STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF JANUARY 30, 2014
Prepared January 3, 2014

ITEM NUMBER: **12**

SUBJECT: **Adopting Total Maximum Daily Loads for Toxicity and Pesticides in Santa Maria River Watershed**

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THIS ACTION: **Adopt Resolution No. R3-2014-0009**

SUMMARY

The Clean Water Act requires the state to identify water bodies within its jurisdiction that are impaired and to develop Total Maximum Daily Loads (TMDLs) to address those impairments. The purpose of a TMDL is to identify the pollutants causing the impairment, to identify the sources of the impairment, and to allocate pollutant loads to nonpoint sources and waste loads to point sources in the form of mass or concentrations that when achieved will eliminate the impairment and restore the beneficial uses of the water body. TMDLs developed by the state also generally include implementation programs that often include a schedule to attain the TMDLs.

Staff recommends adoption of the proposed TMDLs for toxicity and pesticides in the Santa Maria River watershed in Santa Barbara, San Luis Obispo, and Ventura counties. The proposed TMDLs will result in meeting the Basin Plan narrative water quality objectives for toxicity and pesticides in the Santa Maria River watershed. Impairments were identified on the 2008-2010 Clean Water Act section 303(d) list for toxicity and the pesticides chlorpyrifos, diazinon, DDT, dieldrin, endrin, and toxaphene. Additional pesticide impairments, including impairments from pyrethroid pesticides, were identified during the TMDL development and are included in the TMDL. Adoption of the TMDLs includes establishment of pollutant numeric targets for surface waters and numeric allocations for pesticides in the watershed. The proposed resolution includes adoption of the TMDL Basin Plan amendment and CEQA environmental documents.

The Santa Maria River watershed is an approximately 1.2 million-acre watershed that is composed of three large hydrologic areas (HA): Cuyama Valley, Sisquoc, and Guadalupe subwatersheds. The Guadalupe HA, also referred to as the Santa Maria Valley, is the lower subwatershed and is transected by the Santa Maria River, which flows east to west from the confluence of the Cuyama and Sisquoc Rivers to the Pacific Ocean. The toxicity and pesticide impaired waters are located in the Santa Maria valley and include Blosser Channel, Bradley Canyon Creek, Bradley Channel, Greene Valley Creek, Little Oso Flaco Creek, Main Street Canal, Orcutt Creek, Oso Flaco Lake, and the Santa Maria River. The Santa Maria Valley is

dominated by irrigated agricultural and urban land uses. It is a coastal valley with productive alluvial soils that support the production of cool season vegetables such as lettuce and cole crops (broccoli, cabbages and cauliflower), as well as strawberries.

The technical basis of the TMDL is provided in the Technical Project Report, which is an attachment to this staff report. The Technical Project Report is available on the Central Coast Water Board website:

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

DISCUSSION

Project Development for TMDLs

Staff developed the TMDL based on the listings of impaired waters identified on the 2008-2010 Clean Water Act section 303(d) lists, along with water quality monitoring data and information obtained from the Central Coast Ambient Monitoring Program (CCAMP). Staff developed a geographic information system (GIS) for the watershed project and used GIS to map and analyze water quality impairments, hydrologic features, and land uses. Pesticides use in the watershed is reported to the county agricultural commissioners and the California Department of Pesticide Regulation (DPR), and staff analyzed pesticide use reports for sources of pesticide impairment.

The Basin Plan has narrative objectives to protect beneficial uses from toxicity and pesticides; for this project staff developed numeric targets for toxicity and specific toxicity. The targets were developed from appropriate water quality criteria that ensure that beneficial uses of impaired surface waters are protected. The TMDL process includes extensive scientific peer review that is managed by the California Environmental Protection Agency, which contracts with academic reviewers. The reviewers for the TMDL were university professors and researchers in the fields of environmental science and toxicology. The TMDL allocates loads to achieve targets and identifies point and non-point source dischargers and assigns them allocations. Implementation is the responsibility of dischargers; staff developed an implementation and monitoring plan for dischargers to meet allocations and achieve targets. The plan also includes timelines and milestones to meet the TMDLs.

Development of the TMDL includes public outreach and environmental review process according Basin Planning and California Environmental Quality Act Guidelines. The public provided comments at public outreach meetings and through extensive written comments. Staff also met with specific stakeholders to discuss the TMDL.

