Attachment 4

Peer Review Comments and Responses

The technical portions of the proposed Basin Plan amendment to incorporate the sediment TMDL for Los Peñasquitos Lagoon was reviewed by Dr. Kirk R. Barrett, PE, PWS, Director, Passaic River Institute at Montclair State University and Dr. Rockwell Geyer at Woods Hole Oceanographic Institute.

External scientific peer review of the technical portion of a proposed rule (in this case, the proposed Basin Plan amendment) is mandated by Health and Safety Code section 57004. This statute states that the reviewer's responsibility is to determine whether the scientific portion of the proposed rule is based upon sound scientific knowledge, methods, and practices. The San Diego Water Board provided the peer reviewers with the draft Staff Report, the draft Basin Plan amendment, and a list of key issues with discussion for the peer reviewers to address. The list of key issues with discussion provided to the peer reviewers is given below in the first section of this appendix. The peer reviewers' comments and the San Diego Water Board's responses follow in subsequent sections.

Description of Scientific Issues to be Addressed by Peer Reviewers

1. **Sediment Loading Calculation.** Estimation of sediment loading from nine categories of land uses based on estimated impervious fractions. (See the Source Assessment section of the Staff Report)

   There are many potential sources that have influenced the accumulation of sediment within the Lagoon. Sources 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 and results in increased runoff due to hydromodifcation 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 the Numeric Targets section 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 Modeling Report referenced in Appendix A 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.

   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 the Identification of Load Allocations and Reductions section 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 the Implementation Plan section 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 Attachment 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.

Response to Dr. Rockwell Geyer Comments

Comment ID	Comment	Water Board Response
1	This report provides a detailed analysis of the factors contributing to the impairment of Los Peñasquitos Lagoon and a quantitative analysis of the appropriate rate of sediment input that would support a "healthy" ecosystem. The report provides results of field studies as well as two coupled modeling studies, one of the watershed and one of the surface water flow within the Lagoon. The report is well written, and it appears that the underlying modeling and field conform to acceptable professional standards. I do not have any major objections with the methods of the details of the model implementation.	Comment noted.
2	My main objection to the report is that there is very little description (actually none that I could find) about the actual model runs the produced the numbers for the TMDL-i.e. the numbers in Tables ES-1 and ES-2. (Note that these are different runs than the model calibration runs, for which there was adequate detail).	Restoration of the Lagoon is a high priority for the San Diego Water Board. Acknowledging the environmental and political complexities, the uncertainties in sediment sampling, sediment load modeling, and quantification, as well as the time and the financial resources needed to restore a coastal lagoon, and recognizing the urgency to proceed with regulatory actions, the Board will implement a strategy of phased approaches to immediately address sediment impairment in Los Penasquitos Lagoon and restore its designated beneficial uses. Also see responses to comments 3 and 4, below.

3	A detailed description of the input variables and results for the “Current Load” condition and the “Historic Load” condition. This would include tabular and/or graphical summaries for each case of: • Precipitation, • Maximum and “wet season” integrated river discharges (of each subwatershed), • Mean and maximum sediment concentrations for each subwatershed, • Sediment loadings from each subwatershed and the ocean boundary for each of the runs, • Patterns and amounts of sediment deposition in the lagoon following wet weather events for the two cases. …I expect this information has been generated by the modelers. It should be included in the report. In fact, it really represents the essence of the modeling effort. It is hard to make an informed judgment about the appropriateness of the TMDLs without the information [above].	Subwatershed estimates were not provided because the total load transported to the lagoon from the watershed is most important. Regarding the 5th bullet, time-series TSS calibration results for the lagoon are provided in the Lagoon Model Calibration section of the Modeling Report. These data show the lagoon responses during wet and dry weather periods. Sediment load results are typically not provided, except as needed for the TMDL calculations. These data can be compiled from the model results and provided at a later date, due to time constraints.

4	Sensitivity studies for the TMDLs so as to arrive at error estimates. These should mainly involve varying the estimated sediment loading relationship for each subwatershed, as this is where most of the error comes from. The biggest source of uncertainty in the TMDL calculation is the estimation of an appropriate sediment loading curve for the Los Peñasquitos Creek, because of the vast discrepancy between the USGS data and the more recent data. Because this is the dominant contributor (from a water volume standpoint) to the receiving waters, the order-of-magnitude uncertainty in this loading translates into an order-of-magnitude uncertainty in the TMDL. There may be other parameters of model quantities that the modelers believe should be varied as well, for example the geometry of the inlet as influenced by the 101 bridge, in order to determine the sensitivity of the results to these uncertainties. …[T]his approach is more appropriate for the “margin of error” requirement than the more informal approach that was described in the report. I believe that the modelers should have reasonable information about the sensitivity of their results to the uncertainties of the inputs. Thus it should not be difficult to produce meaningful ranges of uncertainty of the worst-case and historical cases.	The Margin of Safety accounts for any lack of knowledge concerning the relationship between effluent limitations and water quality (CWA § 303(d)(1)(C), 40 CFR 130.7(c)(1)). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. The MOS for this TMDL is implicit. Conservative assumptions were discussed in the analysis to account for error. Key model parameters include the geometry of the ocean inlet (held static for the model runs) and other factors to calibrate the models based on available data. There were some discrepancies and uncertainties in the observed data, as described in the reports. Various sensitivity analyses were run to determine the final model configuration and to calibrate the models. Some of this information is included. For example, streambank erosion sensitivity analyses are discussed on page 46 of the Technical Support Document. Additional information on model sensitivity can be provided at a later date, due to time constraints.

