Program Effectiveness

Melissa Turner, M.S.

ESJ Surface Water Quality Monitoring Program Review
August 24, 2020

Panel Request

- Core → Represented → Management Plan development
- 4 case studies
- How did these play out in practice?
- What are the documented water quality improvements?
- Process for incorporating lessons learned
- Effects of results on behavior of other growers outside of management plan watersheds

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Panel Request

4 case studies

1. Chlorpyrifos
2. Sediment toxicity
3. Special Study - Dissolved Oxygen (Dr. Johnson's Presentation)
4. Special Study - Copper (Dr. Johnson's Presentation)

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Management Plan Development

- More than 1 exceedance of a water quality trigger limit (WQTL) in a three-year period requires a management plan UNLESS…
  - Single exceedance of a TMDL constituent
- 3 Management Plan submittals
  - 2007 – Individual site subwatershed management plans
  - 2008 – Management Plan (two parts – Coalition wide and site subwatershed)
  - 2014 – Comprehensive Surface Water Quality Management Plan

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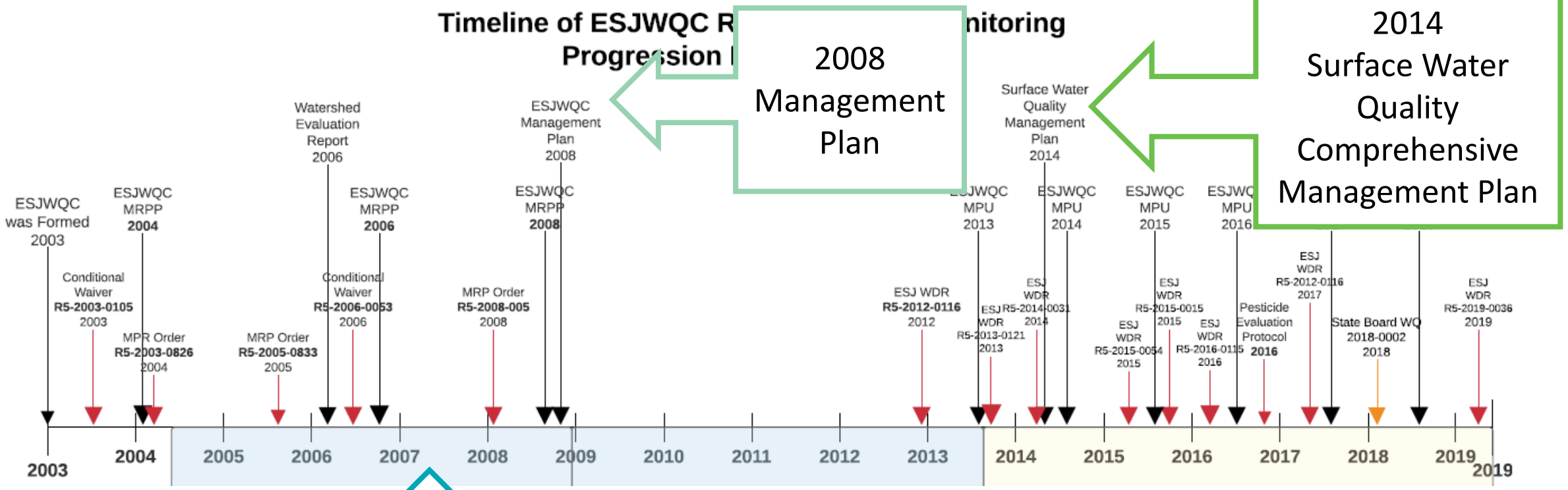
Management Plan Development



2008 Management Plan

2014 Surface Water Quality Comprehensive Management Plan

2007 Site Subwatershed Management Plans

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Comprehensive Surface Water Quality Management Plan - Outline

- Constituents Requiring Management Plans
- WQTLs and Objectives
- Site Subwatersheds
- Physical Setting and Geographical Characteristics
- Constituents of Concern, Transport of Constituents, Source Identification
- Existing Practices and Surface Water Quality Data
- Management Plan Strategy: Monitor, Outreach/Education, Implementation of practices, Evaluate effectiveness
- Compliance schedule for each site subwatershed / constituent combination
- Source Identification Studies (e.g. Copper, Dissolved Oxygen)

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Management Plan Strategy → Focused Outreach

- Compliance schedule – as soon a practicable, not to exceed 10 yrs (per 2012 Order)

- Prioritize subwatershed / constituent based on compliance schedule and type of constituent (e.g. applied by agriculture)

1. Determine Source of Exceedance
   - PUR data to identify timing of application and location
   - Identify growers most likely to contribute to exceedance (proximity to waterway and past applications)
2. Education and Outreach
   - Notification of exceedances, education regarding management practices
   - Tracking of management practices
3. Evaluation of Effectiveness of Practices
   - Water quality monitoring during times of past exceedances and highest use

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Management Plan Chain of Event

- Management plan triggered
- Focused Outreach timeline determined
- Implement Focused Outreach (2 years)
- Implement Management Plan Monitoring (3 years)
- Petition for management plan completion (3+ years)

REPORTING TO REGIONAL BOARD:
1. Exceedance Reports
2. Annual Report

REPORTING TO REGIONAL BOARD:
1. Monitoring Plan Update
2. Annual Report

Management Plan Completion Request

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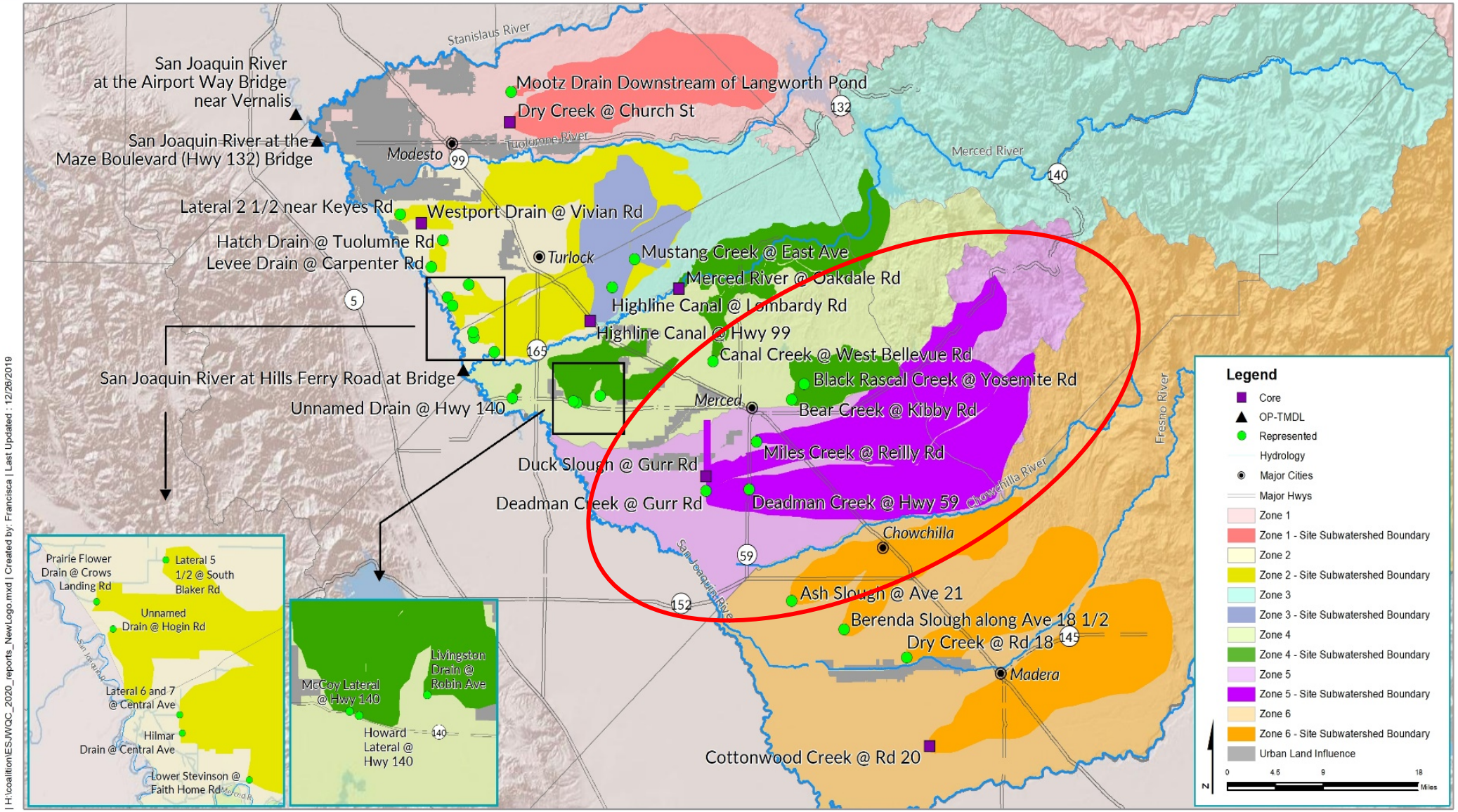