Numeric Targets

The Basin Plan contains general water quality objectives for all inland surface waters, enclosed bays, and estuaries. The Basin Plan does not have numeric water quality objectives for individual pesticides, relying instead on narrative objectives. 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 numeric targets in these TMDLs are numeric interpretations of these two narrative water quality objectives and are derived from several sources. For organophosphate pesticides and associated toxicity, staff selected criteria developed by the California Department of Fish and Game (CDFG) and University of California Davis (UC Davis) as numeric targets. CDFG published freshwater water quality criteria for diazinon and chlorpyrifos (CDFG, 2000)[1] using USEPA methodologies (USEPA, 1985). UC Davis developed freshwater invertebrate toxicity criteria for malathion through a contract with The Central Valley Regional Water Quality Control Board (CVRWQCB) (Faria et al., 2010). The Central Coast Water Board approved the chlorpyrifos and diazinon targets in several recent TMDLs, including the Lower Salinas Watershed Chlorpyrifos and Diazinon TMDL and the San Antonio Creek Chlorpyrifos TMDL.

UC Davis also developed the water column criteria for pyrethroid pesticides that are the basis of the water column targets for the pyrethroids addressed in the TMDL. Additional information regarding the derivation of water column numeric targets is provided in Appendix C of the Final Project Report.

Pesticides within a pesticide class have additive toxicity when more than one type of pesticide is present. Staff developed additive toxicity TMDL targets for the organophosphate pesticides (chlorpyrifos and diazinon) and pyrethroid pesticides.

Along with specific pesticide criteria, the TMDL includes numeric targets for aquatic toxicity based on standard toxicity tests to invertebrates. For organochlorine pesticides in water, water sediment, and fish tissue staff also developed numeric targets.

[1] All references are listed in the References section of the Technical Report, Attachment 2 of this Staff Report.

Water Column Numeric Targets:

Table 1 Water Column Numeric Targets

Chemical	Concentration µg/L (ppb)	Target Type
Chlorpyrifos	0.025	CMC[1]
Chlorpyrifos	0.015	CCC[2]
Diazinon	0.16	CMC
Diazinon	0.10	CCC
Malathion	0.17	CMC
Malathion	0.028	CCC
Bifenthrin	0.004	CMC
Bifenthrin	0.0006	CCC
Cyfluthrin	0.0003	CMC
Cyfluthrin	0.00005	CCC
Lambda-Cyhalothrin	0.001	CMC
Lambda-Cyhalothrin	0.0005	CCC
Chlordane	0.00057	Human Health Consumption
DDD, 4,4- (p,p-DDD)	0.00083	Human Health Consumption
DDE, 4,4- (p,p-DDE)	0.00059	Human Health Consumption
DDT, 4,4-(p,p-DDT)	0.00059	Human Health Consumption
Dieldrin	0.00014	Human Health Consumption
Toxaphene	0.00073	Human Health Consumption

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

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

Additive Toxicity Numeric Target for Organophosphate Pesticides

The organophosphate pesticides chlorpyrifos and diazinon have additive toxicity in the water column. Since the TMDL is linked to toxicity and concentrations, additive toxicity must be considered in the TMDL as a numeric target.

The numeric target for additive toxicity for organophosphate pesticides is:

$$\frac{C\ (diazinon)}{NT(diazinon)} + \frac{C\ (chlopyrifos)}{NT\ (chlorpyrifos)} = S;\ where\ S\ \leq 1$$

Where:

C = the concentration of a pesticide measured in the receiving water.

NT = the numeric target for each pesticide present.

S = the sum; a sum exceeding one (1.0) indicates that beneficial uses may be adversely affected.

The additive toxicity numeric target formula will be applied when both diazinon and chlorpyrifos are present in the water column.

Sediment Numeric Targets:

Since listings are based on human health risks from the consumption of fish, staff recommends the use of human health based criteria as sediment numeric targets. Sediment quality assessment guidelines (SQAGs) were developed by the Florida Department of Environmental Protection and selected for the TMDL. The selected SQAGs are bioaccumulation pollutant concentrations in sediment for inland waters protective of human health. They are based on assessments done in New York and Washington State (WDOH, 1995), where they identified sediment chemistry concentrations that are unlikely to be associated with adverse effects on human health.

Table 1 Sediment Numeric Targets

Chemical Group	**Chemical**	**Concentration** µg/kg o.c. (ppb)	**Target Type**
Organochlorine	Chlordane	1.7	Human Health-Based
Organochlorine	DDD, 4,4- (p,p-DDD)	9.1	Human Health-Based
Organochlorine	DDE, 4,4- (p,p-DDE)	5.5	Human Health-Based
Organochlorine	DDT, 4,4-(p,p-DDT)	6.5	Human Health-Based
Organochlorine	Total DDT	10	Human Health-Based
Organochlorine	Dieldrin	0.14	Human Health-Based
Organochlorine	Endrin	550	Human Health-Based
Organochlorine	Toxaphene	20	Human Health-Based

Additive Toxicity Numeric Target for Pyrethroid Pesticides

The pyrethroid pesticides have additive toxicity in aquatic sediments. Since the TMDL is linked to toxicity and concentrations, additive toxicity must be considered in the TMDL as a numeric target.

