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COLORADO RIVER BASIN REGION

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Total Maximum Daily Load for Organophosphate and Organochlorine Compounds in Imperial Valley Waters, Imperial County

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FINAL STAFF REPORT
ATTACHMENT B TO RESOLUTION R7-2022-0032

May 2022

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ACRONYMS AND ABBREVIATIONS

Irrigated Lands General Order .... Order R7-2021-0050, the general order currently in effect and renewals or modifications thereof

Imperial Agricultural Order............................. Order R7-2015-0008, the conditional waiver that was previously in effect prior to renewals and modifications in the development of the new General Order

ATSDR... Agency for Toxic Substances and Disease Registry

Basin Plan or **BP**... Water Quality Control Plan for the Colorado River Basin Region

BIOS .... Biogeographic Information and Observation System

BPTC .... Best Practicable Treatment or Control

CAFO .... Concentrated Animal Feeding Operations

CalPIP... California Pesticide Information Portal

CDPR or **DPR** .... California Department of Pesticide Regulation

CDFG .... California Department of Fish and Game

CDFW .... California Department of Fish and Wildlife formerly known as California Department of Fish and Game

CCC .... Criterion Continuous Concentration

CFR.. Code of Federal Regulations

CMC .... Criterion Maximum Concentration

CNDDB .... California Natural Diversity Database

Construction General Stormwater Permit ..... State Water Board Order WQ-2009-0009, NPDES General Permit that applies to stormwater discharges from construction and land disturbance activities

CTR ..... California Toxics Rule

CWA ..... Clean Water Act

CRWQCBCRBR ..... California Regional Water Quality Control Board, Colorado River Basin Region

CRWQCBCVR ..... California Regional Water Quality Control Board, Central Valley Region

CRWQCBLAR ..... California Regional Water Quality Control Board, Los Angeles Region

DDT ..... Dichlorodiphenyltrichloroethane

DDD ..... Dichlorodiphenyldichloroethane

DDE ..... Dichlorodiphenyldichloroethylene

DNQ ..... Detect Non-Quantifiable

DW ..... Dry weight

DWQIP ..... Drain Water Quality Improvement Program

E-SMR ..... Electronic Self Monitoring Report

F ..... Fahrenheit

Farm Plan ..... Individual water quality management plan

FE ..... Federally Endangered

FP ..... Fully Protected

FT ..... Federally Threatened

FCG............ Fish Contaminant Goal

ICFB............ Imperial County Farm Bureau

ID............ Identification

IID............ Imperial Irrigation District

in............. Inch

Industrial General Stormwater Permit............ State Water Board Order WQ-2014-0057, NPDES General Permit that applies to stormwater discharges from Industrial Activities

Low Threat Order............ R7-2015-0006, the general order that applies to discharges that pose an insignificant or minimal threat (i.e., low threat) to water quality

MAA............ Management Agency Agreement

MDL............ Method Detection Limit

mg/L............ Milligrams per liter

mgd............ Million gallons per day

MP............ Management Practice

MRP............ Monitoring and Reporting Program

MS4............ Municipal Separate Storm Sewer System

NAS............ National Academy of Sciences

ND............ Non-Detect

NPDES............ National Pollutant Discharge Elimination System

ng/g............ Nanograms per gram (parts per billion)

o.c............. Organic Carbon

ACRONYMS AND ABBREVIATIONS

OC .... Organochlorine

OEHHA .... Office of Environmental Health Hazard Assessment

OP .... Organophosphate

POR .... Period of Record

PEC .... Probable Effects Concentration

PCB .... Polychlorinated Biphenyl

POTW .... Publicly Owned Treatment Works (Sewage Treatment Plant)

ppb .... Parts per billion, µg/kg, ng/g, or µg/L

ppm .... Parts per million, mg/kg, µg/g or mg/L

PUR .... Pesticide Use Report

RL .... Reporting Limit

SC .... State Candidate

SE .... State Endangered

SSC .... Species of special concern

SLN .... Special Local Needs

ST .... State Threatened

SWAMP .... Surface Water Ambient Monitoring Program

SWPPP .... Storm Water Pollution Prevention Plan

SWRCB .... State Water Resources Control Board

TMDL .... Total Maximum Daily Load

µg/L .... micrograms per liter (parts per billion)

UC .... University of California

USEPA .... United States Environmental Protection Agency

USGS .... United States Geological Survey

USIBWC .... United States International Boundary and Water Commission

WHO .... World Health Organization

WL .... Watch List

WQO .... Water Quality Objective

WQS .... Water Quality Standard

Water Board .... Regional Water Quality Control Board, Colorado River Basin Region

Water Boards .... State Water Resources Control Board and the nine Regional Water Quality Control Boards

WDRs .... Waste Discharge Requirements

WWTP .... Wastewater Treatment Plant

EXECUTIVE SUMMARY

This report provides the technical and policy foundation for a proposed amendment to the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) to establish Total Maximum Daily Loads (TMDLs) for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake for Organophosphate (OP) and/or Organochlorine (OC) compounds that violate the water quality standards for these waters. A TMDL represents the maximum load of a pollutant that a waterbody can assimilate and still achieve water quality standards.

As summarized below, staff of the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board or Colorado River Basin Water Board) have identified the sources of the OP and OC compounds, assigned wasteload allocations to point sources and load allocations to nonpoint sources for these pollutants to ensure attainment of applicable water quality objectives/targets, and developed a control strategy and implementation measures to achieve the allocations.

Impairing Pollutants

The pollutants impairing Imperial Valley waters are compounds that are currently used or were historically used but persist in the environment long after their use was banned. The current-use pollutants that will be addressed in the TMDLs are chlorpyrifos, diazinon, and malathion. These OP compounds are man-made pesticides. The concentrations of these pollutants found in water violates Basin Plan toxicity and chemical constituent water quality objectives meant to support/protect the aquatic habitat designated beneficial uses of these waters.

The legacy pollutants that will be addressed in the TMDLs are chlordane, dichlorodiphenyltrichloroethane (DDT) and its related degradates dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE), dieldrin, polychlorinated biphenyls (PCBs), and toxaphene. Chlordane, DDT, dieldrin, and toxaphene are pesticides, and PCBs are electrical insulators. These man-made OC compounds have similar chemical and physical characteristics. In the environment they degrade slowly, tend to attach to sediment particles, and accumulate in aquatic organisms such as fish. The concentrations of these compounds found in fish tissue and/or water violates Basin Plan toxicity and chemical constituent water quality objectives meant to support/protect human health and the aquatic habitat designated beneficial uses of these waters.

The specific waterbodies and pollutants addressed in these TMDLs are depicted in the table below.

Table ES-1. Waterbodies and Pollutants Addressed by TMDL

Waterbody	Pollutants
Alamo River	Chlordane, Chlorpyrifos, DDT, DDD, DDE, Diazinon, Dieldrin, Malathion, PCBs, and Toxaphene
Imperial Valley Drains	Chlordane, Chlorpyrifos, DDT, DDE, Dieldrin, PCBs, and Toxaphene
New River	Chlordane, Chlorpyrifos, DDT, DDD, DDE, Diazinon, Dieldrin, Malathion, PCBs, and Toxaphene
Wiest Lake	DDT, Dieldrin, and PCBs

Source Analysis

The probable sources of OP and OC compounds were investigated using available information about land and water uses in the Imperial Valley, the physical and chemical properties of the compounds, their uses, and environmental data.

There are several nonpoint source discharges of OP and OC compounds potentially contributing to the existing impairments. Nonpoint source discharges from irrigated agricultural lands of OP and OC compounds are considered a major source of the impairments for these pollutants, based upon use restrictions, the known uses of these compounds, the quantities of land used for agricultural purposes near the affected waterbodies, and available water quality data. Additionally, nonpoint source, transboundary pollution from Mexico conveyed via the New River is also a source of diazinon and OC compounds in the New River based upon available water quality data.

There are also several point source discharges of OP and OC compounds potentially contributing to existing impairments. The amount of OP and OC compounds from the National Pollutant Discharge Elimination System (NPDES) permitted municipalities and facilities is currently unknown due to a lack of water quality data or lack of usable water quality data. However, historical pesticide use, use restrictions, and the amount of land used for urban purposes near the affected waterbodies when compared to other uses indicate that NPDES permitted facilities may be a de-minimis source of OC and OP compounds. NPDES permitted Municipal Separate Storm Sewer Systems (MS4s), which discharge urban stormwater, are also considered as de-minimis sources of OC and OP compounds or no source because of the compounds' uses, urban land uses near the affected waterbodies, and desert weather.

TMDL Numeric Targets and Allocations

Numeric targets are water quality targets set to determine when and where water quality objectives are achieved, and hence, when beneficial uses are protected. The numeric targets for these TMDLs are based on USEPA standards and interpretations of the narrative toxicity, chemical constituents, and pesticidal water quality objectives found in the Basin Plan. To interpret the narrative objectives and assign numeric targets, Colorado River Basin Water Board staff researched and applied published water, sediment, and fish tissue toxicity guidelines. The specific numeric targets assigned for the TMDLs are summarized in the tables below.

For the purposes of the Table ES-2 below, Criteria Maximum Concentration (CMC) is a one-hour average, not to be exceeded more than once in a three-year period; and Criteria Continuous Concentration (CCC) is a four-day average, not to be exceeded more than once in a three-year period.

Table ES-2. OP Compounds TMDL Water Column Numeric Targets for the Alamo River, Imperial Valley Drains, and New River.[1]

OP Compound	Water Numeric Targets- CMC (µg/L)	Water Numeric Targets- CCC (µg/L)
Chlorpyrifos	0.02	0.015
Diazinon	0.16	0.1
Malathion	0.17	0.028

[1] Criteria Maximum Concentration (CMC). A 1-hour average, not to be exceeded more than once in a three-year period.

Criteria Continuous Concentration (CCC). A 4-day average, not to be exceeded more than once in a three-year period.

Table ES-3. OC Compounds TMDL Numeric Targets for Alamo River, Imperial Valley Drains, New River, and Wiest Lake

OC Compound	Water Numeric Targets (µg/L)	Fish Tissue Numeric Targets (ng/g)	Sediment Numeric Targets (ng/g DW)
Chlordane	0.0043	3.9	17.6
DDT	0.00059	15	572
DDD	0.00084		28
DDE	0.00059		31.3
Dieldrin	0.00014	0.32	61.8
PCBs	0.00017	2.6	676
Toxaphene	0.00075	4.3	

The TMDL wasteload and load allocations are set equal to the numeric targets above, to ensure that discharges do not exceed the loading capacity of the water bodies. Discharges from point sources are assigned wasteload allocations, and those from nonpoint sources are assigned load allocations. All point and nonpoint source dischargers within the TMDL project area will be held to their wasteload and load allocations.

Control Strategy

To control discharges of OP compounds into Imperial Valley waters and lead to attainment of water quality objectives, it is expected that one or a combination of the following management practices will be used: reduced use, switching to other safer pesticides, and/or enhanced pesticide management practices. In addition to the management practices, California's ban on the possession and use of chlorpyrifos beginning in December 2020, and the relatively short half-life of chlorpyrifos in the soil environment should eliminate the chlorpyrifos impairment. Federal restrictions on the use of diazinon, decreased use of diazinon in Imperial Valley, and relatively short-half-life of diazinon in the soil environment should eliminate the diazinon impairment.

To control discharges of OC compounds into Imperial Valley waters and lead to attainment of water quality objectives, sediment management practices are expected to be used. The uses of chlordane, DDT, dieldrin, PCBs, and toxaphene have all been banned for several decades. The implementation strategy is to reduce the amounts of sediment bound OC compounds entering impaired waters as the chemicals eventually degrade.

Implementation Measures

The TMDLs implementation are focused on implementing the control strategy for probable sources of the impairments and the regulatory mechanisms that will be used to control them.

To control the discharges of OP and OC compounds from irrigated agricultural lands, these TMDLs will utilize requirements put in place by Order R7-2021-0050, *General Waste Discharge Requirements for Discharges of Waste from Irrigated Lands for Dischargers that are Members of a Coalition Group in the Imperial Valley* (Irrigated Lands General Order) and its renewals, modifications, and/or replacements. To meet the load allocations for Imperial Valley irrigated lands in these TMDLs, the Irrigated Lands General Order requires enrolled dischargers to implement management practices, monitor water quality, and report to the Regional Water Board. Among other requirements, agricultural dischargers are required under the Irrigated Lands General Order to implement pesticide and sediment best management practices.

To control the discharges of OP and OC compounds into the New River at the international boundary from Mexico, these TMDLs will utilize work with U.S. federal agencies. Mexico is an independent nation not bound by California water quality regulations. To meet the load allocations for Mexico in these TMDLs, the Regional Water Board will coordinate with the U.S. International Boundary and Water Commission (USIBWC) and USEPA, and recommends these entities develop a plan describing measures to be undertaken by the U.S. and Mexican governments to achieve the assigned load allocations.

To control the discharges of OP and OC compounds from NPDES permitted municipalities and facilities, these TMDLs will utilize requirements put in place by either individual or general NPDES permits or WDRs. NPDES-permitted municipalities and facilities are identified as uncertain sources of OP and/or OC compounds because their existing monitoring did not include monitoring for OP compounds, and the reporting limits (RLs) for OC compounds in the permits were above the numeric targets described above. These NPDES permittees should begin monitoring OP compounds, monitor OC compounds at lower RLs, and also use pesticide and sediment best management practices where possible to limit the amounts of OP and OC compounds, if any, entering Imperial Valley waters. The implementation plan for NPDES sources of impairments will be reassessed once enough acceptable data is generated.

1. INTRODUCTION

1.1. Problem Statement

The Alamo River, Imperial Valley Drains, New River, and Wiest Lake, all surface waters in the Imperial Valley, are polluted/impaired by organophosphate (OP) and/or organochlorine (OC) compounds that are toxic to humans and aquatic life. This is in violation of water quality standards in the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan).

The Alamo River and New River are impaired by the OP compounds chlorpyrifos, diazinon, and malathion, and the Imperial Valley Drains are also impaired by chlorpyrifos. The concentrations of these pollutants found in water violates Basin Plan toxicity and chemical constituent water quality objectives (WQOs) meant to support/protect the aquatic habitat designated beneficial uses of these waters.

The Alamo River, Imperial Valley Drains, and New River are impaired by the OC compounds chlordane, DDT and its degradates DDE and/or DDD, dieldrin, PCBs, and toxaphene. Wiest Lake, a 40-acre lake, is impaired by DDT, dieldrin, and PCBs. The concentrations of these compounds found in fish tissue and/or water violates Basin Plan toxicity and chemical constituent WQOs meant to support/protect human health and the aquatic habitat designated beneficial uses of these waters. The specific waterbodies and pollutants addressed in these TMDLs are described in Table 1-1.

Table 1-1. Waterbodies Assigned TMDLs.

Waterbody	Waterbody Identification Number	Pollutants
Alamo River	CAR7231000019990205093023	Chlorpyrifos, diazinon, malathion, chlordane, DDT, DDD and DDE (DDT degradates), dieldrin, PCBs, and toxaphene

Waterbody	Waterbody Identification Number	Pollutants
Imperial Valley Drains	CAR7231000019990205150323	Chlorpyrifos, chlordane,[2] DDT,[3] DDE, dieldrin,[4] PCBs,[5] and toxaphene[6]
New River	CAR7231000019990205102948	Chlorpyrifos, diazinon, malathion, chlordane, DDT, DDD, DDE, dieldrin, PCBs, and toxaphene
Wiest Lake	CAL7231000020000127135508	DDT, dieldrin, and PCBs

This project establishes Total Maximum Daily Loads (TMDLs) to address the impairments that include numeric targets, load allocations, and implementation plans to control discharges of OP and OC compounds in Imperial Valley waters.

1.2. Clean Water Act Section 303(d) Listing and TMDLs

The federal Clean Water Act gives states the primary responsibility for protecting and restoring surface water quality. The State Water Resources Control Board (State Water Board) is California's water pollution control agency for all federal purposes. (Wat. Code, § 13160.) The State Water Board, along with the nine Regional Water Quality Control Boards (collectively, the Water Boards) protect and enhance the quality of California's water resources through implementing the Clean Water Act, also known as the Federal Water Pollution Control Act Amendments of 1972, as amended (33 U.S.C. §

[2] This listing for chlordane only applies to the Barbara Worth Drain, Peach Drain, Greeson Drain, South Central Drain, and Holtville Main Drain areas of the Imperial Valley Drains.

[3] The listing for DDT only applies to the Barbara Worth Drain, Peach Drain, and Rice Drain areas of the Imperial Valley Drains.

[4] The listing for dieldrin only applies to the Barbara Worth Drain and Fig Drain areas of the Imperial Valley Drains.

[5] The listing for PCBs only applies to the Central Drain area of the Imperial Valley Drains, from Meloland Road to the outlet into the Alamo River.

[6] This listing for toxaphene only applies to the Barbara Worth Drain, Peach Drain, and Rice Drain of the Imperial Valley Drains.

1251 et seq.; Clean Water Act, § 101 et seq.), and California's Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.).

The California Regional Water Quality Control Board, Colorado River Basin Region (Colorado River Basin Water Board) has primary responsibility for the protection of groundwater and surface water quality within the Colorado River Basin Region. (Wat. Code, § 13200(i).) The Basin Plan for the Colorado River Basin Region contains water quality standards, consisting of the beneficial uses of a waterbody and the water quality objectives (or "criteria" under federal terminology) designated to protect those beneficial uses, and also includes the federal and state antidegradation policies. (See Wat. Code, § 13240; 33 U.S.C. § 1313.)

Pursuant to Clean Water Act section 303(d), the Colorado River Basin Water Board is required to submit to USEPA a list identifying waterbodies failing to meet water quality standards and the water quality parameter(s) (i.e., pollutant) causing the failure. This is commonly referred to as the "303(d) List." The 303(d) List must include a description of the pollutants causing lack of attainment of water quality standards and a priority ranking of the water quality limited segments, taking into account the severity of the pollution and the uses to be made of the waters. (40 C.F.R. § 130.7(b)(iii)(4).) Federal regulations define a "water quality limited segment" as "[a]ny segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after application of technology-based effluent limitations required by sections 301(b) and 306 of the [Clean Water] Act." (40 C.F.R. § 130.2(j).)

To restore water quality, a TMDL or other planning tool must be developed for water quality limited segments on the 303(d) List. (See 33 U.S.C. § 1313(d)(1)(C); 40 C.F.R. § 130.7(c)(1).) The elements of a TMDL are described in 40 Code of Federal Regulations sections 130.2 and 130.7, Clean Water Act section 303(d), as well as in U.S. Environmental Protection Agency (USEPA) guidance (USEPA, 2000b). A TMDL is the "sum of the individual [waste load allocations] for point sources and [load allocations] for nonpoint sources and natural background" (40 C.F.R. § 130.2(i)) such that the capacity of the waterbody to assimilate pollutant loads (the loading capacity) is not exceeded. The maximum load can be expressed in mass per time, toxicity, or other appropriate measure. (40 C.F.R. § 130.2(i).) A TMDL is also required to account for seasonal variations and include a margin of safety to address uncertainty in the analysis.

The TMDL must be incorporated into a state's Water Quality Management Plan (40 C.F.R. §§ 130.6(c)(1), 130.7), which in this case is the Colorado River Basin Region's Basin Plan. The TMDL must also be reviewed and approved by both the State Water Board and the USEPA prior to becoming effective.

1.3. Pollutants Addressed

Imperial Valley waters are impaired by compounds that are currently used, and compounds that were historically used but their use has since been restricted/banned. The current use pollutants are OP compounds and historical use pollutants are OC compounds.

The current use pollutants addressed in the TMDLs are:

- Chlorpyrifos, an OP compound and pesticide;
- Diazinon, an OP compound and pesticide; and
- Malathion, an OP compound and pesticide.

Chlorpyrifos, diazinon, and malathion are man-made pesticides that are in current use. They are classified as OP pesticides based upon their chemical structure. They have been used to control pests in agricultural and urban settings, and work by damaging a critical enzyme in living organisms called acetylcholinesterase, which is essential for cell functions. Some chemical and physical properties of OP compounds can be found in Table 1-2 below.

The historical use pollutants addressed in the TMDLs are:

- Chlordane, an OC compound and pesticide;
- Dichlorodiphenyltrichloroethane (DDT), an OC compound and pesticide;
- Dichlorodiphenyldichloroethane (DDD), an OC compound and DDT degradate;
- Dichlorodiphenyldichloroethylene (DDE), an OC compound and DDT degradate;
- Dieldrin, an OC Compound and pesticide;
- Polychlorinated biphenyls (PCBs), OC compounds used for industrial purposes; and
- Toxaphene, an OC compound and pesticide.

These historical use pollutants are often referred to as legacy pollutants due to their persistence in the environment long after their use has been restricted/banned. Collectively, these OC compounds have similar chemical and physical characteristics. In the environment they degrade slowly, are hydrophobic, and tend to attach to sediment particles. Some chemical and physical properties of the OC Compounds can be found in Table 1-2 below.

Table 1-2. Chemical and Physical Properties of OP and OC Compounds.

Common Name	Water Solubility (mg/L)	Sorption Coefficient (soil Koc)	Soil Half-Life (days)
Chlorpyrifos	1.4	0.360 – 31,000	7-120

Common Name	Water Solubility (mg/L)	Sorption Coefficient (soil Koc)	Soil Half-Life (days)
Diazinon	40	40 - 854	21 - 103
Malathion	145	93 – 1,800	1 - 17
Chlordane	0.06	20,000	350
DDD	0.02	100,000	1,000
DDE	0.1	50,000	1,000
DDT	0.0055	2,000,000	1,000-5,500
Dieldrin	0.1	12,000	1,000
PCBs	0.1 – 0.59	varies	940
Toxaphene	0.1	100,000	600

1.4. Project Area

The Alamo River, Imperial Valley Drains, New River and Wiest Lake are in the Imperial Valley. The Imperial Valley covers approximately 500,000 acres south of the Salton Sea, most of it irrigated agricultural land in Imperial County. The principal communities in the Imperial Valley are El Centro, Imperial, Brawley, and Calexico (Figure 1-1).

Figure 1-1. The Imperial Valley

Soils of the Imperial Valley floor are made up of lacustrine alluvium. These soils are poorly drained to well drained, clays, sands, and loams (Table 1-3). Soil salinity is a major concern for farmers in the valley and is controlled by flushing fields with generous amounts of water to leach salts out of the root zone (Zimmerman, 1981). Groundwater supplies in Imperial Valley are limited, recharge slowly, and are often of poor quality (Zimmerman, 1981).

Table 1-3. Soil Associations in Imperial Valley.[7]

Association	Slope	Drainage	Texture
Imperial	Nearly level	Moderately well drained	Silty clay
Imperial-Holtville-Glenbar	Nearly level	Moderately well drained and well drained	Silty clay, silty clay loam, and clay loam
Meloland-Vint-Indio	Nearly level	Well drained	Fine sand, loamy very fine sand, fine sandy loam, very fine sandy loam, loam, and silt loam
Niland-Imperial (minor)	Nearly level	Moderately well drained	Gravelly sand, fine sand, silty clay, and silty clay loam
Fluvaquents (minor)	Nearly level	Poorly drained	Undifferentiated texture

Land in the Imperial Valley has been used to produce agricultural crops since the mid-1920’s. Today, about 450,000 acres of irrigated land are in agricultural production.

The Imperial Irrigation District (IID) distributes up to 3.1 million acre-feet/year of water from the Colorado River, mainly for agricultural purposes (IID, 2011). The water is delivered to nearly level farmland via a gravity driven system of supply canals and ditches. On the field, the water is used for crop irrigation and salinity control. Agricultural wastewater discharges, in the form of tail water and tile water, flow off the farmed land into drains that convey the water to the New and Alamo River, ultimately discharging to the Salton Sea.

Table 1-4 shows the monthly average temperature, precipitation, and snowfall for the town of Imperial, which is in the center of the valley. Without imported water, it

[7] Source: Zimmerman, 1981.

would not be possible to farm in the Imperial Valley because of the area's low precipitation (less than 3 inches per year) and lack of snowfall.

Table 1-4. Monthly Avg. Temp, Precipitation and Snowfall at Imperial, CA (044223) (Nov. 1, 1901 to May 31, 2016).[8]

Month	Avg. Max Temperature (F)	Avg. Min Temperature (F)	Avg. Total Precipitation (in.)	Avg. Total Snowfall (in.)
January	69.8	41	0.39	0
February	73.8	44.8	0.48	0
March	79.4	49.4	0.25	0
April	86.1	55.1	0.1	0
May	93.9	61.6	0.02	0
June	102.6	68.8	0	0
July	106.7	76.6	0.11	0
August	105.4	77	0.31	0
September	101	70.8	0.24	0
October	90.3	59.6	0.25	0
November	78.2	47.9	0.2	0
December	69.8	41.4	0.49	0

Lands and waters in the Imperial Valley and the Salton Sea provide habitat that supports diverse communities of terrestrial and aquatic wildlife. Staff were able to identify four natural communities that support 41 unique plant and 111 unique animal species in the Imperial Valley and Salton Sea. Two plant and 75 animal species are

[8] Source: Western Regional Climate Center website accessed 8/14/2018

identified as having a special protective status. Table A-2 in Attachment A reports on those species and their protective status.

2. WATER QUALITY STANDARDS

Under the federal Clean Water Act, water quality standards consist of designated beneficial uses, numeric and narrative water quality criteria (also referred to as “water quality objectives” under state law, see Water Code section 13241) that protect beneficial uses, as well as the state and federal antidegradation policies.

The Basin Plan for the Colorado River Basin Region, including amendments adopted by the Colorado River Basin Water Board to date, designates beneficial uses, establishes water quality objectives to protect the beneficial uses, and contains implementation programs and policies to achieve those objectives for all waters addressed through the Basin Plan.

State Water Board Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California*, contains the state’s antidegradation policy (Antidegradation Policy). The Antidegradation Policy generally prohibits the Colorado River Basin Water Board from authorizing discharges that will result in the degradation of high quality waters, unless it is demonstrated that any change in water quality will (a) be consistent with maximum benefit to the people of the state, (b) not unreasonably affect beneficial uses, and (c) not result in water quality less than that prescribed in state and regional policies (e.g., the violation of one or more water quality objectives). The dischargers of waste must also employ best practicable treatment or control (BPTC) to minimize the degradation of high-quality waters. High quality waters are surface waters or areas of groundwater that have a baseline water quality better than required by water quality control plans and policies.

2.1. Beneficial Uses

Beneficial Uses describe how each water body is used, for example for municipal and domestic supply (MUN) or for wildlife habitat (WILD). Table 2-1 and Table 2-2 summarize the beneficial uses of Imperial Valley waters as designated in the Basin Plan. Beneficial uses are regarded as existing whether the waterbody is perennial or ephemeral, and whether the flow is intermittent or continuous.

In the table, an “X” signifies an existing use, a “P” signifies a potential use, and an I signifies an intermittent use. See Table 2-2 for Beneficial Use definitions.

Table 2-1. Beneficial Uses of Imperial Valley Waters.

Waterbody	MUN	FRESH	RECI	RECII	WARM	COLD	WILD	RARE
Alamo River		X	X[9]	X	X		X	X[10]
Imperial Valley Drains		X	X[11,11]	X[13]	X		X	X[12]
New River		X	X[12]	X	X		X	X[12]
Wiest Lake	P		X	X	X	I[13]	X	

Table 2-2. Beneficial Use Definitions

Beneficial Use	Use Definition
Municipal and Domestic Supply (MUN)	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

[9] The only REC I usage that is known to occur is from infrequent fishing activity.

[10] Rare, endangered, or threatened wildlife exists in or utilizes some of these waterway(s). If the RARE beneficial use may be affected by a water quality control decision, responsibility for substantiation of the existence of rare, endangered, or threatened species on a case-by-case basis is upon the California Department of Fish and Wildlife on its own initiative and/or at the request of the Colorado River Basin Water Board; and such substantiation must be provided within a reasonable time frame as approved by the Colorado River Basin Water Board.

[11] Unauthorized use.

[12] Although some fishing occurs in the downstream reaches, the presently contaminated water in the river makes it unfit for any recreational use. An advisory has been issued by the Imperial County Health Department warning against the consumption of any fish caught from the river and the river has been posted with advisories against any bodily contact with the water.

[13] The lake was experimentally stocked with trout during the winter of 1987/88. The results from this stocking will be evaluated to see if future stocking will be recommended.

Beneficial Use	Use Definition
Freshwater Replenishment (FRESH)	Uses of water for natural or artificial maintenance of surface water quantity or quality.
Water Contact Recreation (REC I)	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, whitewater activities, fishing, and use of natural hot springs.
Water Non-Contact Recreation (REC II)	Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Warm Freshwater 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.
Cold Freshwater Habitats (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.
Wildlife Habitat (WILD)	Uses of water that support terrestrial ecosystems including, but not limited to, the preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
Preservation of 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.

2.2. Water Quality Objectives (WQOs)

Water Quality Objectives (also known as “water quality criteria” in federal parlance) are established to protect the beneficial uses and can be expressed as concentrations of pollutants that should not be exceeded, or as narrative descriptions of water characteristics that should be met.

The Basin Plan contains the following narrative water quality objectives that apply to Imperial Valley waters:

Basin Plan, Chapter 3 Section II-C. 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 indigenous aquatic life.

Basin Plan, Chapter 3 Section II-N. Chemical Constituents,

> No individual chemical or combination of chemicals shall be present in concentrations that adversely affect beneficial uses. There shall be no increase in hazardous chemical concentrations found in bottom sediments or aquatic life.

Basin Plan, Chapter 3 Section II-O. Pesticide Wastes,

> The discharge of pesticidal wastes from pesticide manufacturing processing or cleaning operations to any surface water is prohibited.

To assess environmental data and determine whether surface waters are meeting the Toxicity and Chemical Constituents water quality objectives, the narrative water quality objectives are interpreted using toxicity guidelines of pollutants outlined in other federal and state regulations, plans, and policies, and published peer reviewed scientific reports as screening values. The following sources were used to determine numeric screening values that were used for screening environmental data when completing assessments of regional waters:

- California Department of Fish and Game (CDFG) values for acute and chronic toxicity. In 2000, CDFG (now CDFW) staff reviewed toxicity information and updated freshwater and saltwater aquatic life criteria for chlorpyrifos and diazinon (Siepmann and Finlayson, 2000). CDFG staff also evaluated the additive toxicity of chlorpyrifos and diazinon and other OP pesticides. In 2004, CDFG staff reevaluated their work for diazinon toxicity and accepted revised toxicity values (Finlayson, 2004). In 2005, staff at the Central Valley Regional Water Quality Control Board, made minor corrections to the significant figures of the chlorpyrifos toxicity values (Beaulaurier et al., 2005).

- UC Davis criteria. Researchers from UC Davis developed a new method for assessing aquatic life toxicity and applied their methodology to develop criteria for OP pesticides in water (Palumbo et al., 2012).

- Median Lethal Concentrations (LC50). Research was conducted by investigators at UC Berkeley (Amweg and Weston, 2007) evaluating toxicity identification evaluations (TIEs) of sediment samples to determine LC50s of pyrethroids and other common pesticides including the OP pesticides chlorpyrifos and diazinon. These LC50s are normalized by the percentage of organic carbon.

- Sediment Probable Effects Concentrations (PECs). MacDonald (et al., 2000) reviewed and compiled various published sediment quality guidelines to develop PECs for 28 chemicals of concern to protect aquatic life from toxic conditions. Data from across the United States was compiled and used to assess the predictive ability of the PECs. It was determined that sediment PECs provide an accurate predictor of probable sediment toxicity. It should be noted that the goal of the PECs was not intended to account for bioaccumulation.

- National Academy of Sciences (NAS) Tissue Guidelines. The USEPA funded the development of Water Quality Criteria by the NAS. These fish tissue guidelines protect aquatic life from the bioaccumulation of toxic substances (NAS,1972).

- Office of Environmental Health Hazard Assessment (OEHHA) Fish Contaminant Goals (FCGs). In 1999 California's OEHHA established screening values to assess the toxicity of contaminants found in fish collected from two lakes (Brodberg and Pollock, 1999). In 2008, OEHHA reviewed their screening values and issued revised FCGs for seven common fish tissue contaminants including chlordane, DDTs, dieldrin, PCBs and toxaphene (OEHHA, 2008). FCGs are estimates of contaminant levels in fish that pose no significant health risks to individuals consuming sport fish. The OEHHA FCGs were modified in the state's 2012 Integrated Report to reflect newer assumptions. The modified FCGs assume an average body weight of 70 kg and a consumption rate of 32 g/day for a 30-year exposure over a 70-year lifetime. Because OC pesticides are considered carcinogens, the risk level was set to one in a million. A cooking reduction factor of 1 was also applied for skin-off fillets.

The narrative WQOs and the screening values that interpret those objectives are shown in Table 2-3.[14]

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[14] Water Quality Objectives and the numeric concentrations may change over time as the science progresses.

Table 2-3. Narrative WQOs and the Numeric Screening Values.

Pollutant	Water Quality Objective	Media Water/ Sediment/ Fish Tissue	Numeric Screening Value	Reference
Chlorpyrifos	Toxicity	Water	CDFG Criteria Maximum Concentration (CMC) of 0.02 µg/L (1-hour ave.) Criteria Continuous Concentration (CCC) of 0.14 µg/L (0.015 µg/l[15])	Siepmann and Finlayson, 2000
Chlorpyrifos	Chemical Constituents	Sediment	LC50 of 1.77 µg/g	Amweg and Weston, 2007
Diazinon	Toxicity	Water	CDFG CMC of 0.16 µg/L CCC of 0.1 µg/L	Siepmann and Finlayson, 2000 Finlayson, 2004
Malathion	Toxicity	Water	UC Davis Criteria CCC of 0.028 µg/L	Palumbo et al., 2012

[15] Minor corrections to significant figures as described in Beaulaurier et al., 2005.

Pollutant	Water Quality Objective	Media Water/ Sediment/ Fish Tissue	Numeric Screening Value	Reference
Chlordane	Chemical Constituents	Fish Tissue	OEHHA FCG of 5.6 ng/g Modified FCG[16] of 3.9 ng/g	Klasing and Brodberg, 2008
Chlordane	Chemical Constituents	Fish Tissue	NAS Tissue guideline of 100 ng/g	NAS, 1972
DDT	Chemical Constituents	Fish Tissue	OEHHA FCG of 21 ng/g (Total DDT[17]) Modified FCG of 15 ng/g	Klasing and Brodberg, 2008
DDT	Chemical Constituents	Fish Tissue	NAS Tissue guideline of 1000 ng/g (Total DDT)	NAS, 1972
DDE	Chemical Constituents	Sediment	PEC of 31.3 ng/g PEC for Sum DDE[18]	MacDonald et al. 2000

[16] Modified FCGs assume an average body weight of 70 kg and a consumption rate of 32 g/day for a 30-year exposure over a 70-year lifetime. For probable carcinogens, the risk level is set to one in a million. A cooking reduction factor of 1 is also applied for skin-off fillets.

[17] Total DDT is the sum of the p,p'- and o,p'- isomers of DDT, DDE, and DDD.

[18] Sum DDE is the sum of the p,p’ and o,p’ isomers of DDE.

Pollutant	Water Quality Objective	Media Water/ Sediment/ Fish Tissue	Numeric Screening Value	Reference
Dieldrin	Chemical Constituents	Fish Tissue	OEHHA FCG of 0.46 ng/g Modified FCG of 0.32 ng/g	Klasing and Brodberg, 2008
Dieldrin	Chemical Constituents	Fish Tissue	NAS Tissue guideline of 100 ng/g	NAS, 1972
PCBs	Chemical Constituents	Fish Tissue	FCG of 3.6 ng/g Modified FCG of 2.6 ng/g (Total PCBs)	Klasing and Brodberg, 2008
Toxaphene	Chemical Constituents	Fish Tissue	FCG of 6.1 ng/g Modified FCG of 4.3 ng/g	Klasing and Brodberg, 2008
Toxaphene	Chemical Constituents	Fish Tissue	NAS tissue guideline of 100 ng/g	NAS, 1972

2.3. California Toxics Rule Standards

In addition to the water quality standards established in the Basin Plan, the USEPA set standards for priority pollutants in state waters. In 2000, USEPA promulgated numeric standards for priority pollutants in the State of California (USEPA, 2000). Referred to as the California Toxics Rule (CTR), the CTR standards apply to surface waters and protects freshwater aquatic life from toxicity, and human health when consuming water and organisms (fish). The CTR standards set limits for OC compounds, but did not set limits for OP compounds. Table 2-4 presents the CTR standards for OC compounds.

Table 2-4. California Toxics Rule Promulgated Standards (µg/L).

OC Compound	Freshwater acute (CMC)	Freshwater chronic (CCC)	Human Health (organism consumption only)
Chlordane	2.4	0.0043	0.00059
DDT (as p, p'-DDT)	1.1	0.001	0.00059
DDE (as p, p'-DDE)			0.00059
DDD (as p, p'-DDD)			0.00084
Dieldrin	0.24	0.056	0.00014
PCBs		0.014[19]	0.00017[20]
Toxaphene	0.73	0.0002	0.00075

[19] The sum of aroclors 1242, 1254, 1221, 1232, 1248, 1260, and 1016

[20] The sum of all congener or isomer of homolog or aroclor analyses.

3. NUMERIC TARGETS

Numeric targets are water quality measures used to determine when the WQOs are achieved, and hence, when beneficial uses are protected.

3.1. Organophosphate Compounds

A review of collected water quality data from Imperial Valley waters indicates the presence of OP compounds in various environmental compartments. The concentrations found in fish tissue and sediment samples did not exceed the screening values. The concentrations found in water samples frequently exceeded the screening values, which was the main factor for listing the waterbodies. In order to address these impairments, numeric targets for water were selected to protect benthic and aquatic organisms, and wildlife from potentially harmful effects (toxicity) associated with these OP compounds.

3.1.1. OP Compounds Water Numeric Targets

Regional water board staff selected CDFG chronic and acute toxicity values as the water numeric targets for chlorpyrifos and diazinon to protect freshwater aquatic life from toxicity. Staff also selected UC Davis chronic and acute toxicity criteria as the water numeric targets for malathion to protect freshwater aquatic life from toxicity. OP compounds water column numeric targets for the Alamo River, Imperial Valley Drains, and New River are listed in Table 3-1.

For the purposes of Table 3-1 below, Criteria Maximum Concentration (CMC) is a one hour average not to be exceeded more than once in a three-year period; and Criteria Continuous Concentration (CCC) is a one-day average not to be exceeded more than once in a three year period.

Table 3-1. OP Compounds Water Column Numeric Targets for Alamo River, Imperial Valley Drains and New River (µg/L).

OP Compound	Water Numeric Targets- CMC (µg/L)	Water Numeric Targets- CCC (µg/L)
Chlorpyrifos	0.02	0.015
Diazinon	0.16	0.1
Malathion	0.17	0.028

3.2. Organochlorine Compounds

A review of water quality data collected from Imperial Valley waters indicates the presence of OC compounds in various environmental compartments. Chlordane has been frequently detected in sediment and fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River. DDT and its degradates have been found in water, sediment, and fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River, and in fish tissue samples collected from Wiest Lake. Dieldrin is frequently detected in water, sediment, and fish tissue samples collected from the New River, Alamo River, and Imperial Valley Drains, and in fish tissue samples collected from Wiest Lake. Toxaphene has been found in fish tissue samples collected from the Alamo River, Imperial Valley Drains, and the New River. PCBs are infrequently detected in water samples collected from the New River, in sediment samples collected from the Alamo River and New River, and in fish tissue samples collected from the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. The concentrations of OC Compounds found in fish tissue samples frequently exceeded the screening values and was the main factor for listing the waterbodies. But the concentrations of OC compounds in water and sediment samples have at times exceeded the CTR standards and LC50 screening values.

In order to address these impairments, water, fish, and sediment numeric targets were selected. Inclusion of water, fish tissue, and sediment numeric targets adequately protects benthic and aquatic organisms, wildlife, and human health from potentially harmful effects associated with these OC compounds.

3.2.1. OC Compounds Water Numeric Targets

Regional Water Board staff selected USEPA CTR standards as the water numeric targets to protect freshwater aquatic life from toxicity, and human health when consuming fish. OC compounds water column numeric targets for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake are listed in Table 3-2.

Table 3-2. OC Compounds Water Column Numeric Targets for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake (µg/L).

OC Compound	Water Numeric Targets (µg/L)
Chlordane	0.0043
DDT (as p, p’-DDT)	0.00059
DDE (as p, p’-DDE)	0.00059
DDD (as p, p’-DDD)	0.00084

OC Compound	Water Numeric Targets (µg/L)
Dieldrin	0.00014
PCBs	0.00017[21]
Toxaphene	0.00075

3.2.2. OC Compounds Fish Tissue Numeric Targets

Regional Water Board staff selected modified OEHHA Fish Contaminant Goals (FCGs) as the fish tissue Numeric Targets. OC compounds fish tissue numeric targets for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake are listed in Table 3-3.

Table 3-3. OC Compounds Fish Tissue Numeric Targets for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake (ng/g).

OC Compound	Fish Tissue Numeric Targets (ng/g)
Chlordane	3.9
DDTs	15
Dieldrin	0.32
Total PCBs[22]	2.6
Toxaphene	4.3

3.2.3. OC Compounds Sediment Numeric Targets

Regional Water Board staff selected sediment Probable Effects Concentrations (PECs) developed by MacDonald et al. (2000) as the sediment Numeric Targets for chlordane, DDT, dieldrin, and PCBs. MacDonald et al. did not determine a PEC for toxaphene. Toxaphene has not been detected in sediment samples at levels above the analytical

[21] The sum of all congener or isomer of homolog or aroclor analyses.

[22] The sum of all PCB congeners and aroclors.

limits. OC compounds sediment numeric targets for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake are listed in Table 3-4.

Table 3-4. OC Compounds Sediment Numeric Targets for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake (ng/g DW).

OC Compound	Sediment Numeric Targets (ng/g DW)
Chlordane	17.6
Total DDTs[23]	572
Sum DDD[24]	28
Sum DDE[25]	31.3
Dieldrin	61.8
Total PCBs[26]	676
Toxaphene	N/A[27]

[23] The sum of the p,p'- and o,p'- isomers of DDT, DDE, and DDD.

[24] The sum of the o,p- and p,p'- isomers of DDD.

[25] The sum of the o,p- and p,p'- isomers of DDE.

[26] The sum of all PCB congeners and aroclors.

[27] No toxaphene Numeric Target has been set. Toxaphene not detected above analytical limits.

4. IMPAIRMENTS ANALYSIS

The status of OP and OC compounds in Imperial Valley waters were assessed and continue to be assessed during the development and adoption of the state's Integrated Report. States that administer the Clean Water Act must review, make necessary changes to, and submit the 303(d) List to the USEPA. Clean Water Act section 305(b) requires each state to report biennially to USEPA on the condition of its surface water quality. The USEPA guidance to the states recommends the two reports, the 303(d) List and 305(b) report, be integrated (USEPA, 2005). In California, the combined report is called the Integrated Report and incorporates the State Water Board's section 303(d) and 305(b) reporting requirements.

4.1. Listing Policy and Criteria

The *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List* (Listing Policy) (SWRCB, 2015) establishes a standardized approach for developing California's 303(d) List, including by specifying the minimum number of measured exceedances of WQOs for a given number of samples needed to determine a water segment is impaired. The policy has guidance for toxicants and conventional pollutants. The OP and OC compounds are considered toxicants. Table 4-1 below depicts the number of exceedances for a given sample size required for placement on the 303(d) List.

Table 4-1. Minimum Measured exceedances to Place Water Segment on 303(d) List for Toxicants.

Sample Size	List water as impaired if number of exceedances is equal to or greater than:
2 – 24	2
25 – 36	3
37 – 47	4
48 – 59	5
60 – 71	6

4.1.1. Quantitation Limits

Analytical quantitation limits are a significant issue when assessing data with a high number of non-detect sample results. Section 6.1.5.5 of the Listing Policy states:

“When available data are less than or equal to the quantitation limit and the quantitation limit is less than or equal to the water quality standard, the value will be considered as meeting the water quality standard, objective, criterion, or evaluation guideline. When the sample value is less than the quantitation limit and the quantitation limit is greater than the water quality standard, objective, criterion, or evaluation guideline, the result shall not be used in the analysis. The quantitation limit includes the minimum level, practical quantitation level, or reporting limit.”

4.2. Assessment of Organophosphate and Organochlorine Compounds in Imperial Valley Waters

During the 2018 Integrated Report assessment, the status of OP and OC compounds was assessed in Imperial Valley waters. Colorado River Basin Water Board staff assessed available data from the following sources:

- CDFW Toxic Substances Monitoring Program (TSMP)
- California’s Surface Water Ambient Monitoring Program (SWAMP)
- United States Geological Survey (USGS)

4.2.1. OP Compounds

In our assessments, Regional Water Board staff found that the concentrations of chlorpyrifos in Alamo River, Imperial Valley Drains, and New River water samples exceeded the CDFG screening values (Table 2-3) on numerous dates and at numerous sampling locations. In addition, the concentrations of chlorpyrifos in a few New River sediment samples exceeded the LC50 screening value. The number of samples exceeding these thresholds were greater than the minimum number of exceedances necessary to list these waterbodies, as identified in Table 4-1 of this Report. As a result, the Alamo River, Imperial Valley Drains, and New River were listed as impaired by chlorpyrifos based on exceedances of the numeric screening values used to interpret the Toxicity WQO for water. The New River listing was partially based on exceedances of the numeric screening value used to interpret the Chemical Constituents WQO for sediment. The chlorpyrifos CDFG screening values for water were selected as the numeric targets (Table 3-1). The chlorpyrifos data and impairment discussion are included in Attachment B.

Staff found that the concentrations of diazinon in Alamo River and New River water samples exceeded the CDFG screening values (Table 2-3) on numerous dates and at numerous sampling locations. The number of samples exceeding the numeric screening values was greater than the minimum number of exceedances necessary to list these waterbodies, as identified in Table 4-1 of this Report. As a result, the Alamo River and New River were listed as impaired by diazinon based on exceedances of the numeric screening values used to interpret the Toxicity WQO for water. The diazinon CDFG screening values for water were selected as the numeric targets (Table 3-1). The diazinon data and impairment discussion are included in Attachment B.

Staff found that the concentrations of malathion in Alamo River and New River water samples exceeded the UC Davis screening values (Table 2-3) on numerous dates and at numerous sampling locations. The number of samples exceeding the numeric screening values was greater than the minimum number of exceedances necessary to list these waterbodies, as identified in Table 4-1. As a result, the Alamo River and New River were listed as impaired by malathion based on exceedances of numeric screening values used to interpret the Toxicity WQO for water. The malathion UC Davis screening values for water were selected as the numeric targets (Table 3-1). The malathion data and impairment discussion are included in Attachment B.

4.2.2. OC Compounds

In our assessments, Regional Water Board staff found that the concentrations of chlordane in Alamo River, some Imperial Valley Drains, and New River fish tissue samples exceeded the OEHHA screening value (Table 2-3) on numerous dates and at numerous sampling locations. The concentrations of chlordane in a few New River fish tissue samples also exceeded the NAS screening value. The number of samples exceeding the OEHHA and/or NAS numeric screening values was greater than the minimum number of exceedances necessary to list a waterbody, as identified in Table 4-1. As a result, the Alamo River, Imperial Valley Drains, and New River were listed as impaired by chlordane based on exceedances of the OEHHA numeric screening value used to interpret the Chemical Constituents WQO for fish tissue. The New River listing was partially based on exceedances of the NAS numeric screening value. The OEHHA numeric screening value is selected as the chlordane numeric target for fish tissue (Table 3-3). Chlordane data and impairment discussion are included in Attachment C.

Staff found that the concentrations of DDT in Alamo River, some Imperial Valley Drains, New River, and Wiest Lake fish tissue samples exceeded the OEHHA screening value (Table 2-3) on numerous dates and at numerous sampling locations. In addition, the concentrations of DDT found in some Alamo River, Imperial Valley Drains, and New River fish tissue samples exceeded the NAS screening value, and the concentrations of DDT found in some Alamo River and New River water samples exceeded USEPA CTR standards (Table 2-4). The number of samples exceeding the numeric screening values and CTR standards was greater than the minimum number of exceedances necessary to list a waterbody, as identified in Table 4-1. As a result, the Alamo River, some Imperial Valley Drains, New River, and Wiest Lake were listed as impaired by DDT based on exceedances of OEHHA and/or NAS numeric screening values that interpret the Chemical Constituents WQO for fish tissue. The listings for the Alamo River and New River were partially based on exceedances of USEPA CTR standards for water. The USEPA CTR standard is the DDT numeric target for water (Table 3-2), and the OEHHA numeric screening value is selected as the DDT numeric target for fish tissue (Table 3-3). DDT data and impairment discussion are included in Attachment C.

Staff found that the concentrations of the DDT degradate DDD in Alamo River and New River water samples exceeded the USEPA CTR standard (Table 2-4) on numerous dates and at numerous sampling locations. The number of samples exceeding the standard was greater than the minimum number of exceedances necessary to list a waterbody, as identified in Table 4-1. As a result, the Alamo River and New River were listed as impaired by DDD based on exceedances of the USEPA CTR standard for water. The CTR standard is the DDD numeric target for water (Table 3-2). The DDD data and 303(d) listing discussion are included in Attachment C.

Staff found that the concentrations of the DDT-degradate DDE in Alamo River, some Imperial Valley Drains, and New River water samples exceeded the USEPA CTR standard (Table 2-4) on numerous dates and at numerous sampling locations. The concentration of DDE in a few Alamo River sediment samples exceeded the PEC screening value (Table 2-3) on numerous dates and at numerous sampling locations. The number of samples exceeding the CTR standard and PEC screening value was greater than the minimum number of exceedances necessary to list a waterbody, as identified in Table 4-1. As a result, the Alamo River, Imperial Valley Drains, and New River were listed as impaired by DDE based on exceedances of the USEPA CTR standard for water. The Alamo River listing was partially based on exceedances of the numeric screening value used to interpret the Chemical Constituents WQO for sediment. The CTR standard is the DDE numeric target for water (Table 3-2), and the PEC is selected as the DDE numeric target for sediment (Table 3-4). DDE data and 303(d) listing discussion are included in Attachment C.

Staff found that the concentrations of dieldrin in Alamo River, some Imperial Valley Drains, New River, and Wiest Lake fish tissue samples exceeded the OEHHA screening value (Table 2-3) on numerous dates and at numerous sampling locations: The concentrations of dieldrin in a few Imperial Valley Drain fish tissue samples also exceeded the NAS screening value. In addition, dieldrin has been found in Alamo River, some Imperial Valley Drains, and New River water samples at concentrations exceeding the USEPA CTR standard (Table 2-4). The number of samples exceeding the numeric screening values and USEPA CTR standard was greater than the minimum number of exceedances necessary to list waterbodies, as identified in Table 4-1. As a result, the Alamo River, some Imperial Valley Drains, New River, and Wiest Lake were listed as impaired by dieldrin based on exceedances of OEHHA and/or NAS numeric screening values used to interpret the Chemical Constituents WQO for fish. The Alamo River, some Imperial Valley Drains, and the New River listings were partially based on exceedances of the USEPA CTR standard for water. The CTR standard is the dieldrin numeric target for water (Table 3-2), and the OEHHA numeric screening value is selected as the dieldrin numeric target for fish tissue (Table 3-3). Dieldrin data and 303(d) listing discussion are included in Attachment C.

Staff found that the concentrations of PCBs in Alamo River, some Imperial Valley Drains, New River, and Wiest Lake fish tissue samples exceeded the OEHHA screening value (Table 2-3) on numerous dates and at numerous sampling locations. Two water samples collected from Imperial Valley Drains also exceeded the USEPA CTR standard. The number of samples exceeding the numeric screen value and CTR standard were greater than the minimum number of exceedances necessary to list a waterbody, as identified in Table 4-1. As a result, the Alamo River, some Imperial Valley Drains, New River, and Wiest Lake were listed as impaired by PCBs based on exceedances of the OEHHA numeric screening value that interprets the Chemical Constituents WQO for fish tissue, and the Imperial Valley Drains listing was partially based on exceedances of the USEPA CTR standard. The CTR standard is the PCBs numeric target for water (Table 3-2), and the OEHHA numeric screening value is selected as the PCBs numeric target for fish tissue (Table 3-3). PCBs data and 303(d) listing discussion are included in Attachment C.

Staff found that the concentrations of toxaphene in Alamo River, some Imperial Valley Drains, and New River fish tissue samples exceeded the OEHHA and/or NAS numeric screening values (Table 2-3) on numerous dates and at numerous sampling locations. The number of samples exceeding the numeric screening values was greater than the minimum number of exceedances necessary to list a waterbody. As a result, the Alamo River, Imperial Valley Drains, and New River were listed as impaired by toxaphene based on exceedances OEHHA and/or NAS numeric screening values that interpret the Chemical Constituents WQO for fish tissue. The OEHHA numeric screening value is selected as the toxaphene numeric target for fish tissue (Table 3-3). Toxaphene data and 303(d) listing discussion are included in Attachment C.

The analysis and conclusions summarized above are consistent with the analysis included in the 2018 Integrated Report. Further details about past and current Integrated Reports for waters in the Colorado River Basin Region are provided on the Colorado River Basin Water Board’s Integrated Report program webpage. (www.waterboards.ca.gov/coloradoriver/water_issues/programs/tmdl/rb7_303d_list.html). Additional information about Integrated Reports is available on the State Water Board’s Integrated Report program page. (https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired).

5. SOURCE ANALYSIS

The sources of OP and OC compounds were investigated using available information about the Imperial Valley, the compounds and their uses, and environmental data.

5.1. Imperial Valley

The Alamo River, Imperial Valley Drains, New River, and Wiest Lake are in the Imperial Valley. The Imperial Valley is in the Colorado Desert region of the Sonoran Desert and is a part of the greater Salton Sea Transboundary watershed. The Imperial Valley is allotted an annual entitlement of 3.1 million acre-feet of Colorado River water. The water flows through the Imperial Dam through one of three desilting basins before being released into the All-American Canal, which then supplies water to nine cities and agricultural fields in Imperial Valley. After its use, wastewater is discharged to the groundwater or to surface waters.

Land use data shows that after undeveloped desert and mountain areas, the largest use of land in Imperial County is for agriculture. About 17 percent of county lands are designated for irrigated agricultural use, totaling over 525,000 acres located mostly in the Imperial Valley (County of Imperial, 2015). In comparison, cities, communities and support facilities occupy less than 1 percent of county land.

Land in the Imperial Valley has been heavily agricultural in use since the mid-1920's. Today, about 450,000 acres of irrigated land are in agricultural production. Agricultural data shows approximately 74 different types of crops being grown on Imperial Valley lands. The major crops grown in the Imperial Valley, based on the amount of land in production, are alfalfa, wheat, sudangrass, lettuce, and sugar beets.

Sources of water in the Alamo River, Imperial Valley Drains, and New River include irrigated agricultural discharges, discharges from Mexico into the New River, and discharges from NPDES permitted facilities. Stormwater runoff is a relatively insignificant source of water due to the arid Imperial Valley climate. The source of water into Wiest Lake is the All-American Canal.

The water in the Alamo River, Imperial Valley Drains, and New River can mostly be attributed to irrigated agricultural discharges. The water in the New River at the international boundary with Mexico can mostly be attributed to discharges from Mexico. Urban stormwater runoff into Imperial Valley waters is a relatively insignificant source of water due to the arid Imperial Valley climate, and the minor amounts of developed lands.

A detailed description of the Imperial Valley can be found in Attachment A.

5.2. Sources of Organophosphate Compounds

The Alamo River and New River are impaired by chlorpyrifos, diazinon, and malathion. Imperial Valley Drains are also impaired by chlorpyrifos. These Imperial Valley waters are impaired by these pollutants because the pollutant concentrations in the waterways violate water quality objectives designed to support/protect their designated beneficial uses.

Chlorpyrifos, diazinon, and malathion are man-made pesticides that are in current use. They are classified as OP pesticides based upon their chemical structure. They have been used to control pests in agricultural and urban settings, and work by damaging a critical enzyme in living organisms called acetylcholinesterase, which is essential for cell functions.

A detailed data analysis of chlorpyrifos, diazinon, and malathion in Imperial Valley can be found in Attachment B.

5.2.1. Chlorpyrifos

Chlorpyrifos was first registered for use by the USEPA in 1965, for a wide variety of urban and agricultural uses. In 2000, the USEPA entered into an agreement with the technical registrants to eliminate virtually all homeowner uses except ant and roach baits in child resistant packaging, leaving only agricultural uses (USEPA, 2006). Beginning in early 2020, California banned the sale of most chlorpyrifos formulations. Under an agreement reached with the makers of chlorpyrifos, sales of most of the pesticide formulations ended February 6, 2020. As of December 31, 2020, the possession or use of the majority of chlorpyrifos products in California has been banned, some granular formulations are still available for use. This ban was due to human health concerns.

As reported on CDPRs, California Pesticide Information Portal (CalPIP), from the year 2000 through 2017, the amount of chlorpyrifos applied annually to Imperial Valley lands averaged about 71,000 pounds to fields cultivated for sugar beet, alfalfa, corn, and broccoli crops.

Water quality monitoring data shows that chlorpyrifos is found in water, sediment and fish tissue samples collected from Imperial Valley waters. The concentrations found in water often exceeds the numeric targets.

Chlorpyrifos has been found in water samples collected from the Alamo River, Imperial Valley Drains, and the New River at monitoring sites along the waterways on numerous occasions. Chlorpyrifos has also been found in sediment samples collected from the Alamo and New Rivers at monitoring sites along the waterways on numerous occasions. There does not appear to be a spatial pattern to the distribution of chlorpyrifos found. There also does not appear to be a seasonal pattern, although samples are not regularly collected/analyzed in the Summer or Winter seasons. The concentrations found in sediment did not exceed the numeric screening value but do serve as an indication of its transport and fate.

Chlorpyrifos has not been found in New River water or sediment samples collected from the international boundary with Mexico on numerous occasions. There was no water quality data to assess the contribution from NPDES permitted facilities which do not normally collect/analyze samples for chlorpyrifos in their monitoring programs.

5.2.2. Sources of Chlorpyrifos

The main source of chlorpyrifos appears to be from nonpoint sources such as agricultural operations where chlorpyrifos is applied in Imperial Valley. Dissolved, and to some extent, sediment-bound chlorpyrifos are being carried with water flowing from these areas where chlorpyrifos is applied to new downstream locations.

Based upon the current restrictions on the use of chlorpyrifos, pesticide use data, valley land uses, and water quality data, discharges from irrigated agriculture are the likely sources of chlorpyrifos. The uses of chlorpyrifos for urban/residential pest control have been restricted. The county wide and valley use trends show that chlorpyrifos is primarily used for agricultural purposes, non-agricultural uses are minimal. In Imperial Valley, the amount of land used for irrigated agriculture is much greater than for urban uses. Water quality data has shown that chlorpyrifos is found in the waters where irrigated agricultural discharges are the main sources of water.

Based upon water quality data collected from the New River, discharges from Mexico do not appear to be a significant source of chlorpyrifos. Chlorpyrifos has not been found in water samples collected from the New River at the international boundary. It was found in a single sediment sample, and in some fish tissue samples, but the concentrations found were well below the numeric screening values.

Based upon the restrictions of urban/residential uses of chlorpyrifos, NPDES facilities may not be a significant source for chlorpyrifos. However, it is uncertain what the contribution from NPDES permitted facilities, if any, is because these facilities do not normally collect/analyze samples for chlorpyrifos in their monitoring programs.

5.2.3. Diazinon

Diazinon was first registered in 1956 for the control of soil insects and pests of fruit, vegetables, forage crops, and field crops (USEPA 2006b). Diazinon is also used on non-lactating cattle in an insecticidal ear tag. In 2000, the USEPA announced an agreement with the registrants of diazinon to cancel all residential uses of diazinon. Indoor uses were cancelled in 2002 and outdoor uses in 2004, leaving only agricultural uses for diazinon (USEPA, 2006b).

As reported in CalPIP, the amounts of diazinon applied has shown a steady decline over time. From 2000 until 2007 the average amount of diazinon applied was 37,000 pounds (lbs) applied annually to fields cultivated for sugar beet, carrot, and lettuce crops. After 2007, the average amount applied annually decreased to approximately 2,400 lbs. In 2016 the amount applied was zero lbs.

Water quality monitoring data shows that diazinon is found in water and fish tissue samples collected from Imperial Valley waters. The concentrations found in water often exceed the numeric targets. Diazinon detections are on the decline, but diazinon is still found in environmental samples. Since about 2009, diazinon has not been found in water samples at concentrations above numeric targets. Decreasing use of diazinon in Imperial Valley in recent years may be the reason for this trend.

Diazinon has been found in water samples collected from monitoring sites along the entire lengths of the Alamo and New Rivers on numerous occasions. Diazinon has also been found in a few fish tissue samples collected from the Alamo River and New River. The concentrations in fish tissue were much lower than the numeric screening value. Diazinon has not been found in sediment samples collected from the Alamo River and New River. There does not appear to be a spatial pattern to the distribution of diazinon found. There also does not appear to be a seasonal pattern.

Diazinon has been found in water and fish tissue samples collected from the New River at the international boundary with Mexico on numerous occasions. The concentrations found in water samples were at times above the numeric targets. The concentrations found in fish tissue were in samples collected in the 1990s and were well below the numeric screening value.

There was no water quality data to assess the contribution from NPDES permitted facilities which do not normally collect/analyze samples for diazinon in their monitoring programs.

5.2.4. Sources of Diazinon

The main sources of diazinon appears to be nonpoint sources where diazinon is applied such as agricultural operations in Imperial Valley and Mexico. Dissolved diazinon pesticides appear to be carried away with water flowing from these areas where diazinon is applied, to new downstream locations.

Based upon the current restrictions on the use of diazinon, pesticide use data, land uses, and water quality data, discharges from irrigated agriculture are a source of diazinon. The uses of diazinon for urban/residential pest control has been restricted. In Imperial Valley, the amount of land used for irrigated agriculture is much greater than for urban uses. Like chlorpyrifos, the county wide and valley use trends show that this pesticide is primarily used for agricultural purposes, non-agricultural uses are minimal.

Water quality data has shown that diazinon is found in the waters where agricultural discharges are the main sources of water.

Based upon water quality data collected from the New River, discharges from Mexico also appear to be a source of diazinon. Diazinon has been found in water samples collected from the New River at the international boundary, sometimes at concentrations above the numeric targets.

Like chlorpyrifos, the restrictions of urban/residential uses of diazinon means that NPDES facilities may not be a significant source of diazinon. It is uncertain what the contribution from NPDES permitted facilities, if any, is because these facilities do not normally collect/analyze samples for diazinon in their monitoring programs.

5.2.5. Malathion

Malathion was first registered for use in the United States in 1956 to control a variety of outdoor insects in both agricultural and non-agricultural settings (ATSDR, 2003). Malathion is registered for use on food, feed, and ornamental crops and in mosquito, boll weevil and fruit fly eradication programs. There are currently no restrictions on the use of malathion in urban/residential settings.

As reported in CalPIP, from the year 2000 through 2017, most reported uses were for agricultural purposes. The average annual amount of malathion applied to Imperial Valley lands was about 50,000 pounds. Malathion was applied in relatively large amounts to fields cultivated for alfalfa, bermudagrass, and broccoli.

Water quality monitoring data shows that malathion is found in water samples collected from Imperial Valley waters. The concentrations found in a few water samples exceeded the numeric targets and is one of the reasons for listing these waters as impaired by malathion.

Malathion has been found in water samples collected from monitoring sites along the lengths of the Alamo and New Rivers in Imperial Valley on numerous occasions. Malathion has not been found in sediment samples and has not been measured in fish tissue samples.

Malathion has not been found in New River water samples or sediment samples collected from the international boundary with Mexico. There was no water quality data to assess the contribution from NPDES permitted facilities which do not normally collect/analyze samples for malathion in their monitoring programs.

5.2.6. Sources of Malathion

The main source of malathion appears to be from nonpoint sources where malathion is applied in Imperial Valley. Dissolved malathion pesticides are thought to be carried with water flowing from areas where malathion was applied, to new downstream locations.

Based upon pesticide use data, valley land uses, and water quality data, discharges from irrigated agriculture are the likely sources of malathion. The county wide and valley use trends shows that malathion was primarily used for agricultural purposes; non-agricultural uses were minimal, and the amount of land used for irrigated agriculture is much greater than for urban uses. Water quality data has shown that malathion is found in waters where agricultural discharges are the main sources of water.

Based upon water quality data collected from the New River, discharges from Mexico do not appear to be a significant source of malathion. Malathion has not been found in water or sediment samples collected from the New River at the international boundary. It is uncertain what the contribution of NPDES permitted facilities, if any, is because the NPDES permitted facilities do not normally collect/analyze samples for malathion in their monitoring programs.

5.3. Sources of Organochlorine Compounds

The Alamo River, some Imperial Valley Drains, and the New River are impaired by chlordane, DDT and its degradates DDE and/or DDD, dieldrin, PCBs, and toxaphene. Wiest Lake, a 40-acre lake, is impaired by DDT, dieldrin, and PCBs. These Imperial Valley waters are impaired by these pollutants because the pollutant concentrations in environmental samples collected from the waterways violate water quality objectives designed to support/protect their designated beneficial uses.

