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MEMORANDUM

DATE: March 26, 2010

TO: SEP-HCP Biological Advisory Team and Citizens Advisory Committee

Cc: Andy Winter (Bexar County)

FROM: Clifton Ladd (Loomis Partners, Inc.)
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SUBJECT: Factors to consider for inclusion of aquatic species in SEP-HCP

Introduction. The Biological Advisory Team (BAT) provisionally recommended 24 species for inclusion in the SEP-HCP at its meeting on February 22, 2010. The categories for inclusion and the number of species in each are as follows:

1) Covered Species (5 species) - Species for which incidental take authorization will be obtained upon permit issuance.

2) Future Covered Species (6 species) - Species that will be addressed in the SEP-HCP as if they were a Covered Species in anticipation of future listings or non-jeopardy determinations, but for which incidental take authorization may not be immediately available. (Anticipates the future use of a minor permit amendment to authorize incidental take for these species.)

3) Voluntarily Conserved Species (4 species) - Species for which incidental take coverage will not be sought, but for which conservation measures would be implemented to ensure a non-jeopardy determination or beneficial NEPA analysis (particularly for currently listed species that are not included as a "Covered Species")

4) Additional Species (10 species) - The list of other species that would benefit from the conservation actions implemented for species in categories 1, 2, and 3, but for which no specific conservation measures would be included.

5) Species Considered but Not Included (65 species) - Species considered by the BAT, but not recommended for inclusion in the SEP-HCP.

The provisionally adopted species list for the SEP-HCP does not include any of the 42 aquatic species that are identified by the Texas Parks and Wildlife Department County Lists of Rare Species for the counties included in the SEP-HCP Plan Area. These aquatic species include 7 salamanders, 5 crustaceans, 8 fishes, 11 insects, 10 freshwater mussels, and 1 turtle (see attached list). Four of these species are currently listed as endangered and are known only to occur in Comal County. Another 13 of these species have been petitioned for federal listing.

The BAT asked for additional information that should be considered with respect to aquatic species in deciding how those species should be addressed under the SEP-HCP. This memo reviews the major factors that we recommend for consideration.

Legal Considerations. The Endangered Species Act (ESA) requires that species covered by an incidental take permit (as in Categories 1 and 2 above) be evaluated with a detailed analysis in the Habitat Conservation Plan (HCP). To obtain incidental take coverage for a species:

- There must be sufficient information to: 1) perform a quantitative take and impacts analysis that clearly relates a proposed activity (such as construction of a new subdivision) to the "take" of protected individuals and describes the direct, indirect, and cumulative impacts of that take on the protected species; and 2) design effective conservation actions with measurable benefits that would avoid, minimize, or mitigate for the impacts of the take.
- Conservation actions proposed in the HCP for the covered species must be practicable to implement.
- The requested incidental take must not jeopardize the survival and recovery of a listed species in the wild.

In addition to the ESA, state law governs how political subdivisions of the state can obtain an ESA Section 10(a) permit and specifically addresses the species that can be included in a HCP. Texas Parks and Wildlife Code Chapter 83 Section 83.011(2) defines "endangered species" as a species listed by the United States Department of the Interior as endangered or threatened under the federal act. Section 83.015(a) requires that a regional HCP, including any mitigation fee, shall be based on the amount of harm to endangered species protected by the plan. Section 83.011(8) defines "harm" for purposes of state law, as meaning significant habitat modification or degradation that, by significantly impairing essential behavioral patterns, including breeding, feeding, sheltering, or migrating, is the proximate cause of: (A) the death of a member of an endangered species; or (B) the physical injury of a member of an endangered species. The effect of these two sections potentially limits an HCP's authority to include non-federally listed species (i.e., the SEP-HCP may not be able to require participants to provide mitigation for species that are not listed as endangered or threatened; a finding and quantification of actual death or physical injury of a species would be required to satisfy the legal definition of "harm" under state law). Additional legal consultation on this matter is advisable if the SEP-HCP seeks to cover any species that are not federally listed.

Biological Considerations. To meet the legal standard for incidental take authorization under the ESA, sufficient information about the biology, life history, habitat requirements, and responses to threats and management actions must be known to complete the take and impact analysis and design the conservation program. For most of the aquatic species being considered, very little biological information is known and even basic questions about the species' life histories and habitat requirements remain unanswered.