The numeric target for additive toxicity for pyrethroid pesticides is:

$$\frac{C\ (Pyrethroid\ 1)}{NLC(Pyrethroid\ 1)} + \frac{C\ (Pyrethroid\ 2)}{NLC\ (Pyrethoird\ 2)} = S;\ where\ S\ \leq 1$$

Where:

C = the concentration of a pesticide measured in sediment.

NLC = the numeric LC50 for each pesticide present (Table 3).

S = the sum; a sum exceeding one (1.0) indicates that beneficial uses may be adversely affected.

The additive toxicity numeric target formula is applied when pyrethroid pesticides are present in the sediment.

Table 2 Pyrethroid Sediment LC50s

Chemical	LC50 ng/g (ppb)	LC50 µg/g OC*(ppm)
Bifenthrin	12.9	0.52
Cyfluthrin	13.7	1.08
Cypermethrin	14.87	0.38
Esfenvalerate	41.8	1.54
Lambda-Cyhalothrin	5.6	0.45
Permethrin	200.7	10.83

*Median lethal concentration (LC50) for amphipods (Hyalella azteca) organic carbon normalized concentrations (ug/g OC)

Fish Tissue Numeric Targets

California State Office of Environmental Health Hazard Assessment (OEHHA) developed Fish Contaminant Goals (FCGs) for chlordane, DDTs, dieldrin, and toxaphene (OEHHA, 2008). FCGs are estimates of contaminant levels in fish that pose no significant health risk to individuals consuming sport fish at a standard consumption rate of eight ounces per week (32 g/day), prior to cooking, over a lifetime (Table 4). The FCGs are designed to assist in the development of fish tissue-base criteria for the mitigation or elimination of pollution and are the TMDL numeric targets protective of beneficial uses.

Table 3 Fish Tissue Numeric Targets

Chemical Group	Chemical	Concentration ng/g (ppb)	Target Type
Organochlorine	Chlordanes	5.6	Fish Contaminant Goal
Organochlorine	DDTs	21	Fish Contaminant Goal
Organochlorine	Dieldrin	0.46	Fish Contaminant Goal
Organochlorine	Toxaphene	6.1	Fish Contaminant Goal

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 and sediment. 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 4 Aquatic Toxicity Numeric Targets

Parameter	Test	Biological Endpoint Assessed
Water Column Toxicity	Water Flea – *Ceriodaphnia (6-8 day chronic)*	Survival and reproduction
Sediment Toxicity	Hyalella azteca (10-day chronic)	Survival

Source Analysis

Surface waters in the Santa Maria watershed are impaired for unknown toxicity, sediment toxicity, and specific pesticides. Organophosphate, pyrethroid, and organochlorine pesticides are all man-made pesticides with human activities as sources of pollution. Several studies in the watershed indicate that the unknown toxicity and the sediment toxicity are associated with currently applied organophosphate and pyrethroid pesticides. In addition, for the development of the TMDL, additional toxicity and pesticide monitoring was conducted by UC Davis that confirmed the association of toxicity to currently applied pesticides. Therefore, the focus of the source analysis for toxicity is on these pesticide groups.

Sources of Organophosphate Pesticides:
Surface waters in the Santa Maria watershed are impaired by the organophosphate pesticides chlorpyrifos, diazinon, and malathion. Applications of these pesticides to agricultural crops results in a source of impairments in the watershed. Residential uses are not a source since non-agricultural uses of chlorpyrifos and diazinon were banned several years ago. Malathion has non-agricultural uses but the malathion impairments are in the Oso Flaco watershed, which has extensive agricultural land use, minimal non-agricultural areas, and significant applications of malathion to crops in proximity to monitoring sites.

Staff evaluated the specific types of pesticide applications associated with water quality impairments by querying agricultural pesticide use reports obtained from the California Department of Pesticide Regulations. For chlorpyrifos the specific use causing impairments is identified as pre-plant granular applications to cole crops (broccoli, cauliflower, cabbage). Diazinon is primarily applied on lettuce and cole crops and malathion is applied on a wide range of crops (broccoli, celery, lettuce, and strawberries).

Sources of Synthetic Pyrethroid Pesticides:
Agricultural and urban pesticide uses are identified as sources of the pyrethroid pollution in the watershed. Pyrethroids are commonly applied urban pesticides and the highest levels of pollution are in drainages with urban stormwater runoff. Pyrethroids are used by both residential consumers and for professional commercial and residential pest control applicators.

