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WORK PLAN

PERMIT RENEWAL FOR THE EDWARDS AQUIFER HABITAT CONSERVATION PLAN

PREPARED FOR:

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April 2023



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Chapter 1

Introduction

1.1 Program Overview

In 1996, the Texas Legislature passed the Edwards Aquifer Authority Act, which created the Edwards Aquifer Authority (EAA) to regulate pumping from the 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 the U.S. Fish and Wildlife Service (USFWS) to prepare the *Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan* (EAHCP or Plan). The EARIP process, including years of negotiations among the eventual Permittees and with many stakeholders, led to the completion of the EAHCP in 2013.

The EAHCP has been highly effective in conserving the Covered Species and the ecosystems on which they depend. Activities covered 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. Its implementation has greatly expanded what is understood about the life histories of many of its Covered Species. The EAHCP’s committees—formed during the EARIP process—have also demonstrated the ability to use the Plan’s adaptive management process to make necessary and important changes to Conservation Measures to improve their overall feasibility and effectiveness.

The EAHCP has a relatively short permit term (15 years), expiring on March 31, 2028. The Permittees are now looking ahead to the end of the permit term and are proceeding with an Incidental Take Permit (ITP) renewal process to continue the program beyond 2028. The primary goal of this renewal process is extending the duration of ITP, but in the process the Permittees will also look to improve the EAHCP to set the stage for its long-term success.

There are three comprehensive goals for the permit renewal of the EAHCP. These goals pertain to the renewal process, renewed permit, and implementation and are as follows:

1. **Renewal Process:** To have an efficient and transparent permit renewal process that considers stakeholder input and results in an ITP renewal prior to the expiration of the current permit in 2028.
2. **Renewed Permit:** Renew the permit in ways that will continue to set up the plan for long-term success by reinforcing the plan’s many accomplishments and adjusting what has not worked well.
3. **Implementation:** Enhance the flexibility and clarity of the plan to make implementation easier, more efficient, and more cost-effective for the long term.

The EAA began identifying potential changes to the EAHCP through the Permit Options Report, which ICF completed in 2020. Potential changes identified to be considered by the Permittees included the following:

- Add Covered Species or Covered Activities.
- Restructure biological goals and objectives for listed Covered Species and add biological goals and objectives for unlisted Covered Species.
- Adjust Conservation Measures and monitoring to improve implementation and effectiveness tracking.
- Separate the EAHCP and the Funding and Management Agreement.
- Simplify processes for administrative and adaptive management changes.
- Evaluate the potential effects of climate change and extend the duration of the ITP well beyond 2028.

Many of these changes would require an amendment to the EAHCP, which will be part of the ITP renewal process. This amendment would require National Environmental Policy Act (NEPA) review by the USFWS through an environmental assessment (EA) or environmental impact statement (EIS). The program under which these efforts will be completed is termed the *Permit Renewal for the Edwards Aquifer Habitat Conservation Plan* (PREAHCP).

1.2 Work Plan Overview

This document will guide the work to be conducted as part of the PREAHCP. It covers the following:

- **Team Organization and Communication.** Identifies team members and roles and specifies communication protocols.
- **Tasks and Quality Control.** Describes each task to be conducted as part of the PREAHCP, including deliverables and assumptions, and summarizes ICF's process for quality control.
- **Schedule.** Outlines the phases of the PREAHCP, based on a detailed project schedule.
- **Amended EAHCP Outline.** Summarizes the organization of the Amended EAHCP.

This work plan is intended to be flexible to respond to new issues and will be modified upon agreement with EAHCP staff.

Chapter 2

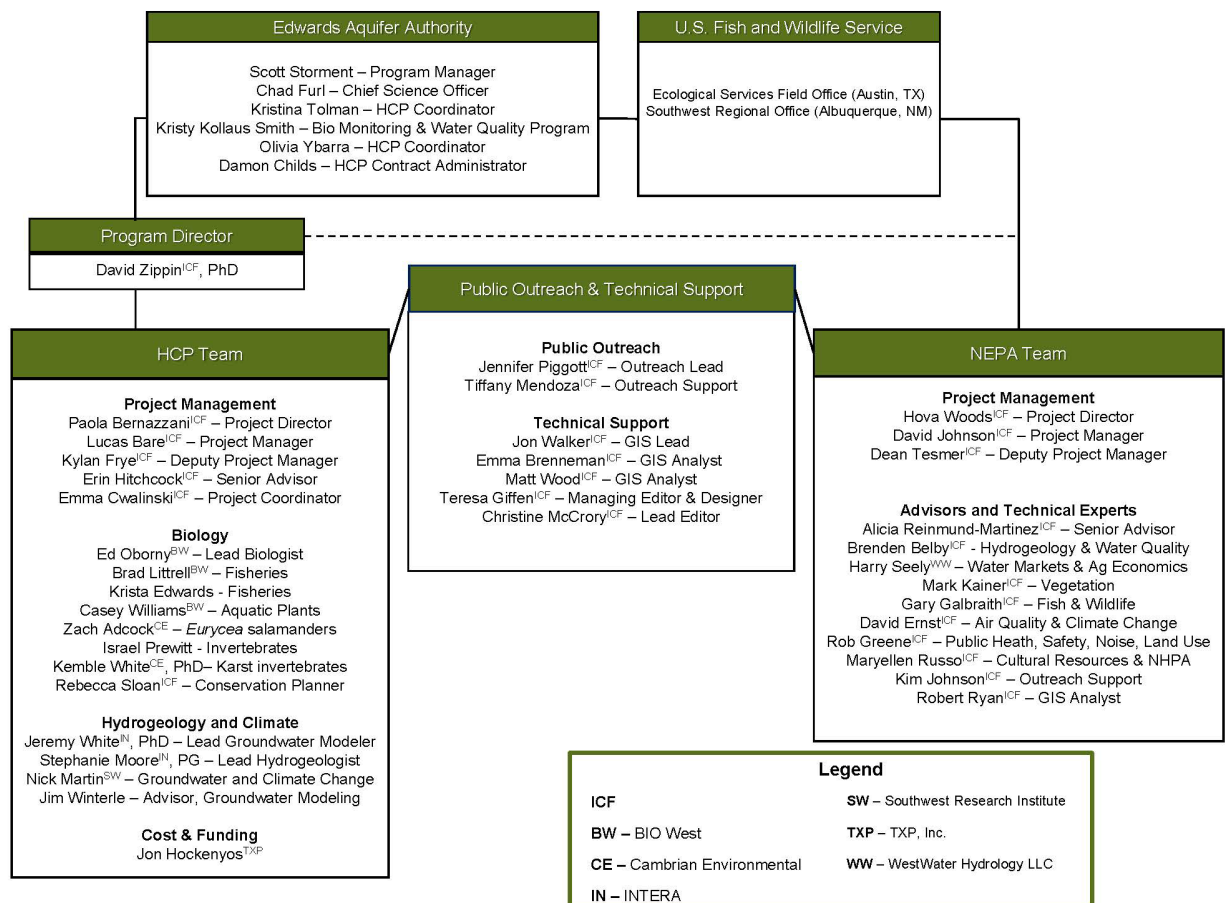
Team Organization and Communication

Effective organization and communication will be key to the success of the PREAHCP. Shared understanding of roles and responsibilities and clear communication throughout the life of the project will be critical to completing project deliverables on schedule and within budget. The following sections describe the team's organization and communication protocols.

2.1 Team Organization

Figure 2-1 illustrates the PREAHCP team organization, including EAHCP staff, the HCP team, and the NEPA team. EAHCP staff will direct the work of the HCP team. The U.S. Fish and Wildlife Service (USFWS) will direct the work of the NEPA team. ICF's program director serves as the connection between the HCP team and the NEPA team for contract and management purposes.

Figure 2-1. Organizational Chart



2.2 Communication

A detailed list of all staff, roles, and contact information will be housed in the project's document library accessible to the EAHCP staff and ICF team and provided by ICF upon request.

The HCP team will communicate directly with EAHCP staff, while the NEPA team will communicate directly with USFWS and with EAHCP staff and the HCP team as authorized by USFWS. Regularly scheduled meetings will serve as a primary communication means for the PREAHCP. HCP team meetings are described below in Section 3.2, Task 2: Meetings. NEPA team meetings are described under the respective NEPA tasks in Sections 3.8, 3.10, 3.11, and 3.13.

Below is a list of communication best practices that will ensure appropriate information is being communicated to the right parties:

- **Include the ICF HCP or NEPA project manager and on all communications.** The relevant project manager should be copied on every message related to the project to facilitate progress tracking, resolution of issues, and escalation of concerns as needed.
- **Precede email subject lines with "PREACHP."** Email communication will have in the subject line "PREAHCP – [email subject]" in order to easily identify communication for this project.
- **Keep decision makers informed.** Identifying and keeping the appropriate decision-making authorities informed throughout the project duration will be critical to its success.
- **Maintain action item list.** ICF will track action items and will read them at the end of each meeting to establish and confirm common understanding of responsibilities and expectations.
- **Communicate meeting objectives.** Prior to beginning meetings, ICF and EAA should clearly state the objectives for each meeting and the end-goal, so participants have a common understanding of what needs to be achieved.
- **Coordinate in advance on deliverables.** Prior to starting work on each deliverable, ICF will coordinate with EAA regarding the outline, content, and format to ensure common understanding of the work product and establish expectations. When submitting each deliverable, ICF will provide written directions to reviewers about how they should comment (see Section 3.14, "Quality Control," for more procedures related to deliverables).
- **GIS.** EAA and ICF will agree to an approach to delivery of EAA GIS data to ICF.
- **External stakeholder engagement.** EAHCP staff will be responsible for all external written communication, including with EAHCP committees, the public, and the USFWS. The HCP team will conduct external communication only as directed by EAHCP staff.

2.3 SharePoint

Microsoft SharePoint will be used to store and share all project files. ICF will maintain the SharePoint site. ICF will establish separate document libraries to organize files and administer appropriate permissions to share files with various users. Master project files, including working versions of all documents, should be stored on the project SharePoint site at all times to avoid version control issues. If master documents are to be downloaded and "checked out" of SharePoint

the user must notify the ICF Project Manager. The following are best practices when using SharePoint:

- Do NOT "check out" the document. This will prevent others from simultaneously editing and will create version control issues.
- Use current version of Microsoft Word when possible and always save as a .docx.
- Click on the link and enable the edit function (open in the traditional MS Word software and NOT the web app).
- Activate track changes.
- Use "AutoSave" or save frequently when editing in SharePoint, and always save and exit the document when you leave your computer (even for a brief break).
- If you see sections where others are reviewing, SharePoint will prevent two reviewers from editing the same paragraph at any one time. Return to these sections later or communicate with the other reviewer to discuss.
- Do not accept track changes when multiple users are in the file.
- Do not attempt major formatting for the document.
- Do not make any changes to the entire text (i.e., changing the font using CTRL+A).
- Do not do a global Find and Replace.
- Co-authoring works best where there are at most five people in the document at a given time.

Chapter 3

Tasks and Quality Control

Below are the tasks to be performed under the PREAHCP effort. ICF will work with the EAHCP staff to avoid unnecessary delays in the project due to requested changes, and ICF will not perform work outside the current contract scope of work without written authorization from EAA.

3.1 Task 1: Program Management

3.1.1 Task Description

ICF will be responsible for managing all ICF staff and subcontractor staff in the execution of the scope of work over the period of performance. ICF will manage different teams for development of the HCP and NEPA documents and will provide technical expertise to perform studies to renew the ITP. The HCP will be developed for the ITP Permittees, and the NEPA document will be developed for the USFWS.

