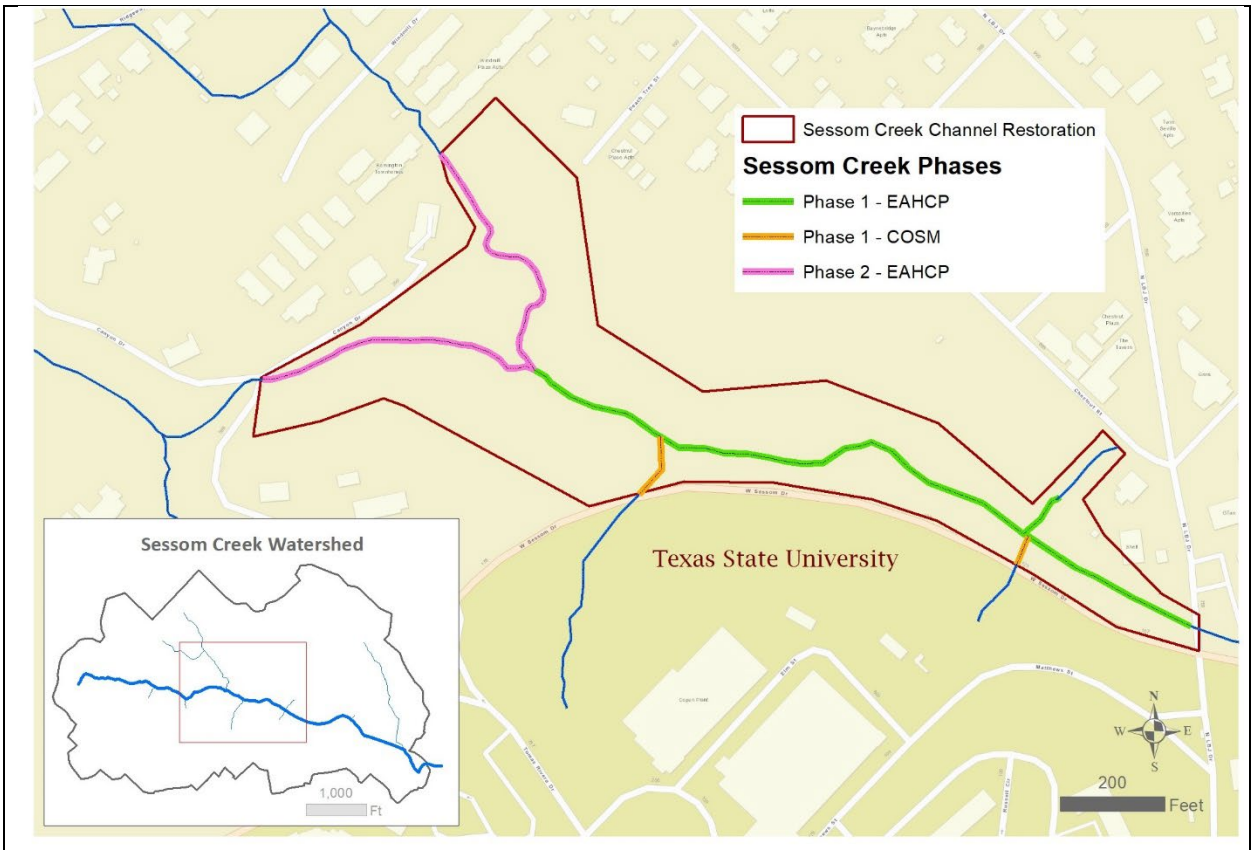


Figure 2. Sessom Creek Stream Restoration Project area. Phase 1, shown as the green line, was completed in 2023. Construction of Phase 2, shown as the pink line, began in May 2025 and is anticipated to be completed in early 2026.

Monitoring:
The EAA Sessom Creek real-time monitoring station will measure turbidity, dissolved oxygen, and temperature. Any changes in water quality due to Sessom Creek restoration will be monitored by this monitoring station, the construction site will be monitored by the construction inspector.