Table 5 Pyrethroid Pesticide Sources

Chemical	Sources
Bifenthrin	Urban structural and consumer home applications and agricultural applications to strawberries
Cypermethrin	Urban structural and consumer home applications and agricultural applications to cole crops and lettuce
Cyfluthrin	Urban structural and consumer home applications
Esfenvalerate	Irrigated agricultural applications to broccoli and cauliflower
Lambda-Cyhalothrin	Urban structural and consumer home applications and agricultural applications to lettuce and broccoli
Permethrin	Urban structural and consumer home applications along with irrigated agricultural applications to lettuce and celery

Sources of Organochlorine Pesticides:

The organochlorine pesticides included in the TMDL are no longer applied in the watershed but are persistent in the environment. Historic use reporting records are not available to determine specific application sites. Historic use is considered to be widespread and included urban, agricultural, and vector mosquito control uses. Surface waters were monitored throughout the Santa Maria Valley floor for DDTs, which were broadly detected primarily as the breakdown products DDD and DDE.

Sediments from irrigated agricultural and urban lands are potential sources of DDTs in surface waters. Additionally, contaminated stream and channel sediments are stores of DDT and are sources of DDT to downstream fisheries such as Oso Flaco Lake, the Santa Maria Estuary, and the coastal confluences.

In addition to DDTs, there are organochlorine pesticide impairments in the watershed for chlordane, dieldrin, endrin, and toxaphene. Sediment analysis for organochlorine chemicals resulted in limited detections of dieldrin and toxaphene. The levels of dieldrin in Oso Flaco Lake sediment were above human health sediment quality assessment guidelines (SQAGs). Sediments in the upper watershed were a historic source of additional organochlorine pesticides but they were not readily detected in the monitoring conducted for the TMDL. Additional monitoring is needed to characterize the presence of these pesticides. Also, monitoring in Oso Flaco Lake is needed to understand the extent of legacy pesticides stored in the lake sediments.

TMDLs and Allocations

Organophosphate pesticide TMDLs:

TMDLs for chlorpyrifos, diazinon, and malathion are water column concentrations as shown in Table 7.

Table 6 Organophosphate Pesticide Water Column TMDLs

Waterbodies Assigned TMDLs[1]	TMDL					
	Chlorpyrifos		Diazinon		Malathion	
	CMC[3] µg/L (ppb)	CCC[4] µg/L (ppb)	CMC µg/L (ppb)	CCC µg/L (ppb)	CMC µg/L (ppb)	CCC µg/L (ppb)
Blosser Channel	0.025	0.015	0.16	0.10	0.17[2]	0.028[2]
Bradley Canyon Creek	0.025	0.015	0.16	0.10	0.17[2]	0.028[2]
Bradley Channel	0.025	0.015	0.16	0.10	0.17[2]	0.028[2]
Green Valley Creek	0.025	0.015	0.16[2]	0.10[2]	0.17[2]	0.028[2]
Main Street Canal	0.025	0.015	0.16	0.10	0.17[2]	0.028[2]
Orcutt Creek	0.025	0.015	0.16	0.10	0.17[2]	0.028[2]
Oso Flaco Creek	0.025[2]	0.015[2]	0.16[2]	0.10[2]	0.17	0.028
Santa Maria River	0.025	0.015	0.16	0.10	0.17[2]	0.028[2]
Little Oso Flaco Creek	0.025	0.015	0.16	0.10	0.17	0.028

[1] All reaches of all surface waters in the Santa Maria valley, including those listed.
[2] Waterbody is currently achieving the TMDL
[3] CMC – Criterion Maximum Concentration (Acute: 1- hour average). Not to be exceeded more than once in a three-year period.
[4] CCC – Criterion Continuous Concentration (Chronic: 4-day (96-hour) average). Not to be exceeded more than once in a three-year period.

Organophosphate Pesticides Additive Toxicity TMDLs:

The organophosphate pesticides chlorpyrifos and diazinon have additive toxicity in the water column. Since the TMDL is linked to toxicity and concentrations, additive toxicity must be considered in the TMDL as a numeric target.

The numeric target for additive toxicity for organophosphate pesticides is:

$$\frac{C\ (diazinon)}{NT(diazinon)} + \frac{C\ (chlopyrifos)}{NT\ (chlorpyrifos)} = S;\ where\ S\ \leq 1$$

Where:

C = the concentration of a pesticide measured in the receiving water.

NT = the numeric target for each pesticide present.

S = the sum; a sum exceeding one (1.0) indicates that beneficial uses may be adversely affected.

The additive toxicity numeric target formula shall be applied when both diazinon and chlorpyrifos are present in the water column.

