

# 2014 Delta Strategic Work Plan

## Introduction

In 2008 the State Water Resources Control Board, San Francisco Bay and Central Valley Water Boards jointly adopted a Strategic Work Plan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Strategic Work Plan). The purpose of the 5-year Strategic Work Plan was to coordinate and prioritize actions, establish key deliverables and time schedules, and identify existing and needed resources. The 2008 Strategic Work Plan is now 5-years old and has become dated. Many of the activities assigned to the Central Valley Water Board have been accomplished while new actions are being recommended by the Delta Stewardship Council and others.

The 2014 Strategic Work Plan is an update to the 2008 Plan. The new Plan is restricted to actions that may significantly benefit Delta water quality. Like the 2008 Work Plan, it has been written for a 5-year period and identifies high priority projects, timelines and deliverables, and resource needs.

The proposed 2014 Strategic Work Plan includes nine projects for the Central Valley. Four of these are a carryover from work begun under the 2008 Strategic Work Plan, three are new projects recommended by the Delta Stewardship Council, and two are the result of multiple new Clean Water Act 303(d) listings and/or Regional Board staff recommendations.

The four remaining 2008 Strategic Work Plan projects are:

- Implementing the Mercury Control Program in the Delta,
- Reviewing the control program for low oxygen levels in the Stockton Ship Channel
- Developing and implementing a sustainable Regional Monitoring Program and
- Evaluating control actions to address chronic low oxygen concentrations in Old and Middle Rivers.

Significant progress has been made on all these projects except for low oxygen levels in Old and Middle Rivers. Lack of progress on the Old and Middle Rivers project is due to a lack of staff resources.

The three new projects being recommended by the Delta Stewardship Council in their recently adopted Delta Plan are:

- Developing and implementing a Nutrient Study Plan for the Delta
- Adopting a Basin Plan amendment for pyrethroid insecticides in sediment and water in the Delta and,
- Maintaining a current list of all new projects to increase beneficial reuse of wastewater in the Central Valley and identifying impediments to additional reclamation.

The nutrient study plan will require additional resources to carry out (Table 1).

Finally, the two new projects being recommended by Board staff are:

- Adopting a Diuron herbicide Basin Plan amendment for the Delta and
- Conducting a toxicological assessment of current use fungicides and herbicides on pelagic primary production in the Delta.

Assessment of current use fungicides and herbicides will also require contract resources (Table 1).

## Low Dissolved Oxygen in the Stockton Ship Channel

**Goal:** Address low oxygen levels in the Stockton Ship Channel.

**Rationale:** Adoption of a Basin Plan amendment to address low oxygen conditions in the Stockton Ship Channel was an action listed in the 2008 Delta Strategic Work Plan. It is also a recommendation in the Delta Plan (WQ R11) adopted by Delta Stewardship Council in 2013.

**Background:** The San Joaquin River experiences periods of low dissolved oxygen in the first few miles of the ship channel downstream from the City of Stockton. These conditions violate the 5 and 6-mg/l dissolved oxygen objectives in the Water Quality Control Plan for the Sacramento and San Joaquin River Basins. The 6.0 mg/l objective was adopted by the State Water Board in 1991 to protect the spawning migration of fall-run Chinook salmon and only applies between 1 September and 30 November in the River between Turner Cut and Stockton while the 5.0-mg/l objective applies everywhere else in the Delta year round. The State Water Board adopted a Clean Water Act (CWA) Section 303(d) list in 1998 that identified low oxygen levels in the Stockton Ship Channel as a high priority action for correction.

The Central Valley Water Board adopted a TMDL Control Plan (Resolution R5-2005-0005) in 2005. The Control Plan contained a waste load allocation for the City of Stockton Regional Wastewater Control Facility for oxygen demanding substances, encouraged stakeholders to construct and fund an experimental aeration device in the Stockton Ship Channel, and required stakeholders to complete upstream studies to identify the sources of oxygen requiring substances and downstream studies to better characterize the assimilative capacity of the channel. The Central Valley Water Board committed to review the allocations and implementation provisions in the Control Plan once all the requirements were met.

