

## COMMENTS REGARDING

*Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks  
Water Quality Attainment Strategy and Total Maximum Daily Load (TMDL)  
Final Project Report (March 2004)*

(listed in the order received)

### LETTERS

**G. Fred Lee, Ph.D.**

**G. Fred Lee & Associates**

March 23, 2004

(2 pages)

**Sejal Choksi**

**San Francisco Baykeeper/Waterkeepers Northern California**

April 9, 2004

(6 pages)

**Donald Freitas**

**Bay Area Stormwater Management Agencies Association**

April 12, 2004

(6 pages)

**James Kelly**

**Bay Area Clean Water Agencies**

April 12, 2004

(4 pages)

**Carl Mosher**

**City of San Jose**

April 12, 2004

(11 pages)

**Douglas Okumura**

**California Department of Pesticide Regulation**

April 14, 2004

(4 pages)

### E-MAIL

**Mary Louise Flint**

**University of California**

April 2, 2004

(1 page)

**Stacy Carlsen**

**Marin County Agricultural Commissioner**

April 9, 2004

(2 pages)

**Diane Fleck (and Debra Denton)**

**U.S. Environmental Protection Agency**

April 29, 2004

(5 pages)

March 23, 2004

Via email: [bjj@rb2.swrcb.ca.gov](mailto:bjj@rb2.swrcb.ca.gov)

Bill Johnson  
SFBRWQCB

Copy to Tom Mumley

Bill,

Following up on your presentation on urban stream toxicity control strategy, as I indicated during the telephone conference call, based on my having been involved in urban area runoff toxicity evaluation for about 10 years (starting in the mid-1990s in Orange County, and then more recently in Stockton and the Central Valley), I find that the approach that you have outlined for addressing stormwater runoff aquatic life toxicity in Bay Region streams is appropriate. While there are a number of details to be worked out, the key issue to success of this program will be the ability to get adequate ongoing monitoring of urban stormwater runoff aquatic life toxicity. In the past the focus of a lot of the Bay Region monitoring was on diazinon measurements. In the future it should be on toxicity measurements because of the shift from one type of pesticide to another. I found that the outline in your "presentation of topics" and your discussion of them is in accord with issues that I have been discussing over the last half a dozen years.

While several of those who participated in the meeting complained about the expense of toxicity monitoring, properly conducted monitoring is part of managing urban stormwater runoff water quality. This expense should be borne by the urban population who wish to use pesticides and other chemicals on their property.

Meaningful monitoring programs require total toxicity monitoring using *Ceriodaphnia* for freshwater and *Mysidopsis* for marine waters, and appropriate freshwater or marine fish larvae. Where toxicity is found with a significant number of deaths in two days, followup studies should be conducted on the same samples, with a toxicity test dilution series, with and without PBO. This approach was used successfully in our Orange County Upper Newport Bay studies, where we defined the presence of toxicity and its magnitude, and initiated a preliminary TIE to determine whether it was OP-caused or pyrethroid-caused toxicity. The sampling should be specifically targeted to event-based runoff situations as well as between runoff events.

Toxicity testing must be an ongoing effort since, as you pointed out, the current regulatory approach for regulating pesticides at the federal and state level does not protect waterbodies from aquatic life toxicity.

Many of the deficiencies you discussed in the registration of pesticides are issues that I have been discussing for about eight years. In connection with my work with the CVRWQCB, Dr. Anne Jones-Lee and I developed the Proactive Approach for screening pesticides for potential environmental impacts associated with their first use in a particular manner in a particular

watershed. This approach should become part of the aquatic life toxicity management program. Adoption of the Proactive Approach that we developed would go a long way toward making up for the deficiencies in the US EPA OPP and DPR registration process. This approach is presented on my website at,

Jones-Lee, A. and Lee, G. F. , “Proactive Approach for Managing Pesticide-Caused Aquatic Life Toxicity,” Report of G. Fred Lee & Associates, El Macero, CA, October (2000). [http://www.gfredlee.com/proactivepest\\_1000.pdf](http://www.gfredlee.com/proactivepest_1000.pdf)

Lee, G. F., “Proactive Approach for Managing Pesticide-Caused Aquatic Life Toxicity,” PowerPoint Presentation to the Sacramento River Watershed Program Toxics Subcommittee, Sacramento, CA, September 26 (2001).  
<http://www.gfredlee.com/ProActivePest.pdf>

One of the issues you did not address in your presentation is how you are going to address additive and synergistic toxicity among pesticides and between pesticides and other chemicals. If you did not discuss this in your report, you should, where you include the potential for toxicity to at least be additive for similar kinds of chemicals and, for some – such as the triazines and OPs – to be synergistic (i.e., toxicity is more than the sum of the toxicities).

Another area that you did not specifically address in the slides or in the discussion is the toxicity of sediments. As I am sure you are aware, sediment toxicity, apparently due to pyrethroid-based pesticides, is becoming quite common. With the widespread use of pyrethroid-based pesticides in urban areas, there should be associated sediment toxicity. This should be part of the standard toxicity testing.

If you should encounter situations where you feel I might be of assistance in helping to support your advocated strategy, please give me a call.

Fred

G. Fred Lee, PhD, DEE  
G. Fred Lee & Associates  
27298 E. El Macero Drive  
El Macero, CA 95618-1005  
(530)753-9630  
(530)753-9956 (fax)  
[gfredlee@aol.com](mailto:gfredlee@aol.com)  
[www.gfredlee.com](http://www.gfredlee.com)

April 9, 2004

Via Electronic Mail

Bill Johnson, Environmental Scientist  
San Francisco Regional Water Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

**Re: Comments on the March 2004 Final Project Report for the Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks TMDL**

Dear Mr. Johnson:

I am writing on behalf of San Francisco Baykeeper, a project of Waterkeepers Northern California ("Baykeeper"), to offer the following comments on the Total Maximum Daily Load ("TMDL") for Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks ("TMDL"). Baykeeper appreciates the time and energy that Regional Board staff has put into this TMDL and implementation plan and welcomes any questions you may have regarding these comments.

Baykeeper commends staff for the development of a well-written and technically thorough document with many proposed solutions to the Diazinon and pesticide-toxicity problem. We are pleased with the TMDL's extensive efforts to curb pesticide toxicity in urban creeks by applying the TMDL's limits to all Bay Area urban creeks and by the Regional Board's foresight to set limits for diazinon replacements.

Substantively, the TMDL takes strong strides toward regulating polluted storm water discharges. The draft identifies urban storm water runoff and dry weather discharges as the largest sources of diazinon additions to urban creeks. By setting toxicity limits equivalent to zero discharge and by selecting more protective water quality criteria for diazinon, the TMDL does not shy away from assigning meaningful reductions in these contributions. Baykeeper applauds the TMDL's requirements for monitoring, documentation and reductions of diazinon discharges by municipal storm water dischargers. Overall, we believe this TMDL is on the right track towards a strong and meaningful Basin Plan Amendment.

However, as currently framed the TMDL raises some concerns that should not go unmentioned. These include, but are not limited to, the need for this TMDL to:

- Allocate loads to all potential sources of pesticide toxicity.
- Require implementation of stronger regulatory controls which will keep toxic pesticides from entering the market.
- Incorporate explicit timelines and compliance deadlines into the Implementation Plan.

- Exercise the Regional Board's and municipalities' full authority to regulate sources.

### **Phase-Outs are Ideal for all Toxic Pesticides**

The problem statement discusses the phase-out of diazinon and the correlated reduction in diazinon concentrations in urban creeks. TMDL at 20; Tables 2.2., 2.3, and 2.5. This praiseworthy success could be referenced in the discussion of regulatory oversight. TMDL at 27 section 4. More importantly, however, the phase-out should be set forth throughout the TMDL Implementation Plan as an exemplar for controlling future pesticide toxicity. Of the stages in the "Management Agency Agreement" only stage (3), mandatory requirements through restricted use pesticide permits, regulations, or other DPR authorities, is likely to be effective. TMDL at 31. The TMDL would be stronger to include this stage and the requirement to phase-out toxic pesticides as explicit actions for all of the decision making entities in the Implementation Plan.

### **Source Assessment**

Despite this TMDL's attempt to regulate all potential point sources of Diazinon and other pesticides, there are other sources that currently contribute and, which may more significantly contribute, to pesticide toxicity in urban creeks. These sources include but are not limited to homeowners, PCOs, nurseries, construction agents, and upstream agriculture/vineyards. While many of the discharges from these sources may enter waterbodies through the storm drain systems, it is entirely possible that any number of these sources have creeks on adjacent or nearby lands, which could result in direct runoff into these waters. As the TMDL also notes, direct discharges of pesticides into waters may also be a potential source of toxicity. TMDL at 43. The TMDL does not currently bring these sources under its regulatory umbrella, and thus it is unclear whether or not these sources will continue contributing to toxicity in urban creeks and may undermine the TMDL's laudable efforts and intentions.

While coverage of all dischargers, even those that are unknown, is of course automatic, it may be appropriate to adjust the TMDL language to include the possibility that the currently labeled de minimus sources may be contributing to more toxicity than is known and will be subject to the TMDLs toxicity limits in the event that they are found to be larger contributors.

### **Numeric Targets**

Baykeeper wholly supports the TMDL's chronic and acute toxicity targets which meet the Basin Plan's narrative objective for no toxicity. As noted in the Numeric Targets section, while "toxicity was frequently observed in urban creeks during the 1990s...[m]ore recently, toxicity has been observed less frequently." TMDL at 58. While it is noteworthy that the TMDL calls for an elimination of toxicity, this approach may not be effective unless it can be tied into an implementation strategy. The earlier

1990s data correlates creek toxicity to diazinon. Missing from the analysis, however, seems to be a discussion of whether the toxicity that is being detected in 2004 is related to the continuing use of diazinon, the substitution of other pesticide for diazinon, or other causes. Even if the source of existing toxicity is currently unknown, once the cause of toxicity is determined, a step in the Implementation Plan should more directly address this issue and some actions to take.

The section continues by stating that future sampling may indicate that other toxic chemicals besides pesticides may be responsible for toxicity. TMDL at 59. While management strategies unrelated to pesticides may be “beyond the scope” of this TMDL, there should certainly be actions in the implementation plan which require the monitoring entities to notify the appropriate sections within water agencies about the data of this toxicity.

### **Implementation Plan**

While further sampling may be necessary to identify specific sources when toxicity exceedences are found, the dual focus of the action plan should be to implement stronger pesticide control measures. The TMDL process should not only be used to monitor and identify sources of toxicity but also to improve the regulation of discharges of specific toxic pollutants. For instance, while it may be a difficult task for the Department of Pesticide Regulation and the State Water Board to work more closely on ensuring that toxic pesticides are simply not allowed to enter the California market, this achievement would be more effective than attempting to convince the public not to use pesticide products that are widely available, heavily advertised and promoted, and legal.