Pyrethroid Pesticide Additive Toxicity TMDLs:

The additive toxicity TMDL for pyrethroids pesticides is based on the additive toxicity targets for pyrethroid pesticides.

$$\frac{C\ (Pyrethroid\ 1)}{NLC(Pyrethroid\ 1)} + \frac{C\ (Pyrethroid\ 2)}{NLC\ (Pyrethoird\ 2)} = S;\ where\ S\ \leq 1$$

Where:

C = the concentration of a pesticide measured in sediment.

NLC = the numeric LC50 for each pesticide present (Table 3).

S = the sum; a sum exceeding one (1.0) indicates that beneficial uses may be adversely affected.

The additive toxicity numeric shall be applied to all surface waters in the Santa Maria River watershed.

Aquatic Toxicity TMDLs:
The TMDLs for water column and sediment toxicity is the aquatic toxicity numeric target.

Organochlorine pesticide TMDLs:
The TMDLs for organochlorine pesticides are water and sediment concentrations outlined in the following tables.

Table 7 DDT Sediment Chemistry TMDLs

Waterbodies Assigned TMDLs[1]	**TMDL**			
	DDD, 4,4- (p,p-DDD) o.c.[2]	**DDE, 4,4- (p,p-DDE) o.c.**	**DDT, 4,4- (p,p-DDT) o.c.**	**Total DDT o.c.**
	µg/kg	**µg/kg**	**µg/kg**	**µg/kg**
Blosser Channel	9.1	5.5	6.5	10
Bradley Channel	9.1	5.5	6.5	10
Green Valley Creek	9.1	5.5	6.5	10
Little Oso Flaco Creek	9.1	5.5	6.5	10
Main Street Canal	9.1	5.5	6.5	10
Orcutt Creek	9.1	5.5	6.5	10
Oso Flaco Creek	9.1	5.5	6.5	10
Oso Flaco Lake	9.1	5.5	6.5	10
Santa Maria River	9.1	5.5	6.5	10

[1] All reaches of all surface waters in the Santa Maria River watershed, including those listed.
[2] o.c.: organic carbon corrected concentrations.

Table 8 Additional Organochlorine Pesticide Sediment Chemistry TMDLs

Waterbodies Assigned TMDLs[1]	TMDL			
	Chlordane o.c.[2]	Dieldrin o.c.	Endrin o.c.	Toxaphene o.c.
	µg/kg	µg/kg	µg/kg	µg/kg
Oso Flaco Lake	1.7	0.14	550[3]	20[3]
Santa Maria River	1.7	0.14	550	20
Orcutt Creek	1.7[3]	0.14	550[3]	20[3]

[1] All reaches of all surface waters in the Santa Maria River watershed, including those listed.
[2] o.c.: organic carbon corrected concentrations.
[3] Waterbody is currently achieving the TMDL.

Table 9 Fish tissue TMDL for organochlorine pesticides

Waterbodiess Assigned TMDLs	Fish Tissue TMDL			
	Chlordane	DDTs	Dieldrin	Toxaphene
	ng/g* (ppb)	ng/g* (ppb)	ng/g* (ppb)	ng/g* (ppb)
Oso Flaco Lake	5.6	21	--	--
Oso Flaco Creek	5.6	21		
Santa Maria River	5.6	21	**0.46**	**6.1**
Orcutt Creek	5.6	21	**0.46**	**6.1**

*ng/g: i.e. nanograms of pollutant per grams of fish tissue (e.g. a fillet)

Allocations and Responsible Parties:

The following allocations will result in achieving the TMDLs described above.

Table 10 Load Allocations

Waste Load Allocations		
Responsible Party	**Source**	**Allocation**
City of Santa Maria – NPDES No. CAS000004	Urban Stormwater	3, 4 & 5
County of Santa Barbara – NPDES No. CAS000004	Urban Stormwater	3, 4 & 5
City of Guadalupe	Urban Stormwater	3, 4 & 5
Load Allocations		
Responsible Party	**Source**	**Allocation**
Owners/operators of irrigated agricultural lands in the Santa Maria Watershed	Discharges from irrigated lands	1, 2, 3, 4 & 5

San Luis Obispo County Public Works	Roadside drainages	5
Santa Barbara County Public Works	Roadside drainage	5
Santa Barbara County Flood Control District	Flood Control Channels and drainages	5
Allocation-1: Organophosphate Pesticide TMDLs (refer to Table 7) Allocation-2: Additive Toxicity TMDL for Organophosphate Pesticides Allocation-3: Additive Toxicity TMDL for Pyrethroid Pesticides Allocation-4: Aquatic Toxicity TMDLs (refer to Table 5) Allocation-5: Organochlorine Pesticide TMDLs (refer to Tables 8, 9, 10)		

Implementation

Discharges from Irrigated Lands:
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 achieve the load allocations include:

1. Implement, and update as necessary, management practices to reduce pesticide loading.
2. Develop/update and implement Farm Plans. The Farm Plans should incorporate measures designed to achieve load allocations assigned in this TMDL.
3. Implement monitoring and reporting requirements described in the Agricultural Order.