Significant progress has been made on meeting the requirements in the 2005 Control Plan for the Stockton Ship Channel. In 2006 and 2007 the City of Stockton completed construction of two nitrification biotowers and wetlands which significantly reduced the load of ammonia and CBOD to the river. Also during this time period, a full-scale aeration device capable of delivering 10,000 lb/day of dissolved oxygen was constructed at the Port of Stockton's West End Complex. A demonstration of the aeration facility was conducted between 2008 and 2011 that showed it to be effective in increasing dissolved oxygen concentrations in the river. Since the implementation of these two projects, the frequency and magnitude of dissolved oxygen violations have declined. Final reports on the upstream studies were completed in May 2008 and reports on the downstream studies will be available in January 2014. Finally, State Board staff has committed to reevaluate the need for the 6.0-mg/l dissolved oxygen objective in the channel as part of their ongoing Phase II Bay-Delta Plan update.

Board staff should review and summarize all the new information available since adoption of the 2005 Control Plan, consult with Stakeholders on alternatives for addressing the remaining low dissolved oxygen impairment, present the recommendations to the Central Valley Water Board and solicit advice on how to proceed.

### Tasks and Deliverables:

- **Fall 2014** Board staff will review information available since adoption of the 2005 TMDL Control Plan and alternatives for addressing the remaining water quality impairments. Board

staff will engage stakeholders in evaluating alternatives and will present a set of recommendations for further action to the Central Valley Water Board.

- **January 2018** If the Central Valley Water Board determines that a Basin Plan amendment is needed to address the low dissolved oxygen, then staff will develop an amendment for Board consideration in the spring of 2018.

**Resources:** One PY in 2013-2014; unknown thereafter until the Central Valley Water Board provides input on follow-up work. No contract funds needed.

**Link to ongoing activities:**

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/san\\_joquin\\_oxygen/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/san_joquin_oxygen/index.shtml)

**Link to historical information:** <http://www.sjrdotmdl.org/>

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## **Implement Mercury Control Program in the Delta**

**Goal:** Implement the Phase I Mercury Control Plan adopted by the Central Valley Water Board in 2010.

**Rationale:** The 2008 Delta Strategic Work Plan called for the development and adoption of a Mercury Control Plan. A recommendation in the Delta Plan adopted by the Delta Stewardship Council (WQ-R8) was for the Central Valley and for the San Francisco Water Boards to coordinate the implementation of their respective Mercury Control Plans and for the Central Valley Water Board to review by December 2018 the results of their methyl mercury control studies and begin implementing feasible control measures in 2020.

**Background:** Several fish species in the Bay Delta Estuary have elevated mercury tissue concentrations that pose a health risk for human and wildlife consumers. The State Water Resources Control Board adopted a CWA Section 303(d) list in 1990 identifying the Bay-Delta Estuary as impaired for mercury and determined that reducing mercury levels in fish was a high priority. The San Francisco Bay Water Board adopted a Mercury Control Plan (Resolution R2-0052) in 2006 that identified outflow from the Central Valley as a major source of inorganic mercury to the Bay and assigned the Central Valley Water Board a load reduction of 110-kg/yr.

