PERMIT RENEWAL FOR THE EDWARDS AQUIFER HABITAT CONSERVATION PLAN

LISTEN AND LEARN REPORT

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EAHCP
PERMIT RENEWAL

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ASR	Aquatic Storage Recovery
EAA	Edwards Aquifer Authority
EAA Act	Edwards Aquifer Authority Act
EAHCP	Edwards Aquifer Habitat Conservation Plan
EARIP	Edwards Aquifer Recovery Implementation Program
ESA	Endangered Species Act
HCP	Habitat Conservation Plan
HCP Handbook	*USFWS Habitat Conservation Planning Handbook*
ITP	Incidental Take Permit
SAV	Submerged Aquatic Vegetation
SAWS	San Antonio Water System
SMART	Specific, Measurable, Achievable, Result-oriented, Time-fixed
USFWS	U.S. Fish and Wildlife Service
VISPO	Voluntary Irrigation Suspension Program Option

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The Listen and Learn Report is a summary of the feedback received from four Listen and Learn workshops conducted as the first phase of the permit renewal process for the Edwards Aquifer Habitat Conservation Plan (EAHCP). Workshops were conducted to receive input and data sources from members of the community and other interested parties about important topics to the permit renewal process, including the approach to the permit renewal, biological goals and objectives, climate change and system vulnerability, and conservation measures. This report documents the Listen and Learn process conducted and the input received.

1.1 Purpose of the Permit Renewal

The EAHCP is beginning a planning process to amend the existing EAHCP and renew the Incidental Take Permit (ITP) to extend its permit term beyond the expiration date of March 31, 2028. The permit renewal process presents an opportunity to reflect on and assess implementation progress and adjust the EAHCP so that it may incorporate lessons learned and adapt to new situations.

The Permittees began planning for the end of the current permit term through the Permit Options Report (ICF 2020), which identified five potential options for the plan and permit, summarized as follows:

- Option 1: Allow Permit to Expire
    - The current permit would expire March 31, 2028. Permittees would need to apply for ITPs for their activities likely to result in take of listed species. Although the Permittees would not allow the permit to expire, this option serves as a useful reference point to demonstrate the value of the EAHCP.
- Option 2: Renew Permit
    - The simplest form of Habitat Conservation Plan (HCP) amendment, this option would only change the expiration date of the permit.
- Option 3: Administrative Changes
    - Non-substantive changes to the plan and its implementation that represent clarifications or minor administrative amendments (e.g., revisions to monitoring or reporting procedures).
- Option 4: Major Permit Amendment
    - Changes that must be made to the actual ITP (e.g., adding or removing a covered species) or changes to the HCP that exceed the scope of what has already been analyzed and advertised to the public (e.g., increasing the size of the Plan Area).
- Option 5: Replace EAHCP with New HCP
    - A replacement HCP is typically considered for HCPs that are very old (i.e., more than 20 years old), when situations arise in which there are new regulations, or if the plan is not functioning well. The criteria for this option do not apply to the EAHCP.

The EAHCP Permit Options Report recommended a combination of Option 3 and Option 4, allowing for administrative changes, as needed, prior to the end of the permit term in 2028 and completion of a major permit amendment prior to the end of the permit term. The process to complete this major amendment comprises the permit renewal process for the EAHCP.

1.2 Overview of the Permit Renewal Process

The permit renewal process allows the EAHCP Permittees to extend the permit beyond its expiration date. It also provides opportunities to improve the EAHCP by reinforcing its accomplishments and adjusting components that could work better. The permit renewal process includes five phases (Figure 1). This report completes Phase 1 of the permit renewal process.

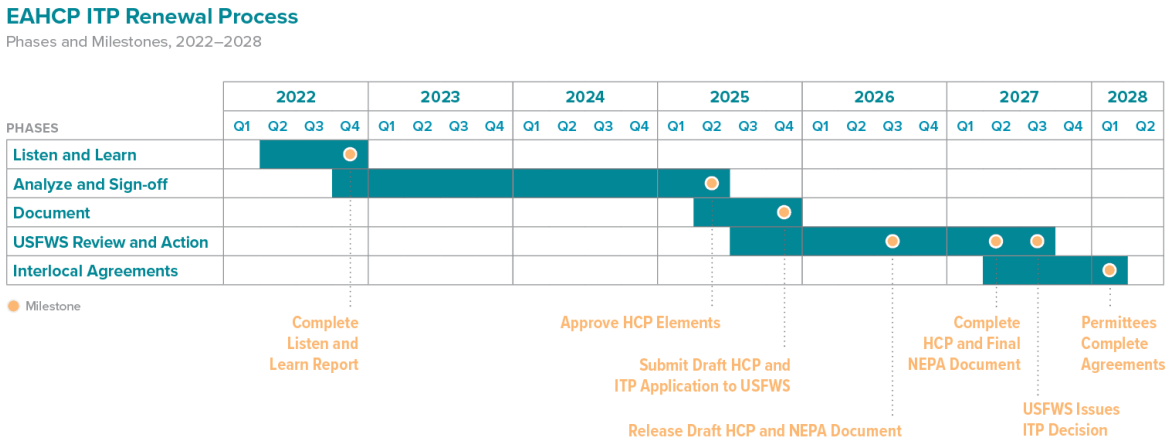

Figure 1. Phases and Milestones of the EAHCP ITP Renewal Process

1.3 Overview of EAHCP

The EAHCP was approved by the U.S. Fish and Wildlife Service (USFWS) in 2013. Activities covered under the plan include groundwater pumping from the Edwards Aquifer, surface water management, aquatic and riparian habitat management, and recreational use in the aboveground springs fed by the aquifer in the cities of New Braunfels and San Marcos. The HCP and its Endangered Species Act (ESA) permit provide authorization for these covered activities to *take*[1] of threatened and endangered species covered by the plan.

The approval of the EAHCP in 2013 was a major achievement toward balancing the growing water demand from the Edwards Aquifer with the ecological needs of the unique and imperiled species that depend on it. In response to growing water demands and concerns about the effect of pumping on ESA-listed species, the Texas Legislature passed the Edwards Aquifer Authority Act (EAA Act) in 1996. The EAA Act created the Edwards Aquifer Authority (EAA) to regulate pumping from the

[1] The Endangered Species Act defines *take* as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any endangered and most threatened wildlife species. *Harm* may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

aquifer and pursue a program "to ensure that the continuous minimum springflows of the Comal Springs and the San Marcos Springs are maintained to protect endangered and threatened species to the extent required by federal law…" (EAA Act § 1.14). The Texas Legislature amended the EAA Act in 2007 to form the Edwards Aquifer Recovery Implementation Program (EARIP) and directed the EARIP to work with USFWS to prepare an HCP. The EARIP process, including years of negotiations among the eventual Permittees and interested/affected parties, led to the completion of the EAHCP in 2013.The EAHCP's permit term is 15 years, expiring on March 31, 2028.

1.3.1 EAHCP Key Elements

In accordance with agency regulations and guidance, all HCPs have the same basic elements. One or more permit holders, called *permittees*, are covered by the ITP. An HCP has a defined permit area, in which all permitted activities occur. The permit is issued for a specific duration, called the *permit term*. An HCP must also define the *covered species* for which take authorization is being requested. Covered species can be listed at the time the permit is issued or not. Covered species not yet listed as threatened or endangered by the ESA are often covered because they are expected to become listed during the permit duration. An HCP also describes the activities or projects expected to take the covered species, called *covered activities*. HCPs must also define *conservation measures* to offset the authorized take of the covered species and meet permit issuance criteria.[2] These basic elements of the EAHCP are as follows.

Permittees: Edwards Aquifer Authority, City of San Antonio (through its San Antonio Water System [SAWS]), City of San Marcos, City of New Braunfels, and Texas State University.

Permit Area: For the purposes of the EAHCP, the permit area is the same as the plan area. It is approximately 3.3 million acres, coinciding exactly with the jurisdictional boundaries of the EAA over which it regulates groundwater uses (not surface water uses): all of three counties (Bexar, Medina, Uvalde) and portions of five counties (Atascosa, Comal, Caldwell, Hays, and Guadalupe).

Permit Term: 15 years (March 18, 2013, to March 31, 2028)

Covered Species: Table 1 lists the species covered by the EAHCP. There have been two status changes to covered species since the EAHCP was approved. The USFWS published a proposed rule in 2021 to delist the San Marcos gambusia due to extinction, but has not yet issued a final rule to delist the species. The petition to list the Comal Springs salamander was withdrawn in 2022.