The Strategic Goals set forth on page 79 are commendably far-reaching. But many of the actions to be taken, especially by the Water Board, are vague. When, for example, will the Water Board decide that it has succeeded in ensuring “all pesticide applications in California comply with the Federal Clean Water Act and the Porter-Cologne Water Quality Control Act?” TMDL at 81. Additionally, the analysis indicates that spraying of hard surfaces and ant control are the main pathways by which pesticide-related toxicity occurs. TMDL at 43, Tables 6.6-6.9. The actions in Tables 10.3 -10.10, however, do not focus on these specific causes or link these insights to priorities for action. It is unclear how any of the “research and monitoring” items or even the “education and outreach” plan will result in less pesticides being applied to hard surfaces or for ant control. There is no doubt that the TMDL will more effectively reduce pesticide toxicity with an Implementation Plan that more directly focuses the actions towards actual source reduction and regulation.

### **Timeline for Compliance Must be Included**

The failure of the TMDL to propose a time frame contradicts the Clean Water Act’s articulated goal of creating fishable, swimmable, and navigable waters by 1983. 33 USC §1251(a).

The actions in the Implementation Plan lack deadlines for compliance, measurable objectives, standards, and a prioritization of activities for achieving the goals. Baykeeper understands and appreciates that many of the activities in the implementation plan are currently being implemented. We see no reason, however, as to why the Implementation Plan cannot contain more specific timelines to meet requirements. The adoption of municipal ordinances, for instance, should be put into place within a year after this TMDL is adopted. If tight timelines and benchmarks are not required, momentum may not move forward with regard to those items in the plan that are not currently under way and that are perceived to be more “drastic” changes. A timeline and prioritization of actions is necessary in order to ensure that the Implementation Plan is effective at reducing pesticide toxicity within a reasonable period of time, especially when the diazinon ban continues to encourage entities to switch to alternatives of unknown toxicity (such as pyrethroids).

Furthermore, Baykeeper strongly believes that there must be an end date for compliance with the actions and clear consequences for an agency or discharger’s failure to comply. Without a clear end date, the implementation of this TMDL could go on indefinitely while toxicity remains and only the most easily accomplished and/or least effective actions are fully completed. Without consequences, no discharger or regulatory agency will have an incentive to implement the more challenging, and more promising, actions in the TMDL. And without a date after which there is an outright prohibition on toxicity, rather than just resulting in additional monitoring, there will be no triggers to creatively implement new practices and regulations, which will undoubtedly achieve the most successful toxicity reduction.

### **Monitoring and Adaptive Management**

The inclusion of an adaptive management plan and the monitoring questions on page 89 of the TMDL is laudable. Baykeeper recommends that the discussion on adaptive management include an analysis of the level of monitoring (i.e., the number of samples) that will be required to “represent the essential range of creek conditions.” TMDL at 90. This level of resolution is needed to answer the five bulleted questions on page 89 and to “provide an explicit rationale for why additional measures to control pesticide discharges will either be impracticable or ineffective.” TMDL at 92. Without such analysis, it will be unclear whether the dischargers’ monitoring program envisioned by the TMDL is feasible and effective.

### **CEQA Requires Precaution**

The TMDL commendably takes a precautionary approach by reaching all Bay Area urban creeks and addressing pesticide-related toxicity, but it could do more to ensure that toxic pesticides do not pollute Bay Area creeks. The Precautionary Principle provides that when an activity raises threats of harm to the environment, precautionary measures

should be taken even if some cause and effect relationships are not fully established. The proponent of the discharge should bear the burden of proof, not the general public. The Precautionary Principle is not outcome determinative, it merely requires analysis of less harmful options and explicit determination that a discharge's proponent has come forward with proof (and that the decision maker has considered the proof) that the activity should proceed.

CEQA, which mandates a precautionary process prior to agency action, applies to the Basin Plan amendment to incorporate the TMDL. In this case, the activities that raise a risk of harm are continued additions of pesticides to urban creeks. The decision to provide for any ongoing discharges, the level at which those discharges will be permitted, and the risks of harm to the public at large as well as specifically impacted populations, should be considered explicitly in the document. Even harms that are not scientifically certain must be considered.

The Precautionary Principle provides that scientific uncertainty should be resolved in favor of the public, not the discharger. This framework provides a strong economic incentive for a discharger to come forward with evidence that resolves the question. Most importantly, a precautionary approach makes explicit what is often an implicit policy decision about who bears the cost of pollution.

Since this TMDL, decides who will bear the cost of pesticide contamination the decision making process should be clear and articulated. If discharges will continue, they must be clearly weighed against the interests of current urban creek users, including the most heavily impacted communities. Along these lines, Baykeeper suggests that the Regional Board require not only phase-outs of existing toxic pesticides, but also a ban on approving new pesticides for the sale in California until they are proven safe for human and environmental health.

Finally, Baykeeper believes that while California pesticide law gives only the Department of Pesticide Regulation the obligation to regulate pesticide use under section 11501.1 of the California Food and Agriculture Code, federal law preempts state law with regard to the use of toxic pollutants that are discharged into California waterways. The State Board and Regional Boards are not considered a "local government agency" as defined by section 11501.1, and thus, the California pesticide law does not preempt actions taken by Regional Boards acting under federal authority. The CWA and its implementing regulations impose a clear and unambiguous obligation on the State of California to allocate loads to all sources. (33 USC §1313(d)(1)(C), 40 CFR §130.2(g) and (h).) Therefore, the entities regulated by this TMDL have authority to place stringent requirements in NPDES permits under section 303 of the CWA and, in fact, are required to do so through federally delegated permitting responsibility.

For the forgoing reasons, Baykeeper urges the TMDL be amended to: (1) allocate loads to all potential sources of pesticide toxicity; (2) require implementation of stronger

San Francisco Bay Regional Water Board

April 9, 2004

Page 6 of 6

regulatory controls which will keep toxic pesticides from entering the market; (3) incorporate explicit timelines and compliance deadlines into the Implementation Plan; and (4) implement stronger regulations in permits and ordinances to control private and municipal pesticide use.

Sincerely,

/s/

Sejal Choksi

Pesticide Program Attorney

San Francisco Baykeeper/Waterkeepers Northern California



# B A S M A A

Alameda Countywide  
Clean Water Program

Contra Costa  
Clean Water Program

Fairfield-Suisun  
Urban Runoff  
Management Program

Marin County  
Stormwater Pollution  
Prevention Program

San Mateo Countywide  
Stormwater Pollution  
Prevention Program

Santa Clara Valley  
Urban Runoff Pollution  
Prevention Program

Vallejo  
Sanitation and Flood  
Control District

April 12, 2004

Bill Johnson  
California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

**Subject: Comments on the Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks: Water Quality Attainment Strategy and Total Maximum Daily Load (TMDL) - Final Project Report**

Dear Bill:

This letter is submitted on behalf of the Bay Area Stormwater Management Agencies Association (BASMAA) in response to the invitation to submit comments on the subject report (Report). We first want to commend you and the other Regional Water Board staff members for all the work that has gone into drafting the Report and we appreciate the opportunity to provide comments. As you know, BASMAA has been intimately involved in the effort to identify and characterize the sources of and develop solutions to the problem of pesticide-related toxicity in Bay Area urban creeks for over ten years. We are submitting these comments in part because of concerns we have regarding the impact of subsequent related Basin Plan amendments may have on our programs and agencies but primarily because, like the Regional Water Board, we are interested in eliminating pesticide-related toxicity in our creeks.

BASMAA has three general comments on the Report:

- (1) the distinction between the water quality attainment strategy and the TMDL should be much more clearly delineated;
- (2) the implementation plan for the TMDL should be developed and adopted through a separate process from the development and adoption of the TMDL; and
- (3) all potential sources of diazinon and pesticide-related toxicity in urban creeks should be separately addressed.

These items are explained in detail below. We also have included additional recommendations for specific revisions as an attachment.

## 1. Clearly separate the TMDL from the Water Quality Attainment Strategy

The Report is an improvement over the Preliminary Project Report (dated September 2002) in that it explicitly states that the TMDL is for diazinon only and does not include pesticide-related toxicity. However, the Report continues to treat the diazinon TMDL and the pesticide-related toxicity water quality attainment strategy (WQAS) as if they were one in the same. This intermingling leads to unnecessary ambiguity, particularly in three sections of the report:

Bay Area  
Stormwater Management

Agencies Association

1515 Clay Street

Suite 1400

Oakland, CA 94612

510.622.2326

[www.basmaa.org](http://www.basmaa.org)

- 1) **Numeric Targets** – pesticide-related toxicity is inappropriately addressed under the TMDL through the development of generic toxicity targets that are not specific to diazinon and therefore are beyond the scope of the diazinon TMDL;
- 2) **Allocations** – the recommended wasteload allocations for urban runoff reference the generic toxicity targets which are not specific to diazinon and therefore are beyond the scope of the diazinon TMDL; and,
- 3) **Implementation Plan** – it is not clear which activities relate to the TMDL versus the WQAS.

Additionally, the mixing of the WQAS for pesticide-related toxicity and the diazinon TMDL has lead to inappropriate assumptions. For example, some of the implementation actions appear to be based on the assumption that the sources and pathways of future pesticide-related toxicity in urban streams will be similar to the sources and pathways of diazinon related toxicity. We should not make that assumption. As you know, new pesticides are constantly being brought to market and gaining market share while others are losing market share. We cannot predict what the pesticide market will look like in ten or twenty years, what the physical properties of those pesticides will be, or which applications may be causing water quality impacts.

We recommend that the Report be revised so the diazinon TMDL, including recommended targets, allocations, and implementation actions, can be clearly separated from the WQAS for pesticide-related toxicity. This can be done by revising the Report to include separate sections for the diazinon TMDL and the WQAS for pesticide-related toxicity, or by developing two separate reports.

## 2. Separate the Implementation Plan from the TMDL

Neither the Clean Water Act nor the U.S. Environmental Protection Agency's (USEPA) regulations require the State Water Resources Control Board or the Regional Water Boards to seek USEPA approval of TMDL implementation plans. TMDL implementation is instead largely a function of state law. By combining the TMDL and the Implementation Plan, the Report blurs this distinction, and thereby will likely undermine the State's authority and flexibility with regard to TMDL implementation. The Regional Board should instead, separate the establishment of the "technical" TMDL (*i.e.*, the calculation of acceptable loading and allocations) from the development of TMDL implementation policies, actions, and schedules.

Sections 13241 and 13242 of the Porter Cologne Act, governs the implementation of TMDLs. The Porter Cologne Act requires Regional Water Boards to consider factors in addition to the considerations mandated by the CWA. When developing implementation plans for TMDLs, the Regional Water Board must take into account beneficial uses of the impaired waters, environmental characteristics of the hydrographic unit under consideration, reasonable limitations on water quality conditions, economic considerations, the need for developing housing, and the need to develop and use recycled water. (Water Code § 13241.) In contrast, USEPA is not required to consider all the factors identified by the Porter Cologne Act.

Stormwater agencies have generally been supportive of linking implementation planning with TMDL development, however by mixing the process of establishing (developing and approving) TMDLs with the process of developing TMDL implementation plans, the Regional Board effectively risks ceding substantial State authority and discretion to the federal government.

