Enclosure 2: Description of Scientific Issues to be Addressed by Peer Reviewers
As revised on March 3, 2011

The statute mandate for external scientific peer review (Health and Safety Code section 57004) states that the reviewer's responsibility is to determine whether the scientific portion of the proposed rule is based on sound scientific knowledge, methods, and practices.

Determination of scientific validity for each of the following issues that constitute the scientific portion of the proposed regulatory action is needed. An explanatory statement is provided for each issue to focus the review.

1. **Sediment Loading Calculation.** Estimation of sediment loading from nine categories of land uses based on estimated impervious fractions. (See Source Assessment section 5.1 of the **Staff Report** and the Watershed Model Setup section (pages 25-29) of the **Modeling Report** (Attachment 2 to the Staff Report))

   There are many potential sources that have influenced the accumulation of sediment within the Lagoon. Sources of sediment include erosion of canyon banks, bluffs, scouring stream banks, and tidal influx. Some of these processes are exacerbated by anthropogenic disturbances, such as urban development within the watershed. Urban development transforms the natural landscape by converting pervious surfaces to impervious surfaces, which increases the volume and velocity of runoff resulting in scouring of sediment, primarily below storm water outfalls that discharge into canyon areas. Sediment loads are transported downstream to the Lagoon during storm events causing deposits on the salt flats, and in Lagoon channels. These sediment deposits have gradually built-up over the years due to increased sediment loading and inadequate flushing, which directly and indirectly affects lagoon functions and salt marsh characteristics.

   Since several land use types share hydrologic or pollutant loading characteristics, many land uses were grouped into similar classifications resulting in a subset of nine categories for modeling. The total area for each land use was multiplied by its respective impervious factor to calculate the estimated impervious fractions. The Loading Simulation Program in C++ (LSPC) model utilizes algorithms that require land use in each catchment to be divided into pervious and impervious categories.

2. **Numeric Target Selection.** Determination that multiple lines of evidence agreed with each other and that attainment of the selected numeric target will result in attainment of the narrative sediment water quality objective and restoration of beneficial uses in the Lagoon. (See Numeric Targets section 4 of the **Staff Report**)

   The TMDL weight of evidence approach utilizes a historical review of available literature regarding urbanization trends and Lagoon impacts to identify an appropriate time period for calculating the numeric target. The lines of evidence

that comprise the approach include urbanization trends, population data, flow data, and a Lagoon conditions evaluation. The lines of evidence indicate that land use conditions present during the mid-1970s represent a time when water quality objectives were met in the Lagoon (i.e., reference conditions). To characterize this historical period, historic land use coverage for the watershed was developed and LSPC model simulations were performed. The resulting net annual sediment load was identified as the TMDL numeric target and represents the loading (assimilative) capacity of the Lagoon for sediment.

3. **Model Assumptions.** Determination that assumptions used in the Loading Simulation Program in C++ (LSPC) and the Environmental Fluids Dynamic Code (EFDC) model were appropriate to accurately calculate sediment load reductions. (See the Watershed Model Setup section (pages 25-29) and Lagoon Model Setup section (pages 29-36) of the **Modeling Report** (Attachment 2 to the Staff Report))

   The model makes assumptions which simplify the load estimations. One set of assumptions refers to the amount of irrigation water applied within the watershed. Another set of assumptions refers to soil characteristics.

   The amount of irrigation water applied is an important component of the water balance in Southern California because summer flows are a function of the irrigation factor. Calculation of the amount of irrigation water applied involves several estimations and assumptions including an assumption that the daily amount of irrigation water is distributed evenly over time; estimated crop coefficients (0.8 for residential and commercial lawns and 0.85 for agricultural areas); an estimated efficiency factor (80 percent); and an assumption that if precipitation exceeds water demand, then the irrigation demand is zero.

   The Soil Survey Geographic Database was used to characterize the soils, obtain soil erodibility values, and determine particle size distribution. Soils transported by surface runoff were assumed to be composed of 5 percent sand, twice as much clay as the percentage of clay within each hydrologic soil group, and the remainder assigned to the silt fraction. Default values for porosity (0.4) and density (1.99 gm/cm^3) were used to characterize sediment.

   Sediment loading to the lagoon was estimated based on modeling of watershed runoff, stream bank erosion, and sediment transport. Bank erosion was represented for stream channels in the lower portion of Carroll Canyon Creek and Carmel Creek based on the difference in observed suspended sediment concentrations and sediment loads contributed by watershed land uses. The streambank erosion module in LSPC was used to account for the additional sediment load to the system. Bank erosion within lagoon channels was not simulated; therefore, sediment erosion and resuspension are assumed to occur only with respect to bottom sediment. In addition, sediment transported via diffusive bed load processes was not characterized in the LSPC modeling.

4. **Implicit Margin of Safety.** Utilization of an implicit margin of safety (MOS) rather than an explicit MOS to account for uncertainty in the TMDL. (See Identification of Load Allocations and Reductions section 7.11 of the **Staff Report**)

   An MOS is incorporated into a TMDL to account for uncertainty in developing the relationship between pollutant discharges and water quality impacts. An explicit MOS was not used to reserve a portion of the loading capacity. Instead, an implicit MOS was included through the application of conservative assumptions in the modeling and TMDL analysis. These assumptions include selection of the critical condition; determination of the soil composition in surface runoff; determination of the reference condition; and selection of the critical location.

5. **Implementation Plan.** Completion of the actions described in the Implementation Plan is expected to result in attainment of the narrative sediment water quality objective and restoration of beneficial uses in the Lagoon. (See Implementation Plan section 9 of the **Staff Report**)

   The Implementation Plan provides the reviewer with the context in which the scientific components will be implemented. The Implementation Plan is a regulatory provision of the Basin Plan amendment, which is briefly summarized in item 5 of Enclosure 1 to this document.

<u>The Big Picture</u>
Reviewers are not limited to addressing only the specific issues presented above and are asked to contemplate the broader perspective.

1. In reading the staff technical reports and proposed implementation language, are there any additional scientific issues that are part of the scientific basis of the proposed rule not described above? If so, please comment with respect to the statute language given above.

2. Taken as a whole, is the scientific portion of the proposed rule based upon sound scientific knowledge, methods, and practices?

Reviewers should also note that some proposed actions may rely significantly on professional judgment where available scientific data are not as extensive as desired to support the statute requirement for absolute scientific rigor. In these situations, the proposed course of action is favored over no action.

The preceding guidance will ensure that reviewers have an opportunity to comment on all aspects of the scientific basis of the proposed San Diego Water Board action. At the same time, reviewers also should recognize that the San Diego Water Board has a legal obligation to consider and respond to all feedback on the scientific portions of the proposed rule. Because of this obligation, reviewers are encouraged to focus feedback on the scientific issues that are relevant to the central regulatory elements being proposed.