[2] The key permit issuance criterion related to conservation measures is that, collectively, they must minimize and mitigate the impact of the taking on each covered species to the maximum extent practicable

Table 1. Species Covered by the EAHCP

Species	Federal Listing Status
Texas wild-rice (*Zizania texana*)	Endangered
Texas blind salamander (*Eurycea rathbuni*)	Endangered
Fountain darter (*Etheostoma fonticola*)	Endangered
Comal Springs dryopid beetle (*Stygoparnus comalensis*)	Endangered
Comal Springs riffle beetle (*Heterelmis comalensis*)	Endangered
Peck's cave amphipod (*Stygobromus pecki*)	Endangered
San Marcos salamander (*Eurycea nana*)	Threatened
Texas troglobitic water slater (*Lirceolus smithii*)	Petitioned for Listing
Edwards Aquifer diving beetle (*Haideoporus texanus*)	Petitioned for Listing
Comal Springs salamander (*Eurycea sp.*)	Not Listed[a]
San Marcos gambusia (*Gambusia georgei*)	Proposed for Delisting[b]

Notes:
[a] The petition for listing the Comal Springs salamander was withdrawn in 2021.
[b] U.S. Fish and Wildlife Service published a proposed rule in 2021 to delist the San Marcos gambusia due to extinction but is yet to issue a final rule.
EAHCP = Edwards Aquifer Habitat Conservation Plan.

Covered Activities: The EAHCP covers activities associated with use of the Edwards Aquifer (including Comal and San Marcos springs) by EAA, SAWS, the City of San Marcos, the City of New Braunfels, and Texas State University (the Permittees). These covered activities include, in summary:

- Groundwater Withdrawal
    - Groundwater withdrawal programs and regulations, as well as permit transfers and amendments
- Management and Operations
    - Water management to maintain consistent flows in the Comal and San Marcos springs
    - Diversion of surface water in accordance with state laws
    - Operation of boats and the spring-fed pool at Comal and San Marcos springs
    - Infrastructure to manage aquatic recreation access
    - Educational activities in Spring Lake
    - Golf course maintenance
- Aquatic Recreation
    - Recreational activities in Comal and San Marcos springs and river ecosystems
- Conservation
    - Minimization, mitigation, and conservation measures to contribute to species recovery

Authorized Take: The EAHCP's take authorization is documented in the ITP. Incidental take coverage applies to the incidental taking of covered species as a result of covered activities. For ESA-listed covered species, take is authorized over the 15-year permit with the following limits:

- 797,000 fountain darters in Comal Springs, Landa Lake, and the Comal River, and no more than 549,129 fountain darters in the San Marcos Springs, Spring Lake, and San Marcos River
- 11,179 Comal Springs riffle beetles
- 1,543 Comal Springs dryopid beetles
- 18,224 Peck's cave amphipods
- 10 Texas blind salamanders
- 263,857 San Marcos salamanders

For non-listed covered species, the permit provides incidental take authorization based on minimum springflow requirements, noting that take limits will be exceeded if minimum flow rates are not met.

Figure 2, below, summarizes the cumulative amount of take that has occurred and is remaining for each listed species through 2021.

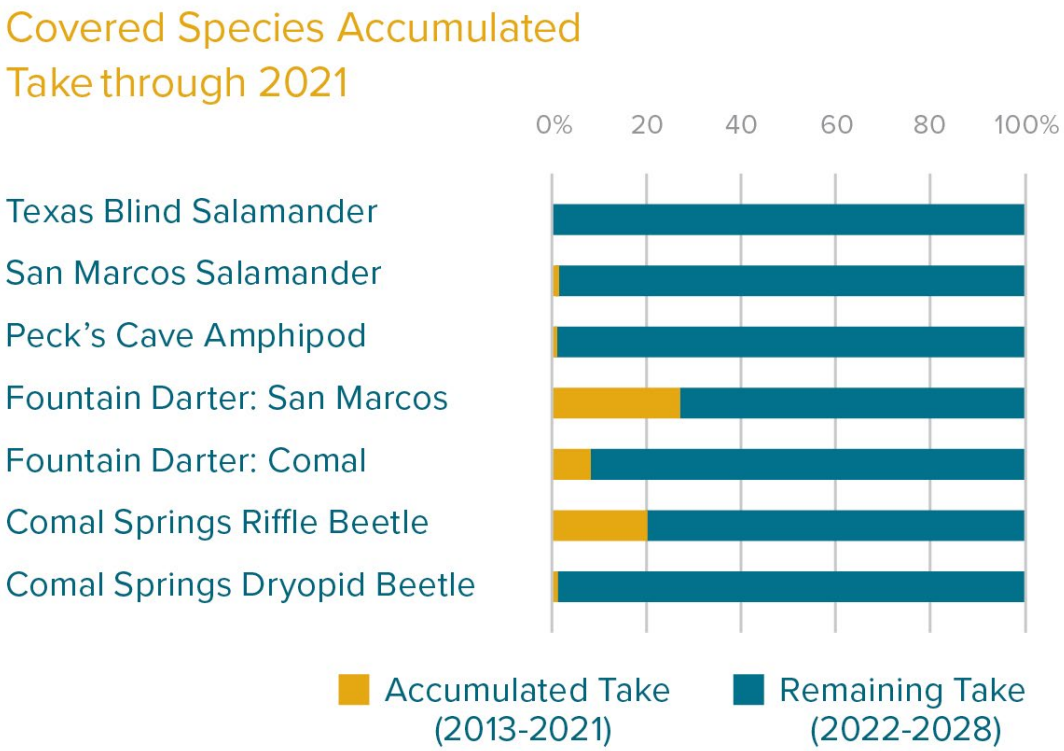

Figure 2. Covered Species Accumulated Take through 2021

Conservation Measures: The EAHCP includes three general types of conservation measures to mitigate the impact of take of covered species.

- Springflow protection measures, including the Aquatic Storage Recovery (ASR) program, Regional Water Conservation Plan, Voluntary Irrigation Suspension Program Option (VISPO), and Stage V Critical Period Management Reductions
- Habitat conservation measures, including measures to promote native aquatic and riparian vegetation restoration, control of non-native species, and water quality, as well as habitat management to minimize impacts from Covered Activities
- Supporting measures, including biological monitoring and calculating incidental take to comply with the ITP, applied research, ecological modeling, expanded water quality monitoring, and the Refugia Program

Chapter 2
Listen and Learn Process

The Listen and Learn process included in-person workshops and online resources to inform interested parties and to gather input from participants to be considered in the permit renewal process. The following sections describe this process.

2.1 Listen and Learn Workshops

Four Listen and Learn workshops provided the public with information about the EAHCP and the permit renewal process and facilitated gathering input from interested parties to inform the permit renewal process. Each workshop, listed below, focused on a key topic to be addressed through the permit renewal process. Meeting locations were selected throughout the EAHCP Plan Area.

- **Workshop 1: Permit Renewal Approach**
  Tuesday, August 2, 2022, 3:30 p.m.–6:30 p.m.
  Norris Conference Center
  618 NW Loop 410, Suite 207, San Antonio, TX 78216
- **Workshop 2: Biological Goals and Objectives**
  Tuesday, August 30, 2022, 3:30 p.m.–6:30 p.m.
  Medina County Fair Hall
  733 FM 462 North, Hondo, TX 78861
- **Workshop 3: Climate Change and System Vulnerability**
  Thursday, September 22, 2022, 3:30 p.m.–6:30 p.m.
  Dunbar Recreation Center
  801 W. Martin Luther King Drive, San Marcos, TX 78666
- **Workshop 4: Conservation Measures**
  Tuesday, October 4, 2022, 3:30 p.m.–6:30 p.m.
  New Braunfels Civic Center – Garden Room
  375 S Castell Avenue, New Braunfels, TX 78130

2.1.1 Noticing

Interested parties and members of the community were encouraged to participate in the workshops, both in-person and/or online, through the permit renewal website. Workshop information was shared via the following methods.

- The EAHCP permit renewal website (https://www.eahcprenewal.org)
- EAA social media accounts such as the EAA's LinkedIn website and NewsDrop magazine
- The EAHCP Steward newsletter
- Email distribution to the EAHCP mailing lists
- Media release to local newspaper and television stations

- Informing the EAHCP Implementing Committee, Stakeholder Committee, and Science Committee

2.1.2 Workshop Format

Workshops were designed to be interactive opportunities for participants to learn about the HCP, permit renewal, and the specific meeting topic, and then to provide their input, knowledge, and opinions. Each meeting included a series of display boards providing background on the EAHCP, describing the permit renewal process, and providing a summary of key considerations for each workshop's specific topic. The project team (EAHCP and ICF staff) were available at the display boards to answer questions. ICF provided a presentation that summarized the information provided on the display boards.

Each workshop also included two to three interactive exercises facilitated by project team members as the primary means for gathering input from workshop participants. All workshop materials, including online feedback forms, were available on the permit renewal website at https://www.eahcprenewal.org.

2.1.3 Participation

Attendance at the workshops included EAHCP Permittees, federal, state, and local government agencies, representatives of environmental and non-governmental organizations, industry consultants, farmers, representatives from the EAHCP Committees, and other individuals and interested parties.

