CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

Total Maximum Daily Loads for Chlorpyrifos and Diazinon
for the
Pajaro River Watershed Monterey, Santa Clara, Santa Cruz, and San Benito Counties, California

Final Project Report
For the

July 11-12, 2013 Water Board Meeting

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
895 Aerovista Place, Suite 101, San Luis Obispo, California 93401
Phone • (805) 549-3147
http://www.waterboards.ca.gov/centralcoast/

To request copies of this report please contact
Shanta Keeling at (805) 549-3464, or by email at:
Shanta.Keeling@waterboards.ca.gov.
Documents also are available at:
http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/pajaro/pesticides/index.shtml

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This report was prepared under the direction of

Christopher Rose, *Senior Environmental Scientist*

by

Shanta Keeling, *Water Resources Control Engineer*

with the assistance of

Mary Hamilton, *Environmental Scientist*
Pete Osmolovsky, *Engineering Geologist*
Peter Meertens, *Environmental Scientist*
Larry Harlan, *Environmental Scientist*

and support and input provided by

Stakeholders, including agencies, organizations, and individuals who have a special interest in the Pajaro River watersheds.

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LIST OF ACRONYMS

AI	Active Ingredient
CDPR	California Department of Pesticide Regulation
CDFG or CDFW	California Department of Fish and Game, now referred to as California Department of Fish and Wildlife.
CCAMP	Central Coast Ambient Monitoring Program
CCC	Criterion Continuous Concentration
CMC	Criterion Maximum Concentration
CMP	Cooperative Monitoring Program
FMP	Farmland Mapping and Monitoring Program
GIS	Geographic Information System
OP	Organophosphate
PUR	Pesticide Use Report
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
Water Board	Regional Water Quality Control Board, Central Coast Region
WDR	Waste Discharge Requirement

EXECUTIVE SUMMARY

TMDL for Chlorpyrifos and Diazinon in the Pajaro River Watershed Summary at a Glance	
Waterbody identification	Pajaro River Watershed including: • Pajaro River (WBID: CAR3051003019980826115152), • Pajaro River Estuary (WBID:CAE3051003020080604154634), • Llagas Creek – below Chesebro Reservoir (WBID CAR3053002020020319075726), and tributaries.
Location	Monterey, Santa Cruz, San Benito, and Santa Clara Counties. Hydrologic Unit Code #18060002
TMDL Pollutants of Concern	Chlorpyrifos, Diazinon
Pollutant Sources	Application of the chlorpyrifos and diazinon in agricultural operations.
Beneficial Uses Impaired	Aquatic Habitat Beneficial Uses, which include wildlife habitat (WILD), cold freshwater habitat (COLD), estuarine habitat (EST), preservation of biological habitats of special significance (BIOL), warm fresh water habitat (WARM), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development (SPWN), rare, threatened, or endangered species (RARE), commercial and sport fishing (COMM), and shellfish harvesting (SHELL).
Numeric Targets, Allocations, and TMDL	See Table 1 below (page 8).
Implementation Strategy	Implement the Agricultural Order.

The following Final Project Report Total Maximum Daily Loads for Chlorpyrifos and Diazinon for the Pajaro River Watershed (TMDL Report) evaluates sources of chlorpyrifos and diazinon and assigns a TMDL for chlorpyrifos and diazinon to the Pajaro River Watershed in Monterey, San Benito, Santa Clara, and Santa Cruz Counties.

Total Maximum Daily Load

A TMDL is a term used to describe the maximum amount of pollutants, in this case, chlorpyrifos and diazinon, that a waterbody can receive and still meet water quality standards. A TMDL study identifies the probable sources of pollution, establishes the maximum amount of pollution a waterbody can receive and still meet water quality standards, and allocates that amount to all probable contributing sources. By "allocating" an amount to a contributing source, we are assigning responsibility to someone, an agency, group, or individuals, to reduce their contribution in order to meet water quality standards.

The federal Clean Water Act requires every state to evaluate its waterbodies and maintain a list of waters (303(d) Impaired Waters List) that are considered "impaired" either because the water exceeds water quality standards or does not achieve its designated use. For each waterbody on the Central Coast's 303(d) Impaired Waters List, the Central Coast Regional Water Quality Control Board

(Central Coast Water Board) must develop and implement a plan to reduce pollutants so that the waterbody is no longer impaired and can be de-listed.

Problem statement

Chlorpyrifos and diazinon are man-made organophosphate (OP) pesticides used for the control of invertebrate pests. The Pajaro River and Llagas Creek were listed as impaired on the 2008-2010 Clean Water Act section 303(d) list because three of eight samples from the Pajaro River and three of four samples from Llagas Creek exceeded the toxicity concentration for chlorpyrifos. The Pajaro River and the Pajaro River Estuary are not on the 2008-2010 303(d) list but are impaired due to diazinon because 4 of 41 samples from the Pajaro River and 3 of 30 samples from the Pajaro River Estuary exceeded the toxicity concentration for diazinon.

Numeric Targets, TMDLs and Allocations

Numeric targets are water quality targets developed to ascertain when and where water quality objectives are achieved and when beneficial uses are protected. The numeric targets for these TMDLs are the same as the numeric water quality criteria that were derived by the California Department of Fish and Game (now referred to as California Department of Fish and Wildlife). 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. Numeric targets for the TMDLs include acute and chronic water column numeric targets for chlorpyrifos and diazinon and additive toxicity targets.

These TMDLs are concentration-based TMDLs equal to the numeric targets.

Discharges of chlorpyrifos and diazinon from irrigated agriculture caused exceedances of the water quality objectives for toxicity and pesticides. Owners and operators of irrigated lands are assigned allocations for chlorpyrifos, diazinon, and toxicity to achieve the TMDL. Responsible parties are assigned allocations for chlorpyrifos and diazinon equal to the numeric targets and TMDLs as represented in the table below. Table 1 below identifies the numeric targets, allocations assigned to responsible parties, and TMDLs assigned to impaired waterbodies.

Table 1. Numeric Targets, TMDL, and Load Allocations for Pajaro River Watershed

NUMERIC TARGETS, TMDLs AND LOAD ALLOCATIONS

Waterbodies Assigned TMDLs[1]	Responsible Party Assigned Allocation (Source)	Receiving Water Numeric Targets, TMDLs, and Allocations
• Pajaro River	Owners/operators of irrigated agricultural lands in the Pajaro River Watershed (Discharges from irrigated lands)	Allocation 1, 2, 3, & 4
• Pajaro River Estuary		Allocation 1, 2, 3, & 4
• Llagas Creek		Allocation 1, 2, 3, & 4

Allocation 1:

Compound	CMC[A] (ppb)	CCC[B] (ppb)
Chlorpyrifos	0.025	0.015

Allocation 2:

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.

Allocation 3:
For additive toxicity of diazinon and chlorpyrifos when both are present.

$$S = \leq 1.0 = \frac{C_{Diazinon}}{LC_{Diazinon}} + \frac{C_{Chlorpyrifos}}{LC_{Chlorpyrifos}}$$

Where:

S = Sum of additive toxicity
$C_{Diazinon}$ = Diazinon concentration in waterbody
$C_{Chlorpyrifos}$ = Chlorpyrifos concentration in waterbody
$LC_{Diazinon}$ = Criterion Continuous Concentration (0.10 µg/L) or Criterion Maximum Concentration (0.16 µg/L) diazinon loading capacity
$LC_{Chlorpyrifos}$ = Criterion Continuous Concentration (0.015µg/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.

Allocation 4:

Parameter	Test	Biological Endpoint Assessed	Test Method #
Water Column Toxicity	Water Flea – *Ceriodaphnia (7-day chronic)*	Survival and reproduction	EPA 1002.0
Sediment Toxicity	Hyallea Azteca (10-day chronic)	Survival and reproduction	EPA 100.1

[1] All reaches of the Pajaro River, Pajaro River Estuary, Llagas Creek, and their tributaries.

TMDL Implementation, Monitoring, and TMDL Timeline

Staff has concluded that the requirements described in the *Conditional Waiver of Waste Discharge Requirements For Discharges from Irrigated Lands* (Agricultural Order) will result in achieving these TMDLs; no other regulatory mechanism is required to implement and achieve the TMDLs.

Owner and operators of irrigated lands in the project area are required to comply with the conditions and requirements of the current *Conditional Waiver of Waste Discharge Requirements For Discharges from Irrigated Lands* (Agricultural Order) and any renewals or modifications thereof.

The timeline to achieve this TMDL is by October 2016.

1 INTRODUCTION

1.1 Clean Water Act Section 303(d)

Section 303(d) of the federal Clean Water Act requires every state to evaluate its waterbodies and maintain a list of waters that are considered "impaired" either because the water exceeds water quality standards or does not achieve its designated use. For each water on the Central Coast's "303(d) Impaired Waters List," the California Central Coast Water Board must develop and implement a plan to reduce pollutants so that the waterbody is no longer impaired and can be de-listed. Section 303(d) of the Clean Water Act states:

Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 1314(a)(2) of this title as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

The State complies with this requirement by periodically assessing the conditions of the rivers, lakes, and bays and identifying them as "impaired" if they do not meet water quality standards. These waters, and the pollutant or condition causing the impairment, are placed on the 303(d) List of Impaired Waters. In addition to creating this list of waterbodies not meeting water quality standards, the Clean Water Act mandates each state to develop Total Maximum Daily Loads (TMDLs) for each waterbody listed. The Central Coast Regional Water Quality Control Board (Water Board) is the agency responsible for protecting water quality consistent with the Basin Plan, including developing TMDLs for waterbodies identified as not meeting water quality objectives.

1.2 Pollutants Addressed

This project addresses impairments due to chlorpyrifos and diazinon, which are organophosphate (OP) pesticides. The project also addresses potential toxicity caused by other pesticides that could be used in the agricultural environment.

1.3 FIFRA/FQPA

Since 2001, the USEPA has mandated diazinon and chlorpyrifos use cancellations (phase-outs) and restrictions for urban and agricultural uses (USEPA Diazinon and Chlorpyrifos Interim Reregistration Eligibility Decisions (IREDs)). The USEPA has undertaken the reregistration process for diazinon and chlorpyrifos to ensure that the pesticides meet the safety standards under the

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Food Quality Protection Act (FQPA) of 1996.

Under the diazinon IRED (USEPA, 2004), all indoor residential use product registrations were cancelled and retail sale of these products ended as of December 31, 2002. All outdoor residential use product registrations were cancelled and retail sale ended in December 31, 2004.

Under the chlorpyrifos IRED, (USEPA, 2002) virtually all products labeled for homeowner use have been cancelled effective December 31, 2001, except containerized ant and roach baits in child-resistant packaging which have not been cancelled because they present minimal exposure. Distribution and sale of products for all other residential uses were prohibited since December 31, 2001. The application rate for termite treatments was reduced as of December 1, 2000. Full-barrier (wholehouse) termite treatment products are no longer distributed or sold as of December 31, 2001. Spot and local post-construction use was cancelled on December 31, 2002, and pre-construction termiticide uses were cancelled on December 31, 2005, unless acceptable exposure data are submitted and demonstrate that post application risks to residents are not of concern.

Many additional diazinon and chlorpyrifos use restrictions and cancellations apply to agricultural uses. Staff anticipates reductions in concentration of chlorpyrifos and diazinon in the impaired waters due to the substantial reduction of chlorpyrifos and diazinon use in the urban environment, and labeling restrictions on agricultural uses.

2 PROBLEM IDENTIFICATION

2.1 Watershed Description

The Pajaro River watershed encompasses approximately 1,300 square miles (832,000 acres). It is about 60 miles southeast of San Francisco and Oakland and 120 miles southwest of Sacramento. The watershed is almost 90 miles in length and varies from 7 to 20 miles in width. The Pajaro River watershed drains into the Monterey Bay and is the largest coastal stream between San Francisco Bay and the Salinas River.

The watershed lies within Monterey, San Benito, Santa Cruz, and Santa Clara counties. Cities include Gilroy and Morgan Hill within the Llagas Creek subwatershed, and Hollister, San Juan Bautista, and Watsonville within other areas of the Pajaro River watershed. Major tributaries to the Pajaro River are San Benito River, Tres Pinos Creek, Santa Ana Creek, Pacheco Creek, Llagas Creek, Uvas Creek, and Corralitos Creek. Flood control projects in the Pajaro River and Llagas Creek watersheds were designed to minimize the natural flooding characteristics and facilitate drainage. The watershed is predominantly mountainous and hilly with elevations ranging from sea level, where the Pajaro River enters the Monterey Bay, to over 4,900 feet in the headwaters of the San Benito River. Please see Figure 2-1 for a graphical display of the watershed. The mean annual precipitation within the Pajaro Valley ranges from 16 inches near the coast to more than 40 inches in the Santa Cruz Mountains (CA Groundwater Bulletin 118).

Land cover within the Pajaro River watershed is primarily comprised of herbaceous grassland, shrubland, and forested land. Agricultural and urban land use development appears within the valley floors and hillsides. Grazing lands comprise about 62% of the total watershed, followed by undeveloped or forest land (22%), and farmland (12%). Please see Table 2-1 for more information regarding other landuses in the Pajaro.

Table 2-1. Landuses in the Pajaro River Watershed (FMMP 2008)

Landuse	Area (square miles)	Percent of entire watershed
Urban	45.8	4%
Grazing Land	802.4	62%
Farmland of Local Importance	32.6	3%
Prime Farmland	96.0	7%
Farmland of Statewide Importance	20.2	2%
Unique Farmland	11.5	1%
Water	0.2	0%
Undeveloped or Forest	286.8	22%
Total	1,295.5	100%

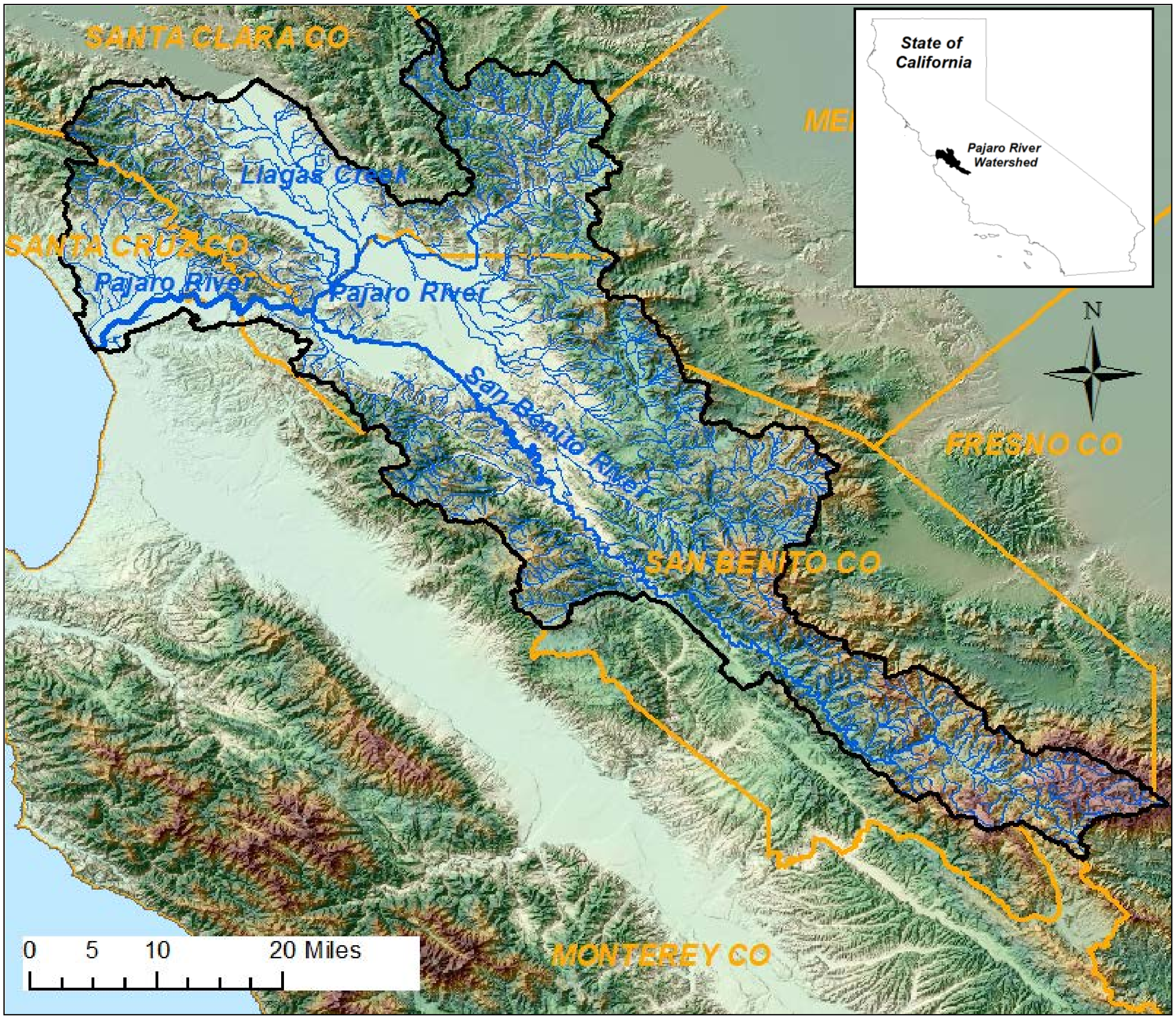

Figure 2-1. The Pajaro River Watershed, outlined in black.