ICF will draft a project work plan and schedule to complete the Amended HCP to discuss at the kickoff meeting (Task 2). We will update the project work plan and schedule as needed through the period of performance to complete the ITP renewal process. The work plan will address the preparation of the NEPA documents generally, acknowledging that more specific planning will be conducted in coordination with the USFWS at the appropriate time, as part of Task 8. ICF will also set up an electronic file sharing site to be maintained and updated through the period of performance.

ICF will create, manage, and distribute any necessary templates in Microsoft Word and PowerPoint and will maintain a list of terms and abbreviations to ensure consistency across all contract deliverables. ICF will also develop an ITP renewal process logo for branding purposes. Templates, the logo, and list of terms and abbreviations will be used for all contract deliverables by the ICF team.

The ICF program director, David, will oversee the HCP and NEPA project directors, Paola and Hova, respectively. The program and project directors will be responsible for setting the tone and approach for the program, guiding the schedule and technical analyses, troubleshooting difficult stakeholder and technical issues, and performing senior review. The project managers, supported by HCP and NEPA deputy project managers, respectively, will oversee authors and technical analyses, be responsible for managing the deliverable and meeting schedule, perform senior review, and serve as the point of contact for EAA, including for invoicing and contractual purposes.

3.1.2 Deliverables

- Draft work plan
- Draft schedule
- Updated work plan as needed

- Updated schedule as needed
- Draft electronic file sharing site
- Updated electronic file sharing site as needed
- Draft Microsoft Word and PowerPoint templates
- Second draft Microsoft Word and PowerPoint templates
- Final Microsoft Word and PowerPoint templates
- Draft PREAHCP logo
- Second draft PREAHCP logo
- Final PREAHCP logo
- List of terms and abbreviations
- Updated list of terms and abbreviations as needed
- Monthly invoices

3.1.3 Assumptions

- SharePoint will be used for all document storage/sharing.
- Microsoft Project will be used to create and maintain a detailed project schedule.
- ICF will update the work plan, schedule, and list of terms and abbreviations periodically throughout the life of the project as needed.

3.2 Task 2: Meetings

3.2.1 Task Description

Meetings are the framework within which important decisions will be made throughout the permit renewal process. The management approach and meeting breakdown described in this section will support work under all HCP tasks. NEPA meeting tasks are described under Tasks 8, 10, 11, and 13.

The following components outline the ICF team's plan for conducting meetings.

- **Regularly scheduled meetings.** We will use regularly scheduled or standing meetings whenever possible.
- **Attendees.** The HCP project manager and HCP deputy project manager will plan to attend all coordination meetings for continuity. Additional ICF team staff will attend meetings on an as-needed basis depending on active project tasks and necessary technical or strategic expertise, determined in coordination with EAHCP staff.
- **Agendas and agenda management.** The ICF team will propose an agenda prior to each coordination meeting. Having an agenda for each meeting is key to ensuring that meetings achieve their intended objectives and that all topics needing discussion and decisions are addressed.

- **Screen sharing.** Screen sharing during meetings is a valuable tool to bolster engagement and understanding of issues being discussed and to facilitate reaching consensus efficiently. Sharing notes and tasks on screen ensures they are correct and limits the need for post-meeting corrections.
- **Review material.** The ICF team will distribute review material to be discussed in meetings in advance of the meeting when feasible.
- **Notes, decisions, and action items.** The ICF team will distribute notes after each meeting. Distributing notes post-meeting ensures everyone on the team concurs with the meeting outcome. ICF will track key decisions and action items for ease of reference. These tools capture the evolution of the project and can be particularly important on longer projects where there may be staff turnover. Assigning action items to individuals or organizations, providing due dates, and then following up with reminders are all tactics the ICF team will use to facilitate accountability and ensure the project stays on schedule.

In addition to the project kickoff meeting, the project will consist of four other meeting types: regularly scheduled coordination meetings (approximately 1 hour), in-person meetings (approximately a full workday), virtual meetings (approximately a half workday), and virtual presentations at the request of the EAHCP management team (likely corresponding with committee or EAA board meetings). Coordination meetings every 2 weeks will be used to track decisions and technical tasks, prepare for upcoming deliverables, debrief from past meetings, plan for future meetings, and check in on program status with respect to the schedule. **Table 3-1** lists the meetings planned to support all HCP tasks, including those allocated under other tasks. Specifically, the table approximates how the 34 in-person and virtual meetings will be allocated amongst HCP development tasks.

ICF will be responsible for meeting coordination and will work with EAHCP staff to identify attendees, set agendas, and manage meeting notes and the decision record.

Table 3-1. HCP Team Meetings¹ by Task in Support of the Permit Renewal for the EAHCP

Task	In-Person Meetings	Virtual Meetings	Virtual Presentations ²	Regular Coordination Meetings ³
Task 2, Kickoff Meeting	1	--	--	--
Task 3, Listen and Learn	See Task 3 ⁴	--	1	16
Task 4, Operating Agreements	--	2	--	2
Task 5, HCP Planning and Alternative Development	6	10	10	42
Task 6, Modeling	2	2	1	12
Task 7, Draft HCP	2	6	1	18
Task 8, Draft NEPA	NEPA Team Meetings Funded Under Task 8			
Task 9, ITP Application	--	--	--	2
Task 10, Public Scoping	NEPA Team Meetings Funded Under Task 10			
Task 11, Draft EIS Public Meetings	NEPA Team Meetings Funded Under Task 11			

Task	In-Person Meetings	Virtual Meetings	Virtual Presentations ²	Regular Coordination Meetings ³
Task 12, Final HCP	1	2	1	8
Task 13, Final NEPA Document	NEPA Team Meetings Funded Under Task 16			
Total Meetings Funded Under Task 2	12	22	14	116

¹NEPA team meetings are not included in Task 2, but are included in the NEPA Tasks 8, 10, 11, and 13 to facilitate a separation of the HCP and NEPA teams (i.e., NEPA team staff and HCP team staff work should be conducted on separate tasks).

²Assumes that the ICF team would be requested to provide up to 20 virtual presentations over the course of the ITP renewal process.

³Assumes regularly scheduled coordination meetings between the HCP team and EAHCP staff approximately twice per month. The number of these meetings for each task is approximated based on the estimated task duration.

⁴Listen and Learn in-person workshops are allocated under Task 3. Coordination meetings and virtual presentations that may occur during this phase of the project are included under Task 2.

3.2.2 Deliverables

- Kickoff meeting agenda
- Coordination of regularly scheduled status meetings
- Attendance and/or facilitation at up to 12 in-person meetings
- Attendance and/or facilitation at up to 22 virtual meetings
- Virtual presentations at the request of the EAHCP project manager

3.2.3 Assumptions

- Up to 4 ICF team members will attend up to 12 in-person meetings and facilitate up to 22 virtual meetings.
- The ICF team will be requested to provide up to 14 virtual presentations over the course of the ITP renewal process.
- In-person meetings will be up to 8 hours in duration.
- Virtual meetings will be up to 4 hours in duration.
- Virtual meetings will be conducted via Microsoft Teams.

3.3 Task 3: Listen and Learn Workshops

3.3.1 Task Description

The HCP team will prepare, conduct, and facilitate four 1-day workshops to get input and data sources from community stakeholders. EAHCP staff will collaborate with the HCP team to focus the content for each workshop. An open-house style meeting will be held for each topic, with each meeting lasting up to 8 hours in duration.

Designing and implementing a successful Listen and Learn workshop process requires strong public meeting design skills, clear intent, and a well-constructed plan for incorporating information gathered from the workshops into the permit renewal process. The HCP team and ICF's public outreach staff will work closely with EAHCP staff and the HCP management team to set goals for the Listen and Learn workshops, outline the best approach for interfacing with stakeholders, and create a list of proposed workshop materials.

Up to four HCP team and public outreach staff persons will attend each workshop. Feedback will be collected on the topic and requests for existing data on the topic will be made electronically before and after each workshop and in-person at each workshop. The outcome of each workshop will be a summary of all the feedback received. EAHCP staff will collaborate with the ICF team in advance to identify stakeholders not yet on the EAHCP mailing list to include on future communications and to invite to the workshops. The four workshop topics to be conducted are outlined below.

3.3.1.1 Workshop 1: Recommended ITP Approach

The purpose of this workshop is to collect feedback on the following items:

- Permit renewal options
 - Covered Activities
 - Covered Species
 - Mitigation and Management Measures
 - Other ITP conditions
- Length of the permit term
- Administrative changes

3.3.1.2 Workshop 2: Biological Goals and Objectives

The purpose of this workshop is to collect feedback on the biological goals and objectives of the EAHCP:

- Define goals for species, habitat, or ecosystems
- What the new goals and objectives might be
- How objectives define success
- What tools may help evaluate success

3.3.1.3 Workshop 3: Climate Change and System Vulnerabilities

Climate is a fundamental component to the future management of the conservation measures implemented in the EAHCP. Understanding the direction/focus of the biological goals and objectives will help to refine a climate vulnerability assessment. Building on the outcome of the first two workshops, the purpose of this workshop is to collect feedback on the following topics regarding climate change.

- The effect of climate change on covered species, habitat, or ecosystem
- The sensitivity, exposure, and adaptive capacity of the spring systems and the Edwards Aquifer

3.3.1.4 Workshop 4: Conservation Measures

The EAHCP defines measures to conserve federally listed species that live in the Edwards Aquifer and the Comal and San Marcos springs through implementation of Minimization and Mitigation Measures (Conservation Measures). The activities defined in the EAHCP have changed via adaptive management or due to the lack of necessity. The purpose of this workshop is to collect feedback on the EAHCP Conservation Measures and determine if changes should be made to the following items.

- Details of the Conservation Measures
- Implementation efforts
- Funding

ICF will be responsible for the following Listen and Learn workshop components.

- Workshop logistics
- Meeting materials (presentations, brochures, fact sheets, display boards, comment forms, and/or sign-in sheets)
- Participation at meetings
- Collecting public comments using various methods (paper forms and electronic)

ICF will conduct a dry run of the first workshop for the EAHCP staff and Permittees 12 days prior to the first workshop. After the four workshops have been conducted, ICF will summarize the feedback received in a draft and final report for EAHCP staff. ICF will coordinate with EAHCP staff to develop recommendations for next steps based on the data received.

3.3.2 Deliverables

- Attendance at up to five in-person meetings
- Draft workshop materials (electronic for each workshop)
- Administrative draft workshop materials (electronic for each workshop)
- Administrative draft workshop materials (printed for dry run)
- Final electronic and printed workshop materials (for each workshop)
- Draft Listen and Learn Workshop Report
- Final Listen and Learn Workshop Report

3.3.3 Assumptions

- To reduce travel costs, ICF will conduct the dry run of the first workshop on the same trip as Workshop 1 (e.g., 1–2 days prior to Workshop 1).
- Up to four ICF team members will attend each Listen and Learn workshop.
- EAHCP staff will be responsible for maintaining the mailing list or public notice of workshops.

3.4 Task 4: Operating Agreements

3.4.1 Task Description

The HCP team management and program director will review existing operating agreements and make recommendations for future changes. This task may require interviewing EAHCP staff, Permittees, and other Committee members. The HCP team will conduct interviews virtually unless conducted concurrently with other in-person meetings under Task 2. ICF will make recommendations for changes to the following documents.