Attendance at each meeting was as follows:

- Workshop 1 – 30 participants
- Workshop 2 – 15 participants
- Workshop 3 – 23 participants
- Workshop 4 – 20 participants

2.2 Online Materials

Materials and information presented at the in-person workshops were available on the permit renewal website (https://www.eahcprenewal.org) to allow interested parties to participate who were unable to attend the in-person workshops. The website was designed to provide a comparable level of information and opportunity to provide input to online participants as those who participated in-person.

Posted materials included copies of all poster boards, a recorded, narrated presentation, and an online survey designed to collect the same input as the in-person exercises. Materials for each workshop were posted on the EAHCP permit renewal website approximately 1 week in advance of each meeting, and notification was provided via email and through the website. The webpage received a total of 292 sessions[3] conducted by 194 users[4].

Users submitted a total of eight online surveys. Information received from the online surveys and via email have been incorporated with the input received at the in-person workshops in Chapter 3, *Workshop Topics and Public Input*.

[3] Google Analytics defines a *session* as the period of time a user is actively engaged with the website.

[4] Google Analytics defines *users* as those who have initiated at least one session.

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Chapter 3
Workshop Topics and Public Input

This chapter is organized by each of the four Listen and Learn workshops. Each section describes the topic and purpose of the workshop, the interactive exercises conducted, and the input received from participants. Comments provided by participants have been edited for clarity. Rows in tables summarizing participants' votes have been ordered from highest number of votes to lowest number of votes.

3.1 Workshop 1: Permit Renewal Approach

The purpose of Workshop 1 was to provide context and background on the permit renewal approach, including information about the permit area, Permittees, and program components. The workshop included an overview of the permit renewal options and renewal process and consideration of potential changes to the covered activities, covered species, and permit duration.

The workshop included three exercises (described below) that served to collect input on 1) potential changes to covered activities; 2) potential changes to covered species; and 3) permit duration.

3.1.1 Exercise 1: Activities Considered for Coverage

Exercise 1 of Workshop 1 included a poster board that posed the following question: "During the permit renewal process, what activities should be removed or considered for coverage that are not already covered?" Participants used stickers and Post-it® Notes to indicate activities that they thought should be added or removed as covered activities and provide comments explaining their choices.

Similarly, the online survey asked participants, "Should the permit renewal process consider adding new activities to the Incidental Take Permit?" and "Should the permit renewal process consider removing certain activities that are currently covered from the Incidental Take Permit?" Participants selected either *Yes, No, Possibly*, or *Unsure* and could elaborate on their choice in a text box.

3.1.1.1 Input Received

Table 2, below, summarizes the input received on Exercise 1 from the in-person workshop and the related online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 2. Input on Activities Considered for Coverage

What activities should be considered for coverage that are not already covered?			
Suggested Listed Activity	**Agree/Add Number of Votes**	**Neutral Number of Votes**	**Disagree/Remove Number of Votes**
Enforcement	9	6	0
Construction activities	6[a]	0	0
Determine recreational carrying capacity, enforce existing rules, and add recreational carrying capacity for low flows	3	0	0
Fences to protect riparian buffer	2	0	0
Expand ASR and reduce critical period to 35%	2	0	0
Major construction projects	1	0	0
Revise the HCP regarding number of divers, boaters, etc., in Spring Lake	1	0	0
Add Texas State activities in Spring Lake that are not covered, such as paddleboarding	1	0	0
Revise Texas State golf course to intramural fields	1	0	0
Operation and maintenance of USGS gauge[b]	0	0	0
Operations and maintenance of surface water diversions and structures, including removal of Texas wild-rice and fountain darter habitat (e.g., intake clearing)[b]	0	0	0
Bridge maintenance or replacement (Texas Department of Transportation or Local)[b]	0	0	0
Activities occurring on banks[b]	0	0	0

Notes:
[a] Includes one online survey submission for dam construction-related activities.
[b] Activity suggested by participants but did not receive any additional agree, neutral, or disagree votes pertaining to the activity.
ASR = Aquatic Storage Recovery; HCP = habitat conservation plan; USGS = U.S. Geological Survey

Additional Feedback

- Although other activities have the potential to adversely affect species, expanding the scope of the HCP to address them may introduce too much uncertainty and complexity to allow for a successful permit amendment.
- Major construction projects should be considered because they can have great impacts on covered species. For example, three dams in San Marcos require either routine maintenance or large-scale reconstruction.

- While recreation management is a covered activity, many attendees noted that there needs to be more enforcement and oversight of recreation activities to help reduce harm to the species and their habitat.
- All these activities have potential impacts on covered species; therefore, all must be considered.

3.1.2 Exercise 2: Species Considered for Coverage

Exercise 2 of Workshop 1 included a poster board that posed the following question: "During the permit renewal process, what species should be removed or considered for coverage that are not already covered?" Participants used stickers and Post-it® Notes to indicate species that should be added or removed and to provide comments explaining their choices.

Similarly, the online survey asked participants "Should the permit renewal process consider adding new species to the Incidental Take Permit?" and "Should the permit renewal process consider removing certain species that are currently covered from the Incidental Take Permit?" Participants selected either *Yes, No, Possibly*, or *Unsure* and could elaborate on their choice in a text box.

3.1.2.1 Input Received

Table 3, below, summarizes the input received on Exercise 2 from the in-person workshop and the online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 3. Input on Species Considered for Coverage

Which species should be considered for coverage?				
Suggested Species	**Add/Keep Number of Votes**	**Neutral Number of Votes**	**Do Not Add/Remove Number of Votes**	**Total Number of Votes**
San Marcos gambusia[a,b]	1	1	5	7
Comal Springs salamander[a,c]	2	1	2	5
Texas wild-rice[a]	3	0	0	3
Whooping crane	1	0	5	6
Cagel's map turtle	1	1	1	3
Guadalupe orb	2	0	1	3
San Marcos saddle-case caddisfly	2	1	0	3

Notes:
[a] Currently covered by EAHCP.
[b] U.S. Fish and Wildlife Service published a proposed rule in 2021 to delist the San Marcos gambusia due to extinction but is yet to issue a final rule.
[c] The petition for listing the Comal Springs salamander was withdrawn in 2021.

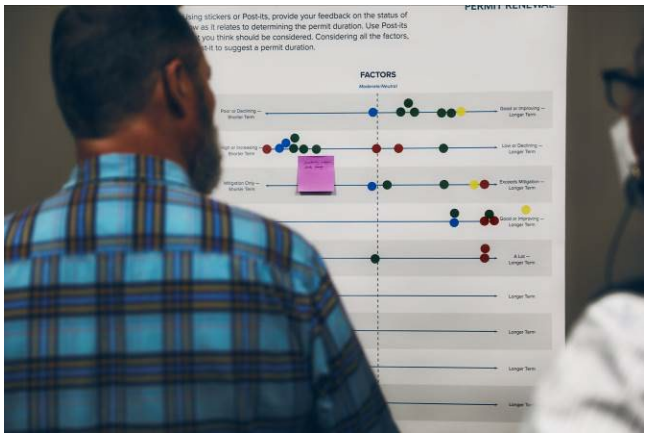
Additional Feedback

- Add endangered species found in the San Marcos, Guadalupe, and San Antonio rivers because they are listed species, and actions within and around the rivers affect them.

- Add species expected to be listed in Covered Area, i.e., Blanco blind salamander (*Eurycea robusta*), Comal blind salamander (*Eurycea tridentifera*), Texas salamander (*Eurycea neotenes*), toothless blindcat (*Trogloglanis pattersoni*), and widemouth blindcat (*Satan eurystomus*).
- The Guadalupe orb (*Cyclonaias necki*) should be considered because it has been proposed for listing. One population of the species is indicated as occurring in the San Marcos River, and flow from the San Marcos springs provides for the flow that supports the population. On the other hand, including the species could introduce challenges, like determining adequate flow levels to avoid take.
- All federally listed species that are currently covered should continue to be covered to avoid species suffering more losses.

3.1.3 Exercise 3: Consideration of Permit Duration

Exercise 3 of Workshop 1 included a poster board that posed the following question: "During the renewal process, what factors should be considered when determining the permit duration?" Participants provided feedback about the status of five factors (see Figure 3, below) as they related to determining the permit duration by placing the stickers or Post-it® Notes on a scale. The prompts at the ends of each scale varied, depending on the factor, but included phrases like *Poor or Declining* and *Good or Improving* in relation to the question "How do you view the status of covered species?" Using additional Post-it® Notes, participants also had the opportunity to add factors not listed that they thought should be considered and suggest a permit duration that considered all the factors.



