MEMORANDUM

GLENN LUKOS ASSOCIATES

Regulatory Services

PROJECT NUMBER: 04720008BANN

TO: Christine Medak, U.S. Fish and Wildlife Service

FROM: Tony Bomkamp

DATE: May 7, 2013

SUBJECT: Recommendations Regarding Fairy Shrimp Surveys for Newport Banning Ranch, Newport Beach, California

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I have reviewed your April 8, 2013 email to John Davis IV regarding the Newport Banning Ranch - Cumulative Fairy Shrimp Report wherein you recommend that "wet season surveys should be conducted in the following pools where cysts were identified as *Branchinecta*: C, D, K, L, M, N, P, Q, W, X, Y, Z, BB, CC, DD, EE, FF, GG, HH, II, KK, LL, MM, OO, PP." As set forth in the Cumulative Fairy Shrimp Report, GLA believes that there is sufficient information, based on previous surveys when combined with the data collected by Charles Black, to eliminate the need for additional surveys for all of these features. The rationale for this is set forth below. In your email, you suggest that "A final protocol wet season survey would help to support the conclusions in your cumulative report" [Emphasis added]. While more data can be helpful (as is the case for a few of the features discussed immediately below) we believe there is overwhelming data for the majority of the features such that additional surveys are not necessary.

Sufficiency of the Data: A Summary

In your email, you suggested that dry-season surveys combined with hatching is "not a recognized substitute" for a wet season survey leading to the recommendation for an additional wet-season survey. This is not consistent with our experience as the dry-season survey, which has the ability to identify cysts, even when the numbers are very low, combined with positive hatching results, perfectly satisfies the requirement of a dry-season survey followed by a wet-season survey. In cases where a dry-season survey identifies cysts from the genus *Branchinecta*, which are difficult to accurately identify based on cyst morphology, the subsequent wet-season survey provides the opportunity for identifying the fairy shrimp to the species level. As such, we believe that there is sufficient data for all the features discussed below to consider the surveys to be "complete" and for some of the features, there is an overabundance of data.

Features C, D, M, X, CC, GG, HH, and PP were all found to contain cysts during the dry-season sampling and *B. lindahli* was hatched in varying numbers from each of these features. In addition, the presence of *B. lindahli* was detected during wet-season surveys in each of these

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features providing further confirmation (as discussed in more detail below) that this is the only species within these features.

Features Y, Z, DD, EE, FF, KK, LL, MM, and OO contained only *B. lindahli* based on results of culturing efforts. As noted above, this provides the same information that a dry-season survey that identifies *Branchinecta* cysts followed by a wet-season survey that allows positive identification of the fairy shrimp present. You noted in your email to Mr. Davis IV that co-occurrences of *B. lindahli* and *B. sandiegonensis* have not been recorded on the NBR site. GLA believes that this fact is both noteworthy and highly informative in that for all the culturing efforts, no co-occurrences were recorded and it is equally important that a substantial number of male and female individuals of *B. Sandiegonensis* were successfully hatched from Feature H, indicating that culturing is equally effective for both species. In all, a total of 175 *B. lindahli* cysts were hatched from 20 features and not a single *B. Sandiegonensis* was found in in any of these samples. Similarly, 22 individual *B. Sandiegonensis* were hatched from Feature H, with no *B. lindahli*. This combined with the numerous individuals collected during wet-season sampling, wherein co-occurrences of the two species was never recorded further strengthens this conclusion.

Given these data, it appears that the evidence is overwhelming that Features C, D, M, X Y, Z CC, DD, EE, FF, GG, HH, KK, LL, OO, and PP do not support *B. Sandiegonensis*, and that additional wet-season surveys would not provide meaningful data that would further inform the presence of listed fairy shrimp.

Features N and P were found to have *Branchinecta* cysts by Mr. Black; however, hatching failed to produce identifiable adults; however, *B. lindahli* was identified during the 2010/2011 wet-season surveys in features N and P providing clear confirmation that *B. lindahli* is the only fairy shrimp occupying these features.

Relative to specific features not already addressed above (Features B F, T, V), and mentioned in the email for which complete protocol surveys were not completed we offer the following response for your consideration.

Feature B was subject to surveys in 2009/2010 and 2010/2011, with *B. lindahli* the only fairy shrimp detected during both wet seasons. Again, given that there have been no co-occurrences of *B. lindahli* and *B. sandiegonensis* on the site we believe that additional surveys would not provide additional information.

Feature F was subject to a dry-season survey by Mr. Black and no cysts were detected. Furthermore, this feature was surveyed on January 6, 2011 as you note. The follow-up survey was conducted on January 20, 2011, 14 days after the initial survey and the feature was no longer ponded (this is within the protocol requirements). The ponding on December 24, 2010 was

within a day or two of the initial ponding event and fairy shrimp would not have been detectable at that time. As such, this feature has met the requirements for a complete survey.

Feature T was originally not surveyed as it consists of a ponded area within a largely asphalt entry road near the 17th Street Gate. Nevertheless, during the 2011 surveys, fairy shrimp were observed and collected and determined to be *B. lindahli*. This feature was subject to a complete survey in 2011/2012 at which time *B. lindahli* was again detected. Given detection of only *B. lindahli* during two successive wet seasons along with the lack of co-occurrences of *B. lindahli* and *B. sandiegonensis* on the site, we believe that another wet-season survey would not provide additional information.

Feature V was first sampled in early 2010 during the 2009/2010 survey season at which time *B. lindahli* was the only fairy shrimp detected. Specifically the feature was sampled on February 18, March 2, and March 5, 2009 and mature *B. lindahli* were detected on two of the occasions. Based on rainfall data, this feature first exhibited ponding on or about January 19th meaning that one survey was missed at the beginning of the season. During the 2010/2011 season, this feature exhibited the initial ponding following the heavy rainfall event of December 23, 2010. Because of the heavy rains in early 2010, this feature became choked with vegetation. Once ponding occurred at the end of 2010, the dead vegetation created a pond with extensive amounts of decaying vegetation, which creates conditions of low oxygen and is highly unsuitable for fairy shrimp. No fairy shrimp were detected during the initial survey pass on January 16 and surveys were discontinued due to the decaying vegetation and associated unsuitable conditions. We also note, that this feature is in project open space and there are no plans for development in this area.

As noted in the "Cumulative Fairy Shrimp Report" Feature BB, which produced three cysts none of which successfully hatched, does not pond water for sufficient depth or duration during most years to provide for successful reproduction in this feature and it is likely that the cysts came from a nearby source.

Feature L, produced two cysts which did not hatch. It is important to note that Feature K, which is immediately adjacent to Feature L produced 3 cysts of which a single female versatile fairy shrimp (*Branchinecta lindahli*) was hatched suggesting that the cysts in Feature L are most likely *B. lindahli*.

As noted in the "Cumulative Fairy Shrimp Report" Feature II produced two cysts, neither of which hatched. This feature is located along the western bluff edge and is closest to Feature HH, which was identified with *B. lindahli* which is likely present in II, nevertheless, this feature does not pond water for sufficient duration during most years to provide for successful reproduction in this feature and it is likely that the cysts came from a nearby source all of which support *B. lindahli* (e.g., Features HH and A which support *B. lindahli*).