- *Funding and Management Agreement*
- *Operational Procedures of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program* (March 2012)
- *Parliamentary Rules of Conduct of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program* (March 2012)
- *Program Operational Rules for EAHCP Program Adaptive Management Stakeholder Committee Members and Participants* (October 2012)
- *Operational Procedures of the Science Committee of the Edwards Aquifer Habitat Conservation Plan Program* (April 2014).

As part of this task, the HCP team will conduct a thorough review of all relevant operating agreements listed above to answer the following questions.

- Do any provisions of these agreements need to change to align to the proposed amendments to the EAHCP?
- Should any provisions of these agreements be changed to improve the efficiency and effectiveness of EAHCP implementation?
- Can any of these agreements be separated from the EAHCP and ITP to provide the Permittees with more flexibility in implementation?

3.4.2 Deliverables

- Recommended tracked change revisions to the following.
 - *The Funding and Management Agreement*
 - *Operational Procedures of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program* (March 2012)
 - *Parliamentary Rules of Conduct of the Implementing Committee of the Edwards Aquifer Habitat Conservation Plan Program* (March 2012)
 - *Program Operational Rules for EAHCP Program Adaptive Management Stakeholder Committee Members and Participants* (October 2012)
 - *Operational Procedures of the Science Committee of the Edwards Aquifer Habitat Conservation Plan Program* (April 2014)

- Documented justification for recommended changes provided in a memorandum format and/or in comments in the reviewed documents.

3.4.3 Assumptions

- The HCP team will conduct interviews with EAHCP staff, Permittees, and other Committee members to obtain information on recommendations for operating agreement changes virtually unless conducted concurrently with other in-person meetings under Task 2.
- The HCP team will provide documented justification for required recommended changes to operating agreements in a memorandum format and/or in comments in the reviewed documents.

3.5 Task 5: HCP Planning and Alternative Development

3.5.1 Task Description

The HCP team will perform planning and technical studies to support the permit renewal for the EAHCP. The HCP team may also use these studies to identify data gaps and additional studies, if any, are needed to inform development of the HCP. These analyses should include the projected level of effort in both cost and time needed for proposed studies. The ICF team will provide any resource tools (i.e., Geographic Information System files, spreadsheets, etc.) created in the development of their work.

This task includes much of the essential content that will make up Chapters 2–7 of the HCP Amendment described under Task 7 (**Figure 3-1**). As with all writing tasks, the ICF team will begin with existing HCP text where useful and relevant. Subtasks 5.4, Define Biological Goals and Objectives, through 5.9, Monitoring Plan, will be informed by Task 6, Modeling Projections. All subtask deliverables will be overseen by the HCP team management staff, drawing on the HCP team’s technical experts as noted below.

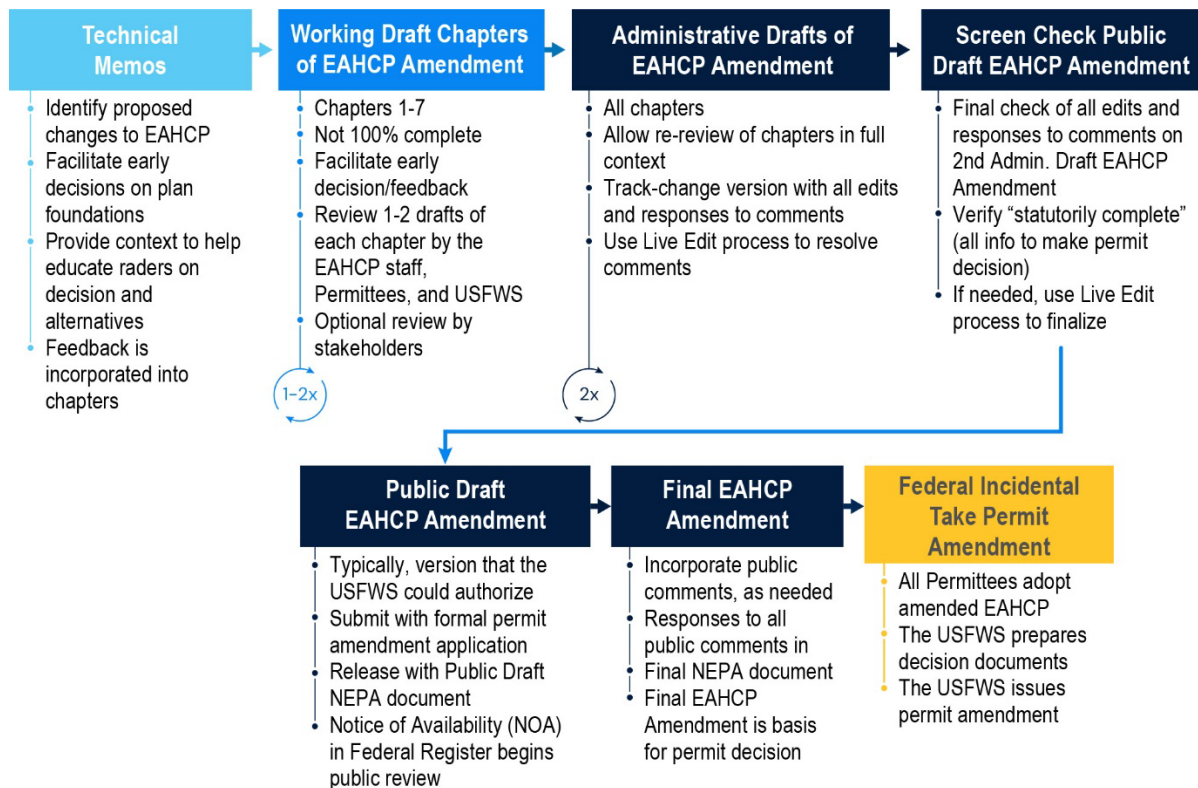
Technical memos or short technical reports will be used as the way to solicit early feedback from EAHCP staff and the USFWS on the foundational elements of the HCP. Two or three versions of each memo will be developed with review from EAHCP staff, the USFWS, and the Stakeholder and Implementing committees. We will coordinate with EAHCP staff to determine a draft development and review process for each memo, but **Table 3-2** provides the assumed approach to deliverables under this task.

Table 3-2. Task 5 Deliverables

Deliverable		# of Drafts	Notes and Next Steps
1a-c	Draft Covered Species Memo	3 ^a	Incorporate into Amended HCP Chapter 3, “Existing Conditions,” and HCP appendix to document covered species selection process (Task 7)
2a-c	Draft Covered Activities Memo	3 ^a	Incorporate into Amended HCP Chapter 2, “Covered Activities” (Task 7)

Deliverable		# of Drafts	Notes and Next Steps
3a-c	Update to Environmental Setting and Baseline Conditions Chapter	3 ^a	Update to EAHCP Chapter 3
4a	Draft Biological Goals and Objectives Memo	1	Follows workshop on this topic with the USFWS; edits incorporated into revised memo
4b-c	Revised Draft Biological Goals and Objectives Memos	2 ^a	Incorporate into Amended HCP Chapter 5, "Conservation Strategy" (Task 7)
5a-c	Draft Preliminary Conservation Strategy Changes Memo	3 ^a	Incorporate into Amended HCP Chapter 5, "Conservation Strategy" (Task 7)
6a-c	Draft Habitat Suitability Analysis	3 ^a	Incorporate into Amended HCP Chapter 5, "Conservation Strategy." Final document as EAHCP appendix (Task 7)
7a	Effects Analysis and Take Assessment Memo (methods only)	1	Precursor topic to performing the effects analysis; important to gain buy-in on methods before we apply them
7b-c	Effects Analysis and Take Assessment Memo	2 ^a	Incorporate into Amended HCP Chapter 4, "Effects Analysis" (Task 7)
8a-b	Draft Monitoring Plan Updates Memo	2 ^a	Incorporate into Amended HCP Chapter 6, Sections 6.2 and 6.3 (Task 7)
9a-c	Draft Preliminary Costs Memo	3 ^a	Incorporate into Amended HCP Chapter 7, "Cost and Funding" (Task 7)
Total		29	

^a Assumes first draft reviewed by EAHCP staff, second draft reviewed by the USFWS and stakeholders, and third draft reviewed and approved by the Implementing Committee. Exceptions are the Biological Goals and Objectives and Effects Analysis and Take Assessment memos, which will have the first draft reviewed by both EAHCP staff and the USFWS simultaneously. It is assumed that the Effects Analysis and Take Assessment Memo and Draft Monitoring Plan Updates Memo will not require Implementing Committee approval at this stage, so only two drafts will be prepared.

Figure 3-1. Document Review Process

Once approved by the Implementing Committee, most technical memos would be applied to the first draft of the relevant Amended HCP chapter (Task 7) (exceptions to this, where a technical memo is assumed to be an appendix to the HCP, are noted in **Figure 3-1**). It is important that material be maintained as a "working draft" up until the Public Draft Amended HCP. The technical memo format helps to convey the working draft status. In cases where the technical material will become an appendix to the HCP, a standalone report is appropriate. In other cases, avoiding a report or memo altogether is preferable so that reviews can be focused on the Amended HCP chapters.

In all cases, technical memos and technical reports in this task will assess and identify important data gaps that may be relevant to the Amended HCP. For each data gap we will identify the following.

- Relevance or importance to completing the Amended HCP
- Risk to the Amended HCP of not addressing the data gap
- Analysis or study required to address the data gap and estimated time and cost (if necessary, analysis to completely address the data gap is unknown, a scoping phase will be described)
- Options to address the data gap during HCP implementation should it not be addressed during the Amended HCP

The following subtasks will be conducted under this task.

3.5.1.1 Subtask 5.1: Define Covered Species

The HCP team will use information collected during workshops and the results of previous deliverables to recommend what Covered Species should be included in the renewed ITP. ICF will coordinate closely with EAHCP staff in finalizing recommendations presented to Permittees. This work plan assumes up to two additional Covered Species added to the EAHCP and the removal of the San Marcos gambusia (proposed extinct).

The HCP team's technical staff will carefully evaluate species for coverage. ICF uses the following criteria to evaluate whether a species should be covered under an HCP.

- **Listing status.** Is the species currently listed as threatened or endangered? If not, considering its status and threats to the species, what is the likelihood that the species will be listed during the permit term?
- **Range.** Is the species known to occur or expected to occur within the Plan Area based on best available data and professional expertise? If not currently known or expected to occur, is it expected to move into the Plan Area during the permit term?
- **Impact.** Will the species or its habitat be affected by Covered Activities at a level that may result in take?
- **Species data.** Is there sufficient scientific data on the species life history, habitat requirements, and occurrence in the Plan Area to allow for adequate evaluation of impacts on the species and the development of Conservation Measures to mitigate those impacts?

Detailed information on the following topics will be included for the species recommended for coverage: listing status, historical and current range, habitat description, habitat extent in the Plan Area, presence in the Plan Area, and threats. Covered Species reports are typically captured, in full, as an appendix to Chapter 3, "Environmental Setting and Baseline Conditions," described under Task 7. The report for each species, often referred to as a species account or species profile, will be authored by an ICF team biology technical expert.

3.5.1.2 Subtask 5.2: Define Covered Activities

The HCP team will use information collected during Listen and Learn workshops, the results of previous deliverables, text in the existing HCP, and information from annual reports documenting the HCP's Conservation Measures, to recommend what Covered Activities should be included in the renewed ITP. We will coordinate closely with EAHCP staff in finalizing recommendations presented to Permittees.