Therefore, in order to maintain the flexibility and independence for the Regional Water Board to implement the TMDL in accordance with the considerations required by the Porter Cologne Act, the Regional Water Board should separate the process into two parallel stages and documents, developing the “technical” TMDL and submitting it to USEPA for approval, and developing the TMDL implementation plan in a separate step of the process in which USEPA approval is not required. Separating the “technical” TMDL from the implementation plan would also help to eliminate some of the ambiguity discussed above in item one.

### **3. Develop Allocations for all Sources of Diazinon and Separately Identify all Sources of Pesticide-Related Toxicity**

The diazinon TMDL and the WQAS for pesticide-related toxicity do not address sources other than municipal storm drain systems. The Report states that “the only source of pesticides in Bay Area urban creeks is essentially urban runoff from storm drains.” As the use of the word “essentially” indicates, there are other sources, and in the future these other sources may be as or more significant than discharges from municipal storm drain systems. The fact that these other sources have not as yet been identified as causing significant problems does not mean that they will not be identified in the future. Many or most urban creeks in the Bay Area have their headwaters in rural areas. Some of these rural areas have extensive agricultural activity occurring in them. We may find that pesticide applications on these agricultural lands are causing toxicity problems downstream in “urban” creeks. Many of these “urban” creeks also have water supply reservoirs upstream. These reservoirs are often treated with pesticides to control algal growth and there have been instances where these pesticides have been detected downstream in significant concentrations. In addition, the Report states that diazinon is not conveyed through groundwater due to its relatively low solubility and the anticipated replacement pesticides are even less soluble. However, imidacloprid is currently registered for use for injection into the soil for termite control as well as for lawn and garden use. Imidacloprid is far more soluble than diazinon and is on the California Department of Pesticide Regulation’s Groundwater Contaminant List. If imidacloprid gains significant market share, groundwater conveyance could be a significant source of pesticide-related toxicity.

In addition to these potential future scenarios, there may be current sources of diazinon in Bay Area urban creeks other than those conveyed by urban runoff. The Report states that “Some agricultural pesticide use does occur within the Water Board’s jurisdiction, but it is a negligible contributor”, and notes that “...less than 2% of all the reported and unreported diazinon use in the Bay Area that year” [2000] was for agricultural purposes in the nine Bay Area counties. Normally, less than 2% might be negligible, but given the research that shows it takes less than a fluid ounce of active ingredient to cause toxicity in urban creeks, no source can be considered negligible or insignificant. Given the miniscule amounts of diazinon it takes to cause an impact, using the approach toward sources described in the Report, it is very possible that all sources of diazinon to urban runoff could be eliminated and there would still be diazinon in urban creeks. After December 2004, the following uses of diazinon will still be allowed: use for food crops, fruit trees, ornamental nurseries, cut flowers, cattle, and squirrels.

We therefore recommend that all potential point and non-point dischargers to urban creeks: (1) be assigned equivalent concentration-based allocations in the diazinon TMDL; and, (2) be separately addressed in the WQAS for pesticide-related toxicity.

BASMAA Comments - Diazinon TMDL / Pesticide-Related Toxicity WQAS Final Project Report

Thank you again for this opportunity to comment on the Report. We look forward to continuing to work with you on this issue. Please contact me at (925) 313-2373, Jim Scanlin (510) 670-6548, or Geoff Brosseau (510) 622-2326 if you have any questions regarding the comments or suggested changes.

Sincerely,

A handwritten signature in black ink, appearing to read "Donald P. Freitas". The signature is fluid and cursive, with a large loop at the end.

Donald P. Freitas  
BASMAA Executive Board Chair

Attachment: Additional BASMAA comments

cc: Jim Scanlin, ACCWP / CEP Diazinon Work Group  
Geoff Brosseau, BASMAA  
Arleen Feng, BASMAA Monitoring Committee / CEP Technical Committee  
BASMAA Executive Board  
Robert Hale, ACCWP  
Kevin Cullen, FSURMP  
Liz Lewis, MCSTOPPP  
Bob Davidson, SMCSTOPPP  
Adam Olivieri, SCVURPPP  
Emily Dean, SCWA  
Jack Betourne, VSFCD  
BASMAA Monitoring Committee Representatives  
Tom Mumley, SFBRWQCB  
Bruce Wolfe, SFBRWQCB  
Dale Bowyer, SFBRWQCB  
Andy Gunther, Clean Estuary Partnership

Attachment: Additional BASMAA comments on the Diazinon TMDL and Pesticide-Related Toxicity WQAS in Bay Area Urban Creeks Final Project Report

These specific comments are in addition to the general comments in the April 12, 2004 BASMAA comment letter.

**1) Clearly distinguish the TMDL scope from the WQAS scope**

BASMAA recommends that these scopes be clearly stated, for example as graphic or a simple set of bullets:

WQAS is larger scope and includes the TMDL scope

- for all Bay Area urban creeks
- pesticide-related toxicity

TMDL

- 37 Bay Area urban creeks
- diazinon

**2) Determine what the goals or focus of the WQAS, TMDL, and as needed the individual parts (e.g., Implementation Plan, Monitoring and Adaptive Implementation) are; and then use consistent terminology and phraseology to describe them.**

The use of different terms and phrases will lead to misinterpretations and misunderstandings now and over the long course of implementation. Examples of inconsistent use of terms and phrases are (within each set of colored text, different terms and phrases are being used to make what appear to be the same statement):

Summary

(p. S-1) ...a strategy to eliminate pesticide-related toxicity from Bay Area urban creeks.

(p. S-1) The water quality attainment strategy addresses water quality threats posed by pesticides discharged to urban creeks.

(p. S-1) ...the overarching water quality attainment strategy that addresses general water quality threats posed by pesticides.

Summary – Implementation Plan

(p. S-3) The over-arching strategy for reducing pesticide-related toxicity in urban runoff is to avoid the use of conventional pesticides that threaten water quality.

Implementation Plan

(p. 77) The strategy is intended to prevent pesticide discharges that impair water quality.

Monitoring and Adaptive Implementation

(p. 91) Analytical... tests will focus on pesticides that pose substantial water quality risks and for which commercially viable analytical methods are available).

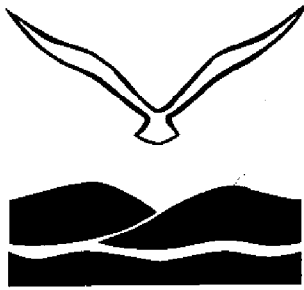
Attachment: Additional BASMAA comments on the Diazinon TMDL and Pesticide-Related Toxicity WQAS in Bay Area Urban Creeks Final Project Report

BASMAA recommends the following terms be used throughout the TMDL and WQAS documents, and that these sentences and other similar ones be revised to use these terms:

implement (or attain) the applicable water quality standard (this phraseology is from the CWA and the CEP MOU)

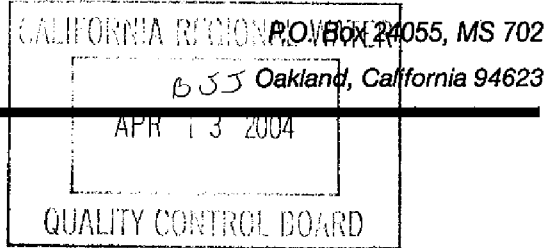
pesticide-related toxicity

Bay Area urban creeks



# Bay Area Clean Water Agencies

Leading the Way to Protect Our Bay  
A Joint Powers Public Agency



April 12, 2004

Mr. Bill Johnson  
San Francisco Regional Water  
Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, California 94612

**Subject: BACWA Comments on Diazinon and Pesticide-Related Toxicity  
in Bay Area Urban Creeks – Water Quality Attainment Strategy  
& TMDL**

Dear Mr. Johnson:

On behalf of the Bay Area Clean Water Agencies (BACWA), I want to thank you for the opportunity to comment on the proposed Water Quality Attainment Strategy and TMDL project report for diazinon and pesticide-related toxicity in Bay Area Urban Creeks. The membership of BACWA is comprised of local governmental agencies that are leaders in urban water resource management and public stewardship of San Francisco Bay water quality. BACWA members own and operate publicly-owned treatment works (POTWs) that discharge to water of the San Francisco Bay Estuary. Together, BACWA's members serve over 5 million people in the nine county Bay Area, treating virtually all domestic and commercial wastewater, and a significant amount of the industrial wastewater generated in this region. BACWA was formed to develop a region-wide understanding of the watershed protection and enhancement needs through reliance on sound technical, scientific, environmental and economic information. It is our goal to ensure that this understanding leads to long-term stewardship of the San Francisco Bay Estuary.

BACWA and its member agencies have an interest in all TMDLs prepared for the San Francisco Bay Area. In particular, BACWA is interested in this Water Quality Attainment Strategy and TMDL as a precursor to addressing the issue of diazinon impairment in the San Francisco Bay. Overall, BACWA appreciates the time and effort put into the Final Project Report by Regional Board staff. BACWA also appreciates the numerous opportunities afforded to stakeholders to comment on the work products prepared by the Regional Board related to this effort.

While recognizing the challenge of addressing toxicity in all Bay Area urban creeks, BACWA submits the following comments on the Final Project Report (FPR) for Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks dated March 2004.

## **Regulatory Impact of the Proposed TMDL on POTWs**

The FPR does not describe the probable regulatory impact of the proposed TMDL approach on Bay area POTWs. There are two categories of POTWs likely to be impacted. The first category is POTWs which discharge to creeks that are the subject of the FPR. BACWA is concerned that the possible application of numeric targets for diazinon and toxicity as end-of-pipe effluent limits for those facilities would result in significant NPDES permit compliance issues and would not resolve the problems that the TMDL is seeking to address. The second category is POTWs that discharge to San Francisco Bay that would be impacted by application of the proposed numeric targets as freshwater “objectives” at some point in the future, through application of the “lower of freshwater or saltwater objectives” approach. BACWA requests that the FPR be modified to address, and hopefully avoid, these unintended consequences.

## **Water Quality Conditions**

The Water Quality Conditions section spends a considerable amount of time documenting incidences of toxicity caused by diazinon in the 1990s. However, the recent data evaluated within the FPR suggests that toxicity in general, and toxicity related to diazinon in particular has been infrequent since September of 2001. For example, the data in Table 2.5 show that out of 130 samples, diazinon may have caused toxicity once and that another source of toxicity may have occurred in three other instances (two of those instances were in non-urban locations). In addition, the data show that 6 samples with a concentration above the proposed diazinon target of 50 ng/l caused no toxicity to *Ceriodaphnia dubia* while only one sample with a concentration of diazinon above 50 ng/l caused toxicity. The recent data suggest that toxicity, in general, and diazinon, in particular, may be a declining issue of concern in Bay Area urban creeks. BACWA requests that the FPR be modified to address this consideration in the proposed TMDL and water quality attainment strategy.

## **Impairment Assessment**

The FPR states that “some samples collected from urban areas, including some recent samples, have been lethal to *Ceriodaphnia dubia* [and] therefore, urban creeks are not free of toxic substances in concentrations that are lethal to aquatic organisms....” As already discussed above, the recent data suggest that this statement may overstate the current situation. The FPR states “available evidence indicates that pesticide-related toxicity in urban creeks is a widespread problem.” In fact, there are only two incidences of toxicity in urban creeks since September of 2001. The FPR’s statements and conclusions do not appear to be well supported by recent data.

