

## HCP § 6.3.1 – 2016 BIOLOGICAL MONITORING WORK PLAN

**Introduction/Overview:** Since 2000, the Edwards Aquifer Authority (EAA) has conducted an extensive biological monitoring program in the Comal and San Marcos spring systems. This program was referred to as the Variable Flow Study<sup>1</sup> (VFS). The elements of this study have now been incorporated into the Edwards Aquifer Habitat Conservation Plan (EAHCP) as the Biological Monitoring Program (BioMP) (EAHCP § 6.3.1).

The EAA developed the VFS in collaboration with a Technical Advisory Group consisting of resource specialists/scientists from multiple entities and with input from other natural resource professionals from the Texas Parks and Wildlife Department (TPWD), United States Fish and Wildlife Service's (FWS) Austin Ecological Services and National Fish Hatchery and Technical Center, and scientists from the Edwards Aquifer Research and Data Center, and Texas State University (*see* BIO-WEST, "Variable Flow Study: Seven Years of Monitoring and Applied Research," 2007). The VFS consisted of a comprehensive sampling program conducted in the spring, summer, fall, and winter.<sup>2</sup> *Id.* The VFS also included a Critical Period component for both the Comal and San Marcos systems based on established trigger levels (including high and low flows) for each. *Id.* The Critical Period component essentially mirrors efforts made during Comprehensive Sampling Plan except at a greater frequency triggered by low flows. *Id.*

During the development of the EAHCP, additional components were added to the VFS in 2013, creating the BioMP. The additional components were developed through discussions between scientists involved with the EARIP process including Thom Hardy, Ed Oborny and scientists from Texas State University, Baylor University, TPWD, San Antonio Water System, and the FWS.

The BioMP includes: (1) Comprehensive Sampling, (2) any triggered Critical Period monitoring, (3) any high flow triggered monitoring (4) and any EAHCP-specific sampling required by Section 6.4.

**Long-term Objective:** The EAHCP establishes that the purpose of the BioMP is "to monitor changes to habitat availability and population abundance of the Covered Species that may result from Covered Activities" (EAHCP § 6.3.1). Another benefit of the BioMP is to collect data that can be used in the applied environmental research studies (EAHCP § 6.3.4) and

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<sup>1</sup> EAA, "The Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the Comal and San Marcos Springs Aquatic Ecosystems," 2000.

<sup>2</sup> In 2003, the winter sampling was eliminated from the Comprehensive Plan. In 2005, the Comprehensive Sampling Program was amended. The spring and fall events remained the same. During the summer, the Comprehensive Sampling Program included only Texas wild-rice annual mapping, dip net sampling for fountain darter, and parasite evaluations.

provide data and information for the ecological model development described in EAHCP § 6.3.3.

The BioMP will be conducted according to established, standard operating procedures to assure consistent data collection and quality (**The link will be inserted here by March 19th**).

**Assumptions:** It is assumed that the 2015 biological monitoring has been completed. In addition, it is assumed that the contractor will coordinate all monitoring activities with the implementation of any Conservation Measures.

**HCP Science Committee:** The BioMP methodologies and scope of work was previously reviewed and slightly modified by the Science Committee.

**Target for 2016:** Following renewal of the contract, the contractor will implement the BioMP for the San Marcos and Comal spring systems.

**Elements of the 2016 Biological Monitoring Program:** The BioMP consists of a Comprehensive Sampling Program that will be conducted in the fall and spring of 2016. During the summer, the only elements of the Comprehensive Sampling program that will be conducted are Texas wild-rice mapping, dip netting for fountain darters, and parasite evaluations. The 2016 Comprehensive Sampling Program will consist of the following elements:

- **Aquatic Vegetation Mapping, Including Texas Wild-Rice**
  - Full system aquatic vegetation mapping occurred in 2013 and will not occur again until 2018; therefore, it is not included in this Work Plan.
- **Annual Texas Wild-Rice Mapping**
- **Fountain Darter Sampling:**
  - In addition, the City of New Braunfels will monitor for gill parasites as part of the requirements in EAHCP § 5.2.6. The monitoring program will evaluate cercarial concentrations in multiple areas along the Comal River on a semiannual basis and more frequently when springflow drops below 150 cfs (EAHCP § 6.3.6).
- **Comal Springs Invertebrate Sampling (Comal Springs riffle beetle, Peck's Cave amphipod and Comal Springs dryopid beetle)**
- **Salamander Visual Observations**
- **Comal Springs Discharge Measurements**
  - To supplement USGS discharge sampling Comal Springs discharge measurements will be conducted spring and fall at Spring Runs 1, 2, and 3, Upper Spring Run reach, and the Old Channel below Elizabeth Street. The measurements will be used to establish the contributions of each major spring run to total discharge in the Comal River and to establish the relative proportion of water flowing in the Old and New Channels.

