

**California Regional Water Quality Control Board
Santa Ana Region**

February 21, 2003

ITEM: 10

SUBJECT: Basin Plan Amendment Workshop: Incorporation of Diazinon and Chlorpyrifos
Total Maximum Daily Load for Upper Newport Bay and San Diego Creek

DISCUSSION

Summary

Upper and Lower Newport Bay and San Diego Creek have been identified as water quality impaired and included on California's 1998 Clean Water Act Section 303d list. Impairment due to aquatic life toxicity has been attributed largely to diazinon and chlorpyrifos (TMDL Report (Appendix A)).

Development of a Total Maximum Daily Load (TMDL) for diazinon and chlorpyrifos in San Diego Creek, and for chlorpyrifos in Upper Newport Bay was initiated in 2001 as part of the TMDLs for toxic pollutants in the Newport Bay Watershed. The United States Environmental Protection Agency (USEPA) worked jointly with Santa Ana Regional Board staff to develop these TMDLs. On June 14, 2002, the USEPA established TMDLs for 14 toxic pollutants, including chlorpyrifos and diazinon. The TMDLs established by USEPA did not include implementation plans.

The purpose of this workshop is to present and receive comments on the proposed amendment to the Water Quality Control Plan [Basin Plan] for the Santa Ana Region to incorporate the diazinon and chlorpyrifos TMDL and an implementation plan. The workshop also serves as a Public Scoping Meeting pursuant to the requirements of the California Environmental Quality Act (CEQA). The purpose of the scoping meeting is to discuss and receive comments on the proper scope and content of the functional equivalent environmental document to be prepared for the proposed amendment pursuant to the RWQCB's certified regulatory program for basin planning under CEQA Guidelines §15251 (g) (at Title 14, Cal Code of Regs. §15251 (g)).

The following discussion summarizes the detailed information concerning the TMDL, including the implementation plan that is provided in the TMDL report. The proposed Basin Plan amendment is shown in Appendix D.

1.0 INTRODUCTION

Newport Bay Watershed

The Newport Bay watershed is located in Orange County, Southern California. The watershed covers an area of 154 square miles (98,500 acres). Cities located partly or fully within the watershed include Orange, Tustin, Santa Ana, Irvine, Lake Forest, Laguna Hills, Costa Mesa, and Newport Beach (Figure 1). The watershed contains large areas of open space, mainly in the foothills and upper areas of the watershed where development has not yet occurred. Newport Bay consists of a highly developed lower

bay south of the Pacific Coast Highway Bridge, and a less developed upper bay that contains a 752-acre ecological reserve. Average rainfall is about 13 inches per year, with 90% of the rainfall occurring between November and April. San Diego Creek is the major drainage channel in the Newport Bay watershed and contributes about 95% of the freshwater flow into Newport Bay.

2.0 IMPAIRMENT ASSESSMENT

Numeric Water Quality Objectives: The Regional Board has not adopted numeric water quality objectives for diazinon and chlorpyrifos. The USEPA has promulgated numeric water quality criteria for California for priority toxic pollutants, but diazinon and chlorpyrifos are not included in this list.

Narrative Water Quality Objectives: The Basin Plan specifies two narrative water quality objectives for toxic substances. These are:

- (1) Toxic substance shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health, and
- (2) The concentration of toxic substances in the water column, sediment or biota shall not adversely affect beneficial uses.

Although diazinon and chlorpyrifos have been detected intermittently in fish and mussel tissue samples from the Newport Bay Watershed, the observed concentrations (with one exception) do not exceed USEPA or OEHHA screening levels. Thus, the first narrative water quality objective (regarding bioaccumulation) is not a concern.

The second narrative objective, however, is not being achieved. San Diego Creek and Upper Newport Bay were listed as impaired due in part, to pesticide-derived toxicity attributable largely to diazinon and chlorpyrifos. Results from 123 toxicity tests have demonstrated the persistent occurrence of aquatic life toxicity in San Diego Creek and Upper Newport Bay.