The HCP team will use the following criteria as a starting point to evaluate whether activities warrant coverage, which can be adapted as needed.

- **Location.** The project and/or activity occurs in the Plan Area.
- **Timing.** Construction of the project or operational or maintenance activities will occur during the permit term.
- **Impact.** The project or activity has a reasonable potential or likelihood to result in take of a Covered Species.

- **Definition.** The location, size, and other relevant aspects of the project or activity can be defined sufficiently such that direct and indirect impacts on Covered Species can be evaluated and Conservation Measures developed to mitigate those impacts.
- **Practicability.** Inclusion of the project and/or activity as a Covered Activity will not result in undue delays or substantial additional cost to HCP development and permitting processes relative to the benefit of including the project, activity, or service in the permit. In other words, it will be more cost-effective to provide endangered species permits for the project, activity, or service through the HCP rather than separately. Impractical Covered Activities include ones that, on their own, would add additional Covered Species, generate substantial controversy, or significantly complicate the impact analysis.

3.5.1.3 Subtask 5.3: Existing Conditions

The HCP team will use information collected during workshops and the existing EAHCP Chapter 3, “Environmental Setting and Baseline Conditions,” to evaluate how the chapter needs to be updated given what conditions have changed since the EAHCP was approved.

Updated existing conditions is an important input to the permit renewal process that will inform the EAHCP effects analysis, conservation strategy, and monitoring and adaptive management plan. The HCP team will start with the existing EAHCP Chapter 3, “Environmental Setting and Baseline Conditions,” and evaluate how the chapter needs to be updated given what conditions have changed since the EAHCP was approved and amended last. We will also consider which changes might be considered for the EAHCP, drawing from the *EAHCP Permit Options Report* and information gathered in the Listen and Learn phase, and determine whether additional analysis of existing conditions on any topics or resource areas that were not addressed in the original EAHCP is required. Sources for information will include the EAHCP and its annual reports and biological monitoring reports, *Review of the Edwards Aquifer Habitat Conservation Plan, Report 3* and the *EAHCP Permit Options Report*. In particular, this subtask will focus on the topics necessary to inform the Amended HCP, including the following.

- Climate, including temperature, precipitation, and drought projections
- Hydrology, including the Edwards Aquifer and aquifer-fed springs in the Plan Area
- Updates to species data for each Covered Species, including new data for Covered Species added to the EAHCP

All relevant text from the EAHCP will be used whenever possible. Some content in Chapter 3 of the EAHCP may need to be updated after completing the remaining Task 5 subtasks. These updates will be made in the Draft HCP (Task 7).

3.5.1.4 Subtask 5.4: Define Biological Goals and Objectives

The HCP team will use information collected during workshops, historical data and studies, and the results of previous deliverables to recommend the biological goals and objectives that should be included in the renewed ITP. The HCP team will coordinate closely with EAHCP staff in finalizing recommendations presented to Permittees.

The existing biological goals and objectives for EAHCP Covered Species will serve as a starting point for the biological goals and objectives to be included in the Amended HCP. New biological goals and

objectives will need to be developed for added Covered Species (we assume up to two species will be added). The HCP team will use a collaborative approach to develop biological goals and objectives, including a workshop with USFWS staff, Permittees, the HCP management team, and species experts. Species experts are crucial to informing the discussion on what are and are not reasonable expectations for species outcomes, which helps frame the discussion with the USFWS to reach biological goals and objectives that result in beneficial conservation outcomes for species while also driving practicable Conservation Measures.

3.5.1.5 Subtask 5.5: Preliminary Conservation Strategy Changes

The HCP team will use information collected during workshops to recommend the mitigation and minimization measures to be included in the renewed ITP. The HCP team and EAHCP staff will coordinate closely in finalizing recommendations presented to Permittees.

This subtask will focus on identifying the options available to update the minimization and mitigation measures in the EAHCP (Chapter 5). The technical memo delivered under this task will identify the important changes to the conservation strategy that will involve deletions, additions, or major changes to existing Conservation Measures based on the following information.

- Adaptive management changes implemented by the EAA so far
- Recommendations of the *Review of the Edwards Aquifer Habitat Conservation Plan, Report 3*
- Recommendations of the *EAHCP Permit Options Report*
- Additional Covered Species that may be added to the EAHCP (e.g., if existing Conservation Measures are insufficient to address the mitigation needs of these new species)
- New information that suggests new or different Conservation Measures will be more effective than existing measures
- Updated Biological Goals and Objectives
- Updated Effects Analysis and Take Assessment

Conservation Measures identified in the approved technical memo will be incorporated into a revised Amended EAHCP Chapter 5 (Task 7).

3.5.1.6 Subtask 5.6: Habitat Suitability Analysis

The HCP Team will use available tools to perform the habitat suitability analysis (HSI). Springflow, the output from MODFLOW, will be fed into the existing HSI structure for each of the modeled scenarios. The HCP team will need to review and update available tools as needed to perform the analysis. The HCP team will conduct habitat suitability analyses for fountain darter, Texas wild-rice, San Marcos salamander, Comal salamander, and Comal Springs riffle beetle. Habitat suitability analyses for other Covered Species are not included in this scope of work.

BIO-WEST will lead the habitat suitability analysis with oversight from ICF's HCP management team and technical assistance, as needed, from Cambrian. Data and analytical tools related to habitat, water quality, and springflow are available to support habitat suitability analyses for fountain darter, Texas wild-rice, San Marcos salamander, Comal salamander, and Comal Springs riffle beetle. Updated projections from Task 6 would also inform the springflow parameter for the analyses. The Comal Springs Riffle Beetle Population Assessment that BIO-WEST is conducting over 2022 and

2023 should also inform the habitat suitability analysis for the riffle beetle, but uncertainty in the beetle's use of subsurface habitat remains. Life history data for the Comal Springs dryopid beetle, Peck's cave amphipod, and other deep aquifer Covered Species remains insufficient to conduct habitat suitability analyses for these species. More data may be available for these species at the time this task is initiated, and the ICF team will coordinate with the EAA to determine the feasibility of habitat suitability analyses for deep aquifer Covered Species.

3.5.1.7 Subtask 5.7: HCP Effects Analysis and Take Assessment

The HCP team will document the effects analysis and take assessment for each Covered Species. The effects analyses and take assessment methods will be updated consistent with the updated Covered Species list, the revised Covered Activity description, and changes to the biological goals and objectives. The effects analysis and take assessment methods will also be updated, as needed, to include any new or revised approaches to the adaptive management program. The effects analysis and take assessment methods will be provided to EAHCP staff and the USFWS for review prior to completing the full analysis and memo.

This subtask will document the proposed changes to the effects analysis and take assessment for each Covered Species. The effects analyses and take assessment methods will be updated consistent with the updated Covered Species list, the revised Covered Activity description, and changes to the biological goals and objectives. The effects analysis and take assessment methods will also be updated, as needed, to include any new or revised approaches to the adaptive management program (that address uncertainties in the effects analysis). The effects analysis and take assessment methods will be provided to EAHCP staff and the USFWS for review prior to completing the full analysis and memo.

3.5.1.8 Subtask 5.8: Monitoring Plan

The HCP team will coordinate closely with EAHCP staff to establish and document a monitoring plan that will evaluate the effectiveness of Conservation Measures.

This subtask will focus on proposed changes to the monitoring program in Sections 6.2 and 6.3 of the EAHCP. The monitoring plan will be updated primarily in response to changes to the Conservation Measures and the adaptive management program. Stakeholder input and lessons learned from implementation of the original HCP are also expected to inform the plan. For example, requirements for monitoring and management requirements for gill parasites may change. Or changes to performance standards for riparian restoration may lead to changes in monitoring approach or frequency. BIO-WEST will lead the development of the monitoring plan updates memo with oversight from the HCP management team. The memo will propose additions, deletions, and changes to the long-term monitoring program and explain the rationale for these changes. Once approved, the revisions to monitoring will be incorporated into a revised monitoring chapter in Task 7.

3.5.1.9 Subtask 5.9: Preliminary Costs

The HCP team will coordinate with EAHCP staff to establish and document costs and funding analysis consistent with USFWS guidance for inclusion in the Draft HCP.

The preliminary cost memo will identify expected cost changes because of the recommended changes to the Covered Activities, Covered Species, biological goals and objectives, Conservation

Measures, and monitoring activities. ICF will use the existing EAHCP budget as a starting point for the costs analysis. The costs report may also consider changes to HCP administration as these changes could lead to adjustments in costs, specifically decreases in cost because of gained efficiency. Jon Hockenyos, HCP economic/financial analyst, will lead the preliminary costs memo.

Deliverables

Table 3-2 summarizes the deliverables under Task 5.

- Draft Covered Species Memo
- Draft Covered Activities Memo
- Update to Environmental Setting and Baseline Conditions chapter
- Draft Biological Goals and Objectives Memo
- Revised Draft Biological Goals and Objectives Memos
- Draft Habitat Suitability Analysis
- Effects Analysis and Take Assessment Memo (methods only)
- Effects Analysis and Take Assessment Memo
- Draft Preliminary Conservation Strategy Changes Memo
- Draft Monitoring Plan Updates Memo
- Draft Preliminary Costs Memo

Assumptions

- ICF will remove the San Marcos gambusia (proposed extinct) from the list of Covered Species and therefore not analyze it in the Amended HCP.
- ICF will add up to two additional Covered Species to the list of Covered Species in the Amended HCP.
- ICF will conduct habitat suitability analyses for fountain darter, Texas wild-rice, San Marcos salamander, Comal salamander, and Comal Springs riffle beetle. Habitat suitability analyses for other Covered Species are not included in this work plan.
- ICF will develop draft technical memos for Task 5 for EAHCP staff, USFWS and stakeholders, and Implementing Committees to review, totaling up to three versions of each memo. ICF will address Implementing Committee comments on the revised draft technical memos in Chapters 1–7 of the Amended HCP. Refer to **Table 3-2** for details.

3.6 Task 6: Modeling Projections

3.6.1 Task Description

The HCP team will work closely with EAA technical staff in the development of study design and execution for each of the subtasks described below. The EAA MODFLOW model will be provided along with technical assistance in completing various model scenario runs.

The estimation of springflow response to changes in climate and water use is a critical element of the Amended HCP. Changes in springflow quantity are one of the primary impact mechanisms to the Covered Species. Maintaining minimum springflow during droughts is a key Conservation Measure of the EAHCP that will be maintained in the Amended HCP. Accordingly, this analysis must be robust, transparent, and reproducible so that the USFWS, Permittees, and stakeholders have confidence in the results and corresponding requirements.

Projections for future surface water and groundwater conditions will be developed and evaluated during this task to assess the adequacy of current minimum springflow commitments in the EAHCP in the face of climate change. Work completed during this task provides the basis for analysis and prediction of future aquatic habitat as required to inform Task 5.

Drawing on the skills and system knowledge of EAA staff, we will implement a risk-based workflow to project future springflow outcomes under a range of possible future climate and water-use conditions. This workflow requires linking existing EAA models and analysis into a bespoke workflow, as shown in **Figure 3-2**. We will use approaches that the EAA and the project team have implemented successfully and efficiently in the past. Jeremy White, PhD, of INTERA will lead the modeling workflow. Nick Martin (SwRI) and Jim Winterle (independent consultant) will provide advice, consultation, and assistance with analyses as needed.