5	In the report, they say that considerable historical analyses were performed to determine that the 1970's represent the appropriate level of loading for the TMDL. I think it would be appropriate to include more of the historical analysis in the report. For example, what evidence is there for the quality of the wetlands in the 1970's or before? The reason I bring this up is to raise the possibility that factors other than land use-for example changes in the geometry of the flow within the lagoon due to the railroad and the 101 may have contributed to siltation even before there was major development of the watershed.	The Technical Support Document, Section 3, discusses in great detail historical information. Any information not found here is located in the references. The Numeric Targets section of the Staff Report was modified to include more of the historical information, including figures that illustrate wetland extent. The comment has a valid point that factors other than land use may have contributed to siltation even before there was major development in the watershed. These other factors, mainly physical in the lagoon, do indeed affect water circulation and sedimentation processes, as described in the TMDL report. This TMDL focuses only on reduction of sediment sources from the watershed. The TMDL has been strengthened to include an adaptive management approach, which will address these, and other, factors that contribute to loss of salt marsh in the Lagoon. The model can be further refined in the future to further examine changes in sediment loading and transport during implementation planning. Also see response to comment 2.

6	Another issue that I expected to see addressed in the report is a discussion of the implications of reducing the loading to the TMDL that is established. What do the models say the sediment accumulation would be under those circumstances? What implications might there be to for remediation of the wetland?	A discussion of foreseeable methods to comply with the TMDL is discussed thoroughly in the California Environmental Quality Act (CEQA) Analysis, which was not available to the reviewers for peer review. The modeled historical condition (which established the TMDL target) estimates the sediment contribution to the lagoon from the watershed and ocean inlet for the critical period. Sediment deposition and erosion events are dynamic, resulting in changing accumulation patterns. These questions can be studied further in the future using the models and additional field data collection. Also see response to comment 2.

7	My overall reaction to this report is that the estimation of the TMDL is not limited by the models or their implementation but rather by inadequate data. The nature of the variability of precipitation in Southern California leads to an extremely difficult sampling problem with respect to watershed processes. Significant sediment transport only occurs during El Niño years, so it takes decades to obtain statistically significant data. Yet land uses and watershed management practices change on timescales comparable to the return interval of the major wet-weather periods, making it even more difficult to develop robust statistics about the sediment transport rates in the system. The vast differences between the USGS data and the subsequent estimates of sediment concentrations are probably not methodological-the indicate the system is highly non-stationary. I have two suggestions in the face of the uncertainty associated with the limited data base.	Comment noted.

8	One is to use information about other watersheds in the southern California area that may have more extensive data sets to inform the determination of an appropriate TMDL. For instance, what are typical wet-weather suspended sediment concentrations in other similar watersheds with varying amounts of developed land? Obviously the lithology, soil types, relief and land use all factor in, watershed models can help normalize for these factors influencing sediment yield. My point is that more data are needed, and data from other watersheds are likely to help guide the determination of appropriate TMDLs.	Page 23 of the TMDL report states "Due to the unique characteristics of the Lagoon, it was determined that a historical analysis of the Lagoon and its watershed would provide the best information available for determining the conditions that support water quality standards". An effort was made to locate an appropriate reference lagoon, including discussions with local experts and the academic community. Lagoon environments throughout southern California (and throughout the state) have experienced significant degradation overtime, therefore, it was determined that modeling of the historical condition would provide the best measure of the sediment load reduction that would be needed for the TMDL. Also see response to comment id number 9, below.
9	My second suggestion in light of the uncertainty of the present sediment loading regime is to pursue an adaptive management approach, in which an effective monitoring system is put in place to obtain detailed sediment loading data while monitoring the response of the receiving waters. The TMDL that comes out of this study should be viewed as provisional, and it should be revised as the data allows a more accurate assessment of the actual loading rate and its impact on the receiving waters. Such a strategy does not preclude the pursuit of remediation efforts within the watershed and the receiving waters, but such efforts should be pursued with deliberation and cognizance of the uncertainty of the estimates of loading and it impact on the impairment of the receiving waters.	Changes have been made to the Staff Report and Basin Plan Amendment to further clarify the adaptive management approach that will be taken for this TMDL. The Implementation Plan section of the Staff Report will further elaborate on this approach. Also see response to comment 2.

Response to Dr. Kirk Barrett's Comments

Comments to address Identified Scientific Issues

Comment ID	Comment	Water Board Response
Sediment Loading Calculation		
1.	The LSPC model is a scientifically tenable model for modeling watershed hydrology and sediment transport, although it might be computational overkill and excessive parameterization (ie, a simpler model might give results that are just as useful).	Comment noted.
2.	LSPC does not include specific provisions for modeling construction sites. Construction sites are known to have the potential to generate intense loadings of sediment – although these loadings are controlled (to varying degrees) by BMPs. Given the rapid development in this watershed, construction sites may be a large source of sediment, whose load would be underestimated by this modeling approach. This issue should be investigated.	The models were calibrated based on observed data; therefore, all sources are implicitly represented in the simulated results. Furthermore, the model can be updated in the future, as needed, to explicitly represent particular sources depending on available data. Based on the San Diego Association of Governments 2000 land use coverage, approximately 171 acres, or 0.3 percent, of the total land use area is identified as construction/transitional. While construction only accounts for a small percentage of land use in the watershed, it is correct that construction sites are known to generate large sediment loads. Construction sites are dual regulated under both local ordinances and statewide general permits, which requires these sites to develop and implement storm water pollution prevention plans.
3.	The mid-70s load is calculated using extremely wet (1993) conditions, but this seems inappropriate since the mid-1970s load did not occur under such extremely wet conditions (based on the flow rates presented in Att. 1 Figure 17). Using an extremely wet year to model 1970s load may well greatly overestimate the actual 1970 loads.	The purpose of the reference period (mid-1970s) is to estimate the loading for the critical period based on landuse conditions in the watershed that preceded recent development and other activities that have led to increased sedimentation in the lagoon. For TMDL development, the same weather conditions (the critical wet period in this case) were modeled to determine the relative difference in sediment loading between the current and historical