Furthermore, the FPR relies on the assumption that diazinon at a concentration above 50 ng/l is a reliable indicator of toxicity to *Ceriodaphnia dubia*. However, the data in Table 2.5 suggest otherwise. According to Table 2.5, diazinon was found at a concentration above 50 ng/l in 14 of 130 samples. However, of the seven samples where toxicity was also tested, toxicity was found only once when the concentration of diazinon exceeded 50

ng/l. (Toxicity was also observed for one sample where diazinon was measured at less than 50 ng/l.) The information contained in Table 2.5 (and information cited below in this letter) calls into question the presumption regarding the relationship between concentrations of diazinon above 50 ng/l and toxicity to *Ceriodaphnia dubia*.

## **Numeric Targets**

*Toxicity Targets:* The TMDL proposes pesticide-related toxicity targets of 1.0 TU for both acute and chronic toxicity. It is problematic to use such targets as the basis for wasteload and load allocations, as the nature of specific toxicity may vary among sources and according to ambient water conditions.

Instead of establishing the numeric target at 1.0 TU, BACWA recommends that the 1.0 TU target be used as a trigger for toxicity identification investigations rather than as a final numeric point of determination. In other words, when an urban creek exceeds the numeric target, further investigation is triggered so that unknown toxicants can be identified, and then numeric targets for these toxicants can be established. Once numeric targets for specified target pollutants are established, wasteload and load allocations can be better derived.

*Diazinon Targets:* BACWA strongly recommends that the FPR reconsider the use of the California Department of Fish and Game criteria as the appropriate numeric target for diazinon and instead consider using the U.S. EPA draft criteria of 100 ng/l, or delaying adoption of the numeric target until U.S. EPA has completed its process.

On December 31, 2003, the U.S. EPA issued a Federal Register notice regarding the Availability of Draft Aquatic Life Criteria for Diazinon and requesting scientific views. (Federal Register Notice Vol. 68., Number 250, Pages 75555-75557.) All scientific information and comments on the draft aquatic life criteria must be submitted to U.S. EPA by March 30, 2004. The FPR provides little justification as to why the U.S. EPA draft aquatic life criteria of 100 ng/l for acute and chronic toxicity are inappropriate, and why the lower Fish and Game criteria are appropriate.

In addition, a recent data report submitted to U.S. EPA by the University of Maryland calls into question U.S. EPA's acute toxicity value for the amphipod, *G. fasciatus*, which is identified as the most sensitive species (Hall, L.J. and R. D. Anderson, April 2004). Moreover, the new Maryland study calls into question the original study used to report the low acute value because it was conducted with unmeasured concentrations of diazinon in test containers. Since the low acute value of *G. fasciatus* published by USEPA is questionable, the University of Maryland study was conducted to determine the acute toxicity of diazinon to the amphipod *Gammarus pseudolimnaeus*, which is closely related to *G. fasciatus* (*G. fasciatus* is not commercially available). The study found that the acute toxicity of *G. pseudolimnaeus* was significantly higher than that of *G. fasciatus*, which ultimately shifts the lowest genus mean acute toxicity value to *Ceriodaphnia dubia* to 370 ng/l. With this shift, the study determined that the appropriate acute toxicity criterion for diazinon is 165 ng/l.

As noted above, the data contained in Table 2.5 suggests that a 50 ng/L concentration of diazinon may not be an appropriate indicator of toxicity, as there are 6 samples that clearly show diazinon above this level with no toxicity. Based on this data and the information contained in the U.S. EPA draft criteria and the University of Maryland data report, there is significant cause to question the California Department of Fish and Game criteria as appropriate indicators of toxicity.

Because there is significant new information that should be considered in relationship to the appropriate aquatic life criteria for diazinon, the Regional Board should modify the FPR to give greater consideration to alternatives to the California Fish and Game. At the very least, the Board should delay the identification of a final target until U.S. EPA has responded to the various scientific viewpoints and adopted final criteria. Once final criteria USEPA have been adopted, the Regional Board can adopt different site-specific criteria if scientifically justified.

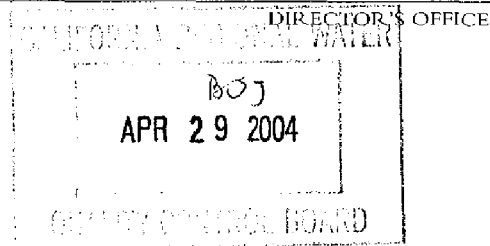
BACWA greatly appreciates the opportunity to comment and looks forward to working with the Regional Board and its staff on this important TMDL.

Sincerely,

A handwritten signature in black ink that reads "J. Kelly". The signature is written in a cursive, slightly slanted style.

James Kelly  
Chair, BACWA

E-copy: Members



April 12, 2004

Bill Johnson  
San Francisco Bay Regional Water Quality Control Board  
1515 Clay St., Suite 1400  
Phone: (510) 622-2354  
E-mail: [bjj@rb2.swrcb.ca.gov](mailto:bjj@rb2.swrcb.ca.gov)

**SUBJECT:** Comments on the final project report for Diazinon and Pesticide - Related Toxicity in Bay Area Urban Creeks Water Quality Attainment Strategy and Total Maximum Daily Load (TMDL).

Dear Mr. Johnson:

The City of San José (City) appreciates the opportunity to submit comments on the March 2004 final report, *Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks Water Quality Attainment Strategy and Total Maximum Daily Load*.

The City supports a cost-effective approach to controlling diazinon and other pesticide pollutants through applicable water quality regulatory mechanisms, including municipal stormwater permits, where necessary to protect beneficial uses. However, it is important that the San Francisco Bay Regional Water Quality Control Board (Water Board) recognizes that there is actually very little data on pesticide toxicity in local creeks and even less data on the contribution on pesticides in municipal stormwater runoff.

In order to have a defensible TMDL the Water Board must first identify the pesticides (if any, beyond diazinon) that are impairing beneficial uses in local creeks, and then identify the specific "upstream" sources of those pollutants. Without such an analysis, it will be impossible to effectively and efficiently regulate the sources of toxicity in urban creeks, much less analyze how municipal stormwater dischargers can help reduce pesticide - related toxicity.

A scientifically sound, defensible TMDL is especially important in this case, given the complex regulatory framework governing pesticides. The report acknowledges this problem by identifying the conflict that exists between regulation under the Clean Water Act versus through the U.S. EPA Office of Pesticide Programs.

In making these comments, we do not intend to imply that municipal storm sewer systems have no role to play in addressing the issue of pesticides. The City has developed or contributed to a variety of activities over the past ten years aimed at characterizing and eliminating pesticide related toxicity in stormwater. These efforts clearly demonstrate the City of San Jose's commitment to reducing water quality impacts related to pesticides and, in particular, diazinon, and include the following:

- significant outreach efforts to residents, businesses, and municipal staff to achieve behavior changes related to pesticide use;
- development and implementation of monitoring studies to characterize concentrations of priority pesticides (e.g., diazinon) and toxicity in urban runoff;
- and participation in regional organizations (e.g., Clean Estuary Partnership and Regional Monitoring Program) addressing pesticide-related issues.

The City has a number of specific policy and technical concerns with this Final Total Maximum Daily Load (TMDL) Project Report:

- The TMDL report places, even acknowledges placing, too large a proportion of the responsibility for diazinon and pesticide related toxicity on municipal storm sewer systems. Municipalities have very little jurisdiction to regulate private application of pesticides.
- This TMDL attempts to allocate loads for pollutants, "pesticide related toxicity," that are not identified in the 303d listing of impaired water bodies.
- The diazinon criterion of 80 ng/L (acute) and 50 ng/L (chronic) results in a target that is overly conservative and not based on the best available science. The California Department of Fish and Game (CDFG) did not follow the U.S. EPA approach. If they had used the U.S. EPA guidelines, they would have derived a number similar to the U.S. EPA criterion of 100 ng/L (acute and chronic).
- In various instances, further described below, this TMDL misquotes or misconstrues historical technical data related to diazinon and pesticide related toxicity.

In summary, this TMDL / WQAS report requires significant revision, and the City of San Jose strongly urges that this report be revised to address both policy and technical points listed above and described in detail below.

- **The proposed allocation scheme does not address upstream sources of diazinon.**

**Comment:** The Final Project Report (Report) identifies structural pest control operators, professional landscapers, and agriculture (along with residential consumer users of diazinon) as sources of diazinon discharges. The Report also lists the U.S. EPA and the California Environmental Protection Agency (including the SWRCB, RWQCB, and California Department of Pesticide Regulation) as agencies with significant implementation roles. However, the report fails to assign waste load or load allocations to most of the entities or

agencies it identifies as sources but rather places all responsibility on urban runoff management agencies (via waste load allocations). Allocation must be assigned to the actual sources of the toxicity, and implementation of the allocation assigned to agencies with jurisdiction over those sources, not to municipalities who have little or no control over the sources.

The Report recognizes that municipal stormwater programs do not have the authority to oversee pesticide applications. Accordingly the proposed allocation *"would pose a significant compliance liability for municipalities with stormwater permits, wherein the municipalities are accountable for the presence of the pesticides in their discharges but do not have the authority to regulate pesticide applications."*

**Recommendation:** The City requests allocating loads to identified sources such as structural pest control operators, professional landscapers, and agriculture, as well as businesses covered under the State Water Resources Control Board's (SWRCB) general permits for construction and/or industrial activities.

- **Separating the TMDL and the Water Quality Attainment Strategy (WQAS).**

**Comment:** In 1999, the State Water Resources Control Board designated 35 urban creeks in the San Francisco bay Area impaired by the organophosphate pesticide diazinon pursuant to Section 303(d) of the Federal Clean Water Act. More recently, the SWRCB increased the number of urban creeks impaired by diazinon to 37. These "303(d)" listings were specific to "Urban Creeks" and specific to impairment by diazinon. TMDLs must be consistent with pollutants identified by the State (See 40 C.F.R. 130.7(c)(1)).

The Water Board's Preliminary Project Report (dated September 2002) expanded the diazinon TMDL to include "pesticide - related toxicity". The City recognizes the Water Board has reconsidered this expansion and specified in the Final Project Report (Report) that the TMDL only includes diazinon, while the water quality attainment strategy (WQAS) includes pesticide - related toxicity. However, throughout the implementation section of the Final Project Report, it is unclear which actions are required under which policy (i.e., the TMDL or the WQAS). Further clarification is needed to determine what actions the City of San Jose's urban runoff management program will need to implement to demonstrate compliance with the TMDL, aside from the WQAS.