Antidegradation Policy: As diazinon and chlorpyrifos are man-made chemicals that do not naturally occur in the environment, it can be argued that their presence in surface water constitutes a lowering of the water quality of that surface water. Pursuant to federal and state antidegradation policies, this is permissible only if beneficial uses are protected, and it can be demonstrated that the lowering of water quality is consistent with the maximum benefit to the people of the state of California.

3.0 NUMERIC TARGETS

At present, there are no established numeric water quality objectives for chlorpyrifos and diazinon. The California Dept. of Fish and Game (CDFG) has developed recommended water quality criteria for diazinon and chlorpyrifos derived using USEPA guidelines. These criteria have not been formally adopted, but are the best scientifically derived guidance available. For this TMDL, the selected numeric targets are the recommended acute and chronic criteria derived by the CDFG for chlorpyrifos and diazinon in freshwater and saltwater. Target concentrations are shown in Table 1. These are the same targets identified by the USEPA in the diazinon/chlorpyrifos TMDL promulgated on June 14, 2002.

Table 1. Selected Numeric Targets

Pesticide	Criterion	Concentration (ng/L)	
		Freshwater	Saltwater
Diazinon	Chronic	50	N/a
	Acute	80	N/a
Chlorpyrifos	Chronic	14	9
	Acute	20	20

Calif. Fish & Game (2000). Chronic means 4-consecutive day average

4.0 SOURCE ANALYSIS

Pesticide Usage

Diazinon and chlorpyrifos are among the top pesticides used in Orange County. From 1995 to 1999, diazinon use averaged about 47,000 lbs active ingredient (ai) per year, while chlorpyrifos use averaged about 110,000 lbs ai per year. In 1999, urban uses accounted for over 97% of diazinon use, while agricultural uses (including nurseries) accounted for the remainder. The usage pattern was similar for chlorpyrifos, with over 95% of the use occurring in urban (particularly residential) areas.

USEPA Phaseout of Certain Diazinon and Chlorpyrifos Uses:

In January 2001, USEPA released a revised risk assessment and agreement with registrants to phase out most diazinon uses. Under the agreement, all indoor uses will be terminated, and all outdoor non-agricultural uses will be phased out over the next few years. In addition, on a national basis, about one-third of the agricultural crop uses will be removed. As urban uses account for over 90% of diazinon use in Orange County, it is likely that the EPA agreement will result in cessation of most diazinon use in the Newport Bay watershed.

The USEPA also negotiated a re-registration agreement with registrants for chlorpyrifos in June 2000. The agreement imposes new restrictions on chlorpyrifos use in agriculture, cancels or phases out nearly all indoor and outdoor residential uses, and also cancels non-residential uses where children may be exposed. In Orange County, residential use likely accounts for over 90% of total chlorpyrifos use and thus over 90% of the current chlorpyrifos use in the Newport Bay watershed is likely to be eliminated.

Data Summary

Over 200 water samples have been collected from the Newport Bay watershed during the period 1996-2001. The overall mean diazinon water concentration was 471 ng/L in the watershed drainage channels and 386 ng/L in Upper Newport Bay. Mean values for both baseflow and stormflow samples exceed both the acute and the chronic numeric targets.

Although twice as much chlorpyrifos is used in the watershed as compared to diazinon, the detection frequency for chlorpyrifos was lower than for diazinon. The overall mean chlorpyrifos concentration was 139 ng/L in the watershed drainage channels and 43.4 ng/L in Upper Newport Bay. Mean chlorpyrifos concentrations under both stormflow and baseflow conditions exceed both the acute and the chronic numeric targets (freshwater and saltwater).

Point Sources: There are thirteen individual waste discharge requirement (WDR) or NPDES permit holders in the Upper Newport Bay watershed. In addition, three general NPDES permits and an areawide municipal stormwater permit apply within the San Diego Creek/Newport Bay watershed. The available data do not currently allow separate quantification of pesticide loads from individual permittees.