Comment ID	Comment	Water Board Response
		condition. The difference in sediment load represents the % reduction required to achieve the TMDL target (historical condition). This is the usual approach for reference condition based TMDLs.
4.	It seems inappropriate to use a very wet year as the basis to compute loads because sedimentation is a cumulative phenomenon that occurs over several to many years – which will not be represented by an extremely wet year. I believe it would be better to model using a range of rainfall amounts, then weight the results based on the frequency of occurrence of those amounts	TMDLs are calculated under critical conditions. The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Sediment is primarily contributed during storm events, which is why the 1993 El Nino water year was selected as the critical time period for TMDL development. The goal of the TMDL is to reduce the majority of the sediment loading to the Lagoon which occurs during storm periods. It wouldn't be reasonable to require sediment loading from storm periods to be equal or less than the total sediment load that's contributed during dry periods. The assumption is that if the watershed loading to the Lagoon under critical conditions is reduced to be equal to the historical condition then WQOs for sediment should be achieved. Because sediment loading is greatest during large storm events, loads are calculated under the wettest conditions, appropriately identified as the critical period (1993 conditions).
5.	Document says "Existing loads were estimated based on modeling of current land use conditions (from the SANDAG 2000 land use coverage)", so the "current" land use is actually from 2000, now more than 10 years past. Figure 12 in Att. 1 (p 29) indicates a ~20% growth	The SANDAG 2000 land use coverage was the most recent landuse dataset that covers the entire watershed and is consistent with other TMDLs in the region. The model can be updated in the future if needed to more accurately simulate current sediment loading.

Comment ID	Comment	Water Board Response
	in population from 2000 to 2010. It seems inappropriate to use 10 year-old land use to calculate current loading.	
6.	It is quite difficult to collect water samples to accurately compute sediment transport. A typical method of collecting a single grab sample is likely to be insufficient to characterize lateral and vertical variability in suspended solids concentrations. Details are needed regarding sample collection procedures and analysis and any QA/QC procedures to verify that representative samples were collected.	This comment has valid point, and we recognize the uncertainties and limitations in sampling suspended sediment concentrations. Sample collection procedures are detailed in Los Peñasquitos TMDL monitoring study (City of San Diego, 2009). Due to time constraints, additional information was not provided in the reports.
7.	The report indicates that streambank erosion is significant in Carroll Canyon Creek (CCC) and Carmel Creek (CC), but not in Los Peñasquitos Creek (LPC). This doesn't seem tenable since I expect that the geomorphic conditions are similar in each canyon. What physical explanation supports the differences in streambank erosion?	Carroll Canyon Creek is primarily responsible for the amount of sediment loading into the Lagoon due to various factors such as land cover/land use, slopes, development intrusion into riparian areas, hydrology, etc. This is supported by long-term observations of sediment loading by California State Parks, the Los Peñasquitos Lagoon Foundation, City of San Diego stormwater personnel, and other accounts. In addition, it should be noted that LPC runs through the Los Peñasquitos Canyon Preserve whereas urbanization occurs directly on the banks of CCC and CC. .
8.	Model parameters for streambank deposition and scour critical shear stresses varied by reach, as indicated in Appendix B. This doesn't seem tenable since I doubt the geologic material change significantly. What is the physical explanation that supports varying these parameters?	There are various differences in stream and watershed characteristics among different areas. Differences can be found in land cover/land use, slopes, development intrusion into riparian areas, hydrology, etc. Streambank erosion rates were based on available monitoring data and differences in modeled land loads. Additional monitoring data are currently being collected by the City of San Diego to further quantify streambank erosion characteristics in different areas for further calibration of the model.
9.	Figure 38 and 39 show poor agreement between measured and modeled flow rates for all 3 storms at all 3 sites, with the model greatly exceeding (often	These discrepancies are addressed in the Modeling Report (Attachment 2). The following statement is included on Page 46 of Attachment 2:

Comment ID	Comment	Water Board Response
	>50%) measured in all cases. Especially for the Carroll Canyon Creek and Carmel Creek subbasins, I can find little basis for trusting the model results are acceptably accurate.	*Note that flow calibration discrepancies shown in Figures 37 through 39 are likely due to possible problems with the flow rating tables and resulting streamflow estimates for these stations, as discussed in the previous section.* The previous section referenced above can be found on and Page 41 of Attachment 2: *Flows typically increase further downstream barring withdrawals and/or infiltration; however, storm volumes during the monitoring period at the downstream station were significantly lower than reported at the upstream USGS gaging station. This may indicate that the flow rating table for the downstream station may not characterize higher flows well, especially since the model calibrated well to the upstream USGS gaging station. As a result, significant adjustments were not made to the model in order to match the measured flows at the MLS.* Best available data were used, and the model was calibrated considering the limitations in the observed data.
10.	The text states "The average difference between modeled and measured EMCs for CC, LPC, and CCC was 83%, 51%, and 65%, respectively." These differences seem significantly large when compared with the percent reduction in sediment load required by the TMDL (67%).	Table 15 is comparing the fractionation of the sediment into sand/silt/clay between observed and modeled values. The 83%, 51%, and 65% refers to the EMC which is a comparison of the flow weighted average concentrations. <u>Generally applicable response</u> This comment has a valid point, and we recognize the uncertainties and limitations in developing the sediment TMDL. We will take into account this and other applicable comments in future improvement of the TMDL, consistent with the following overall strategy: Restoration of the Lagoon is a high priority for the San Diego Water Board. Acknowledging the environmental and political complexities, the uncertainties in sediment sampling, sediment load modeling, and quantification, as well as the time and the financial resources

