STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF MARCH 14-15, 2013
Prepared February 2013

ITEM NUMBER: **11**

SUBJECT: **Adopting a Total Maximum Daily Load for Diazinon and Additive Toxicity with Chlorpyrifos in the Arroyo Paredon Watershed, Santa Barbara County, California**

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SUMMARY

Staff recommends adoption of the proposed Total Maximum Daily Load (TMDL) for Diazinon and Additive Toxicity with Chlorpyrifos in the Arroyo Paredon Watershed.

The proposed TMDL, numeric targets, and load allocations for diazinon will result in meeting narrative water quality objectives for pesticides and toxicity in the Arroyo Paredon watershed. Central Coast Water Board staff has identified sources of diazinon that are causing or contributing to water quality impairment, has identified parties responsible for these sources, and has proposed load allocations necessary to achieve the TMDL.

Staff has identified the *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands in the Central Coast Region* (Agricultural Order) as the existing regulatory mechanism to achieve the TMDL. No new regulatory mechanism is being proposed to implement and achieve the TMDL.

This TMDL is not being adopted through a basin plan amendment, but through the Central Coast Water Board's approval of the resolution associated with this agenda item, which includes findings that compliance with the Agricultural Order will implement the TMDL. According to state policy, Regional Water Quality Control Boards are encouraged to take this approach of TMDL approval when the impairments can be addressed through a single action by the Board; the approach conserves valuable state resources and avoids regulatory redundancy.

Arroyo Paredon is on the 2008-2010 Clean Water Act section 303(d) list of impaired waters due to diazinon. Arroyo Paredon is also on the 2008-2010 Clean Water Act section 303(d) list of impaired waters due to unknown toxicity; unknown toxicity 303(d) listings are toxicity impairments in the water column. Toxicity tests were positive for toxicity to invertebrates, which are target organisms of diazinon. The water quality objectives for pesticides and toxicity are not being met because concentrations of diazinon are present at levels toxic to the environment.

In this agenda item, staff recommends the Central Coast Water Board approve the resolution (Attachment 1 to this Staff Report) that establishes a Total Maximum Daily Load for Diazinon and Additive Toxicity with Chlorpyrifos in the Arroyo Paredon watershed.

Staff developed the technical basis for the TMDL and associated allocations, which is provided in the Final Project Report (Attachment 2 to this staff report). The Project Report is provided at the Central Coast Water Board's website:

http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/arroyo_paredon/index.shtml

DICUSSION

Project Development for the TMDL

Staff developed the TMDL using data and information from the Central Coast Ambient Monitoring Program (CCAMP), Central Coast Cooperative Monitoring Program (CMP), and California Department of Pesticide Regulation (CDPR). Staff also used land use data and conversations with staff from other agencies.

Numeric Targets

The Basin Plan contains general water quality objectives for all inland surface waters, enclosed bays, and estuaries. The narrative water quality objective for toxicity states, in part:

> "*All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal, or aquatic life."*

The narrative water quality objective for pesticides states, in part:

> *"No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses."*

The TMDL numeric targets are numeric interpretations of the narrative water quality objectives for pesticides. The numeric targets for the proposed TMDL are identical to numeric targets derived by the California Department of Fish and Game in 2004 and the Central Valley Regional Water Quality Control Board for diazinon. The Central Valley Regional Water Quality Control Board has used the same targets for several TMDLs that are USEPA approved. These targets were also approved by the Central Coast Water Board on May 5, 2011, for the Lower Salinas River Watershed Chlorpyrifos and Diazinon TMDL, which was approved by USEPA on October 7, 2011. Achieving the proposed TMDL numeric targets will result in achieving the water quality objectives for pesticides in water bodies degraded by diazinon.

Water Column Numeric Targets:
Numeric targets for the TMDL include acute and chronic water column numeric targets for diazinon. The water column numeric targets for diazinon are outlined in the table below:

Compound	CMC [A] (ppb)	CCC [B] (ppb)
Diazinon	0.16	0.10

[A] CMC – Criterion Maximum Concentration or acute (1- hour average). Not to be exceeded more than once in a three-year period

[B] CCC – Criterion Continuous Concentration or chronic (4-day (96-hour) average). Not to be exceeded more than once in a three-year period

Additive Toxicity Numeric Targets:

