

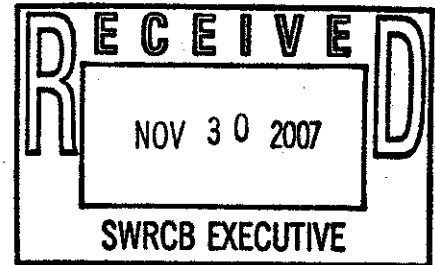
11/19/07 Public Hearing
Enclosed Bay/Estuaries-SQO
Deadline: 11/30/07 by 12 p.m.

Flow Science Incorporated
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November 30, 2007

Jeanine Townsend, Acting Clerk to the Board
Executive Office
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100



Subject: Comments on the Water Quality Control Plan for Enclosed Bays and Estuaries, Sediment Quality Objectives

Dear Chair Doduc and Board Members:

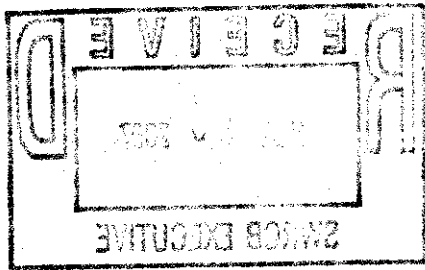
On behalf of the City of Irvine, the Orange County Great Park Corporation, Lennar Heritage Fields, Shea Tustin Legacy Community Partners and the Irvine Company, we appreciate the opportunity to comment on the proposed Water Quality Control Plan for Enclosed Bays and Estuaries of California, Sediment Quality Objectives (SQO Plan) and accompanying Draft Staff Report. Protecting bay and estuary sediments from adverse effects caused by toxic compounds is an important objective that we share with the State Water Resources Control Board (State Board). We are concerned, however, that the draft SQOs may be overbroad. As described below, the draft SQOs appear to identify as "impacted" large portions of certain bays and estuaries, even when there is significant uncertainty that those sediments actually are impacted. We are also concerned that the chemistry thresholds provided by the draft Plan are not predictive of toxicity or other impacts.

We are pleased to provide detailed comments below.

Overall Comments on the SQO Plan

Our experience analyzing the impacts of organochlorine compounds within sediments forms the basis from which we provide several general comments on the proposed SQO Plan, detailed below. More detailed comments are attached to this letter as Attachment A.

I. We request that our ongoing efforts to address sediment quality impairments within the Newport Bay Watershed be deemed compliance with Water Code §§ 13390-13396.7 (Chapter 5.6. Bay Protection And Toxic Cleanup), including the SQO provisions of Chapter 5.6. As detailed below, the County and other stakeholders within the Santa Ana Region have been engaged in a process that is similar in many respects to the process proposed in the SQO Plan. See Attachment A.





Currently, we are developing a work plan to perform stressor identification studies for sediments in Newport Bay. We request that the State Water Board confirm that these efforts, which are being pursued jointly with the Santa Ana Regional Water Quality Control Board in the Newport Bay Watershed to address issues related to sediment quality and toxicity, constitute compliance with the SQO Plan. See Attachment A. See also Attachment 2 to Resolution No. R8-2007-0024 (detailing responsibilities of Working Group and Work Plans in addressing sediment impairment issues in Newport Bay Watershed).

2. We support the use of a Multiple Lines of Evidence (MLOE) approach and Stressor Identification prior to taking management actions. Properly applied, the MLOE approach represents a significant improvement over the current conceptual approaches to assess sediment quality. Existing regulatory programs have a tendency to compare available measurements of concentrations of a limited number of compounds to sediment quality guidelines. However, in our experience, these sediment quality guidelines may be neither site-specific nor scientifically relevant. Inclusion of direct measures of the effects of toxic pollutants, such as toxicity testing of test species and benthic community structure, are important in correctly assessing whether or not sediment is impacted by toxic pollutants. The proposed SQO Plan includes Lines of Evidence for such measures. As detailed in Attachment A, we have concerns with the appropriateness of the chemistry line of evidence, and believe that for many chemicals the threshold values are not predictive of an effect and should not be indicative of an SQO exceedance.¹

Stressor identification is the appropriate course of action when sediments are impaired, and that this process should be initiated *before* TMDLs are developed and *before* management actions are undertaken. Thus, we support the Staff's position that "[g]uideline development should only be initiated after the stressor has been identified." (Appendix A at p. 27.) In many TMDLs and in permits adopted throughout the State, non-regulatory sediment quality guidelines have been used by default as regulatory targets or goals (e.g., as TMDL targets). Stressor identification is necessary to identify the pollutant(s) that are responsible for the observed toxicity and/or benthic community response, and should be able to identify compounds that are not part of the SQO chemistry line of evidence but that may be more likely than those compounds to be responsible for effects. Without stressor identification, management actions may focus only on those pollutants evaluated as part of the MLOE, potentially failing to address pollutants, or other ecological processes, that are not part of the MLOE and that may actually be responsible for the SQO exceedance.

¹ For these reasons, the SQO Plan should expressly clarify that the chemical threshold values should therefore NOT be used for any purpose other than the MLOE evaluation, and specifically should NOT be used as TMDL water quality targets, numeric effluent limitations, triggers for impairment listings, or numeric water quality objectives.



3. **The SQO Plan should require use of current data and assess trends over time.** Our experience throughout the region indicates that it is important to evaluate trends in time and to use current data, which are more representative of current conditions than older data, in evaluating sediment quality. This is particularly important for compounds that have been banned (e.g., DDT, dieldrin, chlorpyrifos) for which concentrations tend to attenuate over time.