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ESJWQC 2019 WY Monitoring Sites Zone Boundaries & Urban Land Influence

ESJWQC

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Projection: property-Lambert Conformal Conic
Units: Foot US
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Hydrology - NHD hydrodata, 1:24,000 scale, http://nhd.usgs.gov/
Roads, highways, railroads - CSRI

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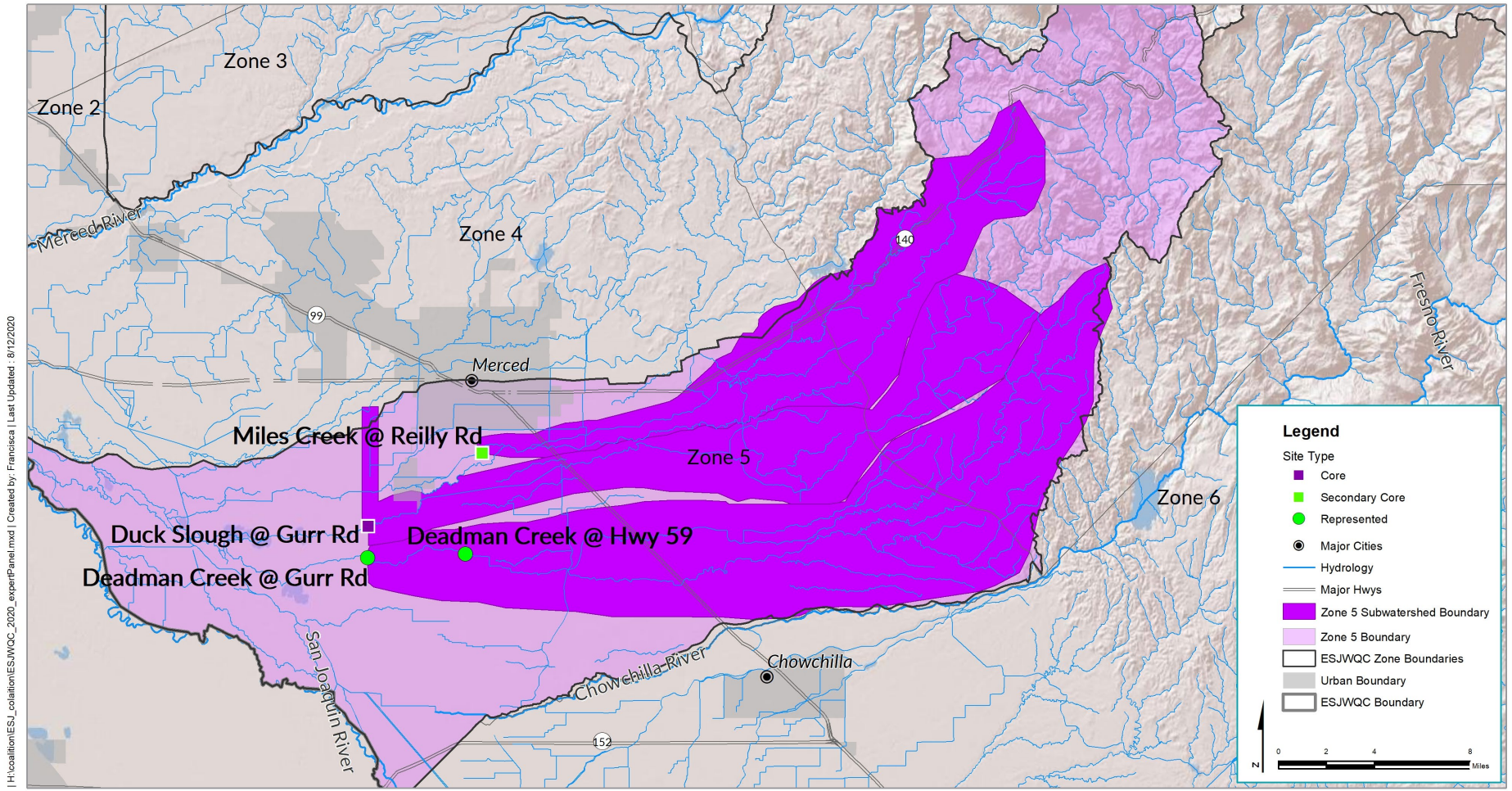
Case Study: Zone 5

- Duck Slough @ Gurr Rd
- Deadman Creek Gurr Rd
- Deadman Creek Hwy 59
- Miles Creek @ Reilly Rd



Zone 5 Monitoring Locations

ESJWQC

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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Hydrology - NHD hydrodata, 1:24,000-scale, http://nhd.usgs.gov/
Roads, highways, railroads - ESRI

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Zone 5 Management Plans

Duck Slough @ Gurr Rd-**bolded text** indicates completed management plan

Year Monitoring Initiated	Constituent	Management Plan Initiated	Focused Outreach	Management Plan Completed	Management Plan Re-Initiated	2nd Focused Outreach	Last Exceedance	Management Plan Completed
2004	Chlorpyrifos	2007	2010-2012	**2012**	2015	2016-2018	2015	**2019**
2004	Malathion	2016	2016-2018	**2019**	NA	NA	2015	NA
2004	Copper	2007	2010-2012	**2015**	NA	NA	2009	NA
2004	Sediment toxicity	2007	2010-2012	**2018**	NA	NA	2013	NA
2004	*C. dubia* toxicity	2007	2010-2012	**2019**	NA	NA	2015	NA
2004	*S. capricornutum* toxicity	2007	2010-2012	**2012**	NA	NA	2008	NA
2004	*P. promelas* toxicity	2014	2010-2012	**2018**	NA	NA	2014	NA

*includes exceedances at upstream location, Duck Slough @ Hwy 99

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Case Study: Duck Slough Subwatershed