Similarly, the online survey asked participants "During the renewal process, what factors should be considered when determining the permit duration?" Participants provided feedback about the status of the same factors provided in the in-person workshop, as they related to determining the permit duration. Participants also had the opportunity to elaborate on their responses in text boxes and add any factors not listed that they thought should be considered. Participants were then asked to consider all the factors and suggest a permit duration.

3.1.3.1 Input Received

Figure 3 and Table 4, below, summarize the input received on Exercise 3 from the in-person workshop and online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

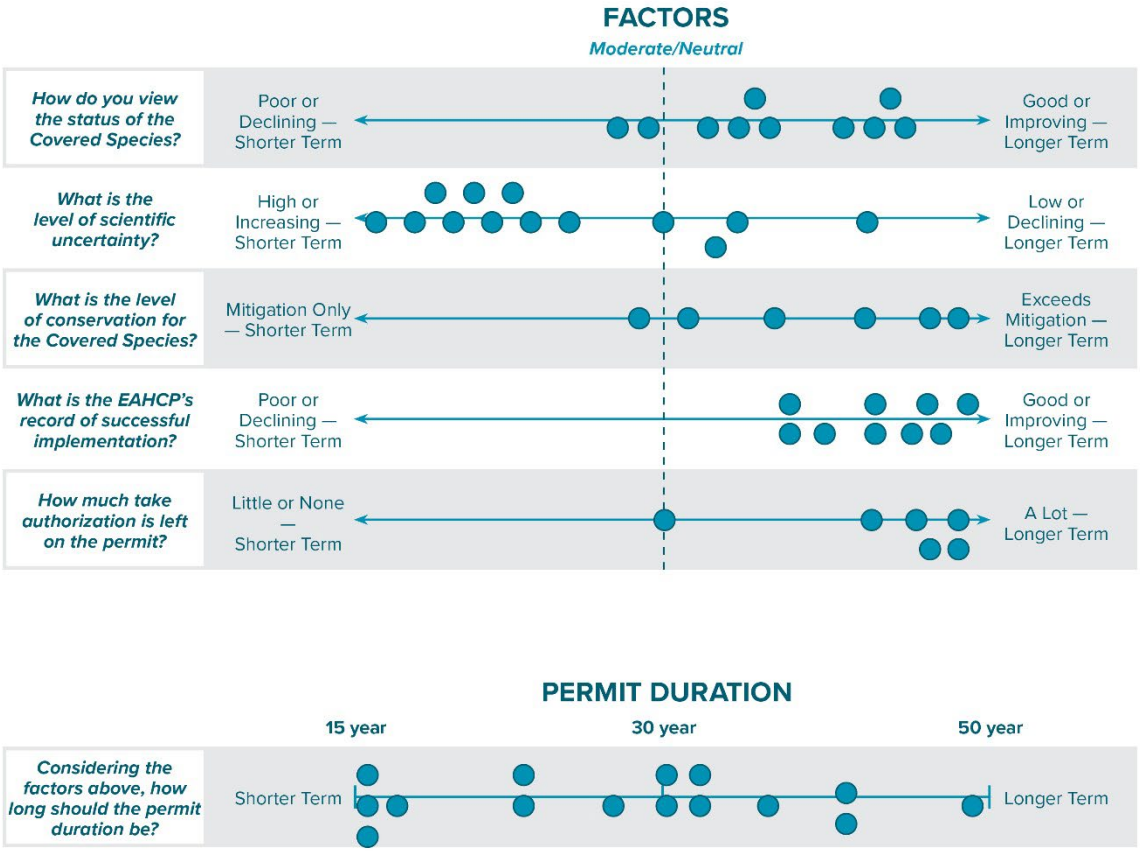


Figure 3. Distribution of Input Received on Permit Duration

Table 4. Feedback on Permit Duration Factors

What factors should be considered when determining the permit duration?	
Factor	**Input**
How do you view the status of the covered species?	• There are many unknowns about the status of various species. Although some appear to be doing well, we have not experienced a prolonged period of extreme low flows under the current EAHCP, so how they will fare during such conditions is unclear. We know very little and have little assurance we could identify problems if they were already occurring.
What is the level of scientific uncertainty?	• There is high uncertainty about climate change and its impacts, future development impacts, and exempt pumping with development. • Due to climate change, uncertainty is very high for the critical factor of future flow levels. • There is great uncertainty about recharge levels, both direct recharge from runoff and recharge from the Trinity aquifer. • There is uncertainty because of limited knowledge about the status and requirements of species.

What factors should be considered when determining the permit duration?	
Factor	**Input**
What is the level of conservation for the covered species?	• Because of unknowns about impacts during extreme drought, it is hard to know how well conservation for covered species is doing. Although programs have been very successful during more moderate conditions, there is uncertainty about species response to sustained drought.
What is the EAHCP's record of successful implementation?	• No additional feedback was provided for this factor.
How much take authorization is left on the permit?	• It is unclear how the current take numbers relate to population dynamics and whether the take numbers are reasonable or inflated when assessed parallel to population dynamics. • Although much take authorization remains, the bulk of that take would be expected to occur during sustained drought periods. Because the EAHCP has not been challenged by such a period, the high level of remaining take authorization does not seem like a strong indicator supporting a long-term permit duration.
Considering the factors above, how long should the permit duration be?	• The permit should be assessed regularly (every 20 years).

EAHCP = Edwards Aquifer Habitat Conservation Plan.

Additional Feedback

- Anything longer than a 15- to 20-year permit term would need a two-phase approach and include increased protections triggered at the beginning of the second phase, unless information demonstrating the absence of need is available.
- With a longer permit term, it would be necessary to develop a more robust approach for ensuring adequate funding, including accounting for inflation and the impacts of climate change.
- With a longer permit term, there would need to be a more definite and robust adaptive management process that includes a mechanism to ensure action in response to defined circumstances.
- A longer-duration HCP will need to consider the potential for impacts on water quality from development once impervious cover reaches a certain threshold level.

3.2 Workshop 2: Biological Goals and Objectives

The purpose of Workshop 2 was to: 1) provide context and background for the biological goals and objectives, including agency guidance for developing biological goals and objectives provided in the *Habitat Conservation Planning Handbook* (HCP Handbook; USFWS and NMFS 2016); and 2) gain feedback about potential changes to the EAHCP's biological goals and objectives that should be considered in the permit renewal process.

The workshop included two exercises (described below) that served to collect input on 1) new biological goals and objectives for the EAHCP; and 2) improving existing biological objectives.

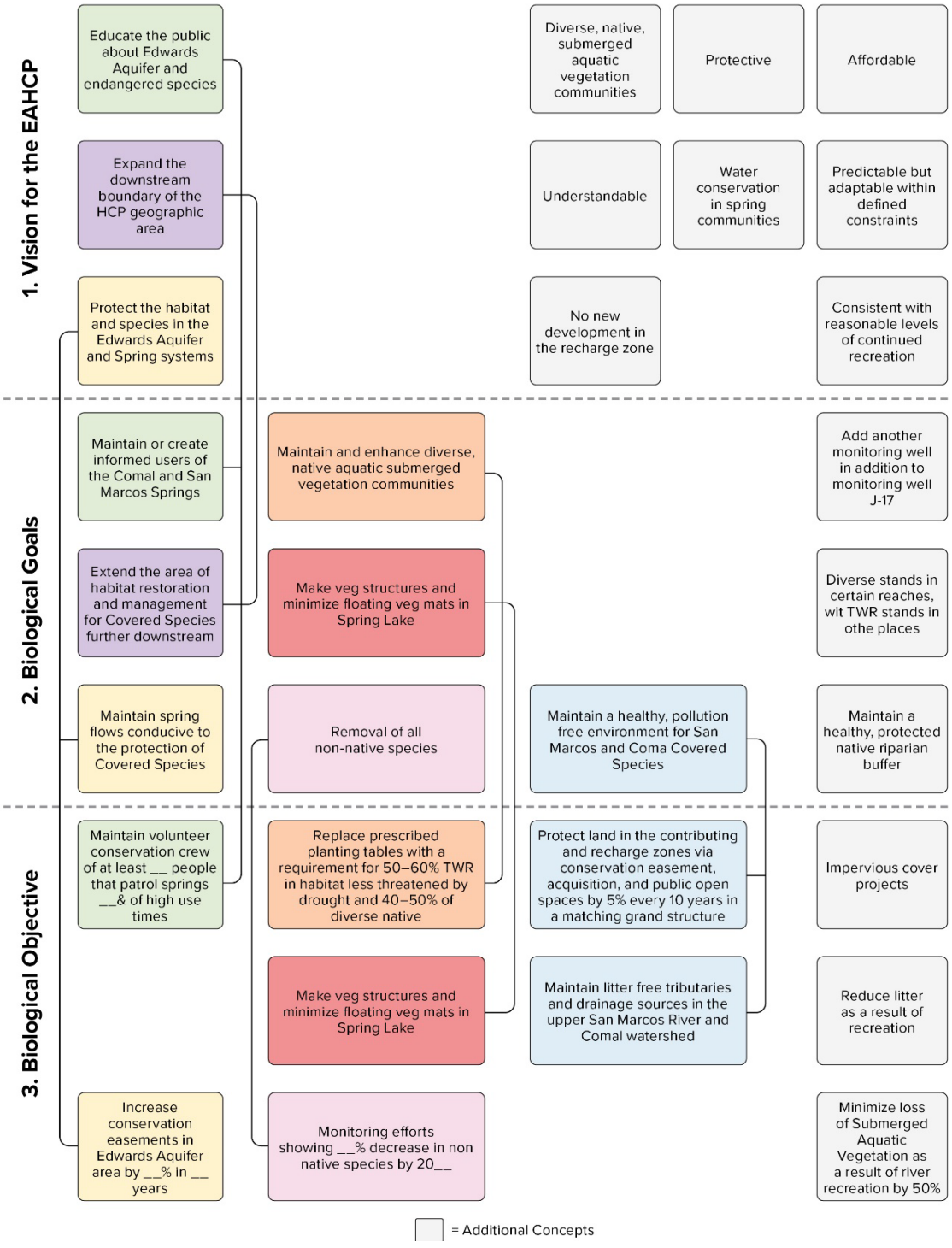
3.2.1 Exercise 1: Developing Biological Goals and Objectives