4. **The proposed SQO Plan should specify that chemical threshold values described in Section V.H. are not to be used as TMDL targets, or to develop NPDES permit limits, or for any other regulatory purpose.** Neither sediment quality guidelines nor the chemical concentrations thresholds contained in SQO Plan Section V.H. are appropriate for use as regulatory targets because they are not site-specific. Numerous studies have shown that concentrations of pollutants in sediments are largely unrelated to observed effects in any consistent manner (See e.g. Bay et al. 2007, Evaluation of Methods for Measuring Sediment Toxicity in California Bays and Estuaries, SCCWRP Technical Report 503). Chemical concentration thresholds are not appropriate as regulatory targets because of the complex and site-specific factors that govern pollutant bioavailability. The fact that chemical concentrations thresholds alone are unreliable indicators of sediment quality necessitates the use of a MLOE approach to assessing sediment quality and calls into question the appropriateness and utility of the chemistry LOE as described in Section V.A. of the proposed SQO Plan. Even so, chemical concentration thresholds remain part of the SQO Plan and are used in combination with the effects measures of toxicity and benthic community health to assess sediment quality (Section V.H.).

Based on the foregoing, we request that the State Board amend the proposed SQO Plan as follows:

- In Section V.H. (Sediment Chemistry), the SQO Plan should be amended to specify that the chemistry threshold values are not to be used for any purpose other than in the chemistry LOE (e.g., chemistry threshold values should not be used as remediation/clean-up targets) ;
- In Section VII.B. (NPDES Receiving Water and Effluent Limits), language should be added to clarify that the threshold values of Section V.H. are not to be used as, or to derive, either receiving water standards or effluent limitations; and
- In Section VII.G. (Development of Site-Specific Management Guidelines), language should be added to specify that the threshold values of Section V.H. are not to be used to establish site-specific management guidelines or regulatory targets.



5. Recommendations on Program Implementation.

The SQO Plan does not clearly define the implementation process and much of the decision-making is left to the discretion of the Regional Boards. While we agree that Regional Boards should retain some discretion regarding evaluation of local factors and implementation actions, we suggest that the State Water Board should specify how, and in which order, listing decisions, stressor identification, and management actions will be taken. Over the years, many members of the State Water Board's SQO Advisory Committee have worked together to develop flow charts that discuss viable, potential management actions. We have attached these flow charts to this letter as Attachment B, and would be willing to work with State Board staff to discuss these concepts and their incorporation into the SQO Plan.

6. **The State Board should explicitly require the Regional Boards to conduct CEQA environmental analyses and to consider economic impacts prior to the implementation of any management action.** In the environmental analysis section of the Draft Staff Report, Staff makes a distinction between a "program level" and "project level" CEQA analysis, and states that the State Board is conducting a program-level analysis on the proposed SQO Plan.

"[T]his CEQA document represents a program level environmental analysis of the draft Part 1 proposal... The corrective actions that require additional controls and or remediation will require a project level CEQA analysis."
(Draft Staff Report at p.102.)

Although the implementation of management actions "could result in potentially significant impacts" (Draft Staff Report at p. 102), the Draft Staff Report further states that the

"[s]taff anticipate (emphasis added) that all reasonably foreseeable potential environmental impacts will be mitigated to less-than-significant levels through a project specific CEQA analysis, the Water Board's regulatory and permitting process or under through other agencies with jurisdiction in relevant areas..." (Draft Staff Report at p.109.)

It is not possible to determine the environmental impacts of a proposed Plan when the Regional Boards are given such broad latitude and discretion to implement the Plan, and when the stressors and proposed management actions are unknown. For this reason, we agree that it is both appropriate and necessary for the State Board to conduct a project-specific CEQA analysis prior to implementation of management actions at the local level. Thus, we recommend that the State Board explicitly state in the SQO Plan and the Final Staff Report that the Regional Boards are required to conduct a project-specific CEQA analysis so that management actions and alternatives are evaluated fully for their potential environmental impacts.



7. Individual Management Actions Should Also Be Analyzed For Economic Impact.

The report entitled "Economic Considerations of Proposed Sediment Quality Plan for Enclosed Bays in California," prepared by Science Applications International Corporation (SAIC) and dated September 18, 2007 (Economics Report), presents the economic evaluation of the proposed SQO Plan. As with the evaluation of environmental impacts, it is nearly impossible to assess the economic impact of the proposed SQO Plan when stressors have not been identified and when no guidance is provided with respect to the management actions that may be undertaken by the Regional Boards.

Although the Economics Report provides monitoring and stressor identification cost estimates, it does *not* provide cost estimates associated with other implementation actions that may be required pursuant to the proposed Plan (such as remediation or cleanup actions). The costs that are provided for the existing Bay Protection and Toxic Cleanup Program (BPTCP) range up to \$1.03 billion for cleanup of "hot spots" statewide. However, hot spots are, by definition, relatively small areas in larger waterbodies. The proposed SQO Plan will regulate entire waterbodies, yet the State Board apparently believes that the economic impacts of implementing the Plan will be small compared to the implementation of existing programs. If this is the case, we recommend that the State Board provide additional guidance to the Regional Boards on how to consider implementation actions and require a project-level assessment of economic costs *prior* to imposing specific management actions.