Chlordane, DDT, dieldrin, PCBs, and toxaphene are man-made compounds. They are classified as OC compounds based upon their chemical structures. Chlordane, DDT, dieldrin, and toxaphene are pesticides that were used in the U.S. for agricultural and non-agricultural pest control until being banned. PCBs were developed for numerous industrial applications and were mostly used in electrical equipment and insulation until being banned. These OC compounds are incredibly persistent in the environment as they are slow to degrade. They also tend to tightly bind to soil or sediment particles. A detailed data analysis of chlordane, DDT and its degradates (DDE and DDD), dieldrin, PCBs, and toxaphene in Imperial Valley can be found in Attachment C of this report.

5.3.1. Chlordane

Chlordane is a pesticide that was used for crops such as corn and citrus, on home lawns and gardens, and for termite control. It was first used in 1948. All uses except termite control were banned in 1983, and all uses were banned in 1988 (ATSDR, 1994).

Chlordane was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields. A review of CDPR Pesticide Use Reports (PURs) from the 1970’s and 1980’s found a few reports of chlordane applications.

Water quality monitoring data shows that chlordane is found in sediment and fish tissue samples collected from Imperial Valley waters. The concentrations found in fish tissue samples often exceeded the numeric target and is the main reason for listing the waters as impaired by chlordane. Chlordane was found in a few sediment samples. The concentration found in one sediment sample exceeded the numeric target, the rest were below.

Chlordane is found in sediment and fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New Rivers at monitoring sites along the waterways on numerous occasions. Chlordane has also been found in New River sediment and fish tissue samples collected from the international boundary with Mexico on numerous occasions. Chlordane is not found in water samples. There does not appear to be a spatial pattern to the distribution of chlordane. The concentrations found in sediment serve as an indication of its transport and fate.

Chlordane is not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are higher than the numeric target.

5.3.2. Sources of Chlordane

The sources of chlordane appear to be from nonpoint discharges from areas in Imperial Valley and Mexico with high residual concentrations in the soil from past usage. Sediment-bound chlordane is thought to be carried with water, flowing from landscapes where chlordane was applied or where the soil retains a high residual, to new downstream locations.

Based upon valley land uses and water quality data, discharges from irrigated agriculture are a source of chlordane. In Imperial Valley, the amount of land used for irrigated agriculture is much greater than for urban uses. Water quality data has shown that chlordane is found in the sediment where irrigated agricultural discharges are the main sources of water.

Based upon water quality data, Mexico is also a source of chlordane. Water quality data has shown that chlordane is found in the sediment samples collected from the New River at the international boundary where discharges from Mexico are the main source of water.

It is inconclusive whether NPDES facilities are a source for chlordane, because the reporting limits for their analysis of chlordane in water are often much higher than the numeric target.

5.3.3. DDT, DDD and DDE

DDT is a pesticide that was used for mainly agricultural uses before the 1960s. DDT was banned for agricultural uses in the U.S. in 1972. DDT is no longer legally sold or used in the U.S. DDT has persisted in soils and sediments, slowly degrading into DDE and DDD (Mischke et al, 1985). DDT was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields.

Water quality monitoring data shows that DDT, DDE, and DDD are found in water, sediment and fish tissue samples collected from Imperial Valley waters. The concentrations found in water and fish tissue often exceed the numeric targets and, in some cases, provided the basis for listing the waters as impaired by DDT, DDE, and DDD.

Water quality monitoring data shows a mix of results:

- DDT has been found in water and sediment samples collected from the Alamo River and New River. DDT has also been found in fish tissue samples collected from the Alamo River, Imperial Valley Drains, New River, and Wiest Lake on numerous occasions. The concentrations of DDT found in fish tissue often exceed the numeric target and is one of the main reasons for listing these waters as impaired by DDT.

- DDE has been found in water and sediment samples collected from the Alamo River, Imperial Valley Drains, and New River on numerous occasions. The concentrations found in water and sediment samples often exceeded the numeric targets and are the main reasons for listing these waters as impaired by DDE.

- DDD has been found in a few water samples collected from the Alamo River and Imperial Valley drains and sediment samples collected from the Alamo River, Imperial Valley Drains, and New River on numerous occasions. Although not presented in the data collected for this analysis, the concentrations of DDD found in water samples collected from the Alamo River and New River in the past (1970s-1980s) exceeded the numeric target, and was one of the main reasons for listing these waters as impaired by DDD.

- DDT, DDE, and DDD have also been found in sediment samples collected from the New River at the international boundary with Mexico on numerous occasions. DDT is also found in fish tissue samples collected from this location. There does not appear to be a spatial pattern to the distribution of DDT, DDE, and DDD. The concentrations found in sediment do not usually exceed the numeric targets but do serve as an indication of its transport and fate.

- DDT, DDE, and DDD are not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the numeric targets.

5.3.4. Sources of DDT, DDD and DDE

The sources of DDT, DDD, and DDE appear to be from nonpoint discharges from areas in Imperial Valley and Mexico with high residual concentrations in the soil from past usage. Sediment-bound DDT is thought to be carried with water, flowing from landscapes where DDT was applied or where the soil retains a high residual of DDT, to new downstream locations. Sediment-bound DDT is degrading into DDD and DDE overtime.

Based upon valley land uses and water quality data, discharges from irrigated agriculture are a source of DDT, DDD, and DDE. In Imperial Valley, the amount of land used for irrigated agriculture is much greater than for urban uses. Water quality data has shown that DDT, DDD, and DDE are found in the sediment where irrigated agricultural discharges are the main sources of water.

Based upon water quality data, discharges from Mexico are also a source of DDT, DDD, and DDE. Water quality data has shown that DDT, DDD, and DDE are found in the sediment samples collected from the New River at the international boundary where discharges from Mexico is the main source of water.

It is inconclusive whether NPDES facilities are a source for DDT, DDD, and DDE, because the reporting limits for their analysis of DDT in water are much higher than the numeric targets.

5.3.5. Dieldrin

Dieldrin is a pesticide that was originally developed in the 1940s as an alternative to DDT. It proved to be a highly effective insecticide and was widely used during the 1950s to early 1970s. Most uses of dieldrin were banned in 1978. Dieldrin is no longer produced in the U.S.

Dieldrin was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields. A review of PURs from the 1970’s and 1980’s found a few reports of dieldrin applications.

Water quality monitoring data show that dieldrin is found in water, sediment, and fish tissue samples collected from Imperial Valley waters. The concentrations regularly found in fish tissue and sometimes in water samples exceed the numeric targets and were some of the reasons for listing these waters as impaired by dieldrin.

Dieldrin is found in water, sediment, and fish tissue samples collected from monitoring sites along the Alamo River, Imperial Valley Drains, New River, and in Wiest Lake on numerous occasions. There does not appear to be a spatial pattern to the distribution of dieldrin. The concentrations found in sediment did not exceed the numeric target but do serve as an indication of the transport and fate of the pollutant in the environment.

Dieldrin is found in New River sediment and fish tissue samples collected from the international boundary with Mexico on numerous occasions. Dieldrin was found in a few sediment samples collected from the Alamo River at the international boundary, but this sediment is more closely associated with agricultural discharges in the United States.

Dieldrin is not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the numeric target.

5.3.6. Sources of Dieldrin

The sources of dieldrin appear to be from nonpoint discharges from areas in Imperial Valley and Mexico with high residual concentrations in the soil from past usage. Sediment-bound dieldrin is thought to be carried with water, flowing from landscapes where dieldrin was applied or where the soil retains a high residual, to new downstream locations.

Based upon valley land uses and water quality data, discharges from irrigated agriculture are a source of dieldrin. In Imperial Valley, the amount of land used for irrigated agriculture is much greater than for urban uses. Water quality data has shown that dieldrin is found in the sediment where agricultural discharges are the main sources of water.

Based upon water quality data, discharges from Mexico is a source of dieldrin. Water quality data has shown that dieldrin is found in the sediment samples collected from the New River at the international boundary where discharges from Mexico is the main source of water.

It is inconclusive whether NPDES facilities are a source for dieldrin, because the reporting limits for their analysis of dieldrin in water are much higher than the Numeric Target.

5.3.7. PCBs

PCBs are a class of OC chemical compounds. They are biphenyl compounds with different amounts of chlorine attached. They were commonly used in a variety of industrial and commercial applications including in electrical transformers and capacitors, for insulation of electrical equipment, and as oil used in motors and hydraulic systems. They were also used in older household appliances. They were in use from approximately 1929 until 1977 when the U.S. banned their manufacturing, processing, distribution, and use (ATSDR, 2000).

There are few records documenting PCB usage. They were thought to be used in Mexico and Imperial Valley in electrical equipment and older consumer household appliances. Staff reviewed the USEPA’s list of most recently regulated PCB transformer data to locate current PCB facilities in the Imperial Valley. The database contained two records for PCB facilities in Imperial Valley; a PCB generator in the city of Imperial and a gypsum facility west of the city of Seely. PCBs can also be released into the environment when older household appliances are improperly disposed of.

Water quality monitoring data shows that PCBs are found in water, sediment and fish tissue samples collected from Imperial Valley waters. The concentrations in fish tissue often exceed the numeric target and is one of the main reasons for listing these water bodies as impaired by PCBs.

PCBs were found in sediment and fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River at monitoring sites along the waterways, and in Wiest Lake on numerous occasions. A few PCBs were found in water samples collected from the New River in 2013. PCBs were also found in a New River water sample collected in 2013, sediment, and fish tissue samples collected from the international boundary. There does not appear to be a spatial pattern to the distribution of PCBs. The concentrations found in sediment serve as an indication of its transport and fate.

PCBs were not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the numeric target.

5.3.8. Sources of PCBs

The sources of PCBs appear to be from nonpoint discharges from areas in Imperial Valley and Mexico with high residual concentrations in the soil. Sediment-bound PCBs are thought to be carried with water, flowing from landscapes or where the soil retains a high residual, to new downstream locations.

Based upon water quality data, discharges from Mexico is a source of PCBs. Water quality data has shown that PCBs are found in water and sediment samples collected from the New River at the international boundary where discharges from Mexico is the main source of water.

Based upon valley land uses and water quality data, discharges from irrigated agriculture are a source of PCBs. In Imperial Valley, the amount of land used for irrigated agriculture is much greater than for urban uses. Water quality data has shown that PCBs are found in the sediment where irrigated agricultural discharges are the main sources of water.

It is inconclusive whether NPDES facilities are a source for PCBs, because the reporting limits for their analysis in water are much higher than the numeric target.

5.3.9. Toxaphene

Toxaphene is a pesticide that was heavily used in the United States in the early to mid-1970s as DDT was phased out. The EPA cancelled most of the pesticide registrations for toxaphene in 1982. All uses of toxaphene were banned in 1990 (ATSDR 1997).

Toxaphene was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields. A review of PURs from the 1970's and 1980's found a few reports of toxaphene applications.

Water quality data shows that toxaphene is found in fish tissue samples collected from Imperial Valley waters. Toxaphene is found in fish tissue samples often at concentrations that exceed the numeric target and is the main reason for listing these waters as impaired by toxaphene.

Toxaphene is found in fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New Rivers at monitoring sites along the waterways. Toxaphene is also found in New River fish tissue samples collected from the international boundary with Mexico. Toxaphene is not found in water or sediment samples.

Toxaphene is not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the numeric target.

5.3.10. Sources of Toxaphene

The sources of toxaphene appear to be from nonpoint discharges from areas in Imperial Valley and Mexico with high residual concentrations in the soil from past usage. Sediment-bound toxaphene are thought to be carried with water flowing from landscapes where toxaphene was applied or where the soil retains a high residual, to new downstream locations, although there is little data to support this.

Water quality data show inconclusive results to identify whether agricultural discharge, discharges from Mexico, or discharges from NPDES facilities are sources of toxaphene. This is due to a lack of data, and/or a lack of useable data.

5.4. Source Analysis Summary

The sources of OP and OC Compounds were investigated in Imperial Valley waters. Regional Water Board staff reviewed land use information, pesticide use, and environmental data to identify sources.

Sources of OP and OC compounds in Imperial Valley are found to be from irrigated agricultural lands, based upon pesticide use restrictions, the uses of the compounds, the amount of land used for agricultural purposes, and water quality data. Discharges from irrigated agricultural lands are considered nonpoint source discharges.

Mexico is also considered as a source of diazinon and OC compounds in the New River based upon water quality data. Discharges from Mexico conveyed via the New River are considered nonpoint source discharges.

The amount of OP and OC compounds coming from NPDES facilities is unknown at this time due to a lack of OP compound water quality data, and OC compound reporting limits for the analysis being much higher the numeric targets. But the pesticide use restrictions for chlorpyrifos and diazinon, and the amount of land used for urban purposes when compared to the amount of land used for agricultural purposes indicate that NPDES facilities may be a de-minimis source of OC and OP compounds. MS4 permittees are also considered de-minimis sources because of the compounds uses, urban land use, and desert weather.

Table 5-1 summarizes staff findings regarding sources of OP and OC compounds in Imperial Valley waters.

Table 5-1. Summary of Sources of OP and OC Compounds in Imperial Valley Waterbodies.

Pollutant	Irrigated Agriculture	Mexico (New River)	NPDES Permitted Facilities
Chlorpyrifos	X		
Diazinon	X	X	
Malathion	X		
Chlordane	X	X	
DDT	X	X	
DDE	X	X	
DDD	X	X	
Dieldrin	X	X	
PCBs	X	X	

Pollutant	Irrigated Agriculture	Mexico (New River)	NPDES Permitted Facilities
Toxaphene[28]			

[28] A lack of data, and/or a lack of useable data prevents staff from identifying potential sources of toxaphene.

6. LOADING CAPACITIES AND TMDLS

A TMDL is the sum of wasteload allocations for point sources (e.g., wastewater treatment facilities), load allocations for nonpoint sources (e.g., agricultural activities, Mexico), allocations for natural sources (e.g., wildlife), and a margin of safety, such that the capacity of the water body to assimilate pollutant loads without violating water quality objectives is not exceeded. Allocations are based on the source analysis and numeric target. The margin of safety accounts for uncertainty, and is recommended by USEPA's TMDL Guidelines (USEPA, 1991). A TMDL can be equated as follows:

TMDL = **Wasteload Allocations**
+ **Load Allocations**
+ **Natural Sources**
+ **Margin of Safety**

Per 40 Code of Federal Regulations section 130.2(i), "TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate ***measure***." (Emphasis added.) In these TMDLs, the chemical constituent loading capacities are the amounts of specific chemicals that can be received in surface waters without exceeding the Basin Plan's chemical constituent and toxicity WQOs and the CTR standards. The TMDLs for chlorpyrifos, diazinon and malathion are expressed in terms of water column concentration-based targets, and the OC TMDLs are expressed as both water and fish tissue concentration-based targets.

6.1. TMDL Targets

6.1.1. Chlorpyrifos, Diazinon, And Malathion TMDL Targets

The TMDL targets for chlorpyrifos, diazinon, and malathion in water are listed below in Table 6-1. These TMDL targets are set equal to the Numeric Targets for water as shown in Table 3-1, averaged over a three-year period to account for short-term variations.

Table 6-1. Water Column Concentration TMDL Targets for Chlorpyrifos, Diazinon and Malathion (µg/L).

Waterbodies	Chlorpyrifos CMC	Chlorpyrifos CCC	Diazinon CMC	Diazinon CCC	Malathion CMC	Malathion CCC
Alamo River	0.02	0.015	0.16	0.10	0.17	0.028
Imperial Valley Drains	0.02	0.015	0.16	0.10	0.17	0.028
New River	0.02	0.015	0.16	0.10	0.17	0.028

6.1.2. TMDL Targets for Chlordane, DDT, DDE, DDD, Dieldrin, PCBs and Toxaphene

The TMDL targets for chlordane, DDT, DDE, DDD, dieldrin, PCBs, and toxaphene in water are listed below in Table 6-2. These TMDL targets are set equal to the Numeric Targets for water as shown in Table 3-2, averaged over a three-year period to account for short-term variations.

Table 6-2. Water Column Concentration TMDL Targets for Chlordane, DDT, DDE, DDD, Dieldrin, PCBs and Toxaphene (µg/L).

Waterbodies	Chlordane	DDT[29]	DDE[30]	DDD[31]	Dieldrin	PCBs[32]	Toxaphene
Alamo River	0.0043	0.00059	0.00059	0.00084	0.00014	0.00017	0.00075
Imperial Valley Drains	0.0043	0.00059	0.00059	0.00084	0.00014	0.00017	
New River	0.0043	0.00059	0.00059	0.00084	0.00014	0.00017	
Wiest Lake		0.00059			0.00014	0.00017	

The TMDL targets for chlordane, DDT, dieldrin, PCBs, and toxaphene in fish tissue are listed below in Table 6-3. These TMDL targets are set equal to the Numeric Targets for fish tissue as shown in Table 3-3, averaged over a three-year period to account for short-term variations.

Table 6-3. Fish Tissue Concentration TMDL Targets for Chlordane, DDT, Dieldrin, PCBs and Toxaphene (ng/g).

Water Bodies	Chlordane	DDT	Dieldrin	PCBs	Toxaphene
Alamo River	3.9	15	0.32	2.6	4.3

[29] as p, p'-DDT

[30] as p, p'-DDE

[31] as p, p'-DDD

[32] The sum of all congener or isomer of homolog or aroclor analyses.

Water Bodies	Chlordane	DDT	Dieldrin	PCBs	Toxaphene
Imperial Valley Drains	3.9	15	0.32	2.6	4.3
New River	3.9	15	0.32	2.6	4.3
Wiest Lake		15	0.32	2.6	

6.2. Linkage Analysis

The goal of the linkage analysis is to establish a link between the pollutant loads and the desired water quality. This ensures that the loading capacities specified in the TMDLs will result in attaining the desired water quality.

For the chlorpyrifos, diazinon, and malathion 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, diazinon and/or malathion loading to the extent allocated will result in achieving the WQSs.

Surface waters are impaired by chlordane, DDT, dieldrin, PCBs, and toxaphene mostly due to their presence in fish tissue. Other regional water boards have established a correlation between OC compound concentrations in water and/or sediment and those in fish tissue (CRWQCBLAR, 2011; CRWQCBCVR, 2010). Organisms can accumulate pesticides from water and/or sediment as well as consumption of organisms from lower trophic levels in the food-web (WHO, 1989). Since OC compounds have an extremely high affinity to bind to sediments, the transport of sediment is the primary pathway from land use to the polluted receiving waterbody. Therefore, a reduction of OC loading into surface waters necessitates minimizing sediment loading from areas where sediment is contaminated with OC compounds. Sediment loading must be minimized to the maximum extent practical to achieve the TMDLs, and therefore the desired water quality. An adaptive management approach must be taken to derive the allowable sediment loading that achieves the OC TMDLs; staff will monitor pollutant concentrations during the implementation phase.

6.3. Allocations

Source analysis indicated that OP and OC compounds in Imperial Valley waters come primarily from irrigated agricultural lands, and Mexico. The amount of OP and OC compounds, if any, coming from NPDES permitted municipalities and facilities is unknown currently due to a lack of OP compound water quality data, and for OC compounds the reporting limits for the analysis being much higher than the Numeric Targets. NPDES permitted municipalities and facilities are assigned OP and OC compound allocations, because if these facilities were not assigned allocations for OP and OC compounds, their allocations would technically be zero. The TMDLs are allocated to point sources and non-point sources in the Imperial Valley as follows.

6.3.1. Wasteload Allocations

Municipalities and facilities regulated by NPDES permits are considered point sources of pollutants and are assigned wasteload allocations. The stormwater discharges from the cities of Imperial, El Centro, Calexico, Brawley, and the County of Imperial are regulated by State Water Board Order 2013-0001-DWQ, the general permit for stormwater discharges from Small Municipal Separate Storm Sewer Systems (MS4), as Phase II collection systems. Discharges from NPDES-permitted facilities are regulated by individual permits adopted by the Colorado River Basin Water Board or are regulated by the Industrial or Construction NPDES general stormwater permits (2014-0057-DWQ, 2009-0009-DWQ) adopted by the State Water Board. The NPDES municipalities and facilities that discharge to the Imperial Valley waters are reported in Table 6-4, and their wasteload allocations are reported in Table 6-5 and Table 6-6.

Table 6-4. NPDES permitted municipalities and facilities assigned wasteload allocations.

Municipality or Facility	Order No.	NPDES Permit No.
City of Brawley Wastewater Treatment Plant	R7-2015-0004	CA0104523
City of Imperial Water Pollution Control Plant	R7-2015-0030	CA0104400
Grass Carp Hatchery (IID)	R7-2016-0003	CA7000004
City of Holtville Municipal Wastewater Treatment Plant	R7-2016-0005	CA0104361
Heber Public Utility District Wastewater Plant, Heber	R7-2016-0006	CA0104370
Naval Air Facility El Centro Wastewater Treatment Plant	R7-2016-0004	CA0104906

Municipality or Facility	Order No.	NPDES Permit No.
Seeley County Wastewater Treatment Plant	R7-2017-0016	CA0105023
City of Westmorland Wastewater Treatment Plant	R7-2017-0017	CA0105007
Country Life Mobile Home and R.V. Park Wastewater Treatment Plant	R7-2018-0010	CA0104264
Date Gardens Mobile Home Park Wastewater Treatment Plant	R7-2018-0009	CA0104841
El Centro Wastewater Treatment Plant	R7-2019-0002	CA0104426
Centinela State Prison Wastewater Treatment Plant	R7-2019-0003	CA7000001
Niland Wastewater Treatment Plant	R7-2019-0005	CA0104451
Calexico Water Pollution Control Plant	R7-2019-0004	CA7000009
El Centro Generating Station (IID)	R7-2020-0006	CA0104248
Calipatria Wastewater Treatment Plant	R7-2020-0010	CA0105015
City of El Centro MS4	2013-0001-DWQ	CAS000004
County of Imperial MS4	2013-0001-DWQ	CAS000004
City of Brawley MS4	2013-0001-DWQ	CAS000004
City of Calexico MS4	2013-0001-DWQ	CAS000004

Municipality or Facility	Order No.	NPDES Permit No.
City of Imperial MS4	2013-0001-DWQ	CAS000004
Industrial General Stormwater Permittees	2014-0057-DWQ	CAS000001
Construction General Stormwater Permittees	2009-0009-DWQ	CAS000002

The wasteload allocations for chlorpyrifos, diazinon, and malathion in the Imperial Valley are assigned to all NPDES permitted municipalities and facilities identified in Table 6-4 as follows:

Table 6-5. Chlorpyrifos, Diazinon and Malathion Wasteload Allocations Assigned to NPDES Permitted Municipalities and Facilities.

Pollutant	Source	Wasteload Allocation
Chlorpyrifos	NPDES Permittees	Same as TMDL Targets in Table 6-1
Diazinon	NPDES Permittees	Same as TMDL Targets in Table 6-1
Malathion	NPDES Permittees	Same as TMDL Targets in Table 6-1

The wasteload allocations for chlordane, DDT, DDE, DDD, dieldrin, PCBs, and toxaphene in the Imperial Valley are assigned to NPDES permitted municipalities and facilities identified in Table 6-4 as follows:

Table 6-6. Chlordane, DDT, DDE, DDD, dieldrin, PCBs, and toxaphene wasteload allocations assigned to NPDES permitted municipalities and facilities.

Pollutant	Source	Wasteload Allocation
Chlordane	NPDES Permittees	Same as the TMDL targets in Table 6-2
DDT, DDE, and DDD	NPDES Permittees	Same as the TMDL targets in Table 6-2

Pollutant	Source	Wasteload Allocation
Dieldrin	NPDES Permittees	Same as the TMDL Targets in Table 6-2
PCBs	NPDES Permittees	Same as the TMDL Targets in Table 6-2
Toxaphene	NPDES Permittees	Same as the TMDL Targets in Table 6-2

6.3.2. Load Allocations

Irrigated agricultural lands and Mexico are considered nonpoint sources of pollutants and are assigned load allocations. The load allocations for chlorpyrifos, diazinon, and malathion in water are assigned to irrigated agriculture and Mexico as follows:

Table 6-7. Chlorpyrifos, diazinon, and malathion load allocations.

Pollutant	Source	Load Allocation
Chlorpyrifos	Irrigated Agriculture	Same as TMDL Targets in Table 6-1
Diazinon	Irrigated Agriculture	Same as TMDL Targets in Table 6-1
Diazinon	Mexico (New River at International Boundary)	Same as TMDL Targets in Table 6-1
Malathion	Irrigated Agriculture	Same as TMDL Targets in Table 6-1

The load allocations for chlordane, DDT, DDE, DDD, dieldrin, PCBs, and toxaphene in sediment and fish tissue are assigned to irrigated agriculture and Mexico as follows.

Table 6-8. Chlordane, DDT, DDE, DDD, dieldrin, PCBs, and toxaphene load allocations.

Pollutant	Source	Load Allocation
Chlordane	Irrigated Agriculture	Same as TMDL Targets per Table 6-2 and Table 6-3
Chlordane	Mexico (New River at International Boundary)	Same as TMDL Targets per Table 6-2 and Table 6-3

Pollutant	Source	Load Allocation
DDT, DDE, and DDD	Irrigated Agriculture	Same as TMDL Targets per Table 6-2 and Table 6-3
DDT, DDE, and DDD	Mexico (New River at International Boundary)	Same as TMDL Targets per Table 6-2 and Table 6-3
Dieldrin	Irrigated Agriculture	Same as TMDL Targets per Table 6-2 and Table 6-3
Dieldrin	Mexico (New River at International Boundary)	Same as TMDL Targets per Table 6-2 and Table 6-3
PCBs	Irrigated Agriculture	Same as TMDL Targets per Table 6-2 and Table 6-3
PCBs	Mexico (New River at International Boundary)	Same as TMDL Targets per Table 6-2 and Table 6-3
Toxaphene	Irrigated Agriculture	Same as TMDL Targets per Table 6-2 and Table 6-3
Toxaphene	Mexico (New River at International Boundary)	Same as TMDL Targets per Table 6-2 and Table 6-3

6.3.3. Natural Sources

Chlorpyrifos, diazinon, malathion, chlordane, DDT, DDE, DDD, dieldrin, PCBs and toxaphene are all man-made compounds, there are no natural sources. Since there are no natural sources of these compounds, natural sources have an allocation of **zero**.

6.4. Margin of Safety

A TMDL requires a margin of safety component that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving water. (33 U.S.C. § 1313(d)(1)(C).) The margin of safety may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the margin of safety. The margin of safety is incorporated into these TMDLs implicitly through conservative assumptions; namely, the desired water quality is conservatively achieved through allocations and targets set equal to desired water quality. If during the TMDL implementation phase, staff develops numeric targets and TMDLs that better reflect the desired water quality, the allocations will be set equal to these modified targets and TMDLs.

6.5. Critical Conditions

TMDLs must always include consideration of critical conditions and seasonal variation to ensure protection of the designated uses of the waterbody. Critical conditions are the combination of environmental factors resulting in the water quality standard being achieved by a narrow margin (i.e., that a slight change in environmental factors could result in exceedance of a water quality standard). Such a phenomenon could be significant if the TMDLs were expressed in terms of loads, and the allowed loads were based on achieving the water quality standards by a narrow margin. However, these TMDLs are expressed as concentrations, which are set equal to the desired water quality condition. Consequently, there are no critical conditions.

6.6. Seasonal Variations

The TMDLs and allocations are expressed in terms of concentrations equal to the desired water quality conditions (targets), which are applicable to all seasons and flow-regimes. Therefore, TMDLs and allocations developed based on seasonal variation are not appropriate in this case. Additionally, chlordane, DDT, dieldrin, PCBs and toxaphene have persisted in the environment for many years, and their impacts and impairments are not expected to vary seasonally.

6.7. Load Duration Curves

Based on USEPA guidance, Regional Water Board staff has provided daily load expressions to supplement the concentration-based expressions of the TMDLs and allocations (see **Attachment D**). USEPA (2007) recommends that TMDLs include a daily time increment in conjunction with other temporal or concentration-based expressions; the load-duration curves implement this recommendation.

The daily load expressions contained in Attachment D are not the TMDLs; however, daily load expressions can facilitate the development of management actions to achieve the allocations and TMDLs. For example, the load duration curves may show that exceedances of the numeric targets during a particular flow regime is expected, or no exceedance is expected at all. This information could be useful to determine implementation strategies. To this end, staff will continue to update the load duration curves when data become available, and when appropriate.

7. IMPLEMENTATION AND TIMELINE

This section describes the Colorado River Basin Water Board's procedures and the regulatory measures that will be used to provide reasonable assurances that water quality standards will be met. Source Analysis indicates that OP and OC compounds in Imperial Valley waters came from irrigated agricultural discharges and discharges from Mexico. The contribution from NPDES facilities is unknown, but presumed to be de minimis at most.

7.1. Irrigated Agricultural Lands

To control the discharges of OP and OC compounds from irrigated agricultural lands in Imperial Valley, this TMDL will be implemented through the Colorado River Basin Water Board's Irrigated Lands Regulatory Program.

Prior to adopting the operative *General Waste Discharge Requirements for Discharges of Waste from Irrigated Agricultural Lands for Dischargers that are Members of a Coalition Group in the Imperial Valley*, Waste Discharge Requirements Order R7-2021-0050 (Irrigated Lands General Order), the Colorado River Basin Water Board's Irrigated Lands Regulatory Program relied on a series of conditional waivers of waste discharge requirements under Water Code section 13269. The final iteration of such waivers occurred in 2015 via Order R7-2015-0008 (2015 Conditional Waiver).

Consistent with the State Water Board's direction in Order WQ 2018-0002 (*East San Joaquin Irrigated Lands General Order*), the operative Irrigated Lands General Order continues to utilize a third-party coalition-based approach to waste discharge requirements (WDRs) and monitoring, wherein individual discharger comply with the General Order primarily through a third-party coalition (Coalition). In lieu of regulatory coverage under the Irrigated Lands General Order, individual dischargers may obtain individual WDRs. To date, no dischargers have requested individual WDRs, presumably because of the lower compliance costs for the Irrigated Lands General Order.

Previously formed under the preceding 2015 Conditional Waiver of WDRs (superseded by the now-operative Irrigated Lands General Order), the coalition established by the Imperial Irrigation District (IID) and the Imperial County Farm Bureau (ICFB) (collectively IID-ICFB Coalition) remains the only Coalition that has been formally recognized by the Colorado River Basin Water Board, though there is a procedure in the Irrigated Lands General Order for the establishment and recognition of a new coalition. (See Irrigated Lands General Order, § E.11, pp. 39-40.)

The Irrigated Lands General Order contains a general prohibition against waste discharges from irrigated agricultural lands causing or contributing to an exceedance of water quality objections (WQOs), unreasonably affecting beneficial uses, or otherwise causing or contributing to a condition of pollution or nuisance. (Irrigated Lands General Order, § C.1.a [Receiving Water Limitations].)

The Irrigated Lands General Order also imposes a general obligation for dischargers to implement management practices to prevent or control discharges of waste that cause or contribute to exceedances of WQOs. (*Id*., § D.1.a.) In the event that monitoring, evaluations or inspections demonstrate that the initially-implemented management practices are ineffective or otherwise inadequate, "improved" practices must be implemented. (*Id*.) The Irrigated Lands General Order thus establishes an iterative process of management practice improvement until discharges (e.g., agricultural runoff) are no longer causing or contributing to exceedances of WQOs.

Under the Irrigated Lands General Order, management practices are identified and evaluated via the Water Quality Management Plan (Farm Plan). Each discharger is required to prepare a Farm Plan utilizing a template approved by the Colorado River Basin Water Board's Executive Officer. (*Id*., § D.2.a, p. 26.) At a minimum, the Farm Plan must include "[a] list of the management practices used on each crop for the annual cycle and an indication whether sediment and erosion control practices are being implemented." (*Id*., § D.2.c.ix, p. 27.) Each discharger is responsible for implementing the management practices identified in the Farm Plan, and "periodically evaluat[ing] the effectiveness of the management practices…, and modifying the Farm Plan "as necessary when visual observation monitoring indicates waste discharges have not been adequately addressed…." (*Id*., § D.2.f, p. 27.)

Beginning in mid-2023, the Coalition(s) will provide an Annual Submittal of Management Practice Data (Farm Plan Annual Report), which will include, among other things, a description of sediment and erosion management practices implemented by each discharger (reported information anonymized to conceal discharger's identity). (Monitoring & Reporting Program R7-2021-0050 [MRP], § IV.C.6, p. B-16.) The MRP does not specify any minimum elements or level of detail that must be included in this discussion. The exact same management practices implemented to address sediment and erosion would also address the discharge of OP and OC compounds into surface waters as well.

Under the MRP, the Coalition(s) must also submit—ostensibly concurrently with the Farm Plan Annual Report discussed above— an Annual Monitoring Report (AMR) that includes a "Summary of management practice information collected as part of the Farm Plans." (MRP, § VI.E.17, pp. B-20.) Specifically, the Coalition is required to "aggregate and summarize information collected from management practices implementation," and "include a quality assessment of the collected information by township (e.g. missing data, potentially incorrect/inaccurate reporting), and a description of corrective actions to be taken regarding any deficiencies in the quality of data submitted, if such deficiencies were identified." (*Id*., p. B-22.)

The Irrigated Lands General Order contains a cost estimate for the preparation of Farm Plans and the submittal of annual reports:

> The information required by the Farm Plan Template could be compiled by anyone with knowledge of farm characteristics and operations ranging from administrative to professional level employees or Members themselves. Completing and submitting the template is expected to take from one (1) to two (2) hours per parcel per year. Cost estimates for labor to complete the Farm Plan range from $60 to $120 per hour. The cost estimate for submitting a completed Farm Plan are estimated to range from $60 to $240 per farm per year or for 5066 farms, $303,960 to $1,215,840 per year.

(Irrigated Lands General Order, Attach. A—Information Sheet, p. A-9.)

> Regional Water Board staff estimates that the AMR and monthly surface water reports will require 400 person-hours at $100 per hour. The Coalition Group is required to submit one AMR and four quarterly surface water reports per year. The total cost is an estimated $40,000 per year.

(*Id.*, p. A-11.)

The Irrigated Lands General Order does not include cost estimates for implementing management practices or improved management practices (i.e., where initial practices are inadequate). The following explanation is provided:

> Implementing management practices that prevent typical agricultural pollutants from entering groundwater and surface waters is the main requirement of the Order. Because of ongoing conservation efforts by IID and sediment reduction programs implemented by the ICFB, management practices for optimizing the uptake of irrigation water by crops, and the nutrients and pesticides that are applied with it, are already being used in the Imperial Valley. The costs of these management practices can be offset by increased crop yields and reduced water and chemical costs. The cost of implementing additional management practices could be a component of the overall costs of complying with the Order but is not considered in the scope of this Cost Analysis.

(*Id.*, p. A-9.)

The Irrigated Lands General Order also requires compliance with applicable TMDLs stating that discharges of wastes from irrigated agricultural lands not violate any applicable water quality standard for receiving waters adopted by the Colorado River Basin Water Board or the State Water Board as required by the federal Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Clean Water Act section 303 or amendments thereto, the Colorado River Basin Water Board will be able to revise and modify the Order in accordance with the more stringent standard. In addition to the TMDLs being considered for adoption, the Colorado River Basin Water Board has adopted Siltation/ Sedimentation TMDLs for the Alamo River, New River, and Imperial Valley drains. The silt TMDLs cover irrigated agricultural land in the Imperial Valley, and the drain system which conveys the discharges away from the irrigate agricultural land. The Siltation/Sedimentation TMDLs set numeric targets of 200 mg/L for Total Suspended Solids (TSS), require the use of sediment management practices to control the amounts of sediment leaving the agricultural lands, require monthly monitoring of TSS in the Alamo River, New River and Imperial Valley Drains, and annual reporting.

The Irrigated Lands General Order also contains monitoring and reporting provisions, to provide for a feedback mechanism for the assessment of progress toward attaining the WQOs. The IID-ICFB Coalition Group is currently collecting water samples from the New and Alamo River twice annually and analyzing the samples for chlorpyrifos, diazinon, and malathion. The Coalition is also collecting fish samples annually and analyzing the samples for OC compounds under the current General Order. This monitoring is expected to continue under the Irrigated Lands General Order.

7.2. Mexico

To control the discharges of diazinon and OC compounds into the New River at the international boundary with Mexico, the Colorado River Basin Water Board will work with its federal partners to ensure attainment of the TMDL numeric targets. Mexico is an independent nation not bound by California water quality regulations, so the implementation plan for controlling the contribution of diazinon from Mexico requires coordination with the United States International Boundary and Water Commission (USIBWC) and USEPA. The USIBWC is a U.S.-Mexican federal agency whose responsibilities include solving international boundary sanitation problems and other border water quality problems. USEPA is the U.S. federal agency responsible for coordination of water quality issues. USIBWC and USEPA have primary responsibility for ensuring that waste discharges from Mexico do not violate or contribute to a violation of water quality objectives in the New River downstream of the international boundary.

Colorado River Basin Water Board staff recommends that USIBWC and USEPA develop a plan describing proposed measures the U.S. Government will undertake to ensure that waste discharges from Mexico do not violate or contribute to a violation of the diazinon or OC compounds TMDLs.

7.3. NPDES Permitted Municipalities and Facilities

To control the discharges of OP and OC compounds from NPDES permitted municipalities and facilities, these TMDLs will utilize requirements put in place by either individual or general NPDES permits or WDRs. In the Source Analysis, NPDES permitted municipalities and facilities were identified as uncertain sources of OP and/or OC compounds, because their existing monitoring programs did not include monitoring for OP compounds, and the RLs for OC compounds were above the numeric targets. NPDES permittees (Table 6-4) should begin monitoring OP compounds in effluent water, and monitor OC compounds in effluent water at lower RLs. The additional monitoring of OP compounds, and enhanced monitoring of OC compounds should be for an initial period of three years and be included with their annual monitoring. NPDES permittees should also use pesticide and sediment best management practices where possible to limit the amounts of OP and OC compounds, if any, entering Imperial Valley waters from their facilities. The implementation plan for NPDES sources of impairments will be reassessed once enough acceptable data from these facilities is generated.

If the monitoring data does show that NPDES permittees are sources of OP and OC compounds, Colorado River Basin Water Board staff will work with the permitees to identify management practices and treatment technologies to reduce loading and achieve their wasteload allocations. Colorado River Basin Water Board staff will utilize the existing NPDES permits and revise as necessary to provide the requirements necessary to implement these TMDLs.

The NPDES permits and WDRs that regulate the discharges generally contain provisions that can implement these TMDL requirements. The individual and general permits contain provisions stating that the MRPs may be modified to increase the number of parameters to be monitored, the frequency of the monitoring or the number and size of samples to be collected or minor clarifications on MRP requirements. Any increase in the number of parameters to be monitored, the frequency of the monitoring or the number and size of samples to be collected may be reduced back to the levels specified in the original MRP is at the discretion of the Executive Officer. The Executive Officer may also determine the need to conduct additional monitoring on a case-by-case basis.

The individual and general permits also contain permit reopener provisions stating that permits may be reopened and modified in the future to include appropriate requirements necessary to fully implement the approved TMDLs if needed.

7.4. Timeline and Milestones

Chlorpyrifos is expected to achieve water quality standards prior to UESPA approval. This estimate is based on the ban on the manufacturing and most uses of chlorpyrifos in California, and the relatively short half-life of chlorpyrifos in soil (7 – 120 days).

The estimated target date to achieve the water quality standards for diazinon is three years after approval of these TMDLs by the USEPA. This estimate is based on use trends showing apparent decreased use, implementation of management practices to mitigate loadings, and regulatory efforts to lessen loading if voluntary actions fail to achieve the water quality standards. Diazinon has only agricultural uses, and the use has been in decline since 2000. In fact, after 2016 the amount of diazinon applied in Imperial Valley was close to zero. Water monitoring data has not shown exceedance of the Numeric Targets since about 2010.

The estimated target date to achieve the water quality standards for malathion is ten years after approval of the TMDL by the USEPA. This estimate is based on the current usage and limited restrictions on its use. Malathion may be an increasing water quality problem if malathion use increases due to restrictions on the use of chlorpyrifos and diazinon.

The estimated target date to achieve the water quality standards for the OC compounds (chlordane, DDT, DDD, DDE, dieldrin, PCBs, and toxaphene) varies from zero to thirty years after approval of the TMDLs by the USEPA. These estimates are based on plots of the concentrations of OC compounds found in fish tissue samples over time and development of a trendline. The target date is estimated to be when the trendline meets the Numeric Target. This process yielded a mix of results. For chlordane, dieldrin, PCBs and toxaphene, the trendlines indicate that the Imperial Valley waters may already be at or near the Numeric Targets. For DDT, the trendlines indicate that it may take from ten to thirty years before the Imperial Valley waters meet the Numeric targets.

All OC compounds in fish tissue show a negative trend when plotting their concentrations over time. OC compounds are extremely persistent in the environment, but water quality data has shown that they do ultimately degrade. For example, the use of DDT was discontinued over 40 years ago, but DDT is still detected in Imperial Valley fish tissue. More recent monitoring data shows that the DDT degradates, DDD and DDE, are present in the watershed, which indicates that DDT is breaking down.

7.5. Determination of Compliance with Wasteload Allocations

In these TMDLs, NPDES-permitted municipalities and facilities are assigned wasteload allocations for OP and OC compounds. However, these NPDES permittees are identified as uncertain sources of OP and/or OC compounds because their existing monitoring did not include monitoring for OP compounds, and the reporting limits (RLs) for OC compounds in the permits were above the numeric targets described above. These NPDES permittees should begin monitoring OP compounds in water, and monitor OC compounds in water at lower RLs. The implementation plan for NPDES sources of impairments will be reassessed once enough acceptable OP and OC data is generated.

Colorado River Basin Water Board staff will assess compliance with wasteload allocations using one or a combination of the following:

A. Attaining the wasteload allocations in the receiving waters.

B. Demonstrating compliance by measuring OP and OC compound concentrations in effluent waters.

C. If necessary, implementation and assessment of management practices and treatment technologies capable of achieving the wasteload allocations identified in these TMDLs in combination with water quality monitoring for a balanced approach to determining program effectiveness.

D. Any other effluent limitations and conditions that achieve the wasteload allocations.

7.6. Determination of Compliance with Load Allocations

In these TMDLs, owners/operators of irrigated agricultural lands and Mexico are assigned load allocations for OP and OC compounds. For irrigated agricultural lands, demonstration of compliance with the load allocations is consistent with compliance with the Irrigated Lands General Order. Load allocations will be achieved through a combination of implementation of management practices and strategies to reduce pollutant loading. Flexibility to allow owners and operators of irrigated agricultural lands to demonstrate compliance with load allocations is a consideration.

Colorado River Basin Water Board staff will assess compliance with load allocations using one or a combination of the following:

A. Attaining the load allocations in receiving waters.

B. Demonstrating compliance by measuring OP compound concentrations in water and OC compound concentrations in fish tissue.

C. Implementing pesticide and sediment management practices that are capable of achieving load allocations identified in these TMDLs.

D. Owners and operators of irrigated agricultural 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.

8. ENVIRONMENTAL REVIEW

Although it constitutes a “project” under the California Environmental Quality Act (CEQA), Public Resources Code section 21000 et seq., this Basin Plan Amendment is a “certified regulatory program” that has been categorically exempted from the requirement for preparation of an Environmental Impact Report (EIR). (Pub. Resources Code, § 21080.5; Cal. Code Regs., tit. 14, 1251, subd. (g).) Basin Plan Amendments must instead comply with the procedural requirements set forth in California Code of Regulations, title 23, section 3775 et seq. This Staff Report and the attached Environmental Review Checklist (Attachment E) constitute the Substitute Environmental Document (SED) that is required per California Code of Regulations, title 23, sections 3777 and 3779.5.

As demonstrated in **Attachment E**, no “fair argument” exists that the proposed Basin Plan Amendment could result in any reasonably foreseeable significant adverse environmental impacts. (See Cal. Code Regs., tit. 23, § 3777, subd. (e); Cal. Code Regs., tit. 14, § 15252, subd. (a)(2)(B).) Similarly, because the proposed Basin Plan Amendment will not require any additional affirmative actions, there are no significant adverse environmental impacts directly resulting from the foreseeable means of compliance. As noted in the previous section, the same iterative process for addressing sedimentation and erosion will be sufficient to address the OC and OP compounds as well.

9. ECONOMIC ANALYSIS

There are three conditions under which economic considerations must be considered in the context of a Basin Plan Amendment.

First, water quality objectives (WQOs) established under the Basin Plan must account for economic considerations. (Wat. Code, § 13241, subd. (d).) Because a total maximum daily load (TMDL) is not WQO, an economic analysis is not required under Water Code section 13241.

Second, prior to the Colorado River Basin Water Board's implementation of an agricultural water quality control program, the Basin Plan must include "an estimate of the total cost of such a program, together with an identification of potential sources of financing…." (Wat. Code, § 13141.) This requirement is inapplicable because such a program already exists in the form of the Board's current Irrigated Lands Regulatory Program (ILRP).

Third, economic considerations must be taken into account by the SED when analyzing impacts of reasonably foreseeable means of compliance with a new requirement or obligation imposed under the Basin Plan. (See Cal. Code Regs., tit. 23, § 3777, subds. (b)(4), (c).) As noted above, the proposed TMDL Implementation Program does not impose any new obligations or requirements. Consequently, no cost estimates are required.

10. PUBLIC PARTICIPATION

Colorado River Basin Water Board staff held several stakeholder meetings during the development of these TMDLs. The following is a summary of TMDL meetings and information items.

On September 23, 2020, staff conducted a Scoping Meeting to seek input from public agencies and members of the public on the proposed Basin Plan Amendment, alternatives, reasonably foreseeable methods of compliance, significant impacts to be analyzed, cumulative impacts (if any) and mitigation measures. (Cal. Code Regs., tit. 23, § 3775.5.) Due to the COVID-19 pandemic, the Scoping Meeting was conducted virtually over the internet.

On March 9, 2022, the Colorado River Basin Water Board posted a Notice of Public Workshop and Public Hearing [etc.] (Public Notice 7-22-29) on the proposed Basin Plan Amendment and draft version of this Staff Report. (Cal. Code Regs., tit. 23, § 3779, subd. (a).)

At an in-person public meeting on April 12, 2022, the Colorado River Basin Water Board held an informational workshop to provide information and receive oral comments on the proposed Basin Plan Amendment. Interested persons were invited to attend and express their views orally on this matter at the workshop.

The 45-day written comment period on the proposed Draft Staff Report began on March 9, 2022, and ended on April 25, 2022. As summarized in Table 10-1, comments were submitted by a total of two individuals and/or organizations either orally at the Board's April 12 workshop, or in writing during the comment period. Responses to these comments are included in **Attachment G** to this Staff Report.

Table 10-1. Comments Received at April 12, 2022 Workshop or During 45-Day Written Comment Period.

Commenter	Submittal Method
Susan St Louis, Salton Sea Coalition	Oral and written comment
Linsday R. Nehm, Naval Facilities Engineering Systems Command Southwest	Written comment

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ATTACHMENT A: IMPERIAL VALLEY DESCRIPTION

1. Imperial Valley

The Imperial Valley is in the Colorado Desert region of the Sonoran Desert. The climate is characterized by hot, dry summers, occasional thunderstorms, and gusty high winds with sandstorms. It is one of the most arid areas in the United States, with an average annual rainfall of about 3 inches and daily high temperatures in excess of 100ºF for more than 100 days per year.

Major sources of water into Imperial Valley waters include the Colorado River, agricultural discharges, discharges from Mexico, and discharges from NPDES permitted facilities. Past studies have looked at and concluded that urban stormwater runoff into Imperial Valley waters is a relatively insignificant source of water due to the arid Imperial Valley climate and the relatively small area used for urban development (California Regional Water Quality Control Board, Colorado River Basin Region (CRWQBCRBR), 2002; CRWQCBCRBR, 2002b).

The Imperial Valley is allotted an annual entitlement of 3.1 million acre-feet of Colorado River water. Colorado River water flows through the Imperial Dam, located about 20 miles North of Yuma Arizona, through one of three desilting basins before being released into the All-American Canal which then supplies water to the Imperial Valley. This water is used to supply nine cities, and to irrigate agricultural fields throughout the Valley. From 1964 through 1998, IID distributed between 2.6 and 3.2 million acre-feet of Colorado River water per year for irrigation purposes (USBR, 2018). Water used to irrigate agricultural fields is used to satisfy crop needs and to control soil salinity.

Excess irrigation water either percolates into the ground or flows off the tail end of the field. There are over 1,450 miles of surface drains in Imperial Valley that provide a drainage outlet for each governmental subdivision of approximately 160 acres. These drains are typically unlined and are used to collect excess surface flow from agricultural fields (tailwater), subsurface discharges (tilewater) and operational discharge from canals and laterals. These Imperial Valley Drains discharge into the Alamo River, New River, or directly into the Salton Sea. The Imperial Irrigation District (IID) maintains this extensive gravity flow drainage system. The district is obligated to provide its drains at sufficient depth, generally 6 to 10 feet deep, to accept tile drain discharge. Where the drain cannot be maintained at sufficient depth, a sump and pump are provided and maintained by the district.

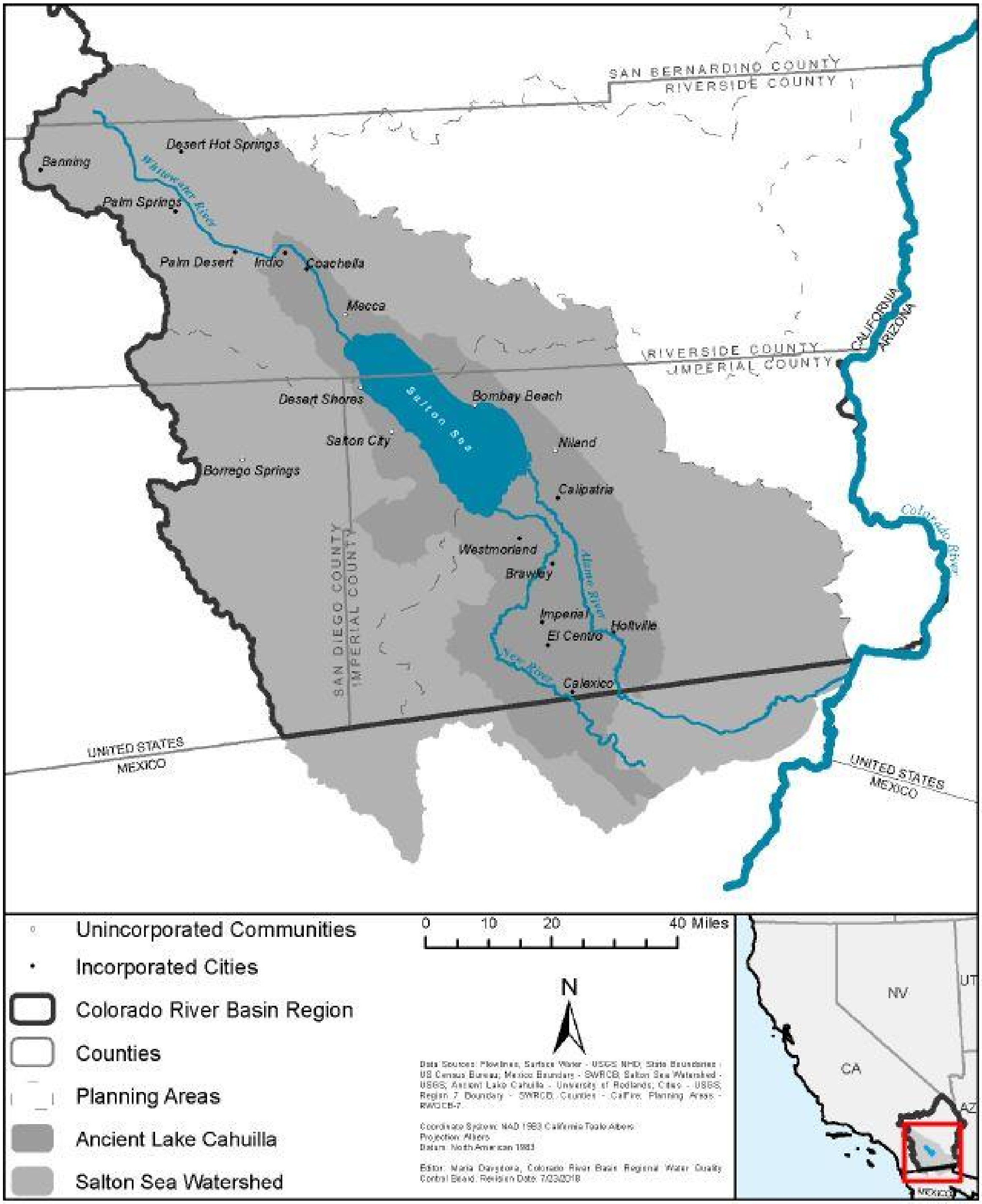
The Alamo River sub-watershed encompasses approximately 340,000 acres within the Imperial Valley. The Alamo River has its headwaters about 0.6 river miles south of the International Boundary. The Alamo River flows northward roughly 60 river-miles through the Imperial Valley, eventually emptying into the southeast corner of the Salton Sea just southwest of the community of Niland. The flow at the international boundary with

Mexico is less than two (2) cubic feet per second (cfs) [Approximately 1,440 acre-feet per year (AFY)]. The flow volume of the Alamo River increases as it travels through the Imperial Valley, where it receives water from over 900 miles of agricultural drains. The United States Geological Survey (USGS) operates streamflow-gaging stations on the Alamo River. A gage located near the river's outlet to the Salton Sea reports the mean annual daily flow (Period of Record (POR) 1961- 2017) ranging from approximately 680 to 990 cfs, averaging about 839 cfs [Approx. 607,400 AFY] (USGS, 2018). The Alamo River is the Salton Sea's largest tributary, contributing about 50% of the Sea's annual inflows, and therefore has a major influence on the water quality of the Sea. The Alamo River flows from an elevation of about 10 feet above mean sea level at the International Boundary to an elevation of about 231.8 feet below mean sea level at the Salton Sea, depending on the level of the Salton Sea which fluctuates based on agricultural return flow discharges and seasonal evapotranspiration rates.

The New River watershed encompasses approximately 175,000 acres in Imperial Valley, and 300,000 acres in the Mexicali metropolitan area and Mexicali Valley, Mexico. The New River carries agricultural runoff, partially treated and untreated municipal and industrial wastewater, storm water, and urban runoff from Mexicali Valley northward across the international boundary into the United States. Currently, the flow of the New River at the international boundary with Mexico is approximately 110 cfs [79,600 AFY] (USGS 2018c). Agricultural runoff makes up approximately 50 to 55 percent of New River flow at the international boundary. Flows have been reduced by as much as 50 percent during the last 10 years due to several factors, including reduction of agricultural runoff and municipal wastewater discharged into the New River and its tributaries in Mexico. As the River travels through Imperial Valley, it receives water from: (a) agricultural runoff from about 400 miles of IID Ag Drains (accounting for about 2/3 of river flow), (b) treated municipal and industrial wastewater, and (c) storm water and urban runoff. The USGS operates streamflow-gaging stations on the New River. A gage located near the river's outlets to the Salton Sea reports the mean annual daily flow (POR 1944- 2017) ranging from approximately 484 to 740 cfs and averaging about 606 cfs (Approx. 438,700 AFY) (USGS, 2018b).

The Imperial Valley is located in the Salton Sea Transboundary watershed which consists of the Salton Sea, a saline lake located within the lowest portion of the Salton Trough depression, and the confluence of the Coachella Valley, Anza Borrego, and Imperial Valley planning areas. A section of the watershed extends to Mexicali Valley south of the United States-Mexico international boundary (See Figure A-1).

Figure A-1. Salton Sea Transboundary Watershed.



2. Land Uses

Imperial County covers approximately 5,000 square miles (2,942,080 acres) (Imperial County, 2015). About 74 percent of County lands are undeveloped desert and mountain areas, mostly under the ownership of the federal or state government. The Salton Sea covers about 7 percent of the counties land (Imperial County, 2015 calculated at elevation -230). About 17 percent of county lands are designated for irrigated agriculture use, totaling over 525,000 acres located mostly in the Imperial Valley (Imperial County, 2015). Cities, communities and support facilities occupy less than 1 percent of county land. Table A-1, shows general land uses and their acreage in Imperial County, while Figure A-2 is a map showing their distribution.

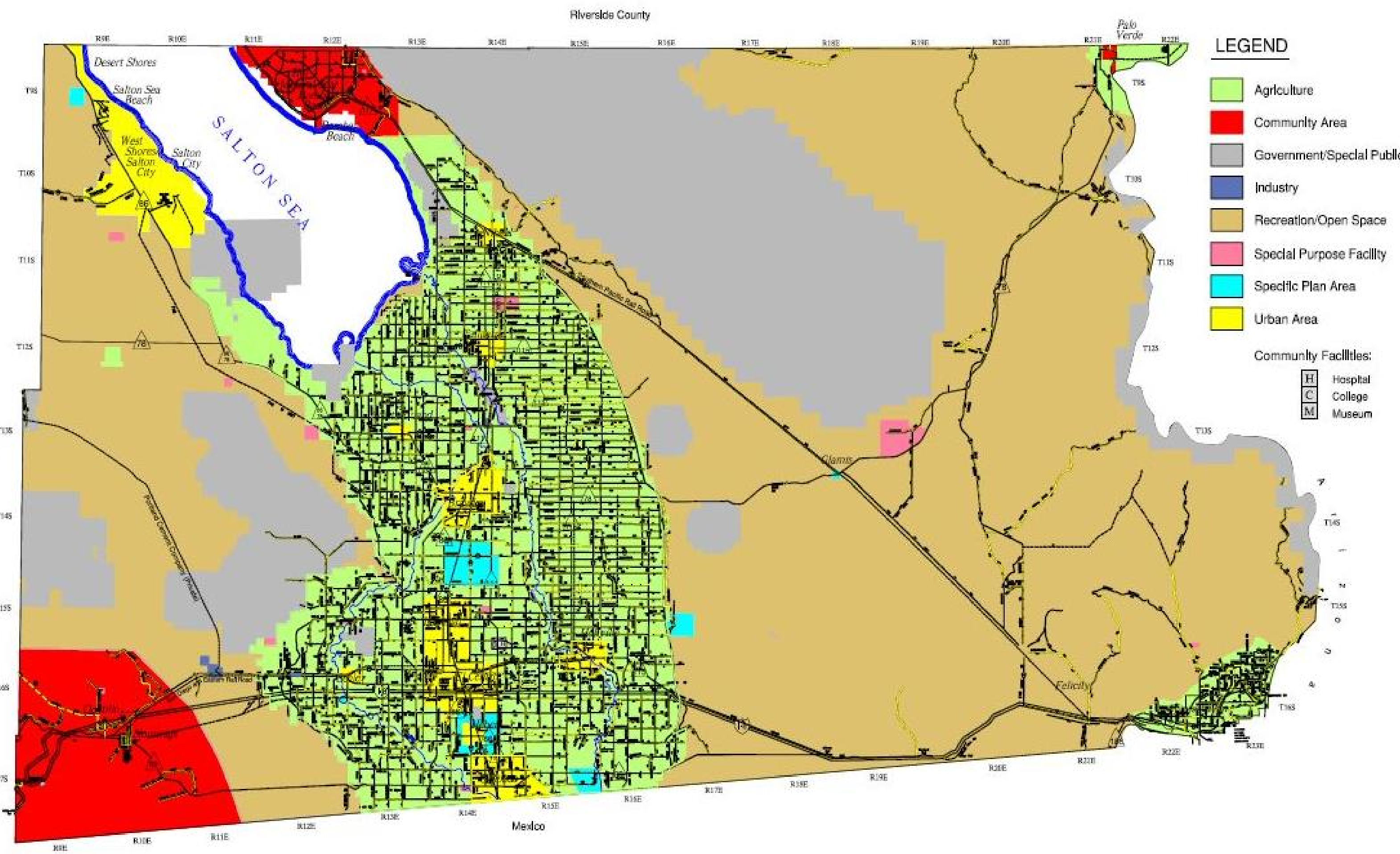
Table A-1. Imperial County Land Use Distribution (County of Imperial, 2015)

Land Use	Acres	Data Source
Irrigated (Agriculture)	-	-
Imperial Valley	512,163	Imperial County, 2015
Bard Valley	14,737	Imperial County, 2015
Palo Verde	7,428	Imperial County, 2015
Developed	-	-
Incorporated	9,274	Imperial County, 2015
Unincorporated	8,754	Imperial County, 2015
Desert/Mountains	-	-
Federal	1,459,926	Imperial County, 2015
State	37,760	Imperial County, 2015
Indian	10,910	Imperial County, 2015
Private	669,288	Imperial County, 2015
Other	-	-
Salton Sea	211,840	Imperial County, 2014 (calculated at elevation -230)

The following bulleted paragraphs provide definitions to the land uses associated with Figure A-2 (Source: County of Imperial, 2015):

- **Agriculture**- Land uses for agricultural production and related industries including aquaculture (fish farms), ranging from light to heavy agriculture. Packing and processing of agricultural products may also be allowed in certain areas, and other uses necessary or supportive of agriculture.
- **Community Area**- Land uses associated with the unincorporated communities of Hot Mineral Spa/Bombay Beach, Ocotillo/Nomirage, and Palo Verde. Their land use orientation is primarily toward relatively low density second home and retirement dwellings and recreational services, rather than urban residential, commercial, and industrial uses.
- **Government/Special Public**- Lands generally owned by public agencies which are presently, and for the foreseeable future, used for a specific governmental purpose. This designation includes military bases, schools or school related facilities and public parkland and may also be applied to airports, sewer and water facilities, cemeteries, and other public utilities and facilities.
- **Industry**- Heavy manufacturing land uses located in areas with the necessary supporting infrastructure and located away from conflicting existing or planned land uses. Generally, these lands are not suitable for agricultural use and are located adjacent to major transportation systems.
- **Recreation/Open**- This category recognizes the unique recreational character of Imperial County and includes desert, mountain, and waterfront areas with the potential for development as public or private parks and recreation facilities in appropriate areas.
- **Special Purpose Facility**- Land uses for basic governmental services which have physical or operational characteristics incompatible with most other land use categories. In particular, noise, odors, air and water quality impacts, aesthetics, and traffic may create dangerous or objectionable conditions.
- **Specific Plan Area**- Land uses with environmental constraints or unique land use concerns or opportunities which require special land use and/or design control.
- **Urban**- Urban land uses characterized by a full level of urban services, in particular public water and sewer systems, and contain or propose a broad range of residential, commercial, and industrial uses.

Figure A-2. Map of Imperial Valley Land Uses.



Source County of Imperial, 2007

3. Biological Resources In The Imperial Valley

Lands and waters in the Imperial Valley and the Salton Sea provide habitat that supports diverse communities of terrestrial and aquatic wildlife. Regional Water Board staff investigated the biological resources in the Imperial Valley using California Department of Fish and Wildlife's (CDFW) Biogeographic Information and Observation System (BIOS), a geographical information system designed to enable the management, visualization, and analysis of biogeographic data collected by the CDFW and its partner organizations. The BIOS application identifies the species and natural communities found in a given location and reports their federal and state protective status as reported in the California Natural Diversity Database (CNDDB). "Special" species are defined as plants, animals, or natural communities whose populations are of concern, including those that are endangered, threatened, special concern species, and otherwise rare/sensitive. "Endangered" species are those that have such limited numbers that they are in imminent danger of extinction throughout all or a significant portion of their range. "Threatened" species are those that are likely to become endangered in the foreseeable future. "Special Concern Species" are those that have declining population levels, limited ranges, and/or continuing threats that have made them vulnerable to extinction. (State-listed Special Concern Species that are "Protected" or "Fully Protected" are those that may not be taken or possessed without a state permit. Federally listed Special Concern Species are no longer tracked by the U.S. Fish and Wildlife Service, and thus are not discussed in this report.) "Rare/Sensitive" species are those that are biologically rare, very restricted in distribution, declining throughout their range, in danger of local extirpation, are closely associated with a rapidly declining habitat, or have a critical, vulnerable stage in their life cycle that warrants monitoring.

Based upon our investigation of the Imperial Valley area, Regional Water Board staff identified four natural communities; Active Desert Dunes, Desert Fan Palm Oasis Woodland, Stabilized and Partially Stabilized Desert Dunes, and Transmontane Alkali Marsh. These communities support forty-one unique plant and one hundred and eleven unique animal species. Two plant and seventy-five animal species are identified as having a special protective status. Table A-2 reports on those species and their protective status.

Table A-2. Special Status Species Occurring or Potentially Occurring in the Imperial Valley and the Salton Sea.