Chlorpyrifos

Sediment toxicity

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Management Plan Process

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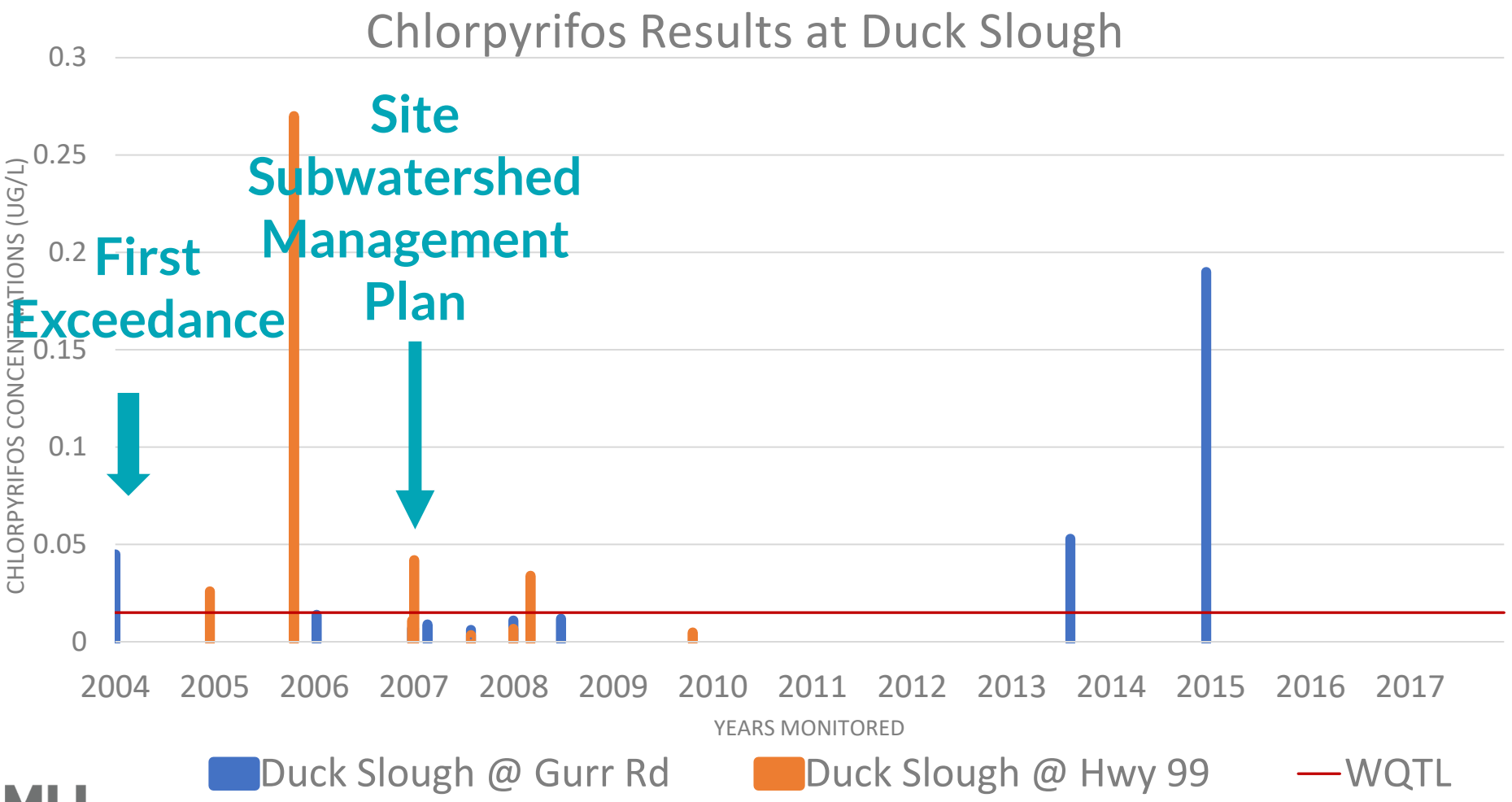
Exceedances of the WQTL

- Duck Slough Subwatershed: Chlorpyrifos



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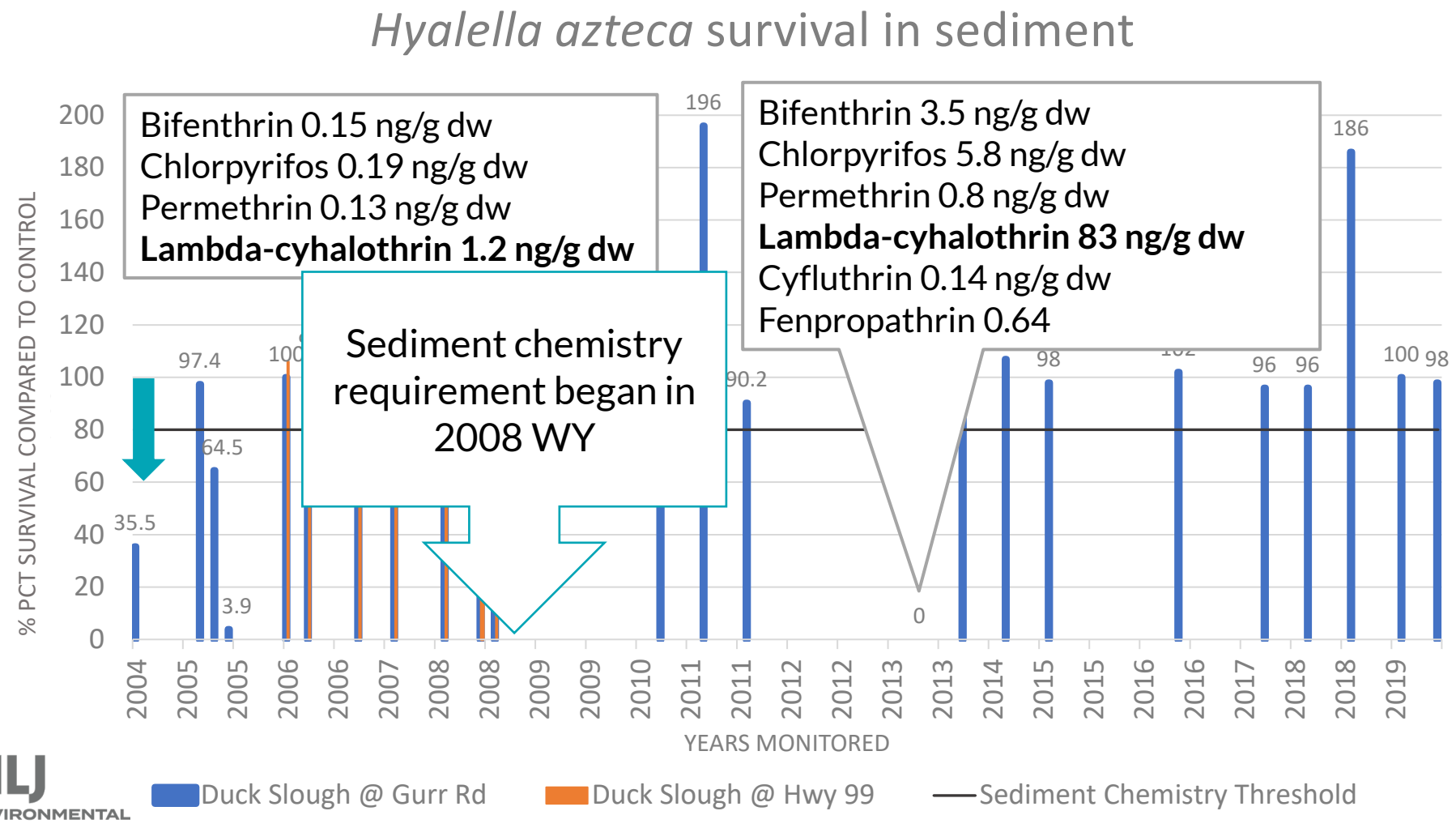
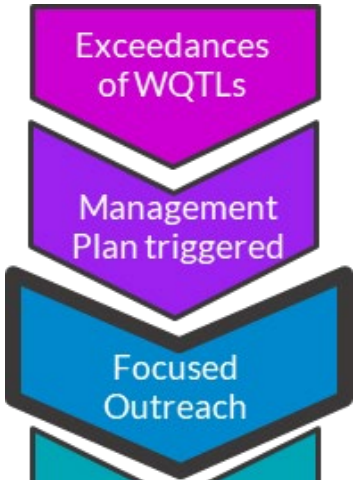
Exceedances of the WQTL