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.

The Department of Pesticide Regulation, the county agricultural commissioners, and USEPA are taking regulatory steps to address pesticide impairments. In accordance with the MAA, DPR has approved urban pesticide regulations to address pyrethroid pesticide water quality pollution. Also as part of the MAA, the Water Board, DPR, and the commissioners are coordinating on possible county chlorpyrifos use permits. USEPA has recently implemented label restrictions and requirements on agricultural uses of diazinon and pyrethroids to address water quality problems.

The current regulatory programs in the watershed do not specifically address water quality

impairments from organochlorine pesticides and the TMDL recommends that stakeholders develop a community-based watershed organochlorine pesticide implementation plan to meet TMDL goals.

Monitoring for Irrigated Lands: 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.

Irrigated agricultural operations are required to monitor toxicity and organophosphate pesticides in surface waters to comply with the Agricultural Order Monitoring and Reporting Program. To achieve the TMDL goals staff recommends including additional monitoring of malathion, malathion derivatives, and pyrethroid pesticides.

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 from 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 toxicity numeric targets 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.

<u>Storm Water Dischargers:</u>
The Central Coast Water Board will require municipal separate storm sewer system (MS4) entities to develop and submit for Executive Officer approval a Wasteload Allocation Attainment Program (WAAP). The WAAP will be submitted within one year of approval of the TMDL by the Office of Administrative Law, or within one year of a stormwater permit renewal, whichever occurs first. The WAAP will include descriptions of the actions that will be taken by the MS4 entity to attain the TMDL waste load allocations, and specifically address:

1. Development of an implementation and assessment strategy.
2. Source identification and prioritization.
3. Best management practice identification, prioritization, implementation schedule, analysis, and effectiveness assessment.
4. Monitoring and reporting program development and implementation. Monitoring program goals shall include: 1) assessment of stormwater discharge and receiving water discharge quality, 2) assessment of best management effectiveness, and 3) demonstration and progress towards achieving interim goals and waste load allocations.

5. Coordination with stakeholders.
6. Other pertinent factors.

Monitoring for Storm Water Dischargers: MS4 entities with operations and storm water conveyance systems in the TMDL project areas are required to develop and submit monitoring programs as part of their WAAP. The goals of the monitoring programs are described in the requirements of the WAAP.

Staff encourages the implementing parties to develop and submit creative and meaningful monitoring programs. Monitoring strategies can use a phased approach, for example, whereby outfall or receiving water monitoring is phased in after best management practices have been implemented and assessed for effectiveness. Pilot projects where best management practices are implemented in well-defined areas covering a fraction of the MS4 that facilitate accurate assessment of how well the best management practices control pollution sources are acceptable, with the intent of successful practices then being implemented in other or larger parts of the MS4.

Determination of Compliance with Wasteload Allocations for Storm Water Dischargers: Waste load allocations will be achieved through a combination of implementation of management practices and strategies to reduce pesticide loading, and water quality monitoring. To allow for flexibility, Water Board staff will assess compliance with waste load allocations using one or a combination of the following:

A. Attaining the waste load allocations in the receiving water.
B. Attaining zero toxicity attributable to pesticides in receiving waters.
C. Demonstrating compliance by measuring pesticide concentrations in stormwater outfalls.
D. MS4 entities may be deemed in compliance with waste load allocations through implementation and assessment of pollutant loading reduction projects (BMPs), capable of achieving interim and final waste load allocations identified in this TMDL in combination with water quality monitoring for a balanced approach to determining program effectiveness.
E. Any other effluent limitations and conditions which are consistent with the assumptions and requirements of the waste load allocations.

Actions can also be demonstrated through participation in statewide efforts, by organizations such as CASQA that coordinated with DPR and other organizations to protect water quality from the use of pesticides.

Time Schedule for Tracking Progress and Achieving the TMDLs

Water Board staff proposes non-regulatory goals to achieve milestones during the implementation phase of the TMDL. Timelines for achieving the TMDLs vary depending on the pesticide impairment.

TMDLs for chlorpyrifos and diazinon impairments could be achieved in a short time frame, since t**h**ey are specifically addressed in the Ag Order and will likely be achieved within five years.

The malathion TMDL could take longer to achieve due to malathion's emergence as a water quality problem, lack of regulatory controls, and increased widespread use since implementation

of increased regulatory restrictions on other organophosphate pesticides. Staff anticipates the TMDL for malathion being achieved in ten years from adoption of the TMDL.