- **Proposed numeric toxicity targets for diazinon in Bay Area urban creeks go beyond the basis for the 303(d) listing.**

**Comment:** Developing a numeric target(s) is an integral part of the TMDL process. The Report proposes four numeric targets. Two diazinon concentration targets (acute and chronic) and two targets (acute and chronic) based on Toxicity Units (TUs). Numeric targets in the Report should be limited to the pollutant identified on the Clean Water Act 303(d) list as causing the impairment (i.e., diazinon). Using toxicity targets in addition to

the two diazinon concentration targets is inconsistent with guidance from the United States Environmental Protection Agency (U.S. EPA 2000), which states "...targets should identify the specific instream goals or endpoints for the TMDL, which equate to attainment of the water quality standard..."

The City is also concerned that new pesticides could become a problem in the future. However, pesticide-related toxicity (not including diazinon) in Bay Area urban creeks, has not been proposed as a listing via Section 303(d), and has not been subject to public comment or approved by the State and/or U.S. EPA. Current pesticide regulatory processes do not even require adequate evaluation of potential toxicity to aquatic life from stormwater runoff as a part of pesticide registration. More data is needed on pesticide-related toxicity before it can be considered. It is beyond the scope of the State's 303(d) listing to address this issue and, accordingly, the numeric criteria based on Toxicity Units should be removed from any proposed diazinon TMDL for urban creeks.

- Page 13: "Diazinon concentrations in Bay Area urban creeks varied seasonally, declining during the winter and increasing in the spring. Diazinon concentrations in urban runoff were greater when no substantial precipitation preceded a storm; therefore, diazinon levels were highest in urban runoff associated with the first winter storms."

**Comment:** This discussion needs graphical representations of the temporal trends discussed. The narrative description is difficult to follow and the use of winter, spring, summer and fall can be ambiguous since first storms can occur in fall or winter. The City suggests adding graphs to depict the important temporal trends. We also suggest consistently using specific months during which important trends were seen in the data.

- Page 34, 35: "Data were inadequate to develop other acute and chronic criteria for permethrin, cypermethrin, bifenthrin, and esfenvalerate in fresh or salt water." "The growing use of pyrethroids poses analytical challenges. Because pyrethroids are nearly insoluble in water, they bind strongly to any type of surface, including the surfaces of test containers and equipment (Laskowski 2002)." "In addition, no published procedures for conducting Toxicity Identification Evaluations for pyrethroids exist; therefore, identifying pyrethroids as the cause of possible toxicity could be difficult (Miller et al. 2002)."

Page 26: *"Given what is known about pesticide use trends, the pyrethroid alternatives may pose the greatest concern for water quality."*

**Comment:** The above statements throughout the text support the need for more information before pesticide-related toxicity can be appropriately addressed in a regulatory context.

- Page 61: "The U.S. EPA and CDFG independently developed water quality criteria following the U.S. EPA's guidelines. Each made distinct assumptions that resulted in

different criteria. The U.S. EPA developed acute and chronic criteria of 100 ng/l (USEPA 2000e)".

**Comment:** The U.S. EPA criteria, is draft criteria, and should be stated as such. *"The U.S. EPA and CDFG independently developed water quality criteria..."* should include the word "freshwater" in an effort to assist non-technical readers to understand the discussion. For example, this sentence could be rewritten: *"The U.S. EPA and CDFG independently developed **freshwater diazinon criteria concentrations** following the U.S. EPA's guidelines."*

- Page S-2: Targets for acute and chronic toxicity are set at 1.0 Toxic Units (TUs).

Page 58: "Therefore, the proposed numeric toxicity targets are as follows. There shall be no pesticide-related acute or chronic toxicity in urban creeks in excess of 1.0 TUa or 1.0 TUc."

**Comment:** 1 TU (acute or chronic) represents a regulatory "threshold" for toxicity impairment. However, samples with toxicity as low as 1 TU may not be sufficiently toxic in order to perform successful Toxicity Identification Evaluations (TIEs). For a chronically, barely toxic sample (e.g. 1.3 TUc) there may not be sufficient persistence of toxicity during holding time to even confirm the baseline toxicity, let alone perform a TIE. These shortcomings are addressed in the U.S. EPA TIE manuals and, should be discussed along with rationale for setting the regulatory limit at 1.0 Toxic Units. The City recommends a tiered approach similar to that being incorporated into current NPDES permits.

The report does not evaluate the role of non-pesticide pollutants in observed creek toxicity. In implementing and managing a pesticide-related toxicity TMDL or WQAS, we should not assume that pesticides cause all toxicity. The report provides poor linkage between the translated numeric objective of 50 ng/L for diazinon and observed toxicity to *C. dubia*. There should be a discussion of the TIE results, referred to in the report, so that this asserted linkage can be evaluated.

- Page S-2: "Proposed diazinon concentration targets are 50 nanograms per liter (four day average) and 80 nanograms per liter (one-hour average).

**Comment:** The TMDL report should discuss why it is implementing the TMDL without first promulgating a numerical Water Quality Standard (WQS) for diazinon. There is no promulgated, quantitative, Water Quality Standard for diazinon in the State.

The report should discuss the technical merits of using the CDFG criteria vs. the draft U.S. EPA criteria. The CDFG - CCC is 50 ng/L. U.S. EPA recently published a draft diazinon CCC for freshwater of 100 ng/l. That criterion and its derivation should be considered.

- Page 10: “As Table 2.1 indicates, the longer a *Ceriodaphnia dubia* organism is exposed to diazinon, the lower the concentration needed to kill it. The concentration lethal to 50% of *Ceriodaphnia dubia* within 4 days of exposure (the 96-hour LC<sub>50</sub>) is about 340 ng/l (Bailey et. al. 1997). The 7-day LC<sub>50</sub> is roughly 100 ng/l (ACURCWP 1995a).” This latter endpoint (100 ng/l) is also reported in Table 2.1 as an “LC<sub>50</sub>”.

**Comment:** The 100 ng/L result (ACURCWP 1995a) is not a true acute value for diazinon toxicity to *Ceriodaphnia dubia* because the test was not run in clean laboratory water. The ambient water used in the study may have contained any of hundreds of unmeasured pollutants. The results should not be reported in a Table which otherwise represents studies done in clean laboratory water. This 7-day acute value (100 ng/L) and the inverse relationship between exposure duration and LC<sub>50</sub> are not substantiated by the example given and may even be altogether false. For example, the U.S. EPA conducted a 7-day chronic study on diazinon in which the Chronic Value (geometric mean of NOEC and LOEC) was reported as 338 ng/L (Norberg-King 1987). In that study, all animals survived in 220 ng/L (and lower) diazinon concentrations, and died in 520 ng/L concentrations. The chronic (geometric mean of NOEC & LOEC) and acute (LC<sub>50</sub>) values were similar and U.S. EPA determined an acute-to-chronic ratio of just 1.112 for *C. dubia*. This means that the trend shown in Table 2.1 is dubious. The chronic result reported by Norberg-King (1987) was a more sensitive endpoint than an LC<sub>50</sub> based on mortality and yet the result was more than three times higher than the LC<sub>50</sub> reported by ACURCWP (1995) for ambient water. The Norberg-King results suggest that there is no difference between 4-day and 7-day mortality of *C. dubia* due to diazinon.

This example points out the difficulty of relating in-stream toxicity to chemical –specific results. To confirm the source of toxicity in a stream, the concentration of toxicant must be sufficient to produce the acute (or chronic) result. Other potential sources of toxicity should be investigated. Ambient waters should not be used to determine acute and chronic toxicity values for given toxicants since these waters may contain substances that either increase or ameliorate the effect of the toxicant under study.

- Page 10: “A similar study was conducted on water samples collected from Crandall Creek following a 1994 storm. Again, the Toxicity Identification Evaluation pointed to diazinon as the source of toxicity. The diazinon concentration in the sample was about 250 ng/l, a level slightly below the 96-hour LC<sub>50</sub> of 300 ng/l estimated for *Ceriodaphnia dubia* during the same study (ACURCWP 1995).”

Page 15 - footnote h: “Diazinon concentrations may exceed 50 ng/l without causing *Ceriodaphnia dubia* toxicity (see Table 2.1).”

**Comment:** The U.S. EPA (2000) and CDFG (2000) reported *Ceriodaphnia dubia* Species Mean Acute Values (SMAV) of 377 and 440 ng/L respectively for diazinon. The authors should specify the percent of sample toxicity reduced by manipulations (e.g.

additions of piperonyl butoxide) designed to lessen the effects of diazinon. Comparing 250 ng/l (the diazinon concentration in the sample) to 300 ng/l (the 96-hour LC<sub>50</sub> estimated for *Ceriodaphnia dubia* during the same study) does not explain all of the toxicity in the sample. Unless the test resulting in an LC<sub>50</sub> of 300 ng/l (ACURCWP 1995) was performed in clean laboratory water, the comparison is unwarranted. The report refers to ACURCWP 1995 study data extensively, but it is not clear that ACURCWP 1995 study results support the author's statements in the TMDL report. The study design should be better explained so that the reader can correctly evaluate the report's assumptions, hypotheses, and conclusions. The authors should explain, in more than just a footnote, that the CDFG CCC of 50 ng/L for diazinon is not the effect level for *C. dubia*. The CDFG and U.S. EPA SMAVs for *C. dubia* are 7.5 to 8.8 times greater than the CDFG CCC of 50 ng/L for diazinon.

- Page 16 – Key Points: “Toxicity Identification Evaluations using *Ceriodaphnia dubia* concluded that diazinon caused the toxicity”

**Comment:** How much of the observed toxicity was due to diazinon? Was a Phase III TIE conducted to confirm the amount of observed toxicity attributed to diazinon?

- Page 37: "...some samples collected from urban areas, including some recent samples, have been lethal to *Ceriodaphnia dubia* (BASMAA 1996; SFBRWQCB 2004b).” "...diazinon concentrations in urban creeks throughout the Bay Area are often within the range of concentrations toxic to *Ceriodaphnia dubia*.”

Page 58: “Because creek water is sometimes toxic to *Ceriodaphnia dubia*, it exceeds the proposed toxicity targets.”

**Comment:** The author's linkage is poorly supported and they do not present TIE data to show the toxicity attributable to diazinon. This is a clear example of where the narrative WQS of “free of toxic substances” has not been appropriately and quantifiably translated to a numerical WQS for diazinon. The narrative toxicity WQS applicable to ambient waters does not have a direct relationship to any potential translated WQS for diazinon because the latter is derived from bioassays conducted in clean laboratory water that is free of other toxic substances. The issues of creek toxicity and diazinon impairment should be separated. The laboratory-derived toxicity of diazinon to *Ceriodaphnia dubia* (LC<sub>50</sub> of 377-440 ng/L) is 7.5-8.8 times greater than the proposed numerical target for diazinon (50 ng/L). The in-stream effects on that organism attributed by the authors to diazinon are likely due to the additive or synergistic effects of other contaminants in combination with diazinon.

- Page 58: “To achieve the targets, the toxicity in urban creeks must be eliminated.”

Page 59: “Other management strategies targeted at other toxic chemicals may be necessary if the toxicity were found to be unrelated to pesticides. Such strategies are beyond the scope of this report.”