Comment ID	Comment	Water Board Response
		needed to restore a coastal lagoon, and recognizing the urgency to proceed with regulatory actions, the Board will implement a strategy of phased approaches to immediately address sediment impairment in Los Peñasquitos Lagoon and restore its designated beneficial uses. The Implementation Section of the report has been revised to provide additional assurances of Lagoon restoration.
11.	Note that goal of the simulation is not simulate only TSS concentrations but also TSS loads, which is the product of flow and concentration. Modeled and measured loads should be compared.	The models were used to estimate total sediment loading to the lagoon and the complex/varying nature of sediment processes within the lagoon. Available TSS data were used to help calibrate the LSPC model, but the total sediment load output was used for TMDL development. Bedload movement is generally not captured in the TSS results, therefore, differences between observed and modeled data are expected. Sediment loads were not measured in the field; therefore, the model results can only be compared to observed concentration data. This information can be obtained in the future and would help with implementation efforts. The models and TMDL were developed based on best available information.
12.	The document says "Sediment transported via diffusive bed load processes also has the potential to be a significant source of sediment loadings; however, this source was neither characterized in the LSPC modeling or would be with traditional TSS sampling" and "bed flow has the potential to be the dominate sediment transport pathway and could add significant sediment to the lagoon." It seems, therefore, unlikely that the TMDL can be accurately calculated without accounting	The Technical Support Document (Attachment 1) includes a description of the LSPC modeling framework and cites references for additional information (Pages 24 & 25). This section states that scouring of the stream bottom and transport processes are included in the model algorithms. This captures the movement of bed material that is deposited and available for scouring and transport downstream, depending on stream velocities and other processes. Bed load contributions were considered in the LSPC watershed model.

Comment ID	Comment	Water Board Response
	for bed load.	
13.	Regarding simulation of oceanic loading to the lagoon, the fact that the model cannot simulate the changing cross section at mouth of the lagoon seems like a serious limitation. The widening and narrowing of the mouth has major affect on tidal flushing and sediment dynamics in the lagoon.	The San Diego Water Board agrees with this comment that the lagoon mouth cross-section is constantly changing, but the ERDC model only represents a fixed rectangular cross-section configuration. Furthermore, the ERDC model cannot model beach erosion processes with the existing model configuration which lacks wave, wave-breaking, and wave-current interaction components. While the mouth's impact on Lagoon processes is important, the focus of this TMDL is to reduce discharges of sediment from the watershed to Lagoon. The model simulation limitations on oceanic loading therefore would have less than significant impact to TMDL calculations of watershed sediment load. Also see response to comment 10 on San Diego Water Board's overall strategy.
14.	The omission of bed load modeling in the lagoon also seems like a serious limitation; bed load is likely a significant component of sediment transport.	See response to comment 12.
15.	Figures 46-71 show large disagreement between modeled and observed TSS concentrations and those of specific size-classes at the mouth and, even more so, at the lagoon segment. It appears to me that the lagoon modeling results are not really tenable for use in computing the required sediment reduction.	See responses to comments 10, 11, and 13.
16.	I would like to see an explicit explanation of how and why the modeled net sediment loading from the ocean showed a 39% decrease from the historical/target condition (9,780 tons) in the 1970s to 5,944 tons currently. How is this explained?	This explanation is contained in section 9.3 of the Technical Support Document (Attachment 1), which states: *The Lagoon model shows that a reduction in watershed sediment loading affects the amount of sediment that can deposit throughout the lagoon from oceanic inputs (considering a constant input of sediment from the ocean boundary under current and historical*

Comment ID	Comment	Water Board Response
		conditions). The model analysis for historical conditions indicates that a greater proportion of sediment that deposits in the Lagoon originates from tidal inputs during lower watershed loading periods, therefore, the TMDL results show that a net [de]crease (original typo) in oceanic loads occurs during the critical wet period under historical landuse conditions…Tidal input from the ocean boundary represents natural background loads, therefore, no reduction is required for this source category.
17.	In any case, it is not clear to me how the oceanic input is incorporated into the TMDL. I assume that calculation of the historical/target and current oceanic input had no effect on calculation of the historical/target and current watershed loadings or the resulting required reduction. In that case, I'm not sure why lagoon modeling was necessary or even useful. It seems to me that one only need compute the sediment load off the watershed to determine the TMDL. Is this correct?	It is correct that the oceanic load will not be considered for reduction, because it is non-controllable nonpoint source, and the San Diego Water Board's authority lies in regulating controllable anthropogenic sources only. However, TMDL development requires the analysis of all potential sources (point and nonpoint), including the oceanic inputs. A Lagoon modeling was therefore necessary to develop a load allocation for the oceanic inputs.
Numeric Target Selection.		
18.	The approach of setting the target condition as a historical loading that produced no impairment in the lagoon seems tenable. Besides, the alternative approach of determining an allowable sedimentation rate in the lagoon and back-calculating the sediment load apparently isn't feasible (based on the large disagreements between measured and modeled results found in this study) given the serious modeling challenges.	Comment noted.
Model Assumptions.		
19.	Regarding irrigation, I don't think it matters much whether it is modeled accurately because the "critical period" which was modeled was based on climatic conditions from 10/1/92 – 4/30/93, which was 1) in the fall and	Comment noted.