The Central Valley Water Board adopted a Phase I Mercury Control Plan (Resolution R5-2010-0043) in 2010. The purpose of the Plan was to reduce fish tissue mercury concentrations in the Delta so that humans could safely eat one meal per week of a mixture of fish species. The Phase I Control Program emphasizes studies to develop and evaluate management practices to control methyl mercury. It also includes provisions for implementing pollution minimization programs and interim mass limits for inorganic mercury point sources, development of upstream mercury control programs and development and implementation of a mercury exposure reduction program to protect humans. Study plans for the control of methyl mercury were developed by all discharger groups and reviewed by a technical advisory committee of independent mercury experts in 2013. Development of control studies will begin in 2014. Staff have also worked with stakeholders and developed a mercury exposure reduction program which was approved by the Executive Officer in 2013. Multiple entities, including State Board, have agreed to fund the program. Staff will work with stakeholders to implement the mercury exposure reduction program in the summer of 2014. Staff is also developing a statewide reservoir mercury control program as part of the effort to control upstream sources of mercury. A public draft of the reservoir control program will be available in the fall of 2014. Finally, upstream inorganic mercury controls efforts are expected to meet the load reduction assigned to the Central Valley by the San Francisco Bay Water Board.

The Phase I TMDL Control Program is scheduled to terminate in 2020. At that time the Central Valley Water Board has committed to review the entire program, including the results of the control studies, and to select methyl mercury management practices for implementation in Phase II. The Phase II Control Program will begin after public review of the Phase I Plan and will last through 2030.

### **Tasks and Deliverables:**

- **October 2015** Provide a comprehensive report to the Central Valley Water Board on progress achieved in Phase I including the development of upstream mercury control

programs, within Delta methyl mercury control studies and implementation of a mercury exposure reduction program.

- **2019** The Central Valley Water Board will conduct a workshop to review progress on the Phase I Delta Mercury Control Program and to consider program modifications including whether to require responsible parties to implement inorganic and methyl mercury management practices in Phase II.
- **2020** Staff will present the Central Valley Water Board a Phase II Basin Plan Amendment for adoption.

**Resources:** 1 PY per year for fiscal years 2014 through 2018; 1.5 PYs in 2019 and 2020. No contract funds needed for program management, although staff and contract resources may be needed for specific mercury control projects.

**Link to ongoing activities:**

[http://www.swrcb.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/index.shtml](http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/index.shtml)

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## Old and Middle River Dissolved Oxygen

**Goal:** Determine and implement control actions necessary to address chronic low dissolved oxygen levels in Old and Middle Rivers.

**Rationale:** The 2008 Delta Strategic Plan called for Central Valley Water Board staff to evaluate low dissolved oxygen conditions in Old and Middle Rivers and prioritize development of a TMDL.

**Background:** Low oxygen levels periodically develop during summer in Old and Middle Rivers when the rock barriers are installed in the south Delta to divert water for agriculture. The low oxygen levels can adversely impact aquatic organisms and are a violation of the Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Limited information exists on the cause and extent of the problem and potential control actions. Summer oxygen levels in Old and Middle Rivers may change if the primary point of diversion for water used south of the Delta is moved from the South Delta near Tracy to the North Delta near Courtland.

A draft Central Valley Water Board staff data report was prepared in June 2013 to identify available water quality data for all dissolved oxygen impaired Delta waterways, including Old and Middle Rivers. Board staff should further evaluate the cause and extent of low oxygen levels in Old and Middle Rivers and produce a White Paper with input from Stakeholders. The White Paper will describe the problem, potential control actions and possible next regulatory steps and will be presented to the Central Valley Water Board by the summer of 2016.

### Tasks and Deliverables:

- **Summer 2016** Board staff will examine existing data, consult with stakeholders, and produce a White Paper describing the nature and extent of the problem, any additional studies need to understand the cause of the impairment, and outlining potential control actions. The White Paper will be presented to the Central Valley Water Board for their input on how to proceed in the summer of 2016.
- **Summer 2018.** If the Central Valley Water Board determines that a Basin Plan amendment is required after reviewing the options outlined in the White Paper, then Board staff will develop an amendment for Board consideration by the summer of 2018.

**Resources:** Half a PY for FY 2015/16 to collect and evaluate data, consult with stakeholders and write a White Paper. Funding requirements for 2016/17 and beyond are dependent upon input from the Central Valley Water Board. This is a new Regional Water Board activity and will require staff and possibly contract funds to carry it out.