**Comment:** If the creek toxicity is due to more than one pollutant all pollutants must be identified to propose successful management practices that will reduce or eliminate creek toxicity. It is impossible to quantifiably link creek toxicity to diazinon or other pesticides unless the contribution of all potential pollutants is determined. An appropriate screening value for (creek) diazinon toxicity to *C. dubia* is 440 ng/L, the Species Mean Acute Value for that species (U.S. EPA 2000). The authors need to explain how they equate (quantifiably link) toxicity of diazinon and other pesticides to *C. dubia*. This will also quantify the amount of toxicity **not** related to pesticides so that “other management strategies... beyond the scope of this report” can be determined.

- Page 61: “The California Department of Fish and Game criteria are lower because the U.S. Environmental Agency considered an additional acute toxicity study and did not rely on a particular chronic toxicity study (CDFG 2001).”

**Comment:** This is a very misleading statement. The four-most-sensitive Genera used to derive the Final Acute Value (FAV) are identical in CDFG and U.S. EPA derivations. However, the Genus Mean Acute Values (GMAV) in the U.S. EPA derivation are either equal to or lower than the CDFG GMAVs is. The resultant CDFG FAV is lower than the U.S. EPA FAV because the U.S. EPA derivation includes 20 GMAVs while there are only 15 GMAVs in the CDFG derivation. Thus, besides the “additional acute toxicity study” (comprised of 7 acute tests using *Ceriodaphnia dubia*), the U.S. EPA also used data from **five genera** that were not used by CDFG.

Although the U.S. EPA FAV regression uses lower numbers than the CDFG, the derived FAV is higher since the regression is based on probabilities (i.e. total number of genera in the dataset). Although the CDFG derivation results in a lower FAV (and resultant acute criterion or Criterion Maximum Concentration), it is not more protective since it ignores data from five genera that U.S. EPA considers acceptable.

The chronic value (Criterion Continuous Concentration or CCC in U.S. EPA terminology) is the Maximum Acceptable Toxicant Concentration or MATC in CDFG terminology. Both are largely determined by the Acute-to-Chronic Ratio (ACR). The difference between the U.S. EPA CCC of 100 ng/L and the CDFG MATC of 50 ng/L is that the U.S. EPA ACR is 2 while the CDFG ACR is 3. The U.S. EPA approach is that sensitive species (*Ceriodaphnia dubia*, *Americamysis bahia*) have ACRs of less than 1. The CDFG includes a chronic study on *Daphnia magna* that was not used by the U.S. EPA. The CDFG used three ACRs to derive a final ACR. Also, CDFGs ACR for *Ceriodaphnia dubia* is higher (1.7 vs. 1.112) because CDFG did not use data from an U.S. EPA study (Norberg-King). The CDFG ACR for *Americamysis bahia* is also higher than the EPA version (2.5 vs. 1.586) because “USEPA used original data to recalculate

values; CDFG (1994) used values calculated by authors” (CDFG 2000). The CDFG approach to the FAV and ACR is based on less data than that of U.S EPA. The City reserves the right to make later comment on the appropriateness of CDFGs derivation of the acute and chronic diazinon criteria and on their use of the *Daphnia magna* data (Surprenant 1988).

- Page 61: “Moreover, recent research has found that diazinon concentrations as low as 100 ng/l can inhibit the ability of some fish (e.g. salmon) to smell. Therefore, diazinon exposure at 100 ng/l could be detrimental to fish that rely on their sense of smell to avoid predation or to perform other critical behavioral functions (Scholz et al. 2000, Moore and Waring 1996).”

**Comment:** This statement is erroneous and misleading. The U.S. EPA draft diazinon criteria document (U.S. EPA 2000) lists Moore and Waring (1996) under unused studies that “exposed plasma, enzymes, excised or homogenized tissue, tissue extracts, or cell cultures.” Scholz et al (2000) is not cited in the EPA (2000) criteria document.

For clarification, City staff reviewed the two papers and concluded that the statement in the TMDL report is grossly incorrect. The significant concentration in both papers was 1000 ng/L not 100 ng/L. Excerpts from the abstracts to these papers are provided below.

Scholz et al. 2000: “Here we assess the effects of diazinon, an organophosphate insecticide, on alarm pheromone induced antipredator response and homing behavior in chinook salmon (*Oncorhynchus tshawytscha*). Nominal exposure concentrations (0.1, 1.0, and 10.0  $\mu\text{g}\cdot\text{L}^{-1}$ ) were chosen to emulate diazinon pulses in the natural environment. In the antipredator study, diazinon had no effect on swimming behavior or visually guided food capture. However, the pesticide significantly inhibited olfactory-mediated alarm responses at concentrations as low as 1.0  $\mu\text{g}\cdot\text{L}^{-1}$ .”

Moore and Waring 1996: “Diazinon, an organophosphate pesticide, had a sublethal effect on the olfactory system of mature male Atlantic salmon parr. The olfactory responses of the parr to prostaglandin  $\text{F}_{2\text{a}}$  ( $\text{PGF}_{2\text{a}}$ ) were studied after exposure of the epithelium to different concentrations of Diazinon in water. Electrophysiological recordings from the epithelium indicated that the responses to this prostaglandin were significantly reduced at nominal concentrations as low as 1.0  $\mu\text{g}\cdot\text{L}^{-1}$ .” (In addition, this study had poor recovery of spiked diazinon and reported diazinon results based on nominal concentrations in water even though measured values range from 13-42% of the nominal concentrations.)

Scientific expressions from both reports (1.0  $\mu\text{g}\cdot\text{L}^{-1}$  and 1.0  $\mu\text{g}\cdot\text{L}^{-1}$ ) equate to 1000 ng/L, or ten times the final chronic value (0.1  $\mu\text{g}/\text{L}$ ) recommended in the EPA (2000) draft criteria document for diazinon. Therefore, there is no need to reduce the EPA criteria to protect this salmonid olfactory endpoint.

- Page 61: “The California Department of Fish and Game criteria are also consistent with diazinon targets selected by other Water Boards.”

**Comment:** The Federal Register notice concerning the availability of the U.S. EPA draft - criterion for diazinon was issued on December 31, 2003. Prior to this draft, U.S. EPA had not derived nor recommended a freshwater final chronic value (CDFG 2000). Thus, “other Water Boards” would necessarily have relied on the CDFG final chronic value. It seems inappropriate to use an outdated criterion simply because it had been previously selected by other Water Boards. The scientific merits of the new derivation should be considered rather than what another state agency did in the past.

- Page 72: “The proposed diazinon concentration targets are also conservative. They were selected, in part, because they are the lowest choice available. They are water quality criteria developed by the California Department of Fish and Game using U.S. Environmental Protection Agency’s guidelines intended to protect most aquatic organisms most of the time (USEPA 1985). The U.S. Environmental Protection Agency’s approach is sufficiently conservative that criteria developed using the U.S. Environmental Protection Agency guidelines may be adopted as water quality objectives.”

**Comment:** City staff agrees that the U.S. EPA criteria are conservative and that the CDFG diazinon criterion of 50 ng/L was the “lowest choice available.” However, the CDFG criterion of 50 ng/L is one-half of the U.S. EPA’s “conservative” final chronic value of 100 ng/L. That results in a target that is overly conservative and not based on the best available science. The CDFG did not follow the U.S. EPA approach. CDFG did not accept or reject the same data as did EPA. CDFG did not derive the same ACR as the U.S. EPA nor did they calculate a final chronic value in the same way as U.S. EPA. In short, if they had used the U.S. EPA guidelines, they would have derived a number similar to the U.S. EPA criterion of 100 ng/L. The City reserves the right to make further comment on this issue in the future.

- Page 87: “Because available information does not indicate that toxicity currently occurs in urban creeks due to pesticides other than diazinon, the toxicity targets are also expected to be met shortly after diazinon is phased out.”

**Comment:** The linkage presented in the report between the toxicity and diazinon targets (1 TU and 50 ng/L, respectively) is poorly supported. The report does not present data indicating that all creek toxicity will go away with diazinon. A toxicity strategy that includes only diazinon is not scientifically defensible. Toxicity and diazinon targets and strategies should be completely separated.

- **Final Comment:** A copy of the S. Siepmann and B. Finlayson report entitled, "Water quality criteria for diazinon and chlorpyrifos" Administrative report 00-3 California Department of Fish and Game should be made available in the appendix of the TMDL.

Bill Johnson  
Diazinon and Pesticide - Related Toxicity in Bay Area Urban Creeks WQAS and TMDL Final Project Report  
April 12, 2004  
Page 11 of 11

The City of San Jose incorporates by reference comments submitted by the Bay Area Stormwater Management Agencies Association and the Bay Area Clean Water Agencies. If you have any questions please contact Steven Osborn at 408-945-5303.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. W. Mosher', written over a horizontal line.

Carl W. Mosher, Director  
Environmental Services Department



# Department of Pesticide Regulation



Paul Helliker  
Director

## MEMORANDUM

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD	
B 53 Arnold Schwarzenegger Governor	
APR 16 2004	
QUALITY CONTROL BOARD	

TO: Bill Johnson, Pesticide TMDL Coordinator  
California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay Street, Suite 1400  
Oakland, California 94612

FROM: Douglas Y. Okumura, Assistant Director  
Division of Pest Management, Environmental  
Monitoring, Enforcement, and Licensing  
(916) 324-4100

*John S. Sanders for*

DATE: April 14, 2004

SUBJECT: COMMENTS ON FINAL PROJECT REPORT

Thank you for the opportunity to comment on the final project report titled *Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks*. The Department of Pesticide Regulation's (DPR's) comments are offered below.

*Page 8:* The section is titled "Toxicity in Urban Creeks," yet it mainly presents historic data. A later section presenting data since 2001 is titled "Recent Data." Since the section beginning on page 8 mainly recounts historic data, perhaps a title that better reflects its contents would be "Historic Data."

*Page 17, Section 3:* It is important to include definitions, and perhaps examples, of structural pest control and landscape maintenance. This would be particularly useful as readers interpret Figures 3.2-3.5.

*Page 27, paragraph 5:* The University of California's Statewide Integrated Pest Management Program has no regulatory oversight, but is very active in pest management research and education.

*Page 26, paragraph 3 (and elsewhere):* The State code that includes DPR's mandates and authorities is the Food and Agricultural Code.

*Page 28, paragraph 1:* To help the reader understand the foundation of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), I recommend that you include some text related to one of FIFRA's stated principles: protection of the environment from unreasonable adverse effects of pesticides. Unreasonable adverse effects are defined in FIFRA as "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."



*Page 29, last paragraph:* DPR regulates sales and use of pesticides, not the manufacture. Also, a pesticide does not become a restricted material because permits are issued, as suggested in the third sentence. Alternative language: “Although DPR cannot . . . it can restrict pesticide use and require permits to apply . . . .”

*Page 30, paragraph 3:* Title 3 California Code of Regulations (3 CCR) section 6158 does not describe what DPR considers environmental harm, as indicated in the text. Title 3 CCR section 6158 simply instructs DPR to give special attention during the registration process to specific factors, such as interference with the attainment of applicable environmental standards, and DPR’s requirements and authorities to prevent environmental harm from pesticides. Title 3 CCR section 6158 does not specifically link these requirements and authorities with attainment of environmental standards, nor does it interpret environmental harm.