Compounding the problems associated with the limited amount of basic biological information is the nature of the threats to these species. Water quality degradation is a major concern for many of the aquatic species under consideration. Land development activities (such as those that will likely be covered by the SEP-HCP) can affect the habitats of aquatic species by degrading water quality. However, many of these effects are indirect (i.e., water discharging at a spring may have entered the aquifer many miles away) and may not be detectible or biologically significant except at a cumulative level. Much more research is needed for most, if not all, of the aquatic species being considered before clear connections can be made between specific land development activities, take of protected individuals, and overall impacts to protected species.

In order to establish the connections between harmful activities and take of the species, answers to specific research questions would be necessary. For example, what is the area of impact for each spring? Maps of the drainage basins of each spring that is occupied would be needed (at least to the level of a detailed hydrogeologic literature review), and would more likely require field work to determine sources of water for each spring (e.g. dye tracing, potentiometric surface mapping,

aquifer tests, dry and wet season water budget analysis). Another question is how much water is necessary to flow from the spring for survival of the species? We would need to provide minimum springflows, descriptions of drought and flood regimes, and plans for how to balance those requirements with water users in the drainage basins. This would entail at a minimum laboratory experiments with the species and possibly require some years of field data acquisition and analysis to determine the threshold flow levels that start causing harm to the species. Water quality questions include how much aberration from normal silt levels, contaminants, temperature, dissolved oxygen, etc., can be tolerated by the species and exactly what type of human activities cause those levels.

Practical Considerations. There are several practical issues to consider when determining whether or how to address aquatic species in the SEP-HCP, including:

- Scope of the Grant -- The scope of the federal grant that is funding development of the SEP-HCP did not anticipate addressing aquatic species. The objective of the SEP-HCP project, as specified in the grant, is to "…develop a comprehensive HCP and associated NEPA documentation over the next three years (2009-2011) for effective conservation of covered terrestrial species in Bexar County and Golden-cheeked Warbler Recovery Unit 6 (proposed unit 5)." The existing budget and schedule for the project does not provide for the detailed analysis of take and impacts or the formation of robust conservation activities for aquatic species.
- Multiple Jurisdictions and Authorities for Regulating Water – Water quality and quantity within the proposed SEP-HCP Plan Area is regulated to some extent and with differing powers or authorities by municipalities, county governments, state agencies, and the federal government. This complicated regulatory environment could make implementation of a comprehensive set of robust water quality protections for reducing or eliminating threats to aquatic species across the Plan Area very difficult to achieve and enforce (particularly for non-listed species).
- Need for and Use of Stronger Water Quality Measures – Most of the aquatic species under consideration are not currently listed as endangered or threatened, and none are even currently candidates for such listing. Therefore, these non-listed species currently have no regulatory protections under the Endangered Species Act and there is no certainty that they will become listed in the future (although, some new listings are likely during the next few decades). Furthermore, it has not been clearly established that land development activities in other counties causes take of endangered aquatic species in Comal County, and this lack of a clear relationship would also generally apply to the indirect or cumulative nature of most water quality impacts on the other aquatic species. Therefore, it is not clear that there is an urgent need for stronger water quality protections for aquatic species in the Plan Area (at least in the short term), which could lead to very little use of any voluntary measures proposed as part of the SEP-HCP. For example, the Texas Commission on Environmental Quality promulgates "Optional Enhanced Measures" under its Edwards Aquifer Rules that are more protective than the required rules and are designed to be "no take" guidelines for certain aquifer-dependant or karst-dependent endangered species in Williamson, Travis, and Hays counties. However, these guidelines have not been widely used and only apply to projects that are more than 1 mile from a spring or cave location. Therefore, it may not be cost effective to develop voluntary no-take guidelines for aquatic species in the Plan Area until there is a more established need for them.

Alternatives for Inclusion. Given the constraints discussed above, the most practical alternatives for addressing aquatic species in the SEP-HCP might be to include them as Category 3 or Category 4 species.

Category 3 Inclusion: Develop one or more sets of voluntary "no take" guidelines for aquatic species in the Plan Area, similar to the Optional Enhanced Measures currently administered by the TCEQ. (See "Edwards Aquifer Technical Guidance Manual - RG-348; http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-348/rg-348a.html).

The TCEQ's Optional Enhanced Measures detail best management practices for compliance with the agency's Edwards Aquifer Rules that also avoid water quality impacts to certain aquatic species and karst habitats in Williamson, Travis, and Hays counties. The USFWS concurred that implementation of these voluntary water quality measures "will protect endangered and candidate species form impacts due to water quality degradation." The voluntary measures, if fully implemented by a project proponent, would result in "no take" of the species addressed by the measures due to water quality impacts.