Forecasts of future springflow patterns will be developed probabilistically using the existing EAA models, climate analyses, and pumping and permit data to represent possible future springflow patterns, as well as to estimate uncertainty in this important HCP quantity. Our team will use a probabilistic approach to address and explicitly describe the uncertainty inherent in forecasted future springflow (**Figure 3-2**). This approach will allow the EAHCP staff, Permittees, and the USFWS to evaluate the efficacy of the springflow protection measures to reduce the risk to aquatic habitat for the Covered Species from the most likely future conditions. We will adopt a scripting-driven workflow approach to increase efficiency, transparency, and reproducibility. This will also increase the quality of the final product and increase stakeholder acceptance.

Throughout the proposed linked-modeling workflow (see below), we note explicit assumptions related to the availability of datasets or models. We will update these assumptions in coordination with EAA at the initiation of Task 6 and as needed throughout its completion. We understand that EAA technical staff will be available throughout the proposed linked-modeling analysis to collaborate with and assist our team as needed. Below is a summary of the deliverables and assumptions identified for this task. Additional detail regarding work to be completed and associated assumptions are provided further below in following sections.

Deliverables

- Draft Temperature and Rainfall Scenarios Report

- Final Temperature and Rainfall Scenarios Report
- Draft Recharge Rates, Pumping Scenarios, and MODFLOW Springflow Projections Report
- Final Recharge Rates, Pumping Scenarios, and MODFLOW Springflow Projections Report

Assumptions

- EAA technical staff will be available throughout the proposed linked-modeling analysis to collaborate with and assist the ICF team as needed.
- ICF will include the Final Temperature and Rainfall Scenarios Report and the Final Recharge Rates, Pumping Scenarios, and MODFLOW Springflow Projections report as appendices to the Amended HCP, and the USFWS will review them during its review of the Amended HCP.
- Detailed assumptions on methods for Task 6 will be developed by the ICF Team and approved by EAHCP staff and EAA modeling staff and appended to this work plan prior to initiating work on Task 6.

3.6.1.2 Subtask 6.1: Temperature and Rainfall Scenarios

EAA staff will deliver their preferred set of downscaled future climate scenarios for more than one concentration pathway, which will already include the comparisons of the recent decadal hindcasts to measured weather. The HCP team will use the existing EAA preferred downscaled future climate scenarios. The HCP team will compare the future predicted temperature and rainfall scenarios to measured temperature and rainfall during the drought of record and other recorded significant drought periods to better understand the temporal and spatial characteristics of the predicted temperature and rainfall scenarios.

The projections of future temperature and rainfall provided by the EAA will be inputs to the modeling efforts in Subtasks 6.2, 6.3, and 6.4 (**Figure 3-2**). Analysis of future recharge in Subtask 6.2 will require temperature and rainfall inputs, as will the pumping scenario development in Subtask 6.3 and the future spring discharge estimates in Subtask 6.4.

We recognize that EAA technical staff have developed downscaled and bias-corrected estimates of future precipitation and temperature conditions from CMIP5¹ for more than one concentration pathway; we also recognize that EAA technical staff have developed approaches for estimating future potential evapotranspiration conditions. If these are the preferred future climate conditions, we will rely on these estimates directly, assuming they will be supplied by EAA technical staff. Our assumption is that the climate analyses that are currently being implemented by the EAA technical staff will include and address the following requirements.

- EAA technical staff has implemented a novel downscaling method that they deem the best available for the study region to produce downscaled CMIP5 projections of temperature and rainfall across the Edwards Aquifer Region (EAR). The EAA technical staff has already judged that this approach is recommended based on reasonably matching historical climate.

¹CMIP = Combined Model Intercomparison Project version 5. We understand that EAA staff are working towards a transition to CMIP6, but peer review and validation is expected to take another 2 years, which may not be in time to incorporate into the HCP renewal process.

- The ICF team will use the downscaled projections produced by EAA technical staff in the analyses under the assumption that they are the EAA's preferred approach and that the EAA has implemented all comparisons that it deems necessary to validate this approach.
- The downscaled CMIP5 projections of temperature and rainfall, produced by the EAA staff with their preferred downscaling method, will incorporate CMIP5 simulations results for more than one Representative Concentration Pathway (RCP) through 2078 across the EAR.
- The project team will produce an ensemble of temperature and rainfall time histories through 2078 across the EAR from the downscaled CMIP5 projections for more than one RCP that cover the entire EAR as produced by EAA technical staff.

The project team will document the future predicted temperature and rainfall scenarios produced for this task in a report (see *Deliverables* above). This approach uses all available EAA science teamwork products and requires extensive collaboration among the ICF team and the EAA science team.

3.6.1.3 Subtask 6.2 Recharge Rates

The HCP team will develop a parallel track approach to addressing recharge rate. The first approach will focus on using first-order correlation analyses to estimate the relation between temperature, rainfall, and recharge from the historic datasets available. The second approach will be to use the watershed model Hydrologic Simulation Program in FORTRAN (HSPF) for each of the contributing basins. The HCP team will re-train HSPF models to produce an HSPF-based recharge estimation tool that is an advanced semi-physical analogue of the USGS recharge estimation method. The HSPF-based recharge estimation tools will focus on the following.

- Estimation and reproduction of historical stream discharge at the upstream border of the Edwards (Balcones Fault Zone, or BFZ)
- Estimation and reproduction of historical stream discharge at the downstream border of the BFZ Edwards Recharge Zone
- Estimation stream seepage losses within the BFZ Edwards Recharge Zone

The HSPF-based recharge estimation tools will estimate runoff contributions from recharge zone subbasins and diffuse recharge from deep percolation through the soil column within the recharge zone to provide a complete water balance-based recharge estimator. This ensemble can then be used with the climate scenarios to account for uncertainty in the transformation from future precipitation and temperature to future estimated recharge.

To estimate predicted future Edwards Aquifer recharge, we will rely on historical USGS estimates of recharge, measured historical temperature and rainfall, and the future predicted temperature and rainfall scenarios developed from Task 6.1. In recognition of the importance of the recharge estimation process and the complexity that it entails, we are proposing a parallel track approach leading to a decision point by mid 2023. One parallel track will focus on using first-order correlation analyses to estimate the relation between temperature, rainfall, and recharge from the historical datasets available. Conceptually, this approach will focus on matching short-duration future precipitation and recharge patterns to historical analogues. For example, we may use a 3-month forward-in-time window for each future precipitation and temperature scenario, matching the climatic quantities within each 3-month window to the most similar 3-month historical period. In essence, this approach will use a correlation-based, pattern-matching engine.

While the historical analogue approach is being developed, we will explore repurposing the existing HSPF models as recharge estimators. The goal of this approach is to re-train the HSPF basin models to reproduce the USGS recharge estimates, using the “Puente Method”², over the historical period. Conceptually, our approach to re-training HSPF models is to produce an HSPF-based tool that is an advanced analogue of the USGS recharge estimation method, which uses water balance methods in conjunction with stream gauges upstream and downstream of the BFZ Edwards Recharge zone. Additionally, we will incorporate “new” stream gauge data, where available, into the HSPF-based tool training process. There are several locations where stream gauges have been installed on either the upstream or downstream border of the BFZ Edwards Recharge Zone in the last 15 years, after formulation of the EAA’s HSPF models.

The ICF team does not plan to “recalibrate” the HSPF models to the myriad available observations to be improved simulators of basin watershed dynamics across the BFZ Edwards Contributing and Recharge zones. Instead, we will train these models to be quasi-physical transform functions, ones that take precipitation and temperature inputs and yield recharge estimates. Conceptually, the HSPF-based recharge estimation tools are solely for BFZ Edwards recharge estimation under the hypothesis that focused recharge from streams, rivers, and karst features in the BFZ Edwards Recharge Zone is significantly more important than diffuse recharge. Consequently, the HSPF-based recharge estimation tools will focus on (1) estimation and reproduction of historical stream discharge at the upstream border of the BFZ Edwards Recharge Zone; (2) estimation and reproduction of historical stream discharge at the downstream border of the BFZ Edwards Recharge Zone; and (3) estimation of stream seepage losses within the BFZ Edwards Recharge Zone. HSPF provides a “lumped”—rather than a “discrete feature”—representation. Simulated stream seepage losses will be extended conceptually within this representation to represent all focused recharge within the recharge zone. The HSPF-based recharge estimation tools will also estimate runoff contributions from recharge zone subbasins and diffuse recharge from deep percolation through the soil column within the recharge zone to provide a complete water balance–based recharge estimator.

As a result of the proposed approach, the retrained HSPF models may include parameter values of decreased physical plausibility in the contributing zone because the HSPF-based representation of regions upstream of the BFZ Edwards Recharge Zone will be lumped, aggregated, and optimized to reproduce stream discharge at the border of the recharge zone. However, the HSPF-based recharge estimation tools may produce a representation of focused BFZ Edwards recharge that has increased physical plausibility because of the inherent focus on this mechanism. We anticipate using the tool PESTPP-IES (White 2018; White et al. 2020)³ for this training because it is highly efficient in high-dimensional spaces and yields an ensemble of HSPF model inputs. If successful, this approach will contain unique HSPF parameter values that all reproduce the historic USGS recharge estimates and available gauge data. This ensemble of HSPF models, which will describe the inherent uncertainty in the physical watershed representation embodied within HSPF, can then be used with the climate

² Puente, C., 1978, Method of Estimating Natural Recharge to the Edwards Aquifer in the San Antonio Area, Texas, U.S. Geological Survey WRI 78-10. 34p.

³ White, J.T. 2018. A model-independent iterative ensemble smoother for history matching and uncertainty quantification in very high dimensions. Environmental Modeling and Software; and White, J.T., Hunt, R.J., Fienen, M.N., and Doherty, J.E., 2020, Approaches to Highly Parameterized Inversion: PEST++ Version 5, a Software Suite for Parameter Estimation, Uncertainty Analysis, Management Optimization and Sensitivity Analysis: U.S. Geological Survey Techniques and Methods 7C26, 52 p., <https://doi.org/10.3133/tm7C26>.

scenarios to account for uncertainty in the transformation from future precipitation and temperature to future estimated recharge.

We see the HSPF-based recharge estimators as the best potential approach to estimating future recharge rates. However, the efficacy of the proposed approach is unknown and contains many unforeseen opportunities for hardship. Therefore, we propose to test the proposed HSPF approach on two representative HSPF basin models. Representative HSPF basin models will be selected in consultation with EAA science staff. If the results of this testing are deemed successful and fit for the purpose of recharge estimation, then we will proceed with completing the re-training for the remaining HSPF basin models. However, if the two-basin test is not successful, we will rely on the historical analogue approach. We anticipate working closely with EAA science staff during this task, especially during the HSPF testing analysis.

3.6.1.4 Subtask 6.3: Pumping Scenarios

The HCP team will develop a set of pumping scenarios through 2078 based on prior pumping, rainfall, and temperature records and informed by future temperature and rainfall scenarios recommended in Task 6.1 (**Figure 3-2**).

Developing an ensemble of appropriate future water-use scenarios requires several important considerations. First, the scenarios should be at least partially coherent with future population projections and expected future agricultural water-use patterns. At the same time, the water-use scenarios must be compatible with the existing specialized version of MODFLOW that is needed to simulate the EAA stage restrictions and EAHCP springflow protection measures requirements. To cope with this complexity, our water-use scenarios will be based on the drought of record water-use patterns and will introduce stochasticity by varying water-use categories within an expected range of plausible future water-use demands. The introduced stochastic water-use component will be coherent with the stochastic future temperature and precipitation projections developed during Subtask 6.1 on a realization-by-realization basis. This will result in a pumping scenario that respects and is aligned with temperature and precipitation quantities (and resulting recharge estimate).