Common Name	Scientific Name	Protective Status
Plants	-	-
Peirson's milk-vetch	Astragalus magdalenae var. peirsonii	FT, SE
Algodones Dunes sunflower	Helianthus niveus ssp. Tephrodes	SE
Animals	-	-
Sonoran Desert toad	Incilius alvarius	SSC
Northern leopard frog	Lithobates pipiens	SSC
Lowland leopard frog	Lithobates yavapaiensis	SSC
Couch's spadefoot	Scaphiopus couchii	SSC
Cooper's hawk	Accipiter cooperii	WL
Sharp-shinned hawk	Accipiter striatus	WL
Golden eagle	Aquila chrysaetos	FP, WL
Short-eared owl	Asio flammeus	SSC
Burrowing owl	Athene cunicularia	SSC
Ferruginous hawk	Buteo regalis	WL
Western snowy plover	Charadrius alexandrinus nivosus	FT, SSC
Mountain plover	Charadrius montanus	SSC
Black tern	Chlidonias niger	SSC
Northern harrier	Circus hudsonius	SSC
White-tailed kite	Elanus leucurus	FP

Common Name	Scientific Name	Protective Status
Willow flycatcher	Empidonax traillii	SE
Southwestern willow flycatcher	Empidonax traillii extimus	FE, SE
California horned lark	Eremophila alpestris actia	WL
Merlin	Falco columbarius	WL
Prairie falcon	Falco mexicanus	WL
American peregrine falcon	Falco peregrinus anatum	FP
Gull-billed tern	Gelochelidon nilotica	SSC
Yellow-breasted chat	Icteria virens	SSC
Least bittern	Ixobrychus exilis	SSC
Gray-headed junco	Junco hyemalis caniceps	WL
Loggerhead shrike	Lanius ludovicianus	SSC
California gull	Larus californicus	WL
California black rail	Laterallus jamaicensis coturniculus	ST, FP
Laughing gull	Leucophaeus atricilla	WL
Gila woodpecker	Melanerpes uropygialis	SE
Wood stork	Mycteria americana	SSC
Long-billed curlew	Numenius americanus	WL
Black storm-petrel	Oceanodroma melania	SSC
Osprey	Pandion haliaetus	WL
Harris' hawk	Parabuteo unicinctus	WL
Large-billed savannah sparrow	Passerculus sandwichensis rostratus	SSC

Common Name	Scientific Name	Protective Status
American white pelican	Pelecanus erythrorhynchos	SSC
California brown pelican	Pelecanus occidentalis californicus	FP
Double-crested cormorant	Phalacrocorax auratus	WL
Summer tanager	Piranga rubra	SSC
White-faced ibis	Plegadis chihi	WL
Black-tailed gnatcatcher	Polioptila melanura	WL
Vermilion flycatcher	Pyrocephalus rubinus	SSC
Yuma Ridgway's rail	Rallus obsoletus yumanensis	FE, ST, FP
Black skimmer	Rynchops niger	SSC
Yellow warbler	Setophaga petechia	SSC
California least tern	Sternula antillarum browni	FE, SE, FP
Crissal thrasher	Toxostoma crissale	SSC
Le Conte's thrasher	Toxostoma lecontei	SSC
Least Bell's vireo	Vireo bellii pusillus	FE, SE
Yellow-headed blackbird	Xanthocephalus xanthocephalus	SSC
Desert pupfish	Cyprinodon macularius	FE, SE
Razorback sucker	Xyrauchen texanus	FE, SE, FP
Crotch bumble bee	Bombus crotchii	SC
Pallid bat	Antrozous pallidus	SSC
Western mastiff bat	Eumops perotis californicus	SSC
Western yellow bat	Lasiurus xanthinus	SSC

Common Name	Scientific Name	Protective Status
California leaf-nosed bat	Macrotus californicus	SSC
Pocketed free-tailed bat	Nyctinomops femorosaccus	SSC
Big free-tailed bat	Nyctinomops macrotis	SSC
Desert bighorn sheep	Ovis canadensis nelson	FP
Peninsular bighorn sheep DPS	Ovis canadensis nelsoni pop. 2	FE, ST, FP
Palm Springs pocket mouse	Perognathus longimembris bangsi	SSC
Yuma hispid cotton rat	Sigmodon hispidus eremicus	SSC
American badger	Taxidea taxus	SSC
Palm Springs round-tailed ground squirrel	Xerospermophilus tereticaudus chlorus	SSC
Southern California legless lizard	Anniella stebbinsi	SSC
California glossy snake	Arizona elegans occidentalis	SSC
Coastal whiptail	Aspidoscelis tigris stejnegeri	SSC
Red-diamond rattlesnake	Crotalus ruber	SSC
Desert tortoise	Gopherus agassizii	FT, ST
Sonoran mud turtle	Kinosternon sonoriense	SSC
Flat-tailed horned lizard	Phrynosoma mcallii	SSC
Colorado Desert fringe-toed lizard	Uma notata	SSC
Sandstone night lizard	Xantusia gracilis	SSC

Protective Statuses Key for Table A-2

FT = Federally Threatened
ST = State Threatened,
SSC = Species of Special Concern,
SC = State Candidate,
FE = Federally Endangered,
SE = State Endangered,
FP = Fully Protected,
WL = Watch List.

4. Agriculture In The Imperial Valley

Abundant sunshine, fertile soils, and easy access to irrigation water are a few of the many factors that make it ideal for growing crops in the Imperial Valley. Imperial Valley is the 11th-ranked agricultural county in the state of California, producing over $1.9 billion dollars in revenue in 2015 (California Department of Food and Agriculture [CDFA], 2016). In 2016, the county Agricultural Commissioner calculated that agriculture contributed 4.5 billion dollars to the local economy (County of Imperial Agricultural Commissioner, 2017). Crops produced include alfalfa, bermudagrass, sudangrass, lettuce, sugarbeets, and other fruit and vegetable crops (Table A-3).

Table A-3. Crops Grown in Imperial Valley (2017).[33]

Crop	Acres
Alfalfa (all)	148,397
Bermudagrass (all)	52,050
Sudangrass (all)	43,834
Lettuce (all)	32,069
Sugarbeets	26,498
Wheat	16,988
Carrots (all)	16,475
Kleingrass	14,510

Crop	Acres
Onions (all)	13,194
Broccoli (all)	13,016
Duck Ponds	9,546
Spinach	8,775
Corn, sweet	7,300
Citrus (all)	7,214
Melons, spring (all)	5,750
Vegetables, mixed	5,123

Crop	Acres
Corn, field	4,123
Cauliflower	3,699
Cabbage	1,933
Potatoes	1,589
Rapini	1,539
Sunflowers (seed)	1,441
Celery (all)	1,279
Ryegrass	1,221
Dates	1,174

[33] Source: Imperial Irrigation District website accessed on 8/13/18

Crop	Acres
Cilantro	1,126
Watermelons	1,028
Oats	904
Grass, mixed	611
Olives	607
Fish farms	480
Sugarcane	472
Palms	459
Coriander seed	428
Pasture, permanent	414
Okra	379
Flowers	296
Sesbania	294
Kale	286
Swiss chard (all)	253
Red beets	230
Sweet basil	211

Crop	Acres
Mustard (all)	191
Parsley (all)	169
Nursery	156
Barley	153
Cabbage, Chinese	140
Sorghum silage	139
Triticale grain	122
Squash	88
Spirulina algae	85
Artichoke (all)	84
Rapeseed	79
Quinoa	74
Collards	70
Fennel	63
Jujube	57
Brussels sprouts	54
Parsnips	50

Crop	Acres
Ornamental trees	47
Aloe vera	41
Mangos	39
Sorghum grain	38
Herbs, mixed	33
Radishes	33
Cucumbers	30
Rockett	25
Asparagus	20
Safflower	15
Peppers, bell	8
Eucalyptus	7
Pecans	4
Fruit, mixed	3
Melons, fall (all)	3
Bamboo	1
Total Acres	**449,336**

5. Regulating Discharges Into Imperial Valley Waters

The Colorado River Basin Water Board and State Water Board issue permits to control nonpoint and point source discharges of waste into waters of the state. The permits include Waste Discharge Requirements (WDRs), Conditional Waivers of WDRs, or National Pollutant Discharge Elimination Systems (NPDES) permits, depending on the nature of the waste discharged and the receiving water body. NPDES permits apply to municipalities and facilities that discharge treated wastewater directly to waters of the United States, whereas WDRs apply to facilities that discharge to waters of the United States and waters of the state. Nonpoint source discharges are diffuse in nature and originate from landscape-type sources. Point source discharges originate from distinct sources.

a. Regulating Nonpoint Source Discharges

The main nonpoint source discharge into Imperial Valley waters is from irrigated agricultural lands. To control the discharges from irrigated agricultural lands the Colorado River Basin Water Board adopted Order R7-2021-0050, *General Waste Discharge Requirements for Discharges of Waste from Irrigated Lands for Dischargers that are Members of a Coalition Group in the Imperial Valley* (Irrigated Lands General Order). Owners and/or operators of irrigated agricultural land in Imperial Valley are required to enroll their land for regulatory coverage under the General Order, or alternatively, submit a report of waste discharge and apply for an individual waste discharge permit. The Irrigated Lands General Order is primarily a representative-based order where a third party formed a coalition group (IID-ICFB Coalition Group) to assist individual owners and operators of irrigated agricultural land in Imperial Valley (Irrigated Agricultural Dischargers) in complying with requirements of the General Order. No individual owners/operators elected to enroll outside of the IID-ICFB Coalition Group and be regulated through an individual waste discharge permit, although this is an option.

The Irrigated Lands General Order requires enrolled dischargers to implement management practices, monitor water quality, and report to the Regional Water Board. Among other requirements, agricultural dischargers are required under the Irrigated Lands General Order to implement pesticide and sediment best management practices.

The Imperial Agricultural Order was initially in effect for a period of five years. It was originally scheduled to expire in January 2020 but was twice extended for an additional twenty-four months and expired in January 2022. The Colorado River Basin Water Board modified and renewed the Imperial Agricultural Order. The new Irrigated Lands General Order has many of the same provisions and requirements as the previous Conditional Waiver, new provisions and requirements, it is consistent with how the Colorado River Basin Water Board intends to regulate agricultural waste discharges in the Region, and is consistent with the state's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Policy, SWRCB, 2004).

i. Siltation/Sedimentation TMDLs

Since 2001, the Colorado River Basin Water Board has developed and adopted Sedimentation/ Siltation Total Maximum Daily Loads (TMDLs) and Implementation Plans (hereafter "silt TMDLs") for the Alamo River, New River, and Imperial Valley Drains. The silt TMDLs cover irrigated agricultural land in the Imperial Valley, the drain system which conveys the discharges away from the farmed fields, and discharges from Mexico. The Siltation/Sedimentation TMDLs set Numeric Targets of 200 mg/L for Total Suspended Solids (TSS), require the use of sediment management practices to control the amounts of sediment leaving the agricultural lands, required monthly monitoring of TSS in the Alamo River, New River and Imperial Valley Drains, and annual reporting.

The silt TMDLs were adopted by the Colorado River Basin Water Board via Basin Plan amendments. The State Water Board and the U.S. EPA approved the silt TMDLs. Table A-4, show the dates that the TMDLs were adopted and approved. TMDL implementation officially begins after USEPA approval.

Table A-4. Sedimentation/Siltation TMDL Adoption and Approval Dates.

Approving Authority	Alamo River Silt TMDL	New River Silt TMDL	IV Drains Silt TMDL
Regional Water Board Adoption Dates	6/27/01	6/26/02	1/19/05
State Water Board Approval Dates	2/19/02	11/19/02	7/21/05
USEPA Approval Dates	6/28/02	3/31/03	9/30/05

ii. Regulating Point Source Discharges

Point source discharges into Imperial Valley waters come from discrete sources and are regulated either by NPDES permits or WDRs. As of April 2021, there are 16 facilities that discharge to Imperial Valley waters that are regulated by individual NPDES permits adopted by the Colorado River Basin Water Board. The number of NPDES permits adopted and active will change over time as new dischargers seek regulatory coverage and as existing permits are terminated or expire. The permits for these individual NPDES facilities establish effluent and receiving water limitations, require the use of best management practices, monitoring, and annual reporting. Table A-5 reports information about these NPDES facilities, with "design flow" in millions of gallons per day (mgd).

Table A-5. Individually-Permitted NPDES Facilities Discharging to Imperial Valley Waters as of April 2021 (mgd).

Facility Name	Board Order (NPDES Permit)	Adoption Date	Design Flow (mgd)	Receiving Waterbody
City of Brawley Wastewater Treatment Plant	R7-2015-0004 CA0104523	6/11/2015	5.9	New River
City of Imperial Water Pollution Control Plant	R7-2015-0030 CA0104400	9/17/2015	2.4	Alamo River
Grass Carp Hatchery (IID)	R7-2016-0003 CA7000004	3/10/2016	2.52	Alamo River
City of Holtville Municipal Wastewater Treatment Plant	R7-2016-0005 CA0104361	6/30/2016	0.85	Alamo River
Heber Public Utility District Wastewater plant, Heber	R7-2016-0006 CA0104370	6/30/2016	1.2	Alamo River
Naval Air Facility El Centro Wastewater Treatment Plant	R7-2016-0004 CA0104906	6/30/2016	0.3	New River
Seeley County Wastewater Treatment Plant	R7-2017-0016 CA0105023	11/9/2017	0.25	New River
City of Westmorland Wastewater Treatment Plant	R7-2017-0017 CA0105007	9/21/2017	0.5	New River

Facility Name	Board Order (NPDES Permit)	Adoption Date	Design Flow (mgd)	Receiving Waterbody
Country Life Mobile Home and R.V. Park Wastewater Treatment Plant	R7-2018-0010 CA0104264	5/14/2018	0.15	Alamo River
Date Gardens Mobile Home Park Wastewater Treatment Plant	R7-2018-0009 CA0104841	5/14/2018	0.02	New River
El Centro Wastewater Treatment Plant	R7-2019-0002 CA0104426	3/7/2019	8	Alamo River
Centinela State Prison Wastewater Treatment Plant	R7-2019-0003 CA7000001	4/11/2019	0.96	New River
Niland Wastewater Treatment Plant	R7-2019-0005 CA0104451	5/15/2019	0.5	Salton Sea
Calexico Water Pollution Control Plant	R7-2019-0004 CA7000009	5/15/2019	4.3	New River
El Centro Generating Station (IID)	R7-2020-0006 CA0104248	1/16/2020	0.995	Alamo River
Calipatria Wastewater Treatment Plant	R7-2020-0010 CA0105015	11/12/2020	1.73	Alamo River

There are also municipalities and facilities that discharge lesser amounts of wastewater into Imperial Valley waters and are regulated by general NPDES permits or WDRs adopted by the Colorado River Basin Water Board or the State Water Board.

As of April 2021, the cities of Imperial, El Centro, Calexico, Brawley, and the County of Imperial are enrolled under the State Water Board Order 2013-0001-DWQ, *National Pollutant Discharge Elimination System (NPDES) General WDRs for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4), a*s Phase II MS4 collection systems (applies to municipalities with a population less than 100,000). Forty-nine facilities are regulated under the State Water Board Order 2009-0009-DWQ, *NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) as of April 2021*. Fifty-four facilities are regulated under the State Water Board Order 2014-0057-DWQ, *NPDES General Permit for Storm Water Discharges Associated with Industrial Activities* (Industrial General Permit) as of April 2021. The number of dischargers enrolled under the general stormwater permits will change over time as new dischargers seek regulatory coverage and as existing permits are terminated or expire. These general stormwater permits require the development of a Storm Water Pollution Prevention Plan (SWPPP) and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce storm water pollution are described.

Three facilities are regulated under Colorado River Basin Water Board Order R7-2015-0006, *General WDRs for Low Threat Discharges to Surface Water* (Low Threat Order) as of April 2021. The Low Threat Order applies to individuals, public agencies, private business, and other legal entities that occasionally discharge treated or untreated wastewater directly to waters of the United States that pose an insignificant or minimal threat (i.e., low threat) to water quality. Examples of low threat discharges include discharges from dewatering projects to construct or protect pipelines and structures from groundwater infiltration or flotation, groundwater extraction because of drilling, constructing, developing, and purging wells. Some low threat discharges may need minimal treatment, such as settling out sediment or dechlorination, to remove specific pollutants prior to discharge and/or application of best management practices (BMPs) to ensure that the discharge does not create conditions of pollution or nuisance. The Low Threat Order establishes effluent and receiving water limitations, requires enrolled dischargers to implement management practices where necessary, monitor water quality, and report to the Regional Water Board. Low threat dischargers are required to develop and implement a BMP Plan that includes site-specific plans and procedures to prevent the generation and potential release of pollutants to waters of the United States.

Thirty facilities are regulated under Colorado River Basin Water Board Order R7-2013-0800, *General NPDES Permit for Concentrated Animal Feeding Operations in the Colorado River Basin Region* (CAFO General Order) as of April 2021. The CAFO General Order applies to operations where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and where vegetation is not sustained in the confinement area during the normal growing season. The CAFO General Order, generally prohibits the direct and indirect discharge of waste to surface water or tributaries, establishes effluent limitations and discharge specifications for manure (nutrients)/litter/process wastewater pollutants, requires monitoring of effluent and solid wastes discharged, and contains provisions to fully contain wastes until they can be properly disposed of.

6. Summary

Regional Water Board staff reviewed available documents and data to characterize land and water uses in Imperial Valley. Imperial County is in the Colorado Desert region of the Sonoran Desert and is a part of the greater Salton Sea Transboundary watershed.

Land use data shows that after undeveloped desert and mountain areas, the largest use of land in Imperial county is for agriculture. About 17 percent of county lands are designated for irrigated agriculture use, totaling over 525,000 acres located mostly in the Imperial Valley (County of Imperial, 2015). In comparison, cities, communities, and support facilities occupy less than 1 percent of county land.

Staff identified four natural communities that support forty-one unique plant and one hundred and eleven unique animal species in the Imperial Valley and Salton Sea. Two plant and seventy-five animal species are identified as having a special protective status.

The Imperial Valley has been heavily agricultural since the mid-1920's. Today, about 450,000 acres of land in Imperial Valley are in agricultural production. Agricultural data shows approximately 74 different types of crops being grown on Imperial Valley lands. The major crops grown in the Imperial Valley, based on the amount of land in production, are alfalfa, wheat, sudangrass, lettuce, and sugarbeets.

The Imperial Valley is allotted an annual entitlement of 3.1 million acre-feet of Colorado River water. The water flows through the Imperial Dam through one of three desilting basins before being released into the All-American Canal which then supplies water to nine cities and agricultural fields in Imperial Valley. After its use, wastewater is discharged to the ground or to surface waters.

Sources of water in the Alamo River, Imperial Valley Drains, and New River include irrigated agricultural discharges, discharges from Mexico into the New River, and discharges from National Pollutant Discharge Elimination System (NPDES) permitted facilities. The source of water into Wiest Lake is the All-American Canal. The water in the Alamo River, Imperial Valley Drains, and New River can mostly be attributed to irrigated agricultural discharges. The water in the New River at the International Boundary can mostly be attributed to discharges from Mexico. Urban stormwater runoff into Imperial Valley waters is a relatively insignificant source of water due to the arid Imperial Valley climate, and the minor amount of developed land.

The Colorado River Basin Water Board or State Water Board issue permits to regulate nonpoint and point source discharges of waste into waters of the state. These regulatory control mechanisms include WDRs, Conditional Waivers of WDRs, or NPDES permits.

In Imperial Valley, the main nonpoint source discharges are from irrigated agricultural lands and are regulated by the Irrigated Lands General Order. The Irrigated Lands General Order requires enrolled dischargers to implement management practices, monitor water quality, and report to the Regional Water Board.

Point source discharges come from many sources and are regulated by individual or general NPDES permits or WDRs. Staff identified five municipalities and 119 facilities that discharge to the Imperial Valley waters (Table 6-4) as of April 2021. The stormwater discharges from the cities of Imperial, El Centro, Calexico, Brawley, and the County of Imperial are regulated by State Water Board Order 2013-0001-DWQ, the general permit for stormwater discharges from Small Municipal Separate Storm Sewer Systems (MS4), as Phase II collection systems. Of the 119 NPDES permitted facilities, the discharge from 16 of the NPDES facilities are regulated by individual permits adopted by the Colorado River Basin Water Board, discharges from the remaining 113 facilities are regulated by general NPDES permits or WDRs adopted by the Regional Water Board or the State Water Board. The number of NPDES permits adopted and active will change over time as new dischargers seek regulatory coverage and as existing permits are terminated or expire. The permits generally establish effluent and receiving water limitations, require the use of best management practices, monitoring, and annual reporting.

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ATTACHMENT B: CHLORPYRIFOS, DIAZINON AND MALATHION IN IMPERIAL VALLEY

1. Background

The Alamo River and New River are impaired by chlorpyrifos, diazinon, and malathion and the Imperial Valley Drains are impaired by chlorpyrifos. The concentrations of these pollutants in water violates Basin Plan toxicity and chemical constituent water quality objectives (WQOs) meant to support/protect the aquatic habitat designated beneficial uses of these waters.

Chlorpyrifos, diazinon, and malathion are current use man-made pesticides. They are classified as organophosphate (OP) pesticides and have been used to control pests in agricultural and urban settings. They work by damaging a critical enzyme in living organisms called acetylcholinesterase, which is essential for cell functions.

Chlorpyrifos was first registered for use by the USEPA in 1965, for residential, industrial and agricultural uses. In June 2000, the USEPA entered into an agreement with the technical registrants to eliminate virtually all homeowner uses except ant and roach baits in child resistant packaging, leaving only agricultural uses for chlorpyrifos (USEPA, 2006). Beginning in early 2020, California banned the sale of most chlorpyrifos pesticide formulations. Under an agreement reached with the makers of chlorpyrifos, sales of most chlorpyrifos pesticide formulations ended Feb. 6, 2020. As of December 31, 2020, the possession or use of the majority of chlorpyrifos products in California is banned, some granular formulations are still available for use. This ban was due to human health concerns.

Diazinon was first registered in 1956 for the control of soil insects and pests of fruit, vegetables, and forage & field crops (USEPA 2006b). Diazinon is also used on non-lactating cattle in an insecticidal ear tag. In 2000, the USEPA announced an agreement with the registrants of diazinon to cancel all residential uses of diazinon. Indoor uses were cancelled in 2002 and outdoor uses in 2004, leaving mainly agricultural uses for diazinon (USEPA, 2006b).

Malathion was first registered for use in the United States in 1956 to control a variety of outdoor insects in both agricultural and non-agricultural settings (ATSDR, 2003). Malathion is registered for use on food, feed, and ornamental crops and in mosquito, boll weevil and fruit fly eradication programs. There are currently no restrictions for the use of malathion in non-agricultural urban/ residential settings.

2. Analysis Of Uses

Chlorpyrifos, diazinon and malathion uses in Imperial County were analyzed using publicly available data on the California Department of Pesticide Regulation's (CDPR's)

California Pesticide Information Portal (CalPIP), a database for reporting pesticide usage by licensed pesticide applicators. The CDPR system is a comprehensive pesticide reporting system, and data in the CalPIP database system are valuable in identifying trends in pesticide use, changes in application patterns, and potential for environmental contamination. CalPIP was queried for chlorpyrifos, diazinon and malathion use in the years 2000 through 2017. Staff first looked at chlorpyrifos, diazinon and malathion use at the county level, followed by a closer look at their uses in the Imperial Valley.

3. Uses in the County

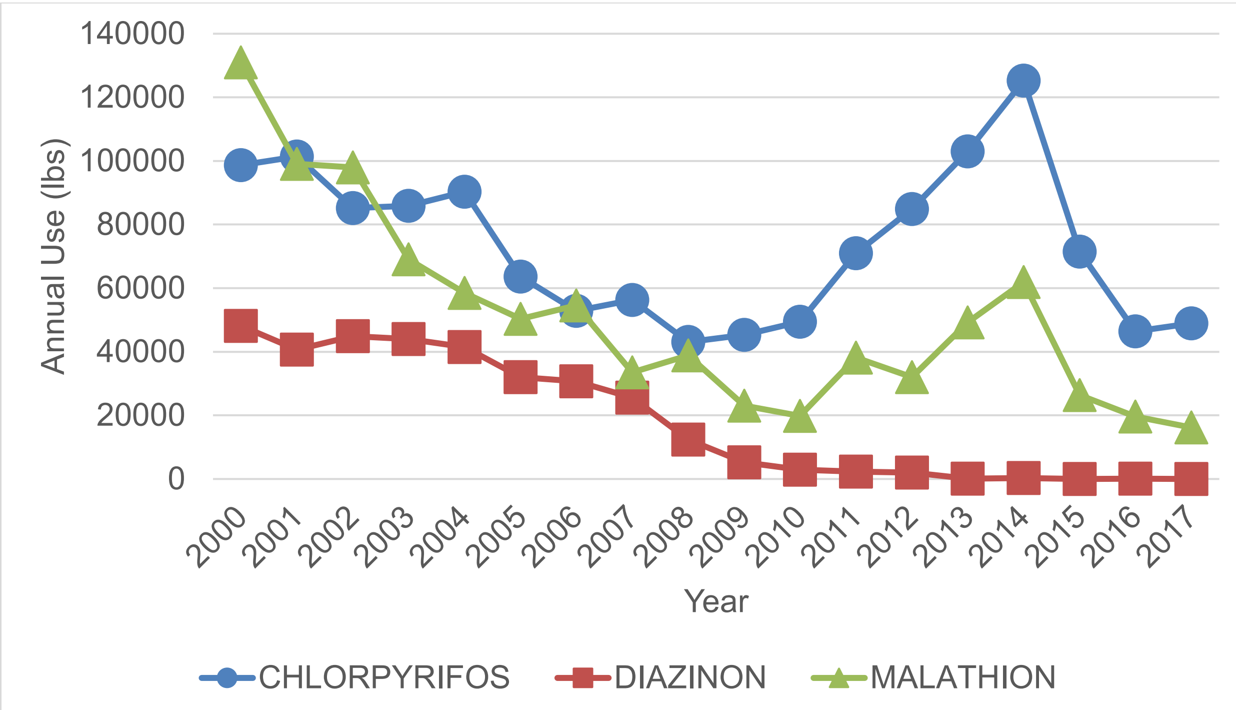
From 2000 through 2017, the total amount of chlorpyrifos, diazinon, and malathion applied in Imperial County averaged approximately 135,000 pounds annually, with a maximum of 277,500 pounds in 2000 and a minimum of 65,000 in 2017. Because the use of malathion in urban settings has not been restricted, PUR data do not account for non-licensed applications by residents and homeowners, so actual uses may be higher.

The pesticide use data shows that the uses of chlorpyrifos and malathion at the county level are following a similar pattern. From 2000 until about 2010, the use of these two pesticides was declining. There was a 56 percent decrease in the amount of chlorpyrifos being applied, and an 84 percent decrease in malathion being applied. After this period of decreasing use, the amounts used dramatically increased reaching peaks in 2014 of 125,000 pounds of chlorpyrifos and 62,000 pounds of malathion. After 2014, the uses decreased to 49,000 pounds of chlorpyrifos and 16,000 pounds of malathion in 2017.

The pesticide use data shows a different pattern for diazinon use when compared to chlorpyrifos and malathion. The use of diazinon has continually decreased throughout the 2000-2017 time period from a high of 48,000 pounds in 2000 to close to zero after 2015. Diazinon continues to be used, but the amounts used are minimal when compared to historical use.

Annual chlorpyrifos, diazinon, and malathion use data for Imperial County is shown in Figure B-1.

Figure B-1. Annual County-Wide Chlorpyrifos, Diazinon, and Malathion Use, 2000-2017



When comparing agricultural applications to non-agricultural ones, the pesticide use data shows that in the last 17 years agriculture has been the dominant user of chlorpyrifos, diazinon, and malathion. The amounts of these pesticides for agricultural use closely follows the total amounts applied throughout the county. Non-agricultural uses are relatively minor. As reported in CalPIP, chlorpyrifos was applied in relatively large amounts to fields cultivated for sugarbeet, alfalfa, corn, and broccoli crops. From 2000 until 2012, diazinon was applied in relatively large amounts to fields cultivated for sugarbeet, carrot, and lettuce crops. After 2012, the amounts of diazinon being applied to any agricultural fields decreased dramatically. Malathion was applied in relatively large amounts to fields cultivated for alfalfa, bermudagrass, and broccoli.

Chlorpyrifos, diazinon, and malathion use data showing agricultural and non-agricultural use patterns in Imperial County is shown in Figure B-2, Figure B-3 and Figure B-4.

Figure B-2. County-Wide Ag and Non-Ag Chlorpyrifos Use, 2000-2017

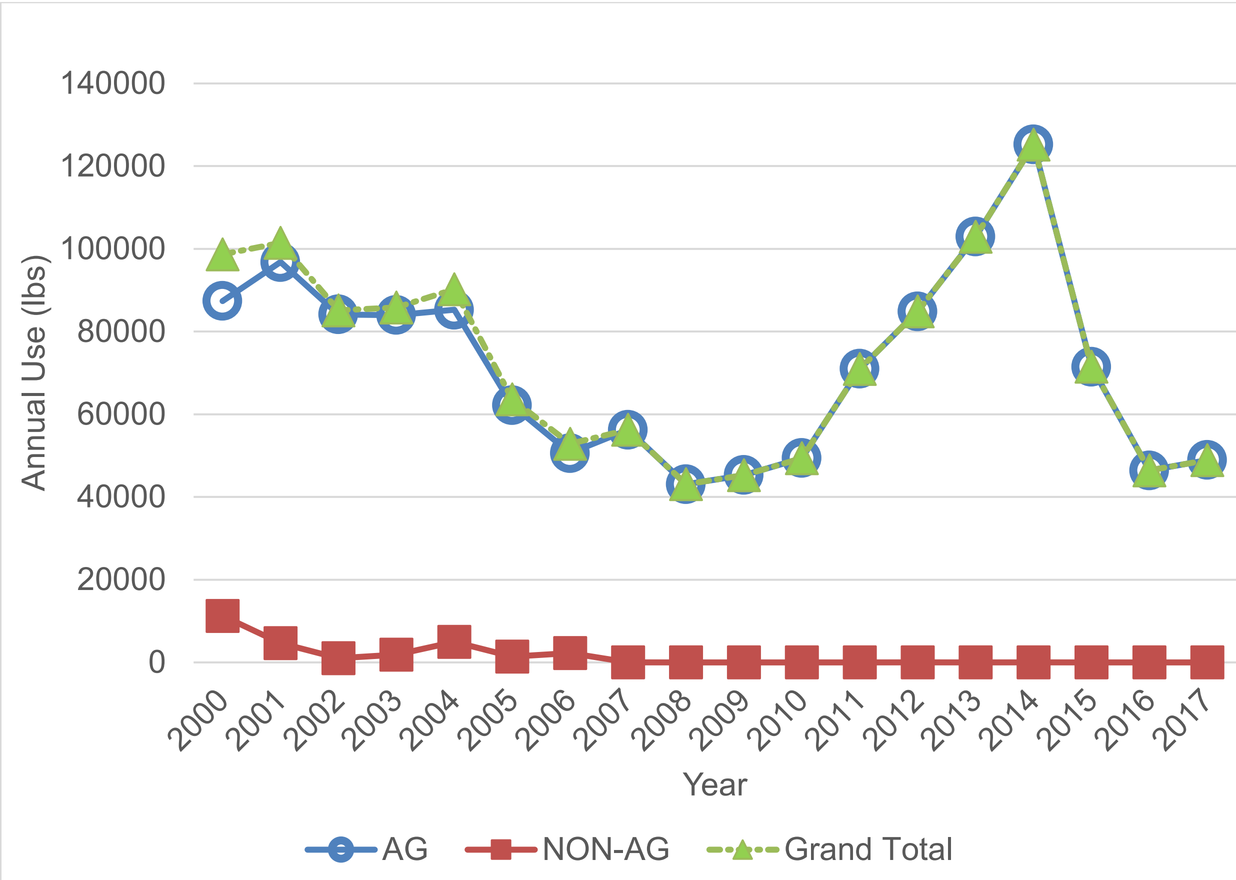


Figure B-3. County-Wide Ag and Non-Ag Diazinon Use, 2000-2017

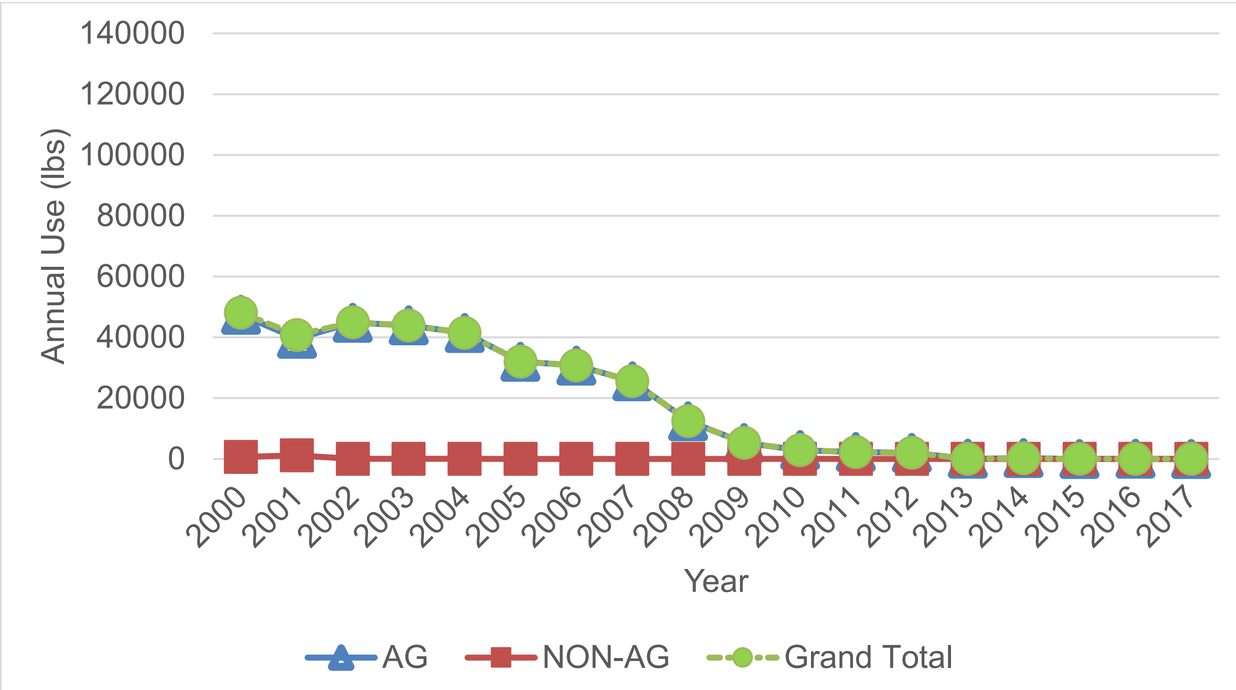
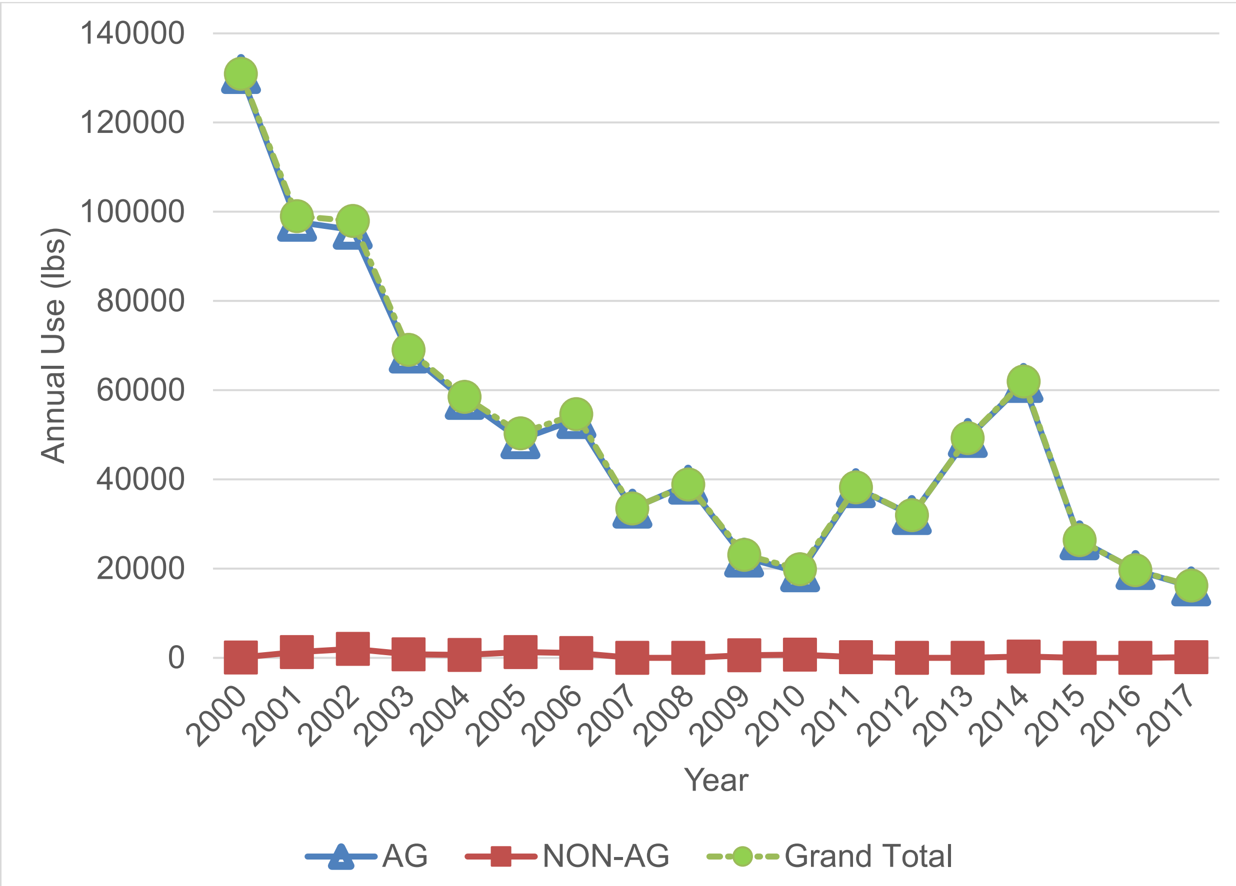


Figure B-4. County-Wide Ag and Non-Ag Malathion Use, 2000-2017



i. Uses in Imperial Valley

Staff examined chlorpyrifos, diazinon and malathion use at the township level to look at their uses in Imperial Valley. CalPIP was queried for the years 2000 through 2017, this time in an area in Imperial County bounded by Township 10 South through Township 17 South, and Range 9 East through Range 16 East, an area which encompasses the Imperial Valley. Non-agricultural uses do not appear in the Valley query because township range information is not collected in the non-agricultural use reports.

During the 2000-2017 time period, chlorpyrifos, diazinon and malathion uses in Imperial Valley is assumed to be primarily for agricultural purposes because of: (1) The county wide trend showing that these pesticides were primarily used for agricultural purposes, non-agricultural uses were minimal; (2) the uses of chlorpyrifos and diazinon in urban/residential pest control has been restricted; and (3) the amount of land used for irrigated agriculture is much greater than for urban uses.

The total amount of chlorpyrifos, diazinon, and malathion applied peaked at 260,000 pounds in the year 2000 and was lowest in 2017 at 65,000 pounds. The amounts of all three pesticides being applied on agricultural fields, while lower than in the early 2000s, is still significant.

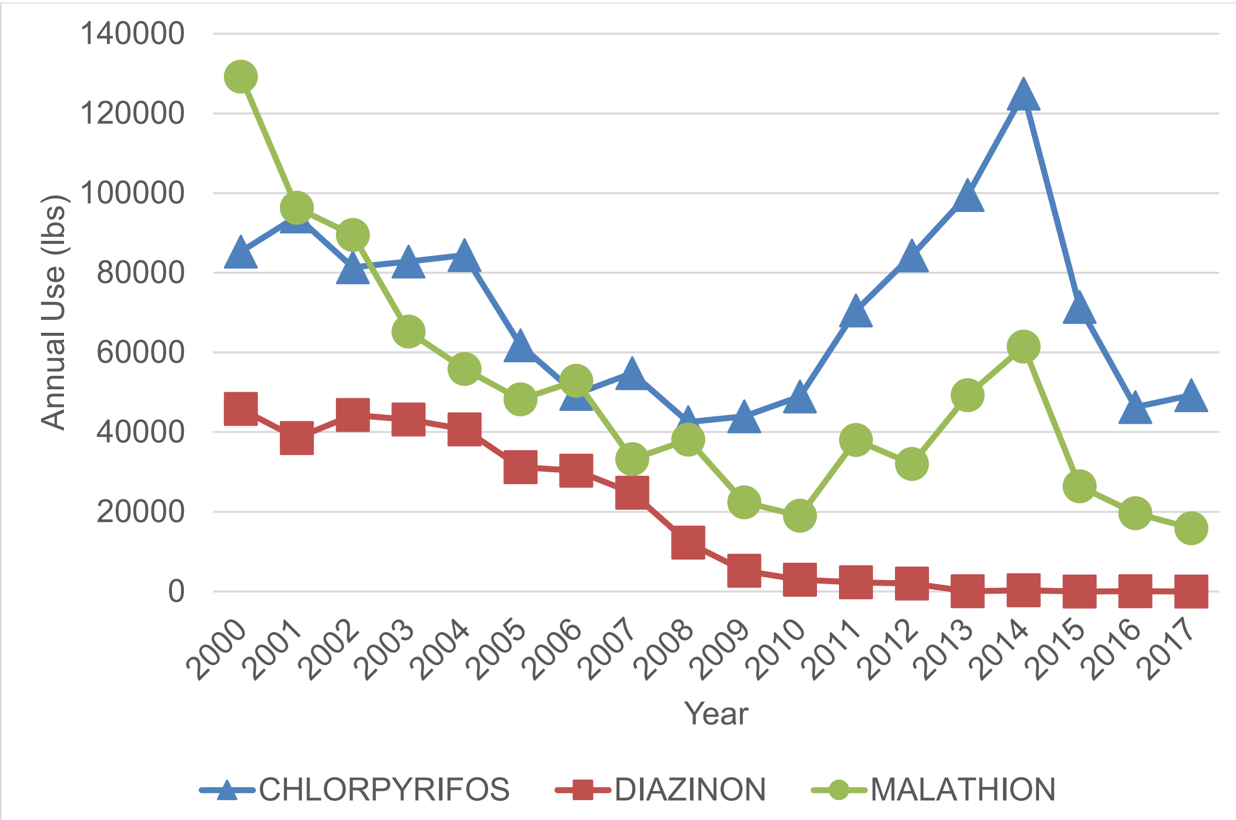
The pesticide use data shows that from 2000 until 2008 the uses of chlorpyrifos was declining, following the county-wide grand total and agricultural use trends. After 2008, the uses of chlorpyrifos increased, reaching a high of 125,000 pounds in 2014, and then fell to 46,000 pounds in 2015. It is expected to decrease to 0 pounds applied in 2021.

Since 2000, the uses of diazinon has decreased following the county-wide trend. Diazinon use was highest at approximately 46,000 pounds in 2000, decreasing to zero pounds of applied in 2015. Diazinon continued to be applied in 2016, but the amounts applied (76 pounds total) are relatively minor when compared to historical uses.

Malathion follows a similar pattern as chlorpyrifos. The increased use starts in 2010, reaching a high of 61,000 pounds in 2014, and falling off to 16,000 pounds in 2017.

Chlorpyrifos, diazinon and malathion use data for Imperial Valley is shown in Figure B-5.

Figure B-5. Chlorpyrifos, Diazinon, and Malathion Use in Imperial Valley, 2000-2017



4. Analysis of Environmental Data

Staff examined the presence of chlorpyrifos, diazinon, and malathion in the Alamo River, Imperial Valley Drains, and New River to attempt to isolate potential sources and to analyze temporal and spatial trends.

Staff assessed water, sediment and fish tissue data from the following sources;

- California's Surface Water Ambient Monitoring Program (SWAMP),
- California's Toxic Substances Monitoring Program (TSMP),
- United States Geological Survey (USGS) monitoring, and
- Imperial Irrigation District (IID) Drain Water Quality Improvement Program monitoring.

Data is summarized as follows. All data are discussed in a narrative form before the data is presented in tables. Sample results with reportable concentrations (above the

Reporting Limit (RL)) of OP pesticides are shown in the data tables following the narrative discussion. Sample results that report detectable concentrations but are below method RLs, commonly reported as Detect Non-Quantifiable (DNQ), are shown in the tables along with a DNQ beside the reported results. Sample results that report non-detectable concentrations, commonly reported as Non-Detect (ND), are omitted from the tables.

Sample results were compared to numeric screening values to make decisions about the status of the OP pesticides in the waters in meeting the WQOs. Sample results that exceed the applied numeric screening value are in bold font and noted with an asterisk (*).

Analytical limits are discussed as a matter of assessing the quality of the data, and the ability to determine if the waters are meeting the WQOs. Ideally the RL should be at or below the applied numeric screening value to conclusively determine if the WQO is being met. This becomes important when significant amounts of sample results are reported as either DNQ or ND.

Map images showing the sampling locations are provided at the end of this report for reference.

It should be noted that Colorado River Basin Water Board NPDES permitted facilities do not normally collect/analyze samples for chlorpyrifos, diazinon, or malathion in their monitoring programs. Currently, it is unknown what their contribution, if any, to the impairment is.

a. Chlorpyrifos

i. Water

SWAMP Data

Chlorpyrifos has been found in SWAMP water samples collected from the Alamo River, Imperial Valley Drains, and New River. Water samples were collected from 52 sampling locations on the Alamo River, Imperial Valley Drains, and New River waterways. Out of 168 sample results reported between 2002 and 2015, 34 sample results were above the RLs. Fourteen were DNQ. The rest of the sample results (120) were ND. Chlorpyrifos was detected in Spring and Fall samples. No samples were collected in the Summer or Winter seasons. Thirty-four sample results exceeded the applied CDFG numeric screening value of 0.015 µg/L (Siepmann and Finlayson, 2000).

The RLs vary from 0.02 to 0.5 µg/L. The MDLs vary from 0.0042 to 0.17 µg/L. The reported RLs may be inadequate to determine if Imperial Valley waterways are meeting the CDFG screening value in water. In future analysis, RLs should consistently be at or below the screening value to conclusively determine if the Alamo River, Imperial Valley Drains, and New River are meeting the WQO.

The water data shown in Table B-1 reports the SWAMP sample results. Sample results that exceed the applied screening value are in bold font and also noted with an asterisk (*). The applied numeric screening value is the CDFG toxicity value of 0.015 µg/L.

Table B-1. SWAMP Data: Concentrations of Chlorpyrifos Concentrations in Water Samples from Alamo River, Imperial Valley Drains and New River (µg/L).

Date	Waterbody	Sampling Location	Result
4/03/2012	Alamo River	Drop 10-723ARDP10	0.026 (DNQ)
5/08/2012	Alamo River	Drop 10-723ARDP10	*[34]0.043
10/17/2012	Alamo River	Drop 10-723ARDP10	*0.294
4/11/2003	Alamo River	Drop 6 A-723ARDP6A	*0.0237
10/06/2010	Alamo River	Drop 6 A-723ARDP6A	*0.053
4/09/2003	Alamo River	Drop 6-723ARDP06	*0.0192
4/10/2003	Alamo River	Harris Road near Imperial-723ARHRSR	*0.0188
4/09/2003	Alamo River	Sinclair Road near Calipatria-723ARSNRR	*0.025

[34] Sample result exceeds the applied CDFG numeric screening value of 0.015 µg/L.

Date	Waterbody	Sampling Location	Result
10/02/2002	Alamo River	Salton Sea Outlet-723ARGRB1	*0.051
4/08/2003	Alamo River	Salton Sea Outlet-723ARGRB1	*0.0255
11/04/2003	Alamo River	Salton Sea Outlet-723ARGRB1	*0.054
10/05/2004	Alamo River	Salton Sea Outlet-723ARGRB1	*0.1623
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1	*0.0992
10/28/2008	Alamo River	Salton Sea Outlet-723ARGRB1	*0.0580
10/19/2009	Alamo River	Salton Sea Outlet-723ARGRB1	*0.2660
10/06/2010	Alamo River	Salton Sea Outlet-723ARGRB1	*0.12
4/03/2012	Alamo River	Salton Sea Outlet-723ARGRB1	0.027 (DNQ)
5/07/2012	Alamo River	Salton Sea Outlet-723ARGRB1	*0.058
10/15/2012	Alamo River	Salton Sea Outlet-723ARGRB1	*0.049
10/21/2013	Alamo River	Salton Sea Outlet-723ARGRB1	*0.135
5/7/2012	Imperial Valley Drains	C Drain-723ARCDRN	*0.043
10/15/2012	Imperial Valley Drains	C Drain-723ARCDRN	*0.106

Date	Waterbody	Sampling Location	Result
5/8/2012	Imperial Valley Drains	Central Drain-723CNTDRN	*0.055
10/21/2015	Imperial Valley Drains	E Drain-723EDRAIN	0.032 (DNQ)
5/8/2012	Imperial Valley Drains	Holtville Drain-723HLVLDR	*0.045
10/16/2012	Imperial Valley Drains	Holtville Drain-723HLVLDR	*0.119
5/7/2012	Imperial Valley Drains	I Drain-723ARIDRN	0.032 (DNQ)
5/8/2012	Imperial Valley Drains	Magnolia Drain-723MAGDRN	*0.162
10/21/2015	Imperial Valley Drains	Marigold Drain-723MARIGD	*0.42
10/16/2012	Imperial Valley Drains	Munyon Drain-723MUNDRN	0.034 (DNQ)
5/8/2012	Imperial Valley Drains	Nettle Drain-723NETDRN	*0.047
5/8/2012	Imperial Valley Drains	Peach Drain-723PEACHD	0.039 (DNQ)
5/8/2012	Imperial Valley Drains	Rose Drain-723ROSDRN	0.03 (DNQ)
10/16/2012	Imperial Valley Drains	Rose Drain-723ROSDRN	*0.108
5/8/2012	Imperial Valley Drains	South Central Drain-723SCNTDR	*0.04

Date	Waterbody	Sampling Location	Result
10/17/2012	Imperial Valley Drains	South Central Drain-723SCNTDR	*0.598
5/8/2012	Imperial Valley Drains	Spruce Drain-723SPRDRN	0.035 (DNQ)
10/19/2015	Imperial Valley Drains	Vail Seven Drain-723VAIL7D	0.03 (DNQ)
4/15/2003	New River	Evan Hewes Highway near Seeley-723NREVHU	0.0148
10/22/2013	New River	Evan Hewes Highway near Seeley-723NREVHU	*0.066
11/04/2003	New River	Salton Sea Outlet-723NROTWM	0.042 (DNQ)
10/05/2004	New River	Salton Sea Outlet-723NROTWM	*0.056
10/26/2005	New River	Salton Sea Outlet-723NROTWM	*0.0528
5/01/2006	New River	Salton Sea Outlet-723NROTWM	0.020 (DNQ)
10/19/2009	New River	Salton Sea Outlet-723NROTWM	0.025 (DNQ)
4/03/2012	New River	Salton Sea Outlet-723NROTWM	0.018 (DNQ)
5/07/2012	New River	Salton Sea Outlet-723NROTWM	0.033 (DNQ)

Date	Waterbody	Sampling Location	Result
10/16/2012	New River	Salton Sea Outlet-723NROTWM	*0.051

USGS Data

Chlorpyrifos has been found in USGS water samples collected from the Alamo River and New River. Water samples were collected from 8 sampling locations on the Alamo River and New River waterways. Out of 24 sample results reported between 2006 and 2007 (Orlando et al., 2008), 20 sample results were above the MDLs. The rest of the sample results (4) were ND. Chlorpyrifos was detected in Spring and Fall samples. No samples were collected in the Summer or Winter seasons. Fourteen sample results exceeded the applied CDFG numeric screening value of 0.015 µg/L.

The MDL is 0.0021 µg/L, no RL is reported. The MDL is adequate to conclusively determine if the Alamo River and New River are meeting the WQO.

The water data shown in Table B-2 reports the USGS sample results. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the DFG toxicity value of 0.015 µg/L.

Table B-2. USGS Data: Concentrations of Chlorpyrifos in Water Samples from Alamo River and New River (µg/L).

Date	Waterbody	Sampling Location	Result
10//17/2006	Alamo River	Harris Road near Imperial-325259115270801	*0.0584
3/16/2007	Alamo River	Harris Road near Imperial-325259115270801	*0.0443
10/16/2006	Alamo River	Near Calipatria- 330402115303501	*0.123
3/14/2007	Alamo River	Near Calipatria- 330402115303501	*0.0547
9/12/2006	Alamo River	Near Niland- 10254730	0.0026
10/14/2006	Alamo River	Near Niland- 10254730	*0.0518

Date	Waterbody	Sampling Location	Result
10/18/2006	Alamo River	Near Niland- 10254730	*0.0344
2/13/2007	Alamo River	Near Niland- 10254730	*0.120
3/12/2007	Alamo River	Near Niland- 10254730	*0.0432
4/17/2007	Alamo River	Near Niland- 10254730	0.006
10/16/2006	New River	Highway 80- 324728115420101	*0.0654
10/15/2006	New River	Below Drop 4 near Brawley- 325951115323501	*0.026
3/14/2007	New River	Below Drop 4 near Brawley- 325951115323501	*0.0152
9/13/2006	New River	Lack Rd near Calipatria- 330559115385601	0.0075
10/14/2006	New River	Lack Rd near Calipatria- 330559115385601	*0.0216
11/14/2006	New River	Lack Rd near Calipatria- 330559115385601	0.0106
2/14/2007	New River	Lack Rd near Calipatria- 330559115385601	*0.0682
3/13/2007	New River	Lack Rd near Calipatria- 330559115385601	*0.0304
4/18/2007	New River	Lack Rd near Calipatria- 330559115385601	0.0056

IID Data

Chlorpyrifos has been found in IID water samples collected from the Alamo River and New River. Water samples were collected from 4 sampling locations on the Alamo River and New River waterways. Out of 12 sample results reported between 2016 and 2018, 9 sample results were above the RLs. The rest of the sample results (3) were ND. Chlorpyrifos was detected in Fall samples. No samples were collected in the Spring, Summer, or Winter seasons. Five sample results exceeded the applied CDFG numeric screening value of 0.015 µg/L.

The MDL is 0.001 µg/L, the RL is 0.002 µg/L. The RLs are adequate to conclusively determine if the Alamo River and New River are meeting the WQO.

The water data shown in Table B-3 reports the IID sample results. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*).The applied numeric screening value is the CDFG toxicity value of 0.015 µg/L.

Table B-3. IID Data: Chlorpyrifos Concentrations in Water Samples from Alamo River and New River (µg/L).

Date	Waterbody	Sampling Location	Result
11/16/2016	Alamo River	Drop 10- ARD10	*0.018
11/28/2017	Alamo River	Drop 10- ARD10	*0.02
11/14/2018	Alamo River	Drop 10- ARD10	0.011
11/28/2017	Alamo River	Salton Sea Outlet- ARO	*0.06
11/14/2018	Alamo River	Salton Sea Outlet- ARO	0.013
11/28/2017	New River	Evan Hewes Highway near Seeley-NREH	0.007
11/16/2016	New River	Salton Sea Outlet- NRO	*0.02
11/28/2017	New River	Salton Sea Outlet- NRO	*0.027
11/14/2018	New River	Salton Sea Outlet- NRO	0.011

ii. Sediment

SWAMP Data

Chlorpyrifos has been found in SWAMP sediment samples collected from the Alamo River, Imperial Valley Drains, and New River. Sediment samples were collected from 13 sampling locations on the Alamo River, Imperial Valley Drains, and New River waterways. Out of 29 sample results reported between 2002 and 2015, 9 sample results were above the RLs, 2 were DNQ. The rest of the sample results (18) were ND. Chlorpyrifos was detected in Spring and Fall samples. No samples were collected in the

Summer or Winter seasons. No sample results exceeded the organic carbon normalized LC50 numeric screening value of 1.77 µg/g (Amweg and Weston, 2007).

The RL varies from 0.00662 to 0.016 µg/g. The MDL varies from 0.0015 to 0.00802 µg/g. The RLs are adequate to conclusively determine if Alamo River, Imperial Valley Drains, and New River sediments are meeting the WQO. In the future, the Total Organic Carbon of sediment samples as a percentage of the sediment dry weight should be analyzed along with chlorpyrifos to calculate o.c. normalized concentrations.

The sediment data shown in Table B-4 reports the SWAMP sample results. The applied numeric screening value is the o.c. normalized LC50 numeric screening value of 1.77 µg/g.

Table B-4. SWAMP Data: Chlorpyrifos Concentrations in Sediment Samples collected from Alamo River and New River (µg/g).

Date	Waterbody	Sampling Location	Result
4/11/2003	Alamo River	Drop 10-723ARDP10	0.0015
4/11/2003	Alamo River	Drop 6 A-723ARDP6A	0.0056
4/09/2003	Alamo River	Drop 6-723ARDP06	0.007
4/09/2003	Alamo River	Sinclair Road near Calipatria-723ARSNRR	0.0023
4/08/2003	Alamo River	Salton Sea Outlet-723ARGRB1	0.009
10/11/2011	Alamo River	Salton Sea Outlet-723ARGRB1	0.00522 (DNQ)

Date	Waterbody	Sampling Location	Result
10/21/2013	Alamo River	Salton Sea Outlet-723ARGRB1	0.0123 [0.135][35]
4/16/2003	New River	International Boundary-723NRBDRY	0.0557
10/28/2008	New River	Salton Sea Outlet-723NROTWM	0.014 [1.49]
10/22/2013	New River	Salton Sea Outlet-723NROTWM	0.0136 [0.654]
10/19/2015	New River	Salton Sea Outlet-723NROTWM	0.00611 (DNQ)

iii. Fish Tissue

TSMP and SWAMP Data

Chlorpyrifos has been found in TSMP and SWAMP fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River. Fish tissue samples were collected from 24 locations on the Alamo River, Imperial Valley Drains, and New River. Out of 145 sample results reported between1978 and 2004, 79 sample results were above the RLs, and 66 were ND. One sample result was above the OEHHA numeric screening value of 660 ng/g (Klasing and Brodberg, 2008).

The RLs vary between 0.985 and 1 ng/g. The MDLs vary between 0.412 and 125 ng/g. The RLs are adequate to conclusively determine if Alamo River, Imperial Valley Drains, and New River fish tissue are meeting the WQO.

The fish tissue data shown in Table B-5 reports the TSMP and SWAMP sample results. The sample result that exceeded the applied screening value is in bold font and noted with an asterisk (*). The applied numeric screening value is the OEHHA Fish Contaminant Goal (FCG) of 660 ng/g.

[35] Values inside of brackets are o.c. normalized values.

Table B-5. SWAMP-TSMP Combined Data: Chlorpyrifos Concentrations in Fish Tissue Samples from Alamo River, Imperial Valley Drains and New River (ng/g).

Date	Waterbody	Sampling Location	Result
9/2/1987	Alamo River	International Boundary-723ST0025	33
11/20/1988	Alamo River	International Boundary-723ST0025	33
11/2/2004	Alamo River	Drop 6A Holtville Drain-723ARDP6A	0.513
11/9/2004	Alamo River	Brawley- 723ARBRAW	2.27
11/9/2004	Alamo River	Brawley- 723ARBRAW	1.75
11/9/2004	Alamo River	Brawley- 723ARBRAW	4.86
5/8/1980	Alamo River	Calipatria- 723ST0023	18
5/23/1981	Alamo River	Calipatria- 723ST0023	12
4/22/1982	Alamo River	Calipatria- 723ST0023	10
6/13/1983	Alamo River	Calipatria- 723ST0023	130
6/13/1983	Alamo River	Calipatria- 723ST0023	36
5/23/1984	Alamo River	Calipatria- 723ST0023	65
5/23/1984	Alamo River	Calipatria- 723ST0023	42
9/17/1985	Alamo River	Calipatria- 723ST0023	24
9/17/1985	Alamo River	Calipatria- 723ST0023	52
9/30/1987	Alamo River	Calipatria- 723ST0023	420
11/18/1988	Alamo River	Calipatria- 723ST0023	38
10/28/1989	Alamo River	Calipatria- 723ST0023	380

Date	Waterbody	Sampling Location	Result
8/3/1990	Alamo River	Calipatria- 723ST0023	30
9/29/1993	Alamo River	Calipatria- 723ST0023	230
10/27/1994	Alamo River	Calipatria- 723ST0023	27
10/27/1994	Alamo River	Calipatria- 723ST0023	180
11/1/1996	Alamo River	Calipatria- 723ST0023	66
11/20/1997	Alamo River	Calipatria- 723ST0023	73
11/11/1998	Alamo River	Calipatria- 723ST0023	194
11/7/2000	Alamo River	Calipatria- 723ST0023	25.4
10/24/2002	Alamo River	Calipatria- 723ST0023	201
11/7/2004	Alamo River	Salton Sea Outlet- 723ARGRB1	25.6
11/7/2004	Alamo River	Salton Sea Outlet- 723ARGRB1	12.3
12/5/1999	Imperial Valley Drains	Central Drain- 723ST0252	177
11/8/2000	Imperial Valley Drains	Central Drain- 723ST0252	8
11/21/2001	Imperial Valley Drains	Central Drain- 723ST0252	2
10/22/2002	Imperial Valley Drains	Central Drain- 723ST0252	33.2
10/29/1989	Imperial Valley Drains	Fig Drain- 723ST0494	36
10/29/1989	Imperial Valley Drains	Fig Drain- 723ST0494	34
8/29/1990	Imperial Valley Drains	Fig Drain- 723ST0494	93

Date	Waterbody	Sampling Location	Result
11/20/2001	Imperial Valley Drains	Fig Drain- 723ST0494	213
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	3.32
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	18
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	23.2
11/7/2000	Imperial Valley Drains	Greeson Drain- 723ST0532	4.2
11/20/2001	Imperial Valley Drains	Greeson Drain- 723ST0532	5.4
10/28/1989	Imperial Valley Drains	Holtville Main Drain- 723ST0565	210
8/30/1990	Imperial Valley Drains	Holtville Main Drain- 723ST0565	19
10/23/2002	Imperial Valley Drains	Holtville Main Drain- 723ST0565	22.2
8/16/1991	Imperial Valley Drains	Mayflower Drain- 723ST0881	53
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	310
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	39
10/10/1985	Imperial Valley Drains	Rice Drain 3- 723ST1252	*1200
10/15/1986	Imperial Valley Drains	Rice Drain 3- 723ST1252	290

Date	Waterbody	Sampling Location	Result
11/21/2001	Imperial Valley Drains	Rice Drain- 723ST1251	2.9
10/20/2002	Imperial Valley Drains	Rice Drain- 723ST1251	1.2
10/20/2002	Imperial Valley Drains	Rice Drain- 723ST1251	1.3
11/17/1988	Imperial Valley Drains	Rose Drain- 723ST1269	87
12/5/1999	Imperial Valley Drains	South Central Drain- 723ST1699	44
10/26/1989	Imperial Valley Drains	Warren Drain- 723ST1864	54
9/9/1990	Imperial Valley Drains	Warren Drain- 723ST1864	62
10/1/1985	New River	International Boundary- 723ST1031	14
7/20/1989	New River	International Boundary- 723ST1031	12
7/31/1990	New River	International Boundary- 723ST1031	59
12/18/1991	New River	International Boundary- 723ST1031	16
11/2/1994	New River	International Boundary- 723ST1031	130
4/22/1982	New River	Westmorland- 723ST1032	10
4/22/1982	New River	Westmorland- 723ST1032	10
6/13/1983	New River	Westmorland- 723ST1032	19

Date	Waterbody	Sampling Location	Result
10/9/1985	New River	Westmorland- 723ST1032	34
10/10/1985	New River	Westmorland- 723ST1032	140
9/3/1987	New River	Westmorland- 723ST1032	110
11/18/1988	New River	Westmorland- 723ST1032	57
8/3/1990	New River	Westmorland- 723ST1032	100
8/15/1991	New River	Westmorland- 723ST1032	27
9/20/1992	New River	Westmorland- 723ST1032	28
10/27/1995	New River	Westmorland- 723ST1032	78
11/20/1997	New River	Westmorland- 723ST1032	63
11/11/1998	New River	Westmorland- 723ST1032	12.5
12/9/1999	New River	Westmorland- 723ST1032	44.1
11/21/2001	New River	Westmorland- 723ST1032	121
10/24/2002	New River	Westmorland- 723ST1032	80.9
11/5/2004	New River	Salton Sea Outlet- 723NROTWM	6.21

b. Diazinon

i. Water

SWAMP Data

Diazinon has been found in SWAMP water samples collected from the Alamo River and New River. Water samples were collected from 10 sampling locations on the Alamo River and New River waterways. Out of 108 sample results reported between 2002 and 2013, 40 sample results were above the RLs, 7 were DNQ, and 61 were ND. Diazinon was detected in Spring and Fall samples. No samples were collected in the Summer or Winter seasons. Sixteen water samples exceeded the applied CDFG numeric screening value of 0.1 µg/L (Finlayson, 2004, Siepmann and Finlayson, 2000).

The RL varies from 0.02 to 0.5 µg/L. The MDL varies from 0.0036 to 0.1 µg/L. The RLs are adequate to conclusively determine if the Alamo River and New River are meeting the WQO. Greater than 90 percent of the RLs are below the CDFG numeric screening value. As a result, the majority of data with sample results reported as ND or DNQ can be considered in a water quality assessment.

The water data shown in Table B-6 reports the SWAMP sample results. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the CDFG toxicity value of 0.1 µg/L.

Table B-6. SWAMP Data: Diazinon Concentrations in Water Samples from Alamo River and New River (µg/L).