Exercise 1 of Workshop 2 included a poster board that prompted in-person participants to: "Follow the steps below to develop your own biological goals and objectives for the Edwards Aquifer Habitat Conservation Plan" and provided a brief explanation of what a vision statement (a *vision statement* can help provide broad, guiding principles for developing biological goals), biological goal, and biological objective should entail. Participants then used Post-it® Notes to suggest a vision statement, concept, or word, biological goals, and biological objectives. Participants drew a line linking objectives to goals, establishing the hierarchical relationship of biological goals and objectives endorsed by the HCP Handbook (USFWS and NMFS 2016). Participants used green stickers to up-vote a vision, goal, or objective.

Similarly, the online survey asked participants to "Follow the steps below to develop your own biological goals and objectives for the Edwards Aquifer Habitat Conservation Plan" and provided a short explanation of a vision statement, biological goal, and biological objective (as well as links to boards and worksheets used at the in-person meetings). Participants used text boxes to suggest vision statements, biological goals, and biological objectives.

3.2.1.1 Input Received

Figure 4, below, summarizes the Exercise 1 input received from the in-person workshop and online survey.



NOTE: The colors and lines used in Figure 4 are for the sole purpose of showing which concepts are connected to each other, as intended by the commenters, and have no significance outside of conveying which concepts the commenters felt were related.

Figure 4. Input on Developing Biological Goals and Objectives

3.2.2 Exercise 2: Evaluating Existing EAHCP Objectives

Exercise 2 of Workshop 2 included a poster board that listed condensed versions of four current EAHCP objectives specific to the Comal or San Marcos Springs Systems and posed the following four questions that relate to HCP Handbook (USFWS and NMFS 2016) guidance for developing biological goals and objectives: 1) "How might we make this objective more specific?" 2) "How might we make this objective more measurable?" 3) "How could we make this objective more achievable?" and 4) "What should be monitored to measure achievement of this objective?" Participants used Post-it® Notes to answer the questions for each objective.

Similarly, the online survey asked participants to "Answer questions below about existing EAHCP objectives" and prompted them to refer to documents used at the in-person meeting that had been uploaded to the EAHCP's ITP Permit Renewal Process website for additional context. Participants stated how each objective could be made more specific, measurable, and achievable, as well as what should be monitored.

3.2.2.1 Input Received

Table 5, below, summarizes the input received on Exercise 2 from the in-person workshop and online survey.

Table 5. Input Received on EAHCP Objectives Related to the Comal and San Marcos Systems

Question/Objective	Input/Response
Comal System – Fountain Darter: *Native vegetation restoration and protection will be implemented in Landa Lake and the Old Channel.*	
How might we make this objective more specific?	• Identify vegetation types. • Identify specific locales. • Identify and quantify protection measures. • Define protection.
How might we make this objective more measurable?	• Measure percentage of cover, area coverage, and quantitative vegetation/plant measurements.
How might we make this objective more achievable?	• Establish system-wide coverage goals.
What should be monitored to measure achievement of this objective?	• Percent cover and area coverage.
Comal System – Comal Springs Riffle Beetle: *Restoration of riparian habitat adjacent to spring openings (Spring Run 3 and Western Shoreline) will be implemented to limit the sedimentation that is experienced following rainfall events.*	
How might we make this objective more specific?	• Provide details of where and coverage amounts. • Map specific areas to be restored and provide criteria for species to be used in plantings.
How might we make this objective more measurable?	• Identify habitat available for measurement. • Define a percentage of cover to be achieved.
How might we make this objective more achievable?	• Remove limiting sedimentation as a target.

Question/Objective	Input/Response
What should be monitored to measure achievement of this objective?	• The amount of vegetated shoreline planted/covered and composition of vegetation. • The composition of vegetation. • Percent cover and sedimentation rate.
***San Marcos System – Texas wild-rice**: Restoration of Texas wild-rice expansion efforts and long-term monitoring focused on high-quality habitat areas.*	
How might we make this objective more specific?	• Define high-quality habitat. • Define how high-quality habitat areas will be identified.
How might we make this objective more measurable?	• Measure percentage of cover and areal coverage. • Define percentage of coverage and density goals.
How might we make this objective more achievable?	• Establish an approach for adaptation because high-quality habitats may shift over time.
What should be monitored to measure achievement of this objective?	• The location of areas of potential high-quality habitat and the extent of Texas wild-rice within those areas.
***San Marcos System – San Marcos Salamander**: Recreation control will be implemented in the eastern spillway below Spring Lake Dam, particularly at total San Marcos discharge of <100 cubic feet per second.*	
How might we make this objective more specific?	• Define recreation control. • Define the area more specifically.
How might we make this objective more measurable?	• Define the level of recreation control based on flow levels.
How might we make this objective more achievable?	• Create a robust plan for implementation.
What should be monitored to measure achievement of this objective?	• The level of recreational impacts at various flow levels.

3.3 Workshop 3: Climate Change and System Vulnerability

The purpose of Workshop 3 was to obtain input on climate change as it related to the EAHCP species and systems. The current EAHCP's conservation strategy does not address the potential effects of climate change on the springflows in the Comal and San Marcos springs systems, which is one reason why the ITP has a fairly short, 15-year permit duration. To renew the ITP for a duration of 20–30 years beyond its 2028 expiration date, the EAHCP will need to address the potential effects of climate change on covered species. Two workshop exercises, described below, were designed to collect feedback about the effect of climate change on the Edwards Aquifer system more generally, and specifically on covered species.

3.3.1 Exercise 1: Climate Change Concerns

Exercise 1 of Workshop 3 included a poster board that posed the following question: "Which effects of climate change are the most concerning to you?" Participants used up to three stickers to indicate which climate change effects listed on the poster board concerned them the most. Participants also used Post-it® Notes to explain their concerns and add climate change effects that concern them, but that were not already listed.

The online survey asked participants to "Use the drop-down menus below to indicate which climate change effects concern you the most, with 1 = most important, 2 = somewhat important, and 3 = less important." Online participants were then asked to "Use the space below to explain why the climate change effect you ranked as 1/2/3 concerns you."

3.3.1.1 Input Received

Table 6, below, summarizes the input received on Exercise 1 from the in-person workshop and online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 6. Input on the Effects of Climate Change

Which effects of climate change are the most concerning?		
Climate Change Effect	**Number of Votes**	**Explanation of Concern**
Temperature increase	16	• An increase in temperature will result in less rainfall. • Will result in a decrease in habitability. • An increase in temperature will cause an increase in evaporation/evapotranspiration, which will increase the vulnerability of riparian plants and animals. • Can negatively affect reproduction of covered species. • Coupled with lower flows, will have more impact to covered species. • More variability in temperatures will create colder winters and hotter summers. • Increased temperature will result in lessened water availability and increased water demand, making it more difficult and expensive to implement springflow protection measures.

