April 26, 2018

Mr. Scott Maloni
Vice President
Poseidon Water
5780 Fleet Street, Suite 140
Carlsbad, CA 92008

Dear Scott,

I am pleased to submit this letter to respond to the April 18 letter received from the Santa Ana Regional Water Quality Control Board (RWQCB). The RWQCB letter provided a summary of the outcome of the April 13 meeting in Sacramento convened to discuss the ETM/APF analyses conducted for the Huntington Beach Desalination Plant (HBDP).

This letter provides responses to the request for additional information found in bullet B – "Outstanding questions for Poseidon". Responses were prepared jointly by Eric Miller (Miller Marine Science and Consulting), Tim Hogan (TWB Environmental Research and Consulting), and with assistance from John Steinbeck (Tenera Environmental).

1. How were the sample source water body (SSWB) areas calculated for each taxon used in Tenera 2010? Were the 2007-2008 current data used to calculate the sample source water body areas in Tenera 2010 or was the same SSWB used as in MBC and Tenera 2005? (see section C.9 below).

   <u>Response:</u> Tenera 2010 used the 2007-2008 current data to calculate the sample source water body.

2. Please provide an explanation and justification for the change between MBC and Tenera 2005 and Tenera 2010 in the offshore displacement used to calculate the total source water body (TSWB) for each taxon (i.e., change from 5 km to 4.45 km).

   <u>Response</u>: The change to 4.45 km occurred in Tenera 2006. The 5 km was only used in MBC and Tenera 2005 Table ES-2 and it was a gross approximation. Note that APF was not calculated in the body of MBC and Tenera 2005; the later estimates of APF for HBGS (which were the basis of the mitigation) used the more accurate estimate of 4.45 km derived by measuring the alongshore extent between Station U4 and D4 upcoast and downcoast boundaries, respectively. The boundaries were those designated in the sampling design and used in the estimation of sampled source water volume illustrated in MBC and Tenera (2005) Figure 3-2 and tabulated in MBC and Tenera (2005) Table 3-1. The measurements

and volumes presented in MBC and Tenera (2005) were unchanged through all subsequent analyses of the intake. The alongshore displacement was multiplied by the 4.45 (the accurate width of the sampled source water body) to arrive at an area of the source water rectangle.

a. Was the same alongshore displacement used for calculating the TSWB for each taxon in MBC and Tenera 2005 and Tenera 2010? If no, please provide justification and explanation for these changes as well.

   <u>Response:</u> Because the APF was not calculated in the body of the 2005 report. Alongshore displacement changed in Tenera 2010 to reflect 2007-2008 current data. As explained during the April 13 meeting, the 2007-2008 current data were considered the best available science since they were collected from a more advanced instrument (acoustic Doppler current profiler or ADCP) that was better able to capture the complexity of the stratified currents. The ADCP collected current velocity data at 1-m intervals from near bottom to the surface to derive a depth-integrated mean current. In addition, the fixed bottom mount of the ADCP was considered better than the moored instrument used in 1999-2000.

3. Please provide a complete discussion of how the larval length data were used in Tenera 2010 and how and why they differed from the larval length data in MBC and Tenera 2005, including:

   a. How and why the Markov Chain Monte Carlo method was used to resample the larval length data from MBC and Tenera 2005.

      <u>Response</u>: Tenera observed from other entrainment studies completed in 2006-2008 that the distribution of several of the taxa with large sample sizes (i.e., lots of measurements) were skewed to small size. Therefore, Tenera thought that randomly sampling from the total would provide a better approach for estimating duration. Tenera just randomly sampled the sample of lengths using resampling techniques. In the 2006-2008 studies, Tenera used a resampling approach where they generate several hundred samples of 100 or 200 lengths from the data and then take the average of the parameters being used in the calculations of hatch size and larval duration. The estimates used in calculating larval duration for the HBGS study were calculated directly from the data with all of the measurements being used in the calculations. The calculated larval duration was based on the difference between the 1st and 95th percentile for all the taxa.

   b. Why sometimes the 10th percentile was used instead of the 1st percentile.

<u>Response:</u> The 1st percentile was used in all of the calculations in the HBGS reports. In the HBDP analyses beginning with Tenera (2010), they used the 10th percentile for most of the taxa and not the calculated hatch length. The following from Tenera 2010 explains why the 1st percentile was used in some cases and the 10th in others: This calculated value (1st percentile) was used because of the large variation in size among larvae smaller than the average length. This calculation assumes that the length frequency distribution is skewed towards smaller sized larvae and usually resulted in a value close to the hatch size reported in the literature. The length frequency distributions for several of the fishes did not follow this pattern and the length of the 10th percentile of the distribution was used as the hatch length for these taxa to eliminate outlier values.

c. Why the following equation was used to estimate hatch lengths for combtooth blennies only:

<u>Response:</u> Hatch length was used for Northern Anchovy as well. There was a typographical error in Tenera (2010) regarding this equation. The equation below was corrected by adding the red text.

i. Hatch Length = Median Length – ((Median Length + 1st percentile Length)/2)

4. Please provide the sampling period frequency and length (used in fi calculations) for the 2003-2004 sampling data.

<u>Response:</u> Please see the MS-Excel file attached to the submittal email accompanying this letter.

Please feel free to call if you have any questions.

Sincerely,

Eric Miller, MS
Principal
Miller Marine Science & Consulting, Inc.

Number days represented by each survey

Survey	HBGS days	HBDP days
HBS001	25	25
HBS003	27	27
HBS006	28	28
HBS010	28	28
HBS014	32	32
HBS019	31	31
HBS023	28	28
HBS027	28	28
HBS031	29	29
HBS035	35	35
HBS041	45	45
HBS045	30	30