Date	Waterbody	Sampling Location	Result
5/08/2002	Alamo River	International Boundary-723ARINTL	0.013 (DNQ)
4/09/2003	Alamo River	International Boundary-723ARINTL	0.034
10/04/2004	Alamo River	International Boundary-723ARINTL	0.011 (DNQ)
5/01/2006	Alamo River	International Boundary-723ARINTL	0.026
10/23/2007	Alamo River	International Boundary-723ARINTL	*0.292
10/17/2012	Alamo River	Drop 10-723ARDP10	0.069
4/09/2003	Alamo River	Drop 6-723ARDP06	0.0054

Date	Waterbody	Sampling Location	Result
4/09/2003	Alamo River	Sinclair Road near Calipatria-723ARSNRR	0.0048
5/06/2002	Alamo River	Salton Sea Outlet-723ARGRB1	0.013 (DNQ)
10/02/2002	Alamo River	Salton Sea Outlet-723ARGRB1	*0.475
11/04/2003	Alamo River	Salton Sea Outlet-723ARGRB1	*0.109
10/05/2004	Alamo River	Salton Sea Outlet-723ARGRB1	*1.601
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1	*0.994
5/01/2006	Alamo River	Salton Sea Outlet-723ARGRB1	0.028
10/23/2007	Alamo River	Salton Sea Outlet-723ARGRB1	0.032
10/28/2008	Alamo River	Salton Sea Outlet-723ARGRB1	*0.230
10/19/2009	Alamo River	Salton Sea Outlet-723ARGRB1	*0.362
10/15/2012	Alamo River	Salton Sea Outlet-723ARGRB1	0.018 (DNQ)
5/08/2002	New River	International Boundary-723NRBDRY	0.049
10/01/2002	New River	International Boundary-723NRBDRY	0.055

Date	Waterbody	Sampling Location	Result
4/09/2003	New River	International Boundary-723NRBDRY	0.069
4/16/2003	New River	International Boundary-723NRBDRY	0.0741
5/03/2004	New River	International Boundary-723NRBDRY	0.033
10/04/2004	New River	International Boundary-723NRBDRY	*0.246
5/09/2005	New River	International Boundary-723NRBDRY	0.052
5/01/2006	New River	International Boundary-723NRBDRY	0.047
5/07/2007	New River	International Boundary-723NRBDRY	0.026
10/23/2007	New River	International Boundary-723NRBDRY	0.019 (DNQ)
10/23/2007	New River	International Boundary-723NRBDRY	*0.174
10/28/2008	New River	International Boundary-723NRBDRY	0.034

Date	Waterbody	Sampling Location	Result
4/15/2003	New River	Evan Hewes Highway near Seeley-723NREVHU	0.0305
10/06/2010	New River	Evan Hewes Highway near Seeley-723NREVHU	0.039
5/06/2002	New River	Salton Sea Outlet-723NROTWM	0.042
10/02/2002	New River	Salton Sea Outlet-723NROTWM	*0.12
4/14/2003	New River	Salton Sea Outlet-723NROTWM	0.0215
4/15/2003	New River	Salton Sea Outlet-723NROTWM	0.02
11/04/2003	New River	Salton Sea Outlet-723NROTWM	*0.171
10/05/2004	New River	Salton Sea Outlet-723NROTWM	*0.106
5/10/2005	New River	Salton Sea Outlet-723NROTWM	0.030
10/26/2005	New River	Salton Sea Outlet-723NROTWM	*2.49
5/01/2006	New River	Salton Sea Outlet-723NROTWM	0.034
5/07/2007	New River	Salton Sea Outlet-723NROTWM	0.009 (DNQ)

Date	Waterbody	Sampling Location	Result
10/22/2007	New River	Salton Sea Outlet-723NROTWM	*0.242
4/21/2008	New River	Salton Sea Outlet-723NROTWM	0.014 (DNQ)
10/28/2008	New River	Salton Sea Outlet-723NROTWM	*0.150
10/19/2009	New River	Salton Sea Outlet-723NROTWM	*0.100
10/06/2010	New River	Salton Sea Outlet-723NROTWM	0.048

USGS Data

Diazinon has been found in USGS water samples collected from the Alamo River and New River (Orlando et al., 2008). Water samples were collected from eight sampling locations on the Alamo River and New River waterways. Out of 24 sample results reported between 2006 and 2007, 12 sample results were above the MDL, and the rest of the sample results (12) were ND. Diazinon was detected in Spring and Fall samples. No samples were collected in the Summer or Winter seasons. Eight water samples exceeded the applied CDFG numeric screening value of 0.1 µg/L (Finlayson, 2004, Siepmann and Finlayson, 2000).

The MDL is 0.0009 µg/L, no RL is reported. The MDL is adequate to conclusively determine if the Alamo River and New River are meeting the WQO.

The water data shown in Table B-7 reports the USGS sample results. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the CDFG toxicity value of 0.1 µg/L.

Table B-7. USGS Data: Diazinon Concentrations in Water Samples from Alamo River and New River (µg/L).

Date	Waterbody	Sampling Location	Result
10/17/2006	Alamo River	Harris Road near Imperial-325259115270801	*0.485
10/16/2006	Alamo River	Near Calipatria-330402115303501	*3.240
9/12/2006	Alamo River	Near Niland-10254730	0.0124
10/14/2006	Alamo River	Near Niland-10254730	*0.713
11/13/2006	Alamo River	Near Niland-10254730	*0.240
2/13/2007	Alamo River	Near Niland-10254730	0.0202
10/19/2006	New River	International Boundary at Calexico-10254970	*0.249
10/16/2006	New River	Highway 80-324728115420101	*0.206
10/15/2006	New River	Below Drop 4 near Brawley-325951115323501	*0.260
9/13/2006	New River	Lack Rd near Calipatria-330559115385601	0.0155
10/14/2006	New River	Lack Rd near Calipatria-330559115385601	*0.333

Date	Waterbody	Sampling Location	Result
11/14/2006	New River	Lack Rd near Calipatria-330559115385601	0.0648

IID Data

Diazinon was found in an IID water sample collected from the New River waterway. Samples were collected from 4 sampling locations on the Alamo River and New River waterways. Out of the 12 sample results reported between 2016 and 2018, one was DNQ and the rest of the sample results (11) were ND. No samples were collected in Spring, Summer, or Winter seasons. This one positive result did not exceed the applied CDFG numeric screening value of 0.1 µg/L (Finlayson, 2004, Siepmann and Finlayson, 2000).

The MDL is 0.001 µg/L, the RL 0.002 µg/L. The RL is adequate to conclusively determine if the Alamo River and New River are meeting the WQO.

The water data shown in Table B-8 reports the IID sample result. The applied numeric screening value is the CDFG toxicity value of 0.1 µg/L.

Table B-8. IID Data: Diazinon Concentration in Water Sample from New River (µg/L).

Date	Waterbody	Sampling Location	Result
11/14/2018	New River	Evan Hewes Highway near Seeley- NREH	(DNQ)

ii. Sediment

SWAMP Data

Diazinon has not been found in SWAMP sediment samples collected from 10 sampling locations on the Alamo River and New River waterways. All 24 sample results reported between 2003 and 2015 were ND. No sample results were above the organic carbon normalized LC50 numeric screening value of 11 µg/g (Ding et al., 2011).

The RL varies from 0.00662 to 0.016 µg/g. The MDL varies from 0.0015 to 0.00802 µg/g. The RL is adequate to conclusively determine if the sediment of the Alamo River and New River are meeting the WQO.

iii. Fish Tissue

TSMP and SWAMP Data

Diazinon has been found in TSMP and SWAMP fish tissue samples collected from the Alamo River and New River. Fish tissue samples were collected from 9 locations on Imperial Valley waterways. Out of 92 sample results reported between1978 and 2004, 5 sample results were above the RLs, 1 was DNQ, and 86 were ND. No sample results were above the OEHHA numeric screening value of 1500 ng/g (Klasing and Brodberg, 2008).

The MDL varies from 20 to 125 ng/g, no RLs are reported. The MDL is adequate to conclusively determine if the fish in the Alamo River and New River are meeting the WQO.

The fish tissue data shown in Table B-9 reports the TSMP and SWAMP sample results. The applied numeric screening value is the OEHHA FCG of 1500 ng/g.

Table B-9. SWAMP-TSMP Combined Data: Diazinon Concentrations in Fish Tissue Samples from Alamo River and New River (ng/g).

Date	Waterbody	Sampling Location	Result
11/9/2004	Alamo River	Brawley- 723ARBRAW	5.01(DNQ)
9/29/1993	Alamo River	Calipatria- 723ST0023	0.042
7/31/1990	New River	International Boundary- 723ST1031	0.097
12/18/1991	New River	International Boundary- 723ST1031	0.095
6/16/1993	New River	International Boundary- 723ST1031	0.070
11/2/1994	New River	International Boundary- 723ST1031	0.140

c. Malathion

i. Water

SWAMP Data

Malathion has been found in SWAMP water samples collected from the Alamo and New River. Water samples were collected from 12 sampling locations on the Alamo River and New River waterways. Out of 70 sample results reported between 2002 and 2013, 11 sample results were above the RL, and 3 were DNQ. The rest of the sample results (56) were ND. Malathion was detected in Spring and Fall samples. No samples were collected in the Summer or Winter seasons. The concentrations found in 8 Alamo River samples and 1 New River sample exceeded the UC Davis criteria of 0.028 µg/L (Palumbo et al., 2012).

The RL varies from 0.05 to 0.5 µg/L. The MDL varies from 0.0021 to 0.14 µg/L. The RLs are inadequate to conclusively determine if the Alamo and New River are meeting the WQO. All the RLs are greater than the criteria. As a result, if data is reported with sample results as Non-Detect (ND) or Detect Non-Quantifiable (DNQ) that data could not be considered in a water quality assessment, and data that reported concentrations above the RL would hold greater weight in a water quality assessment.

The water data shown in Table B-10 reports the SWAMP sample results. Sample results that exceed the applied screening value are in bold font and also noted with an asterisk (*). The applied numeric screening value is the UC Davis criteria of 0.028 µg/L.

Table B-10. SWAMP Data: Malathion Concentrations in Water Samples from Alamo River and New River (µg/L).

Date	Waterbody	Sampling Location	Result
10/28/2008	Alamo River	International Boundary- 723ARINTL	0.033 (DNQ)
5/10/2011	Alamo River	Drop 10- 723ARDP10	*0.16
4/24/2013	Alamo River	Drop 10- 723ARDP10	*0.121
4/11/2003	Alamo River	Drop 6 A- 723ARDP6A	0.0097
4/09/2003	Alamo River	Drop 6- 723ARDP06	0.0086
4/10/2003	Alamo River	Harris Road near Imperial- 723ARHRSR	*0.0428

Date	Waterbody	Sampling Location	Result
4/09/2003	Alamo River	Sinclair Road near Calipatria-723ARSNRR	*0.142
4/08/2003	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.11
11/04/2003	Alamo River	Salton Sea Outlet- 723ARGRB1	0.032 (DNQ)
4/21/2008	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.061
10/28/2008	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.057
4/03/2012	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.122
10/21/2013	Alamo River	Salton Sea Outlet- 723ARGRB1	0.081 (DNQ)
4/15/2003	New River	Evan Hewes Highway near Seeley-723NREVHU	*0.0523

USGS Data

Malathion has been found in USGS water samples collected from the Alamo and New River (Orlando et al., 2008). Water samples were collected from 8 sampling locations on the Alamo River and New River waterways. Out of 24 sample results reported between 2006 and 2007, 6 sample results were above the MDL. The rest of the sample results (8) were ND. Malathion was detected in Spring and Fall samples. The concentrations found in 3 Alamo River samples and 1 New River sample exceeded the UC Davis criteria of 0.028 µg/L.

The MDL is 0.0037 µg/L, no RL is reported. The MDL is adequate to conclusively determine if the Alamo and New River are meeting the WQO.

The water data shown in Table B-11 reports the USGS sample results. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the UC Davis criteria of 0.028 µg/L.

Table B-11. USGS Data: Malathion Concentrations in Water Samples from Alamo River and New River (µg/L).

Date	Waterbody	Sampling Location	Result
3/16/2007	Alamo River	Harris Road near Imperial- 325259115270801	*0.129
3/14/2007	Alamo River	Near Calipatria- 330402115303501	*0.186
2/13/2007	Alamo River	Near Niland- 10254730	0.0166
3/12/2007	Alamo River	Near Niland- 10254730	*0.214
03/14/2007	New River	Near Brawley- 325951115323501	0.0254
03/13/2007	New River	Lack Rd near Calipatria- 330559115385601	*0.113

IID Data

Malathion has not been found in IID water samples collected from 4 sampling locations on the Alamo River and New River waterways. All 12 sample results reported between 2016 and 2018 were ND. No sample results exceeded the UC Davis criteria of 0.028 µg/L. The MDL is 0.001 µg/L, the RL 0.002 µg/L. The RL is adequate to conclusively determine if the Alamo River and New River are meeting the WQO.

ii. Sediment

SWAMP Data

Malathion has not been found in SWAMP sediment samples recently collected from 12 sampling locations on the Alamo River and New River. Out of 48 sample results reported between 2003 and 2015, all were ND. The RL varies from 0.010 to 0.08 µg/g. The MDL varies from 0.0015 to 0.040 µg/g. There are no screening values to compare to these results. Malathion does not appear to attach to sediment particles.

iii. Fish Tissue

Malathion has not been analyzed in fish tissue samples collected from sampling locations on the Alamo River or New River

5. Summary

Staff reviewed available documents and data to characterize chlorpyrifos, diazinon, and malathion in the Imperial Valley. Chlorpyrifos, diazinon, and malathion are man-made pesticides that are in current use. They are classified as organophosphate (OP) pesticides based upon their chemical structure. They have been used to control pests in agricultural and urban settings, and work by damaging a critical enzyme in living organisms called acetylcholinesterase, which is essential for cell functions.

a. Chlorpyrifos

Chlorpyrifos was first registered for use by the USEPA in 1965, for a wide variety of urban and agricultural uses. In 2000, the USEPA entered into an agreement with the technical registrants to eliminate virtually all homeowner uses except ant and roach baits in child resistant packaging, leaving only agricultural uses (USEPA, 2006). Beginning in early 2020, California banned the sale of most chlorpyrifos formulations. Under an agreement reached with the makers of chlorpyrifos, sales of most of the pesticide formulations ended February 6, 2020. As of December 31, 2020, the possession or use of the majority of chlorpyrifos products in California has been banned, some granular formulations are still available for use. This ban was due to human health concerns.

As reported on CDPRs, California Pesticide Information Portal (CalPIP), from the year 2000 through 2017, the amount of chlorpyrifos applied annually to Imperial Valley lands averaged about 71,000 pounds to fields cultivated for sugar beet, alfalfa, corn, and broccoli crops.

Water quality monitoring data shows that chlorpyrifos is found in water, sediment and fish tissue samples collected from Imperial Valley waters. The concentrations found in water often exceeds the CDFG toxicity values, which were the numeric screening values used to assess water quality data.

Chlorpyrifos has been found in water samples collected from the Alamo River, Imperial Valley Drains, and the New River at monitoring sites along the waterways on numerous occasions. Chlorpyrifos has also been found in sediment samples collected from the Alamo and New Rivers at monitoring sites along the waterways on numerous occasions. There does not appear to be a spatial pattern to the distribution of chlorpyrifos found. There also does not appear to be a seasonal pattern, although samples are not regularly collected/analyzed in the Summer or Winter seasons. The concentrations found in sediment did not exceed the o.c. normalized LC50 numeric screening value but do serve as an indication of its transport and fate.

Chlorpyrifos has not been found in New River water or sediment samples collected from the international boundary with Mexico on numerous occasions. There was no water quality data to assess the contribution from NPDES permitted facilities which do not normally collect/analyze samples for chlorpyrifos in their monitoring programs.

b. Diazinon

Diazinon was first registered in 1956 for the control of soil insects and pests of fruit, vegetables, forage crops, and field crops (USEPA 2006b). Diazinon is also used on non-lactating cattle in an insecticidal ear tag. In 2000, the USEPA announced an agreement with the registrants of diazinon to cancel all residential uses of diazinon. Indoor uses were cancelled in 2002 and outdoor uses in 2004, leaving only agricultural uses for diazinon (USEPA, 2006b).

As reported in CalPIP, the amounts of diazinon applied has shown a steady decline over time. From 2000 until 2007 the average amount of diazinon applied was 37,000 pounds applied annually to fields cultivated for sugar beet, carrot, and lettuce crops. After 2007, the average amount applied annually decreased to approximately 2,400 lbs. In 2016 the amount applied was 0 lbs.

Water quality monitoring data shows that diazinon is found in water and fish tissue samples collected from Imperial Valley waters. The concentrations found in water often exceed the numeric targets. Diazinon detections are on the decline, but diazinon is still found in environmental samples. Since about 2009, diazinon has not been found in water samples at concentrations above the CDFG toxicity values, which were the numeric screening values used to assess water quality data. Decreasing use of diazinon in Imperial Valley in recent years may be the reason.

Diazinon has been found in water samples collected from monitoring sites along the entire lengths of the Alamo and New Rivers on numerous occasions. Diazinon has also been found in a few fish tissue samples collected from the Alamo River and New River. The concentrations in fish tissue were much lower than the OEHHA numeric screening value. Diazinon has not been found in sediment samples collected from the Alamo River and New River. There does not appear to be a spatial pattern to the distribution of diazinon found. There also does not appear to be a seasonal pattern.

Diazinon has been found in water and fish tissue samples collected from the New River at the international boundary with Mexico on numerous occasions. The concentrations found in water samples were at times above the CDFG toxicity values. The concentrations found in fish tissue were in samples collected in the 1990s and were well below the OEHHA screening value.

There was no water quality data to assess the contribution from NPDES permitted facilities which do not normally collect/analyze samples for diazinon in their monitoring programs.

c. Malathion

Malathion was first registered for use in the United States in 1956 to control a variety of outdoor insects in both agricultural and non-agricultural settings (ATSDR, 2003). Malathion is registered for use on food, feed, and ornamental crops and in mosquito, boll weevil and fruit fly eradication programs. There are currently no restrictions on the use of malathion in urban/residential settings.

As reported in CalPIP, from the year 2000 through 2017, most reported uses were for agricultural purposes. The average annual amount of malathion applied to Imperial Valley lands was about 50,000 pounds. Malathion was applied in relatively large amounts to fields cultivated for alfalfa, bermudagrass, and broccoli.

Water quality monitoring data shows that malathion is found in water samples collected from Imperial Valley waters. The concentrations found in a few water samples exceeded the UC Davis criteria, which were the numeric screening values used to assess water quality data. These exceedances were one of the reasons for listing these waters as impaired by malathion.

Malathion has been found in water samples collected from monitoring sites along the lengths of the Alamo and New Rivers in Imperial Valley on numerous occasions. Malathion has not been found in sediment samples and has not been measured in fish tissue samples.

Malathion has not been found in New River water samples or sediment samples collected from the international boundary with Mexico. There was no water quality data to assess the contribution from NPDES permitted facilities which do not normally collect/analyze samples for malathion in their monitoring programs.

6. References

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Figure B-6. Map of Alamo River SWAMP and TSMP Sampling Locations.

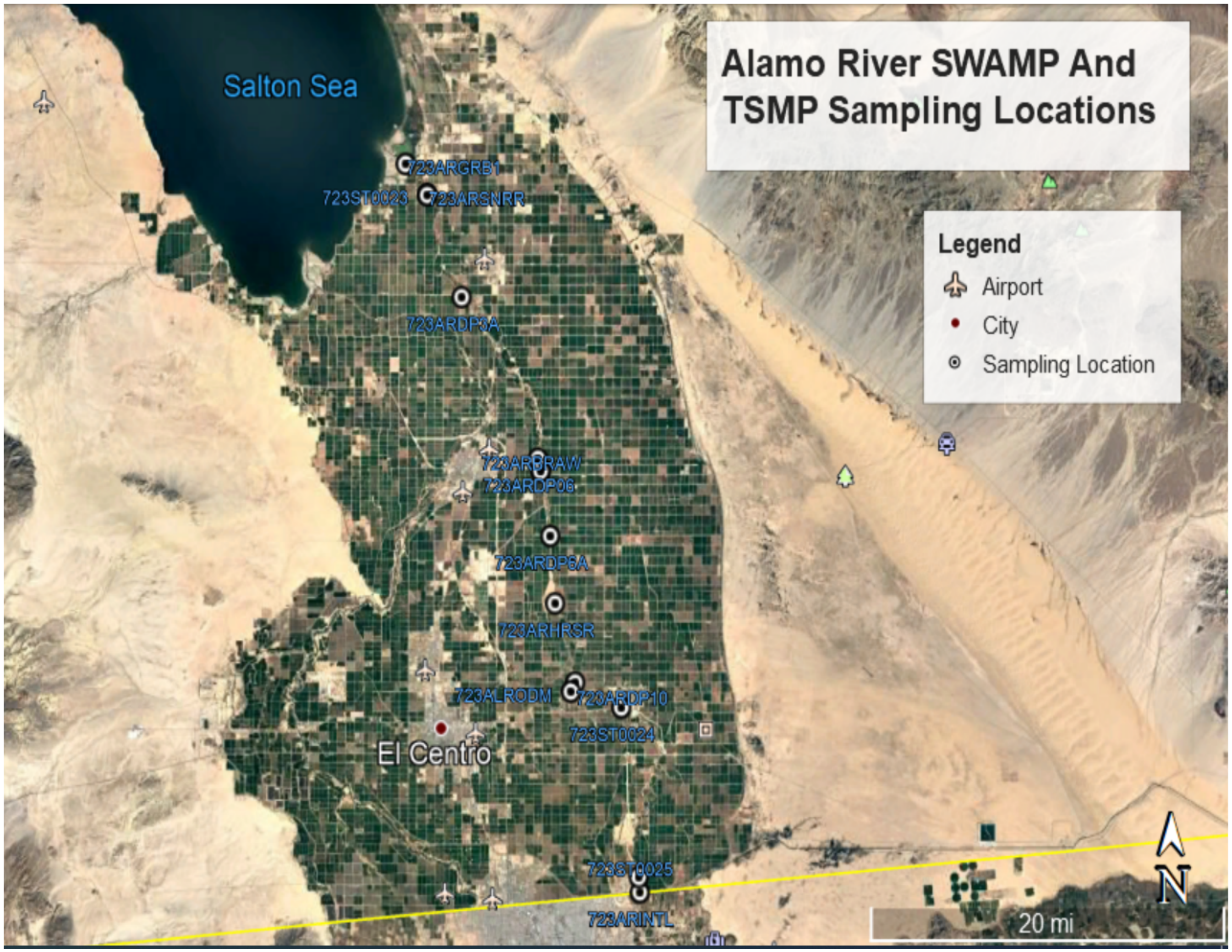


Figure B-7. Map of Imperial Valley Drains SWAMP and TSMP Sampling Locations.

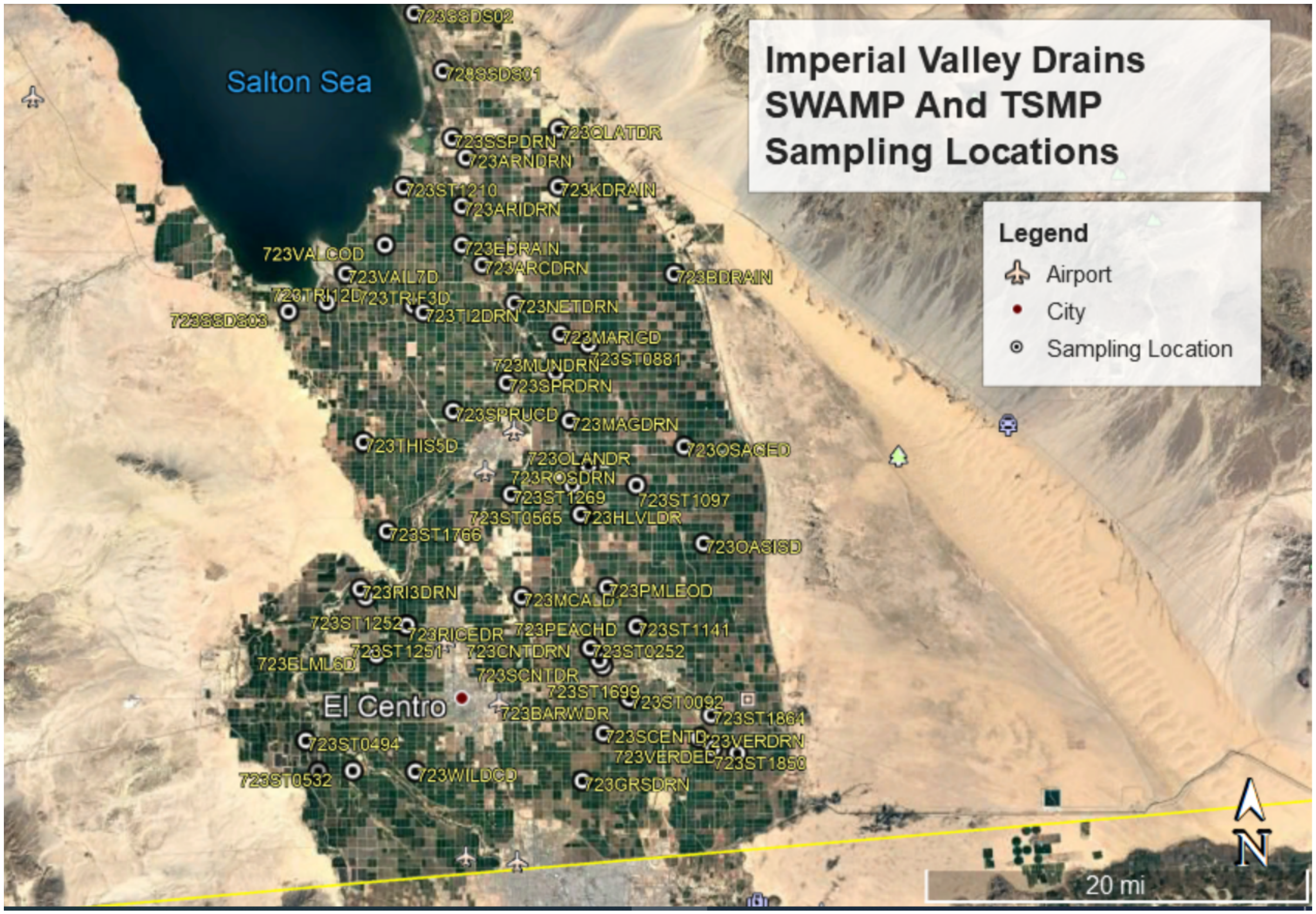


Figure B-8. Map of New River SWAMP and TSMP Sampling Locations.

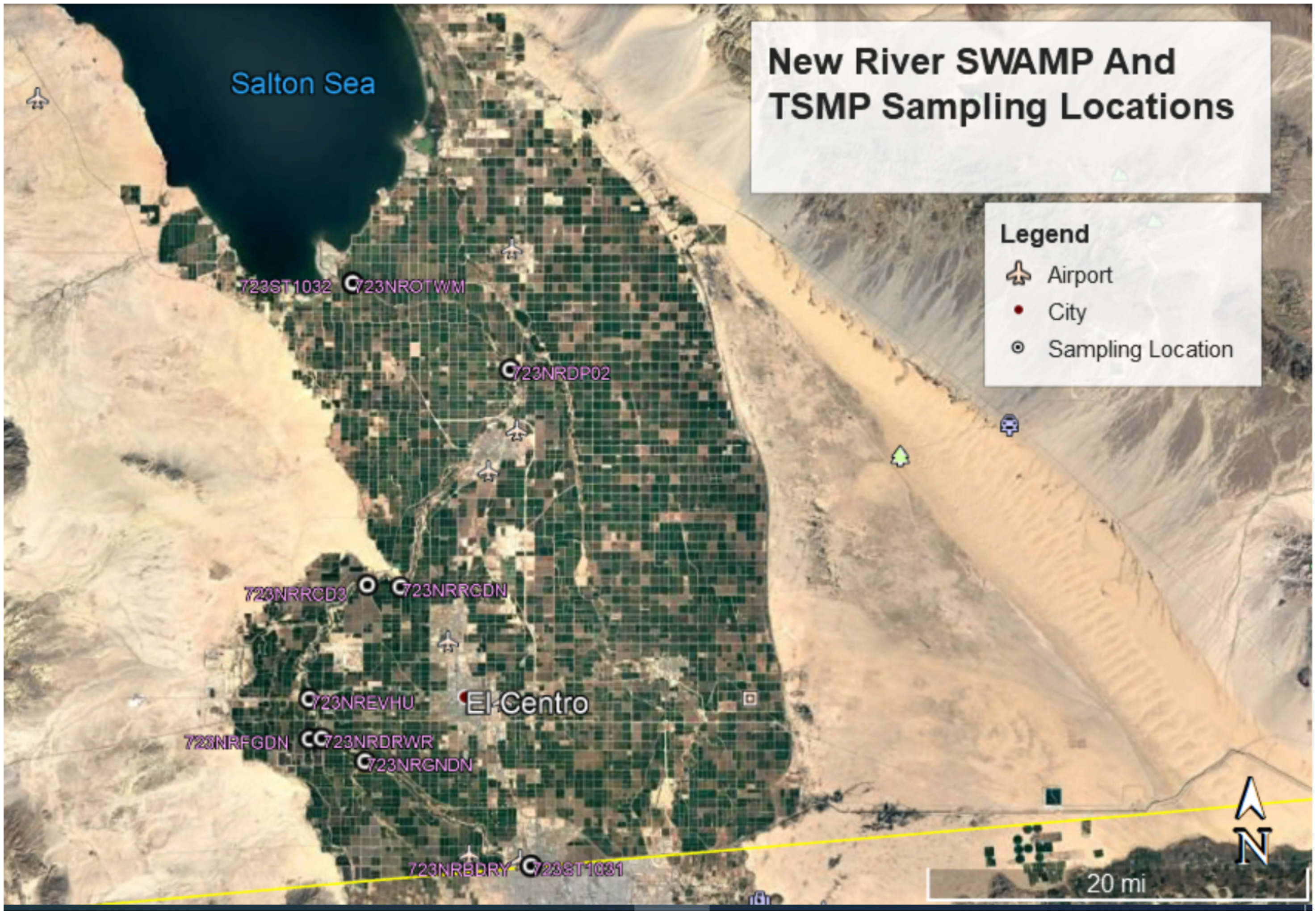


Figure B-9. Map of USGS Sampling Locations.

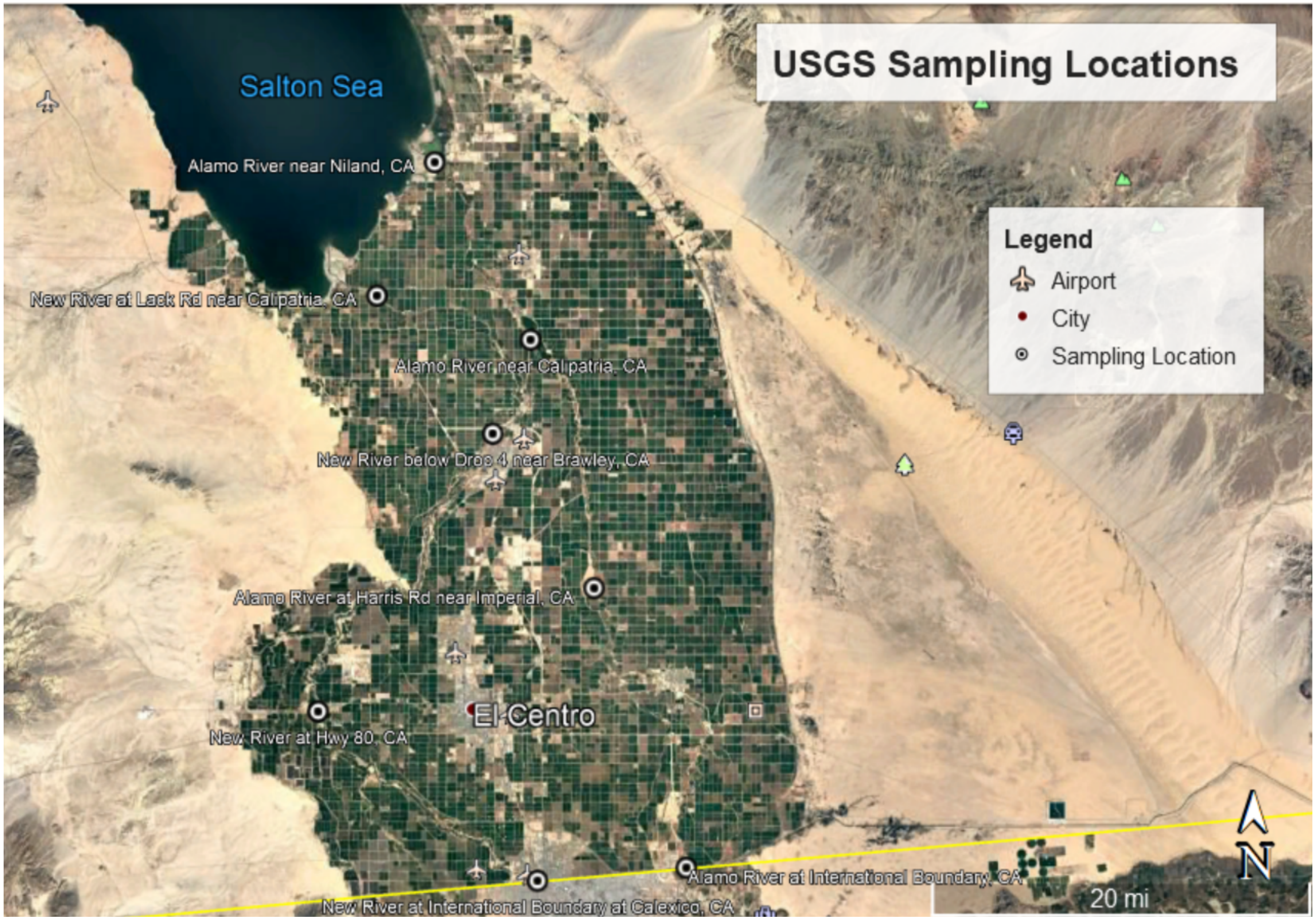
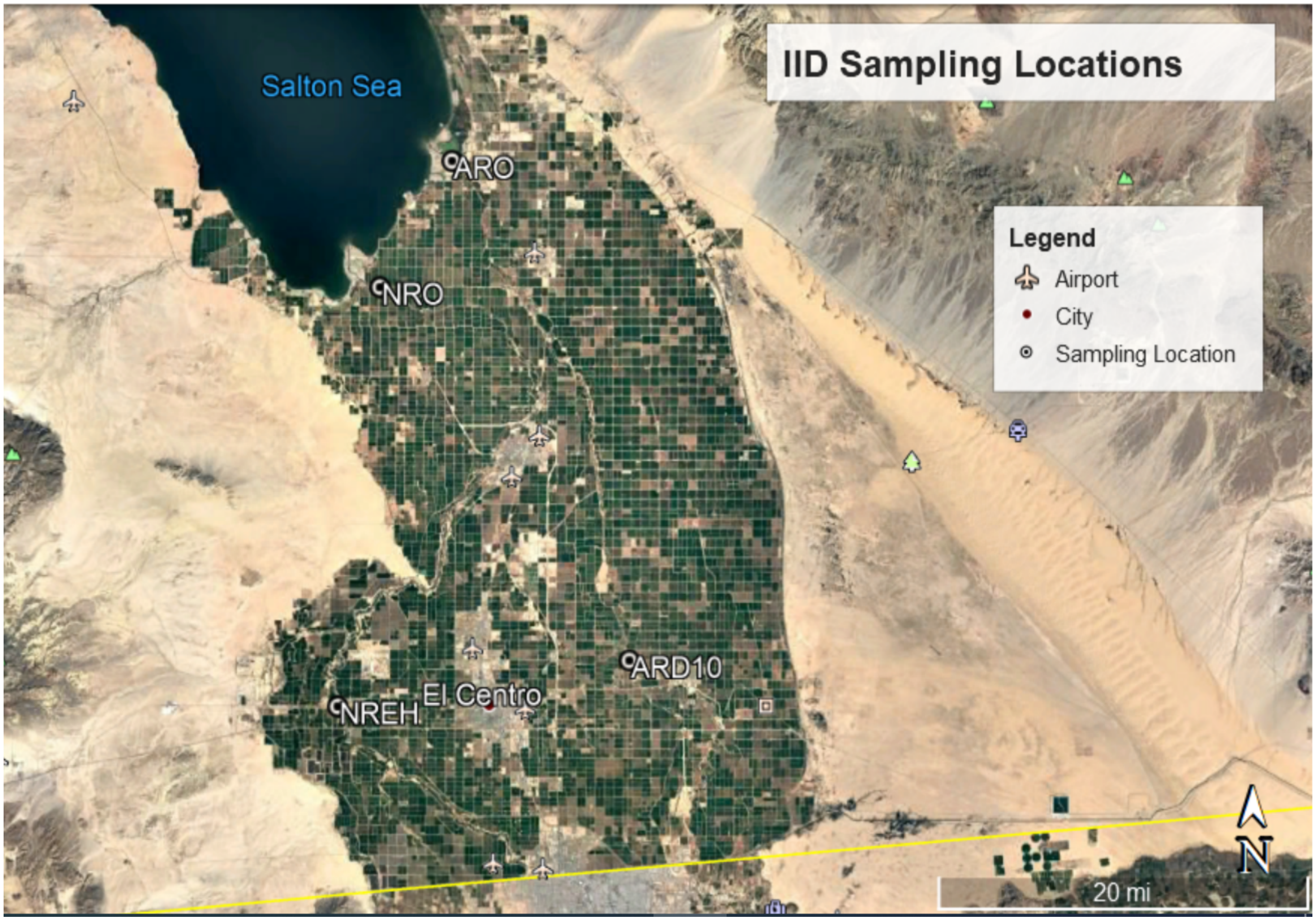


Figure B-10. Map of IID Sampling Locations.



ATTACHMENT C: CHLORDANE, DDT, DIELDRIN, PCBS AND TOXAPHENE IN IMPERIAL VALLEY

1. Background

The Alamo River, Imperial Valley Drains, and New River are impaired by chlordane, dichlorodiphenyltrichloroethane (DDT) and its degradates dichlorodiphenyl-dichloroethylene (DDE) and/or dichlorodiphenyldichloroethane (DDD), dieldrin, polychlorinated biphenyls (PCBs), and toxaphene. Wiest Lake, a 40-acre lake, is impaired by DDT, dieldrin, and PCBs. The concentrations of these compounds in fish tissue and/or water violates Basin Plan toxicity and chemical constituent water quality objectives (WQOs) meant to support/protect human health and the aquatic habitat designated beneficial uses of these waters.

The listed pollutants are man-made compounds used in the U.S. prior to the 2000s. They are classified as organochlorine (OC) compounds based upon there chemical structure. Chlordane, DDT, dieldrin, and toxaphene are pesticides that were used for agricultural and non-agricultural pest control until being banned. PCBs were developed for numerous industrial uses but were most commonly used in electrical equipment and insulation manufactured until being banned. These OC compounds are incredibly persistent in the environment as they are slow to degrade. They also tend to tightly bind to soil or sediment particles.

OC compounds pose risks to wildlife and human health. They have bioaccumulative properties and concentrations of the compounds move up through the food chain from the aquatic environment to wildlife and humans. People who consume fish and shellfish from areas with organochlorine contamination maybe at health risk.

Chlordane is a pesticide that was used for crops such as corn and citrus, on home lawns and gardens, and for termite control. It was first used in 1948. All uses except termite control were banned in 1983, and all uses were banned in 1988.

DDT is a pesticide that was used for mainly agricultural uses before the 1960s. DDT was banned for agricultural uses in the U.S. in 1972. DDT is no longer legally sold or used in the U.S.

Dieldrin is a pesticide that was originally developed in the 1940s as an alternative to DDT. It proved to be a highly effective insecticide and was very widely used during the 1950s to early 1970s. Most uses of dieldrin were banned in 1978. Dieldrin is no longer produced in the U.S.

PCBs are a class of chemical OC compounds. They were commonly used in a variety of industrial and commercial applications including in electrical transformers and capacitors, for insulation of electrical equipment, and as oil used in motors and hydraulic systems. PCBs were also used in consumer household appliances. They were in use from approximately 1929 until 1977 when the U.S. banned their manufacturing, processing, distribution, and use (ATSDR, 2000).

Toxaphene is a pesticide that was heavily used in the United States in the early to mid-1970s as DDT was phased out. The EPA cancelled most of the pesticide registrations for toxaphene in 1982. All uses of toxaphene were banned in 1990 (ATSDR, 2010).

2. Analysis of Uses

OC Pesticide use in the Imperial county was examined, and when possible, in an area bounded by Township 10 South through Township 17 South and Range 9 East through Range 16 East, which encompasses the Imperial Valley. Publicly available data such as pesticide use report (PUR) data that was collected and reported by the California Department of Pesticide Regulation (CDPR) was reviewed. Known limitations of PUR data from before 1990 are described in a report available from the CDPR (CDPR, 2000).

a. Chlordane

PUR data for the years 1974, 1979, 1984, and 1989 were examined for chlordane use in Imperial County.

In 1974 there were 6 reported uses of chlordane on onions (1), and asparagus (5) crops in Imperial County. In 1979, and 1984 (the year after the use was restricted to only subterranean termite control), all reported uses of chlordane were for the use category “federal agency”, and could not be isolated to the Imperial Valley area of the county. In 1989, the year following the usage ban, there were no reported uses of chlordane in Imperial county.

Table C-1 reports PUR data for chlordane, as accessed from CDPR PUR database in 2017.

Table C-1. Chlordane Use in Imperial County from 1974, 1979, and 1984.

Year	Number of Reported Applications	Crop
1974	1	Onions
1974	5	Asparagus

Year	Number of Reported Applications	Crop
1979	8	Federal Agency
1984	17	Federal Agency

b. DDT

Data documenting discrete DDT use could not be found in CDPR records, since widespread reporting of pesticide use was not started until after the use of DDT was banned in 1974.

Table C-2 shows statewide reported DDT usage in California for the years 1970-1980 as reported by CDFA.

Table C-2. DDT Use in California, 1970-1980[36] (Mischke, 1985).

Year	Pounds Used	Main Use
1970	1,164,699	agriculture
1971	111,058	agriculture
1972	80,800	agriculture
1973[37]	NUR[38]	--
1974	160	residential pest control (SLN)
1975-1980	< 200 lbs per year	vector control (SLN)

[36] 1970 was the first year in which the amount of restricted pesticides used in California was reported. In 1980, the introduction of new pesticides replaced the need to use DDT for vector control.

[37] Year all uses were banned except for special local needs (SLN)

[38] NUR - no use reported.

c. Dieldrin

Dieldrin/aldrin use in all Imperial county was examined for the years 1974, 1979, and 1984. In 1974 there were 8 records of dieldrin applications; 7 for structural purposes, and 1 for head lettuce. In 1979 there were no records of reported uses of dieldrin/aldrin. In 1984 there were 4 records of aldrin application for federal agency purposes. Except for the records in 1974, the available dieldrin/ aldrin records in the PUR data did not contain township range information, so it could not be determined where these applications took place in Imperial county.

d. Toxaphene

PUR data for toxaphene use in Imperial county was examined for the years 1974, 1978, 1979, 1981, and 1982. There were 16 records of applications of toxaphene pesticides in 1974. Toxaphene was applied mostly to cotton (Table C-3). No applications of toxaphene pesticides were reported in 1978, 1979, 1981, or 1982. Table C-3 reports PUR data for toxaphene, as accessed from CDPR PUR database in 2017.

Table C-3. Toxaphene Use in Imperial Valley Area, 1974-1982.

Year	Reported Applications	Crop
1974	1	lettuce, head
1974	2	alfalfa
1974	13	cotton

3. Analysis of Environmental Data

Staff examined the presence of chlordane, DDT, dieldrin, PCBs, and toxaphene in the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Staff assessed water, sediment and fish tissue data from the following sources;

- California's Surface Water Ambient Monitoring Program (SWAMP),
- California Department of Fish and Game's Toxic Substances Monitoring Program (TSMP), and
- Electronic Self-Monitoring (E-SMR) Reports from Regional Water Board permitted facilities.

Data is summarized as follows. All data are discussed in a narrative form before the data is presented in tables. Sample results with reportable concentrations (above Reporting Limit [RL]) of OC compounds are shown in the data tables following the narrative discussion. Sample results that report detectable concentrations but are below method RLs, commonly reported as Detect Non-Quantifiable (DNQ), are shown in the tables along with a DNQ beside the reported results. Sample results that report non-detectable concentrations, commonly reported as Non-Detect (ND), are omitted from the tables.

Sample results were compared to numeric screening values to make decisions about the status of the OC compounds in the waters in meeting the WQOs. Sample results that exceed the applied numeric screening value are noted with an asterisk (*).

Analytical limits are discussed as a matter of assessing the quality of the data, and the ability to determine if the waters are meeting the WQOs. Ideally, the RL should be at or below the applied numeric screening value to conclusively determine if the WQO is being met. This becomes important when significant amounts of sample results are reported as either DNQ or ND.

Map images showing the sampling locations are provided at the end of this report for reference.

a. Chlordane

i. Water

SWAMP Data

Chlordane (cis-, trans- isomers) has not been detected in SWAMP water samples collected from Imperial Valley waters. Water samples were collected from 33 sampling locations on the Alamo River, Imperial Valley Drains, and New River waterways. Out of 612 sample results reported between 2002 and 2013, all sample results are below the Method Detection Limits (MDLs), which means they are ND. Chlordane has not been found at concentrations that exceed the United States Environmental Protection Agency (USEPA) California Toxics Rule (CTR) standard of 0.0043 µg/L (USEPA, 2000).

The RLs are, for the most part, 0.002 µg/L. The MDLs are, for the most part, 0.001 µg/L. The RLs are sometimes inadequate for determining if Imperial Valley waters are meeting the USEPA criteria. In future analysis, RLs should consistently be at or below the USEPA CTR standard to conclusively determine if Imperial Valley waters are meeting WQOs.

E-SMR Data

Chlordane has not been detected in water samples collected downstream from 20 NPDES permitted facilities that discharge to the Alamo River, Imperial Valley Drains, and New River. Out of 125 sample results reported between 2010 and 2017, all sample results are ND. Chlordane has not been found at concentrations that exceed the USEPA CTR standard of 0.0043 µg/L (USEPA, 2000).

The RLs vary from 0.001 to 0.5 µg/L. The MDLs vary from 0.004 to 1 µg/L. The RLs should consistently be at or below the USEPA criteria to conclusively determine if discharges from NPDES facilities are meeting WQOs.

ii. Sediment

SWAMP Data

Chlordane (cis- trans- isomers) has been found in SWAMP sediment samples collected from the Alamo River, Imperial Valley Drains, and New River. Sediment samples were collected from 13 sampling locations on the Alamo River, Imperial Valley Drains, and New River. Out of 320 sample results reported between 2002 and 2013, 37 sample results are above the RLs, and 36 are below the RLs but above the MDL, which means they are DNQ. The rest of the sample results (247) are ND. One sample collected from the Alamo River near the outlet to the Salton Sea in May of 2010 exceeded the applied PEC numeric screening value of 17.6 ng/g (MacDonald et al., 2000).

The RL varies from 0.98 to 5.87 ng/g. The MDL varies from 0.242 to 2.99 ng/g. The RLs are adequate to conclusively determine if the sediment of Imperial Valley waters are meeting the WQO.

The sediment data shown in Table C-4 reports SWAMP sample results that are above the MDLs for total chlordane (sum of cis- and trans- chlordane). The sample result that exceeded the applied screening value is in bold font and noted with an asterisk (*). The applied numeric screening value is the PEC of 17.6 ng/g.

Table C-4. SWAMP Data: Chlordane Concentrations in Sediment Samples from Imperial Valley Waterways (ng/g).

Date	Waterbody	Sampling Location	Result
5/01/2006	Alamo River	International Boundary-723ARINTL	0.944 (DNQ)

Date	Waterbody	Sampling Location	Result
4/21/2008	Alamo River	International Boundary-723ARINTL	1.33 (DNQ)
10/02/2002	Alamo River	Salton Sea Outlet-723ARGRB1	1.06 (DNQ)
5/01/2006	Alamo River	Salton Sea Outlet-723ARGRB1	2.83 (DNQ)
5/21/2008	Alamo River	Salton Sea Outlet-723ARGRB1	1.89
5/04/2010	Alamo River	Salton Sea Outlet-723ARGRB1	*19.72
10/03/2002	Imperial Valley Drains	Niland 4 Drain- 723SSDS02	0.628 (DNQ)
10/02/2002	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03	0.618 (DNQ)
5/08/2002	New River	International Boundary-723NRBDRY	1.33 (DNQ)
10/01/2002	New River	International Boundary-723NRBDRY	6.18
4/09/2003	New River	International Boundary-723NRBDRY	12.73
11/04/2003	New River	International Boundary-723NRBDRY	3.44 (DNQ)
5/03/2004	New River	International Boundary-723NRBDRY	7.62
10/04/2004	New River	International Boundary-723NRBDRY	5.54 (DNQ)
5/09/2005	New River	International Boundary-723NRBDRY	2.89

Date	Waterbody	Sampling Location	Result
10/25/2005	New River	International Boundary-723NRBDRY	9.86
5/01/2006	New River	International Boundary-723NRBDRY	11.53
4/21/2008	New River	International Boundary-723NRBDRY	6.49
4/28/2009	New River	International Boundary-723NRBDRY	6.51
10/19/2009	New River	International Boundary-723NRBDRY	6.10
10/05/2010	New River	International Boundary-723NRBDRY	13.39
5/10/2011	New River	International Boundary-723NRBDRY	2.28 (DNQ)
10/11/2011	New River	International Boundary-723NRBDRY	4.21
10/02/2002	New River	Salton Sea Outlet-723NROTWM	0.6 (DNQ)
5/01/2006	New River	Salton Sea Outlet-723NROTWM	1.5
4/01/2008	New River	Salton Sea Outlet-723NROTWM	1.49 (DNQ)
10/28/2010	New River	Salton Sea Outlet-723NROTWM	0.789 (DNQ)

iii. Fish Tissue

TSMP and SWAMP Data

Chlordane (cis-, trans- isomers) has been found in TSMP and SWAMP fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River. Fish tissue samples were collected from 17 locations on the Alamo River, Imperial Valley Drains, and New River. Out of 147 sample results reported between1979 and 2014, 130 sample results are above the RLs, 2 are DNQ, and 15 are ND. One hundred-thirteen sample results are above the OEHHA numeric screening value of 3.9 ng/g (Klasing and Brodberg, 2008).

The RL varies from 0.17 to 30 ng/g. The MDL varies from 0.9 to 30 ng/g. The RLs need to be consistently at or below the FCG in future analysis to conclusively determine if the fish in Imperial Valley waters are meeting the WQO.

The fish tissue data shown in Table C-5 reports SWAMP and TSMP sample results that are above the MDLs for total chlordane. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the OEHHA FCG of 3.9 ng/g.

Table C-5. SWAMP-TSMP Combined Data: Total Chlordane Concentrations in Fish Tissue Samples from Alamo River, Imperial Valley Drains and New River (ng/g).

Date	Waterbody	Sampling Location	Result
9/02/1987	Alamo River	International Boundary- 723ST0025	*171
11/20/1988	Alamo River	International Boundary- 723ST0025	*7.3
11/02/2004	Alamo River	Drop 10- 723ARDP10	3.08
11/02/2004	Alamo River	Drop 10- 723ARDP10	2.96
11/02/2004	Alamo River	Drop 10- 723ARDP10	1.67
4/21/2011	Alamo River	Drop 10- 723ARDP10	0.7
11/16/2011	Alamo River	Drop 10- 723ARDP10	2.67
3/28/2012	Alamo River	Drop 10- 723ARDP10	*4.69

Date	Waterbody	Sampling Location	Result
11/09/2004	Alamo River	Brawley- 723ARBRAW	*4.55
11/09/2004	Alamo River	Brawley- 723ARBRAW	*3.92
11/09/2004	Alamo River	Brawley- 723ARBRAW	*6.21
3/12/1979	Alamo River	Outlet Salton Sea-723ST0023	*31
5/08/1980	Alamo River	Outlet Salton Sea-723ST0023	*50
5/23/1981	Alamo River	Outlet Salton Sea-723ST0023	*46
5/23/1981	Alamo River	Outlet Salton Sea-723ST0023	*61
4/22/1982	Alamo River	Outlet Salton Sea-723ST0023	*65
4/22/1982	Alamo River	Outlet Salton Sea-723ST0023	*11.2
6/13/1983	Alamo River	Outlet Salton Sea-723ST0023	*29.6
6/13/1983	Alamo River	Outlet Salton Sea-723ST0023	*38
5/23/1984	Alamo River	Outlet Salton Sea-723ST0023	*34.6
5/23/1984	Alamo River	Outlet Salton Sea-723ST0023	*43.2
9/17/1985	Alamo River	Outlet Salton Sea-723ST0023	*45.1
9/17/1985	Alamo River	Outlet Salton Sea-723ST0023	*6.3

Date	Waterbody	Sampling Location	Result
9/30/1987	Alamo River	Outlet Salton Sea-723ST0023	*33.6
11/18/1988	Alamo River	Outlet Salton Sea-723ST0023	*12.5
8/03/1990	Alamo River	Outlet Salton Sea-723ST0023	*48.9
9/29/1993	Alamo River	Outlet Salton Sea-723ST0023	*60
10/27/1994	Alamo River	Outlet Salton Sea-723ST0023	*12.8
10/27/1994	Alamo River	Outlet Salton Sea-723ST0023	*7.1
11/01/1996	Alamo River	Outlet Salton Sea-723ST0023	*5.8
11/20/1997	Alamo River	Outlet Salton Sea-723ST0023	*16.2
11/11/1998	Alamo River	Outlet Salton Sea-723ST0023	*10.8
11/07/2000	Alamo River	Outlet Salton Sea-723ST0023	*27.4
11/07/2004	Alamo River	Outlet Salton Sea-723ARGRB1	*6.07
11/07/2004	Alamo River	Outlet Salton Sea-723ARGRB1	0.47
11/07/2004	Alamo River	Outlet Salton Sea-723ARGRB1	2.3
2/08/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*14.06

Date	Waterbody	Sampling Location	Result
4/22/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*8.23
11/17/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*7.82
3/28/2012	Alamo River	Outlet Salton Sea-723ARGRB1	*10.33
5/08/2012	Alamo River	Outlet Salton Sea-723ARGRB1	0.35 (DNQ)
10/16/2012	Alamo River	Outlet Salton Sea-723ARGRB1	1.37 (DNQ)
12/2/2014	Alamo River	Outlet Salton Sea-723ARGRB1	*6.79
9/17/1992	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*6
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*55
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*48
2/7/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*17
4/20/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*28
10/15/2012	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*10
12/5/1999	Imperial Valley Drains	Central Drain-723ST0252	*85.3
11/8/2000	Imperial Valley Drains	Central Drain-723ST0252	*11

Date	Waterbody	Sampling Location	Result
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*12
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*8
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*13
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*8
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*18
2/11/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*15
4/20/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*11
5/08/2012	Imperial Valley Drains	Central Drain-723CNTDRN	0.375
10/15/2012	Imperial Valley Drains	Central Drain-723CNTDRN	*13
11/15/1985	Imperial Valley Drains	Greeson Drain-723ST0532	*33
9/18/1992	Imperial Valley Drains	Greeson Drain-723ST0532	*8.2
11/7/2000	Imperial Valley Drains	Greeson Drain-723ST0532	*27
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	*15
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	*16

Date	Waterbody	Sampling Location	Result
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	*37
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	0.51
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	0.41
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	0.4
10/28/1989	Imperial Valley Drains	Holtville Drain-723ST0565	*7.1
12/5/1999	Imperial Valley Drains	Holtville Drain-723ST0565	*11.3
8/16/1991	Imperial Valley Drains	Mayflower Drain-723ST0881	*9.3
9/17/1992	Imperial Valley Drains	Peach Drain-723ST1141	*76
10/28/1995	Imperial Valley Drains	Peach Drain-723ST1141	*54.4
11/3/1996	Imperial Valley Drains	Peach Drain-723ST1141	*34.9
2/7/2011	Imperial Valley Drains	Peach Drain-723PEACHD	*13
4/19/2011	Imperial Valley Drains	Peach Drain-723PEACHD	*31
5/07/2012	Imperial Valley Drains	Peach Drain-723PEACHD	*15
10/15/2012	Imperial Valley Drains	Peach Drain-723PEACHD	*5.5

Date	Waterbody	Sampling Location	Result
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	*22.6
10/10/1985	Imperial Valley Drains	Rice Drain 3- 723ST1252	*101
2/12/2011	Imperial Valley Drains	Rice Drain- 723RICEDR	*21
4/20/2011	Imperial Valley Drains	Rice Drain- 723RICEDR	*12
8/1/1990	Imperial Valley Drains	South Central Drain- 723ST1699	*14.8
12/5/1999	Imperial Valley Drains	South Central Drain- 723ST1699	*33.8
11/8/2000	Imperial Valley Drains	South Central Drain- 723ST1699	*5
10/15/2012	Imperial Valley Drains	South Central Drain- 723SCNTDR	*9
9/9/1990	Imperial Valley Drains	Warren Drain	*5.7
5/17/1984	New River	International Boundary- 723ST1031	*20.6
10/1/1985	New River	International Boundary- 723ST1031	*30.5
7/20/1989	New River	International Boundary- 723ST1031	*5.3
7/20/1989	New River	International Boundary- 723ST1031	*34.7
7/31/1990	New River	International Boundary- 723ST1031	*247

Date	Waterbody	Sampling Location	Result
12/18/1991	New River	International Boundary- 723ST1031	*103
6/16/1993	New River	International Boundary- 723ST1031	*125
11/2/1994	New River	International Boundary- 723ST1031	*202
12/10/1997	New River	International Boundary- 723ST1031	*13.3
2/9/2011	New River	International Boundary- 723NRBDRY	*4
2/9/2011	New River	International Boundary- 723NRBDRY	*9
4/23/2011	New River	International Boundary- 723NRBDRY	*25
12/2/2011	New River	International Boundary- 723NRBDRY	*24
4/4/2012	New River	International Boundary- 723NRBDRY	*6
5/8/2012	New River	International Boundary- 723NRBDRY	1
10/17/2012	New River	International Boundary- 723NRBDRY	0.45

Date	Waterbody	Sampling Location	Result
5/9/1980	New River	Outlet Salton Sea-723ST1032	*69
5/24/1981	New River	Outlet Salton Sea-723ST1032	*43
5/24/1981	New River	Outlet Salton Sea-723ST1032	*26
4/22/1982	New River	Outlet Salton Sea-723ST1032	*83.2
4/22/1982	New River	Outlet Salton Sea-723ST1032	*62
4/22/1982	New River	Outlet Salton Sea-723ST1032	*6
6/13/1983	New River	Outlet Salton Sea-723ST1032	*74
6/13/1983	New River	Outlet Salton Sea-723ST1032	*12.9
5/24/1984	New River	Outlet Salton Sea-723ST1032	*42.8
10/9/1985	New River	Outlet Salton Sea-723ST1032	*6.3
10/10/1985	New River	Outlet Salton Sea-723ST1032	*21.5
10/15/1986	New River	Outlet Salton Sea-723ST1032	*6.8
9/3/1987	New River	Outlet Salton Sea-723ST1032	*75
11/18/1988	New River	Outlet Salton Sea-723ST1032	*19.8

Date	Waterbody	Sampling Location	Result
8/3/1990	New River	Outlet Salton Sea-723ST1032	*125.9
9/20/1992	New River	Outlet Salton Sea-723ST1032	*59.4
9/29/1993	New River	Outlet Salton Sea-723ST1032	*57.2
10/27/1995	New River	Outlet Salton Sea-723ST1032	*5.3
11/20/1997	New River	Outlet Salton Sea-723ST1032	*23.7
11/11/1998	New River	Outlet Salton Sea-723ST1032	2.6
12/9/1999	New River	Outlet Salton Sea-723ST1032	*18
11/5/2004	New River	Outlet Salton Sea-723NROTWM	1
2/9/2011	New River	Outlet Salton Sea-723NROTWM	*15
4/22/2011	New River	Outlet Salton Sea-723NROTWM	*20
11/17/2011	New River	Outlet Salton Sea-723NROTWM	*6
4/4/2012	New River	Outlet Salton Sea-723NROTWM	*13
5/8/2012	New River	Outlet Salton Sea-723NROTWM	0.34
12/1/2014	New River	Outlet Salton Sea-723NROTWM	3

b. DDT

i. Water

SWAMP Data

DDT and its breakdown products have been found in SWAMP water samples from the Alamo River, Imperial Valley Drains, and New River. Samples were collected from 36 sampling locations on Imperial Valley waterways. Out of 973 sample results reported between 2002 and 2013, 68 sample results are above the RLs, 11 are DNQ, and 894 are ND. The concentrations in water have sometimes exceeded the USEPA CTR standards of 0.00059 µg/L for p,p'- DDT and/or 0.00059 µg/L for p,p'- DDE, and/or 0.00084 µg/L for p,p'-DDD (USEPA, 2000).

The RL varies from 0.002 to 10 µg/L for DDT and its degradates. The MDL varies from 0.001 to 0.12 µg/L for DDT and from 0.001 to 0.52 µg/L for the DDT degradates. The RLs would need to be at or below the USEPA CTR standard in future analysis to conclusively determine if Imperial Valley waters are meeting the WQOs.

The water data shown in Table C-6 and Table C-7 report sample results above MDLs for DDT and its breakdown products. The applied numeric screening value is the USEPA CTR standard of 0.00059 µg/L for p,p'- DDT.

Table C-6. SWAMP Data: DDT concentrations in Water Samples from Imperial Valley Waters (µg/L).

Date	Waterbody	Sampling Location	DDT (o,p')	DDT (p,p')
10/2/2002	Alamo River	Salton Sea Outlet-723ARGRB1		0.0035 (DNQ)
4/15/2003	Alamo River	Salton Sea Outlet-723ARGRB1		0.002 (DNQ)
10/2/2002	Imperial Valley Drains	W Drain-728SSDS01		0.0035 (DNQ)
10/2/2002	New River	Salton Sea Outlet-723NROTWM		0.00455 (DNQ)

Date	Waterbody	Sampling Location	DDT (o,p’)	DDT (p,p’)
4/15/2003	New River	Salton Sea Outlet-723NROTWM		0.003 (DNQ)

Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the USEPA CTR standard of 0.00059 µg/L for p,p’- DDE, and/or 0.00084 µg/L for p,p’-DDD.

Table C-7. SWAMP Data: DDT-Degradate Concentrations in Water Samples from Imperial Valley Waters (µg/L).