Groundwater: Groundwater does not appear to be contributing diazinon and chlorpyrifos loads to the drainage system. Diazinon and chlorpyrifos concentrations are lower downstream of areas where groundwater seeps into the drainage channels, indicating that groundwater serves to dilute the concentrations. Diazinon and chlorpyrifos have not been detected in groundwater sampling conducted by the USGS or by the CDPR in the lower Santa Ana River Basin.

Sediment Remobilization: Diazinon has a relatively low potential to adsorb to sediment, while chlorpyrifos is moderately bound to sediment. Based on the physicochemical properties of the pesticides, sediments are not expected to be a continuing long-term source of loads.

Atmospheric Deposition: As chlorpyrifos and diazinon are often detected in rainfall, the significance of atmospheric deposition as a source of diazinon and chlorpyrifos loading will be investigated as part of the TMDL implementation plan. The TMDL report indicates that chlorpyrifos loading could potentially be significant, however this was based on a single rainfall sample collected in the watershed.

Current Loads

The estimated mean annual diazinon load at the SDC-Campus station is about 32 lbs. This amounts to about 0.3% of the estimated 10,800 lbs of diazinon (ai) used within the watershed in 1999. For chlorpyrifos, the total annual mass of chlorpyrifos entering Upper Newport Bay is about 8 pounds. This is about 0.03% of the estimated 24,300 lbs. ai of chlorpyrifos applied in the watershed in 1999.

5.0 TMDL AND ALLOCATIONS

As in the USEPA promulgated TMDL for diazinon and chlorpyrifos, concentration-based allocations are used for this TMDL. The use of a concentration limit rather than a mass load will better ensure prevention of toxic events caused by elevated concentrations of diazinon and chlorpyrifos. An explicit (10%) margin of safety is included, therefore the concentration-based allocations were calculated as 90% of the numeric target level.

Allocations for San Diego Creek

Table 2 presents the concentration-based freshwater allocations for chlorpyrifos and diazinon; these apply to all point sources (wasteload allocations) and to all non-point sources (load allocations). The diazinon allocations apply to freshwater discharges into San Diego Creek Reach 1 and Reach 2. The chlorpyrifos allocations apply to freshwater discharges into San Diego Creek (Reach 1 and Reach 2) and freshwater discharges into Upper Newport Bay.

Table 2. Diazinon and Chlorpyrifos Allocations for San Diego Creek

Category	Diazinon (ng/L)		Chlorpyrifos (ng/L)	
	Acute	Chronic	Acute	Chronic
Wasteload Allocation	72	45	18	12.6
Load allocation	72	45	18	12.6
MOS	8	5	2	1.4
TMDL	80	50	20	14

MOS = Margin of Safety, Chronic means 4-consecutive day average

Allocations for Upper Newport Bay

Table 3 presents the saltwater allocations for chlorpyrifos in Upper Newport Bay. These allocations apply to all point sources (wasteload allocations) and to all non-point sources (load allocations).

Table 3. Chlorpyrifos Allocations for Upper Newport Bay

Category	Acute (ng/L)	Chronic (ng/L)
Wasteload allocation	18	8.1
Load allocation	18	8.1
MOS	2.0	0.9
TMDL	20	9

MOS = Margin of Safety, Chronic means 4-consecutive day average

Needed Reductions: Estimates of the needed concentration reductions required to achieve the TMDL numeric targets in San Diego Creek range from 90% to 97%. Although the estimated reductions are very steep, the USEPA re-registration agreements should result in a sharp decline in observed diazinon and chlorpyrifos concentrations.