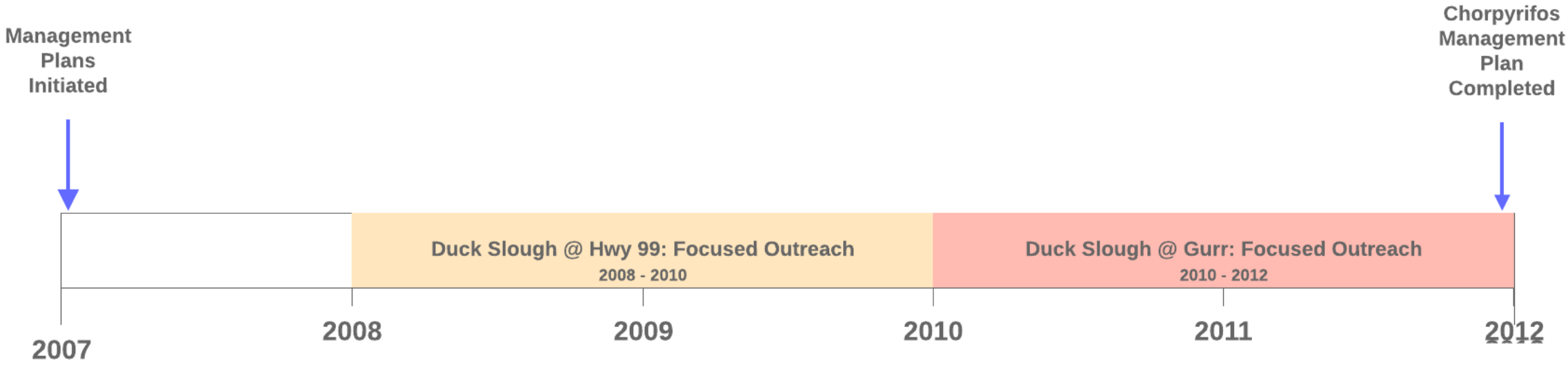
- Duck Slough Subwatershed: Sediment Toxicity



Focused Outreach: Duck Slough

Subwatershed	Irrigated Acreage	Total Targeted Members	Follow Up Surveys
Duck Slough @ Hwy 99	4,016	24	22
Duck Slough @ Gurr Rd	2,656	6	6





Management Practice Recommendations

CATEGORY	RECOMMENDED MANAGEMENT PRACTICE
Irrigation Water Management/ Storm Drainage	Install and/or improve berms between field & waterway
	Install device to control timing of pump/drain into waterway
	Install drainage basins (sediment ponds)
	Laser leveling fields
	Recirculation - tailwater return system
	Install settling pond
	Use of polyacrylamide (PAM)
Erosion and Sediment Management	Grass row centers (orchards, vineyards)
	Constructing wetlands
	Maintaining vegetated filter strips around field perimeter at least 10' wide
	Vegetation is planted along or allowed to grow along ditches
Pest Management/ Dormant Spray Management	Adjusting spray nozzles to match canopy profile
	Using electronically controlled spray nozzles
	Using nozzles that provide largest effective droplet size
	Shutting off outside nozzles when spraying outer rows next to sensitive sites
	Spraying areas close to waterbodies when the wind is blowing away
	Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site
	Checking weather conditions prior to spraying (e.g. storm status)
	Maintaining setback zones

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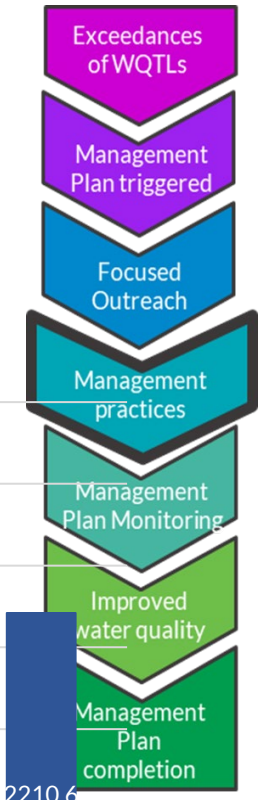
Management Practice Implementation

Spray Drift Practices



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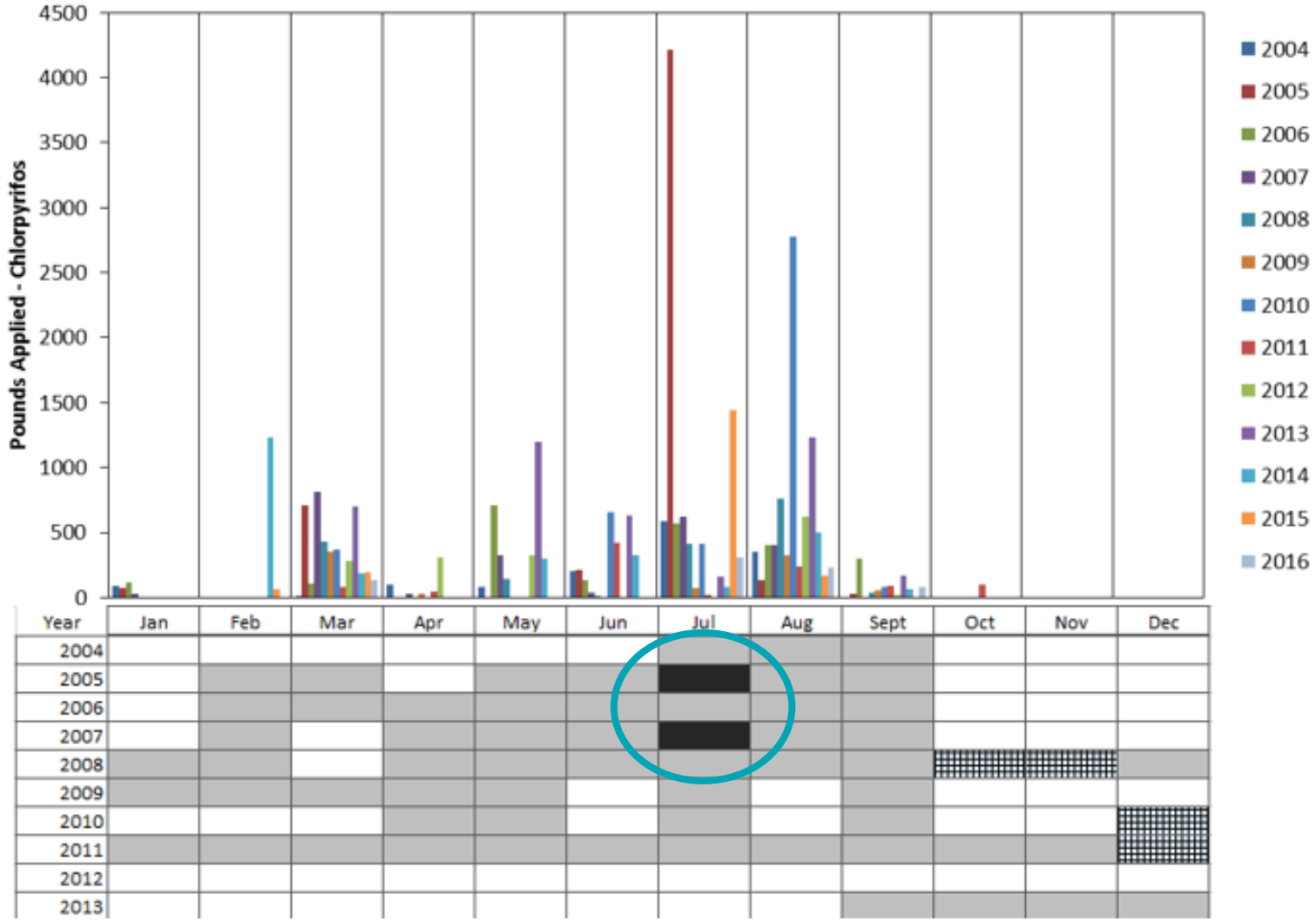
Water Quality Improvements - Chlorpyrifos