2.2 Beneficial Uses

The Pajaro River, along with several tributaries, has designated beneficial uses in the Water Quality Control Plan for the Central Coast Basin (Basin Plan). Table 2-2 summarizes the designated beneficial uses for Pajaro River and selected tributaries. For a more comprehensive list of tributaries to the Pajaro River and their respective beneficial uses, please see http://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/docs/basin_plan_2011.pdf beginning on page II-5.

Table 2-2. Basin Plan designated beneficial uses

	Waterbody					
Beneficial Use	Pajaro River	Pajaro River Estuary	San Benito River	Llagas Creek (above Chesbro reservoir)	Llagas Creek (below Chesbro Res.)	Watsonville Slough
Municipal and Domestic Supply (MUN)	X		X	X	X	
Agricultural Supply (AGR)	X		X	X	X	
Industrial Service Supply (IND)	X		X		X	
Ground Water Recharge (GWR)	X		X	X	X	
Freshwater Replenishment (FRSH)	X		X	X		
Water Contact Recreation (REC-1)	X	X	X	X	X	X
Non-Contact Water Recreation (REC-2)	X	X	X	X	X	X
Commercial and Sport Fishing (COMM)	X	X	X	X	X	X
Warm Fresh Water Habitat (WARM)	X	X	X	X	X	X
Cold Freshwater Habitat (COLD)	X	X		X	X	
Estuarine Habitat (EST)		X				X
Wildlife Habitat (WILD)	X	X	X	X	X	X
Preservation of Biological Habitats of Special Significance (BIOL)		X				X
Rare, Threatened, or Endangered Species (RARE)		X		X	X	X
Migration of Aquatic Organisms (MIGR)	X	X			X	
Spawning, Reproduction, and/or Early Development (SPWN)	X	X	X		X	X
Shellfish Harvesting (SHELL)		X				

Beneficial uses are regarded as existing whether the waterbody is perennial or ephemeral, and whether the flow is intermittent or continuous.

Municipal and Domestic Supply (MUN) - Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply. According to State Board Resolution No. 88-63, "Sources of Drinking Water Policy" all surface waters are considered suitable, or potentially suitable, for municipal or domestic water supply except where:

a. TDS exceeds 3000 mg/l (5000 uS/cm electrical conductivity);
b. Contamination exists, that cannot reasonably be treated for domestic use;
c. The source is not sufficient to supply an average sustained yield of 200 gallons per day;
d. The water is in collection or treatment systems of municipal or industrial wastewaters, process waters, mining wastewaters, or storm water runoff; and
e. The water is in systems for conveying or holding agricultural drainage waters.

Agricultural Supply (AGR) - Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Industrial Service Supply (IND) – Uses of water for industrial activities that depend primarily on water quality (i.e., waters used for manufacturing, food processing, etc.).

Ground Water Recharge (GWR) - Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers. Ground water recharge includes recharge of surface water underflow.

Water Contact Recreation (REC-1) - Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-Contact Water Recreation (REC-2) - Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

*Wildlife Habitat (WILD) - Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

*Cold Fresh Water Habitat (COLD) - Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

*Estuarine Habitat (EST) – Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds). An estuary is generally described as a semi-enclosed body of water having a free connection with the open sea, at least part of the year and within which the seawater is diluted at least seasonally with fresh water drained from the land. Included are water bodies which would naturally fit the definition if not controlled by tidegates or other such devices.

*Preservation of Biological Habitats of Special Significance (BIOL) – Uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection.

*Warm Fresh Water Habitat (WARM) - Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

*Migration of Aquatic Organisms (MIGR) - Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

*Spawning, Reproduction, and/or Early Development (SPWN) - Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

*Rare, Threatened, or Endangered Species (RARE) - Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

Freshwater Replenishment (FRESH) - Uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity) which includes a water body that supplies water to a different type of water body, such as, streams that supply reservoirs and lakes, or estuaries; or reservoirs and lakes that supply streams. This includes only immediate upstream water bodies and not their tributaries.

*Commercial and Sport Fishing (COMM) - Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

*Shellfish Harvesting (SHELL) – Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g. clams, oysters, and mussels) for human consumption, commercial, or sport purposes. This includes waters that have in the past, or may in the future, contain significant shellfisheries.

* = Aquatic habitat beneficial use.

2.3 Water Quality Objectives and Criteria

The Central Coast Region's Water Quality Control Plan (Basin Plan) contains specific water quality objectives that apply to all inland surface waters, enclosed bays and estuaries (CCRWQCB, 1994, pg. III-4). Relevant water quality objectives for this project include:

2.3.1 Toxicity

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 this 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 as specified by the Regional Board.

Survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality conditions, shall not be less than that for the same water body in areas unaffected by the waste discharge or, when necessary, for other control water that is consistent with the requirements for "experimental water" as described in Standard Methods for the Examination of Water and Wastewater, latest edition. As a minimum, compliance with this objective shall be evaluated with a 96-hour bioassay.

In addition, effluent limits based upon acute bioassays of effluents will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data become available, and source control of toxic substances is encouraged.

2.3.2 Pesticides

No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life.

2.3.3 Prohibitions

Waste discharges shall not contain materials in concentrations which are hazardous to human, plant, animal, or aquatic life (Basin Plan IV.A, pg. V-8*).*

Wastes discharged to surface waters shall be essentially free of toxic substances, grease, oil, and phenolic compounds.

Waste discharges to the following inland waters are prohibited:

4. All coastal surface streams and natural drainageways that flow directly to the ocean within the Santa Cruz Coastal, Monterey Coastal, San Luis Obispo Coastal from the Monterey County line to the northern boundary of San Luis Obispo Creek drainage, and the Santa Barbara Coastal Subbasins except where discharge is associated with an approved wastewater reclamation program. (Basin Plan IV.B, pg. V-8)

2.3.4 Water Quality Criteria

The California Department of Fish and Game (now known as California Department of Fish and Wildlife) published freshwater water quality criteria for chlorpyrifos and diazinon (CDFG 2000) using USEPA methodology (USEPA, 1985). Please see Table 2-3 for these water quality criteria.

Table 2-3. California Department of Fish and Game (now California Department of Fish and Wildlife) freshwater quality criteria for chlorpyrifos and diazinon.

Compound	CMC [A] (ppb or µg/L)	CCC [B] (ppb or µg/L)
Chlorpyrifos [C]	0.025	0.015
Diazinon [C]	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.
C. A toxicity ratio is used to account for the additive nature of these compounds. The ratio calculation is provided in this Section 3.2.

2.4 Pollutants Addressed

The pollutants addressed in this TMDL are chlorpyrifos and diazinon. These pesticides were detected in surface waters at concentrations that impair beneficial uses. Organophosphate (OP) pesticides are currently applied as insecticides, primarily on crops. These OP pesticides share the same mode of action as each other and have additive toxic effects on invertebrates in aquatic environments.

Chlorpyrifos is a broad spectrum OP insecticide that was first registered for use on food and fee crops in 1965. It was a widely used residential pesticide until

2000 when EPA cancelled residential use of chlorpyrifos (EPA, 2004). Current registered uses include food and feed crops and professional application for golf course turf, greenhouses, non-structural wood treatments, and as an adult mosquiticide. All structural treatments for termites were terminated in 2005.

Diazinon is a broad spectrum contact OP insecticide that was first registered for use in the United States in 1956. It was a very widely used home lawn and garden pesticide until residential use was restricted (EPA, 2004). In 2004 all residential sales of diazinon were stopped. Current registered uses include food and feed crops, and professional application for landscape maintenance and structural application.

Additional information regarding pesticide environmental behavior properties are outlined in Table 2-4. Note from the information in the table that diazinon is more soluble in water than chlorpyrifos, whereas chlorpyrifos is more likely to sorb to soil particles.

Table 2-4. Summary of pesticide environmental behavior properties.

Common name	Soil half-life (days)	Water solubility (mg/L)	Sorption coefficient (soil Koc)	Water half-life (days) neutral pH
Chlorpyrifos	30	0.4	6070	35-78
Diazinon	40	60	1000	138

Source: National Pesticide Information Center (NPIC) fact sheets

2.5 Data Analysis

This section provides a summary of the 2008-2010 303(d) listings in the Pajaro River Watershed along with a summary of additional impairments.

Staff used the following data in this water quality analysis:

- Central Coast Ambient Monitoring Program (CCAMP)
- Study by Brian Anderson, et. al. of Marine Pollution Studies Laboratory at Granite Canyon, April 20, 2010
- Central Coast Region Conditional Waiver Cooperative Monitoring Program (CMP) Follow-up Monitoring Report; Organophosphate Monitoring at Phase II sites, 2009 (April 6, 2010)
- California Department of Pesticide Regulation (DPR) water quality monitoring, 2007-2010
- DPR's Pesticide Use Reporting
- DOW AgroSciences (2010-2012)[1]

Please see Figure 2-2 for a graphical representation of where the sampling stations are located and Appendix B for a narrative description.

[1] These data were submitted later in the development of the TMDL and while included in the total count of samples, they were not originally included in the data analysis.

2.5.1 Water Quality Impairments

2.5.1.1 2008-2010 303(d) listings

Staff summarized the 2008-2010 303(d) listings for pesticides in the Pajaro River Watershed in Table 2-5. In summary, the Pajaro River and Llagas Creek are impaired by chlorpyrifos. Staff determined that Furlong Creek and Millers Canal are not impaired by chlorpyrifos. Please see Table 2-5 for more information.

Both San Benito River and San Juan Creek were listed for "unknown toxicity" on the 2008-2010 303(d) list. CCAMP performed toxicity sampling at the same time water quality samples were collected for chlorpyrifos and diazinon. San Benito River's toxicity tests showed that the samples exhibited toxicity to plants (2/2 samples) but did not exhibit toxicity to either invertebrates (0/2) or vertebrates (0/2). San Juan Creek had 2/5 samples show toxicity to plants, 2/5 show toxicity to invertebrates, and 0/5 samples exhibit toxicity to vertebrates. Chlorpyrifos and diazinon are designed to control invertebrates. Both San Benito River and San Juan Creek had listing decisions that stated "do not list for chlorpyrifos or diazinon." Both San Benito River and San Juan Creek had 0/2 samples exceed for chlorpyrifos and 1/2 samples exceed for diazinon. Because of these findings, this TMDL will not address the "unknown toxicity" impairments in San Benito River and San Juan Creek because the impairments for toxicity may be due to other pollutants.

Table 2-5. Summary of pesticide listings in the Pajaro River Watershed on the 2008-2010 303(d) list of impaired waters. These listings are based on water samples exceeding the acute (CMC) criteria.

Waterbody	Listing	Exceedances	Data Source	Associated Water Quality Objectives /Numeric Criteria	Monitoring Site(s)	Temporal Representa-tion	Rationale/explanation	Considered impaired after re-evaluation?
Pajaro River	Chlorpyrifos	3/8 samples exceeded evaluation guideline	CCAMP	0.025 µg/L as stated in Sipmann and Finalyson (2000)	305CHI 305MUR 305PAJ 305PJP	1/10/2006 – 5/30/2006	The lines of evidence for the 2008-2010 listing of Pajaro River for chlorpyrifos show that 5/17 samples exceed the water quality criteria. Staff chose to omit Department of Health Services' (DHS) data based on its age (1994-1995). This omitted four samples, all of which did not exceed the criteria. Staff also chose to not include 5 samples that used interstitial water samples; one sample was collected on 3/29/2004 and four samples were collected on 5/3/2006. Additionally, at site 305PJP on 5/3/2006, a duplicate sample was included in the analysis erroneously. Removing selected samples from the analysis did not result in a decision change.	**Yes**
Llagas Creek (below Chesbro Reservoir)	Chlorpyrifos	3/4 samples exceeded evaluation guideline	CCAMP	0.025 µg/L as stated in Sipmann and Finalyson (2000)	305LEA 305LLA	1/5/2006 – 5/17/2006	The lines of evidence for the 2008-2010 listing of Llagas Creek (below Chesbro Reservoir) show that 3/6 samples exceeded evaluation guidelines. Staff chose to omit the 2 samples collected on 5/3/2006 because they were interstitial water samples. Removing selected samples from the analysis did not result in a decision change.	**Yes**
Millers Canal	Chlorpyrifos	1/2 samples exceeded evaluation guideline	CCAMP	0.025 µg/L as stated in Sipmann and Finalyson (2000)	305FRA	1/5/2006 – 5/17/2006	The lines of evidence for the 2008-2010 listing of Millers Canal show 2/3 samples exceeded the evaluation guidelines. Staff reevaluated the data and found that one sample that qualified as an exceedance was marked as "does not qualify" and so should not be counted as a sample. The listing policy states that 2 samples are necessary to exceed the evaluation guideline before the waterbody can be placed on the 303(d) list. Removing selected samples from the analysis resulted in a decision change.	No
Furlong Creek	Chlorpyrifos	1/2 samples exceeded evaluation guideline	CCAMP	0.025 µg/L as stated in Sipmann and Finalyson (2000)	305FUF	1/5/2006 – 5/17/2006	The lines of evidence for the 2008-2010 listing of Millers Canal show 2/3 samples exceeded the evaluation guidelines. Staff reevaluated the data and found that one sample that qualified as an exceedance was marked as "does not qualify" and so should not be counted as a sample. The listing policy states that 2 samples are necessary to exceed the evaluation guideline before the waterbody can be placed on the list. Removing selected samples from the analysis resulted in a decision change.	No

2.5.1.2 Current status and anticipated 2012-2014 303(d) listings

To determine the presence of additional OP pesticide impairments in the Pajaro River Watershed, staff evaluated data from the CCAMP, Cooperative Monitoring Program (CMP), UC Davis/Marine Pollution Studies Laboratory at Granite Canyon/USGS/CCAMP, and the DPR's water quality data as well as pesticide use reporting information. Staff summarized pesticide impairments for the upcoming 2012-2014 303(d) list in Table 2-6. In summary, the Pajaro River and the Pajaro River Estuary are impaired for diazinon. Additionally, recent sampling confirms that the Pajaro River and Llagas Creek remain impaired by chlorpyrifos.

At a recent stakeholder meeting held in December 2012, stakeholders asked staff how many additional samples would need to be collected in each of the impaired waterbodies in order to propose delisting during the next listing cycle. Based on this discussion, staff included the number of additional samples needed in order to propose delisting any of the impaired waterbodies and included this information in Appendix C.

Table 2-6. Summary of data and impairments, including 2008-2010 303(d) listings in the Pajaro River Watershed. Staff *anticipates* the waterbodies considered impaired will be included on the 2012-2014 303(d) list. These anticipated listings are based on exceedances of the chronic value (CCC) for chlorpyrifos and diazinon. This table also includes the data from Table 2-5 and includes more recent data. Please see Appendix C for a graphical display of the data.

