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John Roberts
Executive Director
The Natomas Basin Conservancy
2150 River Plaza Drive, Suite 460
Sacramento, CA 95833

Subject: Summary of Process and Progress toward Revision of the Biological Effectiveness Monitoring Program (BEMP)

Introduction

The Biological Effectiveness Monitoring Program (BEMP) document describes in detail exactly what monitoring tasks will be performed. Preparation of the document is required by the Natomas Basin and Metro Airpark Habitat Conservation plans (HCPs), and the document must be approved by Wildlife Agencies (U.S. Fish and Wildlife Service and California Department of Fish and Wildlife). Biological monitoring is a requirement of the federal Endangered Species Act. As described in the USFWS Five-Point Policy, "the monitoring program should reflect the measurable biological goals and objectives" of the HCP.

The BEMP document describes explicitly what will be monitored, how it will be monitored, and - to a certain extent - how the data will be analyzed. It provides specific guidance so that the monitoring program can be replicated independently by entities with no previous experience with the BEMP. When TNBC issues a request for proposals (RFP) to conduct the biological effectiveness monitoring, the BEMP is the document prospective bidders use to determine what tasks they need to include in their bid.

However, the first RFP to conduct comprehensive biological effectiveness monitoring directed prospective bidders to design a monitoring program that complied with all the requirements and directives in the NBHCP. This was accomplished and the BEMP was approved by the Wildlife Agencies in 2006. The BEMP document was updated in 2009, primarily to accommodate addition land acquisitions, and some aspects of the Giant gartersnake protocols were revised in 2010.

Implementation of the BEMP has been very successful, resulting in the following accomplishments.

- Prevention of the establishment of several highly invasive noxious weeds that threatened habitat values in habitats that were created at great expense.
- Improvements in design and management of created habitats.

- Documented changes in the distribution and abundance of critical habitats throughout the Plan Area
- Documented the natural range of variation in the distribution and abundance of the nesting population of Swainson's hawk, and their reproductive parameters
- Documentation of the natural range of variation in many of the demographic parameters of giant gartersnake populations
- Documentation of the distribution and abundance of other covered species in the Basin.

As a result – at least in part - of over a decade of successful biological effectiveness monitoring, the state of knowledge of the life history requirements of covered species has advanced, and considerably more is now known about the ecology, distribution, abundance, threats, and responses to management of the covered species than was known at the time the NBHCP was written and when the BEMP was first designed. In addition, the scientific methods used to conduct and analyze some aspects of monitoring have improved.

Therefore, TNBC has undertaken the process of revising the BEMP with the objectives of creating greater efficiency, strengthening the ties between monitoring and management (i.e. improving the adaptive management process), and reducing costs.

Process

ICF identified the following process to be followed in updating and revising the BEMP.

Review and identify the goals, objectives, and directives related to the BEMP in the HCPs

This task has now been completed.

Identify those goals, objectives, and directives that have been met or no longer make sense and document how and when they were met or why they are no longer are viable.

This task has now been completed. Among the task that have been completed or no longer make sense include the following:

- **Monitoring on non-reserve lands**. The idea behind this directive in the HCPs was to see if management on reserve lands was effective in increasing populations of covered species relative to non-reserve lands. However, access to non-reserve lands is limited, finding non-reserve lands that match with reserve lands in other uncontrolled characteristics is extremely difficult, and populations of covered species in most cases are too small to make valid comparisons. These and other factors suggest that monitoring on non-reserve lands is more costly than can be justified by the information gained.

- **Monitoring year around on agricultural lands**. Based on the information we now have on the distribution and abundance of other covered species (species other than Swainson's hawk and giant gartersnake) during certain seasons on reserve lands, some of this effort can be reduced without loss of much additional information
- **Documenting the distribution and abundance of noxious weeds on agricultural lands**. Based on results to date, noxious weed monitoring on agricultural reserve lands can be removed from the monitoring program without loss of vital information.

Explicitly define remaining goals and objectives where needed to remove ambiguity and facilitate revision and improvement of the monitoring program.

This task is ongoing. Recommendations are being developed for the consideration of the Executive Director, the Board, and the Wildlife Agencies.

Develop preliminary conceptual models for covered species

Conceptual models – as used here - are either quantitative or qualitative graphical or narrative models that describe an ecological system and are designed to be management-oriented tools. As such, they should link the conservation plan goals/objectives to causes of change in covered species habitats and/or populations and to management activities.