Budget:
Table 7.1
$200,000

Estimated 2026 budget:
$108,879 [AB]

A.) The full amount of funding needed to cover the EAHCP-portion of the construction cost of Phase 2 of the Sessom Creek Stream Restoration project ($675,000) was approved by the Implementing Committee as part of the CoSM/ TXST 2025 EAHCP Workplan and Funding Application. A construction contract was awarded March 2025, construction commenced in May 2025 and will be completed in early 2026. The 2026 budget for this measure is being updated in order to transfer unused funds from 2025 to 2026 to support remaining construction-related costs in 2026.

B.) CoSM was awarded a CWA 319(h) grant by TCEQ/ EPA in the amount of $120,000 which will be utilized to help support costs associated with construction of Phase 2 of the Sessom Creek Stream Restoration project.

5.7.5 Management of Household Hazardous Waste

Long-term Objective:
Implement a household hazardous waste (HHW) collection program that provides a place for citizens of San Marcos and Hays County to properly and safely dispose of HHW to minimize the potential for dumping or introduction of HHW into the river or recharge zone and impacts to Covered Species.

Target 2026:
Continue to operate the COSM HHW Drop-Off and Reuse Center to provide a location for the safe and proper disposal of HHW items. Conduct public outreach to educate residents on proper HHW disposal and awareness of the COSM HHW Drop-Off and Reuse Center.

Methodology:
The HHW Drop-Off and Reuse Center is located at 634 E Hopkins in San Marcos, TX. The hours of operation of the center are every Friday from 12-3:30pm and every Saturday from 8am-12pm. The HHW Drop-Off Center accepts cleaning products, fluorescent lights, paint, paint thinners, solvents, degreasers, glues/ adhesives, pesticides, herbicides, lawn chemicals, pool chemicals, automotive filters, car and household batteries, thermometers, cell phones, used cooking oil, propane cylinders and medical sharps. The HHW Reuse Center allows an opportunity for residents to pick-up HHW items such as cleaning supplies, fertilizers, and paint that are dropped off at the HHW Collection Center.

Monitoring:
Track the amount of HHW received and number of participants from San Marcos, Hays County, and surrounding communities. All necessary documentation will be turned in to TCEQ. Identify the HHW that comes from communities with the San Marcos River watershed and the cost of collecting, processing and disposing of HHW from these communities.

Budget:
<u>Table 7.1:</u>
$30,000

<u>Estimated 2026 budget:</u>
$30,000

5.3.4 Prohibition of Hazardous Materials Transport Across the San Marcos River and its Tributaries

Long-term Objective:
Reduce the potential of spill of hazardous materials in the San Marcos River and its tributaries through the designation of a hazardous materials route in COSM.

Target for 2026:
It is anticipated that the proposed designated hazardous materials route will be formally approved by TXDOT and adopted by the end of 2025. The final phase of implementation includes installation of permanent signage along major highways and roads to inform hazardous material carriers of the hazardous materials transport route.

Methodology:
Contract with a consultant to provide specifications and design plans for hazardous material transport routing signage. Work with TXDOT to gain approval for proposed signage. Hire a construction contractor to install signage.

It is anticipated that two large signs will be installed along the north- and south-bound lanes of IH-35 and small signs installed on Wonder World Dr, Hwy 123 and Hwy 21.

Budget:
Table 7.1:
$0

Estimated 2026 budget:
$50,000

5.7.3 Septic System Registration and Permitting Program

Long Term Objective:
To ensure an aerobic and anaerobic septic system registration, evaluation, and permitting program to prevent subsurface pollutant loadings from potentially being introduced to the San Marcos Springs ecosystem within city limits.

Target for 2026:
Maintain a database of new, modified and existing septic systems within COSM's jurisdiction. City ordinance requires all owners of septic systems connect to municipal sewer lines as they become available.

Methodology - It is required by law that all septic systems are permitted by the local Designated Representative (DR), which is currently the City of San Marcos' Environmental Health Department. Plans are submitted with the application and reviewed by the DR for TCEQ compliance. Once these requirements are met, the permit to construct is issued. The design, site evaluation, installation and inspections can only be performed by individuals that are licensed by TCEQ. Before the installation or modification is approved, inspections are made by the DR to ensure that the system installed corresponds with the design. Once completed, a license to operate is issued to the property owner by the DR. All DRs are subject to TCEQ Compliance Reviews.