*Page 33, paragraph 1 and bullet 2:* The University of California’s Statewide Integrated Pest Management Program does not have regulatory authorities or oversight responsibilities.

*Page 33, paragraph 4:* It would be useful to point out that evaluation methodologies used by the U.S. Environmental Protection Agency’s Office of Pesticide Programs and Office of Water may not be complementary, but they reflect the mandates and authorities described in law. It would be difficult for these agencies to rely only on policy or procedural changes to adjust how they evaluate potential water quality impairments caused by pesticides.

*Page 35, last paragraph:* This paragraph discusses how DPR authorities may be helpful in addressing regulatory gaps and data gaps. It is not clear in the text what regulatory or data gaps could be addressed under what DPR authorities. If the intent of this paragraph is to highlight DPR’s process that may be used to require registrants to submit data as part of a reevaluation, the text should more specifically address that process, including conditions that must be met to proceed with reevaluation (found in 3 CCR section 6220). Otherwise, DPR staff can help craft text that appropriately reflects its authorities.

*Page 44, last paragraph and Figure 6.2:* The report suggests that manufacturers, formulators, distributors, and retailers essentially have the role of co-dischargers and share responsibility for water quality impairments. It is not clear what regulatory responsibilities these parties bear under this novel approach. Also, citations of State, Federal, and case law that provide rationale for this determination would be helpful.

*Page 52, last paragraph and bullets:* The bullets were introduced as “prime opportunities to reduce pesticide discharges to urban creeks . . . .” Instead, they describe circumstances that may contribute to water quality impairments. Perhaps the bullets can be reworded to reflect opportunities for mitigation, as the section title indicates.

*Page 65, Table 8.1:* Bifenthrin is included twice.

*Page 68, paragraph 3:* The second sentence indicates Section 6, discussed that while loads of diazinon have decreased, loads of other pesticides have increased. Section 6 does not include the monitoring data necessary to support this assertion—more supporting monitoring data would be helpful.

*Page 77, paragraph 4:* The second sentence notes that the over-arching strategy is to discourage the use of convention pesticides that threaten water quality. “Discourage” connotes the imposition of impediments, which suggests regulatory actions (for which resources are very limited). An appropriate alternative strategy would be to encourage the use of pest management strategies that do not threaten water quality. Certainly the promotion of integrated pest management would be included in this strategy.

*Page 80, paragraph 1:* The second sentence asserts that DPR will need to use its authorities in order to implement the water quality management strategy and total maximum daily load. DPR is obligated to use its authorities to meet its requirements under the Food and Agricultural Code and the California Code of Regulations, but it also has flexibility to emphasize the priorities of DPR management. The report should avoid the suggestion that DPR is being directed to use its authorities in a particular way.

*Page 81, WB-8:* This proposed action should be modified to remove the suggestion that municipalities operating under a Nation Pollution Discharge Elimination System (NPDES) permit would take regulatory action on pesticides. Consider changing the text to read “. . . permits necessary requirements to protect water quality from the adverse effects of pesticides.”

*Page 81, WB-15:* This is an important action to highlight in this table and in supporting text. Too often measures of success are weak or nonexistent in outreach and education projects.

*Page 82, WB-16:* The sentence in parentheses is not very useful here. The usefulness of these analytical methods is questionable not because they are proprietary, but because they are typically developed for determining compliance with residue tolerances for commodities.

*Page 83, URMP-1:* This proposed action should be modified to remove the suggestion that municipalities operating under an NPDES permit would take regulatory action on pesticides.

*Page 83, URMP-3 and 7 (and elsewhere):* The term “conventional pesticide” is inexact; consider defining it somewhere in the document.

Bill Johnson  
April 14, 2003  
Page 4

*Page 84, URMP-14:* It would be helpful to add “and to the extent authorized by law” to the end of this action.

*Page 85, CAC-1:* Bear in mind that the county agricultural commissioners work under contract with DPR and their activities are governed by a negotiated work plan. Redefining activities of the county agricultural commissioners can be difficult given tight county budgets.

*Page 85, CDCA-2:* Note that modifications to specific education requirements must be made through the rulemaking process.

*Page 98, paragraph 1:* The workgroup will develop staff recommendations to management, who will use the recommendations as advisory. In that context, the second sentence should read that the workgroup will *help* shape future urban pesticide activities.

Thank you for your consideration. If you have any questions or comments, please contact Marshall Lee, of my staff, at (916) 324-4269 or <mlee@cdpr.ca.gov> or Nan Singhasemanon, of my staff, at (916) 324-4122 or <nsinghasemanon@cdpr.ca.gov>.

cc: Marshall Lee, DPR Senior Environmental Research Scientist  
Nan Singhasemanon, DPR Associate Environmental Research Scientist  
Kathy Brunetti, DPR MAA Coordinator  
Walt Shannon, State Water Resources Control Board MAA Coordinator

SENT VIA E-MAIL

**FROM:** Mary Louise Flint  
University of California  
**DATE:** April 2, 2004  
**SUBJECT:** SFBA TMDL

---

Thanks for giving me your final TMDL project report to review and so nicely marking the relevant pages. Here I am about to go on vacation for a week and I want to get back to you on it--perhaps more hastily than is desirable.

1. Page 33. Under University of California Statewide IPM Program add "Maintains and publishes (on paper and on the web) UC's official Pest Management Guidelines for urban and agricultural pests."
2. Page 86. Add UCIPM-3. Serve as a resource for information on alternative pest management practices that reduce pollution. Develop publications and outreach materials that can be used by multiple agencies in their outreach activities.

Could also add "Train UC Master Gardeners to help disseminate information about IPM and safer alternatives within their local communities."

3. Page 96. The amount of funding we received from SWRCB was only \$412,000. We will be training Master Gardeners in all counties with Master Gardener programs who wish to participate. (Probably all.) Bay Area counties with UC Master Gardener programs include Santa Clara, Alameda, Contra Costa, Solano, Sonoma, Napa, Marin.
4. Page 99. The University of California Statewide IPM Program has been actively disseminating information about less toxic pest management methods for homes and gardens and urban users for many years. Its web site at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu) contains information on how to manage more than 120 common garden and household pests using IPM and is accessed by over 15,000 people a day. In 2000-2002, the UC IPM Program carried out a pilot training of UC Master Gardeners in Sacramento County on IPM and water quality and trained volunteers had 12,000 one-on-one contacts with county residents on IPM issues in the first year. Similar education and outreach programs for Master Gardeners will be carried out in the Bay Area Region in 2004-2005. UC IPM has also distributed over 300,000 consumer IPM information cards on 14 different pests through its UC Master Gardener programs and UC Cooperative Extension offices and is committed to getting the message out that there are non-polluting alternatives for almost every home and garden pest problem. UC IPM has also been involved in educational workshops for pest management professionals in public agencies and the private sector to pass along information about alternatives to pesticides with water quality risks.

Hope this does the job.

Mary Louise Flint  
Director, IPM Education & Publications and  
Extension Entomologist  
University of California  
Davis, CA 95616-8620  
(530) 752-7692  
[mlflint@ucdavis.edu](mailto:mlflint@ucdavis.edu)

SENT VIA E-MAIL

**FROM: Stacy Carlsen  
Marin County Agricultural Commissioner**  
**DATE: April 9, 2004**  
**SUBJECT: Diazinon, Bay Area Creeks and TMDL Report  
(CRWQCB SF Bay Region, March 2004)**

---

Dear Bill,

Thanks for all your hard work on the TMDL report. Please accept these comments as part of the public record on the TMDL report.

I have several thoughts and comments on the report in general and specific concerns about the process that has lead to identifying Marin County creeks as impaired and subject to Basin Plan oversight. The Table 1.1 on page four (4) lists eight (8) creeks in Marin County on the "303(d) list" due to toxicity attributed to Diazinon which translates to "impaired" but in fact no creeks in Marin have been found impaired through testing performed by the Regional Board staff or any contracting agency working on behalf of the Board. In the 1994-1995 "wet season" bay area creek testing period only one (1) creek in Marin was sampled (Corte Madera Creek) for Diazinon residues and found negative. Technically your report says the concentration was below the detection limits of 30ng/l and was given an asterisk to note the inability to detect the pesticide due to the detection limits of the analysis process. I interpreted this to mean Diazinon was not found in Marin County. However, diazinon levels found below 50 ng/l do not impair Daphnia according to your report. So if the one sample contained diazinon below 30ng/l there would be health impacts to aquatic organisms in the creek. However, the report assumes that the biological organism Ceriodahpnia dubia, used to predict food chain impacts caused by Diazinon, was being impacted in all Marin Creeks. This is simply not the case and your data does not support such findings of fact. In reality the report omits critical findings of fact - no samples were positive for Diazinon and no samples have been taken in ten years in any of Marin County Creeks to understand our creek condition, trends (if any), and local actions that have been taken to identify areas of concern and to reduce the use in the county. We have active IPM programs and public and pesticide industry training. The report simply misses the mark on scientific approach to identifying if problems exist over time. The report does not contain information to warrant listing creeks in Marin County.

Since the 1994 sampling season there have been no further water testing in Marin County creeks yet you pursue listing all of Marin County creeks in the impaired category under the 303(d) listing as if they were all contaminated with the pesticide diazinon. You rely on pesticide use report data to set trends to predict the contamination of creeks. The logic is if Marin County uses an average of 3089 lbs. of diazinon (Table 3.3), page 20, between 1995-1999 that is enough to supports our impaired creek status. The report assumes they would remain impaired due to the continued use of the pesticide in the county. There is no logic to this assessment. In fact no residues have ever been detected from any creek in the county even at the average diazinon use levels you identify in your report. Contrary to this trend setting method of analysis the actual pesticide use reports for Marin show a significant decline in Diazinon use over time. The 2001 State use summary reports 971 lbs. used and the 2002 State reports document 212 lbs. used county wide. This significant decline in Diazinon use further erodes at the logic of listing any Marin creek as impaired in your report.

The trends in use of diazinon do not support your findings, the negative sample results, and the lack of any systematic creek water sampling program over the past ten (10) years draws only one conclusion: all creeks in Marin County should be removed from the "303(d)" list identified in your report. If you would

like to set up a systematic testing process to determine the status of our creeks I am ready to assist in that process.

Best Regards,

Stacy Carlsen, Marin County Agricultural Commissioner  
415-499-6700

SENT VIA E-MAIL

**FROM:** Diane Fleck and Debra Denton  
**U.S. Environmental Protection Agency**  
**DATE:** April 29, 2004  
**SUBJECT:** Comments on Bay Area Urban Creeks Diazinon TMDL

---

Dear Bill,

Debra Denton and I have reviewed the Final Project Report "Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks." We appreciate the hard work that went into developing this water quality attainment strategy, and the document is well done. We offer the following general and specific comments.