Monitored, no exceedances

Monitored, exceedance

Dry site



3 Years of No Exceedances

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Water Quality Improvements – Sediment Toxicity

Sediment monitoring in spring and fall

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2004												
2005												
2006												
2007												
2008												
2010												
2011												
2013												
2014												
2015												
2016												
2017												
2018												
2019												

2014 WY- 2015 WY Core site monitoring

2018 WY- 2019 WY Core site monitoring

Monitored, no exceedances

Monitored, exceedance

Dry site

>3 Years of MPM; No Exceedances

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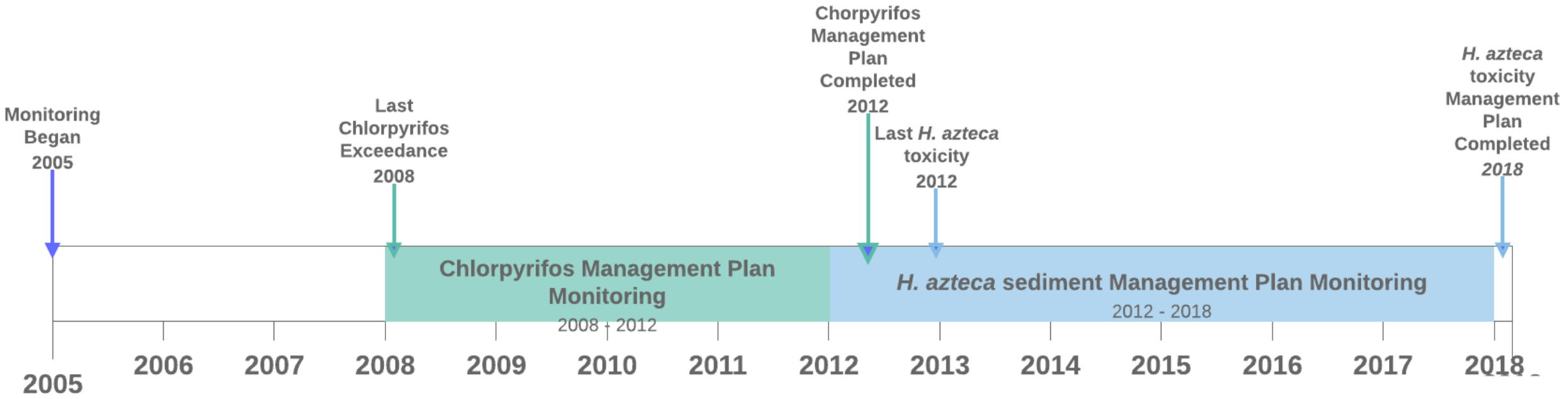
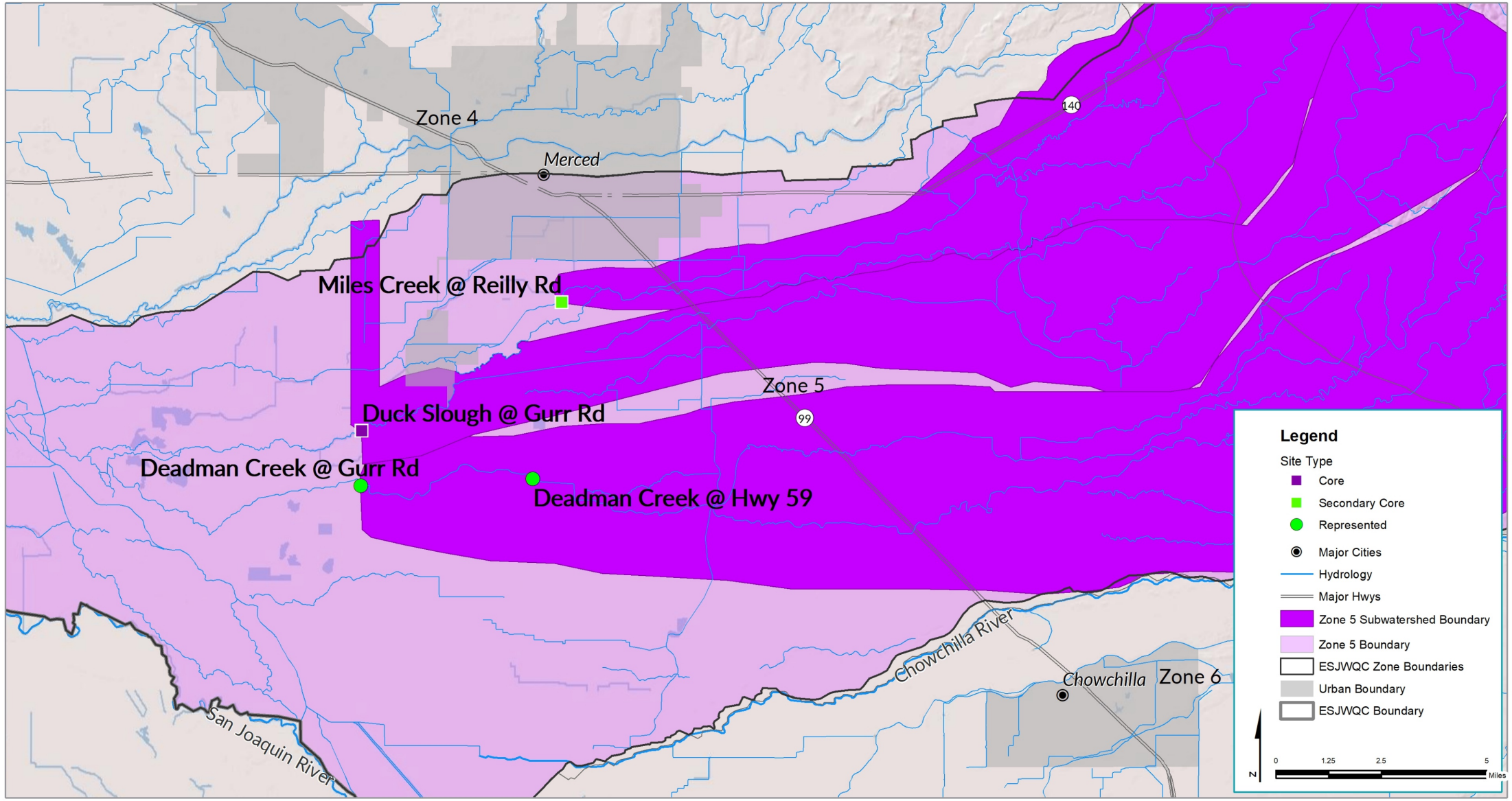
Management Plan Completion

1. Demonstration of water quality improvements (no exceedances)
2. Demonstration that management practices implemented by member are effective
3. Documentation of management practices implemented
4. Documentation of education and outreach