Comment ID	Comment	Water Board Response
	winter when irrigation needs are small and 2) a very wet period which further reduces irrigation.	
20.	Regarding soil characteristics, using the Soil Survey Geographic Database seems a tenable choice. I don't understand the decision to modify the particle size distribution, but I don't think it has much of an effect on the TMDL since it was done for both the current and historical/target runs.	Comment noted.
21.	I have commented on bank erosion and bed load in #1 above.	See response to comment ids 7, 8, and 12.
Implicit Margin of Safety.		
22.	I don't think some of the assumptions are really conservative since they were applied to both the current and target conditions -- the "conservativeness" cancels out.	All margin of safety factors included in the study help to mitigate uncertainty in the modeling and TMDL results. Consistent model application for current and target conditions was necessary for development of the TMDL. For example, modeling of the critical condition for both scenarios does not cancel out the conservative nature of using the critical wet period (1993) to derive the load reduction needed. Note that increased urban development is represented in the current condition which results in much greater sediment loading during this time period.
23.	As mentioned under #1, the choice of a very wet year is not conservative regarding historical conditions.	See responses to comments 3 and 4.
24.	I think the main problem with the implicit MOS is that I don't know how you can assess the magnitude of the MOS. That is a policy issue, though, not a scientific issue.	It is true that one cannot easily assess the magnitude of implicit Margin of Safety (MOS). The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between effluent limitations and water quality (CWA § 303(d)(1)(C), 40 CFR 130.7(c)(1)). EPA guidance explains that the MOS may be implicit through conservative assumptions in the analysis that must be described.
Implementation Plan.		
25.	No comments	Comment noted.
Big Picture		

Comment ID	Comment	Water Board Response
26.	The scientists and engineers that worked on this project did about as good as they could within the constraints they were working. Nonetheless, in my opinion, there are aspects of the study whose scientific soundness is not adequately defended, particularly regarding bank erosion and bed load transport. This opinion, coupled with the significant disagreement between modeled and measured values that reveals uncertainty on a scale similar to the required reduction in sediment load, leads me to the opinion that I believe it is not scientifically sound to confidently conclude that the required reduction is either necessary or sufficient to correct the impairments in the Lagoon.	Please see response to comment 10. This adaptive management approach will allow the pursuit of remediation efforts within the watershed and the receiving waters to proceed with an understanding of the uncertainty of the loading estimates and Lagoon impacts.

Additional Detailed Comments

Comment ID	Page	Comment	San Diego Water Board Response to Comment
Draft Staff Report			
27.	6	Problem statement is needs more support-it does not contain any real data about the cumulative amount or rates of sedimentation across the marsh, nor about the effects of sedimentation. Perhaps this data is contained in the referenced documents by California State Parks. If so, it should be at least summarized here. I expected to see actual data on sediment accumulation in the marsh via LIDAR, ground survey data, surface elevation tables, horizon markers and/or sediment traps. The modeling report references a 2008 bathymetric survey -- is that really all there is? The modeling report also references "the 2006 Los Peñasquitos Lagoon Foundation	Lines of evidence of sediment impairment for Los Peñasquitos Lagoon are contained in the California's 303(d) Listing (the 303(d)/305(b) Integrated Report). The purpose of this study is to identify the overall sediment load reduction that is needed to help meet the lagoon's beneficial uses. Please also see response to comment 10. Due to time constraints, additional information was not incorporated into the reports.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		monitoring report" which "includes monitored elevation profiles in the lagoon" (Hany et al, 2007). Why are the results not presented here? Are there more of these reports? I also expected to see maps of the hydroperiod of the marsh (eg, average hours of flooding per day) and how it has changed over the years due to sedimention. Is it not possible to construct such maps? Moreover, there should be some real data about the effects of the vegetation, eg. ground-level surveys showing change from wetland vegetation to upland vegetation.	
28.	10	This section needs a close-up figure of the hydrography of the lagoon (include berms, culverts and trestles). I can't tell from the existing figures where/how water enters and moves through the marsh.	Comment noted. However, due to time constraint, no changes were made at this time. This comment will be considered in future revisions.
29.	23	Document says "Note that the Highway 101 bridge abutments were recently replaced and have resulted in improved tidal exchange through the area." Increasing tidal flow could induce profound positive changes on the lagoon. Changes, if any, which have been observed in sedimentation rates and/or vegetation since the Highway 101 bridge was replaced in 2005 should be discussed. This could have large implications regarding the amount of reduction in sediment load that is required.	Modeling of current and historic conditions utilized the existing mouth (ocean inlet) geometry. Cross-section data were collected after replacement of the Highway 101 abutments, therefore, the model represents current conditions with respect to the bridge abutments. Examination of the effects of the previous abutments (as affects the ocean inlet geometry) was not required for TMDL development.
30.	23	Document says "This historic land use distribution (Figure 3) was used to calculate the numeric target …"	The reference has been corrected.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		but Figure 3 is actually the 2000 land use, not the 1970s land use (although the 1970s land use is depicted in a figure in Attachment 1).	
31.	23	A USGS quad map is not a very good tool for determining land use, particularly in distinguishing agriculture from "open" land. How was this distinguished? Particularly, was ranching an important land use in the 1970s? Ranching could have an elevated sediment load relative to open land.	An extensive effort was made to locate the best available data to develop a spatial landuse coverage for the historical condition in the watershed. USGS topomaps provided the best information available. The SANDAG 2000 landuse coverage does not break out lands used for ranching versus traditional open space lands, assuming these areas were grouped under that category. Future updates to the model can include a more detailed landuse representation to estimate the loads from these areas.
32.	33	The mid-70s load is calculated using extremely wet (1993) conditions, but this seems inappropriate since the mid-1970s load did not occur under such extremely wet conditions (based on the flow rates presented in Att. 1 Figure 17). Using an extremely wet year to model 1970s load may well greatly overestimate the actual 1970 loads.	See response to comment 3.
33.	33	It seems in appropriate to use a very wet year as the basis to compute loads because sedimentation is a cumulative phenomenon that occurs over several to many years – which will not be represented by an extremely wet year. I believe it would be better to model using a range of rainfall amounts, then weight the results based on the frequency of occurrence of those amounts	See response to comment 4.
34.	35	Document says "Existing loads were estimated based on modeling of current land use conditions (from the SANDAG 2000 land use coverage)",	See response to comment 5.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		so the "current" land use is actually from 2000, now more than 10 years past. Figure 12 in Att. 1 (p 29) indicates a ~20% growth in population from 2000 to 2010. Justify why it is appropriate to use 10 year-old land use to calculate current loading.	
ATTACHMENT 1, Technical Support Document			
35.	1	This needs to be labeled as "Attachment 1: Technical Support Document"	Reference corrected.
36.	32-33	Figures 13 and 14 indicate an *expansion* of wetlands in the lagoon from 2000 to 2009, including near the outlets of Carmel Creek (CC) and LPC – the very place sedimentation should be more severe. Perhaps this is an artifact of the mapping/classification techniques; if so, this should be explained. If it is not such an artifact, it calls in to question the presumption that the sedimentation is impairing wetlands in the lagoon. This issue should be discussed. (The figures do show a change from salt marsh to fresh marsh, but it should be explained why this change can be attributed to sedimentation.)	The wetland surveys depicted in these maps show a coarse representation of wetland areas and types in the lagoon. Also, the report mentions that different survey techniques were used in different years and studies. The purpose of the maps is to show the expansion of freshwater and riparian wetlands in recent years. Sections 4.1.5 and 3.4 state that California State Parks has indicated the sediment is a cause of the impairment and habitat conversion.
37.	35	The document states a "four percent increase in runoff since 1972"; I think that is a mistake – the increase should be much greater than 4%.	The reference has been corrected to state a “four percent increase in runoff per year since 1972.”
38.	40	Document says "Event mean concentrations (EMCs) from storm water and dry weather runoff were collected at the MLS on Los Peñasquitos Creek (LPC) ***near*** the confluence with Carroll Canyon Creek (CCC)." Use of "near" is confusing – is it upstream or	The statement has been corrected to clarify that the MLS is located “immediately upstream of the confluence with Carroll Canyon Creek.”