We recognize that previous EAHCP modeling focused on simulating the maximum permitted groundwater use quantities during the 1950s drought of record period, as this is a conservative approach. We will consult with EAHCP staff and EAA technical staff to determine the preferred approach to representing future water-use demands to produce reasonable pumping scenarios as inputs into the MODFLOW model to best assess future water-use conditions (and uncertainty) in the linked-modeling workflow (**Figure 3-2**).

3.6.1.5 Subtask 6.4: MODFLOW Springflow Projections

The HCP team will develop a set of MODFLOW springflow projections combining pumping and recharge scenarios from Subtasks 6.2 and 6.3, including EAA stage restrictions and EAHCP springflow protection measures. The HCP team may be required to update the EAA MODFLOW model and run scenarios to estimate an ensemble of possible future springflow outcomes. These springflow outcomes will be used to evaluate the performance of the EAA stage restrictions and EAHCP springflow protection measures under varying future forcing conditions, including the effects of climate change.

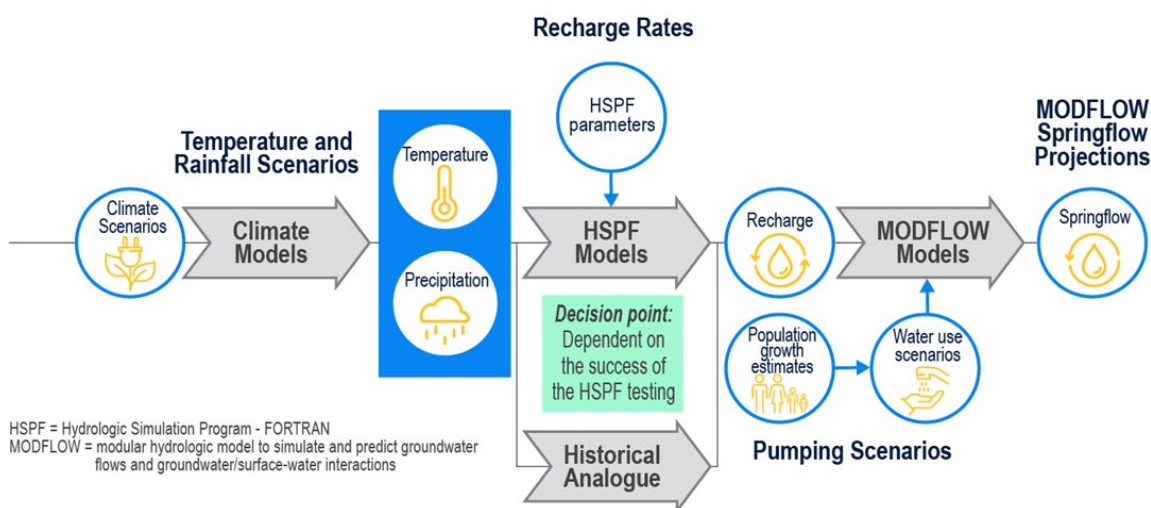
We anticipate that the statistical recharge estimation analysis steps (Subtask 6.2) can be completed in parallel to and in concert with the water-use scenario development process (Subtask 6.3; **Figure**

3-2). This parallel approach will provide schedule and cost efficiencies. Once these two analyses are completed, the resulting water-use scenario ensembles and recharge ensembles will be combined into a joint ensemble. The joint ensemble will be propagated through the MODFLOW model to estimate an ensemble of possible future springflow outcomes. These springflow outcomes will be used to evaluate the performance of the EAA stage restrictions and EAHCP springflow protection measures under varying future forcing conditions, including the effects of climate change. We expect the outcome of this advanced analysis to provide substantial risk-based guidance to inform the HCP renewal process.

We assume the EAA MODFLOW model will be fully configured for deployment to a future conditions analysis and that the coding processes and functions needed to simulate springflow protection measures can be deployed to inform the HCP Planning and Alternative Development tasks including the Habitat Suitability Analysis, Biological Goals and Objectives, and Effects Analysis. We understand the MODFLOW model has not been updated since spring 2019.

We understand the importance of evaluating and explicitly accounting for model input uncertainty in both the HSPF and MODFLOW models. We believe uncertainty in the model inputs will likely increase uncertainty in the simulated future springflows. This uncertainty may also interact with uncertainty in the future precipitation, temperature, and recharge estimates in nonlinear ways to affect the simulation of future springflow. This may, in turn, affect the efficacy of the springflow protection measures. If necessary, the ICF team can quantify and account for these additional uncertainties within the proposed linked-model workflow by drawing on previous experience with the HSPF and MODFLOW models, and through use of the Parameter Estimation (PEST) code model interface. Jeremy White, PhD, will lead this task with technical support from INTERA staff and technical oversight by Jim Winterle.

Figure 3-2. Task 6 Modeling Projections Workflow



3.6.1.6 Subtask 6.5: Modeling Workshop

The HCP team will design and conduct a half-day workshop to facilitate increased understanding of ensemble-based modeling workflows for EAA staff and stakeholders. At the request of the EAHCP

project manager, the HCP team will present a summary of ensemble-based modeling workflows to a joint meeting of EAHCP committees (see **Table 3-1**).

3.6.1.7 Subtask 6.6: Modeling Database

Task 6 will generate many complex spatially and temporally distributed datasets. It is important that these datasets are archived appropriately for transparency and reproducibility, to increase stakeholder acceptance and use during EAHCP implementation. The database should include inputs to and simulation results from each modeling run. The HCP team will develop a cloud-based database to be used to control the versions of the many complex spatially and temporally distributed datasets used across the Task 6 analyses. The datasets will be archived appropriately for transparency and reproducibility to increase stakeholder acceptance and use during EAHCP implementation. The database will include inputs to and simulation results from each modeling run. The database will also serve as the final archive of the datasets.

3.7 Task 7: Draft HCP

3.7.1 Task Description

The HCP team will develop a Draft HCP consistent with USFWS guidelines in accordance with Section 10(a)(1)(B) of the ESA of 1973, as amended. The HCP team will work closely with the EAHCP staff and Permittees to document the proposed Covered Activities, environmental setting, an analysis of Covered Species, the mitigation and minimization measures, approach to adaptive management, costs and funding assurances, changed circumstances and no surprises, permit administration, and other applicable sections. The HCP team will rely on materials developed through other tasks on this contract as well as the best available data. The Amended HCP will be based on the outline included in this work plan. Draft HCP deliverables are listed below under *Deliverables*. The Implementing Committee will review and sign-off on the Final Draft HCP prior to submittal to USFWS. The HCP team will distribute electronic copies of the Final Draft HCP to the public and applicable agencies and, if requested by EAHCP staff, will produce up to 20 hardcopies of the main HCP document with appendices included as electronic files.

The Draft HCP represents the culmination of all previous efforts on the amendment from the Listen and Learn workshops to numerous meetings, assessments, drafts, and individual chapters. This task encompasses internal coordination, QA/QC, the integration of previous comments, formatting, editing, and—critically—a stepwise process for reviewing and resolving input. At the end of this task, a publication-ready Draft HCP will be released to the public (the NEPA document will be released at the same time as per Task 11) for a mandatory public review period in accordance with USFWS policy for review of draft NEPA and HCP documents.

The Amended Draft EAHCP will be assembled from all the elements developed in Tasks 3 through 6. **Table 3-3** summarizes the chapters composing the Amended HCP. A detailed Amended HCP outline is housed in the project's document library here: [HCP Outline](#). This outline will be updated as needed throughout the analysis phase of the permit renewal process.

Table 3-3. Chapters of in the Amended HCP

Amended HCP Chapter	Original EAHCP Chapter	Corresponding Task
Chapter 1, "Introduction"	Same	Variety of sources, including Task 3 and Final Listen and Learn Session Report to summarize outreach process, and several Task 5 technical memos
Chapter 2, "Covered Activities"	Same	Task 5 and Draft Covered Activities Memo (incorporated into chapter)
Chapter 3, "Environmental Setting and Baseline Conditions"	Same	Task 5 and Update to EAHCP Chapter 3
Chapter 4, "Effects Analysis"	Same	Task 5 and Draft Effects Analysis and Take Assessment Methods Memo (incorporated into chapter), and modeling results of Task 6
Chapter 5, "Conservation Strategy"	Same	Task 5 and revised conservation strategy to address effects in Chapter 4, considering future conditions defined in Tasks 5 and 6
Chapter 6, "Monitoring and Adaptive Management"	Same	Task 5, Monitoring Plan Revisions Memo
Chapter 7, "Plan Implementation"	8 and 9	Task 4 and relevant future conditions for changed circumstances
Chapter 8, "Costs and Funding"	7	Task 5, Preliminary Cost Memo and updated funding plan
Chapter 9, "Preparers and Contributors"	10	Completed as part of Task 7
Chapter 10, "Literature Cited"	12	Updated from original HCP
Appendix A: Abbreviations and Acronyms	11	Updated from original HCP
Appendix B: Glossary	New	Updated from Annual Report
Appendix C: Covered Species Memo	New	Task 5
Appendix D: Habitat Suitability Analysis	New	Task 5
Appendix E: Temperature and Rainfall Scenarios Report	New	Task 6
Appendix F: Recharge Rates, Pumping Scenarios, and MODFLOW Springflow Projections Report	New	Task 6

We will make full use of the original EAHCP by adopting its clear organization⁴ and any text that still applies to the Amended HCP. However, to make it clear that the HCP is revised and updated to support a new permit application, we will update the format of the document, including font, headers, footers, the and a different cover. We will clearly indicate in the Draft HCP document and/or a summary table the changes relative to the original HCP. This approach will make clear to all reviewers, including the USFWS, what has been changed and which sections are completely new.

⁴ The one exception to this organization is to combine Chapter 8, "Changed Circumstances, Unforeseen Circumstances, No Surprises, and Other Federal Commitments," and Chapter 9, "Permit Administration," into one chapter called "Plan Implementation" (Table 3-1).

As an amendment, it is as important to show what has not changed from the original HCP as it is to show what has changed.

During this task, close coordination and collaboration with the USFWS will be critical to rapid progress and successful completion of the Public Draft HCP. The ICF team will use several approaches to ensure productive discussion and negotiation between the EAA and the USFWS, including the following.

- Review, sort, and prioritize all comments; code comments that need discussion for ICF's proven live-edit meeting (coded comments are simply prioritized comments tagged with a key word to quickly move through a document)
- Hold in-person live-edit meetings to systematically discuss and resolve all coded comments and, when possible, edit the document on screen to reach agreement on revisions
- Clearly document all decisions made during this process to prevent renegotiating by new USFWS staff
- For comments not adopted, explain why in the comment response
- Hold follow-up meetings as needed to resolve all comments and produce the next draft

Deliverables

- Draft Amended HCP Chapters 1–7 (see **Table 3-3**) reviewed by EAHCP staff
- Revised Draft amended HCP Chapter 1-7 reviewed by Committees and USFWS
- First Administrative Draft Amended HCP reviewed by EAHCP staff and Implementing Committee
- Second Administrative Draft Amended HCP reviewed by Committees and USFWS
- Screen-check Draft Amended HCP reviewed by EAHCP staff and Implementing Committee
- Final Draft Amended HCP for Implementing Committee Review and Sign-off
- Up to 20 hardcopies of the public draft Amended HCP with electronic appendices for distribution

Assumptions

- The ICF team will assemble the Amended HCP from all the elements developed in Tasks 3–6. We assume that compiling the Amended HCP under this task will not require any new substantive analysis in addition to what is already completed under Tasks 3–6.
- The existing EAHCP will serve as the basis for the Amended HCP. Any text that still applies will be adopted in the Amended HCP.