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Zone 5 Monitoring Locations

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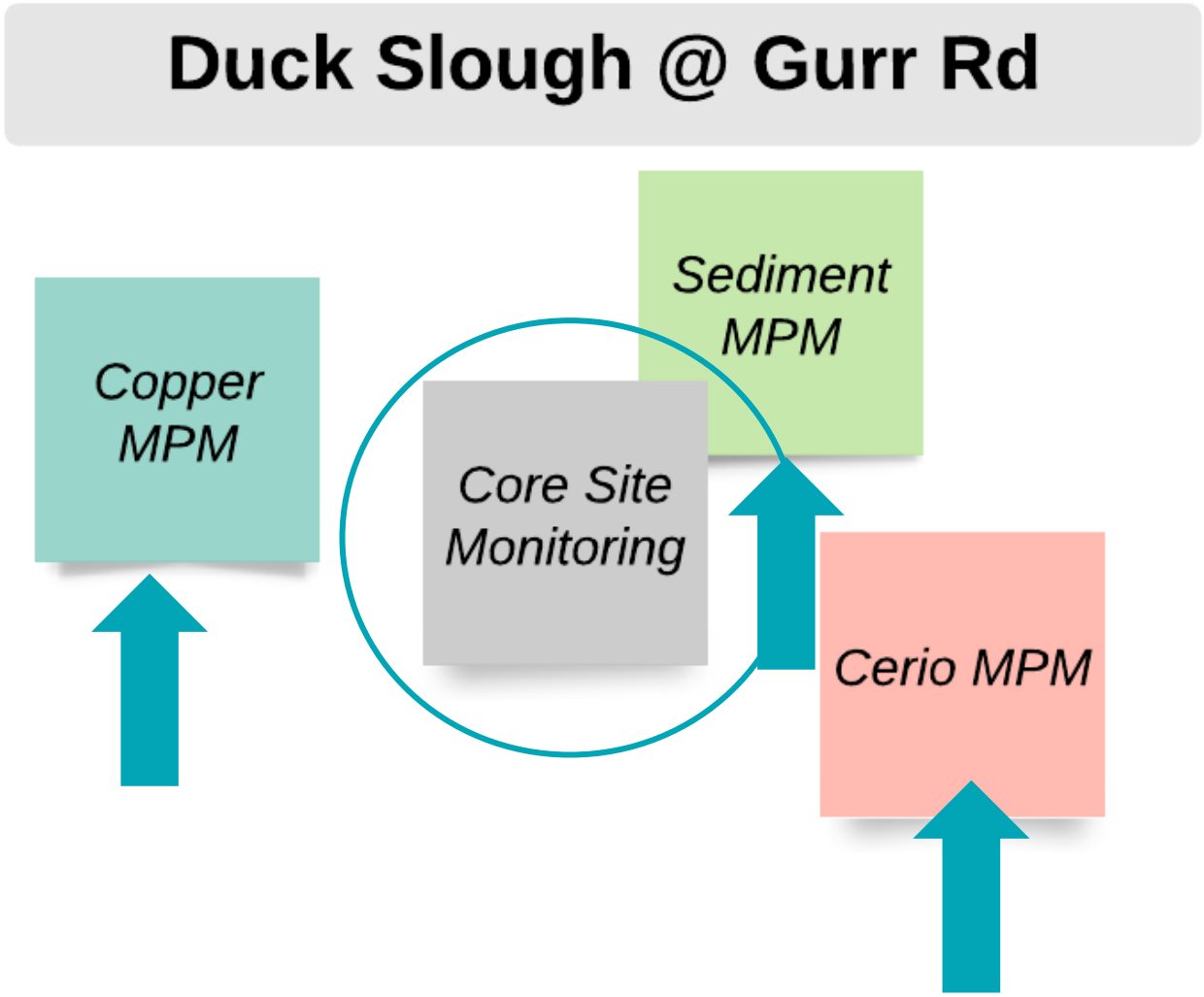
2014 Core Site Monitoring

- *Core Site Consituents*
- *Chlorpyrifos*
- *Copper*
- *Malathion*
- *Diazinon*

- *C. dubia*
- *S. capricornutum*
- *P. promelas*
- *H. azteca sediment*



- Core Site Consituents
- Chlorpyrifos
- Copper
- Malathion
- Diazinon

- C. dubia
- S. capricornutum
- P. promelas
- H. azteca sediment

Duck Slough @ Gurr Rd

- Copper MPM
- Sediment MPM
- Core Site Monitoring
- Cerio MPM

Deadman Creek @ Gurr Rd

- Selenastrum MPM
- Sediment MPM
- Cerio MPM
- Pimephales MPM

Miles Creek @ Reilly Rd

- Chlorpyrifos MPM
- Sediment MPM
- Cerio MPM
- Copper MPM
- Selenastrum MPM
- Diazinon MPM

Deadman Creek @ Hwy 59

- Chlorpyrifos MPM

2014 Monitoring

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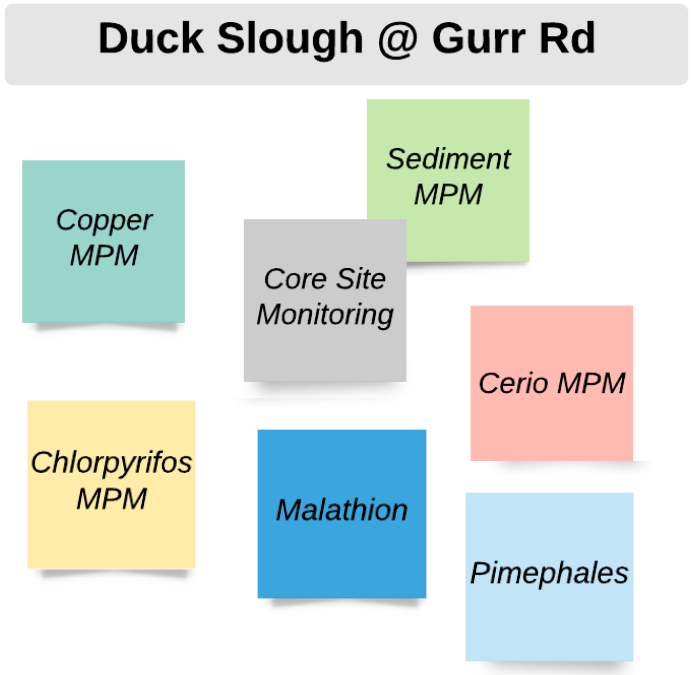
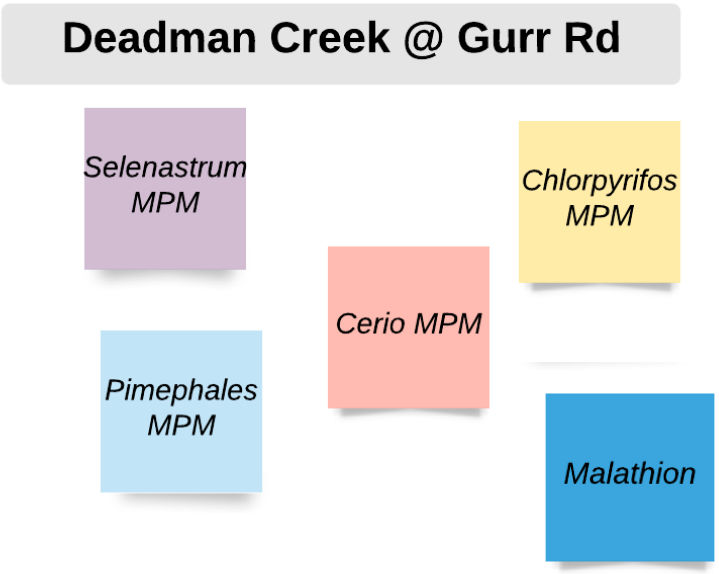
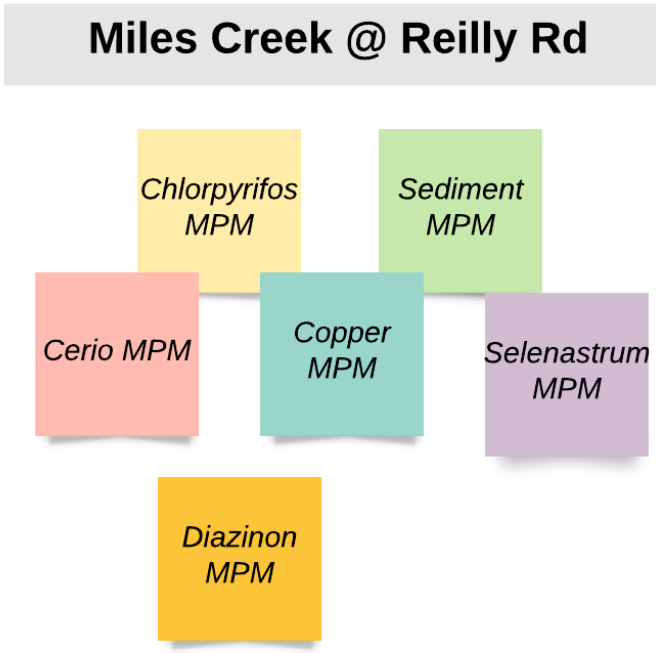
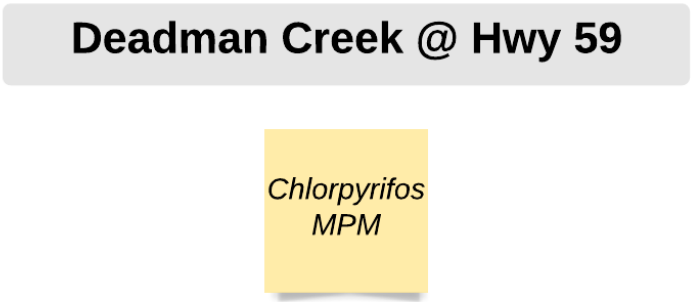
- Core Site Consituents
- Chlorpyrifos
- Copper
- Malathion
- Diazinon