Seasonal Variation/Critical Conditions

Pesticide usage exhibits seasonal patterns, with increasing usage in the warmer months due to increased pest activity. However, runoff into the drainage channels is greatest during the wet season, and higher pesticide concentrations are observed during storm events. The chronic criteria used as the basis for the numeric targets are designed to ensure protection of aquatic life during all stages of life, including the most sensitive stages. The concentration-based allocations (Tables 2 and 3) will apply and be protective during all flow conditions and seasons.

6.0 IMPLEMENTATION PLAN

Planned tasks and the schedule for implementation of the TMDL are detailed in the TMDL report (Appendix A). Aside from the USEPA re-registration agreements, these tasks consist of 1) Revision of discharge permits, 2) development of a pesticide runoff management plan, 3) Monitoring, and 4) Special Studies.

1) Permits: The TMDL allocates wasteloads to all dischargers in the watershed. Since the TMDL is concentration-based, the wasteloads are concentration limits. A maximum four-year compliance schedule (beginning in 2003) is proposed. Interim targets for freshwater, based on ½ the LC50 values for *Ceriodaphnia dubia* would apply until June 2005 (220 ng/L for diazinon and 30 ng/L for chlorpyrifos). Compliance schedules would be included in permits only if they are demonstrated to be necessary, and would require compliance as soon as possible, but no later than December 2007.

2) Pesticide Runoff Management Plan: A pesticide runoff management plan (PRMP) will be developed for the watershed as a cooperative project between the Regional Board and stakeholders. The Regional Board will produce an annual report summarizing information from all sources and evaluating the effectiveness of the PRMP. The annual evaluation report will integrate information from the Regional Board's Stormwater, NPDES, and Non-Point Source programs with data from other agencies and from monitoring projects in the watershed.

3) Monitoring: A Regional Monitoring Program (RMP) has been developed for the watershed as part of the nutrient TMDL. The RMP is intended to provide for efficient monitoring of the watershed through a cooperative, comprehensive monitoring program. The OCPFRD is the lead agency for the RMP. All dischargers are allowed to participate in the RMP in lieu of implementing separate, individual monitoring and reporting programs. The RMP currently includes nine stations in the watershed and five stations in Upper Newport Bay. The monitoring plan for this TMDL will utilize the existing RMP and may include additional monitoring from discharge permit holders in the watershed.

4) Special Studies: Two issues were identified during development of the TMDL that require further analysis: 1) The significance of atmospheric deposition to Upper Newport Bay as a separate chlorpyrifos source; and, 2) The adequacy of the freshwater numeric targets for chlorpyrifos in the tributaries to Upper Newport Bay in achieving the lower saltwater numeric target. Regional Board staff will investigate these issues during the implementation period, and the TMDL may be revised if warranted.

ECONOMIC CONSIDERATIONS

The USEPA re-registration agreements for diazinon and chlorpyrifos will result in dramatic reductions in the use of these chemicals, and switches to alternative pesticides. While these new agreements are identified as a key part of this implementation plan, they are not within the Regional Board's jurisdiction and the costs of their implementation cannot be considered TMDL-related costs.

Information concerning the costs of implementation of this TMDL is being solicited during the public participation phase of consideration of this TMDL. Specifically, potentially affected parties are asked to evaluate the TMDL-related costs, as distinct from those associated with implementation of the re-registration agreements. Given that the re-registration agreements will eliminate household uses of these pesticides, the impacts of the TMDL on urban stormwater permittees are expected to be minimal. Expenditures beyond those now necessary to comply with the established areawide urban stormwater permit would likely be focused on increased/enhanced public education efforts to assure proper pesticide use and disposal. Higher costs are likely to be incurred by agricultural operations (nurseries) to assure that Red Imported Fire Ant (RIFA)-related pesticide applications do not result in pesticide runoff.

6.5 PUBLIC PARTICIPATION

Federal regulations at 40 CFR 130.7 require that TMDLs be subject to public review. The Regional Board, in its consideration and adoption of this proposed TMDL, is following the Basin Planning public review process. A working draft of this TMDL is expected to be presented to the Newport Bay Management Committee for review and comments prior to the public workshop scheduled for February 21, 2003. A public hearing is tentatively scheduled for April 4, 2003.