3.8 Task 8: Draft NEPA

3.8.1 Task Description

The USFWS's renewal of the ITP and approval of the HCP Amendment constitutes a federal action subject to compliance with NEPA. The USFWS (as the NEPA lead agency) has two important considerations for the NEPA document at the outset of the NEPA process. First, the scope of the environmental document will be based on the scope of the Amended HCP and the potential impacts of its implementation. To keep the environmental analysis focused, it will be critical for ICF to work with the USFWS to clearly define the scope of the amendment and develop a clear proposed action under NEPA. Second, it will be important to determine the level of NEPA review. As the lead federal agency responsible for NEPA compliance, the USFWS will determine whether the NEPA document will be an EA or an EIS. If the USFWS anticipates potential significant effects to the human environment due to the implementation of the HCP amendment, it may require the development of an EIS. If this is the case, the USFWS will also determine whether to prepare a supplemental EIS instead of a new EIS. This work plan assumes that USFWS will determine that an EIS is necessary. However, this work plan will be updated at the start of this task to reflect the level of NEPA review determined by USFWS, if necessary.

At the direction of the USFWS, the NEPA team will draft an EIS consistent with USFWS guidance and pursuant to provisions of NEPA (Title 42 of the United States Code (USC) Section 4321 et seq., implemented by Council on Environmental Quality Regulations). To help define project expectations and roles, the NEPA team will develop a memorandum of understanding (MOU) to outline the roles and responsibilities of EAHCP staff, the USFWS, and the NEPA team for the NEPA process. In addition, the NEPA team will develop a clear communications protocol to maintain a firewall between the HCP and NEPA teams. The NEPA team will work with the USFWS regarding any data needs from or questions directed to the HCP team, EAHCP staff, and/or Permittees per the established firewall protocol. The NEPA team will prepare a NEPA schedule with task assignments and milestones and will be responsible for meeting agendas, notetaking, and dissemination of relevant materials. The NEPA team will hold a kickoff meeting with the USFWS and regularly scheduled (approximately twice-monthly) meetings until the public draft NEPA document is completed. The NEPA team will work with USFWS to establish the administrative record protocol and begin implementation at the start of the project, although it will not be submitted in its entirety until the end of the project. The NEPA team will work closely with the USFWS, and EAHCP staff and Permittees as applicable, to document the purpose and need, alternatives considered and those not considered, the affected environment, and environmental consequences. The NEPA team will rely on materials developed through other tasks on this contract as well as the best available data. The NEPA team will perform the necessary steps to develop a Public Draft EIS.

- Submit EIS draft Chapter 1, "Purpose and Need," and Chapter 2, "Description of the Proposed Action and Alternatives," for USFWS review. The description of the proposed action will incorporate the HCP's description of the permit area, permit term, Covered Species, Covered Activities, and conservation strategy.
- Following USFWS review of EIS Chapters 1 and 2, prepare revised versions of the chapters for USFWS approval.
- Following USFWS approval of EIS Chapters 1 and 2, prepare a First Administrative Draft EIS for USFWS review.

- Address USFWS comments and prepare a Second Administrative Draft EIS for USFWS review including the USFWS Regional office and DOI Solicitor's office as appropriate.
- Address USFWS comments and prepare a Third Administrative Draft EIS (camera ready) for concurrence and approval for publication.
- Submit the Public Draft EIS to the USFWS for distribution and filing with the U.S. Environmental Protection Agency.

The ICF team will obtain data and information to characterize baseline conditions for the resource areas from publicly available data, the HCP, the previous EAHCP EIS, and the results of Tasks 5 and 6. The USFWS will ultimately determine which resources to evaluate in detail and which could be informed by early public engagement; however, based on the previous EIS, ICF's experience with similar NEPA documents, and our knowledge of the EAHCP project, we anticipate analyzing the following resources will be analyzed in detail.

- Air quality and climate
- Geology and soils
- Water resources (surface water and groundwater)
- Biological resources, including Covered Species, non-listed species in the area, and wildlife, aquatic, and vegetation
- Socioeconomics
- Environmental justice
- Land use
- Cultural and historic resources

NEPA project director, project manager, and deputy project manager will lead this task. The NEPA project director will be responsible for strategic planning and senior review, as well as ensuring the ICF NEPA team has the necessary resources to adhere to the project's schedule, scope, and budget. The NEPA project manager will be the primary point of contact with the USFWS for the EIS and overseeing the technical quality of the analyses, document preparation, project status reports, and schedule. The NEPA project manager, with the deputy project manager's assistance, will also be responsible for coordinating subject matter experts from the NEPA project team.

Deliverables

- Draft MOU
- Final MOU for execution
- Draft administrative record protocol
- Draft description of the proposed action and alternatives
- Final description of the proposed action and alternatives
- First Administrative Draft EIS
- Second Administrative Draft EIS
- Third Administrative Draft EIS

- Public Draft EIS

Assumptions

- Meetings between the NEPA team and the USFWS assume a kickoff meeting (virtual) and approximately twice-monthly coordination meetings (virtual) through the duration of the task.
- ICF will prepare a draft and final MOU to outline the roles and responsibilities of EAHCP staff, the USFWS, and the NEPA team for the NEPA process.
- The USFWS will compile and reconcile comments on the first and second administrative drafts from all reviewers in a single document.
- ICF will prepare the Draft EIS in electronic form. No hard copies will be necessary.

3.9 Task 9: ITP Application

3.9.1 Task Description

The HCP team will prepare the ITP application package and all supporting documents for submission to USFWS. EAHCP staff will coordinate with the Implementing Committee for review and sign-off of the application prior to submittal.

The ICF team will use the new online application process provided by the USFWS. This application process is expected to evolve throughout the ITP renewal process as the USFWS aims to create a better integrated approach that initiates at start-up and continues through permitting and project implementation.

The ITP application for the ITP renewal will include the draft Amended HCP, and the online application will address the following information.

- All required reports prepared under the existing valid permit
- A list of Covered Species that will be added or removed as part of the renewal, as applicable
- A description of any changes to Covered Activities and/or conservation activities, as applicable
- A description of the change in location of any proposed Covered Activities, as applicable
- A description of any additional changes or revisions to the ITP and HCP

We acknowledge that given the breadth of the changes being considered to the EAHCP, close coordination with the USFWS will be needed to ensure the ITP application meets all the agency's issuance needs.

Deliverables

- ITP application form for an ESA 10(a)(1)(b) ITP amendment.

Assumptions

- EAHCP staff will coordinate Permittee signatures and application fees.

3.10 Task 10: Public Scoping

3.10.1.1 Task Description

If an EIS is required by the USFWS, public scoping meetings will need to be held by the NEPA team. Up to six public scoping meetings will be needed throughout the Plan Area. The NEPA team will conduct a dry run of the public meeting for the USFWS, EAHCP staff, and Permittees. The NEPA team will be responsible for the following duties, which will be planned and executed in consultation with USFWS.

- Meeting logistics
- Published meeting notifications in newspapers
- Draft Notice of Intent (NOI) content for USFWS to publish in the Federal Register
- Meeting materials (presentations, brochures, fact sheets, display boards, comment forms, and/or sign-in sheets)
- Participation at meetings by up to two NEPA team staff persons
- Collect public comments using various methods (paper forms, electronic, and/or court reporters)
- Summarize public comments and the scoping process in a draft and final public scoping report

Public scoping is a required part of the EIS process that provides the opportunity for the public to be informed about the project and provide input on the scope of issues and alternatives to be considered in the NEPA analysis. Public scoping is required for an EIS; however, it is at the discretion of the USFWS to determine the level of public engagement (e.g., the number of public scoping meetings and their format).

The ICF team's Public Outreach specialists will lead the public scoping task and they will coordinate the task with the NEPA project manager and the USFWS. ICF will prepare a public scoping plan in close coordination with the USFWS to determine the right level of engagement based on stakeholder needs and public sentiment. This plan will include ICF's approach to meetings, preparation of meeting materials, preparation of the NOI for the federal register, and collection and summarization of public comments. This plan will ensure an efficient and effective public scoping process and a consistent message when engaging audiences.

Deliverables

- Attendance at up to six in-person public meetings and one dry run
- Draft Public Scoping Plan
- Final Public Scoping Plan
- Draft newspaper meeting notification
- Final newspaper meeting notification
- Publication in up to eight newspapers
- Draft NOI

- Administrative draft meeting materials as electronic files
- Administrative draft meeting materials for dry run
- Final printed and electronic meeting materials
- Draft scoping report
- Final scoping report

Assumptions

- Scoping meetings will consist of six in-person meetings and one in-person dry-run meeting. ICF will hold the six in-person meetings within 2 consecutive work weeks. Up to two staff persons, 1 based locally and one who may need to travel from out of state, will attend in-person meetings.
- Meetings would occur approximately twice-monthly coordination virtual meetings through the duration of the task.
- Meeting materials will include three drafts: administrative draft meeting materials as electronic files, administrative draft meeting materials for “dry run,” and final printed and electronic meeting materials.
- The scoping report will include two versions: draft and final.

3.11 Task 11: Draft EIS Public Meetings

3.11.1 Task Description

If an EIS is required by the USFWS, the work plan assumes that up to six public meetings will need to be held during the Draft EIS public comment period. The NEPA team will conduct a dry run of the public meeting for the USFWS, EAHCP staff, and Permittees. The NEPA team will be responsible for the following duties, which will be planned and executed in consultation with USFWS:

- Meeting logistics
- Published meeting notifications in newspapers
- Draft Notice of Availability content for USFWS to publish in the Federal Register
- Meeting materials (presentations, brochures, fact sheets, display boards, comment forms, and/or sign-in sheets)
- Participation at meetings by up to two NEPA team staff persons

Public meetings during the NEPA process provide the opportunity for the public to hear directly from the lead federal agency and provide comments on the Draft EIS and HCP. ICF’s proposed approach to the public meeting tasks will follow the same approach as Task 10, Public Scoping. ICF will prepare meeting materials and facilitate meetings. ICF’s public outreach lead will lead the task and coordinate with the NEPA project manager and the USFWS.

The USFWS will make the final decision on the number of meetings on the Draft EIS and whether they will be held in person or virtually. This work plan assumes seven in-person scoping meetings during the public comment period (one dry run and six public meetings).

Deliverables

- Published meeting notifications in newspapers
- Draft Notice of Availability content for USFWS to publish in the Federal Register
- Meeting materials (presentations, brochures, fact sheets, display boards, comment forms, and/or sign-in sheets)
- Participation at meetings by up to two NEPA team staff persons

Assumptions

- Draft EIS public meetings will consist of six in-person meetings and one in-person dry-run meeting. ICF will hold the six in-person meetings within 2 consecutive work weeks. Up to two staff persons, one based locally and one who may need to travel from out of state, will attend in-person meetings.
- Meeting would occur approximately twice-monthly coordination virtual meetings through the duration of the task.
- Meeting materials will include three drafts: administrative draft meeting materials as electronic files, administrative draft meeting materials for “dry run,” and final printed and electronic meeting materials.
- Public comments will be submitted directly to the USFWS. The USFWS will provide ICF with a public comment matrix and all copies of comments received.