**General Comments**

1. The title of the document is "Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks" and it clearly addresses diazinon in urban creeks. However, other pesticides are discussed, as the title indicates, but the document is not comprehensive with respect to all other pesticides, and some pesticides are included in more detail than others (e.g., pyrethroids). Please clarify the intended scope of the TMDL document: is it meant to address diazinon, or is it meant to address diazinon and other specific pesticides? If so, which other pesticides? The document must clarify which pesticides, beyond diazinon, it addresses, if any.
2. On page 4, Table 1.1 footnotes the Petaluma River in Sonoma County. It says that the TMDL report addresses the Petaluma River's urban pesticide sources but does not address the River's other potential pesticide sources such as agriculture. All sources must be addressed in a TMDL, for the TMDL to be complete for any particular water body. Please explain how you will accomplish this for the Petaluma River.
3. On page 38, the document states that the proposed TMDL (the water quality attainment strategy) applies to all urban creeks, including those not designated as impaired on California's 303(d) list for the Bay Area (the 37 water bodies listed in Table 1.1). However, the paragraph continues and appears to list in Table 5.1 additional urban creeks that are not designated as impaired on the 303(d) list. If your intention is to adopt TMDLs for waters not listed on the current 303(d) list, the Regional Board should clearly state that these additional waters are impaired due to the pesticide(s) in question, added to the Section 303(d) list, and are also covered by the TMDLs and implementation provisions that apply to the 37 waters currently included on the 303(d) list. Our comment is in light of the recent State court decision concerning the Los Angeles River trash TMDLs, in which the court found the adoption of a TMDL for a segment not included on the 303(d) list for trash is invalid. We suggest you coordinate closely with your counsel to determine the best way to include these currently unlisted waters in the scope of your decision.
4. On page 55, in the first paragraph under Toxicity Targets, in the second sentence, in the fifth and sixth sentence and in the last sentence, additive effects are discussed between chemicals using similar mechanisms of toxicity. Synergistic effects have also been demonstrated in specific pesticide combinations (Pape-Lindstrom and Lydy 1997; Belden and Lydy 2000) as well as more than additive effects have been shown with diazinon and a pyrethroid, esfenvalerate (Denton 2003). We suggest deleting the sentence on "pyrethroids share a similar mechanism of toxicity with each other; therefore, additive effects are possible." We need to conduct studies with pyrethroids mixtures to demonstrate the mechanisms and types of interactions possible. We recommend you cite Lydy (in press) as a excellent overview of pesticide to pesticide interactions.

Lydy MJ, Belden JB, Wheelock CE, Hammock BD, Denton DL. Challenges in regulating pesticide mixtures. In press.

Belden JB and Lydy MJ. 2000. Impact of atrazine on organophosphate insecticide toxicity. *Environ Toxicol Chem* 17:519-525.

5. On page 59, in the second paragraph under Diazinon Concentration Targets, we recommend you reword the third and fourth sentences to clarify that EPA's pollutant specific guidance values are different than the Basin Plan toxicity objectives in that EPA uses a three-pronged approach to water quality protection: a chemical specific approach, a biological approach, and a toxicity approach.

6. On page 59, in the fourth paragraph under Diazinon Concentration Targets (and continued at the top of page 61), we recommend you clarify your discussion of acute values to reflect that acute water quality criteria are intended to protect 95% of the tested genera, but the calculated 5th percentile LC50 would allow 50% mortality of the 5th percentile genus. In order to provide complete acute protection for the 5th percentile genus, the calculated 5th percentile LC50 is subsequently divided by two to estimate the acute lethal threshold concentration or final acute value (FAV). Similarly, we recommend you clarify your discussion of chronic values to reflect that chronic protection is based upon chemical specific, acute-chronic ratios (ACRs) between the LC50s and survival, growth, and reproduction data from chronic, partial chronic, or early life stage tests that meet defined duration and life-stage requirements for each species. Therefore, the FCV is conceptually analogous to the 95% protection concept.

### Specific Comments

1. On page S-1, in the second paragraph under Problem Statement, we recommend you reword the last sentence as follows: Some likely diazinon alternatives, particularly the pyrethroids, pose water quality *and sediment* concerns.

2. On page 8 in Chapter 2, Water Quality Conditions, second paragraph, we recommend you reword the first sentence as follows: In the early 1990s, Bay Area urban runoff management agencies tested urban runoff and urban creek water samples for toxicity using U.S. EPA *toxicity test methods* ~~protocol~~.

3. On page 9, in the first paragraph, we recommend the following: To ascertain the cause of the toxicity in urban creeks, Toxicity Identification Evaluations (*TIEs*) were undertaken in accordance with U.S. EPA protocols. A *TIE* is a process used to identify the *chemical(s) causing the* toxicity.

4. On page 10, in the first full paragraph, we recommend you reword the last sentence as follows: Because piperonyl butoxide decreased the toxicity of the samples, the chemical cause of the toxicity was ~~suspected-determined~~ to be an organophosphorus pesticide, *in addition to measuring diazinon concentrations in samples*.

5. On page 11, in the second paragraph, we recommend you reword the last sentence as follows: These preliminary measurements *generated* ~~spawned~~ more detailed studies.

6. On page 14, in the first paragraph under Recent Data, it states that two analytical techniques were used to measure diazinon concentrations: gas chromatography / mass spectrometry (with a detection limit of 5 ng/l)..... Do you mean a detection limit of 50 ng/l? Also, please provide the U.S. EPA method numbers.

7. On page 21, the first paragraph under Diazinon Alternatives says that diazinon has long occupied a lead position in the pesticide market. Do you mean with respect to pesticide sales? Please clarify the intent of this statement.

8. Also on page 21, the next paragraph says that The Water Board commissioned a study entitled Insecticide Market Trends and Potential Water Quality Implications. Please clarify which Water Board commissioned the study.

9. On page 23, numerous graphs are depicted, all entitled “Pyrethroid Application Trends.” Please clarify to which county these data apply.

10. On page 26, in the first paragraph, we recommend you reword the last sentence as follows: Given what is known about pesticide use trends, the ~~pyrethroid alternatives~~ alternatives (pyrethroids) may pose the greatest concern for water quality.

11. On page 26, in the second paragraph, please add a reference to the information concerning the range of concentrations (90 ng/l to 700 ng/l) of pyrethroids that are toxic to *Ceriodaphnia dubia*.

12. On page 26, the third paragraph cites Denton 2001. Please correct the cite to: Holcombe et al., 1982, so that it reads as follows: In fish, a pyrethroid, esfenvalerate, has been known to cause .... water surface (Holcombe, et.al., 1982).

Holcombe SW, Phipps GL, Tanner DK. 1982. The acute toxicity of kethane, dursban, disulfoton, pydrin, and permethrin to fathead minnows *Pimephales promelas* and rainbow trout *Salmo gairdneri*. Environ Pollut A29:167-178.

13. On page 28, at the top of the page, we recommend you reword as follows: The Federal Clean Water Act prohibits “discharges of ~~toxic harmful~~ pollutants in toxic amounts,” and add the full citation to the Act.

14. On page 33, first paragraph under Regulatory Acts, we recommend you reword the first sentence as follows: Pesticide-related water quality impairment occurs, in large part, because of regulatory gaps stemming from ~~the different ways~~ *mandates of Federal laws (FIFRA vs. CWA) and how the U.S. EPA’s Office of Pesticide Programs and its Office of Water evaluate water quality effects when fulfilling those mandates.*

15. On page 33, the second paragraph under Regulatory Acts, please define or otherwise clarify the “fundamental water quality issues” that are omitted.

16. On page 35, the second paragraph under Chemical Analysis Method, we recommend you delete the last sentence and add in its place the following: U.S. EPA TIE procedures are available for determining the identity of toxicants, however, in particular for pyrethroids, chemical fingerprints are needed to identify specific pyrethroids.

17. On page 56, at the top, in the second line, we recommend you amend the cites to USEPA 2002a and USEPA 2002b, to reflect EPA’s new 2002 test methods.

USEPA. 2002a. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002, EPA/821/R-02/013.

USEPA. 2002b. Methods for Measuring Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, Fifth Edition, October 2002, EPA/821/R-02/012.

18. On page 56, Table 7.1, we recommend you amend the Sources at the bottom of the table to reflect EPA's new 2002 test methods.
19. On page 56, in the second sentence in the paragraph under Table 7.1, we recommend you reword as follows: The U.S. Environmental Protection Agency has ~~published~~ *developed* guidance...
20. On page 56, under Acute Toxicity, we recommend you reword as follows: For purposes of this report, toxic units are defined for acute (~~short duration~~ *biological endpoints measured as survival*) toxicity tests in terms ...
21. On page 57, we recommend you delete the following sentence: ~~It can also be interpreted to mean no effect more than 20% greater than observed in control samples (Pesticide Workgroup, undated).~~
22. On page 57, the last sentence in the paragraph under Figure 7.1, we recommend you reword as follows: For example, if a series of tests were ~~undertaken~~ *conducted* using 25%...
23. On page 57, under the equation for TU<sub>a</sub>, we recommend you reword the first sentence as follows: In the example above, since the NOAEC ~~would be~~ *is* 50%, ~~there would be 2 TU<sub>a</sub>~~ *then, the sample has 2.0 TU<sub>a</sub>*.
24. On page 57, under Chronic Toxicity, we recommend you reword the first sentence as follows: Toxic units for chronic (~~long duration~~ *sublethal effects*) toxicity tests....
25. On page 57, under Chronic Toxicity, we recommend you delete the last sentence, or alternatively, clarify what is meant by "they typically are" i.e., include what effects are typically adverse.
26. On page 58, under Toxicity Targets, you state that the Basin Plan's narrative toxicity objective does not allow any acute toxicity. Do you mean at the edges of the mixing zone? If so, we recommend you clarify this.
27. On page 61, in the first full paragraph, we recommend you reword the third sentence as follows: The U.S. Environmental Protection Agency ~~developed~~ *has proposed* acute and chronic criteria...
28. On page 61, in the second paragraph, we recommend you reword the first sentence as follows: Although both sets of criteria are ~~reasonable~~ *appropriate*, the California Department of Fish and Game's criteria...
29. On page 63, in the second paragraph under Degradation, we recommend you reword the second sentence as follows: This small fraction can be sufficient to exceed the proposed *diazinon* targets.
30. On page 65, at the top, it states that many pesticides, including most of the pyrethroids, resist degradation as much as diazinon. We recommend you clarify what is meant by degradation as much as diazinon.
31. On page 68, under Keypoints, we recommend you reword the second bullet as follows: Degradation, evaporation and deposition *via runoff*, and sediment transport are important pesticide transport mechanisms.
32. On page 91, under Analytical Tests, we recommend you amend the first bullet to reflect EPA's 2002 test methods: [USEPA ~~1993~~ *2002a*; USEPA ~~1994~~ *2002b*].

Please call if you have any questions on the above comments.

Sincerely,

Debra L. Denton Ph.D.  
Environmental Scientist  
USEPA Region 9  
c/o SWRCB  
1001 I Street  
Sacramento, CA 95814  
phone (916) 341-5520  
fax (916) 341-5463

Diane E. Fleck, P.E., Esq.  
U.S. EPA Region 9 WTR-2  
75 Hawthorne Street  
San Francisco, CA 94105  
Phone: 415 972-3480  
Fax: 415 947-3537