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		downstream of the confluence? It makes a big difference.	
39.	41	Document says "… presence of the El Cuervo Norte wetland diverting flows from Los Peñasquitos Creek". This is the first time this diversion has been mentioned. It needs more explanation.	A description of the El Cuervo Norte wetland has been included in section 3, Los Peñasquitos Watershed Description, as follows: *The 27-acre El Cuervo Norte wetlands restoration project is located in the Peñasquitos Canyon Preserve and will provide over 24 acres of southern willow scrub, oak-sycamore woodland and freshwater marsh habitat. The project consists of approximately 9 acres of wetland creation, 14.3 acres of wetlands enhancement, 2 acres of upland native buffer, and 1.3 acres of park access road and a San Diego Gas & Electric power pole maintenance area.*
40.	41	I think Sec 5 Data Inventory and Analysis, even as a summary, needs to be expanded to include more details on how much data was collected and when**. It should also address data collected at the ocean inlet and in the lagoon itself.**	W agree with the comment; however, due to time constraints, additional information was not provided.
ATTACHMENT 2, Modeling Report			
41.	8	I don't understand how the Surface Soil Runoff Fractionation was calculated. Please explain more clearly.	The calculation of these values is explained on Pages 6&7: "To account for these differences, 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 (Table 2)"
42.	11	If you were using area-velocity meters, I don't understand why you have to use Manning's equation to calculate flow rate. The area-velocity meter measures average velocity over the entire water	The Technical Support Document (Attachment 1) includes a description of the LSPC modeling framework and cites references for additional information (Pages 24 & 25). Model development requires Manning's equation inputs.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		column, so it need only be multiplied by cross sectional area (derived from water depth and the stage-area relationship) to compute flow rate.	
43.	15	It is quite difficult to collect water samples to accurately compute sediment transport. (see "Improved protocol for Classification and analysis of Stormwater-borne solids" By Larry A. Roesner et al, Colorado State University, 2007). A typical method of collecting a single grab sample is likely to be insufficient to characterize lateral and vertical variability in suspended solids concentrations. Details are needed regarding sample collection procedures and analysis and any QA/QC procedures to verify that representative samples were collected.	See response to comment 6.
44.	15	CC is missing from the list of stations monitored. 12/7/07 is missing from the list of storms monitored.	Stations TWAS-1 and TWAS-2 were only monitored on 11/30/07 and 2/3/08. This is correct in the text and Table 6.
45.	15 and 16	The text on page 15 says Figure 14 presents the "relationship between rainfall and flow", but Figure 14 is labeled with TSS -- not flow. Which is correct? I don't believe a TSS vs. rain plot is meaningful. A plot of TSS vs. flow would be more useful.	Text will be corrected to state: rainfall and TSS.
46.	15-21	In Tables 5-9, include MLS or TWAS- in the station identifier for clarification.	Comment noted. While the stations are identified correctly in the text and tables, this may be confusing; however, due to time constraints, no changes were made at this time.
47.	17	Flow rate should be added to Table 6. Rain column should indicate rain over what period relative to when the TSS measurement was made, and should specify the location of the rainfall measurement.	Comment noted; however, due to time constraints, no changes were made at this time.
48.	19-21	Show TSS pollutographs in	Comment noted; however, due to time