Adaptation or expansion of the current TCEQ no take guidelines to address the species and localities in the SEP-HCP Plan Area would require the development of a set of best management practices or other conservation measures that would be designed to ensure that a land development project would not affect the targeted aquatic species by way of water quality impacts. A detailed analysis would be needed to demonstrate that the proposed guidelines, if properly implemented, would avoid water quality impacts to each of the aquatic species to be covered by the guidelines. Close coordination with stakeholders, species and engineering experts, local jurisdictions, TCEQ, and the USFWS would be required. More than one set of guidelines may need to be developed to address different sets of species (i.e., surface water species vs. karst/spring outlet species) or land development activities.

We also expect that crafting a set of voluntary measures to protect aquatic species in the Plan Area from water quality impacts would require a comprehensive review, and likely revision, of a number of state and local water quality regulations in order to be able to implement innovative and practicable water quality protection measures that would help attain a no take water quality standard.

Development of "no take" guidelines for aquatic species is beyond the current scope of the SEP-HCP grant, and would require additional funding to implement. We roughly estimate that creation of no take guidelines for the aquatic species would require approximately 18 to 36 months and approximately $200,000 or more of additional funding.

Category 4 Inclusion: We would expect to achieve some water quality benefits by the protection of large tracts of open space for the covered species. Depending on where these preserves are ultimately located and the resources protected within them, the benefit to aquatic species could vary from negligible to major. As a Category 4 species, the SEP-HCP would make an effort to catalog any incidental benefits of the SEP-HCP's conservation actions on the included aquatic species. Such efforts could include identifying aquatic habitats on preserve lands as part of the preserve baseline assessments, occasionally monitoring such features for the presence of Category 4 aquatic species; addressing management of aquatic habitats and species in preserve management plans, and similar activities.

Including the aquatic species in the SEP-HCP in Category 4 would be within the current scope of the SEP-HCP grant and would not require additional time or funds.

Aquatic species in Bexar, Blanco, Comal, Kendall, Kerr, and Medina counties (from TPWD Rare Species Lists; downloaded Dec 30, 2009)