3.12 Task 12: Final HCP

3.12.1 Task Description

The HCP team will address any changes to the Draft HCP based on comments received during the public comment period to produce a Final HCP. The HCP team will work closely with the USFWS, and EAHCP staff and Permittees as applicable, to address comments received on the Draft HCP. The HCP team will facilitate a live-edit meeting with the USFWS, EAHCP staff, and the HCP management team. The HCP team will also support USFWS, at their request, in responding to comments on the draft NEPA document. Once responses to comments have been approved by the EAHCP staff, the HCP team will update the Draft HCP as an Administrative Final HCP with appendices for delivery to the EAHCP staff. Once the Implementing Committee approves the document revisions the HCP team will produce a Final HCP for distribution. The HCP team will provide an electronic copy of the Final HCP to EAHCP staff and the USFWS and may be required to produce up to 20 hardcopies of the main report with appendices included as electronic files.

Managing the Final HCP task requires an understanding of (1) how to provide efficient and substantive responses to comments, (2) how to coordinate the response process with the NEPA team as comments on both the HCP and the NEPA documents are received together, and (3) how to adjust the HCP document without triggering recirculation of the public draft files. The HCP management team and technical experts will work closely with the USFWS, EAHCP staff, and Permittees, as applicable, to revise the HCP in response to comments. ICF will also support the USFWS in responding to comments related to the HCP from the draft NEPA document.

The ICF team will use the following approach for responding to comments and creating the Final HCP. The NEPA team will assign HCP-specific comments to the HCP team and provide a format—approved by the USFWS—for numbering and responding to individual comments, grouped comments, or comment subcomponents (see Task 13 for NEPA team responsibilities). Once the comment response document is complete and all reviewers agree on final changes to the HCP, the ICF HCP team will prepare the Final HCP. ICF will hold a screen-check meeting with the USFWS to create the Final HCP (as described below). Both EAHCP staff and the USFWS must approve all proposed changes to the HCP. Once they approve those changes, ICF will produce a Final HCP for publication.

Deliverables

- Response to comments on Draft HCP
- Administrative Final HCP document with appendices
- Final HCP with appendices for electronic distribution
- Up to 20 hardcopies of the Final HCP with electronic appendices for distribution

Assumptions

- ICF will complete and approve revisions to the Final HCP through a live-edit meeting with the USFWS, EAHCP staff, and the HCP management team.

3.13 Task 13: Final NEPA Document

3.13.1 Task Description

The NEPA team will address any changes to the EIS document based on comments received during the public comment period to produce a Final EIS. The NEPA team will perform the necessary steps to develop a Public Final EIS:

- The NEPA team will process public comments received during the public comment period. At the direction of the USFWS, the NEPA team will identify which comments are related to the HCP and provide the comments that require input from EAHCP staff. USFWS will coordinate with EAHCP staff to develop responses to comments related to the HCP, for inclusion in the Final EIS. If needed, the NEPA team and the USFWS will meet with EAHCP staff to discuss the comments and responses. The HCP consultant team may also assist EAHCP staff in providing input for responses to public comments.
- The NEPA team will draft responses to public comments on the Draft EIS (including agency comments) and submit them to the USFWS for review. The NEPA team will make any revisions to the responses based on USFWS review.
- Following the USFWS's approval of response to comments, the NEPA team will prepare the Administrative Final EIS (with appendices) for USFWS review.
- Following USFWS review, the NEPA team will address final USFWS comments and prepare a Final EIS for electronic distribution.

- Once completed, the NEPA team will provide a draft Record of Decision (ROD) document to USFWS.

Deliverables

- Categorized comments received during the comment period on the Draft EIS and HCP
- Response to comments on the Draft EIS and HCP
- Administrative Final EIS document with appendices
- Public Final EIS document with appendices for electronic distribution
- Final electronic administrative record provided to USFWS and, with USFWS's approval, to EAHCP staff
- Draft language for the Record of Decision (ROD)

Assumptions

- Meetings would occur approximately twice-monthly coordination virtual meetings through the duration of the task.
- ICF will prepare the Final EA in electronic form. No hard copies will be necessary.
- ICF will prepare the Administrative Record and the ROD as part of this task.

3.14 Quality Control

ICF's HCP team will directly oversee all HCP tasks to ensure deliverables meet the EAHCP Program Manager's expectations and the USFWS's permit issuance criteria. The HCP team will use the following process throughout the project to ensure high-quality work products that are delivered on schedule and within budget.

- The HCP project manager and HCP project director or program director discuss each task and deliverable with EAHCP staff to establish a mutual understanding of the scope, schedule, and technical expertise that may be needed. For tasks of a more technical nature, the ICF team's technical staff may need to be involved in these early discussions to help refine the scope.
- The HCP project manager and deputy project manager develop an outline of the deliverable. The outline is reviewed by the project director or program director and then provided to EAHCP staff for review.
- EAHCP staff provide comments on the outline, and the HCP project manager and deputy project manager meet with EAHCP staff to resolve comments. The project director or program director may also be involved in this meeting, depending on the nature of the comments to resolve.
- The HCP project manager and HCP deputy project manager communicate to technical experts assignments for the deliverable, including the outline with any additional guidance, writing assignments, and schedule.
- Technical experts draft the content of the deliverable.
- The HCP deputy project manager, lead conservation planner, or QA/QC and senior regulatory advisor review the initial drafts and provide comments back to technical experts, if needed.

Once the first round of internal comments is addressed, the HCP project manager reviews the deliverable and provides comments back to the deputy project manager, lead conservation planner, and/or technical experts to address.

- Once the second round of internal comments is addressed, the HCP project director or program director reviews the deliverable and provides comments back to the project manager and/or technical experts to address.
- Once the third round of internal comments is addressed, the deliverable is provided to the managing editor and designer for final technical edit and format.
- The HCP project manager resolves any comments with the managing editor and submits the deliverable to EAHCP staff and Permittees for review.

A similar process to that described above will also occur for any NEPA deliverables to the USFWS, involving the NEPA project director, NEPA project manager, NEPA deputy project manager, NEPA QA/QC and senior advisor, and subject matter experts.

Chapter 4 Schedule

The ICF team will maintain a detailed project schedule in the project’s document library.

The detailed schedule includes timelines for all tasks and review periods for EAHCP staff, committees, and the USFWS. The schedule also includes the final step in 2027 of review and approval of Inter-Local Agreements with Permittees before implementation of the renewed permit can begin. Figure 4-1 provides a high-level summary schedule, based on the detailed schedule, of the permit renewal process by phase.

The detailed project schedule will be maintained in Microsoft Project throughout the permit renewal process and will be updated periodically. The ICF HCP and NEPA project managers will monitor all factors with potential to cause deviations from the approved schedule. The causes of potential schedule deviations may include changes to the scope of work that are requested by EAHCP Program Manager, factors that affect critical milestones such as granted requests for shortened or extended review periods, or delays in Federal Register publications. Such factors potentially could either shorten or lengthen either the overall schedule, or components within the schedule.

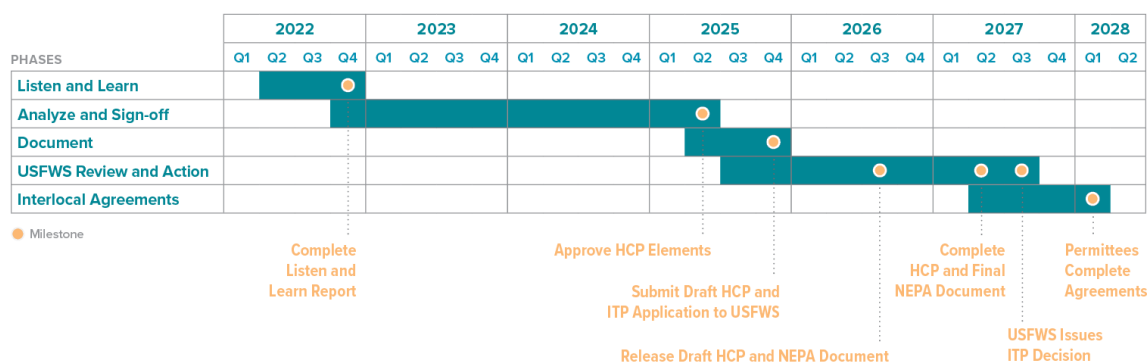
Upon recognition that the need for deviation from the approved schedule is foreseen, the ICF project manager will take the following steps:

1. Identify the proposed deviation from the schedule.
2. Discuss proposed deviation from the schedule with the EAHCP or USFWS staff including rationale, alternative approaches considered, and project implications.
3. EAHCP Program Manager decides whether to accept the proposed schedule deviation.
4. ICF addresses any related scope of work changes that may result from schedule deviations.

Figure 4-1. Permit Renewal Phase Timelines by Quarter

EAHCP ITP Renewal Process

Phases and Milestones, 2022–2028



Chapter 5

Amended EAHCP Outline

Below is a summary outline of the Amended EAHCP. This outline will be updated periodically throughout the permit renewal process, including during Phase 1 and after the completion of Task 5 prior to initiating Phase 3, Documentation.

1. Introduction
 - 1.1. Background
 - 1.2. Permit Area
 - 1.3. Permit Holders and Permit Duration
 - 1.4. Species Proposed for Coverage under the Permit
 - 1.5. Regulatory Framework
 - 1.6. Alternatives Considered during the Development of the HCP
 - 1.7. Public Involvement
2. Covered Activities
 - 2.1. Covered Activities
 - 2.2. Edwards Aquifer Authority
 - 2.3. City of New Braunfels
 - 2.4. City of San Marcos
 - 2.5. Texas State University
 - 2.6. San Antonio Water System
 - 2.7. Texas Parks and Wildlife Department
 - 2.8. Adaptive Management Process
3. Environmental Setting and Baseline Conditions
 - 3.1. Climate
 - 3.2. Aquifer-fed Springs
 - 3.3. Edwards Aquifer
 - 3.4. The Edwards Aquifer, Comal Springs, and San Marcos Springs
 - 3.5. Covered Species
4. Effects Analysis
 - 4.1. Introduction
 - 4.2. Potential Impacts to and Incidental Take of Covered Species
5. Conservation Strategy
 - 5.1. Introduction
 - 5.2. Biological Goals and Objectives
 - 5.3. Minimization and Mitigation Measures
6. Monitoring and Adaptive Management
 - 6.1. Adaptive Management Process
 - 6.2. Monitoring
 - 6.3. Core Adaptive Management Actions
7. Plan Implementation
 - 7.1. Governance
 - 7.2. Permit Amendments
 - 7.3. Annual Reporting

- 7.4. Changed Circumstances
- 7.5. Unforeseen Circumstances
- 8. Costs and Funding
 - 8.1. Cost and Benefit of the EAHCP
 - 8.2. Purpose of Cost Estimate and Annual EAHCP Implementation Budget
 - 8.3. EAHCP Cost Estimate
 - 8.4. Cost Estimate Methodology
 - 8.5. Funding Sources and Assurances
 - 8.6. EAHCP Benefits
- 9. Preparers and Contributors
- 10. Literature Cited
- Appendix A: Abbreviations and Acronyms
- Appendix B: Glossary
- Appendix C: Covered Species
- Appendix D: Habitat Suitability Analysis
- Appendix E: Temperature and Rainfall Scenarios Report
- Appendix F: Recharge Rates, Pumping Scenarios, and MODFLOW Springflow Projections Report