Waterbody	Listing	Exceedances	Data Source	Associated Water Quality Objectives /Numeric Criteria	Monitoring Site(s)	Temporal Representation	Considered impaired?
Pajaro River	Diazinon	4/45 samples exceeded evaluation guideline	Anderson (2/9) CCAMP (1/15) CMP (1/8) DPR (0/9) DOW (0/4)	0.10 µg/L as stated in Sipmann and Finalyson (2000)	305CHI 305THU 305MUR 305PAJ 305PJP	1/10/2006-9/25/2012	**Yes**
Pajaro River Estuary	Diazinon	3/30 samples exceeded evaluation guideline	Anderson (3/30)	0.10 µg/L as stated in Sipmann and Finalyson (2000)	305PJE_L 305PJE_U	1/6/2008 – 10/28/2009	**Yes**
Pajaro River	Chlorpyrifos	4/44 samples exceeded	Anderson (0/8) CCAMP (3/15) CMP (0/8) DPR (1/9) DOW (0/4)	0.015 µg/L as stated in Sipmann and Finalyson (2000)	305CHI 305THU 305MUR 305PAJ 305PJP	1/10/2006 – 9/28/2012	**Yes**
Llagas Creek	Chlorpyrifos	3/9 samples exceed	CCAMP (3/6) CMP (0/3)	0.015 µg/L as stated in Sipmann and Finalyson (2000)	305LCS 305LEA 305LLA	1/5/2006 – 9/22/2011	**Yes**

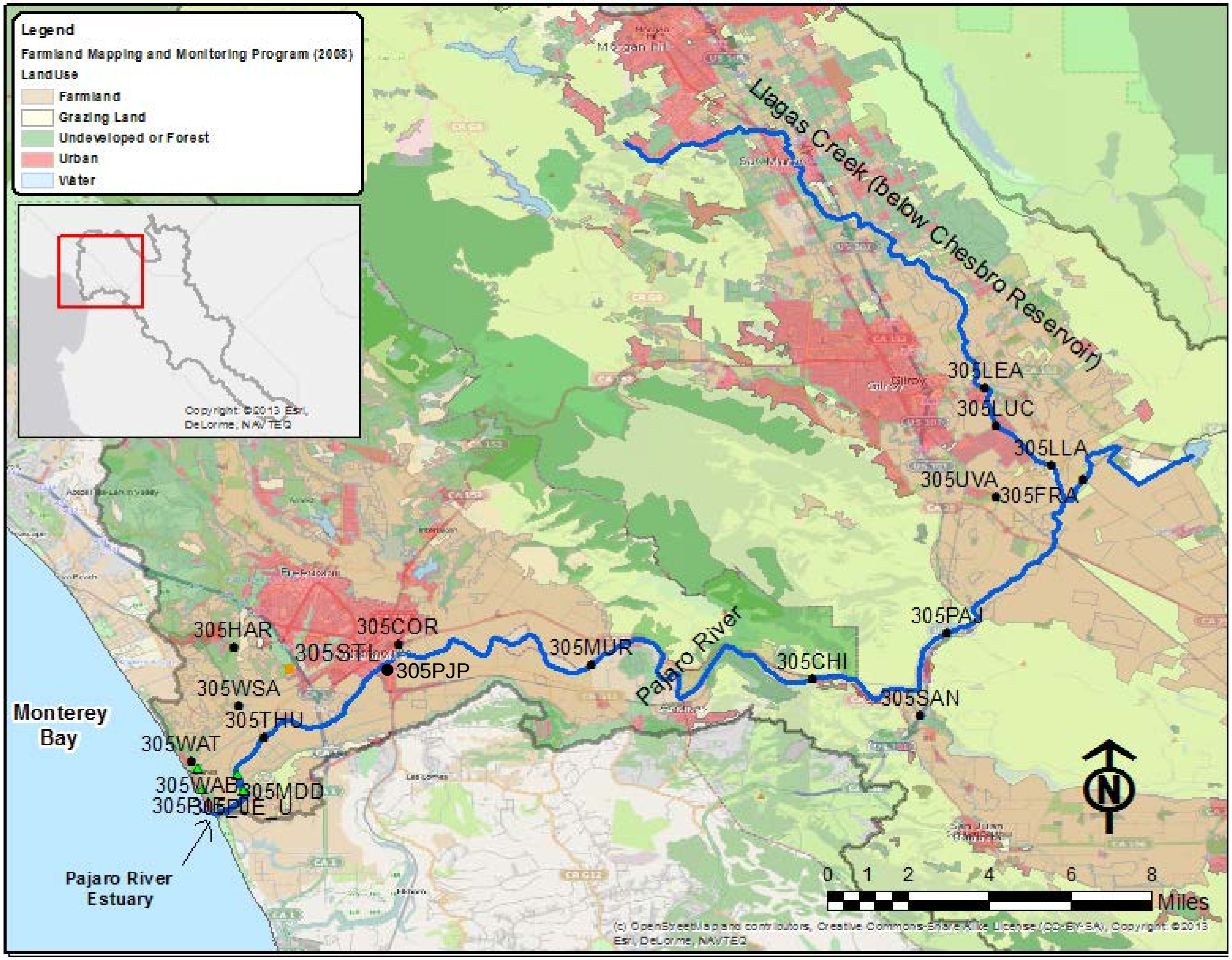

Figure 2-2. Map showing sampling stations in the lower Pajaro River and Llagas Creek. Farmland Mapping and Monitoring Program landuses underly the watershed. Brown represents agricultual areas, red-urbanized areas, yellow-grazing lands and green-undeveloped or forested land.

2.5.2 Problem Statement

The Pajaro River, Pajaro River Estuary, and Llagas Creek are impaired due to exceedances of the water quality objective for pesticides and toxicity. The Pajaro River Estuary is impaired due to diazinon. Pajaro River is impaired due to chlorpyrifos and diazinon. Llagas Creek is impaired due to chlorpyrifos. Please see Table 2-7. The aquatic habitat beneficial uses are not being protected in these waterbodies because of these impairments. This project identifies the causes of impairment and describes solutions to achieve water quality objectives and protection of beneficial uses.

Table 2-7. Impaired waterbodies that are assigned TMDLs; not all of the following waterbodies are listed on the 2008-2010 303(d) list.

WATERBODY	2008-2010 303(d) listed? (Y/N)	WBID	2008-2010 303(d) list pollutant/ stressor	Additional pollutant/ stressors identified	Assigned a TMDL and load allocations?
Pajaro River	Y	CAR3051003019980826115152	Chlorpyrifos	-	**Y**
Pajaro River	N	CAR3051003019980826115152	-	Diazinon	**Y**
Pajaro River Estuary	N	CAE3051003020080604154634	-	Diazinon	**Y**
Llagas Creek (below Chesebro Reservoir)	Y	CAR3053002020020319075726	Chlorpyrifos	-	**Y**
Millers Canal	Y	CAR3053002020080603171000	Chlorpyrifos	-	N
Furlong Creek	Y	CAR3053002019990222111932	Chlorpyrifos	-	N
Number of waterbody/impairment combinations					4

3 NUMERIC TARGETS

Numeric targets are water quality targets developed to ascertain when and where water quality objectives are achieved, and hence, when beneficial uses are protected. The pesticide objectives in the Basin Plan are narrative objectives (see Section 2.3).

3.1 Water Column Numeric Targets

In 2000, CDFG published freshwater water quality criteria for diazinon and chlorpyrifos (CDFG, 2000) using USEPA methodology (USEPA, 1985). Staff selected the CDFG water quality criteria as numeric targets for these TMDLs. These targets are used as TMDL targets in several approved TMDLs, including the Lower Salinas Watershed Chlorpyrifos and Diazinon TMDL and the San Antonio Creek Chlorpyrifos TMDL.

Table 3-1. Chlorpyrifos and diazinon water column numeric targets.

Chemical	CMC[A] µg/L (ppb)	CCC[B] µg/L (ppb)	Reference
Chlorpyrifos[C]	0.025	0.015	CDFG, 2000
Diazinon[C]	0.16	0.10	CDFG, 2000

A. CMC – Criterion Maximum Concentration (Acute: 1- hour average). Not to be exceeded more than once in a three year period.
B. CCC – Criterion Continuous Concentration (Chronic: 4-day (96-hour) average). Not to be exceeded more than once in a three year period.
C. A toxicity ratio is used to account for the additive nature of these components. The ratio calculation is provided in this section.

3.2 Additive Toxicity Numeric Target

Diazinon and chlorpyrifos have the same mechanism of toxic action and exhibit additive toxicity to aquatic invertebrates when they co-occur (Bailey et al., 1997; CDFG, 2000). 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 (Deneer et al., 1988). 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. Central Valley Regional Water Quality Control Board (CVRWQCB) staff developed technical guidance ("Policy for Application of Water Quality Objectives" and policy on "Pesticide Discharges from Nonpoint Sources") and 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* (CVRWQCB, 2007); the following additive toxicity numeric target formula is a numeric target of this TMDL:

$$S = \leq 1.0 = \frac{C_{Diazinon}}{LC_{Diazinon}} + \frac{C_{Chlorpyrifos}}{LC_{Chlorpyrifos}}$$

Where:

S = Sum of additive toxicity
$C_{Diazinon}$ = Diazinon concentration in waterbody
$C_{Chlorpyrifos}$ = Chlorpyrifos concentration in waterbody
$LC_{Diazinon}$ = Criterion Continuous Concentration (0.10 µg/L) or Criterion Maximum Concentration (0.16 µg/L) diazinon loading capacity
$LC_{Chlorpyrifos}$ = Criterion Continuous Concentration (0.015µg/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.

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

3.3 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 3-2. Standard Aquatic Toxicity Tests

Parameter	Test	Biological Endpoint Assessed	Test Method #
Water Column Toxicity	Water Flea – *Ceriodaphnia (7-day chronic)*	Survival and reproduction	EPA 1002.0
Sediment Toxicity	Hyalella azteca (10-day chronic)	Survival and reproduction	EPA 100.1

4 SOURCE ANALYSIS

4.1 Introduction

Chlorpyrifos and diazinon are man-made pesticides. While there are urban and agricultural sources of chlorpyrifos and diazinon, staff determined agricultural applications were what caused exceedances of water quality objectives in the Pajaro River watershed. The following is a general discussion of the sources of these pesticides followed by more detailed sections that address the water quality exceedances and pesticide applications.

4.2 Urban areas and chlorpyrifos and diazinon

Pesticides generally have agricultural and non-agricultural uses. Non-agricultural uses include: professional residential and homeowner residential use products.

In 2000, EPA announced the agreed phase-out with the registrants of residential uses of chlorpyrifos and diazinon. The timing of the residential product phase-out is summarized below:

1. Residential phase-outs announced of chlorpyrifos and diazinon (2000)
2. Formulation of chlorpyrifos stopped (December 1, 2000)

3. Retail sales of chlorpyrifos stopped (December 31, 2001)
4. Retail sales on diazinon for indoor use stopped (December 31, 2002)
5. Formulation of diazinon for outdoor use stopped (June 30, 2003)
6. Retail sales of diazinon for outdoor use stopped (December 31, 2004)

Since non-agricultural use of chlorpyrifos and diazinon was stopped many years ago and these pesticides have relatively short half-lives (refer to Table 2-4), staff determined that residential use in urban settings are not sources of chlorpyrifos or diazinon.

Professionals still apply chlorpyrifos and diazinon for landscape maintenance and structural pest control. The operator who applies the pesticide is required to report the amount of pesticide applied and the date the pesticide was applied to the county agricultural commissioner. Operators are required to apply the pesticide in a manner consistent with specific labeling requirements. Staff analyzed the pounds of professional urban application of chlorpyrifos and diazinon[2] and compared it to agricultural application. As seen in Figure 4-1, application of chlorpyrifos and diazinon did not significantly reduce in the urban environment until 2003. After 2004, the application of these chemicals in the urban environment is significantly less than the application on agricultural crops. Because the pounds applied in the urban area are much less than agricultural areas (since 2004) and the labeling requirements the applicators are required to comply with are stringent, staff concludes urban sources are not contributing to the impairment in the Pajaro River Watershed.

[2] Staff obtained the numbers for urban application from DPR PUR by county. Since professional urban and landscape maintenance operators are not required to report their location, staff made some assumptions in order to calculate this number. Staff took the total pounds of chlorpyrifos and diazinon applied per year in each county and multiplied the total number by 20%. The Pajaro River Watershed is about 20% of Monterey, San Benito, Santa Clara, and Santa Cruz Counties combined.

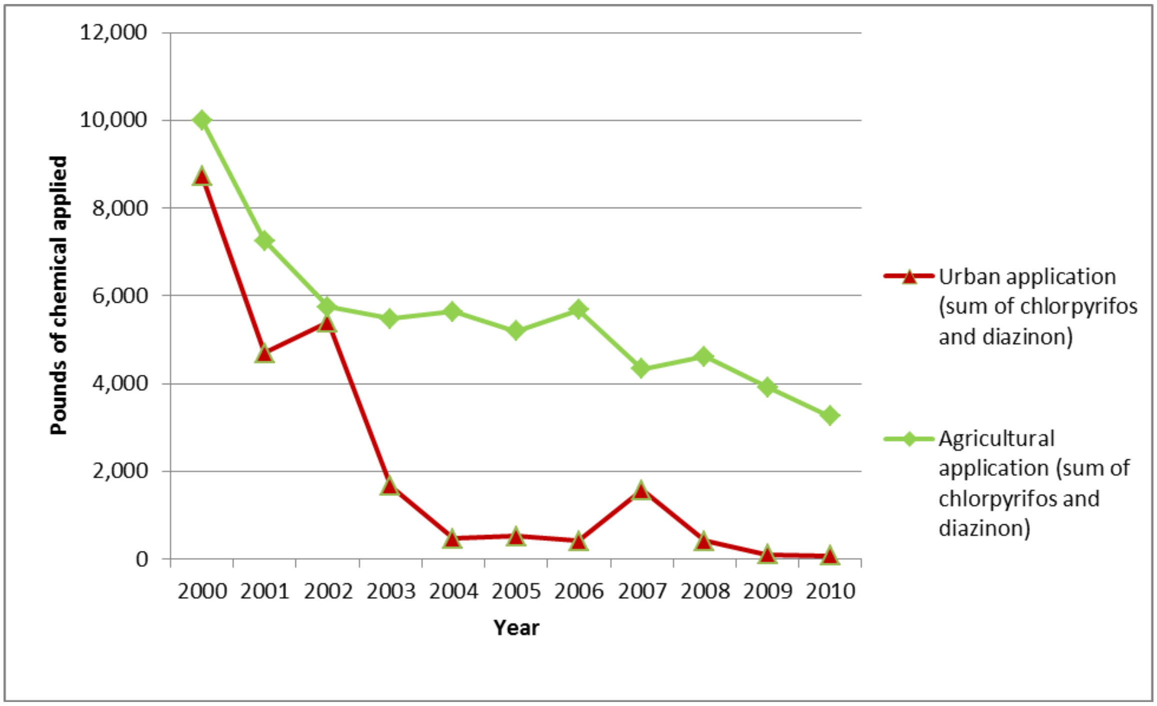

Figure 4-1. Pounds (active ingredient) of chlorpyrifos and diazinon applied in the Pajaro River Watershed between 2000 and 2010. Note that the lines include both chlorpyrifos and diazinon. Urban use in this graph includes structural application and landscape maintenance that are professionally applied. As of the writing of this report, DPR data for 2011 and 2012 was unavailable.

DPR conducts water quality monitoring in the State of California. They have been conducting surface water monitoring in urban areas for many years and sample for many different pesticides and herbicides. As part of their ongoing sampling throughout the state, DPR took samples in urban areas that had no agricultural input in Sacramento, San Francisco, Orange County, and San Diego areas. From 2008 to 2012 DPR detected[3] chlorpyrifos in urban runoff 1.9% of the time (8 detections out of 414 samples) and diazinon 6% of the time (25 out of 414 samples) (Ensminger 2012 and pers. comm. Ensminger 2013), which is a relatively low detection rate. Detection of the chemical does not mean that the chemical was necessarily detected above a water quality criteria.

Based on the information in this section (4.2), staff concludes that urban applications were not a significant source of chlorpyrifos or diazinon during the time water quality sampling took place (2006 to 2011) and that they are not considered a source of loading to this watershed especially over the last four years (2008-2012).

[3] "Detected" is not synonymous with the concentration being at or above the water quality criteria for either chlorpyrifos or diazinon. Detected means the target compound can be distinguished from potential interferences present in an environmental sample (Memorandum, DPR, Feb. 13, 1996).

4.3 Agricultural application of chlorpyrifos and diazinon

Staff evaluated the pounds of active ingredient (AI) of chlorpyrifos and diazinon applied in the Pajaro River Watershed from 2000-2012[4] from agricultural operations. Applications of chlorpyrifos and diazinon in agricultural areas have decreased dramatically. Application of diazinon has decreased with nearly 7,500 pounds AI applied in 2000 to 540 pounds AI applied in 2011. Chlorpyrifos application has gone down as well, from 2,540 pounds AI applied in 2000 to 550 pounds AI in 2010. Please see Figure 4-2 for details. DPR PUR data for 2011 were unavailable during the time this report was written so staff used data from the county agricultural commissioner's offices for 2011 and 2012.