Which effects of climate change are the most concerning?		
Climate Change Effect	**Number of Votes**	**Explanation of Concern**
Change in drought duration/ frequency	14	• Drought will affect springflow. • Springs are already reaching historic lows. • Increased drought will stress the ecosystem, killing plants needed as buffers and as water storage and cause clay soil to become rock, decreasing infiltration rates of water into ground. • We need more knowledge of recharge and impervious cover correlations. • We need to plan for much less water than the current drought of record. • There is a lack of public knowledge with water use and poor construction practices. There needs to be more outreach education. • There is a need to gain regulatory capacity to limit impervious cover over the recharge zone. • Longer, more frequent, and more severe droughts have a cumulative effect on the biome. • Changes in precipitation patterns, with more intense drought and more intense rainfall, will make the impacts harder to address and will make the identification of triggers for action to address drought more difficult.
Change in precipitation intensity	11	• More severe flooding will cause damage to riparian zone and plant diversity. • Will lead to greater sediment loads and less favorable habitats and filling of recharge features. • Will impair water quality. • Can cause increased sediment runoff and accumulation in the system. • Changes in precipitation includes changes in overall amount and pattern. Changes in pattern of precipitation can dramatically affect the amount of recharge and the likelihood of damaging flood conditions in species' habitat.
Decrease in soil moisture	5	• Will cause damage to plant life in the riparian zone. • There needs to be collaborative soil restoration across the riparian and critical zones.
Increase in maximum night-time temperature	2	• Will result in sea level rise. • Night temperature is a driver of drought. • Plants, soil, and infrastructure release accumulated heat at night, and higher night temperatures cause greater stress.
I am not concerned about climate change	0	• No additional feedback was provided for this effect.

Additional Feedback

- EAHCP needs to put an official limit for impervious cover over the recharge zone.
- Increased unpredictability of recharge and of springflow levels is a significant concern. The current EAHCP relies on a recurrence of historical conditions to identify triggers for actions to help maintain springflow levels. Developing alternative trigger mechanisms that are adequately protective for the species, while also providing participants in forbearance-type approaches with adequate predictability, is likely to be quite challenging.

3.3.2 Exercise 2: Potential Effects of Climate Change on Covered Species

Exercise 2 of Workshop 3 included a poster board that posed the question "Which covered species are you most concerned about being affected by climate change?" Participants used up to three stickers to indicate which covered species they were most concerned about being affected. They also used Post-it® Notes to explain why or to add other species not currently covered by the EAHCP that they were concerned about.

The online survey asked participants to "Use the drop-down menus below to indicate which covered species you are most concerned about being affected by climate change, with 1= most important, 2 = somewhat important, and 3 = less important." Online participants were then asked to "Use the space below to explain why the covered species you ranked as 1/2/3 concerns you."

3.3.2.1 Input Received

Table 7, below, summarizes the input received on Exercise 2 from the in-person workshop and online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 7. Input on Climate Change as it Relates to Covered Species

What covered species are you most concerned about being affected by climate change?		
Covered Species	**Number of Votes**	**Explanation of Concern**
San Marcos salamander	14	• Introduced disease and fungus in higher concentrations from low flow conditions affect stressed salamanders. • The species has very limited range in a high-vulnerability area. Many are trampled as they stay under rocks, and, as water levels lower, people trample over rocks more because there is little enforcement of prohibited recreational activities. • Salamanders occurring downstream of Spring Lake are likely to be vulnerable during extended periods of low flow.
Texas wild-rice	9	• Less springflow will mean less physical habitat for species. • Negatively affected by recreational damage to habitat. • Will be extremely difficult to protect species from recreational impacts during extended low flows, and current programs do not appear adequate to do so.

What covered species are you most concerned about being affected by climate change?		
Covered Species	**Number of Votes**	**Explanation of Concern**
Fountain darter	7	• Fountain darters lie on the river bottom and do not have a swim bladder. As stream levels lower, there is greater impact from recreational traffic, but no limits on those activities. • Fountain darters are adversely affected even by lesser levels of drought. • There is a known threat from gill parasites, for which we lack an effective control mechanism, and the extent of threat during extended extreme drought is unknown. • There is an unknown level of threat from the potential die-off of aquatic vegetation during extended periods of extreme drought.
Texas blind salamander	5	• Species are indicators of water quality. • Species is vulnerable due to less nutrient flow as a result of decreased precipitation. • Flood events increase sediment loads, which degrades water quality and fill in recharge features, lessening water quantity for species.
Comal Springs dryopid beetle	4	• Species has a small and limited home range and requires interaction between terrestrial and spring habitats that are negatively affected by low flows.
Comal Springs salamander	4	• Water quality and quantity affects salamanders right away.
Peck's cave amphipod	4	• We need to know more about these species through an increased research focus.
Comal Springs riffle beetle	2	• The use of spring outflow habitat that is void of fine substrate would likely increase during low flow conditions, as a result of climate change, and reduce available habitat. • We know very little about the species and how it behaves and survives during periods of extreme drought and how its population has been affected by historical drought periods.
Edwards Aquifer diving beetle	0	–
Texas troglobitic water slater	0	–
San Marcos gambusia	0	–

"–" = Participants did not provide a response.

Additional Feedback

- We know very little about most of the other species, which also is a concern.

3.4 Workshop 4: Conservation Measures

The purpose of Workshop 4 was to provide information about existing EAHCP conservation measures that are carried out by Permittees in the permit area as part of EAHCP implementation. These measures encompass habitat conservation and springflow protection. Two workshop exercises, described below, collected feedback about what changes to the existing EAHCP conservation measures should be considered as part of the permit renewal process.

3.4.1 Exercise 1: Evaluating Existing EAHCP Conservation Measures

Exercise 1 of Workshop 4 included a poster board that posed the following question: "How successful are existing EAHCP conservation measures?" Participants used a sticker to rate how important selected conservation measures are to them, selecting *Very important, Somewhat important, Neutral, or Not important*.

Participants also used Post-it® Notes to answer questions about conservation measures: 1) "What works well for this conservation measure?" 2) "How could this conservation measure be improved?" and 3) "Are there alternative funding sources or third-party partnerships that could support implementation of this conservation measure?"

Similarly, the online survey asked participants "How important is each conservation measure" and prompted users to click a space under *Very important, Somewhat important, Neutral, and Not important* to indicate their preferences. For each of the 11 measures, the survey asked: 1) "What works well for this conservation measure?" 2) "How could this conservation measure be improved?" and 3) "Are there alternative funding sources or third-party partnerships that could support implementation of this conservation measure?"

3.4.1.1 Input Received

Table 8 and Table 9, below, summarize the input received on Exercise 1 from the in-person workshop and from the online survey.

Table 8. Input on Importance of Existing Conservation Measures

How important is each conservation measure?				
	(Number of Votes)			
Selected Conservation Measures	**Very Important**	**Somewhat Important**	**Neutral**	**Not Important**
Management of public recreation	11	1	0	0
Aquatic vegetation restoration and maintenance	11	1	0	0
Non-native animal species control	10	0	0	0
Management of litter	8	3	0	0

How important is each conservation measure?				
	(Number of Votes)			
Selected Conservation Measures	**Very Important**	**Somewhat Important**	**Neutral**	**Not Important**
Impervious cover/water quality protection	8	2	0	0
Minimizing impacts of contaminated runoff & water quality protection	8	2	0	0
Management of floating vegetation mats	8	2	0	0
Native riparian vegetation restoration	7	4	0	0
Management of household hazardous waste	4	7	0	0
Dissolved oxygen management	1	5	2	0
Monitoring and reduction of gill parasites	0	5	2	1

Table 9. Evaluation of Each Conservation Measure

How successful is each conservation measure?			
Selected Conservation Measure	**What works well for this conservation measure?**	**How could this conservation measure be improved?**	**Are there alternative funding sources or third-party partnerships that could support implementation?**
Management of public recreation	• We saw during COVID-19 lockdowns how effective reducing recreation can be on habitat restoration. • Having limited access points to focus recreational impacts helps preserve other areas. • Direct recreation to confined areas with infrastructure.	• Add managing recreation at flows < 85 cubic feet per section, and do not allow wading/standing in areas less than 3 feet deep. • The current protection is limited more during periods of low flow, which allows for more foot traffic throughout the river and creates a small, wetted channel for recreation. • Protect areas where recreation is expanding.	–
Aquatic vegetation restoration and maintenance	• The shift to a top-down approach has been very successful in both the reduction of non-native vegetation and the increase in native vegetation.	• Add a new control measure for removing floating invasive plants from the San Marcos River. • More flexibility in dealing with low-flow conditions, recreation, ever-expanding areas of maintenance, and new non-native plant species.	• There is already additional funding being applied to this effort via financial aid funding work-study students.