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		graphical form, with the flow hydrograph superimposed on the same graph (ie, one axis for flow, another axis for TSS). This will aid in understanding the relationship between flow and TSS.	constraints, no changes were made at this time.
49.	21 and 22	The USGS often collects "suspended sediment concentration" data rather than "total suspended solids" data. Although identical in concept, they are analyzed differently. The USGS has reported that the two results are often not identical nor comparable ("Collection and Use of Total Suspended Solids Data" by John R. Gray and G. Doug Glysson). Please verify that the USGS data is really TSS and, if it is instead SSC, discuss if it is acceptable to compare with TSS data.	The USGS data are suspended sediment concentrations (SSC). It's not readily known if the pollutograph samples collected were TSS or SSC. Updates to the text will be made based on available information, but may require further investigation in the future to verify the reported parameter.
50.	21	The fact that " TSS concentrations recorded at the MLS on LPC since 2001 were more than five times lower than the data collected by the USGS at both stations" in 1982 to 1986 (including the station that is very near the MLS) seems to contradict the assertion that sediment loadings have increased over time. What explains this contradiction?	Several factors may be attributing to this observation including differing station locations and/or sampling time relative to storms. Due to the difficulties in quantifying sediment loads based off TSS data, these data should not be used solely to compare sediment loadings over time.
51.	22	I don't understand why TWAS-1 and TWAS-2 are included on this graph since I thought they were synonymous with MLS/LPC and CCC respectively.	TWAS-1 and TWAS-2 are different than the MLS and pollutograph stations. Refer to Figures 6 & 7.
52.	22	The EMCs measured by the different methods differ significantly. Which value one uses has large implications on calculation of sediment transport. Is one method considered more reliable than the other and why?	Different methods may have been used in different time period and at different stations. Best available data from different stations and time periods were used to help develop and calibrate the LSPC model.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
53.	23	Present the data in Figures 16 and 17 in a table listing percent (by mass) clay, sand and silt	Comment noted; however, due to time constraints, no changes were made at this time.
54.	26	Text says "Detailed cross section information did not exist for the watershed, therefore, mean stream depth and channel width were estimated using regression curves that relate upstream drainage area to stream dimensions available in the LSPC model setup spreadsheet …"." Drainage area-to-stream dimensions relationships can vary significant from one region to another. Are these relationships specific to this region? If not, how do you know they are applicable to this region?	The LSPC model was developed based on available data to represent the stream channel cross-sections. These data are not specific to southern California. The LSPC model has been successfully applied in multiple watersheds throughout southern California using these assumptions.
55.	26	Text says "Manning's n values ranging from 0.03 to 0.2 reflected very different stream types, including streams with concrete channels to heavily vegetated channels." How was the amount of vegetation in the channels determined?	Amounts of vegetation within channels were determined through visual observations and discussions with monitoring staff.
56.	27	Regarding irrigation, I don't understand how this procedure is appropriate to estimate the amount of irrigation water actually applied. It computes the irrigation demand, but where is the evidence that the amount of irrigation water applied is closely correlated with demand? If these areas are on public water supplies, it may be more accurate to compute irrigation from water use records. With that being said, I expect that very little irrigation takes place in the winter months (when the flows and sediment transport are high) and so it probably doesn't matter. Moreover, the "critical	Representation of the entire hydrologic cycle and water balance components was important for model development, even though the critical period was used to define the TMDL. Water use correlates with irrigation demand. Assumptions used are described on Page 27. Irrigation was assumed to occur year-round.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		period" which was modeled to compute current and target loads ran from 10/1/92 – 4/30/93, which was 1) in the fall and winter when irrigation needs are minimal and 2) a very wet period which further reduces irrigation. So, please discuss irrigation rates in winter.	
57.	28	I am unsure about the applicability of watershed delivery ratios present in a 1975 textbook on sedimentation engineering (Vannoni, 1975). What other estimates of delivery ratios are there? Why have you chosen to used those published by Vannoni? How do you know they are valid in this watershed and climate?	These literature values were used to set the initial parameter values in the model. However, model calibration was used to make necessary adjustments to initial values.
58.	28	How do you know that "Two catchments in the upper watershed (1408 and 1409) had increased rainfall due to higher elevation which was greater than observed at the Alert gage"? I thought there was no gage in those watersheds.	Available rainfall data was scaled based on elevation to account for the difference in the upper watershed. These regional differences were recognized to increase modeling accuracy. Scaling is discussed on Page 28.
59.	34	Regarding oceanic input of sediment, the report says "The concentrations of sand, silt, and clay fractions were set to constant values initially and then adjusted during calibration." When I read this, I took it to mean that there was no independent estimate of oceanic concentrations. But later I saw that Figures 46-58 present observed TSS values at the ocean inlet (although the "Data inventory" section of the report has no discussion about how these data were collected). Why weren't these values used as boundary conditions? Without such a boundary condition, model calibration becomes an exercise of	No data were available on the particle size distribution of oceanic sand input. These initial values were adjusted during calibration based on TSS data collected at the ocean inlet. The TSS data presented in Figures 46-58 were collected at the ocean inlet (lagoon mouth), which is governed by ocean input, watershed input, and local sediment deposition and resuspension. This is different than the oceanic input, which is represented as the ocean open boundary (open ocean far away from the beach). Data were not available to characterize this input.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		adjusting the input concentrations to match the model results -- without regard to whether the input concentrations match reality.	
60.	40	Why are there missing numbers in the "observed flow" column? Why were the time periods 1995-1999 and 2000-2004 for selected for comparison? (I expected the calibration and validation periods to be compared.)	Report will be updated with the missing numbers. Regarding the calibration and validation time periods, the modeling period was divided into two timeframes for calibration/validation. Modeled and observed values are compared within each time period.
61.	39 - 40	Figures 29 and 30 are a good way to compare observed and model results and model results look good, tracking observed cumulative volume. The results in Table 14 look good where it counts – ie, in the 10% highest flows and in the winter flow.	Comment noted.
62.	42-44	I don't understand Figs 33-35. I see only one line on each graph, which I assume corresponding to the same colored line in the legend. There is also black line in each legend, but there are no black lines on the graphs. I'm guessing you plotted observed flow, but omitted modeled flow. Add the modeled flow and include a table of summary statistics (eg, total and peak flow from each event and percent difference).	The Modeling Report has been updated with the correct figures.
63.	44	The report indicates that streambank erosion is significant in CCC and CC, but not in LPC. This doesn't seem tenable since I expect that the geomorphic conditions are similar in each canyon. What would explain the differences in streambank erosion?	See response to comment 3.
64.	44	Model parameters for streambank deposition and scour critical shear stresses varied by reach, as indicated in Appendix B. This	See response to comment 8.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		doesn't seem tenable since I doubt the geologic material change significantly. What is the physical explanation that supports varying these parameters?	
65.	45	The log scale in Fig. 36 confounds comparison of measured vs. modeled. In addition to the Fig, present these results in a table and compute percent error. I expect that several of them will exceed 50%.	Comment noted. No change needed.
66.	46-47	Figure 38 and 39 show poor agreement between measured and modeled flow rates for all 3 storms at all 3 sites, with the model greatly (often >50%) exceeding measured in all cases. (The timing is off too, with the model peaking earlier than measured hydrographs – but errors in timing are not critical for computing sediment loading). The text attributes this disagreement to problems with the rating curves at the sites. This explanation has some credibility in the LPC subbasin because the model-measured flow agreement was good at the USGS station on LPC (over the whole period of record anyway – measured vs. modeled results for these 3 storms at the USGS gage are not presented). For the CCC and CC subbasins, I can find little basis for believing the model results are acceptably accurate.	See response to comment 9.
67.	46-47	Figures 38-39 also show significant disagreement between modeled and measured TSS concentrations. However, interpretation of this disagreement in confounded by 1) the disagreement in the timing of the model hydrograph with the measured hydrograph, coupled with 2) the likely (I have asked to see the	Overall, there is a good agreement between modeled and observed TSS concentrations, as shown in these figures. Measured TSS concentrations are highly variable; therefore perfect agreement is not expected. These results are consistent with the performance of similar modeling studies. See response to comment 9 for modeled hydrograph.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		plot) relationship between TSS and flow. Therefore, I don't think these plots are very useful for assessing the accuracy of TSS predictions. I suggest rescaling the time axis to a non-dimensional "fraction of time to peak flow". I also suggest constructing cumulative TSS mass graphs showing measured and modeled calculations. Given the above mentioned disagreement in flow, I expect there to be large disagreements in these cumulative mass plots.	
68.	48	The text states "The average difference between modeled and measured EMCs for CC, LPC, and CCC was 83%, 51%, and 65%, respectively." These differences seem significantly large; note that these percent differences (which one could interpret as an indicator of uncertainty in the results) are similar to the percent reduction in sediment load required by the TMDL (67%).	See response to comment 10.
69.	49	The report says "suspended sediment simulations reasonably predicted the observed stormwater TSS concentrations in the Los Peñasquitos watershed." The term "reasonably" is ambiguous and subjective and therefore not very useful in judging the appropriateness of the results. Moreover, the goal of the simulation is not only simulate TSS concentrations but to simulate TSS loads. As mentioned above, modeled and measured loads should be compared.	Comment noted. See response to comment 11.
70.	49	The document says " Sediment transported via diffusive bed load processes also has the potential to be a significant source of sediment	See response to comment id number 12.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		loadings; however, this source was neither characterized in the LSPC modeling or would be with traditional TSS sampling" and "Because of the length of those periods without TSS at low levels, bed flow has the potential to be the dominate sediment transport pathway and could add significant sediment to the lagoon." It seems, therefore, unlikely that the TMDL can be accurately calculated without accounting for bed load.	
71.	52-56	The data is too densely compressed on Figures 43-45 to allow interpretation regarding the agreement of modeled and measured values. This data needs to be presented in an additional or alternative way, for example, as a table with error statistics or scattered plots of modeled vs. measured data.	Comment noted; however, due to time constraints, no changes were made at this time.
72.	54	The fact that the model cannot simulate the changing cross section at mouth of the lagoon seems like a serious limitation. The widening and narrowing of the mouth has major affect on tidal flushing and sediment dynamics in the lagoon.	See response to comment 13.
73.	56	The omission of bed load modeling in the lagoon also seems like a serious limitation; bed load is likely a significant component of sediment transport.	See responses to comments 12 and 14.
74.	58-64	Figures 46-58 present observed TSS values at the ocean inlet, but the "Data inventory" section of the report has no discussion about how these data were collected.	Monitoring is described in the report and references. The “data inventory” section was not modified due to time constraints.
75.	58-71	Figures 46-71 show large	Sediment modeling is highly complex and a