Based on self-reported data received from growers for the agricultural waiver program, as October 2012, 172 operations in the Pajaro River Watershed are applying, or have recently applied, chlorpyrifos and/or diazinon to their farms (CCWB, eNOI data, Oct. 2012). Both chlorpyrifos and diazinon are applied year-round to a variety of crops in the Pajaro River watershed (DPR, PUR 2000-2010). Crops that chlorpyrifos is applied to include, but are not limited to, apple, walnuts, corn (human consumption), alfalfa/hay, broccoli, brussels sprouts, onion, grapes (wine), cauliflower, nursery/greenhouse cut flowers, container plants, sunflowers, kale, lemon, bok choy and asparagus. Crops that diazinon is applied to include, but are not limited to, cherry, apple, head and leaf lettuce, spinach, onion, apricot and broccoli. Please see Figure 4-3 and Figure 4-4 for a graphical display of pesticide applied by crop type as a percent of total mass applied. The purpose of these graphs is to display which type of crops these pesticides are being applied to.

[4] Staff used DPR PUR data for 2000-2010 and information from the County Agricultural Commissioner's Offices for 2011 and 2012. Note that data for 2012 only includes up to August or November 2012, depending on the county.

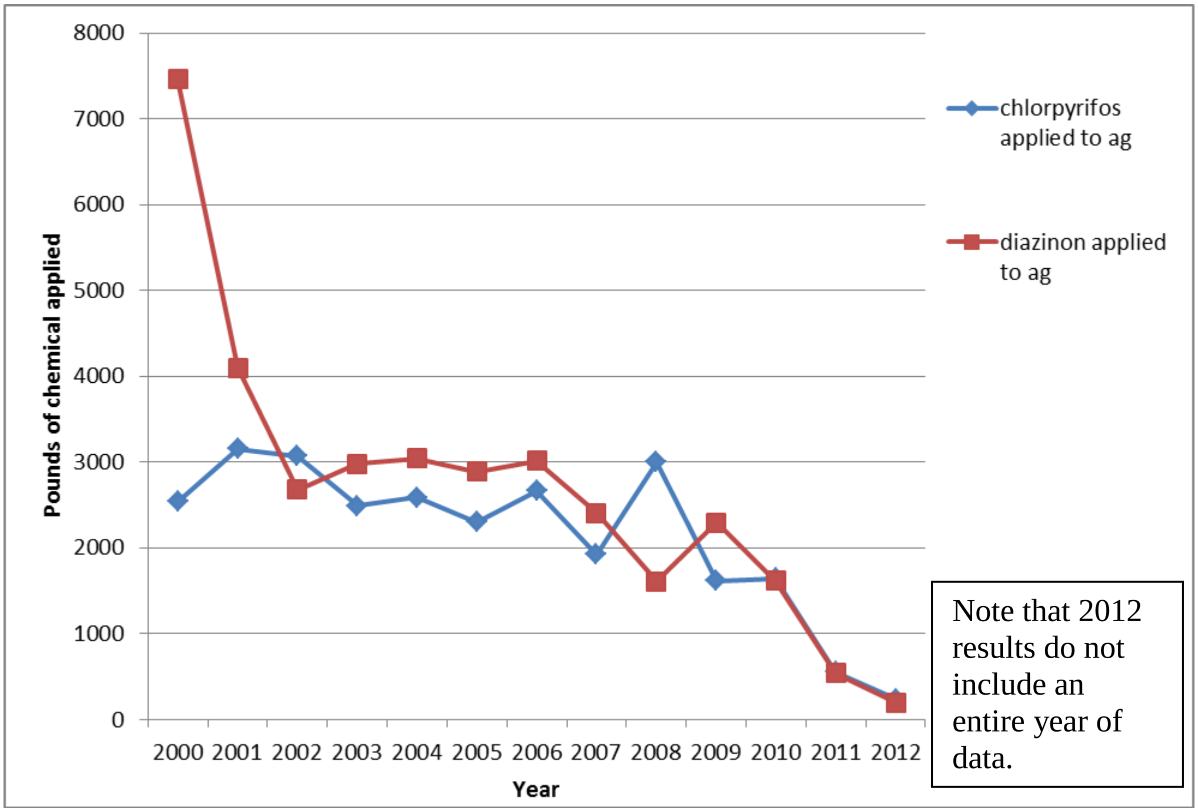

Figure 4-2. Line graph showing the pounds of chemical applied per year from 2000-2012. Note that 2012 does not represent a full year of data. Data for 2012 end between August 2012 to November 2012, depending on the County staff received information from.

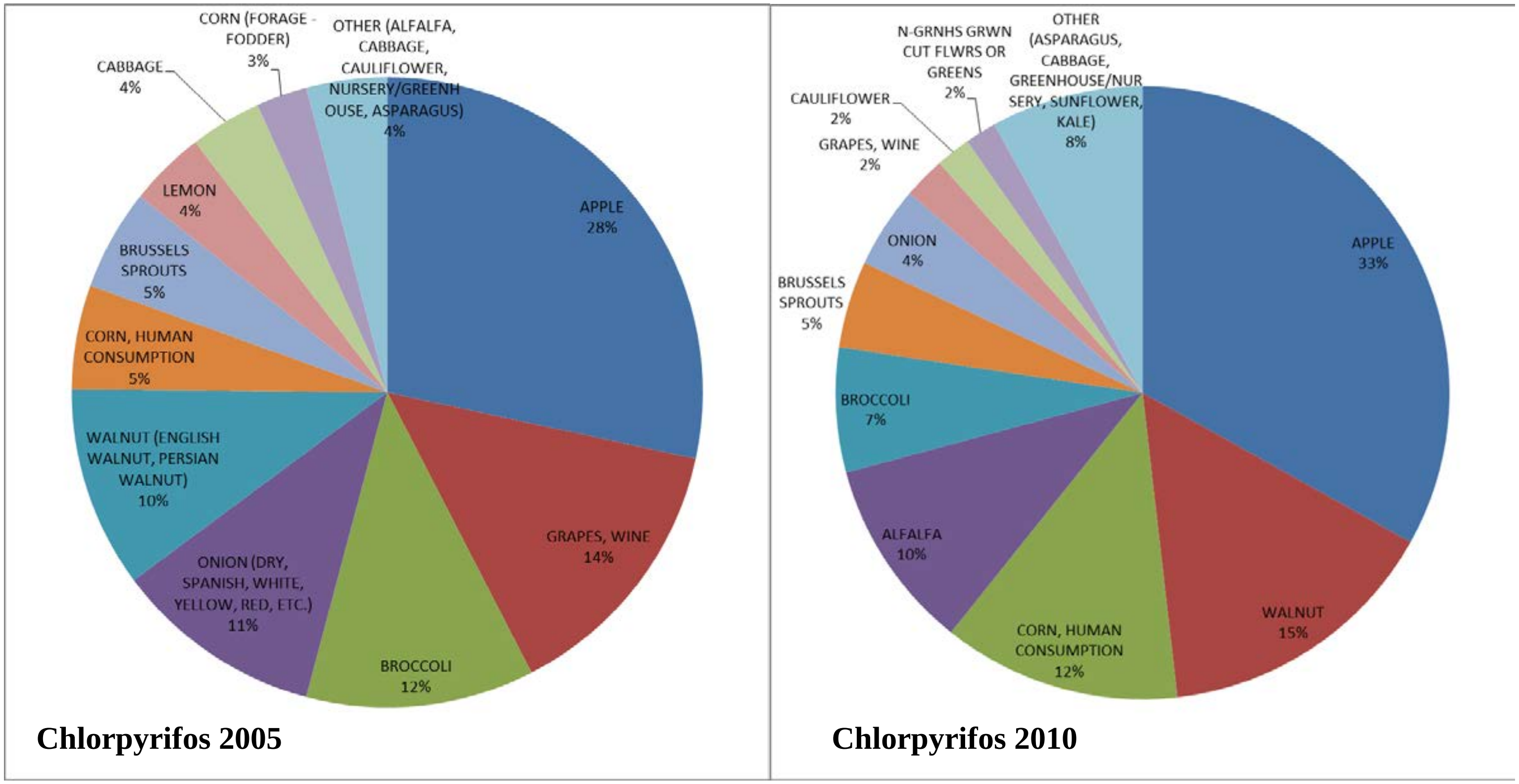

Figure 4-3. Chlorpyrifos applications in the Pajaro River watershed in 2005 and 2010, displayed by crop type as total percent of total mass applied. In 2005 total pounds applied was 2,393 and in 2010 was 1,641 pounds.

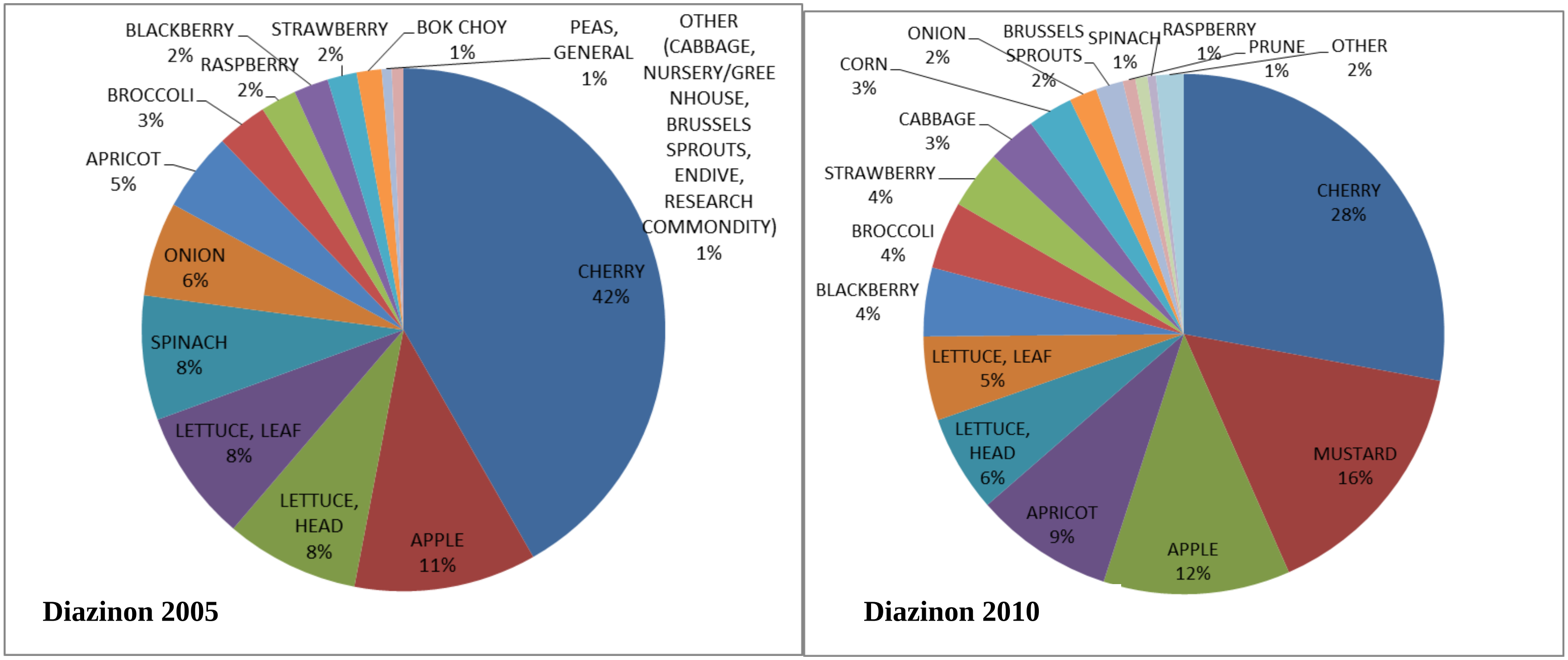

Figure 4-4 - Diazinon application in the Pajaro River watershed in 2005 and 2010, displayed by crop type as total percent of total mass applied. In 2005 total pounds applied was 2,890 and in 2010 was 1,615 pounds.

4.4 Agricultural application of chlorpyrifos and diazinon pesticide use information compared to water quality data

Staff evaluated information from the DPR's Pesticide Use Reports (PUR) for agriculture to determine where chlorpyrifos/diazinon was being applied, how much was being applied, and at what time the chemical was applied. Staff looked at data from 2000-2010 to determine trends in application.

Staff compared the dates when water quality samples exceeded chlorpyrifos and diazinon water quality criteria and then compared those dates and locations with corresponding application of chlorpyrifos or diazinon within a nearby radius (never exceeding four miles and typically much closer). Staff determined that in most cases, there was usually a chemical application of chlorpyrifos or diazinon in close proximity to the water quality sampling station that experienced an exceedance within a couple months. As seen in Table 4-1 and Table 4-2, the crop type to which the chemical was applied varied and included about nine different types of crops.

Table 4-1. Sampling sites showing exceedances of the chlorpyrifos numeric target and corresponding nearby (less than four miles) chlorpyrifos application.

Sample site showing chlorpyrifos exceedance	Waterbody	Date site exceeded	Date chlorpyrifos applied nearby	Crop chlorpyrifos was applied to
305MUR	Pajaro River	5/17/2006	4/1/2006 4/12/2006	apple apple
305PAJ	Pajaro River	5/17/2006	3/20/2006 3/26/2006 3/30/2006 4/19/2006	corn cabbage broccoli alfalfa
305PJP	Pajaro River	5/30/2006	2/11/2006 2/11/2006 3/12/2006	cabbage apple apple
305THU	Pajaro River	6/2/2009	3/12/2009 3/13/2009 4/9/2009	broccoli apple cauliflower
305LEA	Llagas Creek	1/5/2006	10/13/2005	napa cabbage
		5/17/2006	3/9/2006 4/20/2006 4/20/2006	corn alfalfa alfalfa
305LLA	Llagas Creek	5/17/2006	1/9/2006 2/16/2006 3/20/2006	broccoli grapes, wine broccoli

Table 4-2. Sampling sites showing exceedances of the diazinon numeric target and corresponding nearby (less than four miles) diazinon application.

Sample site showing diazinon exceedance	Waterbody	Date site exceeded	Date diazinon applied nearby	Crop diazinon was applied to
305THU	Pajaro River	1/6/2008	8/8/2007 8/16/2007	broccoli brussels sprouts
		2/25/2008	2/13/2008	cauliflower
305 MUR	Pajaro River	2/24/2011	7/4/2010*	apple
305PJE_L	Pajaro River Estuary	1/6/2008	8/8/2007 8/16/2007	broccoli brussels sprouts
305PJE_U	Pajaro River Estuary	1/6/2008	8/8/2007 8/16/2007	broccoli brussels sprouts
		2/25/2008	2/13/2008	cauliflower

*2011 pesticide use reporting data from DPR was unavailable at the writing of this report. It is possible there was a Jan. or Feb. 2011 application that may have caused an exceedance at this site.

4.5 Source analysis conclusions

Based on the information presented in the preceding sections, staff determines that water quality exceedances of chlorpyrifos and diazinon were due to application on agricultural operations.

5 LOADING CAPACITY, TMDLS, AND ALLOCATIONS

5.1 Introduction

TMDLs are "[t]he sum of the individual waste load allocations for point sources and load allocations for nonpoint sources and natural background. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure" in accordance with Code of Federal Regulations, Title 40, §130.2[i].

The loading capacity for the Pajaro River watershed is the amount of chlorpyrifos and diazinon that can be assimilated without exceeding the water quality objectives. The allowable water column concentrations of chlorpyrifos and diazinon that will achieve the objectives for toxicity and pesticides are equal to the numeric targets.

Staff proposes the establishment of concentration-based TMDLs in accordance with this provision of the Clean Water Act.

5.2 Loading Capacity and TMDLs

The TMDLs are set equal to the loading capacity. The following TMDLs are established in the Pajaro River Watershed, including the Pajaro River, Pajaro River Estuary, and Llagas Creek.

The loading capacity, or Total Maximum Daily Load, for chlorpyrifos and diazinon is a water column concentration-based Total Maximum Daily Load and is applicable to each day of all seasons as indicated in Table 5-1.

Table 5-1. Concentration-based TMDLs for diazinon and chlorpyrifos when present individually.

Chemical	CMC[A] µg/L (ppb)	CCC[B] µg/L (ppb)	Reference
Chlorpyrifos[C]	0.025	0.015	CDFG, 2000
Diazinon[C]	0.16	0.10	CDFG, 2000, 2004

A. CMC – Criterion Maximum Concentration (Acute: 1- hour average). Not to be exceeded more than once in a three year period
B. CCC – Criterion Continuous Concentration (Chronic: 4-day (96-hour) average). Not to be exceeded more than once in a three year period
C. A toxicity ratio is used to account for the additive nature of these components. The ratio calculation is provided in section 3.