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
4/21/2011	Alamo River	Drop 10-723ARDP10	*0.019	
4/15/2003	Alamo River	Salton Sea Outlet-723ARGRB1		0.001 (DNQ)
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1		*0.026
4/22/2011	Alamo River	Salton Sea Outlet-723ARGRB1		*0.024
10/16/2012	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03	*0.055	
4/9/2003	Alamo River	International Boundary-723ARINTL		0.001 (DNQ)
11/4/2003	Alamo River	International Boundary-723ARINTL		*0.004
5/3/2004	Alamo River	International Boundary-723ARINTL		*0.002

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
5/10/2011	Alamo River	Drop 10-723ARDP10		*0.009
5/8/2012	Alamo River	Drop 10-723ARDP10		*0.011
10/17/2012	Alamo River	Drop 10-723ARDP10		*0.013
4/24/2013	Alamo River	Drop 10-723ARDP10		*0.024
5/6/2002	Alamo River	Salton Sea Outlet-723ARGRB1		*0.007
10/2/2002	Alamo River	Salton Sea Outlet-723ARGRB1		0.0015 (DNQ)
4/15/2003	Alamo River	Salton Sea Outlet-723ARGRB1		*0.007
11/4/2003	Alamo River	Salton Sea Outlet-723ARGRB1		*0.004
5/3/2004	Alamo River	Salton Sea Outlet-723ARGRB1		*0.003
10/5/2004	Alamo River	Salton Sea Outlet-723ARGRB1		*0.009
5/4/2010	Alamo River	Salton Sea Outlet-723ARGRB1		*0.014
10/6/2010	Alamo River	Salton Sea Outlet-723ARGRB1		*0.026
2/11/2011	Alamo River	Salton Sea Outlet-723ARGRB1		*0.021
5/10/2011	Alamo River	Salton Sea Outlet-723ARGRB1		*0.013

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
5/7/2012	Alamo River	Salton Sea Outlet-723ARGRB1		*0.025
10/15/2012	Alamo River	Salton Sea Outlet-723ARGRB1		*0.02
10/21/2013	Alamo River	Salton Sea Outlet-723ARGRB1		*0.013
5/7/2012	Imperial Valley Drains	C Drain-723ARCDRN		*0.041
10/15/2012	Imperial Valley Drains	C Drain-723ARCDRN		*0.04
5/7/2012	Imperial Valley Drains	I Drain- 723ARIDRN		*0.033
10/15/2012	Imperial Valley Drains	I Drain- 723ARIDRN		*0.012
5/7/2012	Imperial Valley Drains	N Drain-723ARNDRN		*0.027
10/15/2012	Imperial Valley Drains	N Drain-723ARNDRN		*0.035
5/8/2012	Imperial Valley Drains	Barbara Worth Drain-723BARWDR		*0.005
10/17/2012	Imperial Valley Drains	Barbara Worth Drain-723BARWDR		*0.017
2/11/2011	Imperial Valley Drains	Central Drain-723CNTDRN		*0.011
5/8/2012	Imperial Valley Drains	Central Drain-723CNTDRN		*0.016
10/17/2012	Imperial Valley Drains	Central Drain-723CNTDRN		*0.013

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
10/16/2012	Imperial Valley Drains	Fig Drain-723NRFGDN		*0.002
10/16/2012	Imperial Valley Drains	Greeson Drain-723GRSDRN		*0.007
5/8/2012	Imperial Valley Drains	Holtville Drain-723HLVLDR		*0.013
10/16/2012	Imperial Valley Drains	Holtville Drain-723HLVLDR		*0.007
5/8/2012	Imperial Valley Drains	Magnolia Drain-723MAGDRN		*0.014
5/8/2012	Imperial Valley Drains	Munyon Drain-723MUNDRN		*0.011
10/16/2012	Imperial Valley Drains	Munyon Drain-723MUNDRN		*0.011
5/8/2012	Imperial Valley Drains	Nettle Drain-723NETDRN		*0.02
10/15/2012	Imperial Valley Drains	Nettle Drain-723NETDRN		*0.023
5/8/2012	Imperial Valley Drains	Oleander Drain-723OLANDR		*0.006
10/16/2012	Imperial Valley Drains	Oleander Drain-723OLANDR		*0.007
5/8/2012	Imperial Valley Drains	Peach Drain-723PEACHD		*0.009
5/8/2012	Imperial Valley Drains	Rice 3 Drain-723RI3DRN		*0.024
10/16/2012	Imperial Valley Drains	Rice 3 Drain-723RI3DRN		*0.004

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
10/16/2012	Imperial Valley Drains	Rice Drain-723RICEDR		*0.005
5/8/2012	Imperial Valley Drains	Rose Drain-723ROSDRN		*0.032
10/16/2012	Imperial Valley Drains	Rose Drain-723ROSDRN		*0.015
5/8/2012	Imperial Valley Drains	South Central Drain-723SCNTDR		*0.012
10/17/2012	Imperial Valley Drains	South Central Drain-723SCNTDR		*0.011
5/8/2012	Imperial Valley Drains	Spruce Drain-723SPRDRN		*0.01
5/8/2002	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03		0.001 (DNQ)
5/7/2012	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03		*0.007
5/7/2012	Imperial Valley Drains	P Drain-723SSPDRN		*0.021
10/15/2012	Imperial Valley Drains	P Drain-723SSPDRN		*0.006
5/7/2012	Imperial Valley Drains	Timothy 2 Drain-723TI2DRN		*0.037
10/16/2012	Imperial Valley Drains	Timothy 2 Drain-723TI2DRN		*0.01
10/16/2012	Imperial Valley Drains	Verde Drain-723VERDRN		*0.005
5/9/2002	Imperial Valley Drains	W Drain-728SSDS01		0.001 (DNQ)

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
5/8/2002	New River	International Boundary-723NRBDRY		0.0001 (DNQ)
10/22/2013	New River	Evan Hewes Highway-723NREVHU		*0.002
5/6/2002	New River	Salton Sea Outlet-723NROTWM		*0.003
10/2/2002	New River	Salton Sea Outlet-723NROTWM		*0.0023
5/4/2004	New River	Salton Sea Outlet-723NROTWM		*0.002
4/28/2009	New River	Salton Sea Outlet-723NROTWM		*0.022
5/4/2010	New River	Salton Sea Outlet-723NROTWM		*0.006
2/11/2011	New River	Salton Sea Outlet-723NROTWM		*0.007
5/10/2011	New River	Salton Sea Outlet-723NROTWM		*0.008
10/16/2012	New River	Salton Sea Outlet-723NROTWM		*0.008

E-SMR Data

DDT and its breakdown products have not been detected in water samples collected downstream from 18 NPDES permitted facilities that discharge to Imperial Valley waters. All 569 sample results reported between 2010 and 2017 are ND. DDT and its degradates have not been found at concentrations that exceed the USEPA CTR standards.

The RL varies from 0.1 to 3 ug/L for DDT and its degradates. The MDL varies from 0.001 to 1.8 µg/L for DDT and from 0.001 to 2 µg/L for DDT degradates. The RLs would need to be at or below the USEPA CTR standards in future analysis to conclusively determine if discharges from NPDES facilities are meeting the WQOs.

ii. Sediment

SWAMP Data

DDT and its breakdown products DDD and DDE, have been found in SWAMP sediment samples collected from the Alamo River, Imperial Valley Drains, and New River waterways. Samples were collected from 14 sampling locations on the Alamo River, Imperial Valley Drains, and New River. Out of 523 sample results reported between 2002 and 2013, 143 sample results are above the RLs, 134 are DNQ, and 246 are ND. No sediment sample results exceeded the applied PEC numeric screening value of 572 ng/g Total DDTs (MacDonald et al. 2000). No sediment sample results exceeded the applied PEC numeric screening value of 28.0 ng/g for DDDs (MacDonald et al., 2000). Twenty-four sediment sample results exceeded the applied PEC numeric screening value 31.3 ng/g for DDEs (MacDonald et al., 2000).

The RL varies from 0.43 to 21.8 ng/g for DDT and from 0.26 to 8.71 ng/g for DDT breakdown products. The MDL varies from 0.153 to 10.3 ng/g for DDT and from 0.094 to 3.76 ng/g for DDT breakdown products. The RLs are adequate to conclusively determine if the sediment of Imperial Valley waters are meeting the WQOs.

The sediment data in Table C-8, Table C-9 and Table C-10 report SWAMP sample results that are above the MDLs for DDT and its breakdown products. The applied numeric screening value is the PEC of 572 ng/g for Total DDTs.

Table C-8. SWAMP Data: DDT Concentrations in Sediment Samples from Imperial Valley Waters (ng/g).

Date	Waterbody	Sampling Location	DDT(o,p')	DDT(p,p')
10/23/2007	Alamo River	International Boundary-723ARINTL		1(DNQ)
4/21/2008	Alamo River	International Boundary-723ARINTL		0.499(DNQ)
4/28/2009	Alamo River	International Boundary-723ARINTL		0.888(DNQ)

Date	Waterbody	Sampling Location	DDT(o,p')	DDT(p,p')
10/19/2009	Alamo River	International Boundary-723ARINTL		0.335(DNQ)
10/5/2010	Alamo River	International Boundary-723ARINTL		0.483(DNQ)
5/10/2011	Alamo River	International Boundary-723ARINTL		0.349(DNQ)
10/11/2011	Alamo River	International Boundary-723ARINTL		0.427(DNQ)
10/6/2010	Alamo River	Drop 10- 723ARDP10		0.3(DNQ)
4/24/2013	Alamo River	Drop 10- 723ARDP10	1.41(DNQ)	1.65
10/6/2010	Alamo River	Drop 6A- 723ARDP6A	0.625(DNQ)	1.51(DNQ)
10/6/2010	Alamo River	Drop 6- 723ARDP06	0.41(DNQ)	0.885(DNQ)
10/6/2010	Alamo River	Drop 3- 723ARDP03		0.817(DNQ)
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1		1.69(DNQ)
10/23/2007	Alamo River	Salton Sea Outlet-723ARGRB1		1.36(DNQ)
4/21/2008	Alamo River	Salton Sea Outlet-723ARGRB1		1.86(DNQ)
10/28/2008	Alamo River	Salton Sea Outlet-723ARGRB1	0.442(DNQ)	1.59
4/28/2009	Alamo River	Salton Sea Outlet-723ARGRB1		2.35
10/19/2009	Alamo River	Salton Sea Outlet-723ARGRB1		1.38(DNQ)

Date	Waterbody	Sampling Location	DDT(o,p')	DDT(p,p')
5/4/2010	Alamo River	Salton Sea Outlet-723ARGRB1	1.96(DNQ)	22.6
10/6/2010	Alamo River	Salton Sea Outlet-723ARGRB1	0.598(DNQ)	1.43(DNQ)
5/10/2011	Alamo River	Salton Sea Outlet-723ARGRB1	1.15(DNQ)	3.01(DNQ)
10/1/2002	New River	International Boundary-723NRBDRY		39.2
10/25/2005	New River	International Boundary-723NRBDRY		3.81 (DNQ)
10/23/2007	New River	International Boundary-723NRBDRY		0.76 (DNQ)
4/21/2008	New River	International Boundary-723NRBDRY	0.985 (DNQ)	5.59 (DNQ)
4/28/2009	New River	International Boundary-723NRBDRY	1 (DNQ)	4.07
10/19/2009	New River	International Boundary-723NRBDRY	0.597 (DNQ)	3.6 (DNQ)
5/4/2010	New River	International Boundary-723NRBDRY		0.546 (DNQ)
10/5/2010	New River	International Boundary-723NRBDRY	1.38 (DNQ)	11.1
5/10/2011	New River	International Boundary-723NRBDRY	1.15 (DNQ)	4.61 (DNQ)
10/11/2011	New River	International Boundary-723NRBDRY	0.961 (DNQ)	2.77 (DNQ)
10/6/2010	New River	Evan Hewes Hwy-723NREVHU		0.314 (DNQ)

Date	Waterbody	Sampling Location	DDT(o,p')	DDT(p,p')
10/22/2007	New River	Salton Sea Outlet-723NROTWM		3.12 (DNQ)
4/21/2008	New River	Salton Sea Outlet-723NROTWM		6.26 (DNQ)
10/28/2008	New River	Salton Sea Outlet-723NROTWM	1.36	3.07
4/28/2009	New River	Salton Sea Outlet-723NROTWM		1.57
10/19/2009	New River	Salton Sea Outlet-723NROTWM		2.26
5/4/2010	New River	Salton Sea Outlet-723NROTWM	1.45 (DNQ)	3.71 (DNQ)
10/6/2010	New River	Salton Sea Outlet-723NROTWM		0.669 (DNQ)
5/10/2011	New River	Salton Sea Outlet-723NROTWM	0.597 (DNQ)	1.37 (DNQ)
10/11/2011	New River	Salton Sea Outlet-723NROTWM	1.71 (DNQ)	0.348 (DNQ)

The applied numeric screening value is the PEC of 28.0 ng/g for Total DDDs.

Table C-9. SWAMP Data: DDD Concentrations in Sediment Samples from Imperial Valley Waters (ng/g).

Date	Waterbody	Sampling Location	DDD(o,p')	DDD(p,p')
10/23/2007	Alamo River	International Boundary-723ARINTL		0.402 (DNQ)
4/28/2009	Alamo River	International Boundary-723ARINTL	0.392 (DNQ)	0.657 (DNQ)

Date	Waterbody	Sampling Location	DDD(o,p')	DDD(p,p')
10/19/2009	Alamo River	International Boundary-723ARINTL	0.206 (DNQ)	0.423 (DNQ)
5/10/2011	Alamo River	International Boundary-723ARINTL		0.159 (DNQ)
10/6/2010	Alamo River	Drop 10- 723ARDP10	0.198 (DNQ)	0.189 (DNQ)
4/24/2013	Alamo River	Drop 10- 723ARDP10	1.52	1.4 (DNQ)
10/6/2010	Alamo River	Drop 6A- 723ARDP6A	0.915 (DNQ)	
10/6/2010	Alamo River	Drop 6A- 723ARDP6A	0.915 (DNQ)	1.48
10/6/2010	Alamo River	Drop 6- 723ARDP06	0.775 (DNQ)	1.04(DNQ)
10/6/2010	Alamo River	Drop 3- 723ARDP03	0.597 (DNQ)	0.743 (DNQ)
10/2/2002	Alamo River	Salton Sea Outlet-723ARGRB1	2.82	2.97
4/15/2003	Alamo River	Salton Sea Outlet-723ARGRB1	1.05(DNQ)	1.18(DNQ)
5/3/2004	Alamo River	Salton Sea Outlet-723ARGRB1	1.44(DNQ)	1.84
5/9/2005	Alamo River	Salton Sea Outlet-723ARGRB1		1.33(DNQ)
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1	0.803 (DNQ)	1.6
5/1/2006	Alamo River	Salton Sea Outlet-723ARGRB1	1.66(DNQ)	2.56

Date	Waterbody	Sampling Location	DDD(o,p')	DDD(p,p')
10/23/2007	Alamo River	Salton Sea Outlet-723ARGRB1	0.927 (DNQ)	1.23(DNQ)
4/21/2008	Alamo River	Salton Sea Outlet-723ARGRB1	0.916 (DNQ)	1.1(DNQ)
10/28/2008	Alamo River	Salton Sea Outlet-723ARGRB1	0.556	0.921
4/28/2009	Alamo River	Salton Sea Outlet-723ARGRB1	1.31	1.37
10/19/2009	Alamo River	Salton Sea Outlet-723ARGRB1	0.493 (DNQ)	0.741 (DNQ)
5/4/2010	Alamo River	Salton Sea Outlet-723ARGRB1	5.9	14.2
10/6/2010	Alamo River	Salton Sea Outlet-723ARGRB1	1.41(DNQ)	1.35 (DNQ)
5/10/2011	Alamo River	Salton Sea Outlet-723ARGRB1	1.4(DNQ)	0.996 (DNQ)
4/8/2003	Alamo River	Salton Sea Outlet-723ARGRB1		3.5
10/2/2002	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03	1.1(DNQ)	1.78
5/8/2002	New River	International Boundary-723NRBDRY	2.68 (DNQ)	7.33
10/1/2002	New River	International Boundary-723NRBDRY	2.76	12
4/9/2003	New River	International Boundary-723NRBDRY	5.8	19.1
11/4/2003	New River	International Boundary-723NRBDRY	5.34 (DNQ)	15

Date	Waterbody	Sampling Location	DDD(o,p')	DDD(p,p')
5/3/2004	New River	International Boundary-723NRBDRY	3.43	12.5
10/4/2004	New River	International Boundary-723NRBDRY	2.48 (DNQ)	8.68
5/9/2005	New River	International Boundary-723NRBDRY	3.1	8.65
10/25/2005	New River	International Boundary-723NRBDRY	4.42	10.5
5/1/2006	New River	International Boundary-723NRBDRY	5.09	9.1
10/23/2007	New River	International Boundary-723NRBDRY	0.312 (DNQ)	1.08 (DNQ)
4/21/2008	New River	International Boundary-723NRBDRY	1.2 (DNQ)	4.96
4/28/2009	New River	International Boundary-723NRBDRY	3.19	9.55
10/19/2009	New River	International Boundary-723NRBDRY	2.96	8.46
5/4/2010	New River	International Boundary-723NRBDRY	0.351 (DNQ)	0.727 (DNQ)
10/5/2010	New River	International Boundary-723NRBDRY	5.46	17.1
5/10/2011	New River	International Boundary-723NRBDRY	1.13 (DNQ)	2.09
10/11/2011	New River	International Boundary-723NRBDRY	1.4	2.65
10/6/2010	New River	Evan Hewes Hwy-723NREVHU	0.269 (DNQ)	0.452 (DNQ)

Date	Waterbody	Sampling Location	DDD(o,p')	DDD(p,p')
10/5/2004	New River	Salton Sea Outlet-723NROTWM	1.75 (DNQ)	1.9
10/26/2005	New River	Salton Sea Outlet-723NROTWM		0.684 (DNQ)
10/22/2007	New River	Salton Sea Outlet-723NROTWM	0.435 (DNQ)	0.895 (DNQ)
4/21/2008	New River	Salton Sea Outlet-723NROTWM	0.677 (DNQ)	1.75
10/28/2008	New River	Salton Sea Outlet-723NROTWM	2.11	2.13
4/28/2009	New River	Salton Sea Outlet-723NROTWM	0.516 (DNQ)	0.716 (DNQ)
10/19/2009	New River	Salton Sea Outlet-723NROTWM	1.23	1.69
5/4/2010	New River	Salton Sea Outlet-723NROTWM	2.64 (DNQ)	2.73 (DNQ)
10/6/2010	New River	Salton Sea Outlet-723NROTWM	0.378 (DNQ)	0.487 (DNQ)
5/10/2011	New River	Salton Sea Outlet-723NROTWM	0.812 (DNQ)	0.707 (DNQ)

Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the PEC of 31.3 ng/g for Total DDEs.

Table C-10. SWAMP Data: DDE Concentrations in Sediment Samples from Imperial Valley Waters (ng/g).

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
5/8/2002	Alamo River	International Boundary-723ARINTL		3.3
10/1/2002	Alamo River	International Boundary-723ARINTL		1.92(DNQ)
4/9/2003	Alamo River	International Boundary-723ARINTL		10.4
4/12/2003	Alamo River	International Boundary-723ARINTL		6.2
11/4/2003	Alamo River	International Boundary-723ARINTL		4.78
5/3/2004	Alamo River	International Boundary-723ARINTL		9.83
10/4/2004	Alamo River	International Boundary-723ARINTL		1.92(DNQ)
5/9/2005	Alamo River	International Boundary-723ARINTL		4.46
10/25/2005	Alamo River	International Boundary-723ARINTL		1.21(DNQ)
5/1/2006	Alamo River	International Boundary-723ARINTL		4.88
10/23/2007	Alamo River	International Boundary-723ARINTL		8
4/21/2008	Alamo River	International Boundary-723ARINTL		4.31
4/28/2009	Alamo River	International Boundary-723ARINTL	0.986	24.3

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
10/19/2009	Alamo River	International Boundary-723ARINTL		8.07
5/4/2010	Alamo River	International Boundary-723ARINTL		4.99(DNQ)
10/5/2010	Alamo River	International Boundary-723ARINTL		3.4
5/10/2011	Alamo River	International Boundary-723ARINTL		5.14
10/11/2011	Alamo River	International Boundary-723ARINTL		3.26
4/11/2003	Alamo River	Drop 10- 723ARDP10		24
10/6/2010	Alamo River	Drop 10- 723ARDP10		6.89
4/24/2013	Alamo River	Drop 10- 723ARDP10	1.56	*68.1
4/11/2003	Alamo River	Drop 6A- 723ARDP6A		25.2
10/6/2010	Alamo River	Drop 6A- 723ARDP6A	1.07(DNQ)	*35.1
4/9/2003	Alamo River	Drop 6- 723ARDP06		*35.9
10/6/2010	Alamo River	Drop 6- 723ARDP06	0.872(DNQ)	25.2
10/6/2010	Alamo River	Drop 3- 723ARDP03	0.596(DNQ)	18.1
5/6/2002	Alamo River	Salton Sea Outlet-723ARGRB1		*58.6
10/2/2002	Alamo River	Salton Sea Outlet-723ARGRB1	1.33(DNQ)	*66.1
4/8/2003	Alamo River	Salton Sea Outlet-723ARGRB1		*75.4

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
11/4/2003	Alamo River	Salton Sea Outlet-723ARGRB1		13.3
5/3/2004	Alamo River	Salton Sea Outlet-723ARGRB1	1.05(DNQ)	*37.3
10/5/2004	Alamo River	Salton Sea Outlet-723ARGRB1		12.8
5/9/2005	Alamo River	Salton Sea Outlet-723ARGRB1		*35.2
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1	0.796(DNQ)	29
5/1/2006	Alamo River	Salton Sea Outlet-723ARGRB1	1.53(DNQ)	*68.2
10/23/2007	Alamo River	Salton Sea Outlet-723ARGRB1	0.664(DNQ)	28
4/21/2008	Alamo River	Salton Sea Outlet-723ARGRB1	0.734(DNQ)	*36
10/28/2008	Alamo River	Salton Sea Outlet-723ARGRB1	0.458(DNQ)	19.1
4/28/2009	Alamo River	Salton Sea Outlet-723ARGRB1	0.861	*43
10/19/2009	Alamo River	Salton Sea Outlet-723ARGRB1		12.8
5/4/2010	Alamo River	Salton Sea Outlet-723ARGRB1	3.6(DNQ)	*67
10/6/2010	Alamo River	Salton Sea Outlet-723ARGRB1	1.23(DNQ)	*37.8
5/10/2011	Alamo River	Salton Sea Outlet-723ARGRB1	1.22(DNQ)	*45.8

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
5/9/2002	Imperial Valley Drains	W Drain- 728SSDS01		6.65
5/13/2002	Imperial Valley Drains	Niland 4 Drain-723SSDS02		2.78 (DNQ)
10/3/2002	Imperial Valley Drains	Niland 4 Drain-723SSDS02		1.59 (DNQ)
5/8/2002	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03		4.57
10/2/2002	Imperial Valley Drains	Trifolium 1 Drain-723SSDS03		*38.8
5/8/2002	New River	International Boundary-723NRBDRY		15.9
10/1/2002	New River	International Boundary-723NRBDRY		19.4
4/9/2003	New River	International Boundary-723NRBDRY	2.56 (DNQ)	*39.5
11/4/2003	New River	International Boundary-723NRBDRY		*41.2
5/3/2004	New River	International Boundary-723NRBDRY	1.42	27
10/4/2004	New River	International Boundary-723NRBDRY		31.2
5/9/2005	New River	International Boundary-723NRBDRY		*34
10/25/2005	New River	International Boundary-723NRBDRY	2.29 (DNQ)	28.7
5/1/2006	New River	International Boundary-723NRBDRY	5.93 (DNQ)	28

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
10/23/2007	New River	International Boundary-723NRBDRY		4.4
4/21/2008	New River	International Boundary-723NRBDRY	0.68 (DNQ)	17.8
4/28/2009	New River	International Boundary-723NRBDRY	1.55	26
10/19/2009	New River	International Boundary-723NRBDRY	1.68 (DNQ)	21.2
5/4/2010	New River	International Boundary-723NRBDRY		14.4
10/5/2010	New River	International Boundary-723NRBDRY	3.27 (DNQ)	*50.6
5/10/2011	New River	International Boundary-723NRBDRY	0.45 (DNQ)	8.61
10/11/2011	New River	International Boundary-723NRBDRY	0.939 (DNQ)	13.5
4/15/2003	New River	Evan Hewes Hwy-723NREVHU		8.8
10/6/2010	New River	Evan Hewes Hwy-723NREVHU	0.26 (DNQ)	6.89
5/6/2002	New River	Salton Sea Outlet-723NROTWM		*37
10/2/2002	New River	Salton Sea Outlet-723NROTWM		2.09 (DNQ)
4/15/2003	New River	Salton Sea Outlet-723NROTWM		17.9
11/4/2003	New River	Salton Sea Outlet-723NROTWM		17.4

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
5/4/2004	New River	Salton Sea Outlet-723NROTWM		3.04
10/5/2004	New River	Salton Sea Outlet-723NROTWM		*36
5/10/2005	New River	Salton Sea Outlet-723NROTWM		14.6
10/26/2005	New River	Salton Sea Outlet-723NROTWM		14.5
5/1/2006	New River	Salton Sea Outlet-723NROTWM		20.3
10/22/2007	New River	Salton Sea Outlet-723NROTWM		14
4/21/2008	New River	Salton Sea Outlet-723NROTWM	0.615 (DNQ)	25.3
10/28/2008	New River	Salton Sea Outlet-723NROTWM	1.48	*67.7
4/28/2009	New River	Salton Sea Outlet-723NROTWM	0.46 (DNQ)	18.3
10/19/2009	New River	Salton Sea Outlet-723NROTWM	0.984	*36.2
5/4/2010	New River	Salton Sea Outlet-723NROTWM	2.21 (DNQ)	*75
10/6/2010	New River	Salton Sea Outlet-723NROTWM	0.477 (DNQ)	11.8
5/10/2011	New River	Salton Sea Outlet-723NROTWM	0.842 (DNQ)	28.2
10/16/2012	New River	Salton Sea Outlet-723NROTWM		1.2 (DNQ)

Date	Waterbody	Sampling Location	DDE(o,p')	DDE(p,p')
4/14/2003	New River	Salton Sea Outlet-723NROTWM	6.8	

iii. Fish Tissue

TSMP and SWAMP Data

DDT and its breakdown products DDD and DDE, have been found in TSMP and SWAMP fish tissue collected from the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Fish tissue samples were collected from 28 sampling locations on the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Out of 181 sample results reported between 1978 and 2014, 180 sample results are above the RLs, and 1 is ND. 175 fish tissue samples exceeded the OEHHA numeric screening value of 15 ng/g (Klasing and Brodberg, 2008).

The RL varies from 0.46 to 264 ng/g. The MDL varies from 0.087 to 400 ng/g. The RLs need to be consistently at or below the FCG in future analysis to conclusively determine if the fish in Imperial Valley waters are meeting the WQO.

The fish tissue data shown in Table C-11 reports TSMP and SWAMP sample results for total DDT. Sample results that exceed the applied screening are in bold font and noted with an asterisk (*). The applied numeric screening value is the OEHHA FCG of 15 ng/g.

Table C-11. TSMP-SWAMP Combined Data: DDT Concentrations in Fish Tissue Samples from Alamo River, Imperial Valley Drains, New River and Wiest Lake (ng/g).

Date	Waterbody	Sampling Location	Result
11/15/1985	Alamo River	International Boundary-723ST0025	*170
11/15/1985	Alamo River	International Boundary-723ST0025	*1127
9/2/1987	Alamo River	International Boundary-723ST0025	*1371

Date	Waterbody	Sampling Location	Result
11/20/1988	Alamo River	International Boundary-723ST0025	*1152
11/7/2000	Alamo River	International Boundary-723ST0025	*103
11/19/2001	Alamo River	International Boundary-723ST0025	*167
10/22/2002	Alamo River	International Boundary-723ST0025	*59
11/17/2014	Alamo River	International Boundary-723ARINTL	*24
9/30/1993	Alamo River	Holtville- 723ST0024	*515
4/21/2011	Alamo River	Drop 10- 723ARDP10	*99
11/16/2011	Alamo River	Drop 10- 723ARDP10	*134
3/28/2012	Alamo River	Drop 10- 723ARDP10	*1082
5/7/2012	Alamo River	Drop 10- 723ARDP10	*336
10/16/2012	Alamo River	Drop 10- 723ARDP10	*120
9/30/1993	Alamo River	Brawley- 723ST0022	*460
11/9/2004	Alamo River	Brawley- 723ARBRAW	*385
11/9/2004	Alamo River	Brawley- 723ARBRAW	*346.5
11/9/2004	Alamo River	Brawley- 723ARBRAW	*579
6/21/1978	Alamo River	Calipatria- 723ST0023	*882
6/21/1978	Alamo River	Calipatria- 723ST0023	*1490
3/12/1979	Alamo River	Calipatria- 723ST0023	*3730

Date	Waterbody	Sampling Location	Result
3/12/1979	Alamo River	Calipatria- 723ST0023	*50
5/8/1980	Alamo River	Calipatria- 723ST0023	*2482
5/8/1980	Alamo River	Calipatria- 723ST0023	*20
5/23/1981	Alamo River	Calipatria- 723ST0023	*4621
5/23/1981	Alamo River	Calipatria- 723ST0023	*3582
4/22/1982	Alamo River	Calipatria- 723ST0023	*3248
4/22/1982	Alamo River	Calipatria- 723ST0023	*2060
6/13/1983	Alamo River	Calipatria- 723ST0023	*5300
6/13/1983	Alamo River	Calipatria- 723ST0023	*9153
5/23/1984	Alamo River	Calipatria- 723ST0023	*1867
5/23/1984	Alamo River	Calipatria- 723ST0023	*3035
9/17/1985	Alamo River	Calipatria- 723ST0023	*7125
9/17/1985	Alamo River	Calipatria- 723ST0023	*1269
9/30/1987	Alamo River	Calipatria- 723ST0023	*3248
11/18/1988	Alamo River	Calipatria- 723ST0023	*2808
10/28/1989	Alamo River	Calipatria- 723ST0023	*596
8/3/1990	Alamo River	Calipatria- 723ST0023	*5435
9/20/1992	Alamo River	Calipatria- 723ST0023	*340
9/29/1993	Alamo River	Calipatria- 723ST0023	*5517
10/27/1994	Alamo River	Calipatria- 723ST0023	*696
10/27/1994	Alamo River	Calipatria- 723ST0023	*3,081

Date	Waterbody	Sampling Location	Result
11/1/1996	Alamo River	Calipatria- 723ST0023	*1907
11/20/1997	Alamo River	Calipatria- 723ST0023	*2621
11/11/1998	Alamo River	Calipatria- 723ST0023	*959
11/7/2000	Alamo River	Calipatria- 723ST0023	*2672
11/7/2004	Alamo River	Outlet Salton Sea- 723ARGRB1	*546
11/7/2004	Alamo River	Outlet Salton Sea- 723ARGRB1	*115.5
11/7/2004	Alamo River	Outlet Salton Sea- 723ARGRB1	*315
2/8/2011	Alamo River	Outlet Salton Sea- 723ARGRB1	*1001
4/22/2011	Alamo River	Outlet Salton Sea- 723ARGRB1	*685
11/17/2011	Alamo River	Outlet Salton Sea- 723ARGRB1	*490
11/17/2011	Alamo River	Outlet Salton Sea- 723ARGRB1	*1310
3/28/2012	Alamo River	Outlet Salton Sea- 723ARGRB1	*2250
5/8/2012	Alamo River	Outlet Salton Sea- 723ARGRB1	*64
10/16/2012	Alamo River	Outlet Salton Sea- 723ARGRB1	*277
12/2/2014	Alamo River	Outlet Salton Sea- 723ARGRB1	*15.5

Date	Waterbody	Sampling Location	Result
12/2/2014	Alamo River	Outlet Salton Sea-723ARGRB1	*1594
9/17/1992	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*320
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*2109
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*1905
2/7/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*983
4/20/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*674
5/7/2012	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*658
11/18/1988	Imperial Valley Drains	Central Drain-723ST0252	*144
12/5/1999	Imperial Valley Drains	Central Drain-723ST0252	*3384
11/8/2000	Imperial Valley Drains	Central Drain-723ST0252	*465
11/2/2004	Imperial Valley Drain	Central Drain-723CNTDRN	*183.5
11/2/2004	Imperial Valley Drain	Central Drain-723CNTDRN	*138
11/2/2004	Imperial Valley Drain	Central Drain-723CNTDRN	*102
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*571

Date	Waterbody	Sampling Location	Result
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*332
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*566
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*520
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*946
2/11/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*624
4/20/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*773
5/8/2012	Imperial Valley Drains	Central Drain-723CNTDRN	*65
10/15/2012	Imperial Valley Drains	Central Drain-723CNTDRN	*404
11/15/1985	Imperial Valley Drains	Greeson Drain-723ST0532	*597
11/15/1985	Imperial Valley Drains	Greeson Drain-723ST0532	*991
9/18/1992	Imperial Valley Drains	Greeson Drain-723ST0532	13
9/18/1992	Imperial Valley Drains	Greeson Drain-723ST0532	*181
11/7/2000	Imperial Valley Drains	Greeson Drain-723ST0532	*1176
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	*438

Date	Waterbody	Sampling Location	Result
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*414
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*904
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*39
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*15
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*38
10/28/1989	Imperial Valley Drains	Holtville Drain- 723ST0565	*995
8/30/1990	Imperial Valley Drains	Holtville Drain- 723ST0565	*444
12/5/1999	Imperial Valley Drains	Holtville Drain- 723ST0565	*865
11/10/2000	Imperial Valley Drains	Holtville Drain- 723ST0565	*85
8/16/1991	Imperial Valley Drains	Mayflower Drain- 723ST0881	*1710
9/17/1992	Imperial Valley Drains	Peach Drain- 723ST1141	*2577
10/28/1995	Imperial Valley Drains	Peach Drain- 723ST1141	*5106
11/3/1996	Imperial Valley Drains	Peach Drain- 723ST1141	*4549
2/7/2011	Imperial Valley Drains	Peach Drain- 723PEACHD	*503
4/19/2011	Imperial Valley Drains	Peach Drain- 723PEACHD	*614

Date	Waterbody	Sampling Location	Result
5/7/2012	Imperial Valley Drains	Peach Drain- 723PEACHD	*944
10/15/2012	Imperial Valley Drains	Peach Drain- 723PEACHD	*397
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	*3373
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	*379
11/1/1996	Imperial Valley Drains	Pumice Drain- 723ST1210	*120
10/10/1985	Imperial Valley Drains	Rice Drain 3- 723ST1252	*3496
10/15/1986	Imperial Valley Drains	Rice Drain 3- 723ST1252	*364
2/12/2011	Imperial Valley Drains	Rice Drain- 723RICEDR	*2129
4/20/2011	Imperial Valley Drains	Rice Drain- 723RICEDR	*496
11/17/1988	Imperial Valley Drains	Rose Drain- 723ST1269	*953
8/17/1991	Imperial Valley Drains	Rose Drain- 723ST1269	*484
8/1/1990	Imperial Valley Drains	South Central Drain- 723ST1699	*1481
9/18/1992	Imperial Valley Drains	South Central Drain- 723ST1699	*72
12/5/1999	Imperial Valley Drains	South Central Drain- 723ST1699	*2530
11/8/2000	Imperial Valley Drains	South Central Drain- 723ST1699	*712
5/8/2012	Imperial Valley Drains	South Central Drain- 723SCNTDR	12

Date	Waterbody	Sampling Location	Result
10/15/2012	Imperial Valley Drains	South Central Drain-723SCNTDR	*1711
10/27/1989	Imperial Valley Drains	Verde Drain- 723ST1850	*902
10/26/1989	Imperial Valley Drains	Warren Drain-723ST1864	*1355
9/9/1990	Imperial Valley Drains	Warren Drain-723ST1864	*1074
5/17/1984	New River	International Boundary-723ST1031	*326
10/1/1985	New River	International Boundary-723ST1031	*443
5/12/1987	New River	International Boundary-723ST1031	*90
7/20/1989	New River	International Boundary-723ST1031	*108
7/20/1989	New River	International Boundary-723ST1031	*351
7/31/1990	New River	International Boundary-723ST1031	*1209
12/18/1991	New River	International Boundary-723ST1031	*620
6/16/1993	New River	International Boundary-723ST1031	*661
11/2/1994	New River	International Boundary-723ST1031	*594
12/10/1997	New River	International Boundary-723ST1031	*80

Date	Waterbody	Sampling Location	Result
2/9/2011	New River	International Boundary-723NRBDRY	*53
2/9/2011	New River	International Boundary-723NRBDRY	*129
4/23/2011	New River	International Boundary-723NRBDRY	*503
12/2/2011	New River	International Boundary-723NRBDRY	*501
4/4/2012	New River	International Boundary-723NRBDRY	*113
5/8/2012	New River	International Boundary-723NRBDRY	*26
10/17/2012	New River	International Boundary-723NRBDRY	*20
6/22/1978	New River	Outlet Salton Sea-723ST1032	*3368
6/22/1978	New River	Outlet Salton Sea-723ST1032	*124
6/22/1978	New River	Outlet Salton Sea-723ST1032	11
3/13/1979	New River	Outlet Salton Sea-723ST1032	*2200
5/9/1980	New River	Outlet Salton Sea-723ST1032	*2231
5/9/1980	New River	Outlet Salton Sea-723ST1032	*978
5/9/1980	New River	Outlet Salton Sea-723ST1032	*1609

Date	Waterbody	Sampling Location	Result
5/9/1980	New River	Outlet Salton Sea-723ST1032	7
5/24/1981	New River	Outlet Salton Sea-723ST1032	*852
5/24/1981	New River	Outlet Salton Sea-723ST1032	*641
4/22/1982	New River	Outlet Salton Sea-723ST1032	*2739
4/22/1982	New River	Outlet Salton Sea-723ST1032	*1723
4/22/1982	New River	Outlet Salton Sea-723ST1032	*461
6/13/1983	New River	Outlet Salton Sea-723ST1032	*2794
6/13/1983	New River	Outlet Salton Sea-723ST1032	*794
5/24/1984	New River	Outlet Salton Sea-723ST1032	*1111
10/9/1985	New River	Outlet Salton Sea-723ST1032	*690
10/10/1985	New River	Outlet Salton Sea-723ST1032	*670
10/15/1986	New River	Outlet Salton Sea-723ST1032	*638
9/3/1987	New River	Outlet Salton Sea-723ST1032	*2465
11/18/1988	New River	Outlet Salton Sea-723ST1032	*773

Date	Waterbody	Sampling Location	Result
10/29/1989	New River	Outlet Salton Sea-723ST1032	*241
8/3/1990	New River	Outlet Salton Sea-723ST1032	*2635
8/15/1991	New River	Outlet Salton Sea-723ST1032	*510
8/15/1991	New River	Outlet Salton Sea-723ST1032	*68
9/20/1992	New River	Outlet Salton Sea-723ST1032	*975
9/20/1992	New River	Outlet Salton Sea-723ST1032	*120
9/29/1993	New River	Outlet Salton Sea-723ST1032	*1061
10/27/1994	New River	Outlet Salton Sea-723ST1032	*140
10/27/1995	New River	Outlet Salton Sea-723ST1032	*318
11/1/1996	New River	Outlet Salton Sea-723ST1032	*49
11/20/1997	New River	Outlet Salton Sea-723ST1032	*482
11/11/1998	New River	Outlet Salton Sea-723ST1032	*220
12/9/1999	New River	Outlet Salton Sea-723ST1032	*526
11/5/2004	New River	Outlet Salton Sea-723NROTWM	*195

Date	Waterbody	Sampling Location	Result
2/9/2011	New River	Outlet Salton Sea-723NROTWM	*549
4/22/2011	New River	Outlet Salton Sea-723NROTWM	*543
11/17/2011	New River	Outlet Salton Sea-723NROTWM	*258
4/4/2012	New River	Outlet Salton Sea-723NROTWM	*835
5/8/2012	New River	Outlet Salton Sea-723NROTWM	*133
10/16/2012	New River	Outlet Salton Sea-723NROTWM	*30
12/1/2014	New River	Outlet Salton Sea-723NROTWM	11
12/10/2014	New River	Outlet Salton Sea-723NROTWM	*185
12/6/1999	Wiest Lake	Wiest Lake- 723ST1886	*38.5
10/31/1989	Wiest Lake	Wiest Lake- 723ST1886	*38
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	3.88
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	4.82
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	4.99
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*40.41
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*36.44
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*73.69
11/1/2007	Wiest Lake	Wiest Lake- 723PWT019	*48.6

Date	Waterbody	Sampling Location	Result
10/1/2014	Wiest Lake	Wiest Lake- 723PWT019	*71.5
10/1/2014	Wiest Lake	Wiest Lake- 723PWT019	4.76
11/17/2015	Wiest Lake	Wiest Lake- 723PWT019	*17.9
3/1/2016	Wiest Lake	Wiest Lake- 723PWT019	3.9
3/1/2016	Wiest Lake	Wiest Lake- 723PWT019	*266.01
3/1/2016	Wiest Lake	Wiest Lake- 723PWT019	*15.5

c. *Dieldrin*

i. Water

SWAMP Data

Dieldrin has been found in SWAMP water samples collected from the Alamo River, Imperial Valley Drains, and New River. Samples were collected from 33 sampling locations on the Alamo River, Imperial Valley Drains, and New River. Out of 161 sample results reported between 2002 and 2013, 12 sample results are above the RLs, 3 are DNQ, and 146 are ND. 12 water samples exceeded the USEPA CTR standard of 0.00014 µg/L (USEPA, 2000).

The RL varies from 0.002 to 10 µg/L; the MDL varies from 0.001 to 0.17 µg/L. The RLs would need to be at or below the USEPA CTR standard in future analysis to conclusively determine if Imperial Valley waters are meeting the WQO.

The water data shown in Table C-12 reports SWAMP sample results for dieldrin. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the USEPA CTR standard of 0.00014 µg/L.

Table C-12. SWAMP Data: Dieldrin Concentrations in Water Samples from Imperial Valley Waters (µg/L).

Date	Waterbody	Sampling Location	Result
4/09/2003	Alamo River	International Boundary- 723ARINTL	0.001 (DNQ)
5/06/2002	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.002
11/04/2003	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.002
5/03/2004	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.002
4/28/2009	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.01
4/22/2011	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.003
10/15/2012	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.005
10/21/2013	Alamo River	Salton Sea Outlet- 723ARGRB1	*0.002
10/15/2012	Imperial Valley Drains	C Drain- 723ARCDRN	*0.007
10/15/2012	Imperial Valley Drains	N Drain- 723ARNDRN	*0.01
10/17/2012	Imperial Valley Drains	South Central Drain- 723SCNTDR	*0.005
10/16/2012	Imperial Valley Drains	Timothy 2 Drain- 723TI2DRN	*0.003
5/6/2002	New River	Salton Sea Outlet- 723NROTWM	*0.002

Date	Waterbody	Sampling Location	Result
4/15/2003	New River	Salton Sea Outlet-723NROTWM	0.001 (DNQ)
11/4/2003	New River	Salton Sea Outlet-723NROTWM	0.001 (DNQ)

E-SMR Data

Dieldrin has not been found in water samples collected downstream from 18 NPDES permitted facilities that discharge to Imperial Valley waters. All 125 sample results reported between 2010 and 2017, were ND. Dieldrin has not been found at concentrations that exceed the USEPA CTR standard of 0.00014 µg/L.

The RL varies from 0.001 to 0.5 µg/L, the MDL varies from 0.0023 to 0.3 µg/L. The RL and MDL would need to be at or below the CTR standard in future analysis to conclusively determine if discharges from NPDES facilities are meeting the WQO.

ii. Sediment

SWAMP Data

Dieldrin has been found in SWAMP sediment samples collected from the Alamo River, and New River. Sediment samples were collected from 13 sampling locations on the Alamo River, Imperial Valley Drains, and New River. Out of 82 sample results reported between 2002 and 2012, 43 sample results are above the RLs, 13 are DNQ, and 26 are ND. The concentrations found in sediment are below the PEC numeric screen value of 61.8 ng/g (MacDonald et al., 2000).

The RL varies from 0.49 to 5.8 ng/g. The MDL varies from 0.252 to 1.88 ng/g. The RLs are adequate to conclusively determine if the sediment of Imperial Valley waters are meeting the WQO. The sediment data shown in Table C-13 reports SWAMP samples results for dieldrin. The applied numeric screening value is the PEC of 61.8 ng/g.

Table C-13. SWAMP Data: Dieldrin Concentrations in Sediment Samples from Imperial Valley Waterways (ng/g).

Date	Waterbody	Sampling Location	Result
4/28/2009	Alamo River	International Boundary-723ARINTL	0.552 (DNQ)

Date	Waterbody	Sampling Location	Result
10/19/2009	Alamo River	International Boundary-723ARINTL	0.641 (DNQ)
5/04/2010	Alamo River	International Boundary-723ARINTL	1.77 (DNQ)
5/10/2011	Alamo River	International Boundary-723ARINTL	0.71
10/06/2010	Alamo River	Drop 10- 723ARDP10	0.606
4/24/2013	Alamo River	Drop 10- 723ARDP10	2.25
10/06/2010	Alamo River	Drop 6A- 723ARDP6A	1.34
10/06/2010	Alamo River	Drop 6- 723ARDP06	1.38
10/06/2010	Alamo River	Drop 3- 723ARDP03	1.07
5/06/2002	Alamo River	Salton Sea Outlet-723ARGRB1	1.5 (DNQ)
10/02/2002	Alamo River	Salton Sea Outlet-723ARGRB1	1.25
4/15/2003	Alamo River	Salton Sea Outlet-723ARGRB1	0.843 (DNQ)
11/04/2003	Alamo River	Salton Sea Outlet-723ARGRB1	0.656 (DNQ)
4/03/2004	Alamo River	Salton Sea Outlet-723ARGRB1	0.951
10/05/2004	Alamo River	Salton Sea Outlet-723ARGRB1	0.918
5/09/2005	Alamo River	Salton Sea Outlet-723ARGRB1	1.14

Date	Waterbody	Sampling Location	Result
10/26/2005	Alamo River	Salton Sea Outlet-723ARGRB1	0.807
5/01/2006	Alamo River	Salton Sea Outlet-723ARGRB1	2.1
10/23/2007	Alamo River	Salton Sea Outlet-723ARGRB1	1.74
4/21/2008	Alamo River	Salton Sea Outlet-723ARGRB1	2.07
10/28/2008	Alamo River	Salton Sea Outlet-723ARGRB1	1.02
4/28/2009	Alamo River	Salton Sea Outlet-723ARGRB1	1.45
10/19/2009	Alamo River	Salton Sea Outlet-723ARGRB1	0.983
5/04/2010	Alamo River	Salton Sea Outlet-723ARGRB1	4.91
10/06/2010	Alamo River	Salton Sea Outlet-723ARGRB1	1.08
5/10/2011	Alamo River	Salton Sea Outlet-723ARGRB1	1.5
10/01/2002	New River	International Boundary-723NRBDRY	0.689 (DNQ)
4/09/2003	New River	International Boundary-723NRBDRY	2.5 (DNQ)
11/04/2003	New River	International Boundary-723NRBDRY	2.24 (DNQ)
5/03/2004	New River	International Boundary-723NRBDRY	1.74

Date	Waterbody	Sampling Location	Result
10/04/2004	New River	International Boundary-723NRBDRY	1.87
5/09/2005	New River	International Boundary-723NRBDRY	2.24
10/25/2005	New River	International Boundary-723NRBDRY	2.21
5/01/2006	New River	International Boundary-723NRBDRY	4.14
4/21/2008	New River	International Boundary-723NRBDRY	3.73
4/28/2009	New River	International Boundary-723NRBDRY	2.94
10/19/2009	New River	International Boundary-723NRBDRY	1.51
10/05/2010	New River	International Boundary-723NRBDRY	3.2
5/10/2011	New River	International Boundary-723NRBDRY	1.67
10/11/2011	New River	International Boundary-723NRBDRY	1.71
10/06/2010	New River	Evan Hewes Highway-723EVHU	1.07
5/06/2002	New River	Salton Sea Outlet-723NROTWM	1.71 (DNQ)
4/15/2003	New River	Salton Sea Outlet-723NROTWM	0.933 (DNQ)
11/04/2003	New River	Salton Sea Outlet-723NROTWM	0.914 (DNQ)

Date	Waterbody	Sampling Location	Result
10/05/2004	New River	Salton Sea Outlet-723NROTWM	1.55
5/10/2005	New River	Salton Sea Outlet-723NROTWM	0.987
10/26/2005	New River	Salton Sea Outlet-723NROTWM	0.509 (DNQ)
5/01/2006	New River	Salton Sea Outlet-723NROTWM	1.11
10/22/2007	New River	Salton Sea Outlet-723NROTWM	1.45
4/21/2008	New River	Salton Sea Outlet-723NROTWM	3.56
10/28/2008	New River	Salton Sea Outlet-723NROTWM	1.72
4/28/2009	New River	Salton Sea Outlet-723NROTWM	1.26
10/19/2009	New River	Salton Sea Outlet-723NROTWM	0.896
5/04/2010	New River	Salton Sea Outlet-723NROTWM	2.02
10/06/2010	New River	Salton Sea Outlet-723NROTWM	1.05
5/10/2011	New River	Salton Sea Outlet-723NROTWM	1.94

i. Fish Tissue

TSMP and SWAMP Data

Dieldrin has been found in SWAMP and TSMP fish tissue samples collected from the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Fish tissue samples were collected from 30 sampling locations on the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. For Wiest Lake, only a few fish tissue samples have been collected recently and it is still too early to establish a trend. Out of 186 sample results reported between 1978 and 2014, 160 sample results are above the RLs, 2 are DNQ, and 24 are ND. 160 sample results are above the OEHHA numeric screening value of 0.32 ng/g (Klasing and Brodberg, 2008).

The RL varies from 0.46 to 50 ng/g. The MDL varies from 0.207 to 43.1 ng/g. The RLs need to be consistently at or below the FCG in future analysis to conclusively determine if the fish in Imperial Valley waters are meeting the WQO.

The fish tissue data shown in Table C-14 reports SWAMP and TSMP sample results that are above the method detection limits (MDL) for dieldrin. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the OEHHA FCG of 0.32 ng/g.

Table C-14. TSMP-SWAMP Combined Data: Dieldrin Concentrations in Fish Tissue Samples from Alamo River, Imperial Valley Drains, New River and Wiest Lake (ng/g).

Date	Waterbody	Sampling Location	Result
11/15/1985	Alamo River	International Boundary-723ST0025	*9.9
9/2/1987	Alamo River	International Boundary-723ST0025	*25
11/20/1988	Alamo River	International Boundary-723ST0025	*10
10/22/2002	Alamo River	International Boundary-723ST0025	*0.6
11/17/2014	Alamo River	International Boundary-723ARINTL	0.42 (DNQ)

Date	Waterbody	Sampling Location	Result
9/30/1993	Alamo River	Holtville- 723ST0024	*14
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*1.7
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*2.01
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*1.96
4/21/2011	Alamo River	Drop 10- 723ARDP10	*1.74
11/16/2011	Alamo River	Drop 10- 723ARDP10	*1.32
3/28/2012	Alamo River	Drop 10- 723ARDP10	*8.47
5/7/2012	Alamo River	Drop 10- 723ARDP10	*0.962
10/16/2012	Alamo River	Drop 10- 723ARDP10	*1.15
9/30/1993	Alamo River	Brawley- 723ST0022	*9.6
11/9/2004	Alamo River	Brawley- 723ARBRAW	*2.43
11/9/2004	Alamo River	Brawley- 723ARBRAW	*2.07
11/9/2004	Alamo River	Brawley- 723ARBRAW	*7.81
6/21/1978	Alamo River	Calipatria- 723ST0023	*28
6/21/1978	Alamo River	Calipatria- 723ST0023	*33
3/12/1979	Alamo River	Calipatria- 723ST0023	*77
5/8/1980	Alamo River	Calipatria- 723ST0023	*52
5/23/1981	Alamo River	Calipatria- 723ST0023	*10
5/23/1981	Alamo River	Calipatria- 723ST0023	*25
4/22/1982	Alamo River	Calipatria- 723ST0023	*110
4/22/1982	Alamo River	Calipatria- 723ST0023	*8.6

Date	Waterbody	Sampling Location	Result
6/13/1983	Alamo River	Calipatria- 723ST0023	*16
6/13/1983	Alamo River	Calipatria- 723ST0023	*8
5/23/1984	Alamo River	Calipatria- 723ST0023	*16
9/17/1985	Alamo River	Calipatria- 723ST0023	*35
9/17/1985	Alamo River	Calipatria- 723ST0023	*14
9/30/1987	Alamo River	Calipatria- 723ST0023	*51
11/18/1988	Alamo River	Calipatria- 723ST0023	*17
10/28/1989	Alamo River	Calipatria- 723ST0023	*13
8/3/1990	Alamo River	Calipatria- 723ST0023	*90
9/20/1992	Alamo River	Calipatria- 723ST0023	*8.4
9/29/1993	Alamo River	Calipatria- 723ST0023	*74
10/27/1994	Alamo River	Calipatria- 723ST0023	*50
10/27/1994	Alamo River	Calipatria- 723ST0023	*11
11/1/1996	Alamo River	Calipatria- 723ST0023	*19
11/20/1997	Alamo River	Calipatria- 723ST0023	*23
11/11/1998	Alamo River	Calipatria- 723ST0023	*33.4
11/7/2000	Alamo River	Calipatria- 723ST0023	*23
11/7/2004	Alamo River	Outlet Salton Sea- 723ARGRB1	*7.9
11/7/2004	Alamo River	Outlet Salton Sea- 723ARGRB1	*2.14

Date	Waterbody	Sampling Location	Result
11/7/2004	Alamo River	Outlet Salton Sea-723ARGRB1	*4.75
2/8/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*15.1
4/22/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*8.95
11/17/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*2.08
11/17/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*33.6
3/28/2012	Alamo River	Outlet Salton Sea-723ARGRB1	*62.9
5/8/2012	Alamo River	Outlet Salton Sea-723ARGRB1	*0.912
10/16/2012	Alamo River	Outlet Salton Sea-723ARGRB1	*2.04
12/2/2014	Alamo River	Outlet Salton Sea-723ARGRB1	*0.84
12/2/2014	Alamo River	Outlet Salton Sea-723ARGRB1	*7.65
9/17/1992	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*48
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*64.7
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*60.3
2/7/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	11.6

Date	Waterbody	Sampling Location	Result
11/18/1988	Imperial Valley Drains	Central Drain- 723ST0252	*13
12/5/1999	Imperial Valley Drains	Central Drain- 723ST0252	*96.2
11/8/2000	Imperial Valley Drains	Central Drain- 723ST0252	*23.1
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*7.49
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*10.4
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*21.6
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*6.5
11/2/2004	Imperial Valley Drains	Central Drain- 723CNTDRN	*18
2/11/2011	Imperial Valley Drains	Central Drain- 723CNTDRN	*5.55
4/20/2011	Imperial Valley Drains	Central Drain- 723CNTDRN	*6.79
5/8/2012	Imperial Valley Drains	Central Drain- 723CNTDRN	*1.57
11/15/1985	Imperial Valley Drains	Greeson Drain- 723ST0532	*22
11/15/1985	Imperial Valley Drains	Greeson Drain- 723ST0532	*17
10/26/1989	Imperial Valley Drains	Greeson Drain- 723ST0532	*38.5
11/7/2000	Imperial Valley Drains	Greeson Drain- 723ST0532	*13
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*13.5
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*20.8
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	38.3
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*3.56
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*3.09
11/4/2004	Imperial Valley Drains	Greeson Drain- 723GRSDRN	*1.79

Date	Waterbody	Sampling Location	Result
10/28/1989	Imperial Valley Drains	Holtville Drain- 723ST0565	*24
8/30/1990	Imperial Valley Drains	Holtville Drain- 723ST0565	*5.7
12/5/1999	Imperial Valley Drains	Holtville Drain- 723ST0565	*11.7
8/16/1991	Imperial Valley Drains	Mayflower Drain- 723ST0881	*16
9/17/1992	Imperial Valley Drains	Peach Drain- 723ST1141	*310
10/28/1995	Imperial Valley Drains	Peach Drain- 723ST1141	*220
11/3/1996	Imperial Valley Drains	Peach Drain- 723ST1141	*70
2/7/2011	Imperial Valley Drains	Peach Drain- 723PEACHD	*39
10/15/2012	Imperial Valley Drains	Peach Drain- 723PEACHD	*11.3
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	*66
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	*7.8
10/10/1985	Imperial Valley Drains	Rice Drain 3- 723ST1252	*150
10/15/1986	Imperial Valley Drains	Rice Drain 3- 723ST1252	*32
2/12/2011	Imperial Valley Drains	Rice Drain- 723RICEDR	*397
4/20/2011	Imperial Valley Drains	Rice Drain- 723RICEDR	*26.5
11/17/1988	Imperial Valley Drains	Rose Drain- 723ST1269	*22
8/17/1991	Imperial Valley Drains	Rose Drain- 723ST1269	*39
8/1/1990	Imperial Valley Drains	South Central Drain- 723ST1699	*50
9/18/1992	Imperial Valley Drains	South Central Drain- 723ST1699	*5.4

Date	Waterbody	Sampling Location	Result
12/5/1999	Imperial Valley Drains	South Central Drain-723ST1699	*72.7
11/8/2000	Imperial Valley Drains	South Central Drain-723ST1699	*32.3
10/27/1989	Imperial Valley Drains	Verde Drain- 723ST1850	*17
10/26/1989	Imperial Valley Drains	Warren Drain- 723ST1864	*140
9/9/1990	Imperial Valley Drains	Warren Drain- 723ST1864	*52
5/17/1984	New River	International Boundary-723ST1031	*5.7
10/1/1985	New River	International Boundary-723ST1031	*9.8
5/12/1987	New River	International Boundary-723ST1031	*10
7/31/1990	New River	International Boundary-723ST1031	*15
12/18/1991	New River	International Boundary-723ST1031	*11
6/16/1993	New River	International Boundary-723ST1031	*6.8
11/2/1994	New River	International Boundary-723ST1031	*9.4
2/9/2011	New River	International Boundary-723NRBDRY	*2.7
2/9/2011	New River	International Boundary-723NRBDRY	*3.58
4/23/2011	New River	International Boundary-723NRBDRY	*17

Date	Waterbody	Sampling Location	Result
12/2/2011	New River	International Boundary-723NRBDRY	*8.19
4/4/2012	New River	International Boundary-723NRBDRY	*3.47
5/8/2012	New River	International Boundary-723NRBDRY	*0.962
10/17/2012	New River	International Boundary-723NRBDRY	*1.12
6/22/1978	New River	Outlet Salton Sea- 723ST1032	*86
6/22/1978	New River	Outlet Salton Sea- 723ST1032	*7
3/13/1979	New River	Outlet Salton Sea- 723ST1032	*54
5/9/1980	New River	Outlet Salton Sea- 723ST1032	*43
5/9/1980	New River	Outlet Salton Sea- 723ST1032	*30
5/9/1980	New River	Outlet Salton Sea- 723ST1032	*24
5/9/1980	New River	Outlet Salton Sea- 723ST1032	*24
5/24/1981	New River	Outlet Salton Sea- 723ST1032	*17
5/24/1981	New River	Outlet Salton Sea- 723ST1032	*6
4/22/1982	New River	Outlet Salton Sea- 723ST1032	*38
4/22/1982	New River	Outlet Salton Sea- 723ST1032	*30
6/13/1983	New River	Outlet Salton Sea- 723ST1032	*42
6/13/1983	New River	Outlet Salton Sea- 723ST1032	*5.4
5/24/1984	New River	Outlet Salton Sea- 723ST1032	*6.4
10/9/1985	New River	Outlet Salton Sea- 723ST1032	6.1

Date	Waterbody	Sampling Location	Result
10/10/1985	New River	Outlet Salton Sea- 723ST1032	*16
10/15/1986	New River	Outlet Salton Sea- 723ST1032	*10
9/3/1987	New River	Outlet Salton Sea- 723ST1032	*12
11/18/1988	New River	Outlet Salton Sea- 723ST1032	*15
8/3/1990	New River	Outlet Salton Sea- 723ST1032	*45
8/15/1991	New River	Outlet Salton Sea- 723ST1032	*7
9/20/1992	New River	Outlet Salton Sea- 723ST1032	*23
9/20/1992	New River	Outlet Salton Sea- 723ST1032	*6.5
9/29/1993	New River	Outlet Salton Sea- 723ST1032	*21
10/27/1995	New River	Outlet Salton Sea- 723ST1032	*8.3
11/20/1997	New River	Outlet Salton Sea- 723ST1032	*17
11/11/1998	New River	Outlet Salton Sea- 723ST1032	*5
12/9/1999	New River	Outlet Salton Sea- 723ST1032	*13
11/5/2004	New River	Outlet Salton Sea- 723NROTWM	*3.86
2/9/2011	New River	Outlet Salton Sea- 723NROTWM	*16.9
4/22/2011	New River	Outlet Salton Sea- 723NROTWM	*10.9
11/17/2011	New River	Outlet Salton Sea- 723NROTWM	*3.62
4/4/2012	New River	Outlet Salton Sea- 723NROTWM	*6.83

Date	Waterbody	Sampling Location	Result
5/8/2012	New River	Outlet Salton Sea-723NROTWM	*1.07
10/16/2012	New River	Outlet Salton Sea-723NROTWM	*1.01
12/1/2014	New River	Outlet Salton Sea-723NROTWM	*5.01
12/1/2014	New River	Outlet Salton Sea-723NROTWM	0.47 (DNQ)
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*0.63
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*0.57
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*1.53
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*1.34
11/6/2004	Wiest Lake	Wiest Lake- 723WIESLK	*1.23
11/1/2007	Wiest Lake	Wiest Lake- 723PWT019	*0.51
11/17/2015	Wiest Lake	Wiest Lake- 723PWT019	*0.72

c. PCBs

i. Water

SWAMP Data

PCB congeners have been found in SWAMP water samples collected from the New River. Samples were collected from 32 sampling locations on the Alamo River, Imperial Valley Drains, and New River. Out of 7854 sample results reported between 2002 and 2013, 5 sample results are above the RLs and are reported for samples collected from the New River, and 7849 are ND. Three sample results are above the USEPA CTR standard of 0.00017 µg/L (USEPA, 2000).

The RLs are for the most part, 0.002 µg/L. The MDLs are for the most part 0.001 µg/L. The RLs should be at or below the USEPA CTR standard to conclusively determine if Imperial Valley waters are meeting the WQO.

The water data shown in Table C-15 reports SWAMP sample results that are above the method detection limits (MDL) for PCBs. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the USEPA CTR standard of 0.00017 µg/L[39].

Table C-15. SWAMP Data: PCBs Concentrations in Water Samples from New River (ug/L).

Date	Waterbody	Sampling Location	Analyte	Result
10/22/2013	New River	International Boundary-723NRBDRY	PCB 195, Total	*0.004
10/22/2013	New River	Drop 2- 723NRDP02	PCB 087, Total	*0.003
10/22/2013	New River	Rice Drain-723NRRCDN	PCB 005, Total	*0.021
10/22/2013	New River	Rice Drain-723NRRCDN	PCB 049, Total	*0.003
10/22/2013	New River	Rice Drain-723NRRCDN	PCB 170, Total	*0.003

E-SMR Data

PCBs have not been found in water samples collected downstream from 17 NPDES permitted facilities. Out of 833 sample results reported between 2010 and 2017, 833 sample results were below the MDLs (ND). PCBs have not been found at concentrations that exceed the USEPA CTR standard of 0.00017 µg/L.

[39] The sum of all congener or isomer of homolog or aroclor analyses.

The RL varies from 0.01 to 10 ug/L. The MDL varies from 0.08 to 10 µg/L. The permitees should analyze samples at RLs consistently at or below the USEPA CTR standard to conclusively determine if discharges from NPDES facilities are meeting the WQO.

ii. Sediment

SWAMP Data

PCB congeners and Aroclors have been found in SWAMP sediment samples collected from the Alamo River and New River waterways. Samples were collected from 10 sampling locations on the Alamo River and New River. Out of 3292 sample results collected between 2002 and 2013, 503 sample results were above the reporting limit, 419 were DNQ, and 2370 were ND. Despite the high frequency of PCBs found in waterway sediments, there were no exceedances of the PEC numeric screening value of 676 ng/g (MacDonald, 2000).

The RL varies from 0.144 to 92 ng/g. The MDL varies from 0.055 to 35.9 ng/g. The RLs are adequate to conclusively determine if the sediment of Imperial Valley waters are meeting WQOs.

The sediment data shown in Table C-16 reports SWAMP sample results for PCBs. The applied numeric screening value is the PEC criteria of 676 ng/g.

Table C-16. SWAMP Data: Total PCBs Concentrations in Sediment Samples from Imperial Valley Waters (ng/g).

Date	Waterbody	Sampling Location	Result
4/9/2003	Alamo River	International Boundary-723ARINTL	1.623
11/4/2003	Alamo River	International Boundary-723ARINTL	1.096
5/3/2004	Alamo River	International Boundary-723ARINTL	1.801
10/4/2004	Alamo River	International Boundary-723ARINTL	DNQ
5/9/2005	Alamo River	International Boundary-723ARINTL	7.271

Date	Waterbody	Sampling Location	Result
10/25/2005	Alamo River	International Boundary-723ARINTL	0.733
5/1/2006	Alamo River	International Boundary-723ARINTL	1.401
10/23/2007	Alamo River	International Boundary-723ARINTL	DNQ
4/21/2008	Alamo River	International Boundary-723ARINTL	1.509
4/28/2009	Alamo River	International Boundary-723ARINTL	DNQ
5/10/2011	Alamo River	International Boundary-723ARINTL	DNQ
4/24/2013	Alamo River	Drop 10- 723ARDP10	DNQ
5/8/2002	New River	International Boundary-723NRBDRY	101.29
10/1/2002	New River	International Boundary-723NRBDRY	115.903
4/9/2003	New River	International Boundary-723NRBDRY	584.705
11/4/2003	New River	International Boundary-723NRBDRY	319.867
5/3/2004	New River	International Boundary-723NRBDRY	179.567
10/4/2004	New River	International Boundary-723NRBDRY	37.855
5/9/2005	New River	International Boundary-723NRBDRY	153.738

Date	Waterbody	Sampling Location	Result
10/25/2005	New River	International Boundary-723NRBDRY	263.998
5/1/2006	New River	International Boundary-723NRBDRY	85.667
10/23/2007	New River	International Boundary-723NRBDRY	15
4/21/2008	New River	International Boundary-723NRBDRY	41.32
4/28/2009	New River	International Boundary-723NRBDRY	90.696
10/19/2009	New River	International Boundary-723NRBDRY	117.281
10/5/2010	New River	International Boundary-723NRBDRY	319.34
5/10/2011	New River	International Boundary-723NRBDRY	94.79
10/11/2011	New River	International Boundary-723NRBDRY	138.241
10/2/2002	New River	Salton Sea Outlet-723NROTWM	DNQ
4/15/2003	New River	Salton Sea Outlet-723NROTWM	0.876
11/4/2003	New River	Salton Sea Outlet-723NROTWM	1.266
5/4/2004	New River	Salton Sea Outlet-723NROTWM	0.353
10/5/2004	New River	Salton Sea Outlet-723NROTWM	1.707

Date	Waterbody	Sampling Location	Result
5/10/2005	New River	Salton Sea Outlet-723NROTWM	13.582
10/26/2005	New River	Salton Sea Outlet-723NROTWM	2.854
5/1/2006	New River	Salton Sea Outlet-723NROTWM	4.731
4/21/2008	New River	Salton Sea Outlet-723NROTWM	4.649
4/28/2009	New River	Salton Sea Outlet-723NROTWM	DNQ
5/10/2011	New River	Salton Sea Outlet-723NROTWM	DNQ
4/23/2013	New River	Rice Drain-723NRRCDN	DNQ
10/22/2013	New River	Rice Drain-723NRRCDN	DNQ

iii. Fish Tissue

SWAMP Data

PCB congeners have been found in SWAMP fish tissue samples collected from the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Fish tissue samples collected from 29 sampling locations on the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Out of 4640 sample results reported between 2000 and 2014, 837 sample results are above the RLs, 880 are DNQ, and 2923 are ND. There were 43 exceedances of the OEHHA numeric screening value of 2.6 ppb in all Imperial Valley waterways (Klasing and Brodberg, 2008).