The Economics Report estimates monitoring costs for 16 bays for which no (or insufficient) data are available for assessing SQO compliance; these costs range from \$468,900 to \$691,400. In addition to those 16 reaches, the Economics Report looked at the available MLOE data on eight bay segments and estimated costs for Phase I stressor identification testing for those 24 bay segments at \$210,000-\$620,000 *statewide*. However, the County of Orange has currently budgeted significant funding to conduct toxicity evaluations within Newport Bay within the work plan that is being prepared as part of the Newport Bay Organochlorines TMDL working group. See Attachment 2 to Resolution No. R8-2007-0024. Our preliminary budget for the workplan process suggests that the State Board's estimate of statewide costs for stressor identification are at least an order of magnitude too low. Like the assessment of environmental impacts, the assessment of economic impacts appears to have been conducted at a program level. Because the analyses of the SQO Plan were conducted at a programmatic level, we recommend that the State Water Board require the Regional Boards to conduct project-level CEQA analyses, including analysis of a full range of alternatives, when site-specific remediation goals are proposed, when management actions are selected, and/or when NPDES permit limits based upon the SQO Plan are proposed. We also recommend that the State Board specify that economic impacts and feasibility be considered when and if cleanup levels or remediation targets are established following an exceedance and



completion of stressor identification, or when evaluations premised upon the proposed SQO Plan are used in NPDES permitting decisions. Finally, we recommend that the State Board specify in the SQO Plan that the Regional Boards should consider the full range of management actions and alternatives for addressing impaired sediment, including monitored natural attenuation where appropriate..

8. We Support The Development Of Site-Specific Management Guidelines.

We support Staff's recommendation that the "*selection of corrective action can be addressed only after many site-specific factors are considered such as:*

- *The hydrodynamics and flow regime in the area of concern*
- *The specific pollutant that is causing the degradation or impairment*
- *The receptors at risk due to the presence of the pollutants at the levels observed within the area of concern.*
- *The aerial extent*
- *Presence of existing sources or legacy releases*
- *Types of controls in place and feasibility of additional controls" (Draft Staff Report at p. 116.)*

We recommend the SQO Plan be amended to specifically require consideration of site-specific factors such as these in order to guide corrective action decisions when exceedances occur.

Because these and other factors determine the bioavailability and impacts of pollutants in sediments, and because these factors vary from region to region, we support the requirement in the proposed SQO Plan at VII.G to develop site-specific management guidelines, using the result of the stressor identification process and knowledge of local site characteristics.

9. Application of SQOs as Receiving Water Objectives Requires Clarification.

We disagree with Staff's recommendations that narrative SQOs may be applied in NPDES permits as receiving water limits. While we agree with the State Board Staff that application of SQOs as receiving water limits would be far more appropriate than applying SQOs as effluent limits, application as receiving water limits is inappropriate and technically infeasible, at least until stressor pollutants have been identified. Because the relationship between a particular discharge and concentrations in sediments is highly complex, the application of SQOs as receiving water objectives will certainly be problematic. First, SQOs should be applied as receiving water limits only *after* a stressor has been identified. Even if a stressor has been identified, it is unclear how the



permitting agency will ascertain whether a discharge "causes or contributes to" an exceedance of an SQO. The SQO Plan and Staff Report should provide additional guidance in this respect. For example, current discharges may be nearly irrelevant to sediment concentrations if a large reservoir of "legacy" pollutant is present. Additionally, sediments can be mobilized under certain conditions, such that proximity to (or gradients near) an individual discharge point are not necessarily indicative of causation. We also recommend that Staff consider use of other management tools in addition to the insertion of receiving water limits into NPDES permits. In fact, NPDES permits will be an ineffective regulatory management tool in many cases (e.g., for legacy pollutants, where current sources, both point and non-point, may represent only a small fraction of the contaminant reservoir or load within a water body).

Finally, we recommend that the State Board specify in the SQO Plan how "reasonable potential analyses" are to be made (and utilizing what criteria) when it is necessary to evaluate whether a regulated discharge has the reasonable potential to cause or contribute to an exceedance of an SQO.

10. Listing Issues - The State's 303(d) Listing Policy.

The proposed MLOE approach to evaluating SQO appears to be inconsistent with the State's 303 (d) Listing Policy (Listing Policy)², which (in Section 3.6) allows Regional Boards to list a water body as impaired if: (1) "statistically significant... sediment toxicity" is observed, and (2) "the observed toxicity is associated with a pollutant or pollutants...". The Listing Policy specifies that the association of pollutants with toxic or other biological effects can be established using sediment quality guideline exceedances, equilibrium partitioning approaches, or toxicity identification evaluation or similar evaluations. This aspect of the current Listing Policy contradicts, and is less scientifically appropriate, than the proposed MLOE approach to evaluating SQO propriety that is currently incorporated in the proposed SQO Plan.

For this reason, we recommend that the State Water Board amend Alternative 2 of Section 5.7.3 of the Draft Staff Report and Section VII.E.8 of the proposed SQO Plan to specify that the MLOE evaluation approach is to be used to make listing decisions regarding sediment, and that the MLOE approach supersede Section 3.6 of the Listing Policy.

11. Management Priorities Should Be Based Upon Degree Of SQO Exceedance.

In regard to Section 5.6 of the Draft Staff Report, we support allowing Regional Boards discretion to determine whether sediment sites in the "Possibly Impacted" category are impaired or not. As currently drafted in Sediment Quality in Bays and

² Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List, California Water Boards, adopted September 2004.



