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TECHNICAL SUPPORT PROPOSAL
EDWARDS AQUIFER RECOVERY IMPLEMENTAION PLANNING
FY 2009

TITLE: Technical Support for Biological Model Development in Preparation for Endangered Species Take, Jeopardy, and Recovery Analyses for Edwards Aquifer Recovery Implementation Planning

INVESTIGATORS:

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PURPOSE OF THIS PROJECT:

The U.S. Geological Survey (USGS) will provide technical assistance to the U.S. Fish and Wildlife Service (Service), the Edwards Aquifer Recovery Implementation Planning program (EARIP) and their contractors, in modeling the population responses and extinction risks of federally-listed species posed by water use and other factors in the Edwards Aquifer. The principal focus in FY 2009 will be collaboration with the team of scientists led by Dr. Thomas Hardy in their assessment of biological impacts of different flow regimes and other factors on three federally-listed species. USGS will participate in meetings, informal work sessions, and other discussions to contribute expertise in model development and applications that directly support the analysis of take, jeopardy, and recovery under the U.S. Endangered Species Act (ESA). USGS's core objective is to ensure that any models and decision-aiding tools and approaches that are developed will be useful to the Service and EARIP in developing habitat conservation and recovery plans, including conducting required regulatory analyses.

PROJECT BACKGROUND:

The Edwards Aquifer is one of the most prolific artesian aquifers in the world. Located on the eastern edge of the Edwards Plateau in Texas, it directly serves about two million people while supporting seven federally-listed endemic species— three invertebrates, two salamanders, a fish and a plant. Numerous activities are underway to plan for both continued water use and persistence of these ESA-protected species and their habitats.

The EARIP, a voluntary, long-term (15-50 year), multi-stakeholder initiative that seeks to balance water use and development with the recovery of federally-listed species, is overseeing

most of these activities. A successful outcome of the EARIP will be a Habitat Conservation Plan (HCP), permitted through Section 10 of the ESA, providing for incidental take of listed species associated with water development and other management activities. If an HCP is prepared, the Service will need to complete a biological opinion assessing whether proposed activities would jeopardize ESA-protected species. Anticipating this requirement and to support the EARIP process, the Service has agreed to re-evaluate previous take and jeopardy determinations based on spring water flows, using the latest scientific information. The Service is working closely with the EARIP and its technical advisors with the goal of developing plans that avoid jeopardy and promote recovery of listed species in conjunction with meeting water use needs; thus the impacts of variable spring flows, water uses, and other factors on species extinction risks need to be evaluated before the HCP is formally prepared. The USGS seeks to provide technical assistance in modeling extinction risks to support the Service's regulatory analyses.

In addition to these ESA-directed activities, the Texas Legislature has mandated certain actions for the EARIP process including preparation of a Critical Period Management Plan (CPMP) for water use and determination of new water removal caps. The EARIP process will include recommending groundwater pumping limits during spring flow drought for the CPMP. The Service, in turn, has agreed to analyze the potential impacts of the new water caps on listed species as part of the jeopardy analysis after it receives the final HCP. The Service would like to use structured decision making to assist the EARIP develop the CPMP through transparent and rigorous evaluation of the tradeoffs between water use and species impacts. In the long-term, the EARIP may also want to use structured decision making to develop its HCP and prioritize research and recovery efforts in light of water development activities.

As a first step in these evaluations, the EARIP plans to contract with Utah State University and a team of scientists led by Dr. Thomas Hardy to apply and further develop existing predictive models to assess the biological impacts of different flow regimes and other factors on three federally-listed species, Texas Wild Rice (San Marcos Springs), Comal Springs riffle beetle (Comal Springs) and the fountain darter (Comal and San Marcos Springs). In order to derive the most benefits from this modeling work, the EARIP and the Service have requested that the USGS collaborate with the Utah State University contractors.

ACTIVITIES AND LEVEL OF EFFORT:

1) Proposed Activities:
    a. Collaborate with the team led by Dr. Thomas Hardy, and the Biological Modeling Work Group of the EARIP, to maximize the extent to which their biological and river system models will be able to provide species-specific extinction risk estimates correlated directly with management action alternatives, which will be needed by the Service to make decisions in compliance with the ESA. In particular, USGS will participate in the development of conceptual models and the subsequent analytical design (e.g., how to use the models once they are ready), to evaluate impacts of water flow and possible other factors such as non-

native species, water quality, and recreational use on listed species populations. The Hardy modeling team will be working under a separate contract to evaluate the effects of flow regimes on the ecological status of the Comal and San Marcos River systems in support of Critical Period Management Plan development (other collaborators include Texas State University, Texas Parks and Wildlife, EAA/SARA, Bio-West, Inc., and Texas A&M University).

b. Work in close collaboration with the U.S. Fish and Wildlife Service Regional Office in Albuquerque and Austin Ecological Services Field Office to help determine the preferred analytical framework and modeling requirements for completing take, jeopardy, and recovery analysis and how to coordinate these needs with other EARIP activities including Dr. Hardy's CPMP-related modeling.
c. As opportunities arise, also provide technical assistance to structured decision making efforts initiated by the EARIP or the Service, in particular contributing expertise in connecting multiple-objective decision making with ESA regulatory frameworks and risk modeling.

2) Proposed Effort:
   a. Participate in technical working sessions and meetings (between 8 and 11 meetings in Texas, approximately 300 hours).
   b. Additional review and discussion (approximately 220 hours).

PROJECT DURATION: 10/01/2008 through 09/30/2009

PRODUCTS AND SCHEDULE:
09/30/2009 Report on collaborative activities with recommendations for subsequent analyses

BUDGET:

Salaries	$	60,000
Travel & Vehicles	$	25,500
Supplies & Materials	$	-
Instruments	$	-
Total	**$**	**85,500**
In-Kind Contribution		
Salary	**$**	**5,600**