Taxon	Common Name	Scientific Name	Federal Status	State Status	Petitioned	Bexar	Medina	Bandera	Kerr	Kendall	Comal	Blanco	Description
AMPHIBIANS	Cascade Caverns salamander	Eurycea latitans complex		T		x		x	x	x	x		endemic; subaquatic; springs and caves in Medina River, Guadalupe River, and Cibolo Creek watersheds within Edwards Aquifer area
AMPHIBIANS	Texas salamander	Eurycea neotenes			P	x				x			endemic; troglobitic; springs, seeps, cave streams, and creek headwaters; often hides under rocks and leaves in water; restricted to Helotes and Leon Creek drainages
AMPHIBIANS	Blanco River springs salamander	Eurycea pterophila								x		x	subaquatic; springs and caves in the Blanco River drainage
AMPHIBIANS	Edwards Plateau spring salamanders	Eurycea sp 7									x		endemic; springs and waters of some caves of this region
AMPHIBIANS	Comal Springs salamander	Eurycea sp 8									x		endemic; Comal Springs
AMPHIBIANS	Comal blind salamander	Eurycea tridentifera		T	P	x				x	x		endemic; semi-troglobitic; found in springs and waters of caves
AMPHIBIANS	Valdina Farms sinkhole salamander	Eurycea troglodytes complex					x	x	x				isolated, intermittent pools of a subterranean streams and sinkhole in Nueces, Frio, Guadalupe, and Pedernales watersheds within Edwards Aquifer area
CRUSTACEANS	A cave obligate crustaean	Monodella texana				x							subaquatic, subterranean obligate; underground freshwater aquifers
CRUSTACEANS	Cascade Cave amphipod	Stygobromus dejectus							x	x			subaquatic crustacean; subterranean obligate; in pools
CRUSTACEANS	Ezell's cave amphipod	Stygobromus flagellatus					x				x		known only from artesian wells
CRUSTACEANS	Long-legged cave amphipod	Stygobromus longipes								x	x		subaquatic crustacean; subterranean obligate; found in subterranean streams
CRUSTACEANS	Peck's cave amphipod	Stygobromus pecki	LE	E							x		small, aquatic crustacean; lives underground in the Edwards Aquifer; collected at Comal Springs and Hueco Springs
FISHES	Edwards Plateau shiner	Cyprinella lepida			P		x	x					Edwards Plateau portion of Nueces basin, mainstem and tributaries of Nueces, Frio, and Sabinal rivers; clear, cool, spring-fed headwater creeks; usually over gravel
FISHES	Nueces roundnose minnow	Dionda serena					x	x					Edwards Plateau portion of Nueces basin: mainstream and tributaries of Nueces, Frio and Sabinal rivers
FISHES	Fountain darter	Etheostoma fonticola	LE	E							x		known only from the San Marcos and Comal rivers; springs and spring-fed streams in dense beds of aquatic plants growing close to bottom, which is normally mucky; feeding mostly diurnal; spawns year-round with August and late winter to early spring peaks
FISHES	Headwater catfish	Ictalurus lupus					x	x	x	x		x	originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers
FISHES	Guadalupe bass	Micropterus treculii				x		x	x	x	x	x	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system
FISHES	Guadalupe darter	Percina sciera apristis							x	x	x		Guadalupe River basin; most common over gravel or gravel and sand raceways of large streams and rivers
FISHES	Widemouth blindcat	Satan eurystomus		T	P	x							troglobitic, blind catfish endemic to the San Antonio Pool of the Edward's Aquifer
FISHES	Toothless blindcat	Trogloglanis pattersoni		T	P	x							troglobitic, blind catfish endemic to the San Antonio Pool of the Edward's Aquifer
INSECTS	A mayfly	Allenhyphes michaeli						x		x		x	TX Hill Country; mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation
INSECTS	Leonora's dancer damselfly	Argia leonorae					x	x	x				south central and western Texas; small streams and seepages
INSECTS	Texas austrotinodes caddisfly	Austrotinodes texensis						x					appears endemic to the karst springs and spring runs of the Edwards Plateau region; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many lime
INSECTS	A mayfly	Baetodes alleni								x			mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation
INSECTS	Comal Springs diving beetle	Comaldessus stygius									x		known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column
INSECTS	Edwards Aquifer diving beetle	Haideoporus texanus			P						x		habitat poorly known; known from an artesian well in Hays County
INSECTS	Disjunct crawling water beetle	Haliplus nitens										x	unknown, maybe shallow water
INSECTS	Comal Springs riffle beetle	Heterelmis comalensis	LE								x		Comal and San Marcos Springs

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INSECTS	A mayfly	Plauditus futilis						x					OK, TX, and Canada; mayflies distinguished by aquatic larval stage; adult stage generally found in bankside vegetation
INSECTS	A mayfly	Pseudocentroptiloides morihari									x		mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation
INSECTS	Comal Springs dryopid beetle	Stygoparnus comalensis	LE								x		dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood
MOLLUSKS	Rock pocketbook	Arcidens confragosus				x					x	x	mud, sand, and gravel substrates of medium to large rivers in standing or slow flowing water, may tolerate moderate currents and some reservoirs, east Texas, Red through Guadalupe River basins
MOLLUSKS	Texas fatmucket	Lampsilis bracteata			P	x			x	x	x	x	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins
MOLLUSKS	Mimic cavesnail	Phreatodrobia imitata			P	x							subaquatic; only known from two wells penetrating the Edwards Aquifer
MOLLUSKS	Golden orb	Quadrula aurea			P	x	x	x	x	x	x	x	sand and gravel in some locations and mud at others; intolerant of impoundment in most instances; Guadalupe, San Antonio, and Nueces River basins
MOLLUSKS	Smooth pimpleback	Quadrula houstonensis			P							x	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting san
MOLLUSKS	Texas pimpleback	Quadrula petrina			P	x	x	x	x	x		x	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins
MOLLUSKS	False spike mussel	Quincuncina mitchelli			P	x			x	x	x	x	substrates of cobble and mud, with water lilies present; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins
MOLLUSKS	Creeper (squawfoot)	Strophitus undulatus				x		x	x	x	x	x	small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins
MOLLUSKS	Pistolgrip	Tritogonia verrucosa				x			x	x	x	x	stable substrate, rock, hard mud, silt, and soft bottoms, often buried deeply; east and central Texas, Red through San Antonio River basins
MOLLUSKS	Texas fawnsfoot	Truncilla macrodon			P							x	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins
REPTILES	Cagle's map turtle	Graptemys caglei		T					x	x	x		