Estuaries of California (Barnett, et al. 2007), the thresholds between classifications are defined such that large portions of specific water bodies (e.g., the majority of San Francisco Bay, portions of Newport Bay) fall into the "Possibly Impacted" category. Because there is a high degree of uncertainty that "Possibly Impacted" sites are indeed impacted (the "*category designated 'Possibly Impacted' represents the greatest uncertainty and disagreement amongst the LOE of the categories. Stations within this category may be either unimpacted or impacted*" [emphasis added; Staff Report at p. 102]), stations classified as "Possibly Impacted" should not be triggered for stressor identification studies. We suggest that the State Board specify phased implementation of management actions whereby "Clearly Impacted" sites are given high priority by the Regional Boards and addressed prior to "Likely Impacted" or "Possibly Impacted" sites. Since the MLOE approach has "built in" various degrees of exceedance, these should be used to implement stressor identification studies and implementation of management actions.

* * * * *

We appreciate the opportunity to submit these comments, and we look forward to working with the State Board and Staff as the SQO Plan proceeds towards adoption. Please contact me at (626) 304-1134 if you have any questions or if we can provide further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Susan C. Paulsen".

Susan C. Paulsen, Ph.D., P.E.
Vice President and Senior Scientist



Attachment A

Information on activities planned in the Newport Bay Watershed

In June 2002, the United States Environmental Protection Agency (EPA) adopted Total Maximum Daily Loads (TMDLs) to address the State's 303(d) listings for metals, priority organics, pesticides, and "unknown toxicity" in Newport Bay and/or reaches of San Diego Creek, which is tributary to Newport Bay. One part of the TMDLs addressed organochlorine compounds, including DDT, chlordane, and toxaphene, and established TMDL targets based, in part, upon sediment quality guidelines (e.g., ERM and TEL values).

Over the last five years, stakeholders within the Newport Bay Watershed have worked together to evaluate the scientific basis of EPA's TMDLs. Stakeholders are concerned that several aspects of the TMDLs were flawed and have funded several detailed scientific studies to analyze the targets, trends in organochlorine concentrations over time, and the impacts resulting from organochlorine exposures within the Newport Bay Watershed. These studies of the Newport Bay Watershed³ demonstrated that:

- The targets used in the TMDLs include sediment threshold effect levels (TELs) and effects range median (ERM) values, and a review of the underlying data found very significant flaws in these values. None of these targets were intended to serve as regulatory standards, and the flaws in the values are significant enough that they are unsuitable for use as TMDL targets or for any other regulatory purpose.
- Under current watershed conditions, concentrations of DDT and other organochlorines are below levels that would cause chronic toxicity. Recent studies of acute toxicity in San Diego Creek and Newport Bay have found that acute toxicity is not caused by organochlorine compounds, but rather is likely attributable to organophosphate, carbamate, or pyrethroid pesticides.
- Concentrations of organochlorine concentrations within the Newport Bay Watershed have been declining since these compounds were banned, and data indicate that the trends in time are highly statistically significant. Our experience indicates that it is vitally important in establishing regulatory programs to use current data and to consider trends in concentrations and loads over time.

³ Flow Science Incorporated 2006a: DDT Analysis for the Newport Bay Watershed. Flow Science Incorporated 2006b: Toxaphene in the Newport Bay Watershed. Flow Science Incorporated 2006c: Chlordane in the Newport Bay Watershed.



- Many factors are likely responsible for downward trends in organochlorine concentrations over time, including degradation of the organochlorine compounds and changes in land use and sediment control practices within the watershed. It is important to consider the range of watershed- or site-specific factors when evaluating potential management actions.

These studies were submitted as part of an ongoing dialog with the Santa Ana Regional Board (Regional Board), which re-adopted the TMDLs and an implementation plan for the TMDLs in September 2007. See Attachment 2 To Resolution No. R8-2007-0024. In response to the information provided by stakeholders, and in recognition of the outstanding scientific issues related to the TMDL targets, the Regional Board and stakeholders have agreed to work collaboratively to implement a work plan (currently in development) aimed at evaluating the proposed TMDL targets for organochlorine compounds. More importantly, the work plan will include studies to identify the pollutant(s) that are the cause of ongoing chronic and acute toxicity in the sediments of the Bay.

Many aspects of the work plan currently being developed by the Regional Board and stakeholders are similar to key aspects of the proposed SQO Plan. Specifically, the working group will conduct toxicity identification evaluations (TIEs) and other "stressor identification" studies to identify the pollutant(s) responsible for the observed toxicity in the sediments of Newport Bay. Thus, stressor identification is a key component of the work plan and the proposed SQO Plan. The working group will also convene an Independent Advisory Panel (IAP) of experts to review the adopted organochlorine TMDL targets, and, if appropriate, to assist in the development of site-specific targets for the organochlorine compounds in a process similar to the "Development of Site-Specific Management Guidelines," as described in the proposed SQO Plan.

We are hopeful that the current SQO Plan will, by emphasizing stressor identification and by proposing development of site-specific and scientifically relevant targets, support our efforts in the Newport Bay Watershed and allow us to prioritize our expenditure of resources.

Data from Newport Bay demonstrates clearly that chemical concentrations of organochlorine compounds are unrelated to observed toxicity effects. The data collected from Newport Bay show no cause-and-effect relationship between concentrations of DDT and toxicity in Bay sediments. The threshold values contained in Section V.H. of the proposed Plan include concentrations for DDT compounds and chlordane that are well below ambient background concentrations of DDT in Newport Bay; however, there is no indication that these levels affect benthic infauna. We recognize that the State Board does not intend for these threshold values to be used as regulatory targets, but we note that other "screening level" values (such as sediment quality guidelines) are routinely misused as regulatory targets.