### Link to ongoing Activities:

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## Delta Regional Monitoring Program

**Goal:** Develop and implement a self sustaining Regional Monitoring Program (RMP) for the freshwater Bay-Delta Estuary.

**Rationale:** The 2008 Delta Strategic Plan recommended formation of an RMP to coordinate monitoring and assessment efforts in and around the Delta. In addition, the Delta Stewardship Council recommended in the Delta Plan (WQ R9) that an RMP be formed to coordinate monitoring in the Delta so that water quality conditions can be efficiently assessed and regularly reported.

**Background:** Many agencies collect water quality, flow, and ecological data in the Bay-Delta Estuary because of organizational mandates. However, much of the monitoring is uncoordinated so that some of it is duplicative while important information gaps remain unanswered. To a large extent this is because no coordinated, comprehensive contaminant monitoring and assessment program exists.

This has led the Central Valley Water Board and Delta Stewardship Council to recommend formation of a self-sustaining Delta RMP whose mission would be to fund, collect, review, synthesize and report on the status and trends of contaminants in the freshwater Delta. Board staff has been working with stakeholders to develop an RMP

The Delta RMP has completed its organizational phase – a Steering Committee has been formed, governance structures are in place, technical committee co-chairs have been appointed, and efforts are in progress to select the first projects for implementation. Initial RMP funding will come from the redirection of a portion of current expenditures incurred by permittees for receiving water monitoring that is mandated in their current permits. The redirected money will be used by the RMP to fund the implementation of an initial monitoring and assessment program. It is anticipated that additional funding will come from other sources as the program is implemented.

### Tasks and Deliverables

- **Summer 2014:** Regional Water Board will revise permits to allow participation in the RMP *in lieu* of individual monitoring requirements for all permit holders in the Delta.
- **Winter 2014:** RMP Steering Committee will finalize the monitoring and assessment framework.
- **January 2015:** The RMP will implement a coordinated contaminant monitoring plan
- **December 2018:** The RMP will finalize the first monitoring and assessment report

**Resources:** 1 PY for FYs 2014/15 and FY 2015/16; 0.5 PY thereafter. No contract funds required.

### Link to ongoing Activities:

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/delta\\_water\\_quality/comprehensive\\_monitoring\\_program/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/index.shtml)

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## Nutrient Study Plan

**Goal:** Develop and implement a study plan to determine whether nutrient objectives are needed to protect beneficial uses in the freshwater Delta.

**Rationale:** The Delta Stewardship Council recommended (WQ R8) in their Delta Plan that the San Francisco Bay and Central Valley Water Boards cooperatively develop and implement research programs to determine safe nutrient levels for the Bay-Delta Estuary and, if necessary, adopt nutrient objectives.

**Background:** The San Francisco Water Board has begun a program to evaluate the role of nutrients in the Bay. No similar program has been undertaken for the Delta. The freshwater Sacramento-San Joaquin Delta has long been recognized as having elevated concentrations of nutrients. High nutrient levels were not thought to cause water quality problems except for periodic low oxygen levels in the Stockton Ship Channel. However, the paradigm that the Delta is resilient to high nutrient levels is now being reassessed. Elevated nutrient concentrations are hypothesized to contribute to multiple water quality problems besides low oxygen levels in the Stockton Ship Channel. These are increased production of blue-green algae and macrophytes such as water hyacinths and *Egeria densa*, shifts in algal species composition from diatoms to less nutritious flagellate and blue-green algae for aquatic herbivores, and decreased oxygen concentrations in back sloughs in the eastern Delta.