The RL varies from 0.051 to 25 ng/g. The MDL varies from 0.026 to 25 ng/g. The RLs are adequate to conclusively determine if the fish in Imperial Valley waters are meeting the WQO.

The fish tissue data shown in Table C-17 reports SWAMP and TSMP sample results for total PCBs. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the OEHHA FCG of 2.6 ng/g.

Table C-17. SWAMP Data: Total PCBs Concentrations in Fish Tissue Samples from Imperial Valley Waters (ng/g).

Date	Waterbody	Station	Result
11/19/2001	Alamo River	International Boundary- 723ST0025	*26
4/21/2011	Alamo River	Drop 10- 723ARDP10	DNQ
11/16/2011	Alamo River	Drop 10- 723ARDP10	DNQ
3/28/2012	Alamo River	Drop 10- 723ARDP10	*6.82
5/7/2012	Alamo River	Drop 10- 723ARDP10	*4.96
10/16/2012	Alamo River	Drop 10- 723ARDP10	DNQ
11/2/2004	Alamo River	Drop 6A- 723ARDP6A	2.484
11/9/2004	Alamo River	Brawley-723ARBRAW	*118.559
12/9/2014	Alamo River	Drop 3-723ARDP3A	DNQ
11/7/2000	Alamo River	Calipatria-723ST0023	*77
10/24/2002	Alamo River	Calipatria-723ST0023	*21
11/7/2004	Alamo River	Outlet Salton Sea-723ARGRB1	*40.823
2/8/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*10.774

Date	Waterbody	Station	Result
4/22/2011	Alamo River	Outlet Salton Sea-723ARGRB1	0.647
11/17/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*14.141
3/28/2012	Alamo River	Outlet Salton Sea-723ARGRB1	*18.249
5/8/2012	Alamo River	Outlet Salton Sea-723ARGRB1	0.807
10/16/2012	Alamo River	Outlet Salton Sea-723ARGRB1	DNQ
12/2/2014	Alamo River	Outlet Salton Sea-723ARGRB1	0.166
2/7/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	1.775
4/20/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	0.7
5/7/2012	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	DNQ
11/8/2000	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*90
11/19/2001	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*10
10/22/2002	Imperial Valley Drains	Barbara Worth Drain-723ST0092	*36
11/2/2004	Imperial Valley Drains	Central Drain-723CNTDRN	*134
2/11/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*5.534

Date	Waterbody	Station	Result
4/20/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*11.274
5/8/2012	Imperial Valley Drains	Central Drain-723CNTDRN	DNQ
10/15/2012	Imperial Valley Drains	Central Drain-723CNTDRN	2.223
11/8/2000	Imperial Valley Drains	Central Drain-723ST0252	*23
11/21/2001	Imperial Valley Drains	Central Drain-723ST0252	*21
10/22/2002	Imperial Valley Drains	Central Drain-723ST0252	*34
11/20/2001	Imperial Valley Drains	Fig Drain-723ST0494	*10
11/4/2004	Imperial Valley Drains	Greeson Drain-723GRSDRN	*97.747
11/7/2000	Imperial Valley Drains	Greeson Drain-723ST0532	*38
10/16/2012	Imperial Valley Drains	Oleander Drain-723OLANDR	DNQ
2/7/2011	Imperial Valley Drains	Peach Drain-723PEACHD	DNQ
4/19/2011	Imperial Valley Drains	Peach Drain-723PEACHD	DNQ
5/7/2012	Imperial Valley Drains	Peach Drain-723PEACHD	DNQ
10/15/2012	Imperial Valley Drains	Peach Drain-723PEACHD	DNQ

Date	Waterbody	Station	Result
10/16/2012	Imperial Valley Drains	Rice 3 Drain-723RI3DRN	DNQ
2/12/2011	Imperial Valley Drains	Rice Drain-723RICEDR	*10.402
4/20/2011	Imperial Valley Drains	Rice Drain-723RICEDR	*7.172
10/20/2002	Imperial Valley Drains	Rice Drain-723ST1251	*21
10/15/2012	Imperial Valley Drains	South Central Drain-723SCNTDR	*3.007
11/8/2000	Imperial Valley Drains	South Central Drain-723ST1699	*23
2/9/2011	New River	International Boundary-723NRBDRY	*127.291
4/23/2011	New River	International Boundary-723NRBDRY	*179.462
12/2/2011	New River	International Boundary-723NRBDRY	*180.971
4/4/2012	New River	International Boundary-723NRBDRY	*65.557
5/8/2012	New River	International Boundary-723NRBDRY	*12.482
10/17/2012	New River	International Boundary-723NRBDRY	*3.445

Date	Waterbody	Station	Result
5/7/2012	New River	Greeson Drain-723NRGNDN	DNQ
10/15/2012	New River	Greeson Drain-723NRGNDN	DNQ
5/9/2012	New River	Fig Drain-723NRFGDN	DNQ
12/8/2014	New River	Fig Drain-723NRFGDN	2.27
11/21/2001	New River	Westmorland-723ST1032	*113
10/24/2002	New River	Westmorland-723ST1032	*511
11/5/2004	New River	Outlet Salton Sea-723NROTWM	*75.902
2/9/2011	New River	Outlet Salton Sea-723NROTWM	*27.533
4/22/2011	New River	Outlet Salton Sea-723NROTWM	*40.874
11/17/2011	New River	Outlet Salton Sea-723NROTWM	*26.181
4/4/2012	New River	Outlet Salton Sea-723NROTWM	*82.408
5/8/2012	New River	Outlet Salton Sea-723NROTWM	DNQ
10/16/2012	New River	Outlet Salton Sea-723NROTWM	DNQ

Date	Waterbody	Station	Result
12/1/2014	New River	Outlet Salton Sea-723NROTWM	*5.36
11/6/2004	Wiest Lake	Wiest Lake-723WIESLK	*15.983
11/1/2007	Wiest Lake	Wiest Lake-723PWT019	*3.103
10/1/2014	Wiest Lake	Wiest Lake-723PWT019	DNQ

d. Toxaphene

i. Water

SWAMP Data

Toxaphene has not been found in SWAMP water samples. Samples were collected from 24 sampling locations on the Alamo River, Imperial Valley Drains, and New River. Out of 52 sample results reported between 2004 and 2012, all results are ND. Toxaphene has not been found at concentrations that exceed the USEPA CTR standard of 0.00075 µg/L (USEPA, 2000).

The RL varies from 1 to 100 µg/L. The MDL varies from 0.301 to1.5 µg/L. The RL would need to be at or below the USEPA CTR standard in future analysis to conclusively determine if Imperial Valley waters are meeting the WQO.

E-SMR Data

Toxaphene has not been found in water samples collected downstream from 18 NPDES permitted facilities. Out of 121 sample results reported between 2010 and 2017, all results are ND. Toxaphene has not been found at concentrations that exceed the USEPA CTR standard of 0.00075 µg/L.

The RL varies from 0.001 to 10 µg/L. The MDL varies from 0.08 to10 µg/L. The RLs would need to be at or below the USEPA CTR standard in future analysis to conclusively determine if discharges from NPDES facilities are meeting the WQO. The permittees should also adopt a more standardized way of reporting data.

ii. Sediment

SWAMP Data

Toxaphene has not been found in SWAMP sediment samples collected from the Alamo River and New River. Samples were collected from 4 sampling locations on the Alamo River and New River. Out of 36 sample results reported between 2002 and 2006, 1 was DNQ, and the rest (35) are ND. The RL varies from 21 to 64.7 ng/g. The MDL varies from 4.8 to 33.4 ng/g. There is no PEC or other sediment numeric screening value to compare these sample results to.

iii. Fish Tissue

TSMP and SWAMP Data

Toxaphene has been found in TSMP and SWAMP fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River. Fish tissue samples were collected from 41 sampling locations on the Alamo River, Imperial Valley Drains, New River, and Wiest Lake. Out of 207 sample results reported between 1978 and 2014, 97 sample results were above the RLs, 12 were DNQ, and 98 were ND. The RL varies from 19.7 to 1000 ng/g. Ninety sample results were above the OEHHA numeric screening value of 4.3 ng/g (Klasing and Brodberg, 2008).

The MDL varies from 3.94 to 400 ng/g. The RLs need to be consistently at or below the OEHHA screening value in future analysis to conclusively determine if the fish in Imperial Valley waters are meeting the WQO.

The fish tissue data shown in Table C-18 reports TSMP and SWAMP sample results that are above the method detection limit (MDL) for toxaphene. Sample results that exceed the applied screening value are in bold font and noted with an asterisk (*). The applied numeric screening value is the OEHHA FCG of 4.3 ng/g.

Table C-18. TSMP-SWAMP Combined Data: Toxaphene Concentrations in Fish Tissue Samples from Alamo River (ng/g).

Date	Waterbody	Sampling Location	Result
11/15/1985	Alamo River	International Boundary-723ST0025	*260

Date	Waterbody	Sampling Location	Result
9/2/1987	Alamo River	International Boundary-723ST0025	*230
11/20/1988	Alamo River	International Boundary-723ST0025	*300
11/16/2011	Alamo River	Drop 10-723ARDP10	*49.2
3/28/2012	Alamo River	Drop 10-723ARDP10	*443
5/7/2012	Alamo River	Drop 10-723ARDP10	*29
3/12/1979	Alamo River	Outlet Salton Sea-723ST0023	*1870
5/8/1980	Alamo River	Outlet Salton Sea-723ST0023	*2100
5/23/1981	Alamo River	Outlet Salton Sea-723ST0023	*870
5/23/1981	Alamo River	Outlet Salton Sea-723ST0023	*200
4/22/1982	Alamo River	Outlet Salton Sea-723ST0023	*2200
4/22/1982	Alamo River	Outlet Salton Sea-723ST0023	*120
6/13/1983	Alamo River	Outlet Salton Sea-723ST0023	*1400
6/13/1983	Alamo River	Outlet Salton Sea-723ST0023	*1000

Date	Waterbody	Sampling Location	Result
5/23/1984	Alamo River	Outlet Salton Sea-723ST0023	*1100
5/23/1984	Alamo River	Outlet Salton Sea-723ST0023	*1100
9/17/1985	Alamo River	Outlet Salton Sea-723ST0023	*490
9/30/1987	Alamo River	Outlet Salton Sea-723ST0023	*480
11/18/1988	Alamo River	Outlet Salton Sea-723ST0023	*260
8/3/1990	Alamo River	Outlet Salton Sea-723ST0023	*450
9/29/1993	Alamo River	Outlet Salton Sea-723ST0023	650
10/27/1994	Alamo River	Outlet Salton Sea-723ST0023	220
10/27/1994	Alamo River	Outlet Salton Sea-723ST0023	*120
11/1/1996	Alamo River	Outlet Salton Sea-723ST0023	*730
11/20/1997	Alamo River	Outlet Salton Sea-723ST0023	*340
11/11/1998	Alamo River	Outlet Salton Sea-723ST0023	*563
2/8/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*217

Date	Waterbody	Sampling Location	Result
4/22/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*142
11/17/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*42.6
11/17/2011	Alamo River	Outlet Salton Sea-723ARGRB1	*264
3/28/2012	Alamo River	Outlet Salton Sea-723ARGRB1	*1290
5/8/2012	Alamo River	Outlet Salton Sea-723ARGRB1	30 (DNQ)
9/17/1992	Imperial Valley Drains	Barbara Worth Drain- 723ST0092	*250
11/8/2000	Imperial Valley Drains	Barbara Worth Drain- 723ST0092	*517
11/8/2000	Imperial Valley Drains	Barbara Worth Drain- 723ST0092	*443
2/7/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*274
4/20/2011	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*283
5/7/2012	Imperial Valley Drains	Barbara Worth Drain-723BARWDR	*570
12/5/1999	Imperial Valley Drains	Central Drain-723ST0252	*2196

Date	Waterbody	Sampling Location	Result
11/8/2000	Imperial Valley Drains	Central Drain-723ST0252	*76.2
2/11/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*76
4/20/2011	Imperial Valley Drains	Central Drain-723CNTDRN	*118
5/8/2012	Imperial Valley Drains	Central Drain-723CNTDRN	*61
11/15/1985	Imperial Valley Drains	Greeson Drain-723ST0532	*260
11/15/1985	Imperial Valley Drains	Greeson Drain-723ST0532	*120
11/7/2000	Imperial Valley Drains	Greeson Drain-723ST0532	*98.4
10/28/1989	Imperial Valley Drains	Holtville Drain-723ST0565	*390
12/5/1999	Imperial Valley Drains	Holtville Drain-723ST0565	*246
8/16/1991	Imperial Valley Drains	Mayflower Drain-723ST0881	*400
9/17/1992	Imperial Valley Drains	Peach Drain-723ST1141	*2000
10/28/1995	Imperial Valley Drains	Peach Drain-723ST1141	*2800
11/3/1996	Imperial Valley Drains	Peach Drain-723ST1141	*690

Date	Waterbody	Sampling Location	Result
2/7/2011	Imperial Valley Drains	Peach Drain- 723PEACHD	*263
4/19/2011	Imperial Valley Drains	Peach Drain- 723PEACHD	*306
5/7/2012	Imperial Valley Drains	Peach Drain- 723PEACHD	*660
11/20/1990	Imperial Valley Drains	Pumice Drain- 723ST1210	*680
10/10/1985	Imperial Valley Drains	Rice Drain 3- 723ST1252	*1800
10/15/1986	Imperial Valley Drains	Rice Drain 3- 723ST1252	*290
11/17/1988	Imperial Valley Drains	Rose Drain- 723ST1269	*270
8/1/1990	Imperial Valley Drains	South Central Drain- 723ST1699	*620
12/5/1999	Imperial Valley Drains	South Central Drain- 723ST1699	*1964
11/8/2000	Imperial Valley Drains	South Central Drain- 723ST1699	*162
10/27/1989	Imperial Valley Drains	Verde Drain- 723ST1850	*650
4/23/2011	New River	International Boundary- 723NRBDRY	*151
12/2/2011	New River	International Boundary- 723NRBDRY	*71.1

Date	Waterbody	Sampling Location	Result
4/4/2012	New River	International Boundary-723NRBDRY	*125
5/8/2012	New River	International Boundary-723NRBDRY	*66
6/22/1978	New River	Outlet Salton Sea-723ST1032	*3400
3/13/1979	New River	Outlet Salton Sea-723ST1032	*1400
5/9/1980	New River	Outlet Salton Sea-723ST1032	*900
5/9/1980	New River	Outlet Salton Sea-723ST1032	*700
5/9/1980	New River	Outlet Salton Sea-723ST1032	*600
5/9/1980	New River	Outlet Salton Sea-723ST1032	*500
5/24/1981	New River	Outlet Salton Sea-723ST1032	*360
4/22/1982	New River	Outlet Salton Sea-723ST1032	*780
4/22/1982	New River	Outlet Salton Sea-723ST1032	*700
6/13/1983	New River	Outlet Salton Sea-723ST1032	*830
5/24/1984	New River	Outlet Salton Sea-723ST1032	*290

Date	Waterbody	Sampling Location	Result
9/3/1987	New River	Outlet Salton Sea-723ST1032	*160
11/18/1988	New River	Outlet Salton Sea-723ST1032	*170
8/3/1990	New River	Outlet Salton Sea-723ST1032	*240
8/15/1991	New River	Outlet Salton Sea-723ST1032	*300
9/29/1993	New River	Outlet Salton Sea-723ST1032	*130
10/27/1995	New River	Outlet Salton Sea-723ST1032	*190
11/20/1997	New River	Outlet Salton Sea-723ST1032	*390
11/11/1998	New River	Outlet Salton Sea-723ST1032	*65
12/9/1999	New River	Outlet Salton Sea-723ST1032	*138
2/9/2011	New River	Outlet Salton Sea-723NRBDRY	*189
4/22/2011	New River	Outlet Salton Sea-723NROTWM	*215
11/17/2011	New River	Outlet Salton Sea-723NROTWM	*40.6
4/4/2012	New River	Outlet Salton Sea-723NROTWM	*326

Date	Waterbody	Sampling Location	Result
5/8/2012	New River	Outlet Salton Sea-723NROTWM	49 (DNQ)

4. Summary

Staff reviewed available documents and data to characterize chlordane, DDT (and its degradates DDD and DDE), dieldrin, PCBs, and toxaphene in the Imperial Valley. Chlordane, DDT, dieldrin, PCBs and toxaphene are man-made compounds. They are classified as organochlorine (OC) compounds based upon their chemical structures. Chlordane, DDT, dieldrin, and toxaphene are pesticides that were used in the U.S. for agricultural and non-agricultural pest control until being banned. PCBs were developed for numerous industrial applications but were most commonly used in electrical equipment and insulation until being banned. These OC compounds are incredibly persistent in the environment as they are slow to degrade. They also tend to tightly bind to soil or sediment particles.

a. Chlordane

Chlordane is a pesticide that was used for crops such as corn and citrus, on home lawns and gardens, and for termite control. It was first used in 1948. All uses except termite control were banned in 1983, and all uses were banned in 1988 (ATSDR, 1994).

Chlordane was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields. A review of CDPR Pesticide Use Reports (PURs) from the 1970’s and 1980’s found a few reports of chlordane applications.

Water quality monitoring data shows that chlordane is found in sediment and fish tissue samples collected from Imperial Valley waters. The concentrations found in fish tissue samples often exceeded the numeric screening value and is the main reason for listing the waters as impaired by chlordane. Chlordane was found in a few sediment samples. The concentration found in one sediment sample exceeded the numeric screening value, the rest were below.

Chlordane is found in sediment and fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New Rivers at monitoring sites along the waterways on numerous occasions. Chlordane has also been found in New River sediment and fish tissue samples collected from the international boundary with Mexico on numerous occasions. Chlordane is not found in water samples. There does not appear to be a spatial pattern to the distribution of chlordane. The concentrations found in sediment serve as an indication of its transport and fate.

Chlordane is not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are higher than the Numeric Target.

b. DDT, DDD, and DDE

DDT is a pesticide that was used for mainly agricultural uses before the 1960s. DDT was banned for agricultural uses in the U.S. in 1972. DDT is no longer legally sold or used in the U.S. DDT has persisted in soils and sediments, slowly degrading into DDE and DDD (Mischke et al, 1985). DDT was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields.

Water quality monitoring data shows that DDT, DDE, and DDD are found in water, sediment and fish tissue samples collected from Imperial Valley waters. The concentrations found in water and fish tissue often exceed the numeric screening values and, in some cases, provided the basis for listing the waters as impaired by DDT, DDE, and DDD.

Water quality monitoring data shows a mix of results:

DDT has been found in water and sediment samples collected from the Alamo River and New River. DDT has also been found in fish tissue samples collected from the Alamo River, Imperial Valley Drains, New River, and Wiest Lake on numerous occasions. The concentrations of DDT found in fish tissue often exceed the numeric screening value and is one of the main reasons for listing these waters as impaired by DDT.

DDE has been found in water and sediment samples collected from the Alamo River, Imperial Valley Drains, and New River on numerous occasions. The concentrations found in water and sediment samples often exceeded the numeric screening values and are the main reasons for listing these waters as impaired by DDE.

DDD has been found in a few water samples collected from the Alamo River and Imperial Valley drains and sediment samples collected from the Alamo River, Imperial Valley Drains, and New River on numerous occasions. Although not presented in the data collected for this analysis, the concentrations of DDD found in water samples collected from the Alamo River and New River in the past (1970s-1980s) exceeded the numeric screening values, and was one of the main reasons for listing these waters as impaired by DDD.

DDT, DDE, and DDD have also been found in sediment samples collected from the New River at the international boundary with Mexico on numerous occasions. DDT is also found in fish tissue samples collected from this location. There does not appear to be a spatial pattern to the distribution of DDT, DDE, and DDD. The concentrations found in sediment do not usually exceed the numeric targets but do serve as an indication of its transport and fate.

DDT, DDE, and DDD are not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the applied criteria.

c. Dieldrin

Dieldrin is a pesticide that was originally developed in the 1940s as an alternative to DDT. It proved to be a highly effective insecticide and was widely used during the 1950s to early 1970s. Most uses of dieldrin were banned in 1978. Dieldrin is no longer produced in the U.S.

Dieldrin was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields. A review of PURs from the 1970's and 1980's found a few reports of dieldrin applications.

Water quality monitoring data show that dieldrin is found in water, sediment, and fish tissue samples collected from Imperial Valley waters. The concentrations regularly found in fish tissue and sometimes in water samples exceed the numeric screening values and were some of the reasons for listing these waters as impaired by dieldrin.

Dieldrin is found in water, sediment, and fish tissue samples collected from monitoring sites along the Alamo River, Imperial Valley Drains, New River, and in Wiest Lake on numerous occasions. There does not appear to be a spatial pattern to the distribution of dieldrin. The concentrations found in sediment did not exceed the numeric target but do serve as an indication of the transport and fate of the pollutant in the environment.

Dieldrin is found in New River sediment and fish tissue samples collected from the international boundary with Mexico on numerous occasions. Dieldrin was found in a few sediment samples collected from the Alamo River at the international boundary, but this sediment is more closely associated with agricultural discharges in the United States.

Dieldrin is not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the Numeric Target.

d. PCBs

PCBs are a class of OC chemical compounds. They are biphenyl compounds with different amounts of chlorine attached. They were commonly used in a variety of industrial and commercial applications including in electrical transformers and capacitors, for insulation of electrical equipment, and as oil used in motors and hydraulic systems. They were also used in older household appliances. They were in use from approximately 1929 until 1977 when the U.S. banned their manufacturing, processing, distribution, and use (ATSDR, 2000).

There are few records documenting PCB usage. They were thought to be used in Mexico and Imperial Valley in electrical equipment and older consumer household appliances. Staff reviewed the USEPA's most recent list of regulated PCB transformer data to locate current PCB facilities in the Imperial Valley. The list contained two records for PCB facilities in Imperial Valley; a PCB generator in the city of Imperial and a gypsum facility west of the city of Seely. PCBs can also be released into the environment when older household appliances are improperly disposed of.

Water quality monitoring data shows that PCBs are found in water, sediment and fish tissue samples collected from Imperial Valley waters. The concentrations in fish tissue often exceed the numeric screening value and is one of the main reasons for listing these water bodies as impaired by PCBs.

PCBs were found in sediment and fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New River at monitoring sites along the waterways, and in Wiest Lake on numerous occasions. A few PCBs were found in water samples collected from the New River in 2013. PCBs were also found in a New River water sample collected in 2013, sediment, and fish tissue samples collected from the international boundary with Mexico. There does not appear to be a spatial pattern to the distribution of PCBs. The concentrations found in sediment serve as an indication of its transport and fate.

PCBs were not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the Numeric Target.

e. Toxaphene

Toxaphene is a pesticide that was heavily used in the United States in the early to mid-1970s as DDT was phased out. The USEPA cancelled most of the pesticide registrations for toxaphene in 1982. All uses of toxaphene were banned in 1990 (ATSDR 1997).

Toxaphene was thought to be used in Imperial Valley and Mexico, primarily on agricultural fields. A review of PURs from the 1970's and 1980's found a few reports of toxaphene applications.

Water quality data shows that toxaphene is found in fish tissue samples collected from Imperial Valley waters. Toxaphene is found in fish tissue samples often at concentrations that exceed the numeric screening and is the main reason for listing these waters as impaired by toxaphene.

Toxaphene is found in fish tissue samples collected from the Alamo River, Imperial Valley Drains, and New Rivers at monitoring sites along the waterways. Toxaphene is also found in New River fish tissue samples collected from the international boundary with Mexico. Toxaphene is not found in water or sediment samples.

Toxaphene is not found in water samples collected downstream from NPDES permitted facilities. These results are inconclusive because often the reporting limits are much higher than the Numeric Target.

5. References

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Figure C-11. Map of Alamo River SWAMP and TSMP Sampling Locations

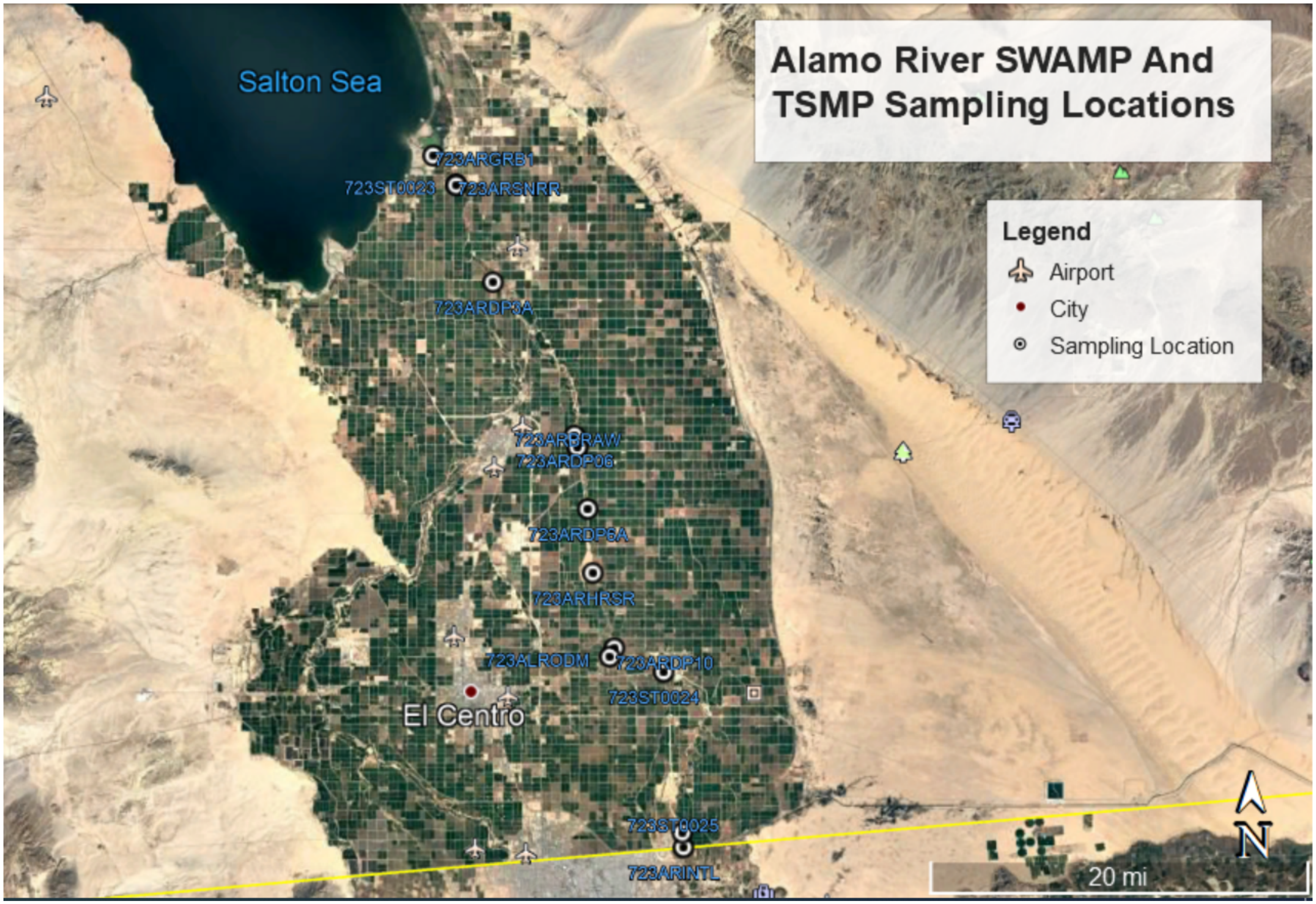


Figure C-12. Imperial Valley Drains SWAMP and TSMP Sampling Locations

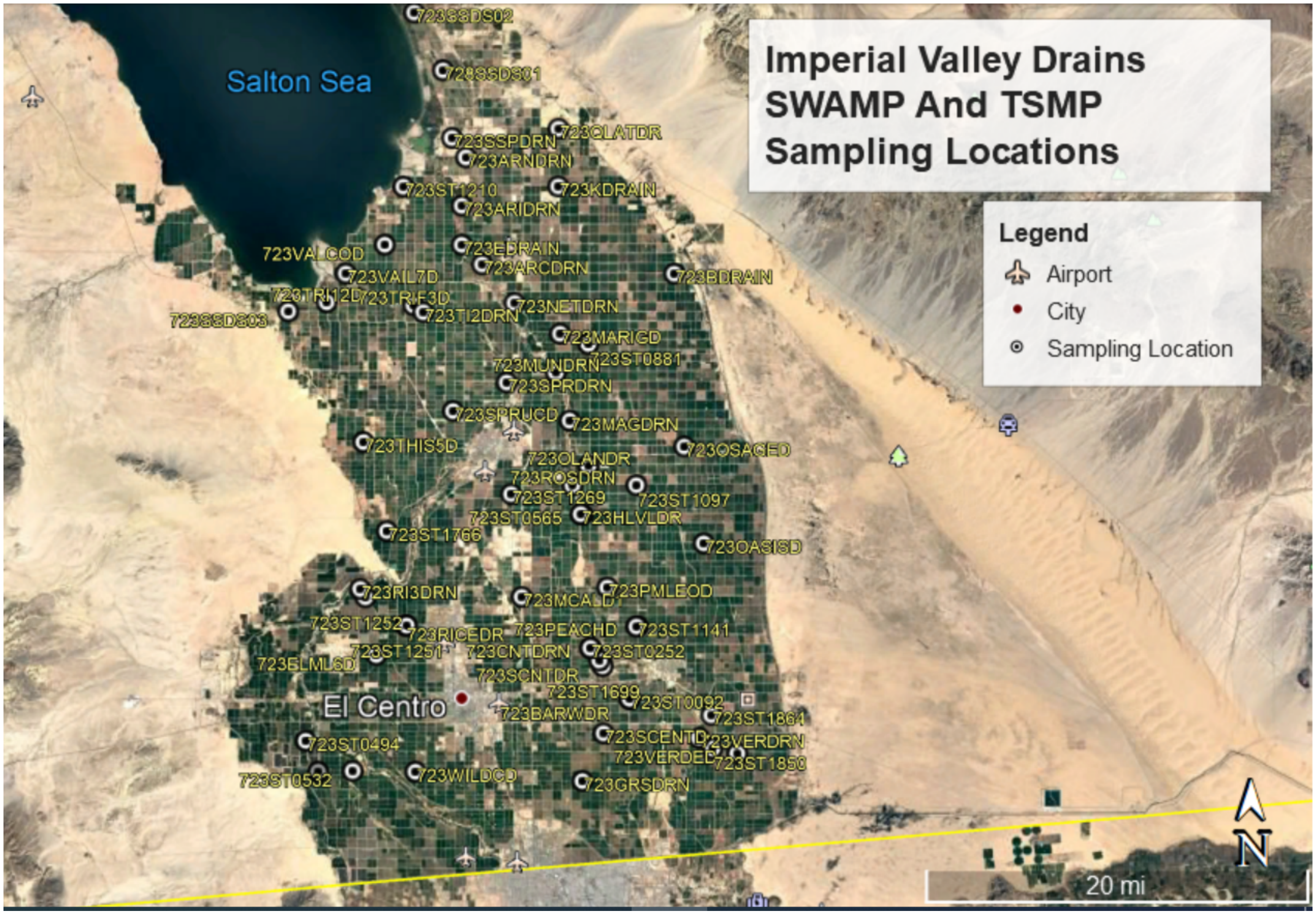


Figure C-13. Map of New River SWAMP and TSMP Sampling Locations.

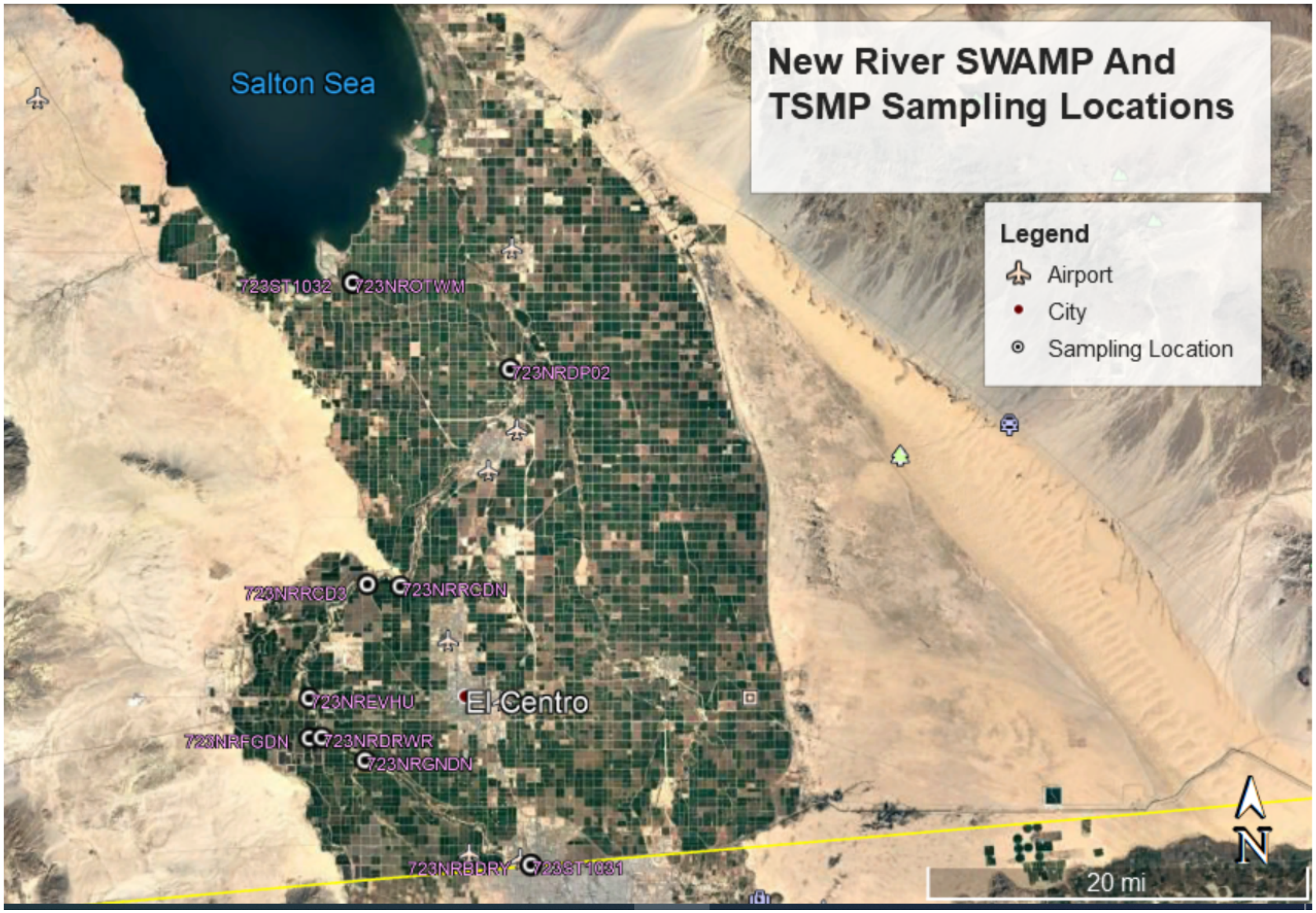
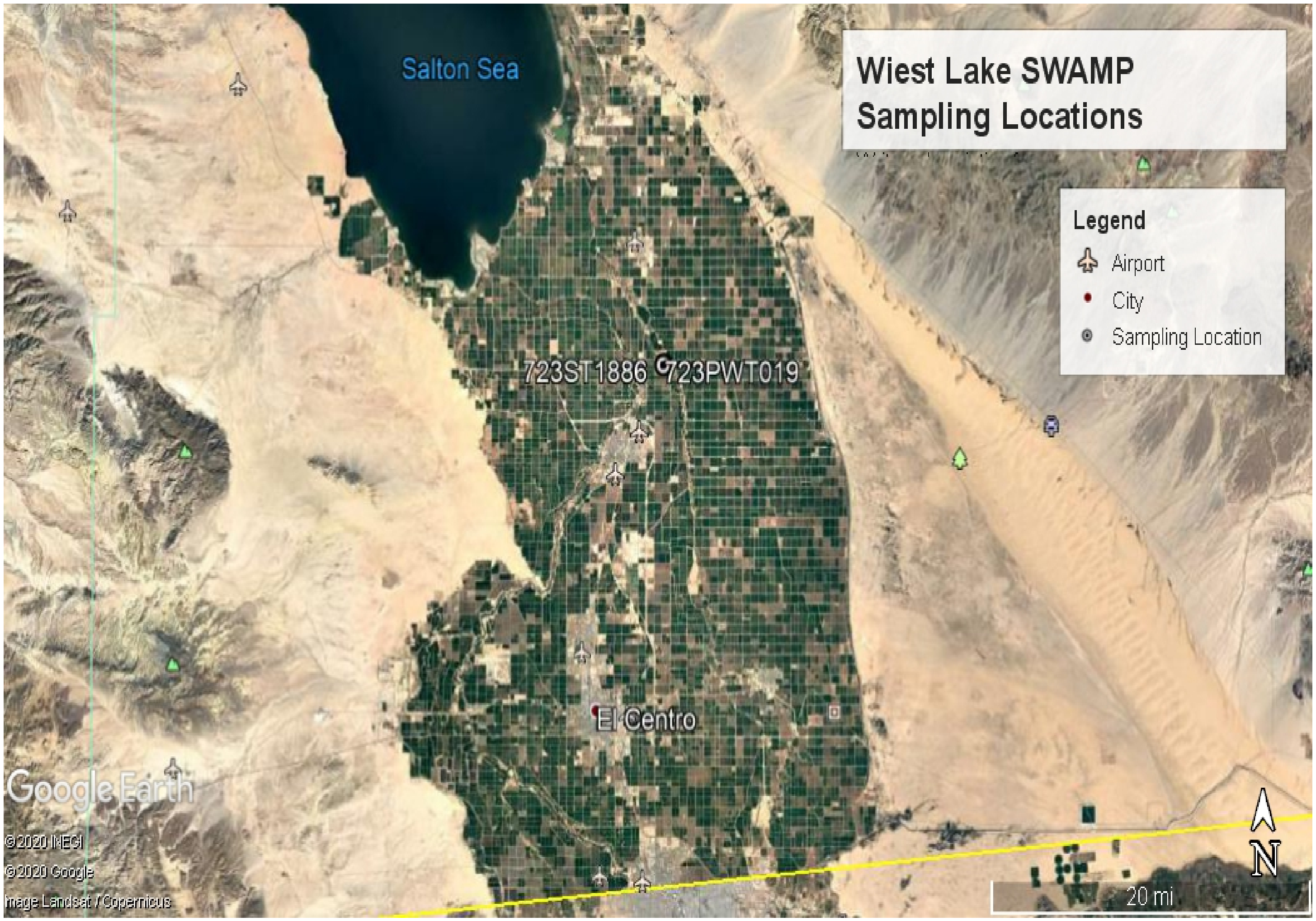


Figure C-14. Map of Wiest Lake SWAMP Sampling Locations.



ATTACHMENT D: LOAD DURATION CURVES

1. Background

The TMDLs for the organophosphate compounds are expressed as concentrations in water, however, based on USEPA guidance, daily load expressions were developed to supplement the concentration based TMDLs and allocations. USEPA recommends supplementing a concentration based TMDL with a daily load expression, as indicated below:

> As a result of the recent D.C. Circuit Court of Appeals decision in *Friends of the Earth, Inc. v. EPA, et al.*, No. 05-5015 (D.C. Cir. 2006), EPA recommends that all future TMDLs and associated load allocations (LAs) and wasteload allocations (WLAs) also be expressed in terms of a daily time increment. While TMDL analytical approaches that result in longer (non-daily) averaging periods may continue to be used to demonstrate consistency with applicable water quality criteria, all final TMDL submissions should include an adequate expression of daily loads in addition to any longer-term loading expression that may be developed as a result of the TMDL analysis.

(USEPA, 2007, “Options for Expressing Daily Loads in TMDLs”, Office of Wetlands, Oceans and Watersheds, June 22, 2007.)

Staff used a load duration curve analysis approach to estimate existing loads and assimilative capacity for organophosphate compounds in the Alamo River, New River, and select Imperial Valley Drains.

2. Developing Load Duration Curve

The load duration curve approach involves calculating the allowable loadings of pollutants over the range of flow conditions expected to occur in the impaired waterways. The development and application of load duration curves is accomplished through the following steps:

1. **Develop Flow Duration Curves.** Flow duration curves for impaired rivers and drains are developed by generating a flow frequency table and plotting the data points. The data reflect a range of natural occurring flows from extremely high to extremely low flows. A flow duration curve for the impaired waterways is developed using available flow data.

2. **Develop Load Duration Curves.** The flow duration curve is translated into a load duration (or TMDL) curve by multiplying each flow value by the WQS/target for a particular pollutant, and then multiplying by a unit conversion factor. The

resulting points are plotted to create a load duration curve where the y-axis is expressed in terms of a pollutant load (grams/day).

3. **Plot Observed Loads.** To utilize the Load Duration Curve, water quality sample concentrations are converted to a load by multiplying the concentration by the average daily flow on the day the sample was collected, and a unit conversion factor. Then, the individual loads are plotted as points on the load duration graph and can be compared to the WQS/target.

4. **Compare Observed Loads to Allowable Loads.** Points plotting above the curve represent exceedances of the water quality objective (i.e., the allowable load, or total maximum daily load). Those plotting below the curve represent compliance with the water quality objective and therefore represent compliance with the maximum daily loads.

The load duration curve itself can be established as the TMDL. The TMDL would be dynamic and based on flow. Essentially, the loading capacity is the load corresponding to the flow along the curve. Alternatively, a static TMDL can be established based on the area beneath the curve, representing the loading capacity of the river or drain. The difference between this area and the area representing current loading conditions is the load that must be reduced to meet water quality standards.

3. Flow Data

Daily average flow data for key water quality monitoring sites was provided by Imperial Irrigation District. Flow data was processed for one site on the Alamo River (723ARGRB), two sites on the New River (723NRBDRY, 723NROTWM), and four on Imperial Valley Drains (723CNTDRN, 723HLVLDR, 723ROSDRN, and 723SCNTDR). On any day of the year the daily average flow will vary from one year to the next because of irrigation scheduling and the occasional rainfall event, so daily flows were averaged for each day of the year for the 2015-2019 time period. Figure D-1 through Figure D-7 show the graphs of average daily flows.

Figure D-1. Alamo River Outlet (723ARGRB) Average Daily Flow (2015-2019)

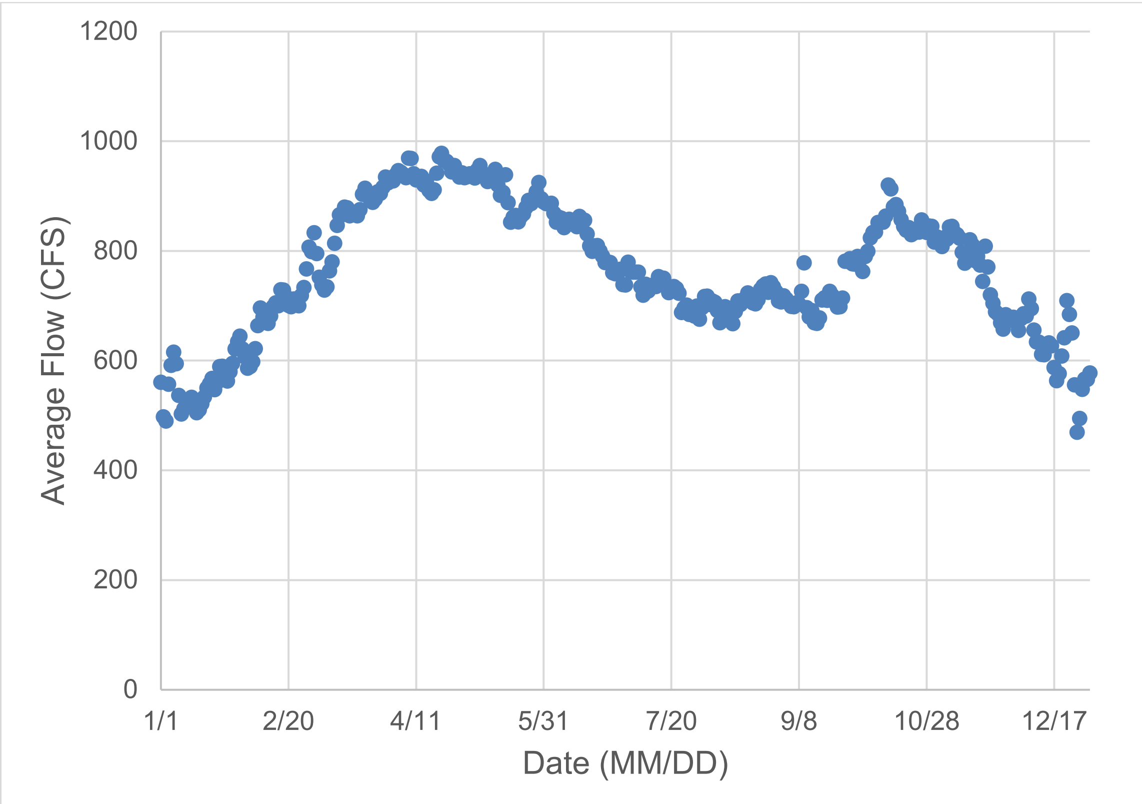


Figure D-2. Central Drain (723CNTDRN) Average Daily Flow (2015-2019)

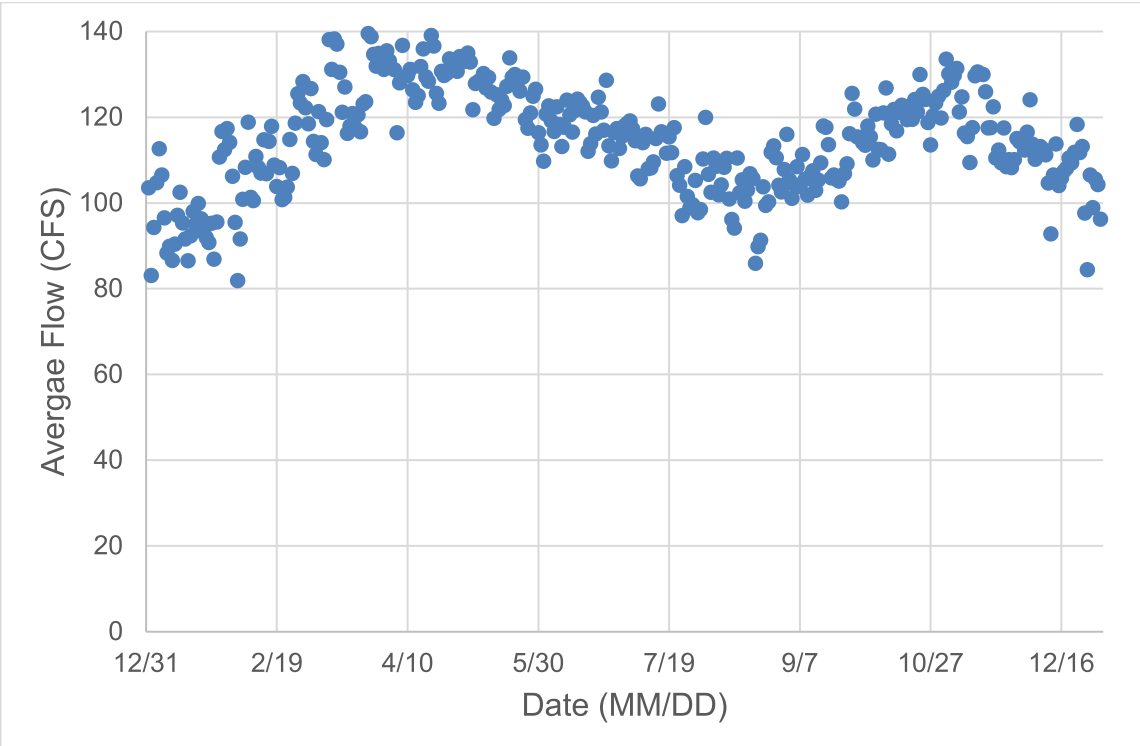


Figure D-3. Holtville Main Drain (723HVLDR) Average Daily Flow (2015-2019)

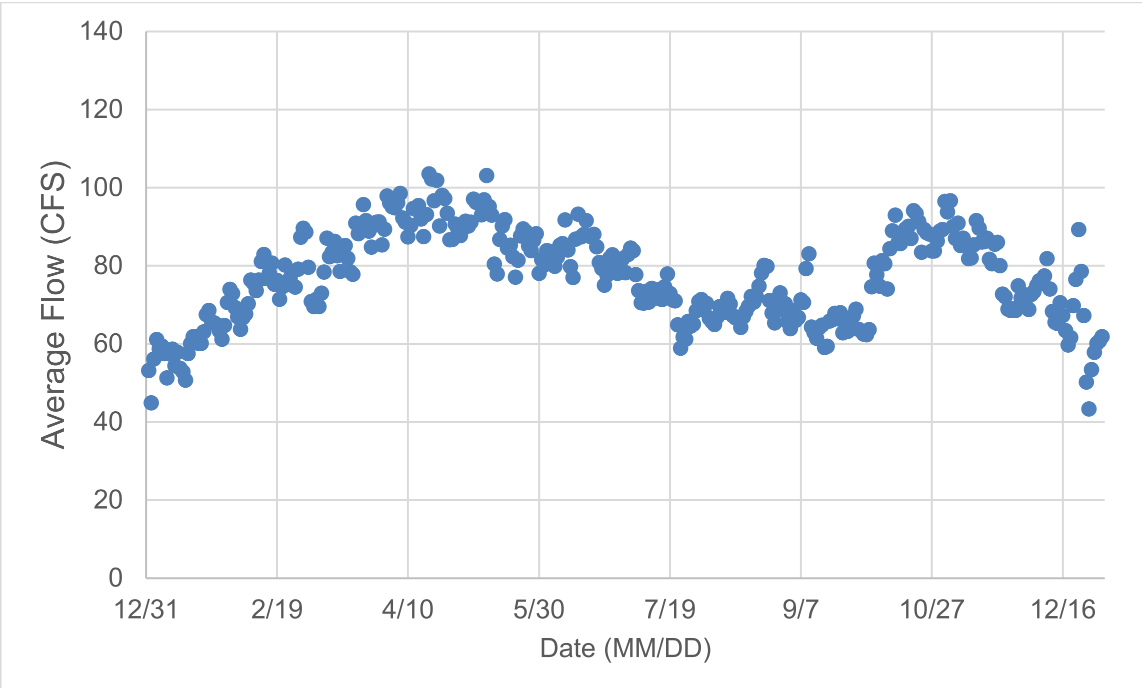


Figure D-4. Rose Drain (723ROSDRN) Average Daily Flow (2015-2019)

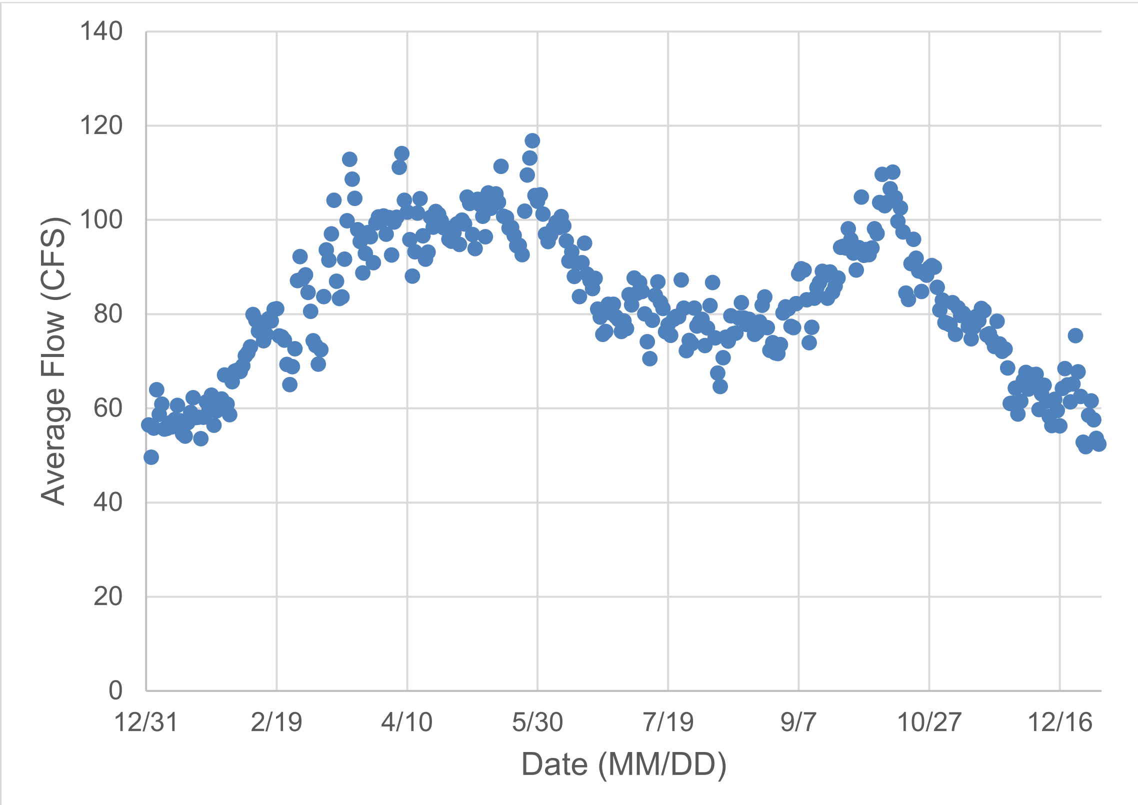


Figure D-5. South Central Drain (723SCNTDR) Average Daily Flow (2015-2019)

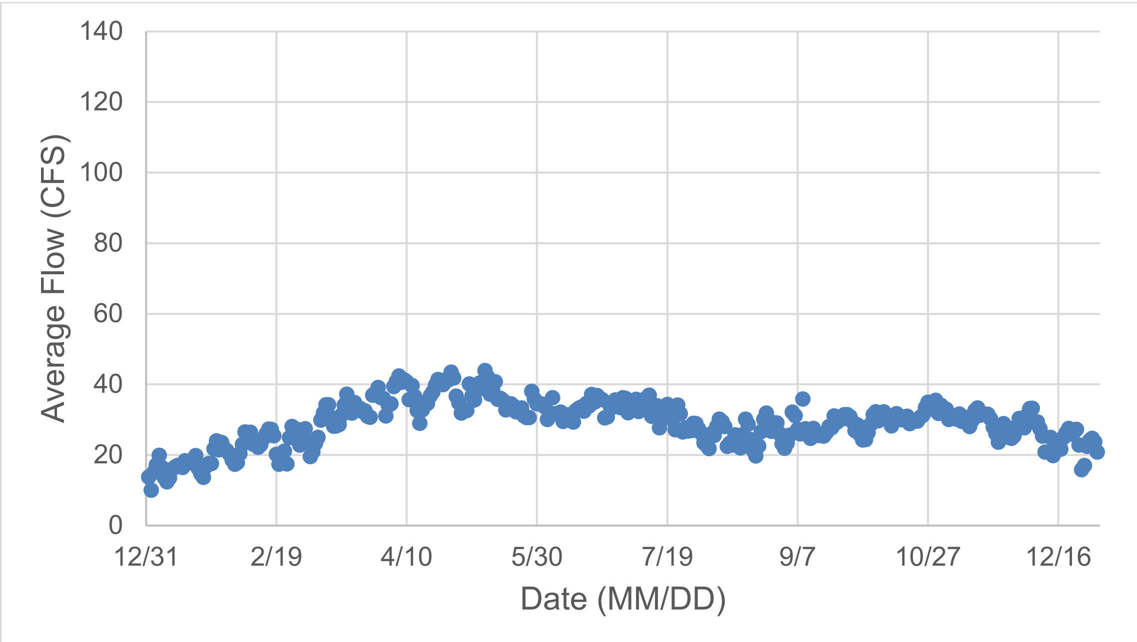


Figure D-6. New River International Boundary (723NRBDRY) Average Daily Flow (2015-2019)

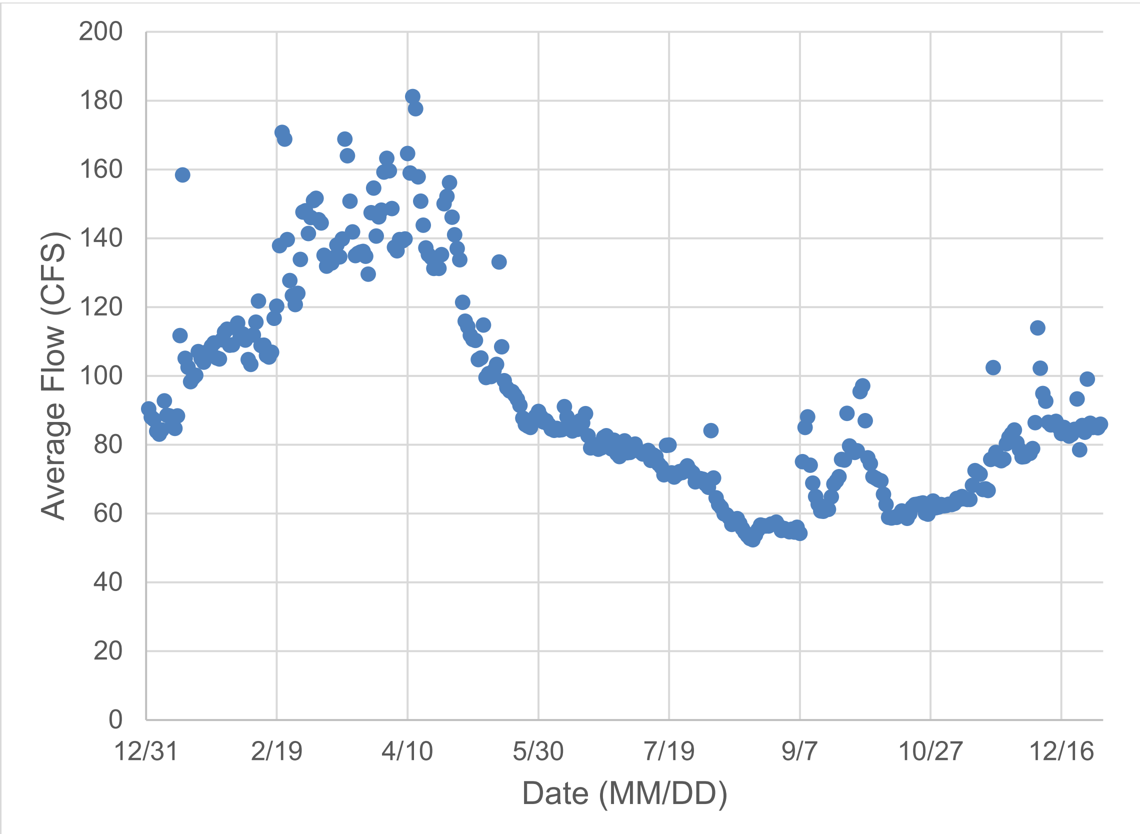
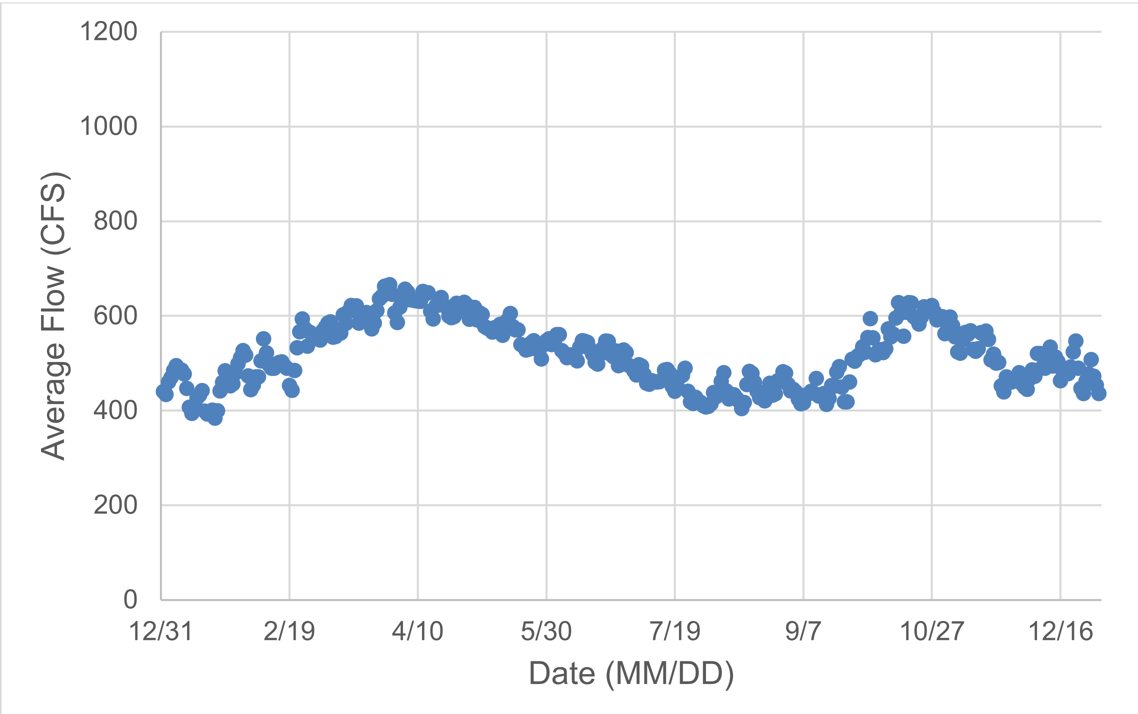


Figure D-7. New River Outlet to Salton Sea (723NROTWM) Average Daily Flow (2015-2019)



The flow data shows that there is perennial flow in the Alamo River, Imperial Valley Drains, and New River. The volume of flow in the Alamo River and New River increase downstream as Imperial Valley Drains discharge into them. The highest flows are found at the Alamo and New Rivers outlets to the Salton Sea. Typically, the flow in the Alamo River, Imperial Valley Drains, and the New River increase in the Spring, and Fall months due to increased irrigation and discharge from agricultural land. The flow of the New River at the International Boundary deviates from this pattern and may be influenced by other factors besides discharges from irrigated agricultural lands in Mexico.

4. Flow Duration Curves

Flow duration curves were developed for the Alamo River, Imperial Valley Drains, and New River sites. Flow values are first ranked from highest to lowest. For each observation, the percentage of observations exceeding that flow is calculated. For example, the lowest measured flow has an exceedance frequency of 100 percent, indicating that flow has equaled or exceeded this value 100 percent of the time, while the highest measured flow has an exceedance frequency of 0 percent. The median flow occurs at a flow exceedance frequency of 50 percent. Flow duration curves can be subjectively divided into several hydrologic flow regime classes. Figure D-8 through Figure D-14 show the graphs of flow duration curves.