Use of a single line of evidence or even two lines of evidence can lead to erroneous conclusions about the causation of sediment toxicity. This fact was noted by the Scientific Steering Committee convened by the State Water Board to assist in SQO development, which explained that

"...the more lines of evidence used in a sediment assessment, the smaller the likelihood of incorrectly designating a site as unimpacted as compared to a single line of evidence...with a full compliment [sic] of triad data, the sediment analyst can be most assured that a clean site is not contaminated, not toxic, and supports a healthy benthos...Therefore, the use of a MLOE approach increases the likelihood of the accurate and correct classification of sediments."

Sediment quality guidelines, including ERMs and TELs, were used in establishing targets within the toxicity TMDLs in Newport Bay. Impairment assessments and TMDL targets for DDT, toxaphene, and chlordane were established in Newport Bay based, in part, on ERM and TEL values. However, several studies have been conducted within the watershed to evaluate chronic and acute toxicity. These studies indicate that DDT and other organochlorine compounds are not likely to cause acute toxicity in the water and sediment of Newport Bay at current levels. See Figure 1 below, which shows little or no correlation between DDT concentration and amphipod toxicity for data throughout the southern California Bight, and Figure 2, which presents a subset of the data in Figure 1 that were collected in Newport Bay. Figures 1 and 2 clearly show no correlation between DDT concentration and amphipod toxicity.



10-Day Amphipod Survival vs. DDT in Southern California Embayments

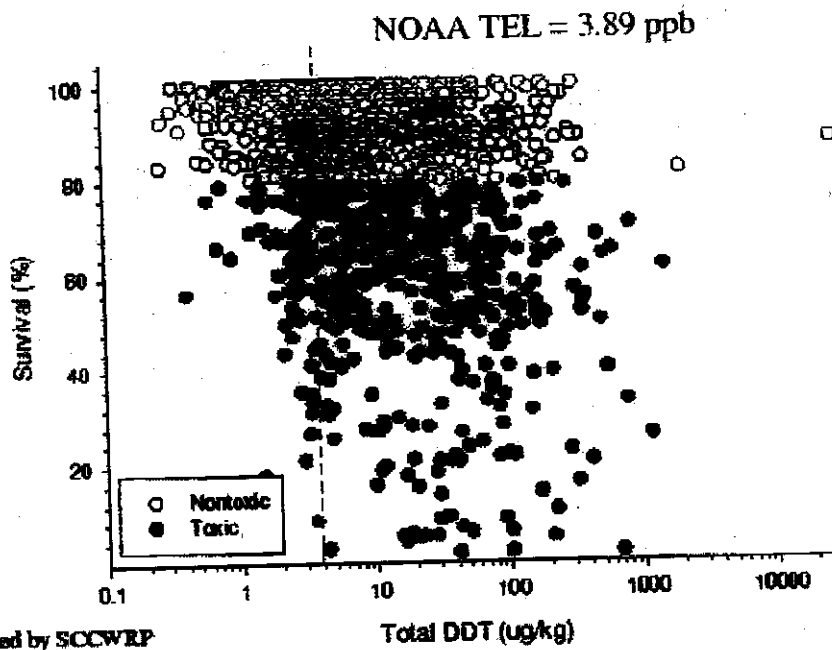


Figure 1. Plot of total measured DDT concentration in sediments of southern California embayments and amphipod survival. Plot produced by Southern California Coastal Water Research Project (SCCWRP), and taken from a presentation made by Kathy Rose of the Santa Ana Regional Board on December 1, 2006.