Board staff will assemble a nutrient Technical Advisory Committee (TAC) composed of University scientists and knowledgeable local resource agency staff to develop study plans, help fund and carry out the studies, and evaluate results. The nutrient study plans will be closely coordinated with the San Francisco Bay study effort. The primary goal of the studies will be to determine whether nutrient concentrations cause or contribute to impairments. If the studies implicate nutrients as causing problems, then follow up work will be recommended to establish safe levels using the Nutrient Numerical Endpoint (NNE) paradigm being developed by the State Water Board. The discharger community would be asked to form a Stakeholder Advisory Group (SAG) to help formulate study questions and research plans and act as a forum for the dissemination of results. Finally, the State Water Board is assembling an External Science Review Team (SRT) of international nutrient experts to review the results of their Statewide NNE program. State Board staff has agreed, when the freshwater nutrient studies are complete, to have their SRT review and critique the study results.

### Tasks and Deliverables

- **Spring 2014** Staff will assemble a nutrient TAC and request that the discharger community form a SAG to develop nutrient study plans.
- **Winter 2014** Staff will present the nutrient study plan to the Central Valley Water Board and Delta Stewardship Council for their review and comment.
- **2015 and beyond** Staff will incorporate the comments of the Central Valley Water Board and Delta Stewardship Council in the study plan and begin soliciting external funding to carry out the studies.
- **Winter 2017** Staff will write a White Paper, after consultation with the TAC and SAG, summarizing the new information and evaluating whether nutrients from the Central Valley cause or contribute to water quality impairments in the Delta or San Francisco Bay. The

State Water Board will be asked to convene their SRT to review the results of the nutrient studies and the conclusions in the Regional Water Board's White Paper.

- **Spring 2018** Staff will present the white paper recommendations and the comments of the State Board SRT to the Central Valley Water Board and Delta Stewardship Council and request direction on next steps.
- **Summer 2018.** If the Central Valley Water Board determines that nutrient objectives are needed, then Board staff will develop study plans and a schedule for obtaining the remaining information for determining site specific water quality objectives. The schedule will include a date for presenting a draft nutrient Basin Plan amendment to the Regional Board for adoption.

**Resources:** Half a PY for fiscal years 2014 through 2019. Contract resources will also be required but the amount is unknown until a study plan has been developed. This is a new Regional Water Board activity and will require staff and contract funds to carry it out.

**Link to ongoing Activities:**

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## Pyrethroid Basin Plan Amendment

**Goal:** Amend the Basin Plan to include a control program to reduce pyrethroid insecticide concentrations in sediment and water in the Delta to safe levels.

**Rationale:** The Delta Stewardship Council in their Delta Plan (WQ R8) recommended that the Central Valley Water Board adopt a Basin Plan amendment to begin the control of pyrethroid insecticides in the Central Valley and Delta.

**Background:** Twenty-five pyrethroid insecticides are registered for urban and agricultural use in California. Six of these-- bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin, and permethrin--have been found in water and sediment at concentrations toxic to aquatic organisms. This has resulted in multiple listings on the CWA 303(d) list. Regional Board staff has begun developing a pyrethroid insecticide Basin Plan Amendment for valley floor water bodies in the Sacramento River and San Joaquin River Basins, including the Delta. A California Environmental Quality Act scoping meeting was held in the fall of 2012 to announce the project and solicit public comment. The proposed Basin Plan amendment would include water and sediment objectives and an implementation plan. The proposed implementation plan would be carried out through the National Pollution Discharge Elimination System and Irrigated Lands Regulatory Program.

### Tasks and Deliverables:

- **Summer 2014** Draft staff report released for external peer review.
- **Winter 2014** Board workshop to review and solicit comments on the draft Basin Plan Amendment.
- **Summer 2015** Basin Plan Amendment would be presented to the Central Valley Water Board for adoption.

**Resources:** 1 PY for FY 2013/14 through 3015/16. No contract funds needed

### Link to ongoing Activities:

[http://www.swrcb.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/central\\_valley\\_pesticides/pyrethroid\\_tmdl\\_bpa/index.shtml](http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/central_valley_pesticides/pyrethroid_tmdl_bpa/index.shtml)

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## Recycling and Reuse of Wastewater

**Goal:** Document current recycling efforts in the Central Valley and identify impediments to additional reclamation.

**Rationale:** The Delta Stewardship Council recommended in their Delta Plan (WQ-R10) that the Central Valley Water Board should require responsible entities that discharge municipal wastewater or urban runoff to Delta waters to evaluate whether all or a portion of their discharge could be recycled to reduce contaminant loads. In 2009 the Central Valley Water Board passed a resolution stating that all operators of wastewater treatment plants shall provide upon request an evaluation of wastewater reclamation and land disposal. In 2013 the State Water Board adopted a resolution establishing statewide goals for increasing the use of recycled wastewater.