- C. dubia
- S. capricornutum
- P. promelas
- H. azteca sediment









2015 Monitoring

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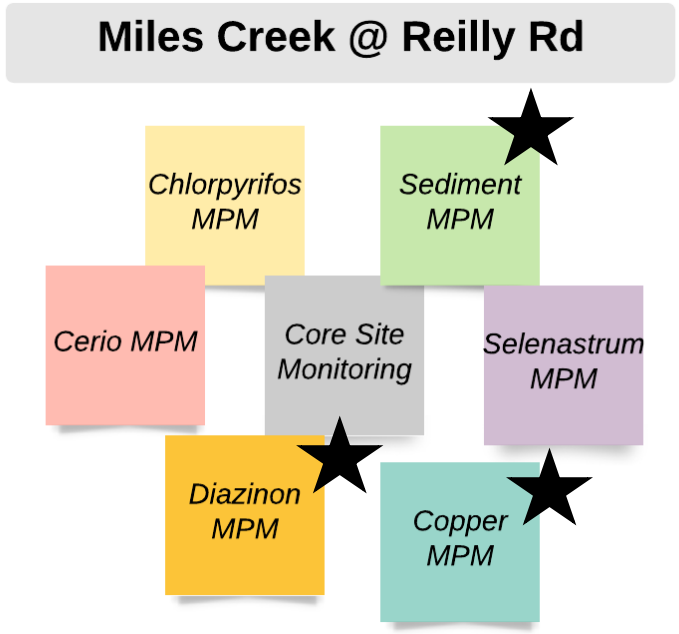
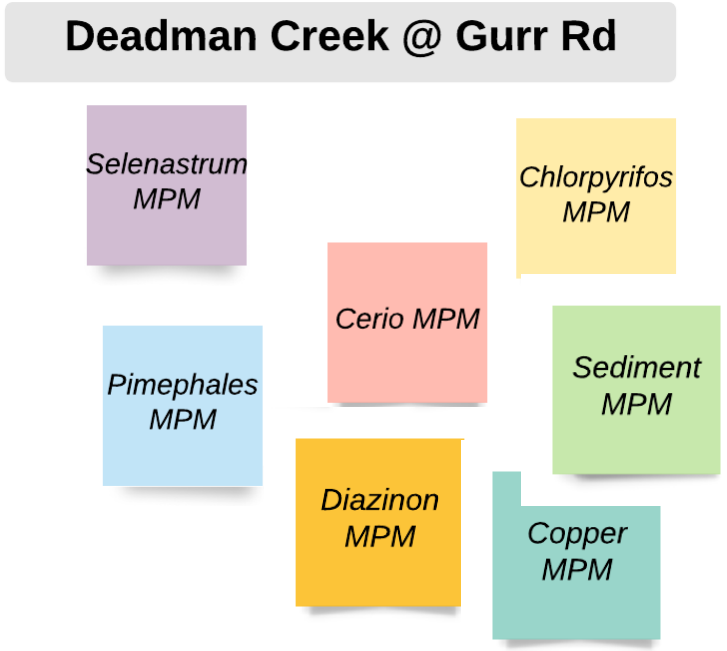
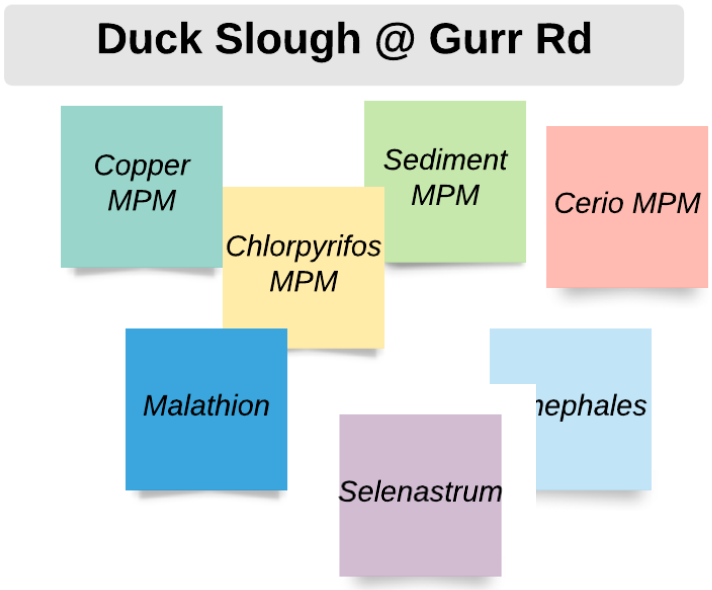
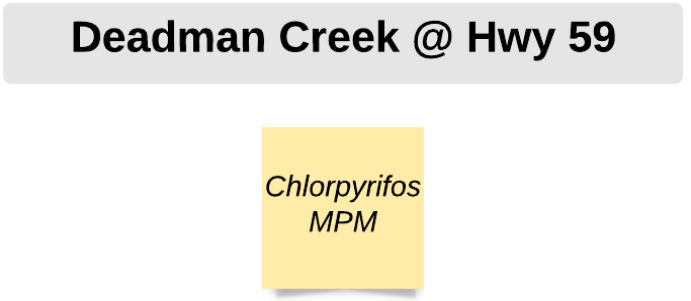
- Core Site Consituents
- Chlorpyrifos
- Copper
- Malathion
- Diazinon

- C. dubia
- S. capricornutum
- P. promelas
- H. azteca sediment









2016 Monitoring

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Management Plan Monitoring – An Iterative Approach

- Management Plan Monitoring
  - Assessed annually
  - Months of past exceedances
  - Evaluation of pesticide use