6.6 CONSIDERATION OF ALTERNATIVES

No Project

The "No Project" alternative would be no action by the Regional Board to adopt a TMDL with implementation measures and a monitoring program. This alternative would not meet the purpose of the proposed action, which is to correct ongoing violations of the Basin Plan narrative objective regarding toxic substances and adverse impacts to beneficial uses. This alternative would result in continuing water quality standards violations and threats to public health, and would not comply with the requirements of the Clean Water Act. This alternative would also not be consistent with the USEPA TMDL established in June 2002.

Alternatives based on alternative compliance schedules and/or alternative numeric targets

The Regional Board could consider a TMDL that is based on alternative numeric targets, such as those derived via application of a Probabilistic Ecologic Risk Assessment (PERA). However, the proposed numeric targets are based on the best scientific information now available concerning the toxicity of diazinon and chlorpyrifos and, thus provide the best assurance that the narrative water quality objective for toxic substances will be achieved and that beneficial uses will be protected. The proposed numeric targets are therefore consistent with the purpose of the TMDL. The USEPA has found that the PERA would not assure water quality standards protection as required by the Clean Water Act.

The Board could also consider an alternative TMDL implementation strategy that is based on a different compliance schedule approach. Adoption of a longer schedule would prolong non-attainment of water quality standards. The proposed compliance schedule approach reflects the timing of implementation of the re-registration agreements, which are expected to result in significant reductions in the use of diazinon and chlorpyrifos. The proposed compliance schedule approach is therefore reasonable and attainable.

Proposed Alternative

Staff believes that the recommended TMDL reflects a reasoned and reasonable approach to the reduction of aquatic life toxicity in San Diego Creek and Newport Bay. The proposed implementation schedule also provides a realistic time frame in which to complete the tasks required by the TMDL.

6.7 SCIENTIFIC PEER REVIEW

The TMDL report (Appendix A) has been scientifically peer reviewed. Peer review comments and staff responses are included as Appendix B. The peer review recommended inclusion of additional data on the physiochemical properties and degradation pathways for diazinon and chlorpyrifos. These data have been incorporated into Table 3-1 and Table 4-1 of the TMDL report and additional text describing the hydrolysis pathway for diazinon degradation has been included in Section 4.1.

6.8 ENVIRONMENTAL CHECKLIST

The Basin Planning Process has been certified by the Secretary of Resources as functionally equivalent to the requirement of the California Environmental Quality Act (Public Resources Code Section 21000 *et seq.*) for preparation of an Environmental Impact Report or Negative Declaration.

As previously stated, the February 21, 2003 workshop will serve also as a public scoping meeting to discuss the proper scope and content of the functional equivalent environmental document to be prepared for this proposed amendment.

The Regional Board is required to complete an environmental assessment of any changes it proposes to make to the Basin Plan. The environmental checklist (Appendix E) determines that there are no significant adverse environmental impacts from the proposed Basin Plan Amendment. The amendment package, and supporting documentation are functionally equivalent to an Environmental Impact Report or Negative Declaration.

6.9 PROPOSED BASIN PLAN AMENDMENT

The Basin Plan amendment package includes the following six documents:

1. February 21, 2003 Staff Report
2. TMDL Report
3. Peer Review Comments and Responses
4. Draft Resolution
5. Draft Basin Plan Amendment
6. Environmental Checklist

The TMDL report and peer review documentation are included as Appendices A and B to this staff report. Appendix C contains the draft Resolution No. R8-2003-039, while specific proposed language changes to

the Implementation Plan (Chapter 5) of the Basin Plan are included as an attachment to Resolution No. R8-2003-039 (Appendix D). The environmental checklist is Appendix E.

**Figure 1-1
Newport Bay Watershed**