- **Water Quality Sampling**
  - For the details of the water quality monitoring program see, EAHCP, “Work Plan: Water Quality Monitoring Program Strategy for Comal Springs and San Marcos Springs for 2016” ([http://www.eahcp.org/files/admin-records/NEPA-and-HCP/2016\\_Water\\_Quality\\_Monitoring\\_Work\\_Plan.pdf](http://www.eahcp.org/files/admin-records/NEPA-and-HCP/2016_Water_Quality_Monitoring_Work_Plan.pdf))
- **Fixed Station Photography**
- **Flow Partitioning within Landa Lake:**
  - Flow partitioning will be monitored within Landa Lake during each Comprehensive Sampling event.
  - An Acoustic Doppler profiler or similar device will be used to measure the flow patterns and current velocities from Spring Island through the upper portion of Landa Lake will be measured concurrently with BioMP discharge measurements at Comal Springs.
- **Macroinvertebrate Food Source Monitoring**
- **Edwards Aquifer Diving Beetle and Texas Troglotic Water Slater**
- **Fish Community Sampling For Native Fish**
- **Reporting**
  - EAA will require its contractor to submit monthly progress reports to EAA describing the contractor’s activities conducted during the previous month.
  - The contractor will be required to submit a draft annual report no later than December 31, 2016, that provides all of the sampling activities conducted for the year period and an evaluation of the results of those activities, and a cumulative evaluation of the data collected since 2000 for the BioMP and its predecessor VFS program.
  - The contractor will be required to evaluate the effects of any ongoing Conservation measures on the results of the monitoring program.
  - Sufficient tables, graphs, and exhibits will be provided in the text to clearly indicate what data was collected, the location, and the analytical data.
  - As an appendix to the written report, copies of completed field logbooks and copies of the raw data sheets for all water chemistry and biological sampling will be included.

**Elements of the Critical Period and EAHCP Components of the BioMP:** Critical Period and EAHCP Components of the BioMP will be conducted according to the established, standard operating procedures. It is likely that some of the sampling dates of the three components of the BioMP will coincide with each other during low flow periods. Efforts will be made to coordinate sampling events when they are closely-related temporally to prevent duplicative sampling events.

### **Incidental Take Permit: Permit Conditions, Habitat Baseline, and Take Estimation**

- Section 11.H of the Incidental Take Permit (ITP) sets out the terms and conditions and incidental take protection provided for each covered species over the 15-year term of the permit.
- The ITP requires the permittees to document compliance with the ITP. To quantify the amount of take per species, the USFWS allows the use of habitat as a surrogate for population number.
- The Incidental Take Permit: Permit Conditions, Habitat Baseline, and Take Estimation methodology and results for will be conducted according to the standard method agreed upon with USFWS in 2014 and presented to the Science Committee and the Implementing committees ([http://www.eahcp.org/files/admin-records/NEPA-and-HCP/BW\\_2014\\_ItemM\\_Incidental\\_Take\\_memo\\_1.pdf](http://www.eahcp.org/files/admin-records/NEPA-and-HCP/BW_2014_ItemM_Incidental_Take_memo_1.pdf)).

### **Budget for Implementing 2016 BioMP:**

<i>Table 7.1</i>	<i>\$400,000</i>
<b><i>2016 Work Plan</i></b>	<b><i>\$417,029</i></b>

The breakdown of the budget estimate for the comprehensive biological monitoring program for Comal and San Marcos Springs ecosystems is found in Attachment 1. The BioMP budgeted amount for Comprehensive Sampling and EAHCP Ch. 6 drought triggered monitoring for the Comal and San Marcos systems is \$417,029. The cost of any Critical Period component of the BioMP, as established by the former EAA Variable Flow Study will continue to be paid by the EAA.

Attachment 1 **Confirm with Chris**BUDGET ESTIMATE FOR A COMPREHENSIVE BIOLOGICAL MONITORING PROGRAM  
FOR COMAL AND SAN MARCOS SPRINGS ECOSYSTEMS

<u>TASK</u>	<u>ESTIMATED</u>
<u>COST</u> COMPREHENSIVE SAMPLING PROGRAM	
Task 1. Literature Review	\$ 0
Task 2. Aquatic Vegetation Mapping	\$ 56,833.
Task 3. Texas wild-rice Mapping	\$ 14,513.
Task 4. Fountain Darter Sampling	\$ 82,837.
Task 5. Comal Springs Invertebrate Sampling	\$ 47,582.
Task 6. Salamander Visual Observations	\$ 23,683.
Task 7. Comal Springs Discharge Measurements	\$ 4,539.
Task 8. Water Quality Sampling	\$ 4,190.
Task 9. Fixed Station Photography	\$ 2,154.
Task 10. Flow Partitioning in Landa Lake	\$ 18,679.
Task 11. Macroinvertebrate Food Source Monitoring	\$ 68,754.
Task 12. Fish Community Sampling	\$ 59,613.
Task 13. EAHCP Habitat Baseline and Disturbance	\$ 14,822.
Task 14. Annual "Take" Estimation	<u>\$ 18,830.</u>
Comprehensive Subtotal	<u>\$417,029.</u>
CRITICAL PERIOD SAMPLING PROGRAM	
Task 15. High/Low Flow Monitoring	\$217,384.
Task 16. EAHCP Low Flow Sampling Program	<u>\$108,693.</u>
Critical Period Subtotal	<u>\$326,077.</u>
<b>2016 TOTAL PROJECT TOTAL</b>	<b><u>\$743,106.</u></b>