Urban drainages are impaired for pyrethroids and these pesticides are used extensively by consumers for home and garden pests and by professional applicators. DPR recently enacted surface water protection regulations for the professional use of pyrethroid pesticides, which should greatly reduce urban pesticide loading. However, consumer pesticide use is not regulated and it may be difficult to achieve pyrethroid TMDLs in urban drainages in a short time frame. Therefore, staff estimates achieving the TMDL in 15 years.

The target date to achieve the TMDLs for organochlorine pesticides (DDT, DDD, DDE, chlordane, eldrin, toxaphene, and dieldrin) is 30 years after approval of the TMDL by the Office of Administrative Law. This estimate is based on their persistence in the environment, widespread legacy usage, and bioaccumulation in the food web.

ENVIRONMENTAL SUMMARY

The California Resources Agency has certified the basin planning process in accordance with section 21080.5 of the Public Resources Code and therefore the process is exempt from Chapter 3 of the California Environmental Quality Act (CEQA). If Chapter 3 applied to the TMDL, an Environmental Impact Report may have been required for the project. The analysis contained in the Technical Project Report (attachment 2), the CEQA Checklist and Analysis (attachment 3, this staff report), and the responses to comments comply with the requirements of the State Water Board's certified regulatory CEQA Substitute Environmental Documents process, as set forth in California Code of Regulations, Title 23, section 3775 et seq. Furthermore, the analysis fulfills the Central Coast Water Board's obligations attendant with the adoption of regulations "requiring the installation of pollution control equipment, or a performance standard or treatment requirement," as set forth in section 21159 of the Public Resources Code. All public comments were considered.

Public Resources Code section 21159 provides that an agency shall perform, at the time of the adoption of a rule or regulation requiring the installation of pollution control equipment or a performance standard or treatment requirement:

1. an environmental analysis of the reasonably foreseeable methods of compliance,
2. an analysis of the reasonably foreseeable environmental impacts of the methods of compliance,
3. an analysis of reasonably foreseeable mitigation measures to lessen the adverse environmental impacts, and
4. an analysis of reasonably foreseeable alternative means of compliance with the rule or regulation that would have less significant adverse impacts.

Section 21159(c) requires that the environmental analysis take into account a reasonable range of environmental, economic, and technical factors; population and geographic areas; and specific sites.

The CEQA Checklist and Analysis (attachment 3) provides the environmental analysis required by Public Resources Code section 21159. The CEQA Checklist and Analysis identifies reasonably foreseeable methods of compliance with the TMDL and specifies whether there are any anticipated impacts to the environment associated with the reasonably foreseeable methods of compliance.

The CEQA Environmental Checklist and associated analysis provide the necessary information pursuant to state law to conclude that the proposed TMDL, implementation plan, and the associated reasonably foreseeable methods of compliance will not have a significant adverse effect on the environment. Water Board staff has made this determination based on best available information in an effort to fully inform the interested public and the decision makers of potential environmental impacts.

ANTI-DEGRADATION

These Basin Plan amendments are consistent with the provisions of the 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 adoption of the proposed Basin Plan amendment and TMDL implementation plan will not de-designate or limit beneficial use designations, will not relax any water quality standard, and will not result in lowering of water quality. The proposed Basin Plan amendments will result in water quality improvements; therefore, state and federal anti-degradation analyses are not required.

SCIENTIFIC PEER REVIEW

Independent scientific peer review was conducted for this TMDL project. Three individuals were selected to review this document for scientific adequacy: Jeffrey Jenkins, Ph.D., Professor, Oregon State University, Department of Environmental and Molecular Toxicology; Jonathan D. Maul, Ph.D., Professor, Texas Tech University, Department of Environmental Toxicology; and Linda S. Lee, Ph.D., Program Head, Purdue University, Ecological Science and Engineering Interdisciplinary Graduate Program and Professor Environmental Chemistry, Purdue University, Department of Agronomy. These researchers collectively have substantial research experience in environmental toxicology.

Peer reviewer selection was facilitated through the University of California. The detailed step-by-step guidance for setting up and obtaining reviews appears as Exhibit F[2] Supplement to the Guidelines[24] in an interagency agreement between the California Environmental Protection Agency and the University of California. The January 7, 2009 Supplement to the Guidelines[3], in part, provides guidance to ensure confidentiality of the process.

The three peer reviewers provided comments to staff between October and November 2012. Staff prepared responses and revised the Project Report in response to these comments prior to distributing it for a public comment. Peer review comments and staff responses are included in attachment 5. As a result of these comments, staff made several changes to technical information contained in the Project Report; these changes are discussed in staff responses described in attachment 5.