Additive toxicity TMDL when diazinon and chlorpyrifos both are present:

$$S = \leq 1.0 = \frac{C_{Diazinon}}{LC_{Diazinon}} + \frac{C_{Chlorpyrifos}}{LC_{Chlorpyrifos}}$$

Where:

S = Sum of additive toxicity
$C_{Diazinon}$ = Diazinon concentration in waterbody
$C_{Chlorpyrifos}$ = Chlorpyrifos concentration in waterbody
$LC_{Diazinon}$ = Criterion Continuous Concentration (0.10 µg/L) or Criterion Maximum Concentration (0.16 µg/L) diazinon loading capacity
$LC_{Chlorpyrifos}$ = 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.

The TMDLs for water column and sediment toxicity is equal to the aquatic toxicity numeric target, which is based on standard toxicity tests to aquatic test organisms. The TMDL is based on the Basin Plan general objective for toxicity (see Table 5-2).

Table 5-2. Standard Aquatic Toxicity Tests

Parameter	Test	Biological Endpoint Assessed	Test Method #
Water Column Toxicity	Water Flea – *Ceriodaphnia (7-day chronic)*	Survival and reproduction	EPA 1002.0
Sediment Toxicity	*Hyalella azteca* (10-day chronic)	Survival and reproduction	EPA 100.1

5.3 Linkage Analysis

The goal of the linkage analysis is to establish a link between pollutant loads and desired water quality. This, in turn, ensures that the loading capacity specified in the TMDLs will result in attaining the desired water quality. For these TMDLs, this link is established because the load allocations are equal to the numeric targets, which are the same as the TMDLs. Therefore, reductions in chlorpyrifos and diazinon loading will result in achieving the water quality standards.

5.4 Allocations

Table 5-2 shows load allocations assigned to responsible parties. The allocations are equal to the TMDLs. The allocations are receiving water allocations. Please see *section 6.4 Timeline and milestones* with regards to timelines associated with meeting these allocations.

Table 5-3. Load allocations

LOAD ALLOCATIONS		
Waterbodies Assigned TMDLs[1]	**Responsible Party Assigned Allocation (Source)**	**Receiving Water Numeric Targets, TMDLs, and Allocations**
• Pajaro River	Owners/operators of irrigated agricultural lands in the Pajaro River Watershed (Discharges from irrigated lands)	Allocation 1, 2, 3 & 4
• Pajaro River Estuary		Allocation 1, 2, 3 & 4
• Llagas Creek		Allocation 1, 2, 3 & 4

Allocation 1:

Compound	CMC[A] (ppb)	CCC[B] (ppb)
Chlorpyrifos	0.025	0.015

Allocation 2:

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.

Allocation 3:

$$S =\leq 1.0 = \frac{C_{Diazinon}}{LC_{Diazinon}} + \frac{C_{Chlorpyrifos}}{LC_{Chlorpyrifos}}$$

Where:

S = Sum of additive toxicity
$C_{Diazinon}$ = Diazinon concentration in waterbody
$C_{Chlorpyrifos}$ = Chlorpyrifos concentration in waterbody
$LC_{Diazinon}$ = Criterion Continuous Concentration (0.10 µg/L) or Criterion Maximum Concentration (0.16 µg/L) diazinon loading capacity
$LC_{Chlorpyrifos}$ = 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.

Allocation 4:

Parameter	Test	Biological Endpoint Assessed	Test Method #
Water Column Toxicity	Water Flea – *Ceriodaphnia (7-day chronic)*	Survival and reproduction	EPA 1002.0
Sediment Toxicity	*Hyalella azteca* (10-day chronic)	Survival and reproduction	EPA 100.1

[1] All reaches of the Pajaro River, Pajaro River Estuary, Llagas Creek, and their tributaries.

Available samples collected within the applicable averaging period (e.g., 1-hour CMC and 4-day CCC) for the numeric targets will be used to determine compliance with the allocations and loading capacity.

5.5 Margin of Safety

This TMDL uses an implicit margin of safety. The margin of safety for this TMDL is implicit in the water column numeric targets selected for chlorpyrifos and diazinon. Since this is a concentration-based TMDL, the TMDL is the same as the loading capacity for each compound.

The assigned TMDL assumes no significant reductions in chlorpyrifos or diazinon loading due to removal from the water column by degradation and/or adsorption to sediment particles and subsequent sediment deposition. Since these processes are likely to take place, this assumption contributes to the implicit margin of safety in the proposed allocation methodology. This is a conservative assumption resulting in an implicit margin of safety.

Staff used water column numeric criteria for chlorpyrifos and diazinon, developed by the California Department of Fish and Game, now known as California Department of Fish and Wildlife (CDFG, 2000; CDFG, 2004) following USEPA protocols (USEPA 1985), to establish the loading capacity. Therefore, the loading capacity has the same conservative assumptions used in those procedures.

5.6 Critical Conditions and Seasonal Variation

A critical condition is the combination of environmental factors resulting in the water quality standard being achieved by a narrow margin, i.e., that a slight change in one of the environmental factors could result in exceedance of the water quality standard. Such a phenomenon could be significant if the TMDL were expressed in terms of load, and the allowed load was determined on achieving the water quality standard by a narrow margin. However, this TMDL is expressed as a concentration, which is equal to the desired water quality condition. Consequently, there are no critical conditions.

The TMDL includes additive toxicity numeric targets to address critical conditions where both chlorpyrifos and diazinon are present.

Exceedance of water quality objectives occurred in the months of January, February, May, and September, which are inclusive of both wet and dry weather. Therefore, there is no seasonal variation affecting the TMDLs and allocations.

6 IMPLEMENTATION AND MONITORING

6.1 Introduction

This TMDL is being implemented by the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Agricultural Order); this includes the order currently in effect and renewals or modifications thereof. Central Coast Water Board staff will conduct a review of implementation activities when monitoring and reporting data is submitted as required by the Agricultural Order. Central Coast Water Board staff will pursue modification of Agricultural Order conditions or other regulatory means (e.g. waste discharge requirements), if necessary, to address remaining impairments from chlorpyrifos and diazinon during the TMDL implementation phase.

Note that the current Agricultural Order requires dischargers to comply with applicable TMDLs. If the Agricultural Order did not provide the necessary requirements to implement this TMDL, staff would propose modifications of the Agricultural Order in order to achieve this TMDL. Staff concludes that the current Agricultural Order provides the requirements necessary to implement this TMDL. Therefore, no new requirements are proposed as part of this TMDL.

Note that the Agricultural Order states that compliance is determined by a) management practice implementation and effectiveness, b) treatment or control measures, c) individual discharge monitoring results, d) receiving water monitoring results, and e) related reporting. The Agricultural Order also requires that dischargers comply by implementing and improving management practices and complying with the other conditions, including monitoring and reporting requirements, which is consistent with the Nonpoint Source Pollution Control Program (NPS Policy, 2004). Finally, the Agricultural Order states that dischargers shall implement management practices, as necessary, to improve and protect water quality and to achieve compliance with applicable water quality objectives. Therefore, compliance with this TMDL is demonstrated through compliance with the Agricultural Order, which provides several avenues for demonstrating compliance, including management practices that improve water quality that lead to ultimate achievement of water quality objectives.

The Porter-Cologne Water Quality Control Act grants the Water Boards the authority to implement and enforce water quality laws. Water Board staff ensures compliance with the Agricultural Order using the authority and regulatory mechanisms granted through the California Water Code, including application of enforcement actions described in the Water Quality Enforcement Policy. Therefore, the Central Coast Water Board does not need an additional regulatory program (e.g., a new plan or policy adopted through a Basin Plan Amendment) to address impairments caused by chlorpyrifos and diazinon in the project area, because the Agricultural Order is the regulatory mechanism in place to address these impairments.

The implementation requirements, and monitoring and reporting requirements identified below are actions recommended to achieve and demonstrate progress toward achieving the TMDL. The requirements identified below are not additional requirements above and beyond those described in the Agricultural Order and are not intended to be an exhaustive list of actions necessary to achieve the TMDL; the implementation and monitoring requirements described in the Agricultural Order are sufficient to achieve and demonstrate progress.

The parties with allocations for this TMDL include any agricultural operations that use chlorpyrifos and diazinon on their crops. Please see section 6.4, Timelines and Milestones for the timeline and milestones associated with complying with this TMDL.

6.2 Implementation Requirements

Implementing parties must 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, or its renewals or replacements to meet load allocations and achieve the TMDL. The requirements in these orders, and their renewals or replacements in the future, will implement the TMDLs and rectify the impairments addressed in this TMDL.

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

a. Enroll in the Agricultural Order.
    - 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.
    - 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.

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.

6.3 Monitoring and Reporting Requirements

Growers required to monitor must meet the monitoring requirements of the *Conditional Waiver of Waste Discharge Requirements For Discharges from Irrigated Lands* (Agricultural Order).

The Agricultural Order includes monitoring and reporting requirements that assess progress toward achieving these TMDLs. To achieve this goal, the monitoring requirements should include:

1. Water column chlorpyrifos and diazinon monitoring consistent with numeric targets outlined in Section 3.1.
2. Laboratory analytical methods rigorous enough for data comparison with the numeric targets.
3. Sampling site locations shall be consistent with CCAMP and CMP sites (Table 6-1).
4. Results submitted to the Water Board, upon request.

Table 6-1. Recommended receiving water monitoring sites for TMDL progress assessment.

Impaired Waterbody	Recommended Monitoring Sites
Llagas Creek	305LEA, 305LLA
Pajaro River	305CHI, 305MUR, 305PAJ, 305PJP, 305THU
Pajaro River Estuary	305PJE_L, 305PJE_U

Note that the Agricultural Order requires some dischargers to submit results of individual surface water monitoring, characterizing their individual discharge of chlorpyrifos and diazinon.

CCAMP anticipates conducting their rotational sampling in the Pajaro River Watershed in 2016. If needed, their sampling may include chlorpyrifos and diazinon. The CMP collects annual samples for conventional parameters (monthly for conventional parameter and four times a year for toxicity). The CMP also intends to sample for supplemental chemistries (pesticides and herbicides) in 2014 in the Pajaro River Watershed.

6.4 Determination of Compliance with Load Allocations

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, Central Coast Water Board staff will assess compliance with load allocations using one or a combination of the following:

1. Attaining the load allocations in receiving waters.
2. Attaining zero toxicity attributable to pesticides in receiving waters.
3. Implementing management practices that are capable of achieving 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.

6.5 Timeline and milestones

Discharge of pesticides at levels toxic to the environment affects a spectrum of beneficial uses and is a serious water quality problem. As such, implementation should occur at an accelerated pace to achieve the allocations and TMDL in the shortest time-frame feasible.

The target date to achieve the allocations, numeric targets, and TMDLs in the impaired waterbodies addressed in this TMDL is October 2016. This date coincides with planned monitoring efforts to help defray costs to implementing parties and reflects the decrease in chlorpyrifos and diazinon use in the Pajaro River Watershed and associated ease with which the TMDL can likely be achieved (please see Section 6.6 Existing Implementation Efforts). The Agricultural Order should establish timeframes for individual dischargers to achieve water quality standards; achieving water quality standards will result in achieving TMDL allocations.

Water Board staff will reevaluate impairments caused by chlorpyrifos and diazinon when monitoring data is submitted and during renewals of the Agricultural Order. Water Board staff will modify the conditions of the Agricultural Order, if necessary, to address remaining impairments.

6.6 Cost Estimates

Existing regulatory requirements are sufficient to attain water quality standards for diazinon in the project area. The Regional Board is not approving any new activity, but merely finding that ongoing activities and regulatory requirements are sufficient. Therefore, this TMDL is not a “project” that requires compliance with the California Environmental Quality Act (California Public Resources Code § 21000 et seq.) and the Central Coast Water Board is not directly undertaking an activity, funding an activity or issuing a permit or other entitlement for use by this action (Public Resources Code § 21065; 14 Cal. Code of Regs. §15378).

6.7 Existing Implementation Efforts

Based on available reports, information from CDPR and agricultural commissioners, DOW AgroSciences, public meetings, information from growers, and phone and email conversations, staff concludes that the amount of chlorpyrifos and diazinon being applied in the watershed is declining (see Figure 4-2). In addition to the pounds of chemical applied being reduced, many growers and agencies that work with growers maintain that improved management practices associated with applying these chemicals have aided in fewer detections of these chemicals in the water column over the last three to four years (2009-2012).

CDPR has worked with chemical companies and the USEPA on changing many of the labeling requirements associated with how agricultural professionals need to apply these chemicals (Interim Reregistration Eligibility Decisions, Diazinon, May 2004 for example). Examples of specific labeling changes to diazinon include:

- cancellation of all granular registrations (except for use on lettuce)
- deletion of aerial applications (except for once/year for lettuce)
- application rate reduction for ornamentals and lettuce
- require engineering controls for all uses
- reduce the number of applications of diazinon per growing season.

Similar labeling changes apply to chlorpyrifos as well.

DPR set forth regulations regarding controlling dormant spray applications on August 2006. Specific prohibitions[5] on applications within 100 feet of sensitive aquatic sites, when runoff is expected within 48 hours, when winds are <3 mph and >10 mph, have also likely reduced detections of these chemicals near agricultural fields.

Based on these labeling changes, prohibitions, and reduced application of these pesticides, staff expects growers have already taken many, if not all, of the necessary steps in order to meet this TMDL in the near future.

[5] http://www.cdpr.ca.gov/docs/emon/dormspray/05_004final.pdf text of final regulations made to the California Code of Regulations, Pesticides and Pest Control Operations…dormant insecticide contamination prevention.

7 PUBLIC PARTICIPATION

Staff held a public outreach meeting on August 22, 2012 in Watsonville to inform stakeholders that we were commencing work on a TMDL for organophosphate pesticides in the Pajaro River watershed. Staff emailed and mailed a factsheet with some basic information about this process in advance of the meeting to stakeholders. Staff gave a brief presentation that included information on TMDLs and solicited feedback and comments from stakeholders. There were approximately 20 people in attendance at this meeting which included growers, agricultural consultants, City of Watsonville representatives, the Pajaro Valley Water Management Authority, Cooperative Monitoring Program representatives and the Coastal Watershed Council.

Staff made a copy of a draft preliminary project report available online for stakeholders on December 3, 2012 and also emailed and hardcopy mailed a notice for a public meeting. Staff held another stakeholder meeting on December 10, 2012 in Watsonville, in order to present information and solicit feedback. In attendance at this meeting were growers, City of Watsonville representatives, an agricultural commissioner, Preservation Inc., Dow Agro Sciences, and Crop Production. Staff presented information during the meeting and solicited feedback from the stakeholders. Based on feedback received during the meeting, staff made some additions to the Project Report dated December 3, 2012.

Staff has been corresponding with Preservation Inc., Agricultural Commissioners, Dow AgroSciences, and DPR during the course of developing this TMDL.

Staff plans for this item to be on the July 11, 2013 Board Meeting agenda for the Central Coast Water Board Hearing that will be held in Watsonville.