Conceptual models are being developed to identify and prioritize gaps in our knowledge of factors affecting covered species and management uncertainties that could potentially be addressed by the monitoring program and will thus facilitate the adaptive management process. Preliminary draft conceptual models have been developed for the giant gartersnake and burrowing owl.

Develop monitoring options based on the goals/objectives and conceptual models defined in steps 1-5.

We are in the process of preparing monitoring options, and are particularly focused on giant gartersnake. We have a preliminary list of questions that should be answered by the giant gartersnake monitoring effort, including

1. **What criteria are used to determine conservation is NOT working or the conservation program needs to be changed?** We established thresholds in the original BEMP based upon information provided in the effects analysis of the HCPs and on the small number of GGS that are captured in the Fisherman's Lake Reserve area. We now have more information on which to base such a threshold, and are looking at population projection models to determine criteria using the information we have collected on GGS demographic rates.
2. **At what threshold do you change management or initiate further evaluation?** This is also being explored using the data collected to date.

We are considering a range of monitoring options, particularly with respect to giant gartersnake, including the following:

1. Continue with 5 demographic monitoring sites and occupancy monitoring
2. Demographic monitoring with no occupancy monitoring
3. Occupancy monitoring with no demographic monitoring
4. Reducing the number of demographic monitoring sites
5. Conduct demographic monitoring for a 5-year period with 5-year breaks between monitoring sessions.

We are also considering the re-allocation of some of the funds saved from reductions in the monitoring program to directed studies to answer specific and relevant management questions. A preliminary list of possible study questions has already been prepared.

Prepare a summary of the process to date that includes the steps taken in the process, outcomes of those steps, and justification for options selected. This document will be used in meetings with Board members and/or TAC members and/or Wildlife Agency representatives.

A preliminary draft of this document has been prepared and - as work progresses on the BEMP revision process – the summary document is updated.

Table 1. Cost Estimate for Revising the NBHCP Biological Effectiveness Monitoring Program and Document.

	Consulting Staff					Subcontractor						
Employee Name	Leslie D	Giffen T	Saelee S	Schiff D		Brian Halstead	Michael Casazza	Jim Estep				
Project Role	Project Manager	Editor	Graphic Artis	GIS Specialist		USGS Senior Scientist	USGS Senior Scientist	Senior Scientist				
Task *Labor Classification*	Sr Consult III	Assoc Consult I	Sr Consult I	Assoc Consult III	Subtotal				Subtotal	Labor Total	Direct Expenses	Total Price
Task 1. Project Management	6				$900				$0	$900		
					$0				$0	$0		
Task 2. Review and identify goals/objectives of the NBHCP	8				$1,200				$0	$1,200		
					$0				$0	$0		
Task 3. Identify goals that have been met	4				$600				$0	$600		
					$0				$0	$0		
Task 4. Explicitly define those goals/objectives, remove ambig	8				$1,200	$1,000	$500	$500	$2,000	$3,200		
					$0				$0	$0		
Task 5. Develop preliminary conceptual models	24				$3,600	$1,250	$1,250	$1,000	$3,500	$7,100		
					$0				$0	$0		
Task 6. Develop monitoring options	24				$3,600	$1,000	$1,000	$1,000	$3,000	$6,600		
					$0				$0	$0		
Task 7. Prepare a summary of the process	16	6			$3,090				$0	$3,090		
					$0				$0	$0		
Task 8. Prepare a draft of the revised BEMP Document	44	36	16	20	$15,060	$500			$500	$15,560		
					$0				$0	$0		
Task 9. Prepare a presentation on revisions to the BEMP	8				$1,200	$500			$500	$1,700		
					$0				$0	$0		
Task 10. Participate in Meetings	8				$1,200	$1,000		$1,000	$2,000	$3,200		
					$0				$0	$0		
Task 11. Prepare the Final BEMP document	8	16	4	8	$4,480				$0	$4,480		
					$0				$0	$0		
Total hours	158	58	20	28								
ICF E&P 2015 Billing Rates	$150	$115	$120	$120								
Subtotals	$23,700	$6,670	$2,400	$3,360	$36,130	$5,250	$2,750	$3,500	$11,500	$47,630		
Direct Expenses												
523.02 Reproductions											$600	
Mark up on all non-labor costs and subcontractors:	4%										$484	
Direct expense subtotal											$1,084	
Total price												$48,714