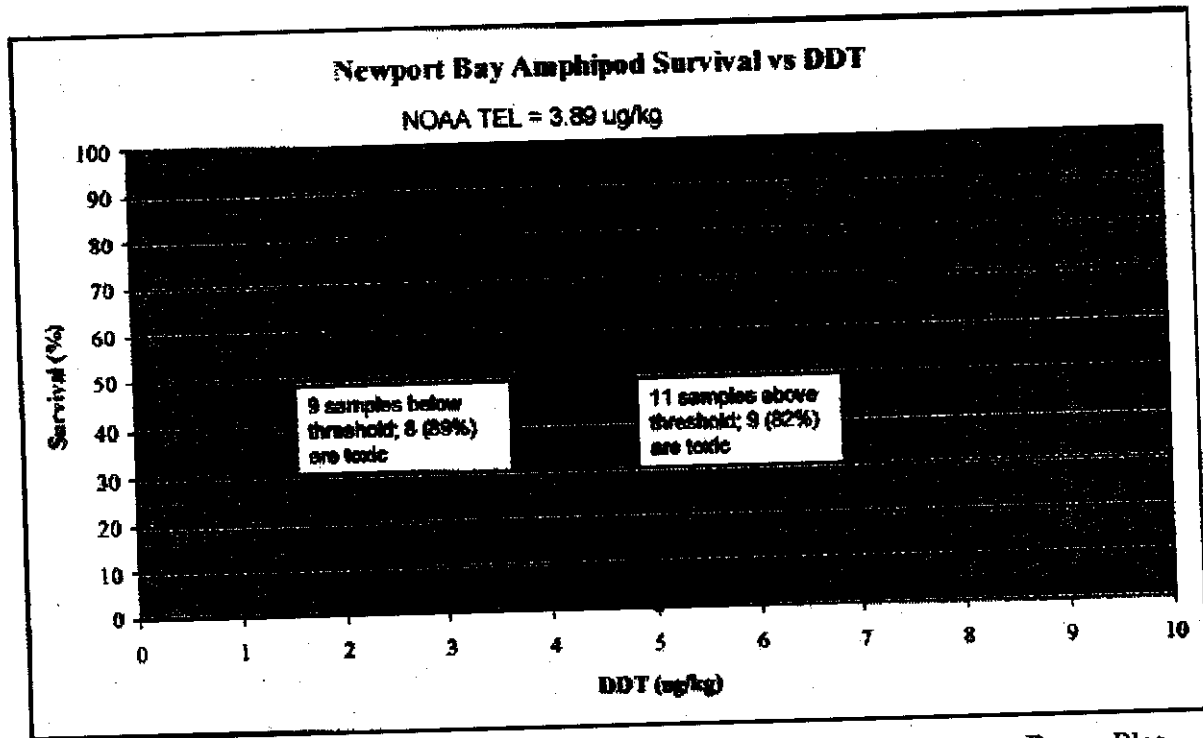


Figure 2. Data from the SCCWRP database were extracted for Newport Bay. Plot shows no correlation between concentrations of DDT in Newport Bay sediments and Amphipod survival. The NOAA TEL value, which is used in the Newport Bay Organochlorine TMDLs, is plotted for reference.

Although acute toxicity occurs in the sediments of Newport Bay, variations in sediment toxicity were not correlated with concentrations of DDT, PCBs, or PAHs (Bay et al., 2004). Research by Bay et al. (2004) concluded that the toxicity may be caused by organic compounds that were unmeasured in their study, such as organophosphate, pyrethroid, and carbamate pesticides. Similarly, Lee et al. (2001) noted that toxicity related to urban storm water runoff is present in Newport Bay, but they believe that the cause of the toxicity is not heavy metals or organochlorine compounds but rather organophosphate pesticides, such as diazinon and chlorpyrifos. Lee and Taylor (2001) also suggest that pyrethroid pesticides should be investigated further as a potential source of toxicity. Thus, available evidence in Newport Bay suggests that we should not be regulating organochlorine compounds, but should be working to identify the compounds that are responsible for toxic effects.

Sediment quality guidelines (SQGs) are not available for many of these newer organic compounds, and concentrations of these compounds are not included in the chemistry line of evidence (LOE) of the proposed SQO Plan. Although the chemistry thresholds proposed within the chemistry LOE of the MLOE approach proposed in the SQO Plan differ from SQGs, there is no reason to believe that they have any predictive value for any individual compound. For this reason, it is important that the State Water Board



specify that (1) the chemistry LOE thresholds are not to be used for TMDL development, to establish cleanup values, or in developing NPDES permit limits; and (2) that stressor identification must be conducted *prior* to implementation of any management action intended to address an exceedance of SQOs.

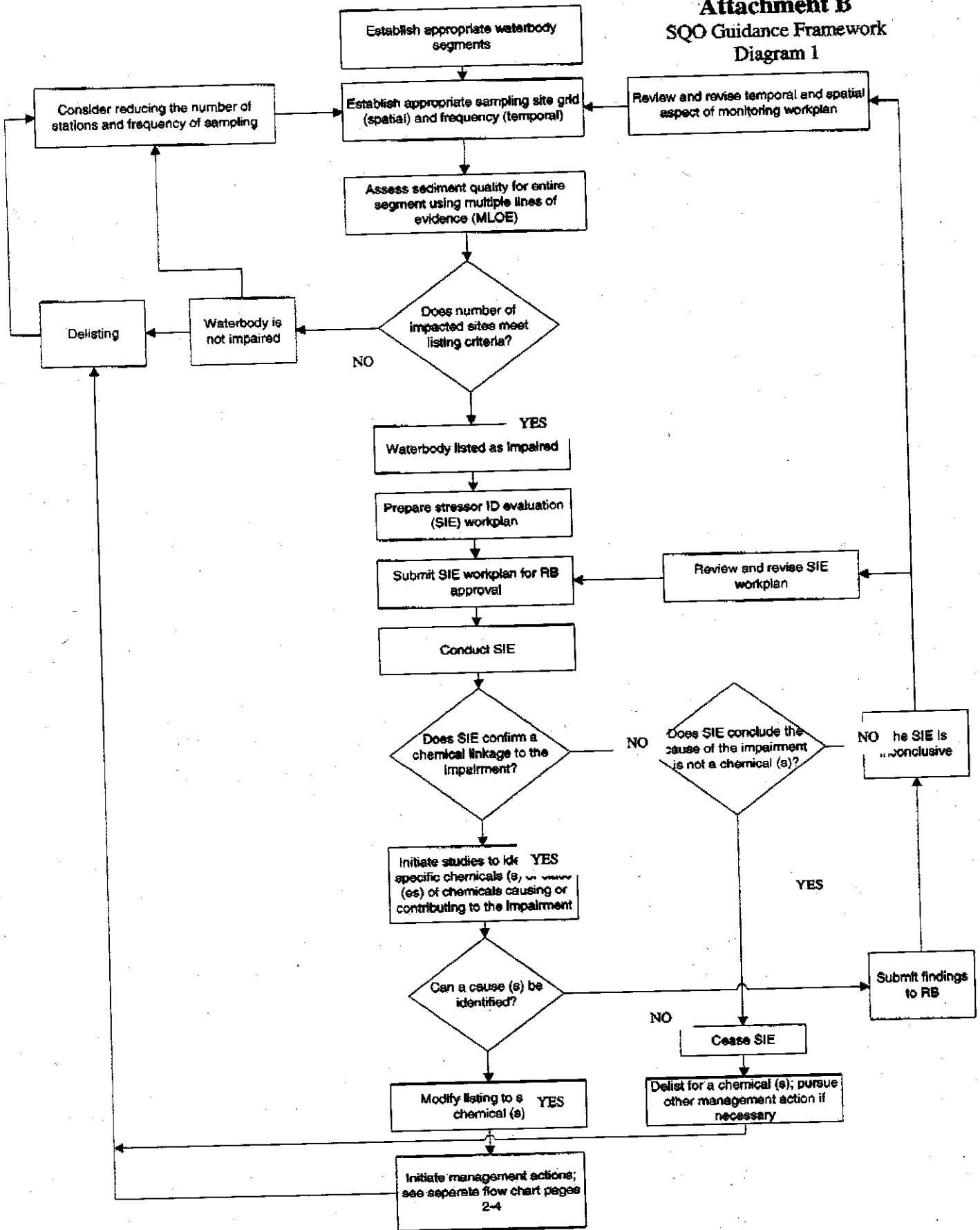
The SQGs used in the Newport Bay TMDL are intended to protect benthic infauna from toxic effects caused by chemical contaminants. The Newport Bay TMDLs are also intended to protect against chronic toxicity that could result from bioaccumulation. However, a review of the scientific literature revealed that relevant wildlife populations are not currently exposed to levels of DDE, a metabolite of DDT, in Newport Bay that are known to cause chronic toxicity, and that the expected continuing decline in DDE concentrations in the environment due to the regulatory ban in 1972, makes it highly unlikely that DDE concentrations in wildlife tissue will increase in the future.⁴