Data collected in the Arroyo Paredon watershed indicates that chlorpyrifos is also present and needs to be considered in terms of additive toxicity. Diazinon and chlorpyrifos have the same mechanism of toxic action and exhibit additive toxicity to aquatic invertebrates when they co-occur. Mixtures of compounds acting through the same mechanism suggest there is no concentration below which a compound will no longer contribute to the overall toxicity of the mixture. Therefore, the total potential toxicity of co-occurring diazinon and chlorpyrifos needs to be assessed, even when one or both of their individual concentrations would otherwise be below thresholds of concern. Technical guidance developed by staff of the Central Valley Regional Water Quality Control Board (CVRWQCB) ("Policy for Application of Water Quality Objectives" and policy on "Pesticide Discharges from Nonpoint Sources") include formulas for addressing additive toxicity. Additive toxicity can be evaluated by the following formula from *Basin Plan Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for Diazinon and Chlorpyrifos Runoff into the Sacramento and Feather Rivers*; the following additive toxicity numeric target formula is a numeric target of this TMDL.

For additive toxicity of diazinon and chlorpyrifos when both are present:

$$S = \leq 1.0 = \frac{C_D}{LC_D} + \frac{C_C}{LC_C}$$

Where:

S = Sum of additive toxicity

C_D = Diazinon concentration in waterbody

C_C = Chlorpyrifos concentration in waterbody

LC_D = Criterion Continuous Concentration (0.10 µg/L) or Criterion Maximum Concentration (0.16 µg/L) diazinon loading capacity.

LC_C = Criterion Continuous Concentration (0.015 µg/L) or Criterion Maximum Concentration (0.025 µg/L) chlorpyrifos loading capacity.

Value of S cannot exceed 1.0 more than once in any consecutive three-year period.

Aquatic Toxicity Numeric Target:

The aquatic toxicity numeric target is the evaluation of the Basin Plan general objective for toxicity using standard aquatic toxicity tests to determine toxicity in the water column. The general objective for toxicity is:

All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with the objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of appropriate duration, or other appropriate methods.

The following standard aquatic toxicity tests will be used to determine compliance with the aquatic toxicity numeric target:

Table 1 Standard Aquatic Toxicity Tests

Parameter	**Test**	**Biological Endpoint Assessed**
Water Column Toxicity	Water Flea – *Ceriodaphnia (7-day chronic)*	Survival and reproduction

Source Analysis

Discharges from irrigated agriculture in the project area are the single controllable source causing impairment due to diazinon.

In 2000, USEPA began a phase-out of allowable diazinon use. Retail sales for residential indoor use of these pesticides ended in 2002 and retail sales for outdoor residential uses ended in 2004. Since 2004, agricultural applications of diazinon remain as the significant use of this pesticide.

The half-life of diazinon in the water column ranges from 12-138 days, depending on field conditions. Based on application dates, staff concludes that it is likely that exceedance of diazinon targets seen in 2001 and 2002 were the result of an application of diazinon (D.Z.N. Diazinon AG600 WBC) to nursery-greenhouse grown cut flowers or greens.

The impaired waterbody in the project area is flanked by lands used for agricultural purposes where diazinon is applied. Staff described diazinon applications in the project area in Chapter 4 of the Final Project Report (which is Attachment 2 of this staff report).

TMDL and Allocations

The TMDL for Diazinon and Additive Toxicity with Chlorpyrifos in Arroyo Paredon is a concentration-based TMDL and is equal to the numeric targets as described in the numeric targets section above. Concentration-based TMDLs are an appropriate expression of TMDLs and meet USEPA requirements for TMDL approval. USEPA has approved concentration-based diazinon TMDLs for the Central Coast and the Central Valley Regional Water Quality Control Boards.

Owners and operators of agricultural lands using diazinon are assigned load allocations equal to the TMDL and numeric targets; the load allocations are receiving water allocations.

Implementation and Monitoring

Implementing parties will comply with the Conditional Waiver of Waste Discharge Requirements for Irrigated Lands (Order R3-2012-0011) and the Monitoring and Reporting Programs in accordance with Orders R3-2012-0011-01, R3-2012-0011-02, and R3-2012-0011-03 to meet load allocations and achieve the TMDL.