**Background:** Water Code Section 85021 states that it is the policy of the State of California to reduce its reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. In 2013 the State Water Board adopted a Resolution (SWRCB Resolution No. 2013-0003) establishing a statewide goal of increasing the use of recycled municipal wastewater by one million acre-feet per year by 2020 and two million acre-feet per year by 2030. A million acre-feet is about 25 percent of all municipal wastewater produced in the State of California. Periodic statewide surveys have been conducted to determine how much municipal wastewater is being recycled. The most recent survey was conducted in 2009 and found that statewide reclamation of municipal wastewater had only increased by 144,000 acre-feet since 2001. This represents about 14 percent of the 2020 State Water Board goal and less than 7 percent of the 2030 goal. During the same time period reclamation in the Central Valley only increased by about 30,000 acre-feet. A renewed statewide effort will be required if the 2020 and 2030 State Board goals are to be met. At a minimum, achieving the State Board goal will require information on current activities, the potential for expanded effort, and impediments to additional recycling. This information will be needed by the State Water Board and California Legislature to encourage and fund additional reclamation.

In 2009 the Central Valley Water Board adopted resolution R5-2009-0028 stating that, *“any new or existing discharger that owns or operates a wastewater treatment plant will provide upon request in their Report of Waste Discharge (ROWD) a report regarding...efforts that have been taken to promote new or expanded wastewater recycling and reclamation opportunities and programs...The reports should include all current efforts and actions involving...recycling...the status of current opportunities and activities, the potential for new opportunities and activities, and impediments to new efforts...”*.

Water Board staff will require all operators of major wastewater treatment facilities to periodically provide in their ROWDs a report regarding current efforts to promote new or expanded wastewater recycling programs and impediments to additional reuse. Board staff will collate and periodically post these reports on our website for public review.

### Tasks and Deliverables:

- **Spring 2014** Board staff will commence to require information of all major wastewater treatment facilities in the Central Valley on the current status of their recycling efforts, potential for additional reclamation, and impediments to expanded recycling in Reports of

Waste Discharge. Discharger reports will be reviewed and posted on our website for public review.

**Resources:** This is a new Regional Board activity but will require no additional resources to carry out.

**Link to ongoing Activities:**

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## **Diuron Basin Plan Amendment**

**Goal:** Adopt a Basin Plan amendment to reduce diuron herbicide concentrations to non toxic levels in water in the Central Valley and freshwater Delta.

**Rationale:** Diuron is one of the common pre emergent herbicides used in the Central Valley and Delta and has been observed on multiple occasions at toxic concentrations to aquatic life.

**Background:** Diuron is a pre-emergent herbicide used to control annual broadleaf and grassy weeds. It is one of the most common herbicides applied in the Central Valley with both agricultural and non agricultural uses. Most applications occur between November and February with the potential for offsite movement in storm runoff. Eight water bodies in the Central Valley have been placed on the CWA 303(d) list for diuron because of detections exceeding published aquatic life beneficial uses. A California Environmental Quality Act scoping meeting was held in October 2012 announcing the Water Board's intention of developing a control program and soliciting public input on project alternatives. Once adopted, staff expects to coordinate the implementation program with existing water board programs including National Pollution Discharge Elimination Program permits, Irrigated Lands Regulation Program, waste discharge requirements and waivers of waste discharge requirements.