Clearly, use of a single LOE (usually chemical concentrations in sediment alone), or even of two LOEs together, has led to the implementation of management actions that are either unnecessary or that do not have the intended effect. Our work within the Newport Bay Watershed confirms that concentrations of DDT, chlordane, and toxaphene appear to be unrelated to toxicity within sediments. Thus, we support the State Board Staff in their use of Multiple Lines of Evidence (MLOE) and stressor identification to develop site-specific management targets. As discussed in the proposed SQO Plan, a number of factors control the impacts of toxic pollutants in sediments, including chemical factors and interactions, bioavailability, and sensitivity of organisms to particular pollutants in a given setting. Parameters such as pH, salinity, oxygen concentration, sediment grain size, and temperature impact the bioavailability of these pollutants and can vary from one bay or estuary to another. The interaction of these various factors is complex and requires a sophisticated scientific approach.

While we believe that the use of MLOE is scientifically appropriate as an abstract proposition, we note that the State Water Board's implementation of the MLOE approach may be overly conservative. For example, discrepant results within a single LOE are "rounded up" to the category of higher impact. Also, the SQO evaluations appear to be driven disproportionately by the toxicity LOE. Although we support in concept the use of MLOE, we encourage the State and Regional Boards to consider the degree of exceedance, and which of the lines of evidence are responsible for the exceedance, when establishing priorities for implementing management actions.

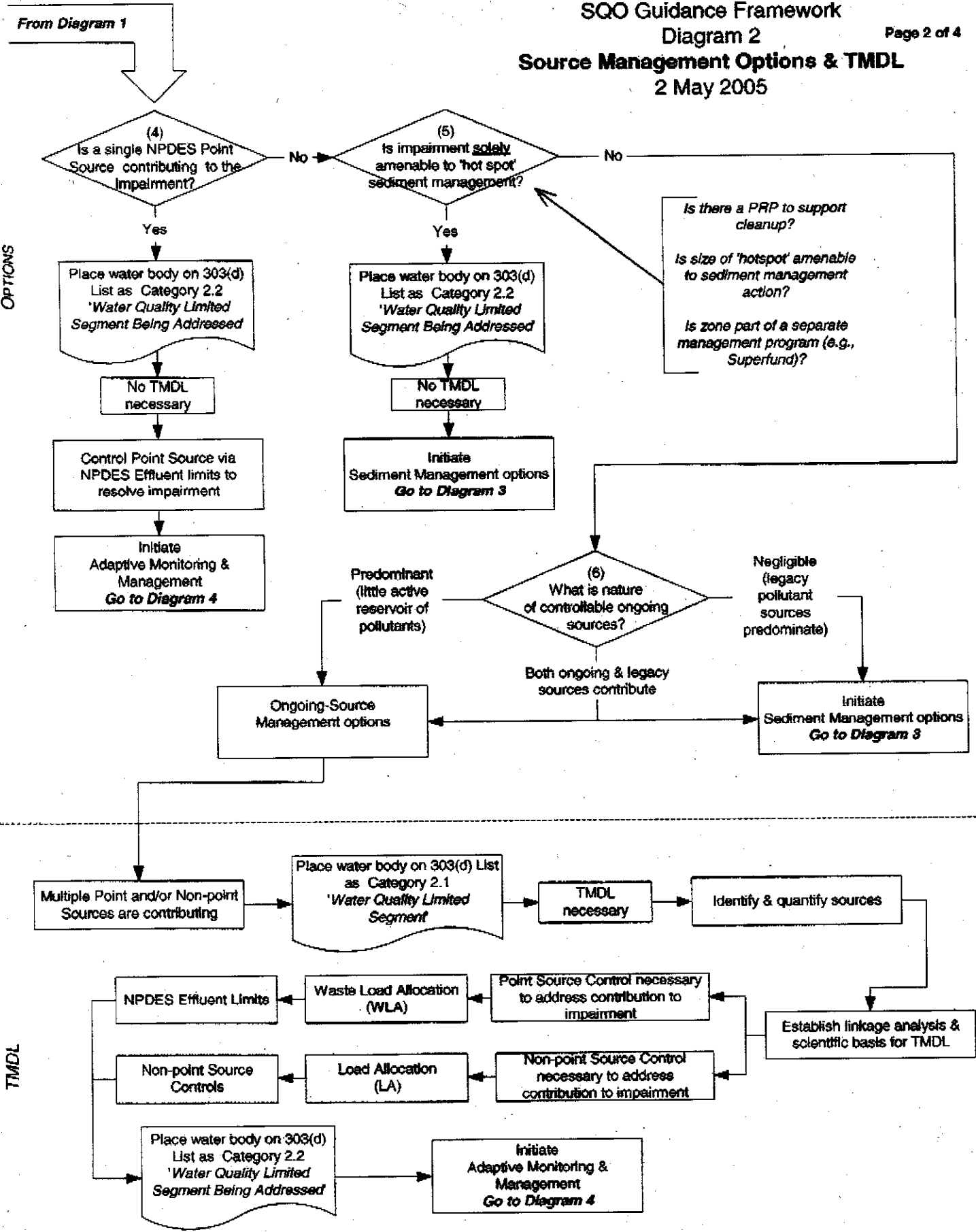
⁴ DDT Analysis for the Newport Bay Watershed, Flow Science Inc., 2006a.