Current requirements in the Agricultural Order that will result in achieving the load allocations include:

a. Enroll in the Agricultural Order.
    i. Current enrollment requirements inform staff whether chlorpyrifos or diazinon is applied; growers update this information annually.
b. Implement monitoring and reporting requirements described in the Agricultural Order.
    i. Current reporting requirements include a description of discharges leaving the growers field, which can be a primary mode of pesticide transport, and management practices used to mitigate pesticide loading. Reporting requirements also include analysis of diazinon and toxicity tests at cooperative monitoring sites, including the Arroyo Paredon.

c. Implement, and update as necessary, management practices to reduce pesticide loading.
d. Develop and update and implement Farm Plans. The Farm Plans should incorporate measures designed to achieve load allocations assigned in this TMDL.

The TMDL implementation plan also utilizes an interagency approach between the Department of Pesticide Regulation (DPR) and the Water Boards to address impairments. The approach is described in the California Pesticide Management Plan for Water Quality (California Pesticide Plan), which is an implementation plan of the Management Agency Agreement (MAA) between DPR and the Water Boards. The agricultural commissioners of Santa Barbara and San Luis Obispo counties are also responsible for implementing the California Pesticide Plan.

Monitoring: Owners and operators of irrigated agricultural lands will perform monitoring and reporting in accordance with Monitoring and Reporting Program Orders R3-2012-0011-01, R3-2012-0011-02, and R3-2012-0011-03, as applicable to the operation. Monitoring requirements include both chlorpyrifos and diazinon monitoring. Additionally, water standard column toxicity tests are required in the current monitoring orders.

Determination of Compliance with Load Allocations for Irrigated Lands: Demonstration of compliance with the load allocations is consistent with compliance with the Agricultural Order. Load allocations will be achieved through a combination of implementation of management practices and strategies to reduce pesticide loading and water quality monitoring. Flexibility to allow owners and operators of irrigated lands to demonstrate compliance with load allocations is a consideration; additionally, staff is aware that not all implementing parties are necessarily contributing to or causing surface water impairments.

To allow for flexibility, Water Board staff will assess compliance with load allocations using one or a combination of the following:

1. Attaining the load allocations in the receiving water.
2. Attaining zero toxicity attributable to pesticides in receiving water.
3. Implementing management practices that are capable of achieving interim and final load allocations identified in this TMDL.
4. Owners and operators of irrigated lands may provide sufficient evidence to demonstrate that they are and will continue to be in compliance with the load allocations; such evidence could include documentation submitted by the owner or operator to the Executive Officer that the owner or operator is not causing waste to be discharged to impaired waterbodies resulting or contributing to violations of the load allocations.

Time Schedule for Tracking Progress and Achieving the TMDL

The target date to achieve the allocations, numeric targets, and TMDL in the impaired waterbody is March 2019. This date coincides with planned monitoring efforts to help defray costs to implementing parties and reflects the apparent decrease in diazinon use in the Arroyo Paredon watershed and associated ease with which the TMDL can likely be achieved.

The Agricultural Order has established milestones to achieve water quality standards; achieving water quality standards will result in achieving the TMDL. Dischargers will show verifiable progress towards achieving water quality objectives through requirements described in the Agricultural Order.

Water Board staff will reevaluate impairments caused by diazinon when monitoring data is submitted and during renewals of the Agricultural Order. Water Board staff will propose

modifications of the Agricultural Order or other regulatory mechanisms, if necessary, to address remaining impairments.

ANTI-DEGRADATION

The proposed TMDL is consistent with the provisions of State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" and 40 CFR 131.12. The TMDL requires actions that will result in improved water quality throughout the watershed and maintenance of the level of water quality necessary to protect existing and anticipated beneficial uses. The TMDL is implemented through the Agricultural Order, which is adopted in compliance with Water Code section 13269. The Order includes conditions and prohibitions requiring compliance with water quality standards, implementation of management practices to attain water quality objectives, and monitoring and reporting programs. The Order is enforceable and subject to review at least every five years.

PUBLIC INVOLVEMENT

Staff conducted stakeholder outreach efforts during TMDL development. Staff made a presentation in August 2012 and engaged with stakeholders during the development of the TMDL. Staff provided a formal written comment period from November 26, 2012, through January 11, 2013, where comments were solicited from interested parties. No comments were received.

RECOMMENDATION

Adopt Resolution No. R3-2013-0004

ATTACHMENTS:

The attachments are available at:

http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/arroyo_paredon/index.shtml

1. Draft Resolution No. R3-2013-0004
2. Final Project Report: "Total Maximum Daily Load for Diazinon in Arroyo Paredon Watershed, Santa Barbara County"
3. Notice of Public Hearing