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StationCode	SampleDate	CollectionTime	SampleTypeCode	Replicate	CollectionDepth	UnitCollectionDepth	LabCollectionComments	SampleComments	MatrixName	MethodName	CountOfDWC_Result_Numeric_w_MD	Chlorpyrifos; Total; ng/g dw	Chlorpyrifos; Total; ug/L	Diazinon; Total; ng/g dw	Diazinon; Total; ug/L	Malathion; Total; ng/g dw	Malathion; Total; ug/L
305CARxxx	1/12/2006	12:30:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305CARxxx	5/17/2006	8:15:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		0.0676		
305CARxxx	9/22/2011	2:00:00 PM	Grab	1	-88	m	CollTime reported as 1:		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305CHIxxx	1/10/2006	12:30:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305CHIxxx	5/17/2006	11:00:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.022		
305CORxxx	1/10/2006	2:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305CORxxx	5/17/2006	12:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.022		
305FRAxxx	1/5/2006	12:30:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0826		-0.03		
305FRAxxx	5/17/2006	9:10:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.022		
305FRAxxx	9/22/2011	11:30:00 AM	Grab	1	-88	m	CollTime reported as 14		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305FUFxxx	1/5/2006	12:15:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0512		-0.03		
305FUFxxx	5/17/2006	9:55:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		0.0291		
305FUFxxx	2/24/2011	9:45:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305FUFxxx	9/22/2011	1:00:00 PM	Grab	1	-88	m	ATL REPORTED 0.1m		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305HARxxx	1/12/2006	11:00:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305HARxxx	5/30/2006	10:50:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305HARxxx	5/30/2006	10:55:00 AM	Grab	2	0.1	m	Field Duplicate of 305H		samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305HARxxx	2/24/2011	12:00:00 PM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305HARxxx	9/21/2011	2:49:00 PM	Grab	1	-88	m	ATL REPORTED 0.1m		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305LEAxxx	1/5/2006	1:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.061		-0.03		
305LEAxxx	5/17/2006	10:15:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0742		-0.022		
305LLAxxx	1/5/2006	12:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305LLAxxx	5/17/2006	9:45:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0528		-0.022		
305LLAxxx	2/24/2011	9:20:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305LLAxxx	9/22/2011	12:30:00 PM	Grab	1	-88	m	ATL REPORTED 0.1m		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305MURxxx	1/10/2006	1:15:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305MURxxx	5/17/2006	11:20:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0789		0.0968		
305MURxxx	5/17/2006	11:25:00 AM	Grab	2	0.1	m	Duplicate		samplewater	ELISA SOP 3.3	2		0.0778		0.218		
305MURxxx	2/24/2011	11:15:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		0.704		-0.03
305MURxxx	9/21/2011	11:30:00 AM	Grab	1	-88	m	ATL REPORTED 0.1m		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305PACxxx	1/12/2006	1:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305PACxxx	5/17/2006	9:00:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.022		
305PAJxxx	1/12/2006	12:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305PAJxxx	5/17/2006	7:40:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0511		-0.022		
305PAJxxx	2/24/2011	8:50:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		0.028		-0.03
305PJPxxx	1/10/2006	2:30:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305PJPxxx	5/30/2006	10:15:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0593		-0.03		
305SANxxx	1/10/2006	11:15:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305SANxxx	5/17/2006	10:40:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		0.0633		
305SANxxx	2/24/2011	8:30:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305SANxxx	9/21/2011	10:45:00 AM	Grab	1	-88	m	Duplicate sampple colle		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305SANxxx	9/21/2011	10:45:00 AM	Grab	2	-88	m	Duplicate; ATL REPOR		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305SJNxxx	1/10/2006	12:00:00 PM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		

305SJNxxx	5/17/2006	10:50:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		0.0603		
305THUxxx	2/23/2010	11:30:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.02		0.069		0.052
305THUxxx	7/20/2010	12:15:00 PM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305THUxxx	2/24/2011	11:30:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305THUxxx	9/21/2011	1:30:00 PM	Grab	1	-88	m	ATL REPORTED 0.1m		samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305UVAxxx	1/5/2006	11:30:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		0.0694		-0.03		
305UVAxxx	5/17/2006	9:25:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		0.0325		
305UVAxxx	2/24/2011	9:10:00 AM	Grab	1	0.1	m			samplewater	EPA 8141AM	3		-0.005		-0.005		-0.03
305WSAxxx	1/12/2006	10:00:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305WSAxxx	1/12/2006	10:30:00 AM	Grab	2	0.1	m	Field Duplicate of 305W		samplewater	ELISA SOP 3.3	2		-0.05		-0.03		
305WSAxxx	5/30/2006	10:35:00 AM	Grab	1	0.1	m			samplewater	ELISA SOP 3.3	2		-0.05		-0.03		

COUNTY	SITE	CHEMICAL	CONC_ug_L	LOQ_ug_L	SAMP_DATE	LATITUDE	LONGITUDE	SITE_CODE	STUDY_CODE	SAMP_TIME
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	28-Aug-07	36.87154	-121.81734	44_17	91	930
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	chlorpyrifos	0	0.01	28-Aug-07	36.86871	-121.81584	44_18	91	1030
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0.043	0.01	28-Aug-07	36.87154	-121.81734	44_17	91	930
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	diazinon	0.0203	0.01	28-Aug-07	36.86871	-121.81584	44_18	91	1030
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	29-Aug-07	36.87154	-121.81734	44_17	91	1000
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0.042	0.01	29-Aug-07	36.87154	-121.81734	44_17	91	1000
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	11-Sep-07	36.87154	-121.81734	44_17	91	955
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	chlorpyrifos	0	0.01	11-Sep-07	36.86871	-121.81584	44_18	91	1030
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0.0491	0.01	11-Sep-07	36.87154	-121.81734	44_17	91	955
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	diazinon	0	0.01	11-Sep-07	36.86871	-121.81584	44_18	91	1030
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	14-Apr-08	36.87154	-121.81734	44_17	91	1410
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0.0544	0.01	14-Apr-08	36.87154	-121.81734	44_17	91	1410
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	6-May-08	36.88006	-121.79204	44_15	91	1245
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	6-May-08	36.87154	-121.81734	44_17	91	1315
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0	0.01	6-May-08	36.88006	-121.79204	44_15	91	1245
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0.131	0.01	6-May-08	36.87154	-121.81734	44_17	91	1315
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	22-Jul-08	36.88006	-121.79204	44_15	92	1310
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	22-Jul-08	36.87154	-121.81734	44_17	92	1345
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0.0172	0.01	22-Jul-08	36.88006	-121.79204	44_15	92	1310
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0	0.01	22-Jul-08	36.87154	-121.81734	44_17	92	1345
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	19-Aug-08	36.88006	-121.79204	44_15	92	1200
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	19-Aug-08	36.87154	-121.81734	44_17	92	1330
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0	0.01	19-Aug-08	36.88006	-121.79204	44_15	92	1200
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0	0.01	19-Aug-08	36.87154	-121.81734	44_17	92	1330
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	28-Apr-09	36.88006	-121.79204	44_15	92	1025
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0.0396	0.01	28-Apr-09	36.88006	-121.79204	44_15	92	1025
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0.0176	0.01	2-Jun-09	36.88006	-121.79204	44_15	92	900
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0.0193	0.01	2-Jun-09	36.87154	-121.81734	44_17	92	945
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0.0185	0.01	2-Jun-09	36.88006	-121.79204	44_15	92	900
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0	0.01	2-Jun-09	36.87154	-121.81734	44_17	92	945
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	28-Jul-09	36.88006	-121.79204	44_15	92	1200
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	28-Jul-09	36.87154	-121.81734	44_17	92	1045
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	chlorpyrifos	0	0.01	28-Jul-09	36.86871	-121.81584	44_18	92	1115
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0.0129	0.01	28-Jul-09	36.88006	-121.79204	44_15	92	1200
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0	0.01	28-Jul-09	36.87154	-121.81734	44_17	92	1045
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	diazinon	0.0113	0.01	28-Jul-09	36.86871	-121.81584	44_18	92	1115
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	1-Sep-09	36.88006	-121.79204	44_15	92	1215
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	1-Sep-09	36.87154	-121.81734	44_17	92	1115
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	chlorpyrifos	0	0.01	1-Sep-09	36.86871	-121.81584	44_18	92	1145
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0	0.01	1-Sep-09	36.88006	-121.79204	44_15	92	1215
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0	0.01	1-Sep-09	36.87154	-121.81734	44_17	92	1115
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	diazinon	0.0117	0.01	1-Sep-09	36.86871	-121.81584	44_18	92	1145
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	15-Sep-09	36.88006	-121.79204	44_15	92	1045
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	15-Sep-09	36.87154	-121.81734	44_17	92	1115
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	chlorpyrifos	0	0.01	15-Sep-09	36.86871	-121.81584	44_18	92	1145
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0	0.01	15-Sep-09	36.88006	-121.79204	44_15	92	1045
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0	0.01	15-Sep-09	36.87154	-121.81734	44_17	92	1115
Santa Cruz	Beach Street ditch, just upstream of Watsonville Slough tidegate	diazinon	0	0.01	15-Sep-09	36.86871	-121.81584	44_18	92	1145
Santa Cruz	Pajaro River at Thurwacher Bridge	chlorpyrifos	0	0.01	18-May-10	36.88006	-121.79204	44_15	93	1110
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	chlorpyrifos	0	0.01	18-May-10	36.87154	-121.81734	44_17	93	1145
Santa Cruz	Pajaro River at Thurwacher Bridge	diazinon	0.033	0.01	18-May-10	36.88006	-121.79204	44_15	93	1110
Santa Cruz	Watsonville Slough at Shell Rd, just upstream of tidegates	diazinon	0.012	0.01	18-May-10	36.87154	-121.81734	44_17	93	1145

Site ID	Month	Year	Duplicate	Chlorpyrifos (ug/L)	Diazinon (ug/L)	Malathion (ug/L)
305CAN	January	2009		nd	nd	nd
305CAN	February	2009		nd	nd	nd
305CAN	August	2009		ns	ns	ns
305CAN	September	2009		ns	ns	ns
305CHI	January	2009		nd	0.0447	nd
305CHI	February	2009		nd	0.0101	0.0067
305CHI	August	2009		nd	0.0186	nd
305CHI	September	2009		nd	0.1251	nd
305CHI	September	2009	1	nd	0.1152	nd
305 COR	January	2009		ns	ns	ns
305COR	February	2009		nd	0.0676	0.0078
305COR	August	2009		nd	nd	nd
305COR	September	2009		ns	ns	ns
305FRA	January	2009		nd	0.0113	nd
305FRA	February	2009		nd	0.0061	nd
305FRA	August	2009		ns	ns	ns
305FRA	September	2009		ns	ns	ns
305LCS	January	2009		nd	nd	nd
305LCS	February	2009		nd	0.0075	nd
305LCS	August	2009		nd	nd	nd
305LCS	September	2009		ns	ns	ns
305PJP	January	2009		nd	0.0378	nd
305PJP	February	2009		nd	0.0266	nd
305PJP	August	2009		nd	nd	nd
305PJP	September	2009		nd	nd	nd
305SJA	January	2009		nd	0.0083	nd
305SJA	February	2009		nd	0.0190	nd
305SJA	August	2009		nd	nd	nd
305SJA	September	2009		nd	0.0386	nd
305STL	January	2009		nd	0.0216	nd
305STL	February	2009		nd	0.0154	nd
305STL	August	2009		nd	nd	0.0947
305STL	September	2009		nd	nd	nd
305TSR	January	2009		nd	0.0034	nd
305TSR	February	2009		nd	nd	nd
305TSR	August	2009		nd	nd	nd
305TSR	September	2009		nd	nd	nd
305WSA	January	2009		nd	0.0122	nd
305WSA	February	2009		nd	0.0267	nd
305WSA	August	2009		nd	nd	0.099
305WSA	September	2009		nd	nd	nd

StationCode	SampleID	SampleDate	CollectionTime	SampleTypeCode	PreparationPreservation	PreparationPreservationDate	DigestExtractDate	MatrixName	AnalyteName	ResultQualCode	result (ug/L)	MDL (ug/L)	RL	QACode
305MDD	MDD	6-Jan-2008	11:30	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305MDD	MDD	24-Feb-2008	12:00	Grab	LabFiltered, LabExtracted	None	26-Feb-2008	samplewater	CHLORPYRIFOS	=	0.007	0.0021	-88.0	X
305MDD	MDD	29-Apr-2008	11:20	Grab	LabFiltered, LabExtracted	None	30-Apr-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305MDD	MDD	2-Jul-2008	11:30	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305MDD	MDD	16-Feb-2009	13:20	Grab	LabFiltered, LabExtracted	None	17-Feb-2009	samplewater	CHLORPYRIFOS	=	0.0032	0.0021	-88.0	X
305MDD	MDD	22-Sep-2009	11:30	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305MDD	MDD	14-Oct-2009	10:50	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	CHLORPYRIFOS	=	0.0112	0.0021	-88.0	X
305MDD	MDD	22-Oct-2009	11:00	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305MDD	MDD	28-Oct-2009	8:55	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305MDD	MDD	6-Jan-2008	11:30	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	DIAZINON	=	0.0166	0.0009	-88.0	X
305MDD	MDD	24-Feb-2008	12:00	Grab	LabFiltered, LabExtracted	None	26-Feb-2008	samplewater	DIAZINON	=	0.054	0.0009	-88.0	X
305MDD	MDD	29-Apr-2008	11:20	Grab	LabFiltered, LabExtracted	None	30-Apr-2008	samplewater	DIAZINON	=	0.0134	0.0009	-88.0	X
305MDD	MDD	2-Jul-2008	11:30	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	DIAZINON	=	0.01061	0.0009	-88.0	X
305MDD	MDD	16-Feb-2009	13:20	Grab	LabFiltered, LabExtracted	None	17-Feb-2009	samplewater	DIAZINON	=	0.1596	0.0009	-88.0	X
305MDD	MDD	22-Sep-2009	11:30	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305MDD	MDD	14-Oct-2009	10:50	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305MDD	MDD	22-Oct-2009	11:00	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305MDD	MDD	28-Oct-2009	8:55	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	6-Jan-2008	8:50	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	25-Feb-2008	9:58	Grab	LabFiltered, LabExtracted	None	26-Feb-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	2-Apr-2008	11:00	Grab	LabFiltered, LabExtracted	None	4-Apr-2008	samplewater	CHLORPYRIFOS	=	0.0338	0.0021	-88.0	X
305PJE_L	Pajaro Lower	29-Apr-2008	12:15	Grab	LabFiltered, LabExtracted	None	1-May-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	29-May-2008	10:00	Grab	LabFiltered, LabExtracted	None	30-May-2008	samplewater	CHLORPYRIFOS	=	0.0074	0.0021	-88.0	X
305PJE_L	Pajaro Lower	2-Jul-2008	12:50	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	12-Aug-2008	12:50	Grab	LabFiltered, LabExtracted	None	14-Aug-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	10-Sep-2008	14:00	Grab	LabFiltered, LabExtracted	None	12-Sep-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	8-Oct-2008	14:30	Grab	LabFiltered, LabExtracted	None	10-Oct-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	17-Feb-2009	11:40	Grab	LabFiltered, LabExtracted	None	18-Feb-2009	samplewater	CHLORPYRIFOS	=	0.004	0.0021	-88.0	X
305PJE_L	Pajaro Lower	9-Sep-2009	8:40	Grab	LabFiltered, LabExtracted	None	10-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	22-Sep-2009	10:50	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	14-Oct-2009	9:50	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	22-Oct-2009	15:30	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	28-Oct-2009	9:30	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_L	Pajaro Lower	6-Jan-2008	8:50	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	DIAZINON	=	0.1331	0.0009	-88.0	X
305PJE_L	Pajaro Lower	25-Feb-2008	9:58	Grab	LabFiltered, LabExtracted	None	26-Feb-2008	samplewater	DIAZINON	=	0.0902	0.0009	-88.0	X
305PJE_L	Pajaro Lower	2-Apr-2008	11:00	Grab	LabFiltered, LabExtracted	None	4-Apr-2008	samplewater	DIAZINON	=	0.0464	0.0009	-88.0	X
305PJE_L	Pajaro Lower	29-Apr-2008	12:15	Grab	LabFiltered, LabExtracted	None	1-May-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	29-May-2008	10:00	Grab	LabFiltered, LabExtracted	None	30-May-2008	samplewater	DIAZINON	=	0.0282	0.0009	-88.0	X
305PJE_L	Pajaro Lower	2-Jul-2008	12:50	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	12-Aug-2008	12:50	Grab	LabFiltered, LabExtracted	None	14-Aug-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	10-Sep-2008	14:00	Grab	LabFiltered, LabExtracted	None	12-Sep-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	8-Oct-2008	14:30	Grab	LabFiltered, LabExtracted	None	10-Oct-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	17-Feb-2009	11:40	Grab	LabFiltered, LabExtracted	None	18-Feb-2009	samplewater	DIAZINON	=	0.0614	0.0009	-88.0	X
305PJE_L	Pajaro Lower	9-Sep-2009	8:40	Grab	LabFiltered, LabExtracted	None	10-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X