Comment ID	Page	Comment	San Diego Water Board Response to Comment
		disagreement between modeled and observed TSS concentrations and those of specific size-classes at the mouth and, even more so, at the lagoon segment. It is not possible, based on these figures alone, to quantify the size of this disagreement nor its implication on the uncertainty of predicted effects of sediment load reductions. Suffice it to say that it appears to me that the lagoon modeling results are not really tenable for use in computing the required sediment reduction.	significant amount of information is provided to compare the modeled vs. observed results. Detailed discussion of the sediment modeling results is provided in the Sediment Calibration section that begins on page 57 of the Technical Support Document (Attachment 1). Please also see response to comment id 10.
76.	71	I would like to see an explicit explanation of how and why the modeled net sediment loading from the ocean showed a 39% decrease from the historical/target condition (9,780 tons) in the 1970s to 5,944 tons currently. How is this tenable?	See response to comment 16.
77.	71	Given that the choice of the target condition was a historical watershed sediment loading, I'm not sure why lagoon modeling is even necessary. It seems to me that one only need compute the sediment load off the watershed. (However, if other ways of reducing sedimentation in the lagoon will be considered such as more railroad trestles, digging more creeks or dredging the mouth more often, then the model could be useful.)	See response to comment 17.
78.	71	I expected the lagoon model results to include sedimentation rates within the lagoon. Ideally, there should be measured sedimentation rates with which to compare the modeled rates. This would be the real "acid test" of the modeling system – can it reproduce sediment accumulation rates in the lagoon?	Observed measurements of sediment loading in the lagoon are not available. This comparison can be made in the future, depending on the availability of information.

Comment ID	Page	Comment	San Diego Water Board Response to Comment
79.	71	This report needs an additional section discussing the application of the model to the critical period, under historical/target and current conditions.	Application of the model to the critical period under each condition is discussed in Sections 8 .6 and 9.3 of the Technical Support Document.