Figure D-8. Alamo River Outlet (723ARGRB) Flow Duration Curve

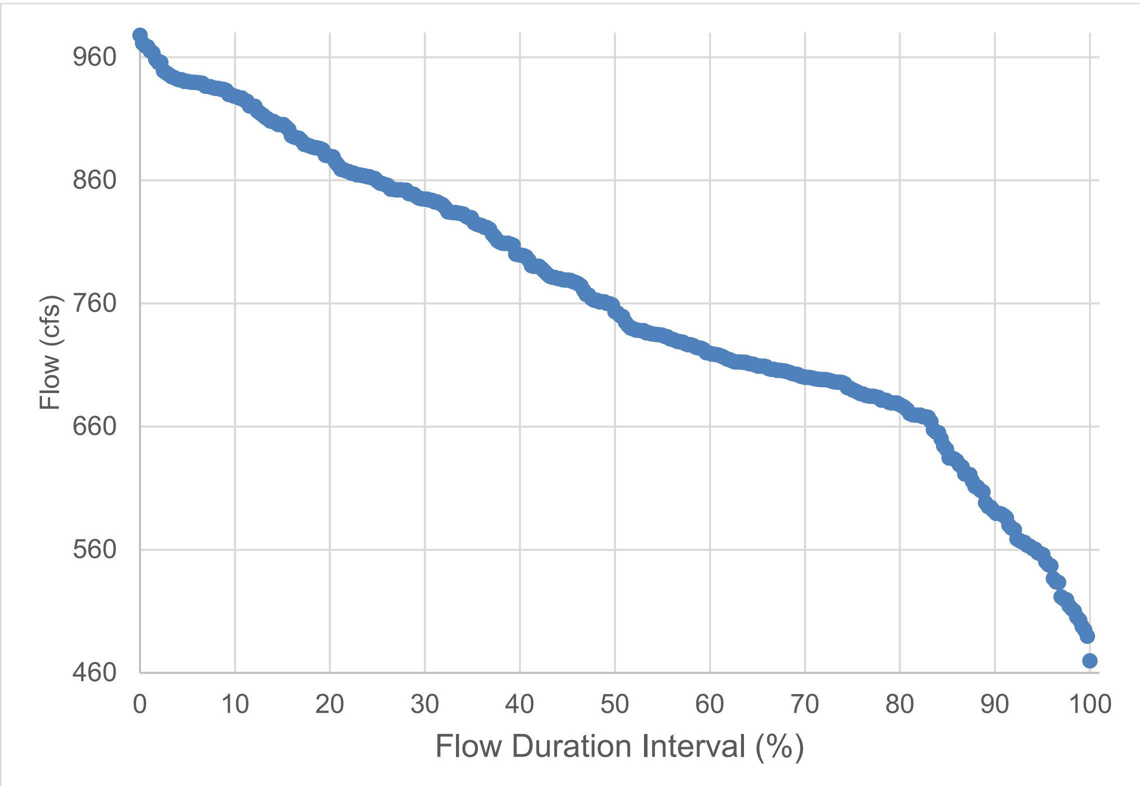


Figure D-9. Central Drain Flow (723CNTDRN) Flow Duration Curve

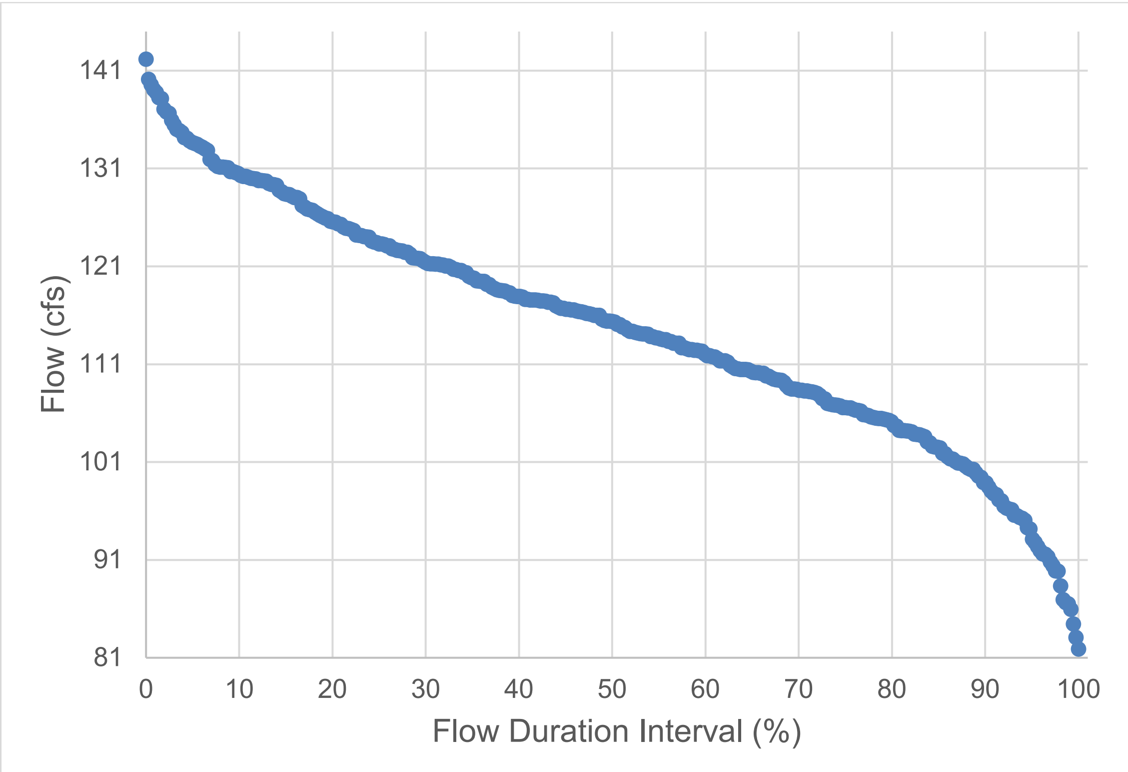


Figure D-10. Holtville Main Drain (723HVLDR) Flow Duration Curve

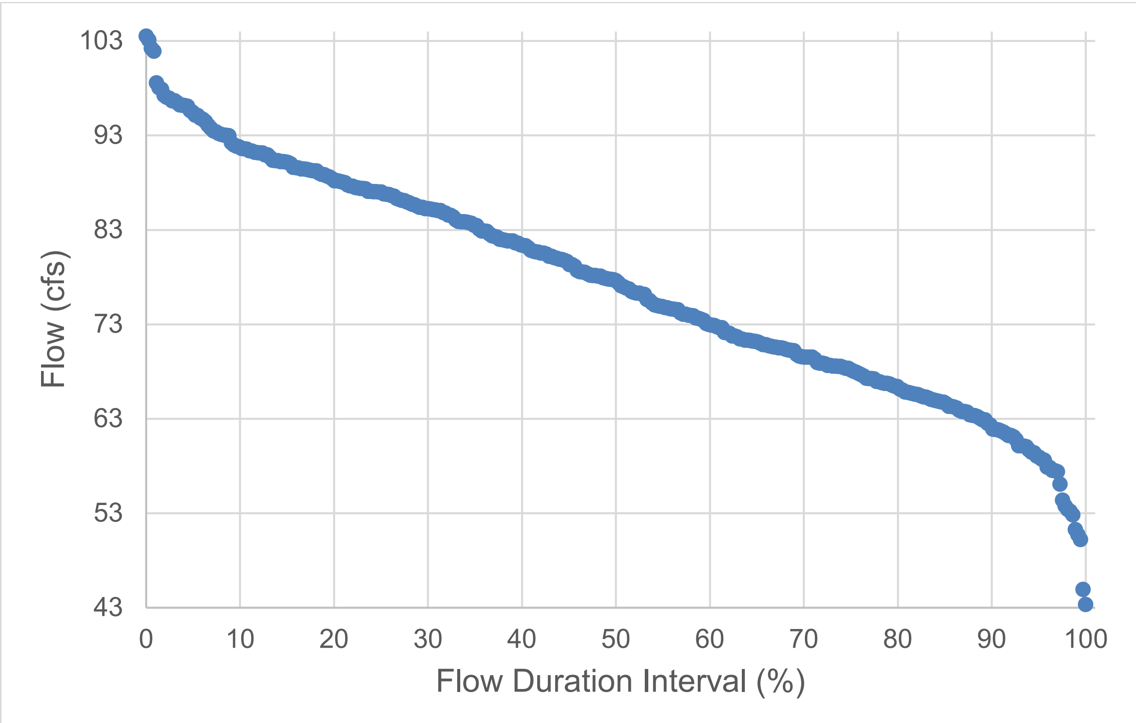


Figure D-11. Rose Drain (723ROSDRN) Flow Duration Curve

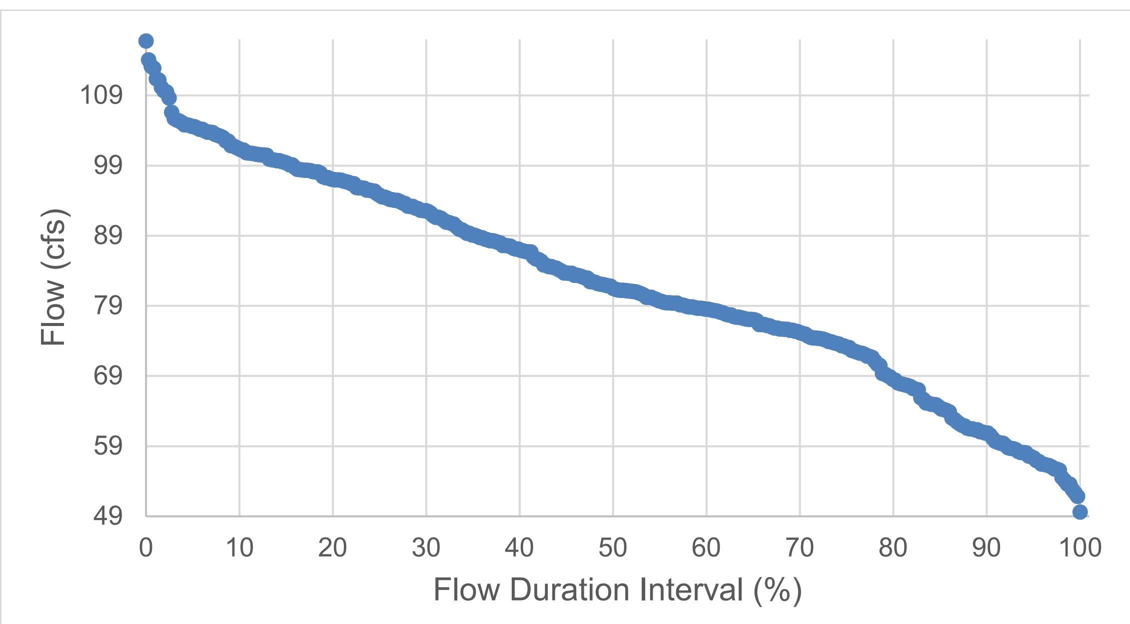


Figure D-12. South Central Drain (723SCNTDR) Flow Duration Curve

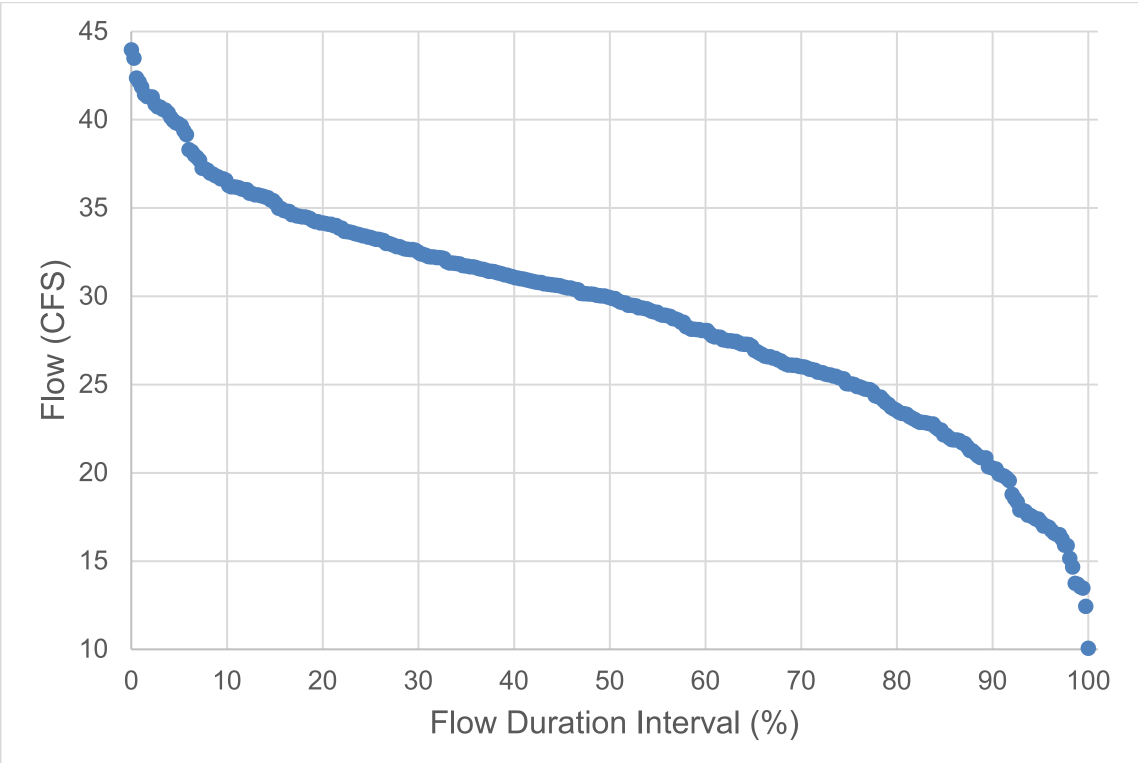


Figure D-13. New River International Boundary (723NRBDRY) Flow Duration Curve

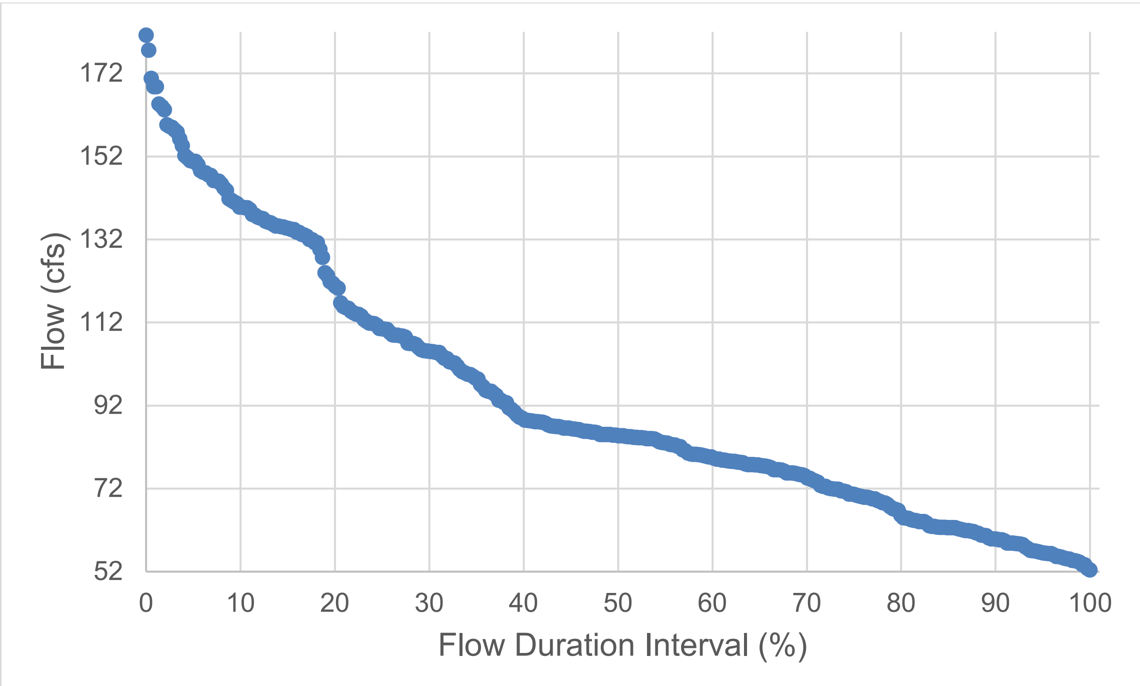
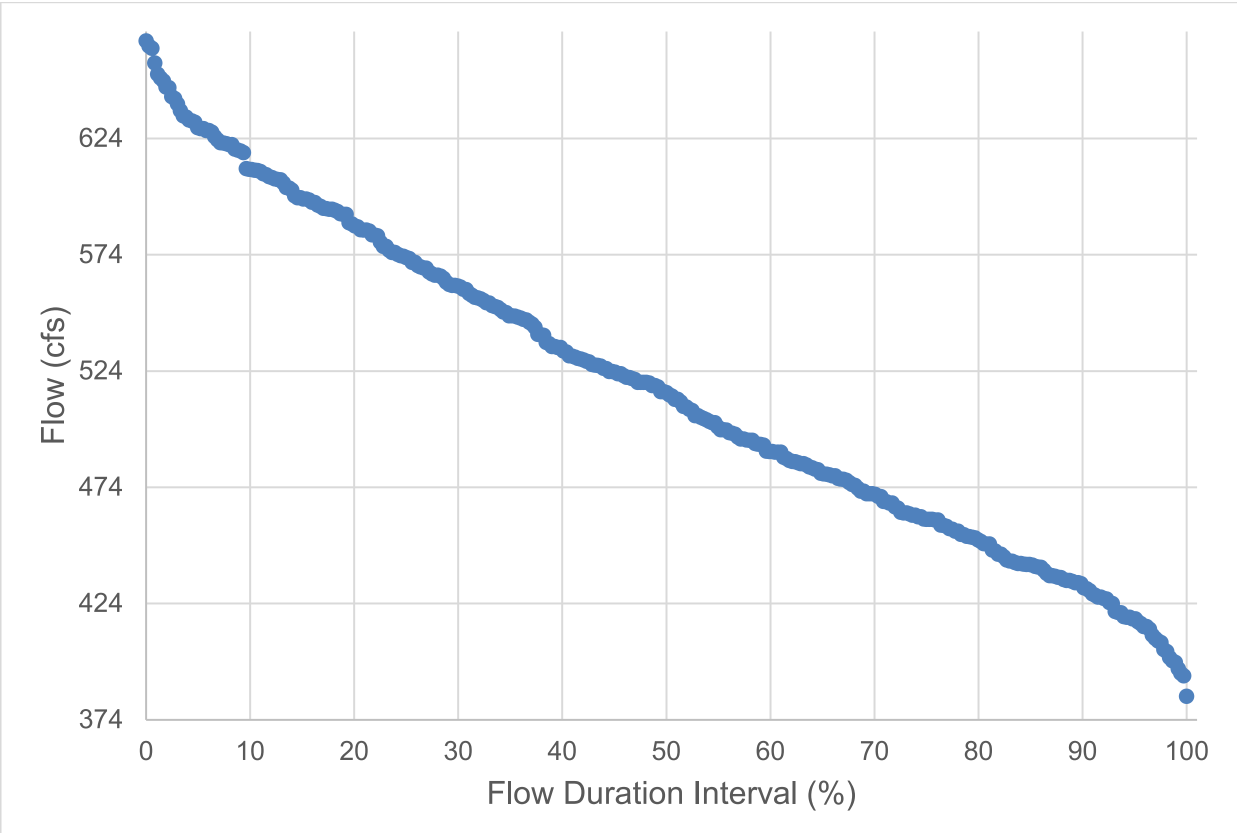


Figure D-14. New River Outlet Salton Sea (723NRWM) Flow Duration Curve



As illustrated in Figure D-8 through Figure D-14, the flow duration curve increases along the x-axis with the greatest flows at the point along the y-axis. The flow duration curve is based on the daily average flow and each point on the x-axis represents a percent of time that a flow is met or exceeded. The zero value on the x-axis represents the highest observed flow and 100 represents the lowest observed flow that was exceeded or met 100 percent of the time. The y-axis represents flow in cubic feet per second (cfs). The flow duration curves indicate that there is perennial flow in the rivers and drains

5. Load Duration Curves

A load duration curve is the allowable loading capacity of a pollutant, as a function of flow. The flow duration curve is transformed into a load duration curve by multiplying the flow by the water quality objective and a conversion factor. The load duration curve is thus calculated by multiplying the flow at the given flow exceedance percentile, by the instantaneous criteria and unit conversion factors; therefore, the loading capacity for chlorpyrifos is:

Loading capacity (grams/day)
=
0.02 µg/L (criteria) * Q (cfs) * 2.447 (unit conversion factor)

The Alamo River and New River are impaired by chlorpyrifos, diazinon, and malathion and the Imperial Valley Drains are also impaired by chlorpyrifos. The water quality objectives that staff selected to calculate the load duration curves were the numeric targets of 0.02 µg/L for chlorpyrifos, 0.16 µg/L for diazinon, and 0.028 µg/L for malathion (Siepmann and Finlayson, 2000; Finlayson, 2004, Palumbo et al., 2012). Figure D-15 through Figure D-25 show the graphs of load duration curves.

a. Chlorpyrifos Load Duration Curves

Figure D-15. Alamo River Outlet (723ARGRB) Chlorpyrifos Load Duration Curve

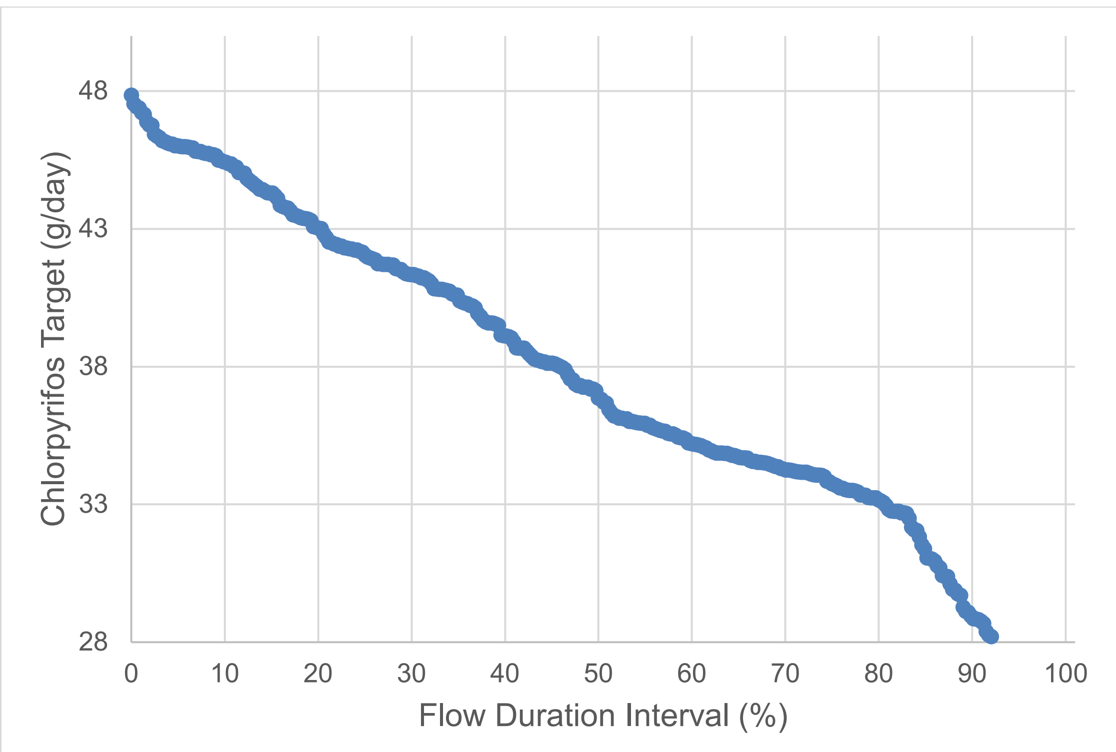


Figure D-16. Central Drain (723CNTDRN) Chlorpyrifos Load Duration Curve

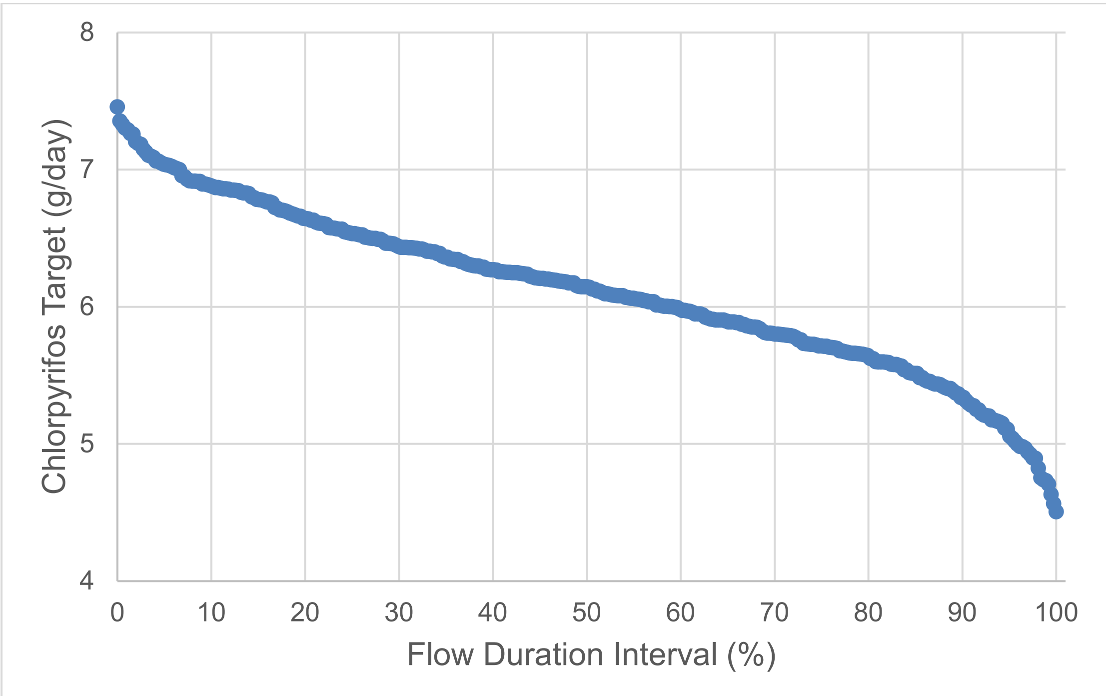


Figure D-17. Holtville Main Drain (723HVLDRN) Chlorpyrifos Load Duration Curve

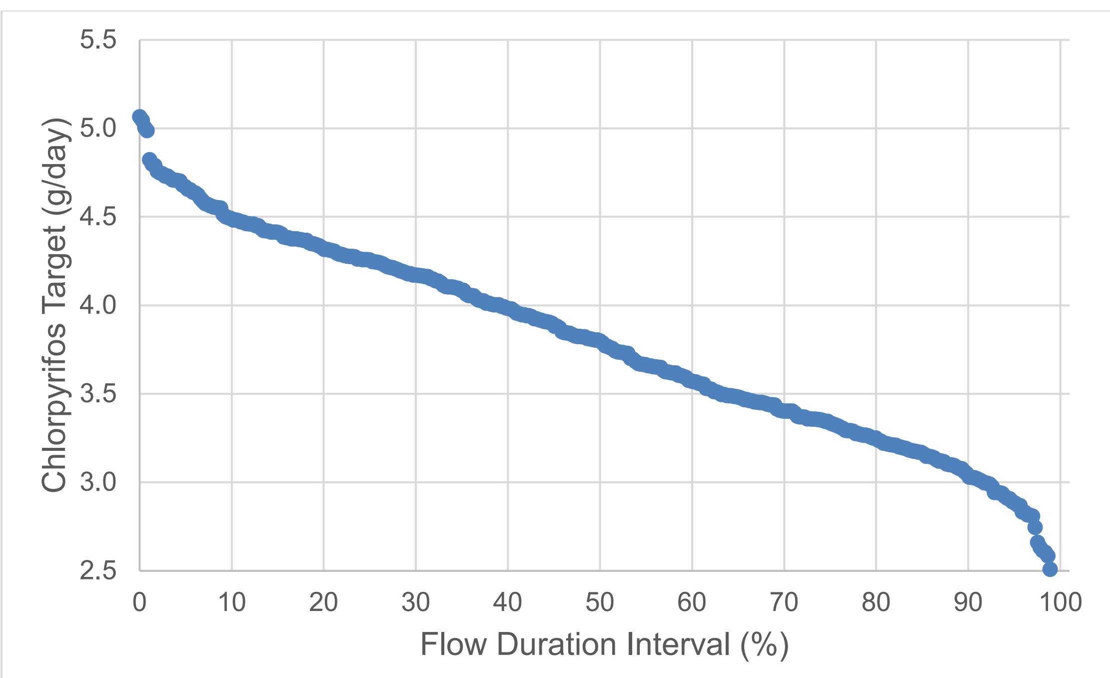


Figure D-18. Rose Drain (723ROSDRN) Chlorpyrifos Loading Duration Curve

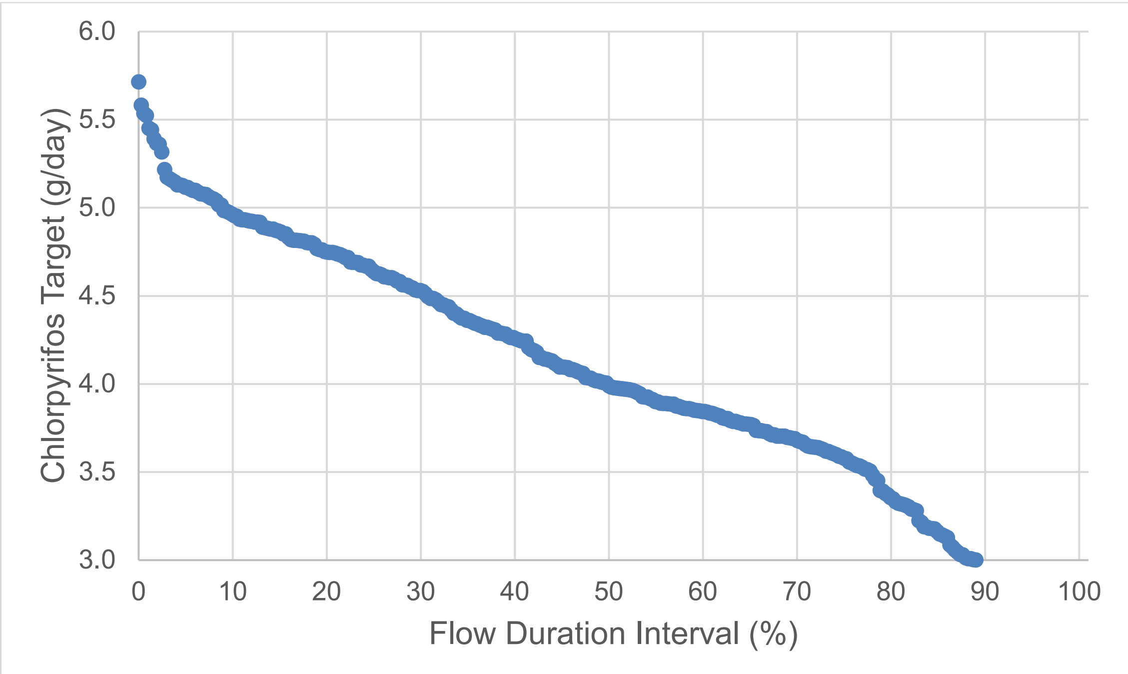


Figure D-19. South Central Drain (723SCNTDR) Chlorpyrifos Load Duration Curve

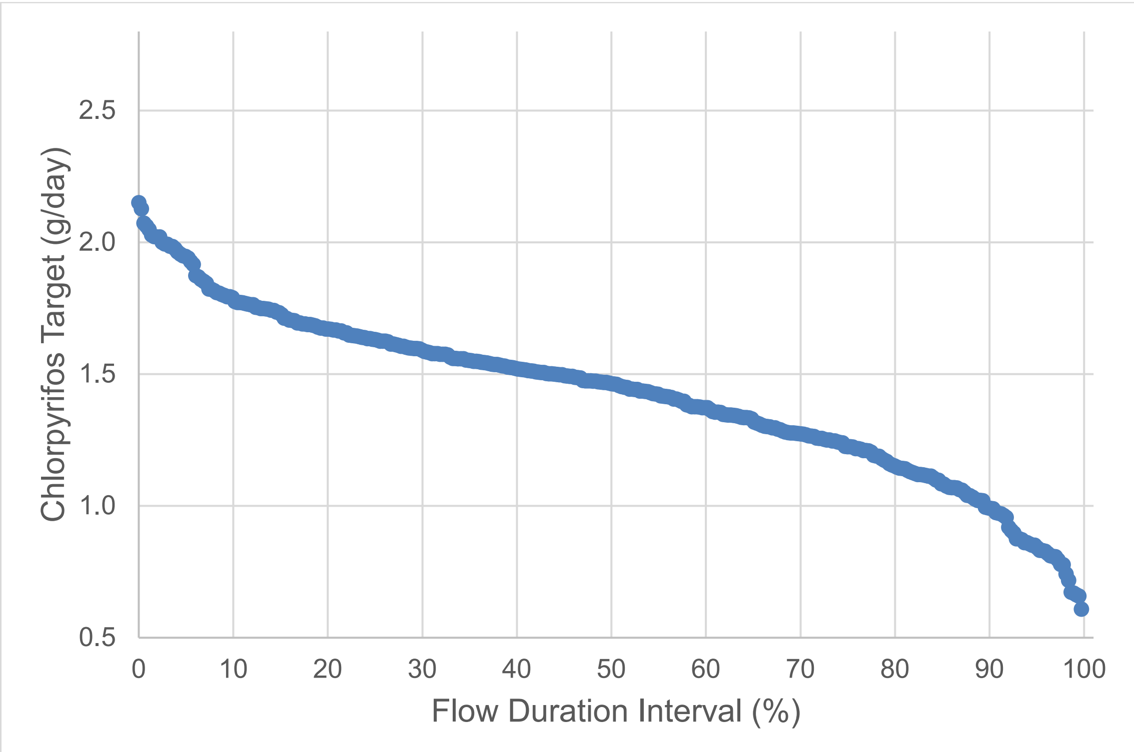
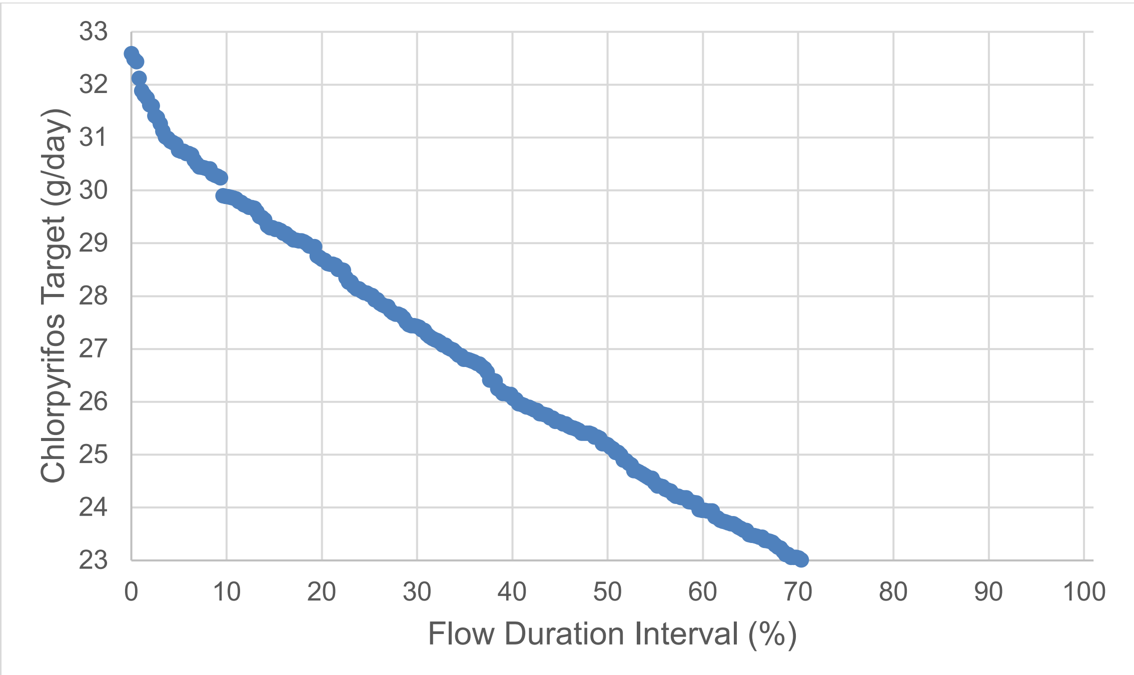


Figure D-20. New River Outlet Salton Sea (723NROTWM) Chlorpyrifos Load Duration Curve



b. Diazinon Load Duration Curves

Figure D-21. Alamo River Outlet (723ARGRB) Diazinon Load Duration Curve

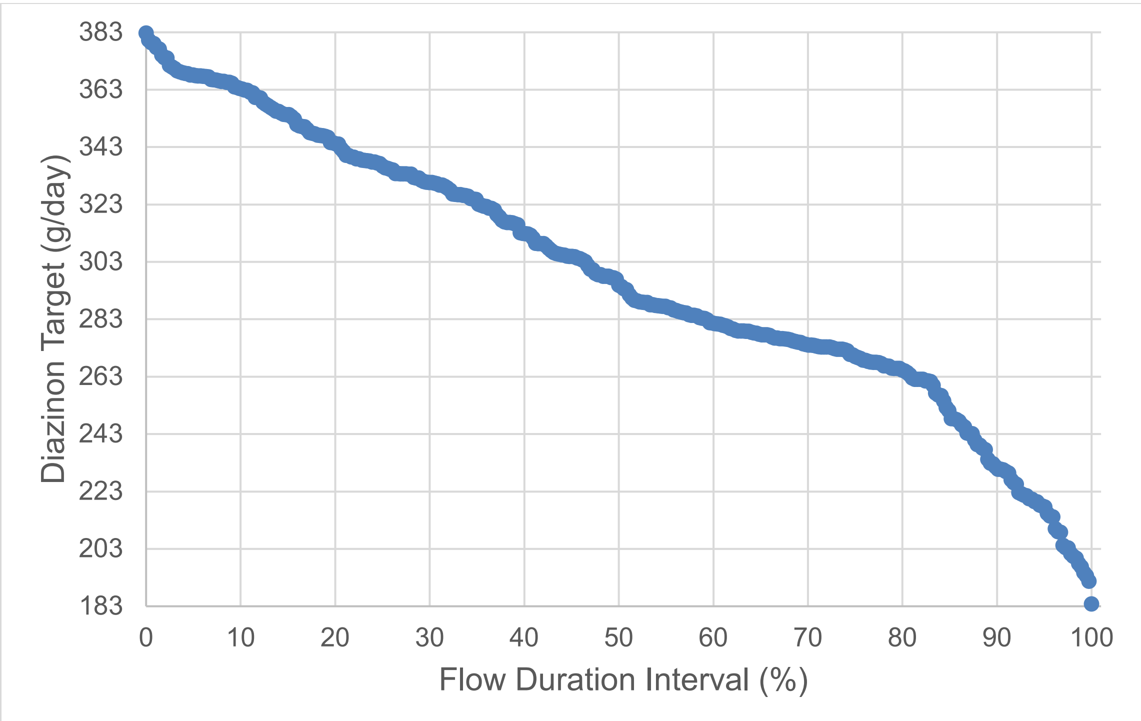


Figure D-22. New River International Boundary (723NRBDRY) Diazinon Load Duration Curve

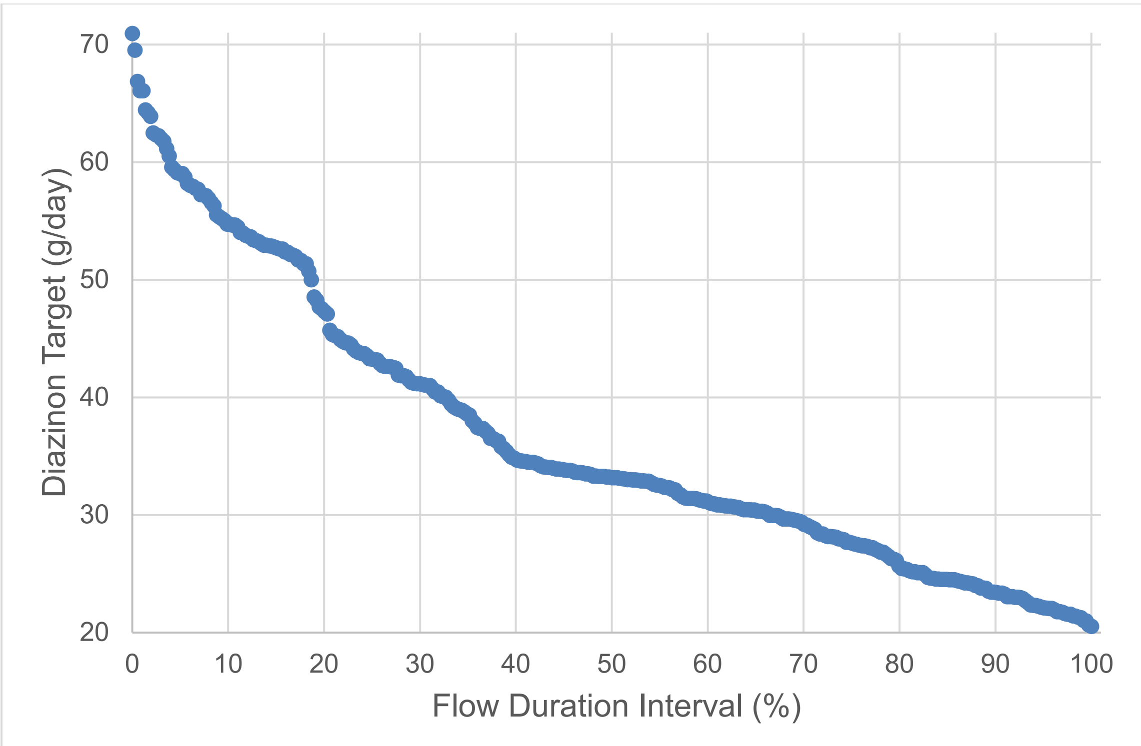
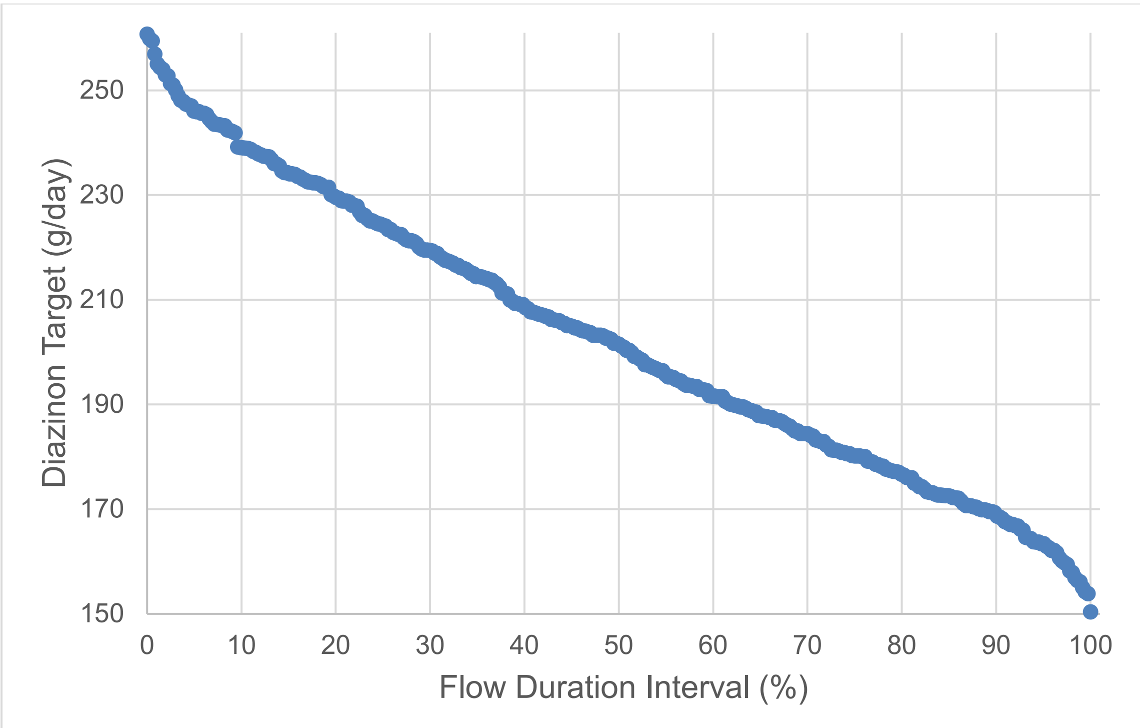


Figure D-23. New River Outlet Salton Sea (723NROTWM) Diazinon Load Duration Curve



c. Malathion Load Duration Curves

Figure D-24. Alamo River Outlet (723ARGRB) Malathion Load Duration Curve

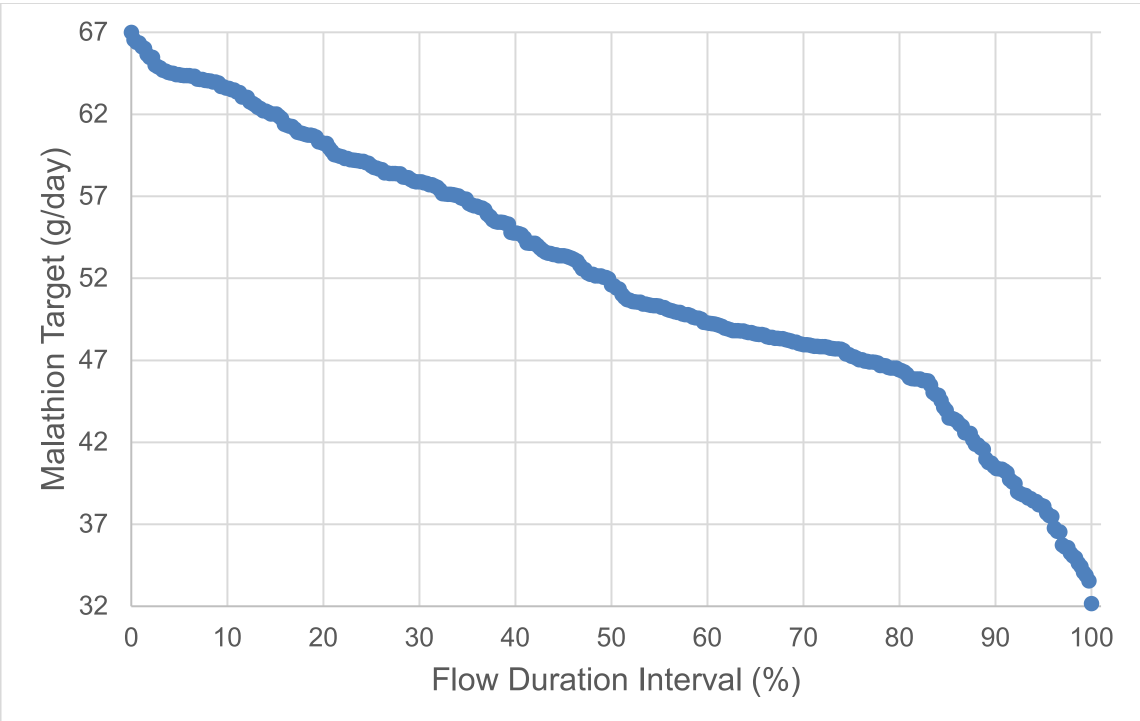
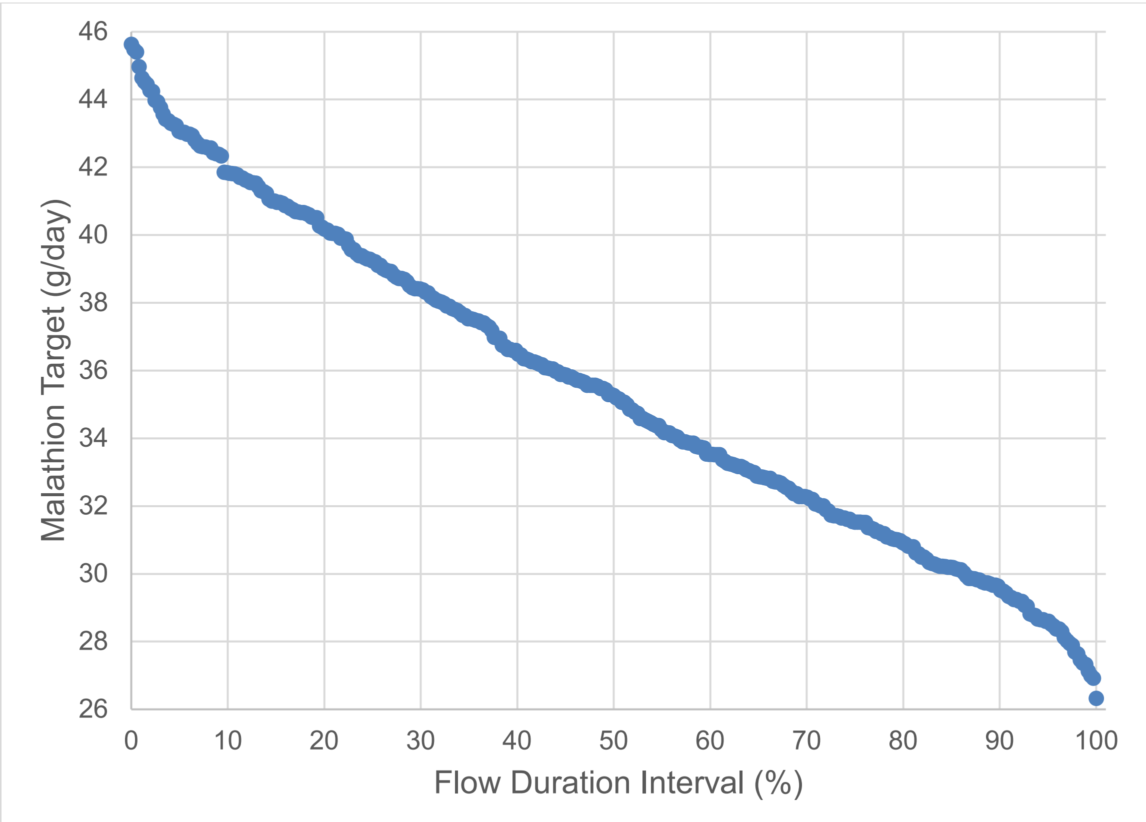


Figure D-25. New River Outlet Salton Sea (723NRBDRY) Malathion Load Duration Curve



6. Summary

Staff are establishing concentration based TMDLs in accordance with 40 CFR 122.45(f) of the Clean Water Act. However, based on USEPA guidance, staff has provided daily load expressions to supplement the concentration-based expression of the TMDLs and allocations.

Staff used a load duration curve analysis approach to create daily load expressions to estimate existing loads and assimilative capacity for chlorpyrifos, diazinon, and malathion in the Alamo River, New River, and Imperial Valley Drains.

Daily average flow data was provided by the Imperial Irrigation District and was used to create Flow Duration curves for the Alamo River, Imperial Valley drains, and New River at key location. The flow duration curves served as the basis for Load Duration curves, which are a daily expression of the load allocations of chlorpyrifos, diazinon, and malathion.

Daily load expressions can facilitate the development of management actions to achieve the allocations and TMDLs. For example, the load duration curves may show that exceedance of the numeric targets during a particular flow regime is excessive, or no exceedance at all. This information could be useful to determine implementation strategies. To this end, staff will continue to update the load duration curves when data become available, and when appropriate.

7. References

Finlayson, B. 2004. Water quality for diazinon. Memorandum to J. Karkoski, Central Valley RWQCB. Rancho Cordova, CA: Pesticide Investigation Unit, CA Department of Fish and Game.

Palumbo, A.J., P.L. TenBrook, T.L. Fojut, I.R. Faria and R.S. Tjeerdema. 2012. Aquatic life water quality criteria derived via the UC Davis method: I. Organophosphate insecticides. Reviews of Environmental Contamination and Toxicology 216:1-48.

Siepmann, Stella, and Finlayson B, 2000. Water quality criteria for diazinon and chlorpyrifos. Administrative Report 00-3. Rancho Cordova, CA: Pesticide Investigations Unit, Office of Spills and Response. CA Department of Fish and Game.

USEPA, 2007 “Options for Expressing Daily Loads in TMDLs”, U.S. Environmental Protection Agency Office of Wetlands, Oceans and Watersheds, June 22, 2007.

ATTACHMENT E: ENVIRONMENTAL REVIEW CHECKLIST

A. Project Title

Basin Plan Amendment to Establish Total Maximum Daily Load for Organochloride and Organophosphate Compounds in Imperial Valley Waters, Imperial County.

B. Lead Agency Name and Address

California Regional Water Quality Control Board,
Colorado River Basin Region
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260

C. Lead Agency Contact Person

Lauren Briggs
California Regional Water Quality Control Board,
Colorado River Basin Region
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(760) 313-1291
lauren.briggs@waterboards.ca.gov

D. Project Description

The project is a proposed amendment to the Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Board). The amendment would incorporate into the Basin Plan a Total Maximum Daily Load (TMDL) for organochlorine (OC) and organophosphate (OP) compounds in Alamo River, New River, Imperial Valley Drains and Wiest Lake in Imperial County, California. The existing Basin Plan includes narrative water quality objectives that apply to organic compounds. The objectives are being violated and the beneficial uses are being impaired in the Alamo and New Rivers, Imperial Valley Drains and Wiest Lake by excessive discharge of OC and OP compounds by nonpoint and point sources dischargers in the Imperial Valley Watershed. The TMDL Implementation Plan requires that parties responsible for the impairment to implement: a) management practices (MPs), monitoring and reporting with a time schedule for the agricultural sources by the Imperial Valley agricultural general order R7-2021-0050; b) coordination between Regional Water Board and U.S. federal agencies to control discharges of OP and OC compounds into the New River at the international boundary from Mexico; and c) requirements put in place by either individual or general NPDES permits or WDRs like monitoring and requirements to report pollutant loads associated with these facilities.

E. Project Location

Colorado River Basin Region (southeastern California),
Imperial County, California

F. CEQA Checklist

The CEQA Checklist is a series of questions grouped by subject that identifies different types of potential environmental impacts that a project may cause. CEQA considers what are the existing conditions of the physical project site as a baseline. It then compares how much change will occur to the site if the project is implemented. Based on the CEQA Guidelines, the impact severity is rated on a scale of four impact levels. The four levels are: potentially significant impact, less than significant with mitigation incorporated, less than significant impact, or no impact.

1. Aesthetics

The level of impacts to aesthetics are evaluated based on the following questions posed under impact description in the matrix below, except as provided in Public Resources Code section 21099, will the project:

Table E-1. CEQA Checklist—Aesthetics.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Have a substantial adverse effect on a scenic vista?	no	no	no	**YES**
B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
C. Substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	no	no	no	**YES**
D. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	no	no	no	**YES**

2. Agriculture and Forestry Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

The level of impacts to agriculture and forestry resources are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-2. CEQA Checklist—Agriculture and Forestry Resources.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	no	no	no	**YES**
B. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	no	no	no	**YES**
C. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
D. Result in the loss of forest land or conversion of forest land to non-forest use?	no	no	no	**YES**
E. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	no	no	no	**YES**

3. Air Quality

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. The level of impacts to air quality are evaluated based on the following questions posed under impact description in the matrix below as to will the project:

Table E-3. CEQA Checklist—Air Quality.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Conflict with or obstruct implementation of the applicable air quality plan?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
B. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality?	no	no	no	**YES**
C. Expose sensitive receptors to substantial pollutant concentrations?	no	no	no	**YES**
D. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	no	no	no	**YES**

4. Biological Resources

The level of impacts to biological resources are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-4. CEQA Checklist—Biological Resources.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	no	no	no	**YES**
B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
C. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	no	no	no	**YES**
D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	no	no	no	**YES**
E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	no	no	no	**YES**
F. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	no	no	no	**YES**

5. Cultural Resources

The level of impacts to cultural resources are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-5. CEQA Checklist—Cultural Resources.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Cause a substantial adverse change in the significance of a historical resource pursuant to section 15064.5?	no	no	no	**YES**
B. Cause a substantial adverse change in the significance of an archaeological resource pursuant to section 15064.5?	no	no	no	**YES**
C. Disturb any human remains, including those interred outside of dedicated cemeteries?	no	no	no	**YES**

6. Energy

The level of impacts to energy are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-6. CEQA Checklist—Energy.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	no	no	no	**YES**
B. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	no	no	no	**YES**

7. Geology and Soils

The level of impacts to geology and soils are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-7. CEQA Checklist—Geology and Soils.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving rupture of known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	no	no	no	**YES**
B. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving strong seismic ground shaking?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
C. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving seismic-related ground failure, including liquefaction?	no	no	no	**YES**
D. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving landslides?	no	no	no	**YES**
E. Result in substantial soil erosion or the loss of topsoil?	no	no	no	**YES**
F. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	no	no	no	**YES**
G. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
H. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	no	no	no	**YES**
I. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	no	no	no	**YES**

8. Greenhouse Gas Emissions

The level of impacts to greenhouse gas emissions are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-8. CEQA Checklist—Greenhouse Gas Emissions.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
B. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	no	no	no	**YES**

9. Hazards and Hazardous Materials

The level of impacts to hazards and hazardous materials are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-9. CEQA Checklist—Hazards and Hazardous Materials.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
B. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	no	no	no	**YES**
C. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	no	no	no	**YES**
D. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	no	no	no	**YES**
F. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	no	no	no	**YES**
G. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	no	no	no	**YES**

10. Hydrology and Water Quality

The level of impacts to hydrology and water quality are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-10. CEQA Checklist—Hydrology and Water Quality.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	no	no	no	**YES**
B. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	no	no	no	**YES**
C. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in a substantial erosion or siltation on- or off-site?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
D. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?	no	no	no	**YES**
E. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	no	no	no	**YES**

Impact Description	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
F. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows?	no	no	no	**YES**
G. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	no	no	no	**YES**
H. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	no	no	no	**YES**

11. Land Use and Planning

The level of impacts to land use and planning are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-11. CEQA Checklist—Land Use and Planning.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Physically divide an established community?	no	no	no	**YES**
B. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	no	no	no	**YES**

12. Mineral Resources

The level of impacts to mineral resources are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-12. CEQA Checklist—Mineral Resources.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?	no	no	no	**YES**
B. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	no	no	no	**YES**

13. Noise

The level of impacts to noise are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-13. CEQA Checklist—Noise.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	no	no	no	**YES**
B. Generate excessive ground-borne vibration or ground-borne noise levels?	no	no	no	**YES**
C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	no	no	no	**YES**

14. Population and Housing

The level of impacts to population and housing are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-14. CEQA Checklist—Population and Housing.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	no	no	no	**YES**
B. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	no	no	no	**YES**

15. Public Services

The level of impacts to public services are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

Table E-15. CEQA Checklist—Public Services.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Fire protection?	no	no	no	**YES**
B. Police protection?	no	no	no	**YES**
C. Schools?	no	no	no	**YES**
D. Parks?	no	no	no	**YES**
E. Other public facilities?	no	no	no	**YES**

16. Recreation

The level of impacts to recreation are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-16. CEQA Checklist—Recreation.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	no	no	no	**YES**
B. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	no	no	no	**YES**

17. Transportation

The level of impacts to transportation are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-17. CEQA Checklist—Transportation.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	no	no	no	**YES**
B. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	no	no	no	**YES**
C. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	no	no	no	**YES**
D. Result in inadequate emergency access?	no	no	no	**YES**

18. Tribal Cultural Resources

The level of impacts to tribal cultural resources are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

Table E-18. CEQA Checklist—Tribal Cultural Resources.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	no	no	no	**YES**
B. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	no	no	no	**YES**

19. Utilities and Service Systems

The level of impacts to utilities and service systems are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will

Table E-19. CEQA Checklist—Utilities and Service Systems.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	no	no	no	**YES**
B. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	no	no	no	**YES**
C. Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
D. Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	no	no	no	**YES**
E. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	no	no	no	**YES**

20. Wildfire

The level of impacts to wildfire are evaluated based on the following questions posed under impact description in the matrix below as to whether the project is located in or near state responsibility areas or lands classified as very high fire hazard severity zones will the project:

Table E-20. CEQA Checklist—Wildfire.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Substantially impair an adopted emergency response plan or emergency evacuation plan?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
B. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	no	no	no	**YES**
C. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	no	no	no	**YES**
D. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	no	no	no	**YES**

21. Mandatory Findings of Significance

The level of impacts to mandatory findings of significance are evaluated based on the following questions posed under impact description in the matrix below as to whether the project will:

Table E-21. CEQA Checklist—Mandatory Findings of Significance.

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	no	no	no	**YES**

Impact Description	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
B. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)?	no	no	no	**YES**
C. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	no	no	no	**YES**

G. Discussion

This section provides detailed discussions on the items listed in the environmental checklist above.

1. Aesthetics Discussion

Will the project:

1A. Have any substantial adverse effect on a scenic vista?

No Impact. The proposed project will not have a substantial adverse effect on a scenic vista. The project applies to land that has been cultivated for at least the last 60 years and in many cases to farmland that has been cultivated for over a century. The MPs which will be implemented to control and improve tailwater and tilewater quality will occur on existing, privately owned farmland and farmland owned by the IID. The RPs have been implementing many of these MPs (e.g., Irrigation Land Leveling, Irrigation Water Management, Pesticide Selection, etc.) for decades as part of their day-to-day farming operations. Further, the compliance monitoring activities will take place at static locations on the drains, Wiest Lake, New and Alamo Rivers, and effluents of point sources. This project expects to improve aesthetic qualities by improving the health of the ecosystem through reduced pollutant discharges from agricultural lands, NPDES facilities and the international boundary.

1B. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. The proposed project will not substantially damage scenic resources within a state scenic highway. MP implementation will occur on existing farmland cultivated for at least the last 60 years and in many cases to farmland that has been cultivated for over a century. Compliance monitoring will occur at static locations on the waterbodies and effluents of point sources. Controlling and improving the quality of agricultural and NPDES wastewater discharges, and compliance monitoring will not affect scenic resources. This project expects to improve scenic resources by improving the health of the ecosystem through reduced pollutant discharges from agricultural lands, NPDES facilities and the international boundary.

1C. Substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

No Impact. The proposed project will not substantially degrade the existing visual character or quality of the site and its surroundings. MP implementation and compliance monitoring will occur on existing farmland cultivated for at least the last 60 years and in existing NPDES and international boundary facilities. These agricultural lands, NPDES and international boundary facilities are not sensitive with respect to visual character or quality. Controlling and improving the quality of agricultural, NPDES and international boundary wastewater discharges, by implementing MP and compliance monitoring will not affect such resources.

1D. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No Impact. The proposed project will not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. MP implementation and compliance monitoring will occur mostly in daylight hours, using standard non-glaring machinery (e.g., tractors, backhoes and sampling equipment).

2. Agriculture and Forestry Resources Discussion

Will the project:

2A. Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The proposed project will not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. The project requires farmers/growers to continue using MPs on farmland to control agricultural wastewater discharge quality and control pollutants associated with discharges. It also requires farmers/growers, and NPDES facilities to perform compliance monitoring.

2B. Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The proposed project does not conflict with existing zoning for agricultural use, or the California Land Conservation Act known as the Williamson Act. MP implementation will occur on existing farmland cultivated for at least the last 60 years and compliance monitoring will occur in drains transporting tail water and in existing NPDES facilities and surface water bodies.

2C. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. The proposed project does not conflict with existing zoning for or cause rezoning of, forest land, timberland or timberland zoned Timberland Production. MP implementation will occur on existing farmland cultivated for at least the last 60 years and compliance monitoring will occur in drains transporting tail water and in existing NPDES facilities.

2D. Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The proposed project does not conflict with existing zoning for agricultural use, or the California Land Conservation Act known as the Williamson Act. MP implementation will occur on existing farmland cultivated for at least the last 60 years and compliance monitoring will occur in existing NPDES facilities.

2E. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. The proposed project does not involve other changes in the existing environment which could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. MP implementation will occur on existing farmland cultivated for at least the last 60 years and compliance monitoring will occur in existing NPDES facilities.

3. Air Quality Discussion

Will the project:

3A. Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The implementation of MP and compliance monitoring does not conflict with or obstruct implementation of the applicable air quality plan.

3B. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality?

No Impact. The contribution attributable to the proposed project is not considered cumulatively in the Imperial County Air Quality Plans that and therefore, is less than significant. The Imperial County is considered nonattainment area for PM 2.5 and 8-hour ozone. The project requires farmers/growers to continue using MPs on farmland and NPDES facilities to control pollutants associated with discharges and compliance monitoring. MPs themselves are not sources of emissions. Construction, operation, and maintenance of some MPs (e.g., land leveling, sprinkler irrigation, drip irrigation, etc.) may involve the temporary use (one-time or once-per-year) of construction equipment (e.g., tractors, backhoes) that are sources of gasoline/diesel byproduct emissions and fugitive dust emissions (particulates). However, the equipment used for construction and operation and maintenance meets emission standards. Therefore, construction equipment emissions are not expected to violate or contribute substantially to an existing or projected air quality violation.

3C. Expose sensitive receptors to substantial pollutant concentrations?

No Impact. The proposed project will not expose sensitive receptors to substantial pollutant concentrations. The MPs and compliance monitoring are not individually or cumulatively significantly different than current agricultural practices (e.g., preparing land for planting) or practices used in NPDES facilities. The project requires farmers/growers to continue using MPs on farmland to control agricultural wastewater discharge quality and control pollutants associated with discharges. Particulate emissions associated with MP and water quality monitoring will occur primarily in agricultural fields where large numbers of people are not expected to congregate.

3D. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

No Impact. The proposed project will not create objectionable odors. Implementation of MPs and compliance water quality monitoring will not create objectionable odors.

4. Biological Resources Discussion

Will the project:

4A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The proposed project will not have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special status species in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. MP implementation, and compliance water quality monitoring will not affect such resources, on the contrary. Improved water quality contributes to healthier and sustainable habitat for biological resources.

4B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The proposed project will not have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife, or U.S. Fish and Wildlife Service.

The Alamo and New Rivers, Imperial Valley Drains and Wiest Lake support riparian habitat. Riparian habitat provides valuable vegetative cover for numerous sensitive bird species, including the endangered Yuma Clapper Rail, the Mountain Plover, Burrowing owl, Short-eared owl, Black-tailed gnatcatcher, Crissal thrasher, Yellow warbler, California gray-headed junco, and Colorado Valley woodrat. The drains and delta also provide critical habitat for sensitive fish species including the endangered Desert Pupfish. Reduction of pollutants to the drains will not alter this important vegetative cover nor will it affect sensitive wildlife in any adverse manner. To the contrary—improved water quality creates a healthier habitat for wildlife and other biological resources.