Monitoring:
The City of San Marcos Environmental Health Department reviews all applications and inspects the installations of all new and modified septic systems within the City's jurisdiction. The Department also monitors maintenance and responds to all complaints reported or observed.

Budget:
Table 7.1:
$0

Available budget for 2026:
$0

5.4.5 Diversion of Surface Water

Long-term Objective:
Texas State University (TXST) will curtail its permitted surface water diversions as a function of total San Marcos springflow to protect the aquatic resources as specified under the EAHCP flow management strategy.

Target for 2026:
Curtail surface water withdrawals as specified in EAHCP Section 5.4.5. Under TCEQ Certificates 18-3865 and 18-3866, TXST's total diversion rate from the headwaters of the San Marcos River for consumptive use is limited to 8.1 cfs (See EAHCP Section 2.5.5). The total diversion rate from Spring Lake is limited to 4.88 cfs; the total diversion rate from the San

Marcos River at Sewell Park is limited to 3.22 cfs (See EAHCP Section 2.5.5.1 and 2.5.5.2 respectively).

Methodology:
TXST will reduce surface water withdrawals during low-flow conditions per Table 5-4 of the EAHCP (Table 2). When streamflow, as measured at the USGS gauge (08170500) San Marcos River, reaches 80 cfs, TXST will not exceed a total diversion rate more than 6.1 cfs. This reduction in pumping will occur at the pump just below Spring Lake Dam in order to maximize the benefits to salamanders, TWR, and other aquatic resources in the San Marcos River below Spring Lake Dam. When the USGS gauge reaches 60 cfs, TXST will not exceed a total diversion rate more than 4.1 cfs. The additional 2 cfs reduction will be made from the pumps located in the slough arm of Spring Lake, and, therefore, maximize the benefits to the aquatic resources within the main stem San Marcos River below Spring Lake Dam. When the USGS gauge reaches 49 cfs, TXST will not exceed a total diversion rate to 1 cfs. This further reduction will be made by restricting the pumps located in the Sewell Park reach. TXST surface water diversions will be suspended when the streamflow declines below 45 cfs.

Table 2. Reductions in Surface Water Diversion Rates Required by TXST during Low-Flow Conditions (EAHCP Table 5-4)

Streamflow (cfs)	Spring Lake Diversions (cfs) Cert. No. 18-3865	San Marcos River Diversions (cfs) Cert. No. 18-3866	Total Diversion Rate (cfs)
>80	4.9	3.2	8.1
80 – 60	2.9	3.2	6.1
60 – 49	0.9	3.2	4.1
49-45	1.0	0	1.0
<45	0	0	0

Monitoring:
The COSM/ TXST Habitat Conservation Plan Manager will monitor San Marcos River streamflow conditions and will notify TXST when reductions in diversion rates are required. TXST will track the volume and rate of surface water diversions from the San Marcos River.

Budget:
Table 7.1:
$0

Available budget for 2026:
$0

5.4.7 Diving Classes in Spring Lake

Long-term Objective:
Maintain the integrity of the ecology within Spring Lake through controlling access to Spring Lake in accordance with federal, state and local laws.

Assumptions: All diving activities in Spring Lake are governed by the Spring Lake Management Plan.

Target for 2026:
Implement the diving protocols as outlined in the Spring Lake Management Plan, EAHCP, and the ITP with the following modifications: no more than 16 volunteer divers will be allowed in the lake per day, with no more than eight at one time.

Methodology - The Diving Safety Officer will monitor all diving activities in Spring Lake, assuring all guidelines contained in the Diving Safety Manual for Spring Lake, Spring Lake Management Plan, EAHCP, and ITP are observed.

Monitoring:
The Lake Manager, with assistance from the Diving Safety Officer, will compile an annual summary of diving activities conducted in Spring Lake and provide to the Diving Control Board for its review.

Budget:
Table 7.1:
$0

Available budget for 2026:
$0

5.4.8 Research Programs in Spring Lake

City ordinance and state law designate the public waters of Spring Lake as restricted to activities authorized by the University. Proposals for research projects in Spring Lake must be submitted to the Environmental Review Committee, through the Lake Manager, for review and approval.