How successful is each conservation measure?			
Selected Conservation Measure	**What works well for this conservation measure?**	**How could this conservation measure be improved?**	**Are there alternative funding sources or third-party partnerships that could support implementation?**
Non-native animal species control	• Community involvement and volunteers make a significant impact on this effort. • The armored catfish bounty and the tournament are excellent additions to the funded work.	• As urbanization increases, potential introductions of non-native species increase, so this measure will likely continue to need additional effort over time. • Periodic population surveys to assess the removal efforts.	• Texas Parks & Wildlife Department/ USFWS
Management of litter	• This measure only works due to supplemental effort. • Dedicated contractors are doing well in certain areas.	• Expand area of litter into watersheds and reduce litter from roads and culverts. • Efforts only occur within the recreational focused areas (above Interstate 35), but not downstream far enough, where significant litter ends up. • Increased involvement from the local community.	• There is already funding helping with this from the Lion's Club and volunteers. • Alternative funding is already being utilized, with volunteers doing a large amount of this work.
Impervious cover/water quality protection	–	• Support conservation easements in the recharge zone. • The HCP could offer a source of funding for water quality improvement projects that are matched by a grant, agency, or institution.	–

How successful is each conservation measure?			
Selected Conservation Measure	**What works well for this conservation measure?**	**How could this conservation measure be improved?**	**Are there alternative funding sources or third-party partnerships that could support implementation?**
Management of floating vegetation mats	• The City of New Braunfels has a contractor that does a great job in managing floating vegetation in Landa Lake. • Floating vegetation mat removal is key to TWR enhancement and has made a significant impact on the expansion of TWR. • Wild-rice has expanded in the San Marcos River, and vegetation mat control has helped in this.	• Consider funding the effort in such a way that total removal of the floating vegetation from the river system is possible to avoid the downstream effects of floating vegetation. • The control of floating vegetation, including water sprite and watercress in Spring Lake, needs to be funded.	• Alternative funding is already being utilized. • The funding allocated for this is flexible enough – as Texas wild-rice has increased, the effort required to mitigate the veg mat impact has increased.
Native riparian vegetation restoration	• The fences have been highly successful.	• Expand invasive plant removal into and along the four tributaries to reduce/eliminate direct seed source. • Efforts will never be fully successful because property owners are allowed to keep non-native and impactful species on their riverfront property. • Keep the restored areas fenced off.	–
Management of household hazardous waste	–	• Support city-sponsored days to receive household hazardous waste.	–
Dissolved oxygen management	We need to know more about this in drought conditions.	• It is premature to write this off for future prolonged drought, but should consider options.	–
Monitoring and Reduction of Gill Parasites	–	• It is premature to dismiss parasite issues during future droughts because we don't know enough.	–

Notes:
Although given the opportunity to, no in-person or online participants commented on the *minimizing impacts of contaminated runoff and water quality protection* conservation measure, so it is not listed in Table 9.
"–" = Participants did not provide a response.

3.4.2 Exercise 2: Changes to Conservation Measures

Exercise 2 of Workshop 4 included a poster board that posed the following question: "What changes to the EAHCP conservation measures should the permit renewal process consider?" and provided changes to conservation measures for consideration. Participants indicated whether they agreed with the change, and if they responded with a no, why they did not agree. The exercise then listed nine different conservation measures, with an explanation of the challenge each conservation measure faces, along with the rationale for change. Participants selected *Yes* or *No* and explained why they did or not agree with the change.

The online survey included the same questions and response options as the in-person workshop.

3.4.2.1 Input Received

Table 10, below, summarizes the input received on Exercise 2 from the in-person workshop and online survey.

Table 10. Input on Changes to Conservation Measures

What changes to the EAHCP conservation measures should the permit renewal consider?			
	Number of Votes		
Recommended Change	**Agree**	**Disagree**	**Public Input**
Establish clear targets or standards for control of non-native animal species.	13	0	• A regular population survey or effectiveness study on methods would be a better way to determine success. • There needs to be a way to measure volunteer effort for such measures, because effort-per-unit-removed can seem deflated if volunteer effort is not being accounted for. • There is currently a large economic impact piece missing for impacts on these species and how much the removal effort is/could reduce this. • Effective population surveys need to be funded to help the contractors measure their success (TPWD is currently funding some studies on armored catfish).

What changes to the EAHCP conservation measures should the permit renewal consider?			
	Number of Votes		
Recommended Change	**Agree**	**Disagree**	**Public Input**
Control recreational use and public access areas further in the San Marcos River during peak recreation periods.	12	0	• This must be done carefully to achieve community acceptance. • Increased recreation, along with potential seasonal low flows, magnifies the overall impact, creating a smaller river footprint with more people in it; additional signage or outreach might help. • Areas of high recreation should be restricted to specific locations because instream foot traffic is the main causes of damage. • Set a condition on low flows and defined periods, like holidays and weekends, if under those conditions.
Extend ASR and VISPO groundwater leases and lease options (i.e., forbearance agreements) beyond the permit term expiration of 2028.	11	0	• ASR especially beats pumping reductions and should replace some reduction.
Establish performance standards for riparian restoration.	9	0	–
Increase flexibility of the EAHCP to achieve springflow protection through additional water conservation programs or recuring new sources of supply.	7	1[a]	• This seems overbroad; without more specifics, it is less likely that benefits would be adequately quantifiable. • The EAA is not a water purveyor, and I do not think they should be charged with exploring alternative supplies for the region. • Unsure if this is effective, or if EAA should be involved in other utility supplies.
Combine the triggers and payment structure of the two groundwater forbearance programs currently in the EAHCP into one program, with the same pumping-reduction target of 90,000 acre-feet per year in a drought of record.	7	0	• Must look at triggers to see if they are sensitive enough and make sense after review of the climate data.
Revise dissolved oxygen management as a conservation measure.	7	0	–
Revise the conservation measure to reduce gill parasites.	7	0	–

What changes to the EAHCP conservation measures should the permit renewal consider?			
	Number of Votes		
Recommended Change	**Agree**	**Disagree**	**Public Input**
Add flexibility to the groundwater rights purchase programs to allow the EAA to purchase water rights instead of only allowing long-term leases or lease options.	6	2	• I do not think the EAA should purchase water rights, and I think that the current lease program works just fine. Also, these rights are very expensive. I cannot imagine the current aquifer-management fee could support a transition to outright purchases of rights. I understand the want for long-term security through outright ownership, but I am not sure that is financially practical.

Notes:
[a] Although three participants provided additional public input for this recommended change, only one disagree vote was given, as shown in the table. Additionally, one participant selected both agree and disagree to indicate that they were unsure, or neutral.
"–" = Participants did not provide a response .

3.5 Other EAHCP Feedback

During the Listen and Learn process, additional public comments were submitted to EAHCP staff via email. These comments provide general feedback and recommendations related to species conservation and system management and are included for consideration in Appendix A.

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Chapter 4
Key Takeaways and Next Steps in the Permit Renewal Process

4.1 Key Takeaways

The feedback received from interested parties and members of the community during the Listen and Learn process identified key issues and topics that will be evaluated, considered, and incorporated (as appropriate) in the permit renewal. A summary of key takeaways from the input received are as follows.

- Commenters are interested in seeing additional activities covered under the HCP in favor of those activities that would provide beneficial uses, such as enforcement, fences to protect riparian habitat, and others. There is support for adding construction activities, although less support for major construction projects or dam repairs.
- There is support for including additional covered species, with an emphasis on species that are anticipated to be listed (e.g., those proposed for listing) and those already listed that are found in adjacent, interrelated water systems.
- The majority of commenters prefer a permit duration of 25–35 years, based on EAHCPs successful implementation, take authorization remaining on permit, and high level of species conservation, species improvements, and scientific uncertainly.
- The biological goals and objectives developed by participants focus on educating the public and permit holders, ensuring flow and vegetative conditions that will support covered species, removing non-native species from key habitats, and protecting key areas (e.g., recharge areas) through conservation easements, volunteer support, responsible recreation, and monitoring.
- Commenters think that there should be more focus on increasing the specificity, measurability, and achievability of HCP objectives, and commenter input provided a starting point for examining some specific improvements in these areas.
- Commenter concerns about climate change related to EAHCP systems are focused on temperature increase, changes in drought duration/frequency, and change in precipitation intensity, all of which were thought to have the potential to affect springflow conditions and covered species within the system.
- Commenters are most concerned about the San Marcos salamander, Texas wild-rice, and fountain darter, which are all known to be highly affected by springflow conditions, such as water quality and/or quantity, and vulnerable to impacts from recreation.
- When evaluating EAHCP conservation measures, participants indicated that management of public recreation, aquatic vegetation restoration and maintenance, and non-native species control are the most important measures, whereas monitoring and reduction of gill parasites was the least important measure.

- Commenters provided insight about the benefits and drawbacks of each conservation measure, which will be important in evaluating how to improve conservation measures based on lessons learned through implementing them to improve their effectiveness.

4.2 Next Steps

This report serves to conclude the Listen and Learn phase of the permit renewal process and leads to the next phase, Analyze and Sign-off, which will begin at the end of 2022 and proceed through 2024. The Analyze and Sign-off phase will include compiling and analyzing data to thoroughly consider potential changes to the components of the EAHCP. The consultant team, working with EAHCP staff, will develop technical memoranda describing the analyses conducted and potential changes to the EAHCP. To document key decisions through the permit renewal process, these memoranda will be reviewed by the EAHCP Committees and USFWS before the Implementing Committee signs off on them.