In 2011, the Natural Resources Agency prepared an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Salton Sea Species Conservation Habitat Project. The Species Conservation Habitat Project is intended to serve as a proof of concept for the restoration of the shallow water habitat that currently supports fish and wildlife dependent on the Salton Sea. This habitat is being threatened and lost due to salinity increases and declining Sea elevation. The Species Conservation Habitat Project's goals are: (1) to develop a range of aquatic habitats that will support fish and wildlife species that depend on the Sea; and (2) develop and refine data needed to successfully manage the Project's habitat through adaptive management. The 2020 Annual Report on the Salton Sea Management Program can be downloaded from:

https://saltonsea.ca.gov/wp-content/uploads/2020/02/2020-Annual-Report_2-21-20-v3.pdf

The proposed project complements the Natural Resources Agency's Project and the Agency's overall efforts to restore the Salton Sea because it requires implementation of management practices to address water quality impairments and improve overall drain water quality—drain water is a vital source of flow for the Salton Sea. Further, it also compliments and is consistent with the New River Improvement Project Strategic Plan (New River Strategic Plan). In May 2012, the California-Mexico Border Relations Council adopted the New River Strategic Plan, which recommends implementation of a series of structural and non-structural measures to address New River water quality impairments. Included in the non-structural recommendations is the development and implementation of Imperial Valley agricultural General Order of Waste Discharge Requirements (Order R7-2021-0050) to address water quality impacts associated with agricultural return flows discharged into the New River. A copy of the New River Strategic Plan can be downloaded from:

https://calepa.ca.gov/wp-content/uploads/sites/6/2016/10/Border-CMBRC-2011yr-StrategicPlan.pdf

A factsheet with an update of the New River Strategic Plan implementation can be downloaded from:
https://www.waterboards.ca.gov/coloradoriver//water_issues/programs/new_river/2019/031219_fs_new_river_fnl.pdf

4C. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. The proposed project will not have a substantial adverse effect on federally protected wetlands through direct removal, filling, hydrological interruption, or other means. Control and reduction of pollutant discharges that could impair water quality will benefit water bodies in the project area. Improved water quality creates a healthier habitat for wildlife and other biological resources.

4D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

No Impact. The proposed project will not interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with an established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. Control and reduction of pollutant discharges that could impair water quality will benefit water bodies in the project area. Improved water quality creates a healthier habitat for wildlife and other biological resources.

4E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The proposed project does not conflict with any local policies or ordinances protecting biological resources. Control and reduction of pollutant discharges that could impair water quality will benefit water bodies in the project area. Improved water quality creates a healthier habitat for wildlife and other biological resources.

4F. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The proposed project does not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Control and reduction of pollutant discharges that could impair water quality will benefit water bodies in the project area. Please see discussion responding to Question 4B., above, for further discussion of the Natural Resources Agency Salton Sea Species Conservation Habitat Project.

5. Cultural Resources Discussion

Will the project:

5A. Cause a substantial adverse change in the significance of a historical resource pursuant to section 15064.5?

No Impact. The proposed project will not cause a substantial adverse change in the significance of historical resources. The Colorado River Basin Water Board is not aware of these resources in the project area and the CEQA Scoping Meeting it held on September 23, 2020, early in the development of this TMDL, did not disclose the presence of any such resources as well. The Colorado River Basin Water Board received no comments regarding the occurrence of sensitive or unique historical, archaeological, paleontological, or geological resources. Likewise, no information was obtained concerning the occurrence of ancient burial grounds, outside of formal cemeteries.

MPs implementation and compliance monitoring will occur on existing farmland cultivated for at least the last 60 years and existing NPDES facilities. Therefore, it is unlikely that any new historical resources will be identified. Control and reduction of pollutants that impair water quality is beneficial to water bodies in the project area, and will not affect historical resources.

5B. Cause a substantial adverse change in the significance of an archaeological resource pursuant to section 15064.5?

No Impact. The proposed project will not cause a substantial adverse change in the significance of archaeological resources. Please see discussion responding to Question 5A., above.

5C. Disturb any human remains, including those interred outside of dedicated cemeteries?

No Impact. The proposed project will not disturb any human remains, including those interred outside of formal cemeteries. Please see discussion responding to Question 5A., above.

6. Energy Resources Discussion

Will the project:

6A. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

No Impact. The proposed project will not result in potentially significant environmental impact due to wasteful consumption of energy resources. MPs implementation and compliance monitoring on farmland and on NPDES facilities will not result in unnecessary consumption of energy. Control and reduction of pollutant discharges that could impair water quality will benefit water bodies in the project area.

6B. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. The proposed project will not conflict with a state or local plan for renewable energy or energy efficiency. MP implementation and compliance monitoring will occur on existing farmland cultivated for at least the last 60 years. Compliance monitoring will occur on waterbodies and existing NPDES facilities.

7. Geology and Soils Discussion

Will the project:

7A. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving rupture of known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

No Impact. The proposed project will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic activity. While it is true that the Imperial Valley is one of the most active seismic zones in North America, with numerous historic earthquakes, the MPs in the proposed project are not individually or cumulatively significantly different than current agricultural practices (e.g., preparing land for planting). The project requires farmers/growers to continue using MPs on farmland to control agricultural wastewater discharge quality and control pollutants associated with discharges. Likewise, the compliance monitoring in the proposed project is not individually or cumulatively significantly different than the current compliance monitoring used on farmland and NPDES facilities.

7B. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving strong seismic ground shaking?

No Impact. The proposed project will not cause potential substantial adverse effects involving strong seismic ground shaking. MP implementation and compliance monitoring will occur on existing agricultural farmland cultivated for at least 60 years and at existing NPDES facilities.

7C. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving seismic-related ground failure, including liquefaction?

No Impact. The proposed project will not cause potential substantial adverse effects involving seismic related ground failure, including liquefaction. MP implementation and compliance monitoring will occur on existing agricultural farmland cultivated for at least 60 years and compliance monitoring will occur at NPDES facilities. MPs and monitoring likely to be implemented do not involve structures that will affect or disturb soils to any significant degree, cause soils to become unstable, or result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

7D. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving landslides?

No Impact. The proposed project will not cause potential substantial adverse effects involving strong seismic ground shaking and landslides. Please see discussion responding to Question 7C., above.

7E. Result in substantial soil erosion or the loss of topsoil?

No Impact. The proposed project will not result in substantial soil erosion or the loss of topsoil. MP implementation will occur on existing farmland and most likely reduce soil erosion or the loss of topsoil. Compliance monitoring will not result in soil erosion or the loss of topsoil.

7F. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

No Impact. The proposed project will not be located on a geologic unit or soil that is unstable as a result of the project. Please see discussion responding to Question 7C., above.

7G. Be located on expansive soil, as defined in Table 18 1 B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No Impact. The proposed project will not be located on expansive soil creating substantial direct or indirect risks to life or property. MPs implementation and compliance monitoring will occur on existing agricultural farmland cultivated for at least 60 years and at NPDES facilities. MPs and compliance monitoring to be implemented are unlikely to affect soil to any significant degree or create substantial risk to life or property.

7H. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The proposed project does not involve septic tanks or alternative wastewater disposal systems.

7I. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact. The proposed project will not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. MPs implementation and compliance monitoring will occur on existing farmland cultivated for at least the last 60 years and at NPDES facilities.

8. Greenhouse Gas Emissions Discussion

Will the project:

8A. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

No Impact. The proposed project will not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. MPs and compliance monitoring themselves are not sources of emissions. Construction, operation, and maintenance of some MPs (e.g., land leveling, sprinkler irrigation, drip irrigation, etc.) may involve the temporary use (one-time or once-per-year) of construction equipment (e.g., tractors, backhoes) that generate mobile point source emissions. However, the equipment used for construction and O&M meets emission standards. Therefore, construction equipment emissions are not expected to violate or contribute substantially to greenhouse gas emissions.

8B. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact. The proposed project does not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of greenhouse gases.

9. Hazards and Hazardous Materials Discussion

Will the project:

9A. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

No Impact. The proposed project will not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. The proposed project may indirectly impact the application of pesticides on farmland. Pesticides can be considered as hazardous materials, but the application of pesticides is controlled by the California Department of Pesticide Regulation (CDPR) and the Imperial County Agricultural Commissioner (ICAC) to prevent and mitigate hazards to the public or the environment. Pesticides should only be applied after consulting with a licensed Agricultural Pest Control Advisor, and only then by a certificated Qualified Applicator. In addition, the MPs are not individually or cumulatively significantly different than current agricultural pesticide practices. The project requires farmers/growers to continue using MPs on farmland to control agricultural wastewater discharge quality and control pollutants associated with discharges. It also requires NPDES facilities to implement compliance monitoring and to control pollutants associated with discharges.

9B. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

No Impact. The proposed project will not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Please see discussion responding to Question 9A., above.

9C. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. The proposed project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. MPs implementation and compliance monitoring will occur on existing agricultural farmland cultivated for at least 60 years and at NPDES facilities. Please see discussion responding to Question 9A., above.

9D. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The proposed project will not be located on sites included on a list of hazardous materials sites that would result in creation of a significant hazard to the public or the environment. MP implementation and compliance monitoring will occur on existing agricultural fields and NPDES facilities.

9E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. Small portions of the proposed project are located within two miles of public airports, but the proposed project will not result in a safety hazard for people residing or working in the project area. According to the Airport Land Use Compatibility plan, Imperial County Airports (Imperial County, 1996), the principal means of reducing risk to people on the ground is to restrict land uses so as to limit the gathering of people in areas most susceptible to aircraft accidents, which means that agricultural land use, which does not tend to result in a gathering of people, can be carried out with minimal exposure to safety hazards. Construction and/or installation of some MPs in an airport land use area may involve the temporary use of farming and construction equipment (e.g., tractors, backhoe, and caterpillars) that may temporarily increase the hazard potential. However, such activities will occur on farmland not typically surrounded by people, and once installed, the MPs themselves are not areas where people would tend to gather. The NPDES facilities are not within two miles of a public airport or public use airport. MP implementation and compliance monitoring will occur on existing agricultural farmland cultivated for at least 60 years and at NPDES facilities.

9F. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The proposed project will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. MP implementation and compliance monitoring will occur on existing agricultural fields and NPDES facilities, which generally are not corridors for emergency response or evacuation.

9G. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No Impact. The proposed project will not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. MP implementation and compliance monitoring will occur on existing farmland and at NPDES facilities. MPs to be implemented are unlikely to increase the risk of loss, injury or death involving wildland fires.

10. Hydrology and Water Quality Discussion

Will the project:

10A. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

No Impact. The proposed TMDL requires implementation of actions to reduce pollutant discharges to Imperial Valley waterways and groundwaters and to discharge in compliance with Basin Plan water quality standards (WQS). Implementation of MPs will improve the water quality of receiving surface waters and groundwaters by reducing pollutant loading to receiving waters, and preventing pollutants from reaching receiving waters. The proposed TMDL also includes a comprehensive monitoring program for receiving waters to ensure compliance with WQS, and overall improvements in water quality.

10B. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

No Impact. The proposed project does not involve the extraction or recharge of groundwater supplies and will not impede sustainable groundwater management of the basin. The Imperial Valley is part of the Imperial Hydrologic Unit. In general, first-encountered groundwater in the Imperial Valley is not used for domestic purposes because it typically consists of storm water and irrigation water that percolates and passes the root zone of farmland. Tile drains have been installed by IID to convey shallow groundwater away from the root zone of crops. Most of the shallow groundwater, leaching water, or excess irrigation water flows into the drains and New and Alamo Rivers. Groundwater levels have remained relatively stable within the majority of the basin between 1970 and 1990 because of a constant rate of discharge from canals and subsurface agricultural drains (DWR, 2003).

10C. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in a substantial erosion or siltation on or off site?

No Impact. The proposed project does not require alteration of the existing drainage pattern of the site or area, and would not result in substantial erosion or siltation on or off site. Rather, the proposed project expects to reduce sediment/silt discharge to surface waters by implementing MPs that minimize erosion and sediment deposition.

10D. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?

No Impact. The proposed project does require alteration of the existing drainage pattern of the site or area, and would not result in a substantial increase in the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Alteration of drainage patterns (e.g., re-routing surface waters, increasing paved areas, increasing agricultural runoff) is not a foreseeable method of compliance with this TMDL. Please see discussion responding to Question 10C., above.

10E. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

No Impact. The proposed project will not substantially alter the existing drainage pattern of the area nor create or contribute runoff water. Rather, the proposed project should improve the quality of runoff from agricultural fields, thereby reducing substantial additional sources of pollution. Please see discussion responding to Question 10D., above.

10F. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows?

Impact. The proposed project will not substantially alter the existing drainage pattern of the area nor impede or redirect flood flows. Please see discussion responding to Question 10D., above.

10G. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Impact. The proposed project will not expose people or structures to a significant risk release of pollutants due to project inundation by seiche, tsunami, or flood hazard.

10H. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Impact. The proposed project will not obstruct implementation of a water quality control plan or sustainable groundwater management plan. Rather, the proposed project requires implementation of actions to reduce pollutant discharges to Imperial Valley waterways and groundwaters and be in compliance with Basin Plan water quality standards (WQS).

11. Land Use and Planning Discussion

Will the project:

11A. Physically divide an established community?

No Impact. The proposed project will not physically divide an established community. MP and compliance monitoring will occur on existing fields and NPDES facilities and will not result in any land use or planning impacts.

11B. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The proposed project will not conflict with any applicable land use plan, policy, or regulation adopted by an agency with jurisdiction over the project for the purpose of avoiding or mitigating an environmental effect. MP implementation and compliance monitoring will occur on existing fields and drains, and will not impact land use or planning.

12. Mineral Resources Discussion

Will the project:

12A. Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?

No Impact. The proposed project will not result in the loss of availability of a known mineral resource of value to the region and the residents of the state. MP and compliance monitoring will occur on existing farmland and NPDES facilities.

12B. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. The proposed project will not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. MP and compliance monitoring will occur on existing farmland and NPDES facilities.

13. Noise Discussion

Will the project:

13A. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

No Impact. The proposed project will not result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan ordinance, or applicable standards of other agencies. Construction and/or installation of some MPs may involve the temporary use of farming and construction equipment (e.g., tractors, backhoe, caterpillars) that may emit noise at levels greater than 60 decibels. However, such activities will occur on farmland not typically surrounded by people.

13B. Generate excessive groundborne vibration or groundborne noise levels?

No Impact. The proposed project will not expose persons to or generate excessive groundborne vibration or groundborne noise levels. Construction and/or installation of some MPs may involve the temporary use of farming and construction equipment (e.g., tractors, backhoe, caterpillars) that may emit groundborne vibration or noise. However, such activities will occur on farmland not typically surrounded by people. Once installed, the MPs themselves are not sources of significant groundborne vibration or noise.

13C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. Small portions of the proposed project are located within two miles of public airports, but the proposed project will not expose people residing or working in the project area to excessive noise levels. According to the Airport Land Use Compatibility plan, Imperial County Airports (Imperial County, 1996), noise exposure in the vicinity of the airports for agricultural cropland will clearly be acceptable, which means that agricultural land use can be carried out with essentially no interference from the noise exposure. Construction and/or installation of some MPs may involve the temporary use of farming and construction equipment (e.g., tractors, backhoe, and caterpillars) that may increase ambient noise levels in the area. However, such activities will occur on farmland not typically surrounded by people, and once installed, the MPs themselves are not the sources of excessive noise.

14. Population and Housing Discussion

Will the project:

14A. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The proposed project will not induce substantial unplanned population growth in an area. MPs and compliance monitoring will not result in new homes and businesses nor extend other infrastructures that will induce population growth.

14B. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. The proposed project will not displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere. MPs and compliance monitoring will not displace people.

15. Public Services Discussion

Will the project create impacts to:

15A. Fire protection?

No Impact. The proposed project will not result in adverse impacts on fire protection. MP implementation and compliance monitoring will occur on existing agricultural farmland under cultivation for at least 60 years and at NPDES permitted facilities. MPs and monitoring to be implemented are unlikely to affect fire protection, police protection, schools, parks and other public facilities.

15B. Police protection?

No Impact. The proposed project will not result in adverse impacts on police protection and associated activities related to acceptable service ratios, response times, or other performance objectives for this public service. Please see discussion responding to Question 15A., above.

15C. Schools?

No Impact. The proposed project will not result in adverse impacts on schools and associated activities. Please see discussion responding to Question 15A., above.

15D. Parks?

No Impact. The proposed project will not result in adverse impacts on parks and associated activities related to other performance objectives for this public service. Please see discussion responding to Question 15A., above.

15E. Other public facilities?

No Impact. The proposed project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for public services. Please see discussion responding to Question 15A., above.

16. Recreation Discussion

Will the project:

16A. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The proposed project will not increase the use of existing neighborhood and regional parks or other recreational facilities. MPs and monitoring to be implemented will not increase park or recreational facility use.

16B. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The proposed project will not include recreational facilities or require the construction or expansion of recreational facilities. MPs and monitoring to be implemented will not include or require recreational facility use.

17. Transportation Discussion

Will the project:

17A. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

No Impact. The proposed project does not conflict with adopted policies, plans, or programs addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. MP and compliance monitoring implementation do not involve or affect alternative transportation. The proposed project will not exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways. Construction and/or installation of some MPs and compliance monitoring may require use of vehicle and farming or construction equipment (e.g., tractors, backhoe, caterpillars). However, transportation and movement of farming equipment is common on the roads and highways serving the area where MPs are to be implemented. Potential traffic congestion may occur temporarily in isolated areas, but is not expected to exceed a level of service standard for designated roads or highways

17B. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

No Impact. The proposed project will not have impact on vehicle miles traveled nor cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections). Construction and/or installation of some MPs may require use of farming equipment (e.g., tractors, backhoe, caterpillars). However, transportation and movement of farming equipment is common on roads and highways serving the area where MPs are to be implemented. Traffic congestion may occur temporarily in isolated areas, but is not expected to increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections.

17C. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. The proposed project will not substantially increase hazards due to design features or incompatible uses. Construction and/or installation of some MPs and compliance monitoring may require use of vehicle, farming and construction equipment (e.g., tractors, backhoe, caterpillars). However, transportation and movement of farming and construction equipment is common on the roads and highways serving the area where MPs are to be implemented, and do not create an incompatible use hazard.

17D. Result in inadequate emergency access?

No Impact. The proposed project will not result in inadequate emergency access. Construction and/or installation of some MPs and compliance monitoring may require use of vehicle, farming and construction equipment (e.g., tractors, backhoe, caterpillars). However, transportation and movement of farming and construction equipment is common on the roads and highways serving the area where MPs are to be implemented, and should not create inadequate emergency access.

18. Tribal Cultural Resources Discussion

Will the project:

18A. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

No Impact. MP implementation and compliance monitoring will occur on existing agricultural drains, on farmland under cultivation for at least 60 years and at NPDES permitted facilities. These activities are not expected to affect or change any Tribal cultural resources. Further, implementation of the TMDL is not expected to affect sites listed on the state or federal register of historic places. Pursuant to Public Resources Code section 21080.3.1, commonly referred to as AB 52, the Regional Water Board notified Tribal organizations that requested to be consulted and are affiliated with the Imperial Valley watershed and Imperial County of the project. In addition, the Regional Water Board notified the other Tribal organizations within Colorado River Region Water Board area that are on the California Tribal Consultation List and California Native American Tribal List. Regional Board received one letter from the Viejas Band of Kumeyaay Indians communicating that the project site has cultural significance or ties to Viejas. Viejas Band requested that a Kumeyaay Cultural Monitor be on site for ground disturbing activities to inform them of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains. Subsequently, the Regional Board Tribal Coordinator contacted the Viejas Band of Kumeyaay Indians by email and phone calls to inform that the project should not entail any new ground disturbing activities that could lead to an inadvertent discovery of cultural artifacts, cremation sites, or human remains. Since it is expected that one or a combination of the following approaches will be used for the project: reduced pesticide use, switching to other safer pesticides, and/or enhanced pesticide management practices. These approaches do not involve ground-disturbing activities. Regional Board staff did not receive a response from the email to the Viejas Band of Kumeyaay Indians.

18B. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

No Impact. Please see the response at 18A. In addition, in the event that the ground disturbances uncover previously undiscovered or documented resources, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains. (Health & Safety Code, section 7050.5; Public Resource Code, section 5097.9 et seq).

19. Utilities and Service Systems Discussion

Will the project:

19A. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

No Impact. The proposed project will not require or result in construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities or expansion of existing facilities. MPs and compliance monitoring will not require construction of new or expanded water or wastewater treatment. Implementation may involve new monitoring in wastewater treatment plants and storm water drainages.

19B. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

No Impact. The proposed project will not require new water supplies to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. MPs implementation and monitoring does not involve new water supplies.

19C. Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. MP implementation and compliance monitoring will not increase demand on the wastewater treatment providers. The proposed project will not result in a determination regarding its capacity by the wastewater treatment provider.

19D. Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

No Impact. The proposed project does not involve landfills, and will not generate additional solid waste to be accommodated by a landfill.

19E. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. The proposed project complies with federal, state, and local statutes and regulations related to solid waste. MP implementation and compliance monitoring does not involve solid waste.

20. Wildfire Discussion

Will the project:

20A. Substantially impair an adopted emergency response plan or emergency evacuation plan?

No Impact. The proposed project does not impair an adopted emergency responses or evacuation plans. MPs implementation and compliance monitoring will occur on existing farmland, existing NPDES facilities and waterbodies, which generally are not corridors for emergency response or evacuation.

20B. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. The proposed project does not exacerbate wildfire risks and expose project occupants to pollutant concentrations from a wildfire. MPs implementation and compliance monitoring will occur on existing farmland, at NPDES facilities and surface waterbodies, which does not exacerbate wildfire risks.

20C. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact. The proposed project does not involve installation or maintenance of infrastructure that may exacerbate fire risk. MP implementation and compliance monitoring will occur on existing farmland and NPDES permitted facilities. MPs to be implemented are unlikely to increase the risk of loss, injury or death involving wildland fires

20D. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. The proposed project does not expose people or structures to significant risks from post-fire impacts. MPs and compliance monitoring will occur on existing fields, NPDES facilities and waterbodies that are generally in a plane area with a low gradient, which generally are not corridors for emergency response or evacuation.

21. Mandatory Findings of Significance Discussion

Will the project:

21A. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

No Impact. The proposed project will not degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. Rather, the proposed project is expected to improve the environment by regulating the discharges of waste and thereby improve water quality in the area such that it meets the Water Quality Standards.

21B. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)?

No Impact. The proposed project will not have impacts that are individually limited or cumulatively considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. There are several existing and proposed projects involving water quality of the Alamo River, New River, Imperial Valley Drains, Wiest Lake and Salton Sea: Alamo River Sediment TMDL, Imperial Valley Drains Sediment TMDL, New River Sediment TMDL, Imperial Valley Agricultural General Order of Waste Discharge Requirements, Wetlands

Demonstration Projects, Colorado River Quantification Settlement Agreement (QSA) and California Natural Resources Agency's Salton Sea Management Program (SSMP). These projects have been providing benefits to the water quality of the affected waterbodies and to the biological resources and environment by reducing the amount of pollutants inflow into the waterbodies. For example, the QSA projects provided for mitigation of the adverse water quality impacts that the QSA projects might create, and further enhances water quality by creating the Species Conservation Habitat (SCH) Project to restore the Salton Sea. In connection with the SCH Project, this project compliments the SCH Project and overall efforts to restore the Salton Sea because this project requires implementation of management practices to address water quality impairments and improve overall drain water quality.

In addition, implementation of existing laws/regulations/treaties, better coordination with third party cooperating agencies/organizations, and monitoring of water quality are activities that are not cumulatively considerable. Rather, the proposed project is expected to reduce negative cumulative effects, if any, through better agency coordination, and to protect beneficial uses of Alamo and New Rivers, Imperial Valley Drains, Wiest Lake and Salton Sea by reducing the amount of pollutants in agricultural discharges

21C. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

No Impact. The proposed project does not have environmental effects which will cause substantial adverse effects on human beings either directly or indirectly. Implementation of existing laws/regulations/treaties, better coordination with third party cooperating agencies/organizations, and monitoring are activities that do not adversely affect human beings. Rather, the proposed project is expected to reduce water quality related problems (e.g., unsafe fish consumption) that may adversely affect human beings.

ATTACHMENT F: STAFF RESPONSE TO PEER REVIEW COMMENTS

1. Preface

The Colorado River Basin Water Board staff will propose adoption of the Basin Plan amendment to establish Total Maximum Daily Loads (TMDLs) for the Alamo River, Imperial Valley Drains, New River, and Wiest Lake that are not meeting their water quality standards (WQSs) because of organophosphate (OP) and organochlorine (OC) compounds

Pursuant to Health and Safety Code section 57004, all California Environmental Protection Agency (CalEPA) organizations to submit the scientific basis and scientific portion of all proposed policies, plans and regulations for external scientific review. The peer reviewer's responsibility is to determine whether the scientific findings, conclusions, and assumptions are based upon sound scientific knowledge, methods, and practices.

The University of California (UC) facilitated peer reviewer selection. The detailed step-by-step guidance for setting up and obtaining reviews appears in an Interagency Agreement between the CalEPA and the UC (see Exhibit F of guidance document). A January 7, 2009 Supplement to the Guidelines, provides, among other things, additional guidance to ensure confidentiality of the process. No person may serve as an external scientific peer reviewer if that person participated in the development of the scientific basis or scientific portion of the proposed rule, regulation, or policy.

Two individuals were selected to review this document for scientific adequacy:

Dr. George M. Hornberger, Ph.D.
Distinguished University Professor Emeritus, Vanderbilt University

Dr. Ralf Schulz, Ph.D.
Professor, Environmental Sciences; iES Landau, Institute for Environmental Sciences, University Koblenz-Landau

These researchers collectively have substantial research expertise in pesticide pollution, toxicity, the fate and transport of organophosphate and organochlorine compounds, hydrology, desert irrigated agriculture, and Total Maximum Daily Loads (TMDLs).

Health and Safety Code section 57004 further provides that if the peer reviewers find that an agency failed to demonstrate that the scientific portion of the proposed rule is based upon sound scientific knowledge, methods, and practices, the reviewer's report shall state that finding, and the reasons explaining the finding.

The staff of California Regional Water Quality Control Board, Colorado River Basin (Colorado River Basin Water Board or Board) asked the reviewers to comment on whether the scientific portions of the TMDL Staff Report and Implementation Plan are based upon sound scientific knowledge, methods, and practices. Specifically, the reviewers were asked to comment on five specific areas:

1. **Numeric Targets**—Whether the selection of numeric targets for organophosphate and organochlorine compounds are adequate in protecting the beneficial uses of the Imperial Valley waters.

2. **Source Analysis**—Whether the sources of organophosphate and organochlorine compound pollution in impaired surface waters were identified.

3. **Allocations**—Whether the proposed load and wasteload allocations are accurate.

4. **Implementation**—Whether the proposed implementation plan is accurate and effective.

5. **Monitoring Plan**—Whether the proposed monitoring plan is accurate and effective.

In addition to the findings, assumptions, and conclusions each individual agreed to review, reviewers were also invited to identify and address additional subjects that should be considered as part of the scientific basis of the TMDL project and to comment whether the entirety of the proposed TMDL project is based on sound scientific knowledge, methods, and practices. Other assumptions, knowledge, methods, and practices that are in addition to the agreed upon review are included within the reviewer’s comments.

Colorado River Basin Water Board staff appreciates the thorough reviews provided by the external scientific peer reviewers. Staff have taken their comments and expertise into consideration in an effort to improve the technical information in the TMDL Staff Report.

2. Comments by George M. Hornberger, Ph.D.

2.1. Numeric Targets

Comments: [The Colorado River Basin Water Board's] selection of numeric targets for organophosphate and organochlorine compounds addressed by these TMDLs is accurate. The numeric targets selected in these TMDLs are based on USEPA standards and interpretations of the narrative toxicity and chemical constituent WQOs in the Basin Plan. I am not a toxicologist, but the numeric targets appear to be based on multiple studies by established experts.

Staff Response: Colorado River Basin Water Board staff thanks you for your comments.

2.2. Source Analysis

Comments: [The Colorado River Basin Water Board] accurately identified probable sources contributing organophosphate and organochlorine compound pollution in impaired surface waters. For both OP and OC compounds, staff investigated their chemical and physical properties, historical uses, and water quality data to further identify sources. It is clear from much previous work, as well as from common sense, that agriculture is the overwhelming source of contaminants flowing into drains, rivers, and ultimately to the Salton Sea in this region. [Board] staff clearly identified the likely sources of the various contaminants considered. It is unlikely that NPDES discharges will prove to be major sources of agricultural chemicals, but it is prudent to collect data to ensure that this assumption is warranted.

There are multiple statements in the document that spatial and seasonal patterns are not evident. To the extent that the effectiveness of corrective actions could be shaped given such spatial and temporal patterns, this conclusion should be reviewed. For example, there are indications of spatial patterns in chlorpyrofis (e.g., see Figures 32 and 33 in Liu, 2020). Also, the legacy contaminants are associated with sediment runoff, which is controlled by seasonal fluctuations in discharge (e.g., see Figure 69 in TetraTech, 2016).

Staff Response: Colorado River Basin Water Board staff appreciates your comment regarding probable sources contributing organophosphate and organochlorine compound pollution in impaired surface waters were properly identified.

Regarding spatial and seasonal patterns, staff do not disagree that there is evidence of spatial and seasonal patterns, as described in Liu (2020) and TetraTech (2016). As this

TMDL is being implemented, the additional data collected will likely provide more information regarding spatial and seasonal patterns associated with contaminant concentrations. After additional data has been gathered, this topic can be further addressed.

2.3. Allocations

Comments: [The Colorado River Basin Water Board] accurately set the proposed load and wasteload allocations. The TMDL load and wasteload allocations are set equal to the State's numeric targets. The proposed allocations reflect the numeric targets that staff defined based on available data. As mentioned above, these appear to be well justified on the basis of previous work.

Staff Response: Colorado River Basin Water Board staff appreciates your comments validating the proposed load and wasteload allocations.

2.4. Implementation

Comments: [The Colorado River Basin Water Board's] proposed implementation plan is accurate and effective. To control discharges of OP compounds, it is expected that one or a combination of the following management practices will be used: reduced use, switching to other safer pesticides, and/or enhanced pesticide management practices. To control OC compounds, The implementation strategy is to reduce the amounts of sediment bound OC compound entering impaired waters as the chemicals eventually degrade.

Implementation is to be achieved through the renewed Imperial Agricultural Order [Waste Discharge Requirements Order R7-2021-0050 (*General Waste Discharge Requirements for Discharges of Waste from Irrigated Lands for Dischargers that are Members of a Coalition Group in the Imperial Valley*)] that requires compliance with the water quality objectives. The approach allows operators flexibility in meeting objectives. Monitoring and reporting is required and, should data show underperformance of management practices, there is a requirement that practices will be improved. This is a sound adaptive management process.

There is no discussion in the document about linking the TMDL requirements with the complexities of the conditions in the region. Although this may be beyond the scope of the current document, it would be good to acknowledge that broad collaboration will be required to address multiple objectives. The environmental issues surrounding the Salton Sea are well known (e.g., Doede and DeGuzman, 2020). It is important that attempts to solve one problem do not cause equally bad or worse problems in other areas. My main example relates to runoff as described below.

Meeting the TMDL objectives will almost certainly require a reduction in tailwater discharges (e.g., Bali and Escabosa, 2014). Inflows to the Salton Sea have been declining with implications for both water quality in the lake and airborne release of contaminants from sediments exposed as the lake level recedes. Changes in inflows due to TMDL enforcement will be in addition to those resulting from climate and other changes (TetraTech, 2016; CH2MHill, 2018). Given the many important unknowns related to changes in the water resources of the region (e.g., Fogel et al. 2021), it will be important for [the Colorado River Basin Water board] to maintain communication and collaboration with other government and non-government agencies to ensure the best outcome for the region through coordinated adaptive management. In terms of reductions in tailwater discharges, for example, it may be necessary to explore other, nontraditional solutions (e.g., Levers et al., 2019) in addition to implementing TMDL requirements.

Staff Response: Colorado River Basin Water Board staff thanks you for your comments stating the implementation strategy is a sound adaptive management process.

Board staff do not plan to include a discussion linking this TMDL requirement with other complexities in the Imperial Valley in the staff report, as these concerns are beyond the scope of the TMDL. This issue is discussed in the CEQA Checklist and Analysis Report under the section “Mandatory Findings of Significance Discussion.” This CEQA report was not shared with the peer reviewers. Staff can share the CEQA report with the peer reviewer after it is completed. Once established, the TMDL will be implemented through the Board’s Irrigated Lands General Order [Colorado River Basin Water Board Waste Discharge Requirements Order R7-2021-0050 (*General Waste Discharge Requirements for Discharges of Waste from Irrigated Lands for Dischargers that are Members of a Coalition Group in the Imperial Valley*)] and subsequent revisions thereof. The Irrigated Lands General Order is intended to effectively regulate the quality of agricultural wastewater discharges from irrigated agricultural lands in the Imperial Valley into waters of the State, and ensure that such discharges are not causing or contributing to exceedances of the numeric or narrative water quality standards (SWRCB, 2021). In addition, the Colorado River Basin Water Board is charged with protecting the beneficial uses of the Salton Sea and its tributaries (Alamo River, New River, and the Imperial Valley Drains). Board staff meet the agencies leading projects in the watershed and provide support through permitting and developing other regulatory tools (TMDLs and Basin Plan Amendments) in an effort to protect the receiving waters.

Other government and nongovernment groups are actively addressing environmental concerns in the Imperial Valley. For example, in 2015 the Salton Sea Task Force was formed by members of the California Natural Resource Agency (CRNA), California Department of Water Resources (CDWR), and California Department of Fish and Wildlife (CDFW) with short and midterm goals to monitor air quality and ecological threats at the Salton Sea (SSMP, 2017). This Task Force developed the Salton Sea Management Plan , a 10-year plan that aims to improve conditions by constructing 30,000 acres of habitat and dust suppression projects around the Salton Sea. An initial goal is to develop habitat dust suppression projects in areas that were once fully submerged. Phase 1 of the 10-year plan was initiated in 2020 through the development of the Species Conservation Habitat project. This project will encompass about 4,110 acres of exposed lakebed and create a network of ponds and islands for bird and fish habitat (CNRA, 2021). Additionally, in 2020, the SSMP completed 755 acres of temporary dust suppression projects as a proactive measure to treat areas where there is exposed lakebed.

2.5. Monitoring Plan

Comments: [The Colorado River Basin Water Board's] proposed monitoring plan is accurate and effective. For OP compounds, the monitoring programs will require water sampling and testing, once annually. For OC compounds, the monitoring programs will require water and fish tissue sampling and testing, once annually. The document indicates that the "Coalition Group is currently collecting water samples from the New and Alamo River twice annually and analyzing the samples for chlorpyrifos, diazinon, and malathion." I presume that data to date show that moving to annual sampling is justified, but it would be good to state this explicitly.

Staff Response: Colorado River Basin Water Board staff appreciates your comments indicating the proposed monitoring plan is accurate and effective. The State of California Surface Water Ambient Monitoring Program (SWAMP) and the IID-ICFB Coalition (Imperial Valley Agricultural Coalition) perform monitoring in addition to other monitoring being done throughout the region. Moving to annual monitoring for OP pesticides can be proposed due to usage bans and the environmental fate of a particular compound. California's ban on the possession and use of chlorpyrifos in December 2020, and its relatively short half-life in soil should eliminate chlorpyrifos impairment in the Imperial Valley. Federal restrictions on the use of diazinon have decreased its use in the Imperial Valley. Due to usage bans and its short life in soil, Board staff anticipate diazinon impairment to be eliminated. However, the opposite argument (to continue monitoring OP compounds twice per year) can be made for malathion. Malathion is still applied in the spring and the fall in the Imperial Valley. Even though the use of malathion has been decreasing over the years in the Imperial Valley, staff plans to continue monitoring OP compounds twice per year for the next three years, after which, we will reevaluate the data collected and make changes to the monitoring if appropriate.

Based on the above information, we will consider revising the Staff Report for this TMDL to explicitly justify biannual monitoring of OP pesticides.

3. Comments by Ralf Schulz, Ph.D.

3.1. Numeric Targets

Comments: Agriculture in Imperial County, California is dependent on (Colorado River) freshwater used at substantial amounts to irrigate the crops and for soil salinity control. This water is discharged-off the agricultural fields through an extensive system of subsurface drains and surface drainage channels via Alamo River and New River into Salton Lake. Since, and as long, agriculture in the Imperial Valley depends greatly on the application of synthetic pesticides, it appears entirely unavoidable that considerable amounts of these pesticides are entering surface waters such as Alamo River, New River, and Salton Lake and affect the aquatic communities therein and thus the ecological integrity of these systems.

The California Regional Water Quality Control Board Colorado River Basin Region is proposing Total Maximum Daily Loads (TMDLs, for abbreviations used here please see the respective Technical Report) for a number of current-use OP and (legacy) OC insecticides in Imperial Valley waters, Imperial County. The staff of the Colorado River Basin Water Board has put tremendous effort in compiling an impressive, well structured Technical Report on the background for this proposal along with a large amount of supporting data.

According to this Technical Report, the Alamo River and New River are impaired (concentrations exceed WQOs) by the current-use OP compounds chlorpyrifos, diazinon, and malathion, and the Imperial Valley Drains are also impaired by chlorpyrifos. Furthermore, the Alamo River, Imperial Valley Drains, and New River are impaired by the OC compounds chlordane, DDT and its degradates DDE and/or DDD, dieldrin, PCBs, and toxaphene. Wiest Lake, a 40-acre lake, is impaired by DDT, dieldrin, and PCBs. All OC use has been banned in Imperial County and thus the OC pesticides can be considered as legacy pollutants. According to additional literature, the OP insecticides chlorpyrifos and diazinon are important drivers of toxicity in the surface water system (e.g. de Vlaming 2004; references cited in the text are only included in the reference list at the end of this document, if they are not already listed in the Technical Report). The presence of OP and OC insecticides in Imperial County surface waters at concentrations exceeding the WQOs is why the Water Board is proposing TMDLs for these compounds.

I consider the approach to establish TMDLs for the three current-use OP and the set of legacy OC insecticides as helpful to further control the reduced risks due to these compounds, which will likely arise from use restrictions (see also Conclusion 4 below).

The proposed CMC numeric target value (Table 3-1) of chlorpyrifos is in-line with most of the toxicity data available. The recent US EPA Draft Assessment Report for chlorpyrifos (USEPA 2020) lists for the freshwater amphipod Hyalella azteca an acute toxicity (LC50) of 0.0138 µg/L. Applying an assessment factor as usually done in the US regulatory risk assessment (https://www.epa.gov/pesticide-science-andassessing-pesticide-risks/technical-overview-ecological-risk-assessmentrisk#Deterministic) would lead then to a value of 0.0069 µg/L, a value about a factor of three lower than the proposed CMC numeric value. According to the US EPA Reregistration Eligibility Document (RED), the acute freshwater Regulatory Threshold Level (RTL) is 0.05 µg/L (Stehle & Schulz 2015), thus in the range of the CMC numeric value proposed here.

Similarly, for diazinon, both large US databases of toxicity data, the ECOTOXicology knowledgebase; https://cfpub.epa.gov/ecotox/ and the OPP Pesticide Ecotoxicity Database; https://ecotox.ipmcenters.org) list a toxicity value for Daphnia magna, which leads to a final value of 0.06 µg/L (Schulz et a. 2021), a value about a factor of 2.7 lower than the proposed CMC numeric value, when considering the a.i. content of the tested formulation and applying the safety factor. According to the US EPA Reregistration Eligibility Document (RED), the acute freshwater RTL is 0.105 µg/L (Stehle & Schulz 2015).

Finally, for malathion, the ECOTOXicology knowledgebase lists a toxicity value for Hyallela spec., which leads to a final value of 0.03 µg/L (Schulz et a. 2021), a value about a factor if 5.6 lower than the proposed CMC numeric value, when applying the safety factor. According to the US EPA, the acute freshwater toxicity value for Moina macropa is 0.01 µg/L, which leads to an RTL of 0.005 µg/L (Stehle & Schulz 2015), a value about a factor of 34 lower than the proposed CMC numeric value. It does, by the way, not become clear from the data listed in Table 2-3, how the malathion CMC was derived.

Do these additional data change the derivation of the respective CMC target?

Staff Response: Colorado River Basin Water Board staff appreciates your comments regarding our efforts in developing this Staff Report.

Staff elected not to use alternative methods for deriving numeric targets and reducing numeric targets to lower limits for two reasons.

Firstly, in accordance with evaluation guidelines found in Section 6.1.3 of the Listing Policy, staff selected scientifically-defensible objectives or numeric criteria that are widely used in peer reviewed and USEPA approved TMDLs across the State of California.

Secondly, OP and OC compounds are hydrophobic; given their low concentrations in water, they can often be hard to detect. While Board staff collects the samples, a commercial laboratory analyzes the samples. These commercial laboratories often do not have the appropriate instrumentation and capability to detect numeric targets at the lower limits that were suggested in your comments; thus, resulting in “no detection.” Staff plan to use the proposed numeric targets in this TMDL as they have the potential to be measured in commercial laboratories and can be used to protect water quality and beneficial uses.

Comments (*Continued*): The proposed target values for OC insecticides appear sensible, given that the database for sediment toxicity data is comparably sparse and that all of these compounds are legacy compounds, for which no use restrictions would apply, since they have been banned quite some time ago.

I would like to bring up a few more points, which I consider important when assessing the broader context of the TMDLs proposed here for a number of compounds:

1. Apart from the three OPs there is according to the Department of Pesticide Regulation Annual Pesticide Use Report for 2018, kindly provided by the Water Board, a large number of other pesticides used in the area. It might thus be valuable to express the potential freshwater toxicity that is controlled by the proposed TMDLs for the three OPs in the light of the Total Applied Toxicity (TAT) stemming from the application of other insecticides. Such an approach, which simply multiplies pesticide use data with the reciprocal value of the substance-specific toxicity, has recently been applied to US agriculture (Schulz et al. 2021). I used this approach here and calculated based on the 2018 use data the aquatic invertebrate TAT for chlorpyrifos, diazinon and malathion and compared it with the TAT stemming from the application of pyrethroids, which are known to have a very high aquatic invertebrate toxicity.

The following use data (excluding non-agricultural uses) in Imperial County for 2018 were taken:

Three OP insecticides	Total application in pounds
Diazinon	10
Malathion	25517
Chlorpyrifos	26656
Total	52183

Pyrethroids	
Bifenthrin	1132
Cyfluthrin	692
Cyfluthrin Beta	665
Cypermethrin	45
S-Cypermethrin	5800
Fenpropathrin	1852
Lambda-Cyhalothrin	6608
Permethrin	10842
Esfenvalerate	4064
Total	31700

As RTL values for these insecticides, those listed in Schulz et al. (2021) were taken. This calculation shows that in comparison to the TAT of the three OPs, the pyrethroids, though been applied at a lower total amount, represent an aquatic invertebrate TAT, which is a factor of 29 higher. This is just a rough estimate, but it may illustrate, that here are other pesticide applications, which are from an aquatic ecotoxicity point of view are likely more important than the three OPs under consideration. Many aspects, that at the end of the day drive the entry and bioavailability of a given pesticide need to be considered here, some of which are also dealt with in Schulz et al. (2021). A study by LeBlanc et al. (2004) found e.g. the pyrethroids bifenthrin, esfenvalerate, lambda cyhalothrin, and permethrin in suspended or bed sediment of the Alamo or New River at levels exceeding sediment RTLs according to Stehle & Schulz (2015). This just indicates their presence in the surface waters already in 2001, although the use of these pyrethroids has been up to approximately a factor of four lower in 2001 compared with the usage in 2018 as listed above.

I do not consider this a comprehensive analysis but still my conclusion from this is: TMDLs are helpful to reduce the targeted OP and OC toxicity, yet if they will reduce the most relevant sources of aquatic pesticide toxicity in Imperial County is not easy to evaluate, but also beyond the scope of this review. I acknowledge, however, that a TMDL for some pyrethroids in New River is under development.

I bring up this point since, according to the information provided, the Basin Plan states in chapter 3 Section II-N. Chemical Constituents: “No individual chemical or combination of chemicals shall be present in concentrations that adversely affect beneficial uses.” Does this mean that along with the OP monitoring other pesticides (including pyrethroids with very high toxicity to aquatic invertebrates) will be monitored as well and an assessment of the monitoring data of the OPs is always done in the light of the results of the entirety of pesticides detected at a given site?

Staff Response: A TDML is the maximum amount of a particular pollutant that may enter a waterway without causing the waterbody to fall below water quality standards for that pollutant. The objective of this Staff Report is to establish TMDLs for OP and OC compounds that violate water quality standards in Imperial Valley waterways. While this report is only addressing a few OP and OC compounds combinations to those waterbodies that are identified in the Clean Water Act 303(d) impaired list, the Colorado River Basin Water Board has several other TMDLs in development to address additional impairments to waterways within our region.

TMDLs or TMDL alternatives that are under development include:

- DDT and toxaphene TMDL alternative for the Palo Verde Outfall Drain and Lagoon.
- PCBs, DDT, dieldrin, and toxaphene TMDL for the Coachella Valley Stormwater Channel.
- PCBs, chlordane, chlorpyrifos, DDT, diazinon, dieldrin, and toxaphene TMDL for the Alamo River, Imperial Valley Drains, and New River.
- Ammonia, nutrients, and toxicity TMDL for the New River.
- Bifenthrin and cypermethrin TMDL for the New River.
- Ammonia and toxicity TMDL for the Coachella Valley Stormwater Channel.
- Chloride, indicator bacteria, and toxicity TMDL for the Alamo River.
- Dissolved oxygen and nutrient TMDL for the Salton Sea.

TMDLs that have been approved and adopted by the Region Water Board include:

- Sedimentation and siltation TMDL for the Alamo River.
- Pathogens TMDL for the New River.
- Sedimentation and siltation TMDL for the New River.
- Trash TMDL for the New River.
- Sedimentation and siltation TMDL for the Imperial Valley Drains.
- Bacterial indicators TMDL for the Coachella Valley Stormwater Channel
- Dissolved oxygen TMDL for the New River.

Given the range of TMDLs currently in development and TMDLs that have been approved and adopted by the Board, staff do not feel it is necessary to broaden the scope of the Imperial Valley OP and OC TMDL to incorporate additional impairments.

Comments (*Continued*): 2. A second general point is that it might not be easy to estimate which ecological harm the OP insecticides (and others) have already done in the past decades of intensive pesticide usage, i.e. which sensitive aquatic species might have been eradicated already some time ago (Schulz 2004; see also Conclusion 5 below). There is the question, whether there is the objective and possibility to identify those species, and to allow them to re-establish themselves as a result of the proposed OP TMDLs in the light of other (more toxic) pesticides used and of various other stressors (e.g. the salt content) being present at the same time.

Staff Response: Colorado River Basin Water Board staff took your comments in consideration. Please refer to the response to your first point.

Comments (*Continued*): 3. A third point is that any option to identify potential reasons for impairment of the water quality or aquatic communities is only possible for those compounds successfully monitored using appropriate RLs. The Technical Report stresses this important point using the Example of NPDES, yet it applies also to the vast number of agricultural nonpoint source pesticide discharges. Considering these more general aspects, implementation of the proposed TMDLs for OP and OC compounds means that this measure helps to control the role, these compounds play in the surface water impairment. It does, however, not ensure that no impairments due to pesticides occur any further. The proposed TMDLs likely even not tackle the most important pesticides in the Imperial County surface waters. This can, however, not be stated with confidence based on the available information and the extent of the data to be reviewed.

Staff Response: Colorado River Basin Water Board staff took your comments in consideration. Please refer to the response to your first point.

3.2. Source Analysis

Comments: According to the Technical Report, the water in the Alamo River, Imperial Valley Drains, and New River can mostly be attributed to irrigated agricultural discharges, which are considered nonpoint source discharges. The presence in surface waters of the current-use pesticides chlorpyrifos and malathion, despite some use restrictions in place, originates from irrigated agricultural discharges in Imperial County, while the presence of diazinon is attributed to cross-border entries from Mexico to the US via the New River. Detections of banned OC pesticides is due to historical uses of these compounds in combination with their persistence in the environment. Generally, nonagricultural uses and point sources are considered not being of high importance and NPDES permitted facilities are currently not possible to evaluate due to a lack of monitoring data. The assumption is that NPDES also rather play a minor role, which is supported by the fact (as outlined in Attachment B of the report) that the total use of the three OPs and their use in agriculture are almost the same.

I agree with these conclusions and consider them as well-founded through the data and conditions described in the Technical Report.

Staff Response: Colorado River Basin Water Board staff appreciates your comments.

3.3. Allocations

No comments were provided on this issue.

3.4. Implementation

Comments: According to the Technical Report, in order to meet the load allocations for Imperial Valley irrigated lands with regard to these TMDLs, the Imperial Agricultural Order requires enrolled dischargers to implement management practices (e.g. reduced use, switching to other safer pesticides), monitor water quality, and report to the Regional Water Board. Among other requirements, agricultural dischargers are required under the Imperial Agricultural Order to implement pesticide and sediment best management practices.

In my view the listed measures will certainly contribute to the objective of meeting load allocations. This is not really a surprise though, given the fact that implementation of the TMDL is planned for each OP at a point in time, when usage has been banned already some years ago (chlorpyrifos) or the amount applied is close to zero since many years (diazinon). In the case of malathion, it is not possible to assess from the information provided whether effective measures to reduce the cross-border inputs from Mexico can indeed be identified and implemented. Whether diazinon TMDL targets in the New River, that originate from Mexico, will be met in the future appears to a certain extent a political but not a scientific question. Probably due to this fact, the date of implementation is with ten years after approval of the TMDL quite far in the future. It is, in conclusion, not clear to me, why the timelines for implementation are set in a way that at their implementation the likelihood of meeting the targets is very high, e.g. due to usage bans some years before? Since TMDLs are not enforceable, what would be the problem of not meeting them temporarily? In conclusion, I do not consider this point as being of high importance in the light of the overall approach.

In the context of implementation, I wonder whether the New and Alamo River Wetlands Master Plan (TetraTech 2007) is still relevant and suggestions made therein to establish and use constructed wetlands amongst other purposes for pollution control management have been followed up. I consider vegetated wetlands as an effective tool to control nonpoint source pollution and have been lucky in the past to be involved in some joint studies on this matter conducted in the Mississippi Delta together with staff from the USDA ARS in Oxford, MS (Schulz et al. 2003; Stehle et al. 2011).

Staff Response: To address your concerns regarding the timelines for implementation, in the environment OC compounds degrade slowly, are hydrophobic, and have the tendency to attach to sediment particles. For OC compounds, the estimated target date of zero to thirty years is based on use trends showing apparent decreased use, implementation of management practices to mitigate loadings, and regulatory efforts to lessen loading if voluntary actions fail to achieve the water quality standards. Staff agree that the ban on manufacturing and use of certain compounds will result in the likelihood of water quality standards being met prior to the estimated target date. Staff also recognize that meeting water quality standards by their targeted date requires voluntary compliance. This TMDL will be implemented through the Board’s Irrigated Lands General Order, which requires owners and/or operators of irrigated agricultural land to enroll their land for regulatory coverage thereunder, or alternatively, submit a report of waste discharge and apply for an individual waste discharge permit. Dischargers are required to implement management practices that prevent or control discharges of waste that are causing or contributing to the exceedance of water quality objectives. Dischargers are also required to attend annual education and outreach events to inform them on the progress in reaching numeric targets and recommending pesticide or sediment management practices. If monitoring data, inspections, and/or statistical evaluations of the effectiveness of the implemented management practices indicate that they have not been effective in preventing the discharges from causing or contributing to exceedances of water quality objectives, members of the Coalition Group will be informed and required to implement improved management practices.

3.4. Monitoring Plan

Comments: According to the Technical Report, the IID-ICFB Coalition Group is currently collecting water samples from the New and Alamo River twice annually and analyzing the samples for chlorpyrifos, diazinon, and malathion. The Coalition is also collecting fish samples annually and analyzing the samples for OC compounds.

Assuming that the numbers provided in Table 4-1 relates to a time period of a year, that means all samples (i.e. 100%) that are taken at a given water segment must exceed the WQO in order to cause problems. If this is the case, I consider the number of two samples per year as being too low to provide sensible conclusions on exceedances versus non-exceedances. This assumption is supported by the fact, that the results in section B.3 indicate already now exceedance rates well below 100%. But it may as well be that I got this wrong and that the numbers of samples that will be analyzed in the future is much higher, since the data presented in section B.3 lists quite some monitoring results that have been gathered in the past.

To the best of my understanding, sampling water twice annually for OP analysis and fish samples annually for OC compounds is the intended monitoring regime. It becomes not clear how many sites will be used for this monitoring. I suggest to take some effort to sample and monitor also pyrethroids in sediments and, though not easy, in water in an appropriate way. As surely known, University of California, Riverside staff has a very strong expertise in this area.

According to the Technical Report, the CCC numeric target is a 4-day average, not to be exceeded more than once in a three-year period. If a regular sampling is conducted only twice annually, how will the adherence to the CCC numeric targets be checked? This problem may even persist with a more frequent sampling approach, since at the time when an analytical result, potentially indicating a numerical target exceedance, for a sample that had been taken already a while ago is available, it might be too late to take further samples for 4-day average considerations.

According to the Technical Report, discharges from NPDES should be monitored in the future using appropriate standards in order to come up with data, that will help to consider possible future actions in addition to best management practices which should already be in place. Likely, NPDES only contribute marginally to the overall pollution observed. I agree with these plans and assumptions.

In case it is possible to identify an aquatic species (e.g. a freshwater crustacean) which is susceptible to the pesticides of concern, it might also make sense to monitor presence of this species and use this as an additional success criteria.

Staff Response: Staff Report Table 4-1 (Minimum Number of Measured Exceedances Needed to Place Water Segment on 303(d) List for Toxicants) is a replicated table from the State Water Resources Control Board's Listing Policy (SWRCB, 2015b). The Listing Policy states water segments shall be placed on the section 303(d) list for toxicants if the number of measured exceedances supports rejection of the null hypothesis: actual exceedance proportion less than 3 percent.

The Listing Policy establishes a standardized approach for developing California's 303(d) List by specifying a minimum number of measured water quality objective (WQO) exceedances are allowed for a given number of samples collected to determine that a water segment is impaired, as shown in Staff Report Table 4-1.

To address your comment that it is unclear on how many sites there are, in the Alamo River there are 14 sampling sites, the New River there are 11 sampling sites, the Imperial Valley Drains has 36 sampling sites, and Wiest Lake has 3 sampling site. Staff would also like to mention that there is currently a Pyrethroid Pesticide TMDLs in development for the Imperial Valley and do not think it is necessary to broaden the scope of the OP and OC Staff Report to incorporate that particular impairment.

In addition, OP and OC compounds, as well as pyrethroids, are currently being monitored in the Imperial Valley through the State of California Surface Water Ambient Monitoring Program (SWAMP) in addition to other monitoring being done throughout the region.

Concerning your comments questioning how numeric targets will be checked with bi-annual monitoring, with our current monitoring plan, if the implementation management practices are effective, staff will continue to see downward trends of compound concentrations causing impairment, regardless of the frequency of sampling. Given the usage bans of certain compounds, as well as the rate at which many compounds degrade in the environment, staff believe water quality standards will be met by their target dates

Staff would also like to thank you for your comments regarding the plans and assumptions and appreciate your suggestions to consider monitoring the success of other species in the area.

4. References

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Salton Sea Management Program (SSMP), 2017. Salton Sea Management Program – Phase I: 10-Year Plan. Updated August 2018.

SWRCB, 2015b. Water Quality Control Policy for Developing California’s Clean Water Act Section 303(d) List. Adopted September 30, 2004; Amended February 3, 2015.

TetraTech, 2016. Salton Sea Funding and Feasibility Action Plan Benchmark 2 Report: Review and Update Existing Condition Data, May Report to Salton Sea Authority.

ATTACHMENT G: STAFF RESPONSE TO PUBLIC COMMENTS

In accordance with California Code of Regulations, title 23, section 3779, subdivision (d), Colorado River Basin Water Board staff has prepared the following responses to significant environmental issues raised in written comments received during the formal written comment period (March 9 to April 25, 2022) and oral comments made at the workshop on April 12, 2022.

Comments from Susan St Louis, Salton Sea Coalition

A comment letter from Susan St Louis was received on April 13, 2022.

Comment Susan St Louis-1

As citizens of the Coachella and Imperial Valleys, we are profoundly concerned with the fate of the Salton Sea and its surrounding rivers and drains, and the many public health issues linked with the Sea.

Staff Response:

Staff is aware of the changing conditions at the Salton Sea and the concerns of the community. Staff is also aware of a number of efforts that are underway to assess the conditions at the Salton Sea, address the emissions from the exposed area, and to construct aquatic habitat in the exposed playa areas. Staff at the Colorado River Basin Region works cooperatively with agencies addressing these concerns at the Salton Sea; issuing permits, reviewing plans, and providing regulatory oversight of discharges that impact water quality in the Salton Sea. The Regional Water Board conducts Surface Water Ambient Monitoring Program (SWAMP) sampling along the Alamo River, New River, Coachella Valley Storm Water Channel, the Imperial Valley Drains and the Salton Sea. that assesses pollutant levels in each of these waterbodies.

The consideration of the TMDL for Organophosphate and Organochlorine Compounds in Imperial Valley Waters provides the framework for addressing contamination in the Imperial Valley Waters. This will lead to improved water quality in these waterbodies and ultimately to improved water quality in the Salton Sea.

Comment has been noted.

Comment Susan St Louis-2

We are happy that you are initiating TMDLs for organophosphate (OP) and organochlorine (OC) compounds in the New and Alamo Rivers, to be in compliance with the Clean Water Act. This is a great first step. Additionally, we heard at the April 12 Water Board meeting that more TMDL’s are being planned for those rivers and other water bodies of the Salton Sea Basin. We’re gratified to see changes finally taking place. We hope that you will consider doing a full epidemiological study of ALL pollutants that threaten human, plant, fish and animal life around the Sea. The problems of hypersalinity, pollution, and toxic levels of chemicals and metals will only get worse as climate change speeds up the drying of the lake and the waters become more concentrated and the playa more exposed.

Staff Response:

TMDLs or TMDL alternatives that are under development include:

- DDT and toxaphene TMDL alternative for the Palo Verde Outfall Drain and Lagoon
- PCBs, DDT, dieldrin, and toxaphene TMDL alternative for the Coachella Valley Stormwater Channel
- New River Ammonia and Toxicity
- New and Alamo Rivers Pyrethroid Pesticides
- Ammonia and toxicity TMDL for the Coachella Valley Stormwater Channel
- Chloride, indicator bacteria, and toxicity TMDL for the Alamo River
- Dissolved oxygen and nutrients TMDL for the Salton Sea

TMDLs that have been approved and adopted by the Region Water Board include:

- Sedimentation and siltation TMDL for the Alamo River
- Pathogens TMDL for the New River
- Sedimentation and siltation TMDL for the New River
- Trash TMDL for the New River
- Sedimentation and siltation TMDL for the Imperial Valley Drains
- Bacterial indicators TMDL for the Coachella Valley Stormwater Channel
- Dissolved oxygen TMDL for the New River

The requested epidemiological study is a study that requires knowledge and data associated with the incidence, distribution, and possible control of diseases. That is outside of the expertise that is available in the Colorado River Basin Regional Water Quality Control Board.

Comment Susan St Louis-3

Participants at the Salton Sea Summit (April 6-7) emphasized that due to the long term drought, Colorado River water allotments will continue to shrink as they are divided among western states with growing populations and increasing demands. Colorado River water is NOT the answer. Due to lessened snowpack and rainfall, major CA reservoirs are at historic lows, and are also no solution to the California drought.

Staff Response:

Comment has been noted.

Comment Susan St Louis-4

With no natural inputs, the Salton Sea will continue to evaporate and grow more saline and polluted. The anticipated growth of Lithium mining in the Salton Sea basin will attract many new workers and their families to the area, adding to the population that will be at risk from these sources of pollution. And where will the clean water come from to support both the communities that will spring up around the lithium projects and the mining processes themselves? We need to keep working to clean and desalinate as much water as possible in the Salton Sea Basin as we face a dry future here.

Staff Response:

The proposed Basin Plan Amendment establishes TMDLs for OP and OC compounds in Imperial Valley Surface Waters and provide a framework to reduce the pollutant concentrations by limiting the amount of the pollutant that can be discharged from point and nonpoint sources. The adoption of the proposed TMDL will result in improved water quality in the Imperial Valley Waters.

Comment Susan St Louis-5

Thank you for finally beginning testing for OP and OC compounds. Now we need the Region 7 Water Board to establish a measurement system for ALL pollutants, to collect accurate scientific data, and then push to clean up the pollution in the Salton Sea itself and in its surrounding rivers and drains.

Staff Response:

Colorado River Basin Water Board staff thanks you for your comments.

Comments from Lindsay R. Nehm, Naval Facilities Engineering Systems Command Southwest

A comment letter from Linsday R. Nehm was received on April 25, 2022.

Comment Lindsay R. Nehm -1

The TMDL targets in Tables 6-1 and 6-2 require very low reporting limits. USEPA Method 625.1 does not list detection limits (MDLs) for all of these compounds; however, for the MDLs that are included in the method, they are higher than the TMDL targets in Tables 6-1 and 6-2. Please include in the report an analytical method or methods that have reliably been shown to measure the compounds below the TMDL targets in Tables 6-1 and 6-2.

Staff Response:

The TMDL targets for OP compounds in water shown in Table 6-1 are set equal to the Numeric Targets for water as shown in Table 3-1, averaged over a three-year period to account for short-term variations. The TMDL targets for OC compounds in water shown in Table 6-2 are set equal to the Numeric Targets for water as shown in 3-2, averaged over a three-year period to account for short-term variations. Numeric targets for OP and OC compounds in water were selected based on human health beneficial use protection, best available data, and other accepted scientific literature commonly used in other Regions.

These targets are currently below most commonly used USEPA approved analytical methods, however, analytical methods that are closer to the targets exist and can be used, such as USEPA test method 8081A. As laboratory equipment becomes more sensitive and analytical methods advance, achieving a method detection limit below the targets will be possible. The text states that we are requesting facilities “monitor OC compounds in effluent water at lower RLs” not at the target concentrations. The Regional Water Board understands the limitations of current commonly used analytical methods and is requesting the use of a more sensitive method to increase the possibility of getting usable data.

No changes will be made to the staff report at this time.

Comment* Lindsay R. Nehm *-2

In the first paragraph of Section 7 (page 56) of the Draft Staff Report, the following statement is made, “The contribution from NPDES facilities is unknown, but presumed to be de minimis, at most.”

Table 6-4 includes both industrial and construction general permittees. The IGP and draft CGP only require TMDL monitoring where TMDL-specific pollutants are identified in the permittee’s pollutant source assessment.

We recommend that the text be revised to state:

“NPDES permittees (Table 6-4) should begin monitoring OP compounds in effluent water, and monitor OC compounds in effluent water at lower RLs. Industrial and Construction General Stormwater Permittees, should only monitor for these compounds if the permittee's pollutant source assessment, identifies these compounds as pollutants. The additional monitoring of OP compounds, and enhanced monitoring of OC compounds should be for an initial period of three years and be included with their annual monitoring."

Staff Response:

The Industrial General Permit and the Construction General Permit both state that dischargers located within a watershed where a TMDL is being adopted and approved by the Regional Water Board are required to implement additional management practices and monitoring activities to comply with applicable waste load allocations and implementation schedules based on TMDL specific pollutants. Dischargers must comply with the approved TMDL if the TMDL identifies industrial or construction activities as a source of the pollution.

In any event, the proposed TMDL and Implementation Plan do not specify the type and frequency of monitoring for TMDL-specific pollutants. Accordingly, these issues are outside of the scope of the proposed Basin Plan Amendment. Instead, they will be addressed through permitting on a case-by-case basis.

Comment* Lindsay R. Nehm *-3

The staff report includes the statement, "The contribution from NPDES facilities is unknown, but presumed to be de minimis at most."

Because the NPDES dischargers are expected to be de minimis contributors for OP and OC compounds, and there are 21 named facilities plus unnamed IGP and CGP facilities, relying on Executive Officer action to reduce monitoring where appropriate has the potential to be burdensome on the Executive Officer, result in delays in reduced monitoring and be very costly for NPDES facilities.

Please revise the text to state:

If the three-year average concentrations of OC and OP compounds at an NPDES facility are below the TMDL targets in Tables 6-1 and 6-2, the facility's monitoring requirement for the compounds is automatically discontinued. If the ELAP-certified Analytical Labs cannot detect the compounds at or below the TMDL targets, the NPDES facility can still discontinue monitoring as long as results are non-detect and the lab report includes a statement that the testing method was the most sensitive ELAP method.

Staff Response:

To control the discharges of OP and OC compounds from NPDES permitted municipalities and facilities, these TMDLs will utilize requirements put in place by either individual or general NPDES permits or WDRs. In the Source Analysis, NPDES permitted municipalities and facilities were identified as uncertain sources of OP and/or OC compounds, because their existing monitoring programs did not include monitoring for OP compounds or these compounds have not been detected, and the reporting limits (RLs) for OC compounds were above the numeric targets. The implementation plan for NPDES sources of impairments will be reassessed once enough acceptable data from these facilities is generated. Regional Water Board staff will thoroughly review data collected during the initial 3-year study and determine on a case-by-case basis if any changes should be made to the monitoring plans.

Individual and general permits give authority to the Executive Officer to modify monitoring efforts on a case-by-case basis as more data becomes available. The Regional Water Board will maintain authority to determine when the required sampling is suspended. At this time, we do not plan to implement the proposed changes to the Staff Report.