Attachment B
SQO Guidance Framework
Diagram 1



SQO Guidance Framework
Diagram 2
Source Management Options & TMDL
 2 May 2005

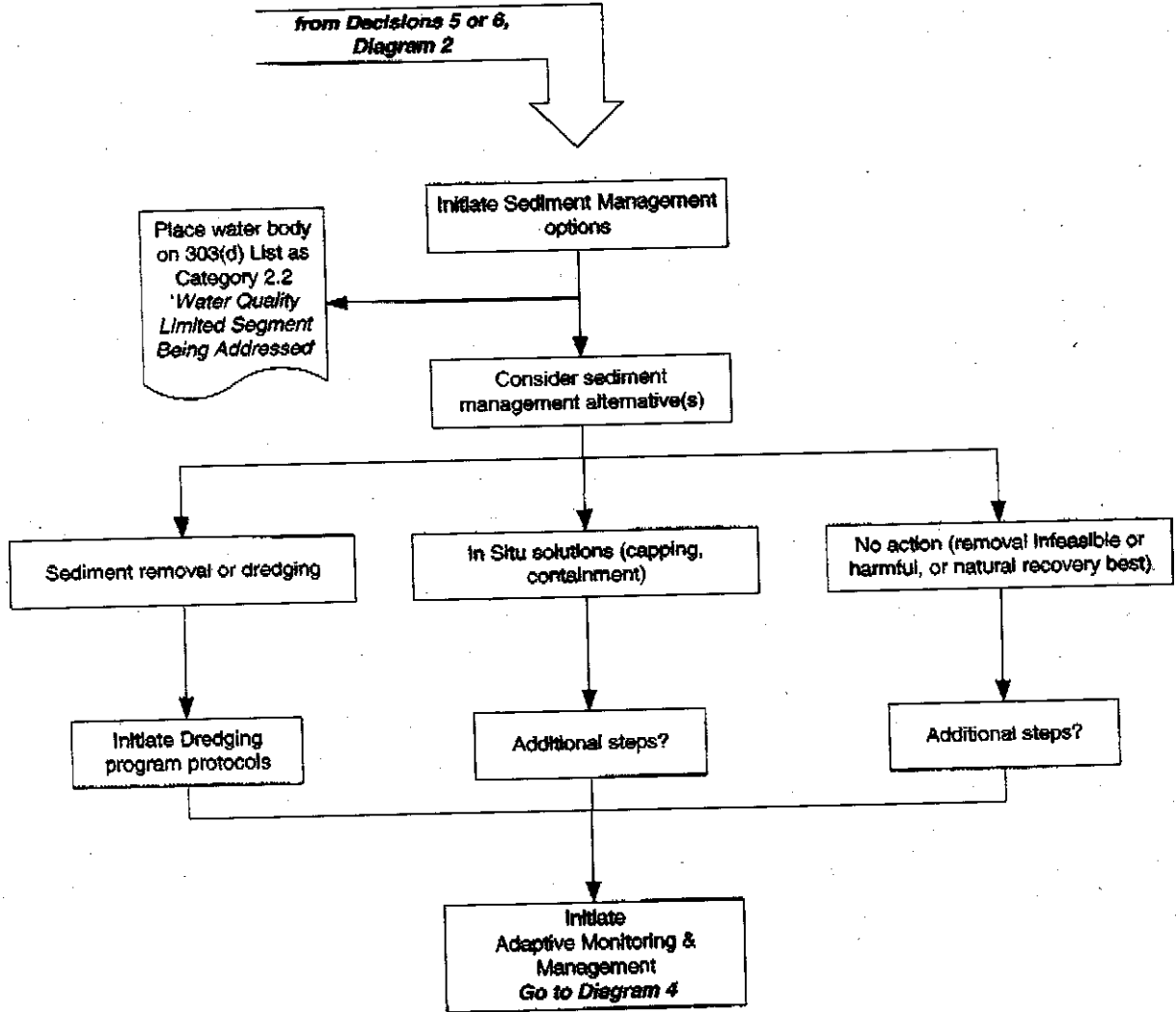
EVALUATION OF SOURCE MANAGEMENT OPTIONS



TMDL

SQO Guidance Framework
Diagram 3
Sediment Management Options
2 May 2005

EVALUATION OF SEDIMENT MANAGEMENT
OPTIONS



SQO Guidance Framework
Diagram 4
Adaptive Monitoring & Management
2 May 2005