### **Tasks and Deliverables:**

- **Summer 2014.** Release draft staff report for external peer review.
- **Winter 2014** Hold public workshop to review and solicit comments on the draft Basin Plan Amendment.
- **Summer 2015** Bring the Basin Plan Amendment to the Central Valley Water Board for an adoption hearing.

**Resources:** This project will require 1 PY in FY 2013/14 through 2015/16.

### **Link to ongoing Activities:**

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/central\\_valley\\_pesticides/diuron\\_tmdl\\_bpa/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/central_valley_pesticides/diuron_tmdl_bpa/index.shtml)

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## Fungicides and Herbicides

**Goal:** Conduct a toxicological assessment of current use fungicides and herbicides on pelagic primary production in the freshwater Delta.

**Background:** The algal community in the Delta has changed over the last several decades from diatoms to a flagellate/blue-green dominated community. Diatoms are more nutritious to primary consumers like zooplankton than flagellates and blue green algae. There has also been a decrease over the same time period in the biomass of pelagic primary production in the Delta making it one of the least productive large estuaries in the world. Changes in algal quality and quantity or “bottom up” effects are one of the four factors hypothesized to contribute to the pelagic organism decline (POD).

A recent review of several decades of pesticide monitoring in the Delta has also demonstrated a shift in the type of pesticides being detected. The most common chemicals before the POD (1990-1999) were organophosphate and carbamate insecticides. There has been a shift in pesticide detections during (2000-2002) and after the POD years (2003-2010) to fungicides and herbicides. Little is known about the potential toxicity of these new compounds to algae and whether their off site movement might contribute to shifts in the quantity and quality of available food for POD species. A toxicological assessment is needed to determine the potential toxicity of these compounds and whether they might contribute to the observed shift in primary production in the Delta.

Existing monitoring and assessment groups will be asked to form a Technical Advisory Committee (TAC) to guide the development of an assessment study plan, help solicit funding and evaluate the toxicological results. The overall purpose of the assessment is to determine whether current use herbicides and fungicides are reducing primary production rates or contributing to shifts in algal species composition in the Delta. At the termination of the work all assessment results will be summarized by Regional Board staff in a White Paper. The White Paper will recommend potential follow up actions.

### Tasks and Deliverables

- **Summer 2014** Form a TAC and develop study plans to assess the algal toxicity of current use herbicides and fungicides in the Delta.
- **2015 and 2016** Solicit funding and conduct toxicological assessments.
- **Spring 2017** Board staff will produce a White Paper that summarizes all new information including whether any of the current use pesticides may reduce primary production rates or alter algal species composition in the Delta. The White Paper will also recommend potential follow up actions.
- **Fall 2017** Board staff will present the conclusions of the White Paper to the Central Valley Water Board and request advice on next steps.

### Link to ongoing Activities:

**Resources:** Half a staff person in calendar years 2014 through 2016 and a still to be determined amount of contract money for toxicity testing and analytical work. This is a new Regional Board project and will require both staff and contract resources to carry out.

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Table 1. Summary of new resources required to successfully carry out the 2014 Delta Strategic Work Plan. Contract funds will be determined after study plans are developed.

Project	FY 2014/15		FY 2015/16		FY 2016/17		FY 2017/18		FY 2018/19	
	Staff (PY)	Contract (\$)	Staff (PY)	Contract (\$)	Staff (PY)	Contract (\$)	Staff (PY)	Contract (\$)	Staff (PY)	Contract (\$)
Low dissolved oxygen in Stockton Ship Channel										
Implementing Mercury Control Program for Delta										
Old and Middle River Dissolved Oxygen			0.5							
Delta Regional Monitoring Program										
Nutrient Study Plan	0.5	yes	0.5	yes	0.5	yes	0.5	yes	0.5	
Pyrethroid Basin Plan Amendment										
Recycling and Reuse of Wastewater										
Diuron Basin Plan Amendment										
Fungicides and Herbicides	0.5	yes	0.5	yes						
Total	1.0	yes	1.5	yes		yes		yes		