305PJE_L	Pajaro Lower	22-Sep-2009	10:50	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	14-Oct-2009	9:50	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	22-Oct-2009	15:30	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_L	Pajaro Lower	28-Oct-2009	9:30	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_U	Pajaro Upper	6-Jan-2008	8:00	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	25-Feb-2008	10:35	Grab	LabFiltered, LabExtracted	None	26-Feb-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	2-Apr-2008	12:30	Grab	LabFiltered, LabExtracted	None	4-Apr-2008	samplewater	CHLORPYRIFOS	=	0.0186	0.0021	-88.0	X
305PJE_U	Pajaro Upper	29-Apr-2008	11:05	Grab	LabFiltered, LabExtracted	None	1-May-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	29-May-2008	12:15	Grab	LabFiltered, LabExtracted	None	30-May-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	2-Jul-2008	11:55	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	12-Aug-2008	13:15	Grab	LabFiltered, LabExtracted	None	14-Aug-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	10-Sep-2008	10:40	Grab	LabFiltered, LabExtracted	None	12-Sep-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	8-Oct-2008	14:00	Grab	LabFiltered, LabExtracted	None	10-Oct-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	17-Feb-2009	10:40	Grab	LabFiltered, LabExtracted	None	18-Feb-2009	samplewater	CHLORPYRIFOS	DNQ	0.002	0.0021	-88.0	JA
305PJE_U	Pajaro Upper	9-Sep-2009	9:15	Grab	LabFiltered, LabExtracted	None	10-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	22-Sep-2009	11:15	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	14-Oct-2009	10:50	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	22-Oct-2009	11:00	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	28-Oct-2009	8:25	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305PJE_U	Pajaro Upper	6-Jan-2008	8:00	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	DIAZINON	=	0.1488	0.0009	-88.0	X
305PJE_U	Pajaro Upper	25-Feb-2008	10:35	Grab	LabFiltered, LabExtracted	None	26-Feb-2008	samplewater	DIAZINON	=	0.1308	0.0009	-88.0	X
305PJE_U	Pajaro Upper	2-Apr-2008	12:30	Grab	LabFiltered, LabExtracted	None	4-Apr-2008	samplewater	DIAZINON	=	0.0096	0.0009	-88.0	X
305PJE_U	Pajaro Upper	29-Apr-2008	11:05	Grab	LabFiltered, LabExtracted	None	1-May-2008	samplewater	DIAZINON	=	0.0302	0.0009	-88.0	X
305PJE_U	Pajaro Upper	29-May-2008	12:15	Grab	LabFiltered, LabExtracted	None	30-May-2008	samplewater	DIAZINON	=	0.0358	0.0009	-88.0	X
305PJE_U	Pajaro Upper	2-Jul-2008	11:55	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	DIAZINON	=	0.0158	0.0009	-88.0	X
305PJE_U	Pajaro Upper	12-Aug-2008	13:15	Grab	LabFiltered, LabExtracted	None	14-Aug-2008	samplewater	DIAZINON	=	0.0302	0.0009	-88.0	X
305PJE_U	Pajaro Upper	10-Sep-2008	10:40	Grab	LabFiltered, LabExtracted	None	12-Sep-2008	samplewater	DIAZINON	=	0.0092	0.0009	-88.0	X
305PJE_U	Pajaro Upper	8-Oct-2008	14:00	Grab	LabFiltered, LabExtracted	None	10-Oct-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_U	Pajaro Upper	17-Feb-2009	10:40	Grab	LabFiltered, LabExtracted	None	18-Feb-2009	samplewater	DIAZINON	=	0.0446	0.0009	-88.0	X
305PJE_U	Pajaro Upper	9-Sep-2009	9:15	Grab	LabFiltered, LabExtracted	None	10-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_U	Pajaro Upper	22-Sep-2009	11:15	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_U	Pajaro Upper	14-Oct-2009	10:50	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305PJE_U	Pajaro Upper	22-Oct-2009	11:00	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	DIAZINON	=	0.015490	0.0009	-88.0	X
305PJE_U	Pajaro Upper	28-Oct-2009	8:25	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305THU	Thurwachter	6-Jan-2008	9:45	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	25-Feb-2008	14:30	Grab	LabFiltered, LabExtracted	None	28-Feb-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	29-Apr-2008	10:35	Grab	LabFiltered, LabExtracted	None	1-May-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	2-Jul-2008	10:50	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	17-Feb-2009	12:20	Grab	LabFiltered, LabExtracted	None	18-Feb-2009	samplewater	CHLORPYRIFOS	DNQ	0.0018	0.0021	-88.0	JA
305THU	Thurwachter	22-Sep-2009	12:45	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	14-Oct-2009	12:30	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	22-Oct-2009	11:50	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	28-Oct-2009	10:40	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305THU	Thurwachter	6-Jan-2008	9:45	Grab	LabFiltered, LabExtracted	None	8-Jan-2008	samplewater	DIAZINON	=	0.1562	0.0009	-88.0	X
305THU	Thurwachter	25-Feb-2008	14:30	Grab	LabFiltered, LabExtracted	None	28-Feb-2008	samplewater	DIAZINON	=	0.219	0.0009	-88.0	X
305THU	Thurwachter	29-Apr-2008	10:35	Grab	LabFiltered, LabExtracted	None	1-May-2008	samplewater	DIAZINON	=	0.027	0.0009	-88.0	X
305THU	Thurwachter	2-Jul-2008	10:50	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	DIAZINON	=	0.0162	0.0009	-88.0	X
305THU	Thurwachter	17-Feb-2009	12:20	Grab	LabFiltered, LabExtracted	None	18-Feb-2009	samplewater	DIAZINON	=	0.0326	0.0009	-88.0	X
305THU	Thurwachter	22-Sep-2009	12:45	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305THU	Thurwachter	14-Oct-2009	12:30	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305THU	Thurwachter	22-Oct-2009	11:50	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305THU	Thurwachter	28-Oct-2009	10:40	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305WAB	Watsonville	7-Jan-2008	17:00	Grab	LabFiltered, LabExtracted	None	10-Jan-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	26-Feb-2008	7:45	Grab	LabFiltered, LabExtracted	None	28-Feb-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X

305WAB	Watsonville	29-Apr-2008	13:00	Grab	LabFiltered, LabExtracted	None	30-Apr-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	2-Jul-2008	12:20	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	16-Feb-2009	9:15	Grab	LabFiltered, LabExtracted	None	19-Feb-2009	samplewater	CHLORPYRIFOS	=	0.031	0.0021	-88.0	X
305WAB	Watsonville	22-Sep-2009	10:15	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	14-Oct-2009	10:15	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	22-Oct-2009	10:15	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	28-Oct-2009	10:35	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	CHLORPYRIFOS	ND	-0.0021	0.0021	-88.0	X
305WAB	Watsonville	7-Jan-2008	17:00	Grab	LabFiltered, LabExtracted	None	10-Jan-2008	samplewater	DIAZINON	=	0.0254	0.0009	-88.0	X
305WAB	Watsonville	26-Feb-2008	7:45	Grab	LabFiltered, LabExtracted	None	28-Feb-2008	samplewater	DIAZINON	=	0.064	0.0009	-88.0	X
305WAB	Watsonville	29-Apr-2008	13:00	Grab	LabFiltered, LabExtracted	None	30-Apr-2008	samplewater	DIAZINON	=	0.0251	0.0009	-88.0	X
305WAB	Watsonville	2-Jul-2008	12:20	Grab	LabFiltered, LabExtracted	None	3-Jul-2008	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305WAB	Watsonville	16-Feb-2009	9:15	Grab	LabFiltered, LabExtracted	None	19-Feb-2009	samplewater	DIAZINON	=	0.27	0.0009	-88.0	X
305WAB	Watsonville	22-Sep-2009	10:15	Grab	LabFiltered, LabExtracted	None	24-Sep-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305WAB	Watsonville	14-Oct-2009	10:15	Grab	LabFiltered, LabExtracted	None	15-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305WAB	Watsonville	22-Oct-2009	10:15	Grab	LabFiltered, LabExtracted	None	23-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X
305WAB	Watsonville	28-Oct-2009	10:35	Grab	LabFiltered, LabExtracted	None	29-Oct-2009	samplewater	DIAZINON	ND	-0.0009	0.0009	-88.0	X

CLIENT	PROJECT	PROJECTNUM	LabName	SAMPLENAME	LABSAMPID	MATRIX	RPTMATRIX	SAMPDATE
Antinetti Consulting, LLC	Dow AgroSciences	Dow AgroSciences	CRG Marine Laboratories	CMP-70-305CHI-P01	1010001-07	Liquid	Liquid	09/28/2010 13:00:00
Antinetti Consulting, LLC	Dow AgroSciences	Dow AgroSciences	CRG Marine Laboratories	CMP-70-305CHI-P01	1010001-07	Liquid	Liquid	09/28/2010 13:00:00
Antinetti Consulting, LLC	Dow AgroSciences	Dow AgroSciences	CRG Marine Laboratories	CMP-70-305PJP-P01	1010001-08	Liquid	Liquid	09/28/2010 10:45:00
Antinetti Consulting, LLC	Dow AgroSciences	Dow AgroSciences	CRG Marine Laboratories	CMP-70-305PJP-P01	1010001-08	Liquid	Liquid	09/28/2010 10:45:00

PREPDATE	ANADATE	BATCH	METHODCODE
10/04/2010 06:51:00	10/06/2010 06:30:00	C0J0401	Organophosphorus Pesticides - EPA 625(m)
10/04/2010 06:51:00	10/06/2010 06:30:00	C0J0401	Organophosphorus Pesticides - EPA 625(m)
10/04/2010 06:51:00	10/06/2010 07:29:00	C0J0401	Organophosphorus Pesticides - EPA 625(m)
10/04/2010 06:51:00	10/06/2010 07:29:00	C0J0401	Organophosphorus Pesticides - EPA 625(m)

METHODNAME	PREPNAME	ANALYTE	CASNUMBER	SURROGATE	Result	DL	RL	UNITS	RPToMDL	BASIS	DILUTION	ANALYST	ANALYTEORDER
EPA 625 (M)	EPA 3510C Separatory Funnel	Chlorpyrifos	2921-88-2	FALSE	ND	1.03	2.05	ng/L	TRUE	Wet	1	up	104
EPA 625 (M)	EPA 3510C Separatory Funnel	Diazinon	333-41-5	FALSE	ND	2.05	4.10	ng/L	TRUE	Wet	1	up	111
EPA 625 (M)	EPA 3510C Separatory Funnel	Chlorpyrifos	2921-88-2	FALSE	ND	1.01	2.02	ng/L	TRUE	Wet	1	ZZZ	104
EPA 625 (M)	EPA 3510C Separatory Funnel	Diazinon	333-41-5	FALSE	ND	2.02	4.04	ng/L	TRUE	Wet	1	ZZZ	111

LabID	Project Iteration ID	Project ID	ProjectDescription	Client Sample ID	Time Collected	Replicate Number	Parameter	Qualifier
9311	1109005-002	1109005	2011 Site Recs for OP Monitoring	CMP-82-305PJP-P01	11:45	R1	Chlorpyrifos	ND
9311	1109005-002	1109005	2011 Site Recs for OP Monitoring	CMP-82-305PJP-P01	11:45	R1	Diazinon	ND
17705	1109005-004	1109005	2012 Site Recs for OP Monitoring	CMP-94-305PJP-E	12:10	R1	Chlorpyrifos	ND
17705	1109005-004	1109005	2012 Site Recs for OP Monitoring	CMP-94-305PJP-E	12:10	R1	Diazinon	ND

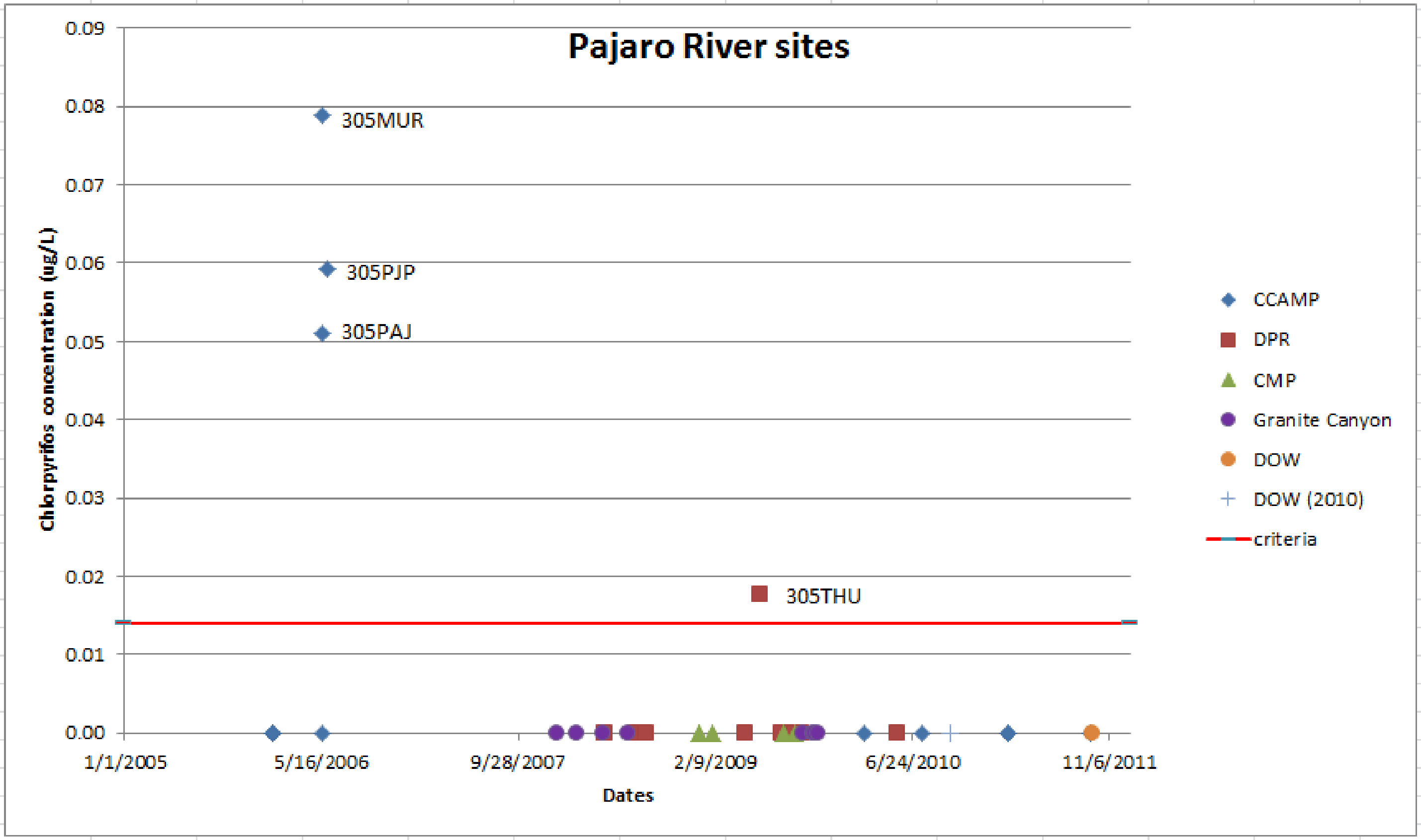
Result	PercentRecovery	DryWetRatio	Units	QA Qualifier	MDL	RL	Batch ID	Date Sampled	Date Received	Date Processed	Date Analyzed	Matrix
0			ng/L		1	2	O-2073	27-Sep-11	30-Sep-11	30-Sep-11	11/7/2011	Freshwater
0			ng/L		2	4	O-2073	27-Sep-11	30-Sep-11	30-Sep-11	11/7/2011	Freshwater
0			ng/L		1	2	O-3120	25-Sep-12	28-Sep-12	29-Sep-12	10/22/2012	Freshwater
0			ng/L		2	4	O-3120	25-Sep-12	28-Sep-12	29-Sep-12	10/22/2012	Freshwater

Client Name	Project Officer	TrueValue	Fraction	Group	Method	CASNo	AcceptanceRange	RPD
Dow AgroSciences LLC			Total	Organophosphorus Pesticides	EPA 625			
Dow AgroSciences LLC			Total	Organophosphorus Pesticides	EPA 625			
Dow AgroSciences LLC			Total	Organophosphorus Pesticides	EPA 625	2921-88-2		
Dow AgroSciences LLC			Total	Organophosphorus Pesticides	EPA 625	333-41-5		