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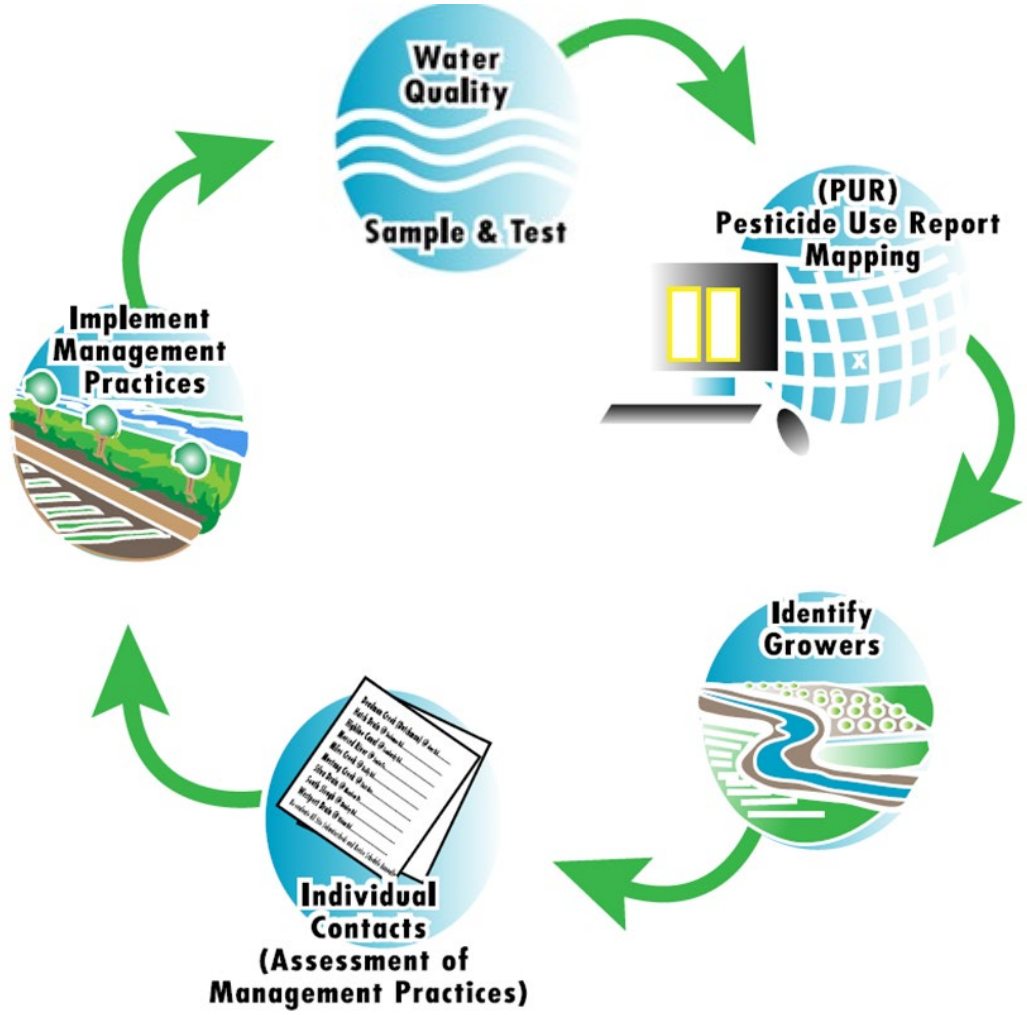
Management Plan Monitoring – An Iterative Approach

- **Monitoring Plan Update**
  - Submitted August 1 annually
  - Evaluation of last years water quality results
  - Evaluation of Pesticide Use Reports

- Determine months to monitor based on likelihood that the constituent applied is causing water quality impairments
- If water quality continues to be a problem, assess the identification of growers



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Duck Slough @ Gurr Rd - Chlorpyrifos

- Monitoring resulted in additional water quality exceedances
  - March 3, 2014
  - July 14, 2015 (last exceedance)
- Second round of focused outreach and education: 2016 -2018
  - 8 growers; only 2 were previously contacted
  - Most practices implemented focus on spray drift management
- Management plan monitoring: 2016 – 2018
- Management plan completion: 2019

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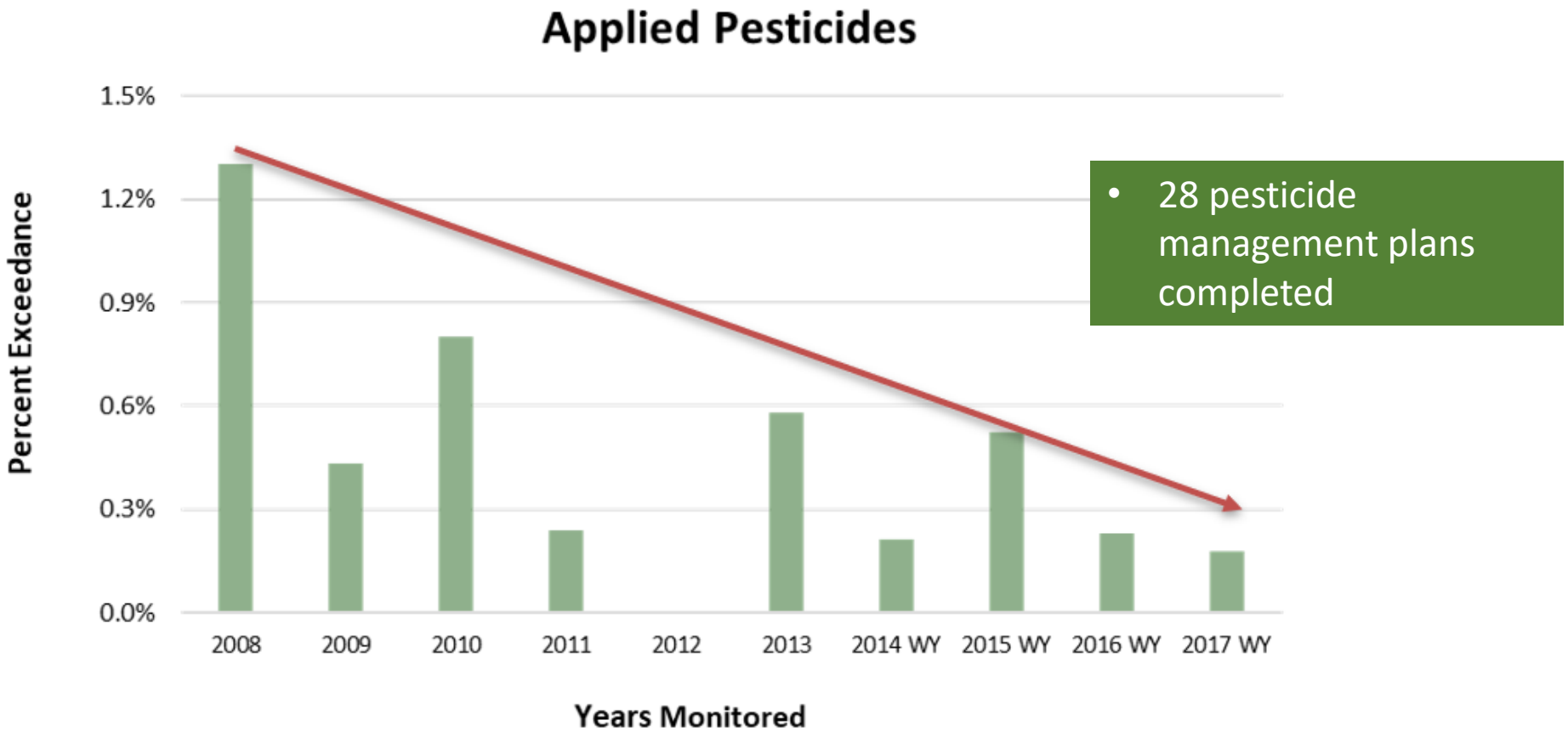
Changes in Growers' Behaviors



- 28 pesticide management plans completed

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Questions?

East San Joaquin Water Quality Coalition

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