[2] Online linkage: http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/exhibit_f.pdf

[3] http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/rb1_klamath_river/peer_review_guide_010709.pdf

PUBLIC INVOLVEMENT

Staff conducted stakeholder outreach efforts throughout the project process. Staff worked with city, county, state, and federal agencies during the data collection and data analysis phases. Results of coordinated efforts were publicized in newspapers and distributed via email.
Staff made several presentations and engaged with stakeholders during the development of the TMDL. Staff made contact with and/or persons from the following list attended the meetings:

- Cachuma Resource Conservation District
- Coastal San Luis Resource Conservation District
- Irrigated agriculture representatives
- City of Santa Maria
- Central Coast Salmon Enhancement
- Central Coast Water Quality Preservation Inc.
- City of Guadalupe
- Farm Bureau
- Grower Shipper Association of Santa Barbara and San Luis Obispo Counties
- Santa Barbara County Agricultural Commissioner's Office
- San Luis Obispo County Agricultural Commissioner's Office
- Laguna County Sanitation District
- Nipomo Community Services District
- Northern Chumash Tribal Council
- San Luis Obispo Coast Keeper
- San Luis Obispo Farm Bureau
- California Department of Parks and Recreation
- U.S. Fish and Wildlife Service
- UC Cooperative Extension

Staff conducted a CEQA stakeholder scoping meeting on November 9, 2012. Staff held other stakeholder meetings on February 23, 2010, January 25, 2011, and June 14, 2012, prior to the formal public comment period preceding the Central Coast Water Board public hearing to consider adoption of the TMDL. Staff responded orally to public comments and questions at the stakeholder meetings.

This Staff Report, the resolution, and other attachments were made available for formal public comment on January 28, 2013, to meet the required 60-day comment period. Please note that the Water Board is required to provide a 45-day public comment period; stakeholders requested a 60-day comment period and staff obliged this request.

Comments were received from:

1. Ms. Claire Wineman, President, Grower Shipper Association of Santa Barbara and San Luis Obispo Counties (Grower Shipper Association), in an email attachment received March 29, 2013.
2. Ms. Kay Mercer, President, KMI, in an email attachment received March 29, 2013.
3. Mr. Richard E. Adam, Santa Maria Valley farmer, in a letter received February 20, 2013.
4. Mr. Richard G. Sweet, P.E., Director of Utilities, City of Santa Maria, in an email attachment received March 29, 2013.

5. Ms. Joy Hufschmid, Project Clean Water Manager, County of Santa Barbara Public Works Department Project Clean Water, in and email attachment received March 26, 2013.
6. Mr. Richard Boon, Chair, California Stormwater Quality Association, in an email attachment received March 28, 2013.
7. Mr. James W. Wells, President, Environmental Solutions Group, LLC., on behalf of the Pyrethroid Working Group, a coalition of pyrethroid pesticide manufacturers, in an email attachment received March 29, 2013.
8. Ms. Theresa A. Dunham, Somach, Simmons and Dunn Attorneys At Law, on behalf of the FMC Corporation, in an email attachment received March 29, 2013.
9. Ms. Janet Parrish, TMDL Liaison, US EPA, comment letter in an email attachment received March 25, 2013.
10. Ms. Janet Parrish, TMDL Liaison, US EPA, detailed comments included in an email attachment from Janet Parrish, received March 25, 2013.

Staff made changes to the proposed Basin Plan amendment documents as a result of these comments. The implementation plan was changed to emphasize statewide efforts to address pollution from pyrethroids using regulations adopted by the California Department of Pesticide Regulation. In addition, responding to comments and additional analysis, staff modified the pyrethroid targets to only sediment based parameters, toxicity and additive formula TMDLs, which better reflect transport mechanisms than the previously proposed water column allocations.

The public also provide substantial CEQA comments and staff revised the CEQA checklist and analysis based on the comments. Staff changed the conclusions of several environmental impacts to potential significant based on comments and provided additional alternative analysis. Due to these changes, CEQA documents were recirculated on October 15, 2013, for an additional 45-day comment period. Public comments and staff responses are included as an attachment to this Staff Report.

RECOMMENDATION

Adopt Resolution No. R3-2014-0009 as proposed to approve the Total Maximum Daily Loads for Toxicity and Pesticides in the Santa Maria Watershed.

ATTACHMENTS

The attachments are available on the Santa Maria Watershed TMDL – Pesticide Module website at:
http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/santa_maria/pesticide/index.shtml

1. Resolution R3-2014-0009 and Basin Plan Amendment
2. Final Project Report: Total Maximum Daily Loads for Toxicity and Pesticides in the Santa Maria Watershed (includes Appendices A - C)
3. CEQA Checklist and Analysis
4. Combined Public Notices
5. Scientific Peer Review and Staff Response
6. Public Comments and Staff Response (ending March 2013)

7. Public Comments and Staff Response for Substitute Environmental Document (ending November 2013)