Chapter 5
References

ICF. 2020. *Edwards Aquifer Habitat Conservation Plan Permit Options Report*. September. (ICF 704.19.) Austin, Texas. Prepared for Edwards Aquifer Authority, San Antonio, Texas.

USFWS and National Marine Fisheries Service (NMFS). 2016. *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*. December 21.

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Appendix A
Other EAHCP Feedback

During the Listen and Learn process, additional public comments were submitted to EAHCP staff outside of the in-person workshops and online surveys via email. These comments provide general feedback and recommendations related to species conservation and system management. Three comments were received and are included below.

Comment 1

Date Submitted: October 12, 2022
Submitted to: EAHCP@edwardsaquifer.org
Source: Stakeholder 1 (Individual)

Section 1.14 (a) of the EAA Act requires the Authority to "protect species that are designated as threatened or endangered under applicable federal or state law."

Section 1.14 also requires EAA to "maximize the beneficial use of water available for withdrawal from the aquifer."

Protection of minimum springflows for the benefit of endangered species has been a remarkable success. In the severe 2011 to 2014 drought, Comal springs continued to flow above the required minimum, even though Comal had ceased to flow in the 1950's drought of record with a quarter of the population. EAA and our regional partners accomplished this by utilizing measures adopted in the EARIP process of Conservation, VISPO, ASR and Critical Period reductions, along with many measures to enhance endangered species habitat.

Responsibility to protect water supply has had some significant attention: The San Antonio Region created a successful HCP and received an Incidental Take Permit to draw water supply legally from the aquifer, and the Legislature raised the Cap on pumping to 572,000 af. However, firm yield from the Edwards Aquifer for water supply has been reduced from 350,000 acre-feet in the 2001 Region L Plan to at least 263,000-acre feet for the EAHCP. The cost of replacing that much water as the population continues rapid growth is significant, serious, and expensive. This year, 32,000 customers in San Antonio have been unable to pay their water bills. Smaller communities, especially, have limited options for increasing water supply.

I. My request for EAHCP permit renewal is that we increase firm yield of water supply to meet the statutory requirement to protect water supply as well as species. It is possible to do this while also increasing the reliability of measures to protect minimum springflows.

We can increase firm yield by substituting Aquifer Storage and Recovery for Stage V, 4% additional critical period reduction, and possibly even Stage IV, additional 5% pumping reduction. The benefits would be achieved by every permit holder in the San Antonio Region, and springflows and downstream flows would also be made more reliable—a "win/win/win."

Reconnaissance analysis of ASR capability in the Carrizo Aquifer has already been done: https://www.sciencedirect.com/science/article/pii/S2214581817302628?via%3Dihub

The process may be lengthy, but well worth the effort. If you compare the cost of SAWS ASR at approximately $250 million with the cost of Vista Ridge at $2.7 billion, it appears to be a very attractive and feasible long-range approach to support both water supply and springflows and should be included in the 2028 EAHCP.

Including an ASR program for regional benefit would have to be carried out by a water supplier with technical input from EAA and highly qualified support from contractors and possibly state agencies. The EAHCP is not isolated from the impacts of population growth and increased water demand.

II. Additional strategies should be included in the next HCP

(a) The first is additional easements, as contemplated in the "Next Generation" program of seeking to protect springflows and water supply with conservation easements upgradient of Comal and San Marcos Springs.

(b) Since 80% of recharge for the Edwards Aquifer originates in the Contributing Zone of the Edwards Aquifer, easements in the Contributing Zone should also be eligible for consideration.

(a) Soil regeneration, preferably on easements, but also in other dedicated areas such as parks, should be encouraged. Financial incentives to increase infiltration of rainfall into soil might be available in the long run, as EAA research at the Field Research Park is able to quantify benefits of various strategies to slow down and infiltrate overland flow.

If the average infiltration across the entire 5400 square miles of Contributing Zone were increased by just 2 inches, there could be long term benefits to abatement of flood and drought impacts for streams, springs and downstream.

(b) A "how to guidance manual" just to inform individual landowners of the benefits of soil on their own properties may have an impact as well.

Low Impact Development. Increased impervious cover in the Recharge and Contributing Zones, especially due to development in Hays, Comal, Kendall, and Bexar Counties can also be expected to have an impact on stream flow and recharge to the Edwards and Trinity aquifers. Regional collaboration, including with the development community, for such a program is needed. Ennis, Texas, has redone its main street with pervious cover and the trees that line it don't need watering**.**

Comment 2

Date Submitted: October 12, 2022
Submitted to: EAHCP@edwardsaquifer.org
Source: Stakeholder 2 (Individual)

Also, please consider that as Climate Change effects are finally quantified and increases in Impervious Cover in the Edwards Recharge Zone and Contributing Zone are considered, increasing ASR Carrizo Storage with accompanying increases in Edwards well forbearance and/or recharge of the Edwards Aquifer with ASR waters upgradient of Comal and San Marcos springs could completely neutralize what would otherwise be adverse effects on Minimum Springflow.

We are asking that this increased ASR response to Climate Change and Increases in Impervious Cover also be considered by the EAHCP in formulating the application for a new Incidental Take Permit as well.

Comment 3

Date Submitted: October 12, 2022
Submitted to: EAHCP@edwardsaquifer.org
Source: Stakeholder 1, Stakeholder 2, and Stakeholder 3 (Regional Clean Air and Water Association)

We ask that the following strategies be considered as part of the EAHCP process presently underway. A Response to these comments would likely require, among other things, use of the Edwards groundwater model and some economic and legal analysis as well.

These comments are intended to put strategies on the table for consideration as part of a process that will eventually result in an application to renew the Incidental Take Permit that will be presented to the US Fish and Wildlife in 2028.

Suggested Strategies:

1. Edwards Aquifer Firm Yield Water Supply could be enhanced for all EAA Permit Holders by eliminating or modifying the Critical Period Pumping Reductions currently found in Stage V, Critical Period Management Plan, changing the Maximum Pumping Reduction to a lower percentage figure than the present 44%, which modification would automatically increase Firm Yield Water Supply for all EAA Aquifer Permit holders while simultaneously providing for
2. Better Protection of endangered species by providing more certainty for obtaining Minimum Spring Flows in the severest months of a repeat of the Drought of Record at Comal Springs and San Marcos Springs;
3. All to be accomplished by increasing EAHCP ASR Storage of Edwards waters in a Carrizo Aquifer ASR project, AND by using those additional stored waters in ASR during severest drought times to provide for minimum springflow protection, EITHER
    a. by increasing forbearance of Edwards Wells pumping near and upgradient of Comal and San Marcos Springs, AND/OR
    b. by increasing recharge into the Edwards Aquifer from the ASR Stored waters up-gradient of Comal Springs and San Marcos Springs.

Increasing Firm Yield of all EAA Pumping Permits:

By eliminating or modifying the 44% maximum pumping reduction found on all Edwards permits in Stage V of the Critical Period Management Program for the San Antonio Pool and the Uvalde Pool, Edwards permit holders will all be subjected to lower Maximum Pumping Reductions. That modification would increase the water supply from the Edwards that can be counted on at all times - including severest droughts - which is the Firm Yield Water Supply of the EAA Edwards Withdrawal Permits for each and every EAA Edwards permit holder.

The precise new Maximum Pumping Reduction percentage can be determined by a carefully designed analysis that can be done by EAA Staff or by a well-qualified Consultant, using the most current, up-to-date Edwards groundwater model available.

That newly determined Maximum Withdrawal Reduction percentage could be decreased by adding additional ASR Carrizo Aquifer storage to the 50,000 acre feet of ASR Storage that had been accepted in the ITP Permit granted by US Fish in 2013 by increasing the available ASR Carrizo Storage for

EAHCP purposes by using either the existing SAWS ASR facility or by using a new regionally sponsored ASR facility.

There are many promising potential additional ASR Sites in the Carrizo Aquifer for storage of waters according to recent studies done for the Texas Water Development Board.

REQUEST OF REGIONAL CLEAN AIR AND WATER ASSOCIATION

Regional Clean Air and Water Association is requesting that this strategy of increasing ASR Storage for EAHCP purposes become part of the rollover renewal of the existing Edwards INCIDENTAL TAKE PERMIT - for 30 years or longer - with an opportunity every five years after 2028 to review and increase the ASR Storage Program to provide for additional ASR Storage to provide additional protection to meet Minimum Springflow Requirements based on the reality of how much ASR storage has been provided at any given point in time in. the future, and additional reductions in the Maximum Pumping Reductions found in Critical Period Management Plan.

The resulting new Maximum Pumping Reduction percentages can be calculated for each new level of ASR Storage by using the most up to date Edwards groundwater model available, either by the EAA science staff or by a well-qualified consultant chosen by EAA/EAHCP processes.