Shed	H2OBody	SiteTag	SiteName	
305	San Juan Creek West Branch (San Benito Cour	305ACR	305ACR - San Juan Creek	
305	Bennett Slough	305BENSTP	305BENSTP - Bennett Slough at Struve Pond	
305	Carnadero Creek	305CAN	305CAN - Carnadero Creek	
305	Pajaro River	305CHI	305CHI - Pajaro River	
305	Pajaro River	305CHIxxx	305CHIxxx - Pajaro River at Chittenden Gap	
305	Salsipuedes Creek (305)	305COR	305COR - Salsipuedes Creek (305)	
305	Salsipuedes Creek (305)	305CORxxx	305CORxxx - Salsipuedes Creek downstream of Corralitos Creek	
305	Millers Canal	305FRA	305FRA - Millers Canal	
305	Millers Canal	305FRAxxx	305FRAxxx - Pajaro River at Frazier Lake Road	
305	Furlong Creek	305FUFxxx	305FUFxxx - Furlong Creek at Frazier Lake Road	
305	Harkins Slough	305HARxxx	305HARxxx - Harkins Slough at Harkins Slough Road	
305	Llagas Creek (below Chesbro Reservoir)	305HOL	305HOL - Llagas Creek (below Chesbro Reservoir)	
305	Llagas Creek (below Chesbro Reservoir)	305LCS	305LCS - Llagas Creek (below Chesbro Reservoir)	
305	Llagas Creek (below Chesbro Reservoir)	305LEAxxx	305LEAxxx - Llagas Creek at Leavesley Road	
305	Llagas Creek (below Chesbro Reservoir)	305LHB	305LHB - Llagas Creek	
305	Llagas Creek (below Chesbro Reservoir)	305LLA	305LLA - Llagas Creek (below Chesbro Reservoir)	
305	Furlong Creek	305LLAxxx	305LLAxxx - Llagas Creek at Bloomfield Avenue	
305	McGowan Ditch	305MDD	305MDD - Monterey Drainage Ditch - trib to Pajaro River between McGowean Rd and Bluff Dr	
305	Pajaro River	305MURxxx	305MURxxx - Pajaro River at Murphy's Crossing	
305	San Juan Creek (San Benito County)	305MVR	305MVR - San Juan Creek	
305	Pacheco Creek	305PACxxx	305PACxxx - Pacheco Creek at San Felipe Road	
305	Pajaro River	305PajRiv2	305PajRiv2 - Pajaro River POP	
305	Pajaro River	305PAJxxx	305PAJxxx - Pajaro River at Betabel Road	
305	Pajaro River Estuary	305PJE_L	305PJE_L - Pajaro River Estuary Lower	
305	Pajaro River Estuary	305PJE_U	305PJE_U - Pajaro River Estuary Upper	
305	Pajaro River	305PJESD1	305PJESD1 - Pajaro River Estuary-Sediment site 1	
305	Pajaro River	305PJESD2	305PJESD2 - Pajaro River Estuary-Sediment site 2	
305	Watsonville Slough	305PJESD3	305PJESD3 - Pajaro River Estuary-Sediment site 3	
305	Watsonville Slough	305PJESD4	305PJESD4 - Pajaro River Estuary-Sediment site 4	
305	Pajaro River	305PJESD5	305PJESD5 - Pajaro River Estuary-Sediment site 5	
305	Pajaro River	305PJESD6	305PJESD6 - Pajaro River Estuary-Sediment site 6	
305	Pajaro River	305PJESD7	305PJESD7 - Pajaro River Estuary-Sediment site 7	
305	Pajaro River	305PJESD8	305PJESD8 - Pajaro River Estuary-Sediment site 8	
305	Pajaro River	305PJP	305PJP - Pajaro River at Main St	
305	Pajaro River	305PJPxxx	305PJPxxx - Pajaro River at Porter/Main	
305	San Juan Creek (San Benito County)	305PRR	305PRR - San Juan Creek at Prescott Rd	
305	San Benito River	305SAN	305SANxxx - San Benito at Y Road	
305	San Benito River	305SANxxx	305SANxxx - San Benito at Y Road	
305	San Benito River	305SBH	305SBH - San Benito River	
305	San Juan Creek (San Benito County)	305SJA	305SJA - San Juan Creek (San Benito County)	
305	San Juan Creek (San Benito County)	305SJNxxx	305SJNxxx - San Juan Creek @ Anzar	
305	Struve Slough	305STL	305STL - Struve Slough at Lee Rd.	
305	Pajaro River	305THU	305THU - Pajaro River at Thurwachter	
305	Pajaro River	305THU	305THU-Pajaro River at Thurwachter Bridge	
305	Pajaro River	305THUxxx	305THU-Pajaro River at Thurwachter Bridge	
305	Tequisquita Slough	305TSR	305TSR - Tequisquita Slough at Shore Rd	
305	Watsonville Slough	305WAB	305WAT-Watsonville Slough below Beach Street Input	
305	Effluent Watsonville to Pacific Ocean	305WatsEff	305WatsEff -	
305	Watsonville Slough	305WSA	305WSAxxx - Watsonville Slough upstream Harkins Slough	
305	Harkins Slough	305WSAxxx	305WSAxxx - Watsonville Slough upstream Harkins Slough	

APPENDIX C – GRAPHS SHOWING DATA IN A TIME SERIES AND NUMBER OF ADDITIONAL SAMPLES NEEDED TO PROPOSE DELISTING

Pajaro River Chlorpyrifos summary



There are 44 total samples.

There were 3 exceedances in 2006 and 1 exceedance in June of 2009.

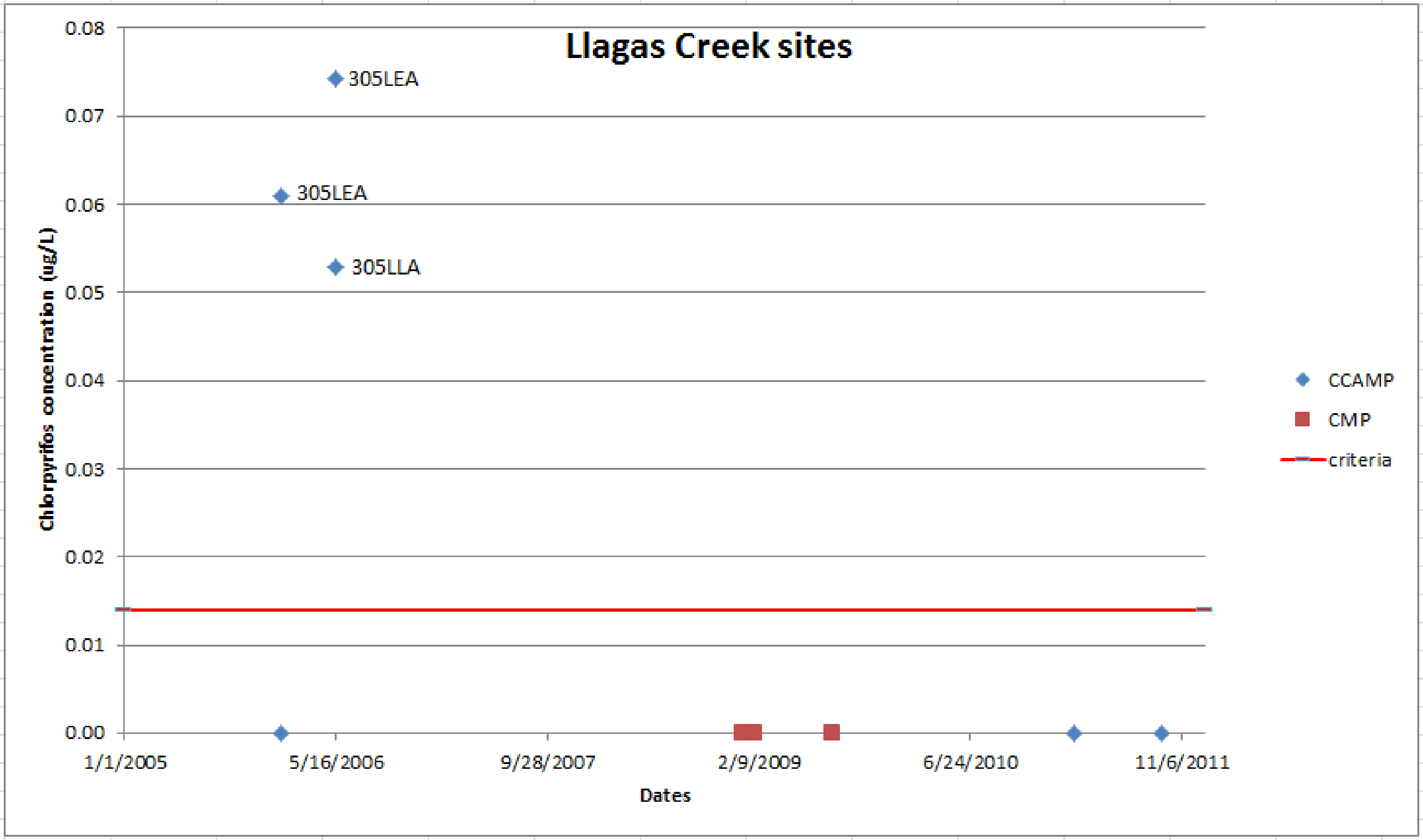
16 samples post June 2009 show no exceedance of the criteria.

Some spots are actually two data points but on top of one another.

Listing policy states to delist if number of exceedances is equal or less than 4 out of between 48 and 59 samples.

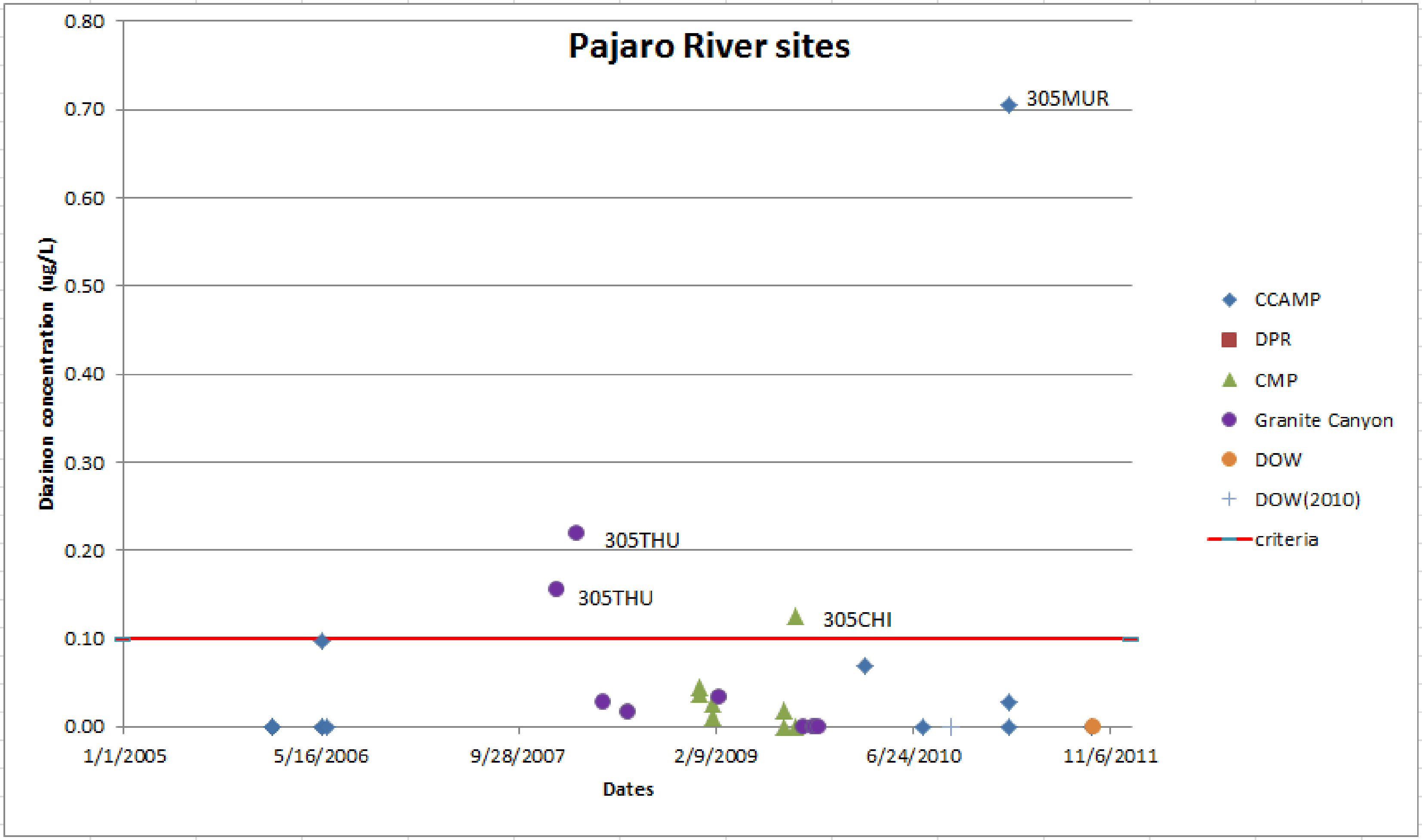
Could propose to delist with 4 additional samples below the water quality criteria

Llagas Creek Chlorpyrifos summary



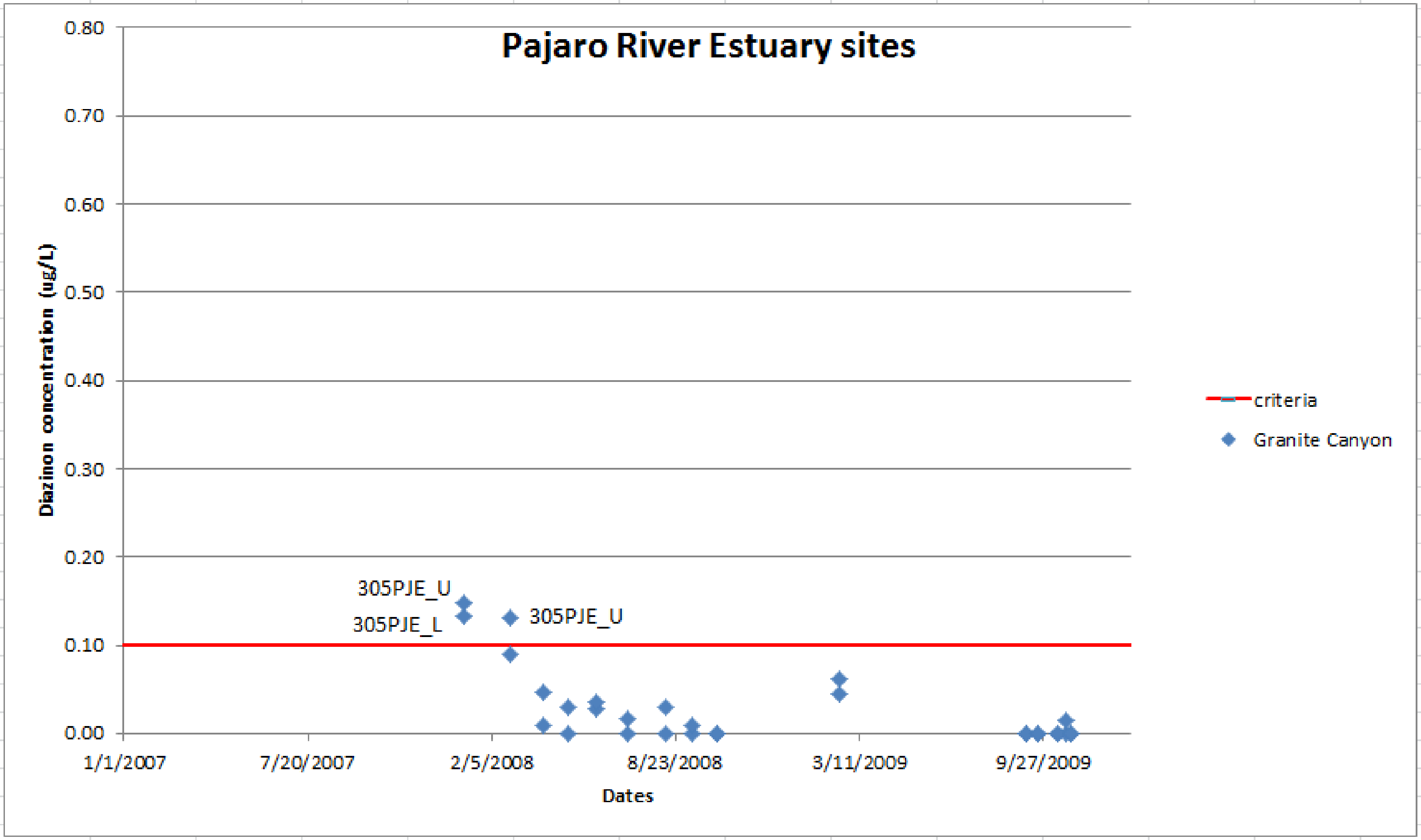
There are 9 total samples.
There were 3 exceedances in 2006. No exceedances since 5/17/2006.
5 samples post 5/17/2006 show no exceedance of the objective.
Listing policy states to delist if number of exceedances is equal or less than 3 out of between 28 and 36 samples.
Could propose to delist with 19 additional samples below the water quality criteria.

Pajaro River Diazinon Summary



There are 45 total samples.
There were 4 exceedances. The exceedances are from Jan 6, 2008 - Feb. 24, 2011.
Listing policy states to delist if number of exceedances is equal or less than 4 out of between 48 and 59 samples.
Could propose to delist with 3 additional samples below the water quality criteria.

Pajaro River Estuary Diazinon Summary



There are 30 total samples.

There were 3 exceedances. Exceedances are Jan. and Feb. 2008.

Listing policy states to delist if number of exceedances is equal or less than 3 out of between 37 and 47 samples.

Could propose to delist with 7 additional samples below the water quality criteria.