Long-term Objective:
Maintain the integrity of the ecology within Spring Lake through controlling access to Spring Lake in accordance with federal, state and local laws. All research activities in Spring Lake are governed by the Spring Lake Management Plan, EAHCP, and ITP.

Target for 2026:
Implement the protocols for research as specified in the Spring Lake Management Plan, EAHCP, and ITP.

Methodology - Proposals for research projects in Spring Lake must be submitted to the Environmental Review Committee, through the Lake Manager, for review and approval.

Proposals for research projects must be submitted in writing and include:

1. Name and contact information of the responsible party conducting the research;
2. Purpose and expected outcomes of the activities, including a description of how the project contributes to science;
3. Description of activities, including, if appropriate, measures to be taken to minimize any impact on endangered species or their habitat, or any cultural resources found in the lake;
4. Methodology, including literature review;
5. Type of equipment used, how much; where it will be placed, and for how long it will remain in lake (see Equipment in Lake Section E of the Spring Lake Management Plan);
6. Expected impact; and
7. Timeline of project.

Monitoring:
The Lake Manager will compile an annual summary of the research conducted in the lake, including statements on the impact of these activities on the health of the lake.

Budget:
Table 7.1:
$0

Available budget for 2026:
$0

5.4.10 Boating in Spring Lake and Sewell Park

Long-term Objective:
Maintain the integrity of the ecology within Spring Lake and San Marcos River through controlling access to Spring Lake in accordance to federal, state and local laws. All boating activities in Spring Lake are governed by the Spring Lake Management Plan, EAHCP, and ITP.

Target for 2026:
Implement the protocols for boating as specified in the Spring Lake Management Plan in support of the EAHCP and ITP.

Follow the below protocol for all boats (canoe, kayak, and paddleboards) used for educational activities, excluding glass bottom boats:

1. All boats must be properly washed/disinfected before being placed in lake and once they are removed per the protocol defined in the Spring Lake Management Plan.
2. Participants must receive an orientation prior to boating including instruction on safety, basic boat handling, and on-site rules and regulations. The orientation will cover information specific to Spring Lake's sensitivity and endangered species.
3. All non-glass bottom boat activity must not interfere with routine glass bottom boat operations.

To minimize the impacts of boating on the Covered Species' habitat in Sewell Park, canoeing/kayaking classes in Sewell Park will be confined to the region between Sewell Park and Rio Vista dam. Students will enter/exit canoes/kayaks at specified access points to avoid impacting the flora and fauna along the bank. All classes will be supervised.

Monitoring:
The Lake Manager will compile an annual summary of boating activities conducted on the lake, including statements on the impact of these activities on the health of the lake.

Budget:
Table 7.1:
$0

Available budget for 2026:
$0

5.4.9 Management of Golf Course and Grounds

Long-term Objective:
Management of the grounds to minimize and reduce negative effects to aquatic ecosystem in Spring Lake and the San Marcos River.

Target for 2026:
Continued implementation of the Grounds Management Plan and Integrated Pest Management Plan. Texas State University completed conversion of the Golf Course to Intramural Recreation Fields. COSM will work with the Texas State Facilities to better understand how the change will affect the Grounds Management Plan and the Integrated Pesticide Management Plan.

Methodology - The grounds will be maintained to meet the recreational function in an environmentally sensitive manner. It is the responsibility of the Grounds Manager to maintain the grounds in accordance with the Integrative Pest Management Plan (IPM). This plan describes the activities and materials to be used to control pests (i.e. insects, weeds, and other living organisms requiring control) in a way that minimally impacts the environment. The IPM is updated as needed by the Grounds Manager, in consultation with the Lake Manager and the Environmental Review Committee. The Grounds Manager will consult with the Lake Manager on any unique situations that may arise outside of routine maintenance that could impact Spring Lake.

Monitoring:
Each year the Grounds Manager will report to the Lake Manager detailed information on maintenance activities and materials used during the year. Documentation of herbicide application is monitored by the Texas Department of Agriculture through unannounced spot checks.

Budget:
Table 7.1:
$0

Available budget for 2026:
$0