

# Field Tour Guide for the Surface Water Expert Panel

East San Joaquin Water Quality Coalition

January 8, 2020



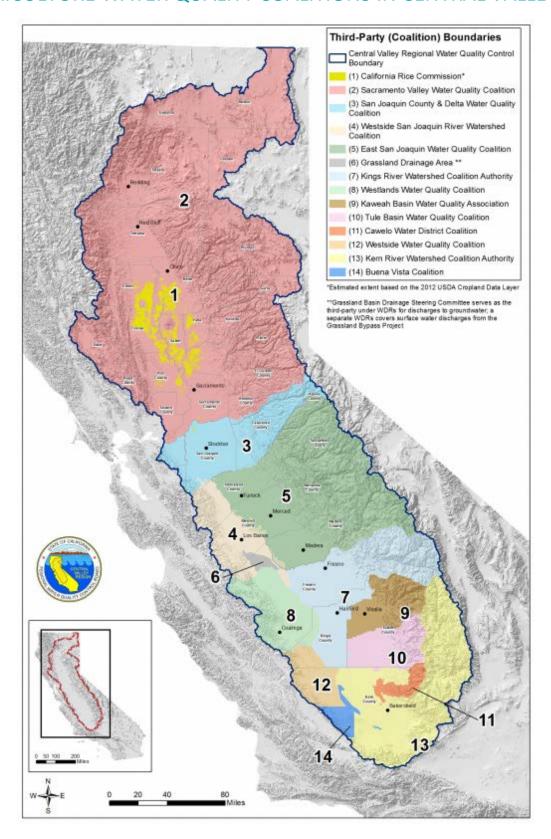
#### PURPOSE OF FIELD TOUR

To give the Surface Water Expert Panel an overview of the Coalition's surface water monitoring strategy and tour of the Coalition Region's diverse landscape. The Surface Water Expert Panel will visit one of the San Joaquin River TMDL sites, two Core sites, and four Represented sites located within Zone 4.

# SCHEDULE FOR FIELD TOUR: JANUARY 8, 2020

Stop	Location	Distance	Estimated Arrival Time	Stop Duration	Departure Time
Depart Rancho Cordova					7:00
Rest Stop (Starbucks) 2952 Speno Dr. Patterson		87 mi (2 hrs)	9:00	15 min	9:15
1	San Joaquin River at Hills Ferry (TMDL)	19 mi (30 min)	9:45	15 min	10:00
2	Unnamed Drain at Hwy 140 (Rep)	6.9 mi (10 min)	10:10	10 min	10:20
3	Howard Lateral at Hwy 140 (Rep)	12.4 mi (15 min)	10:35	0 min	10:35
4	Livingston Drain at Robin Ave (Rep)	4.9 mi (10 min)	10:45	10 min	10:55
Rest Stop (ampm) 1615 Bell Ln, Atwater		10 mi (15 min)	11:10	20 min	11:30
5	Bear Creek at Kibby Rd (Rep)	13 mi (20 min)	11:50	15 min	12:05
Merced County Farm Bureau Lunch (provided)		6 mi (45 min)	12:50	1 hr	1:50
6	Canal Creek at West Bellevue Rd (Core)	8 mi (15 min)	2:05	10 min	2:15
7	Merced River at Oakdale Rd (Core)	10.8 mi (15 min)	2:30	30 min	3:00
Arrive Rancho Cordova		119 mi (2 hrs)	5:00		

### AGRICULTURE WATER QUALITY COALITIONS IN CENTRAL VALLEY.



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Figure 1. Core Site Monitoring Strategy Flowchart

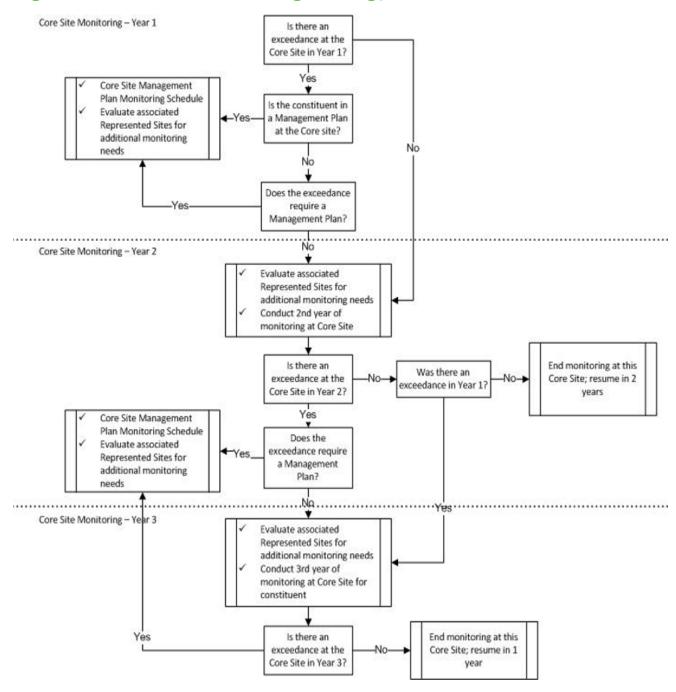
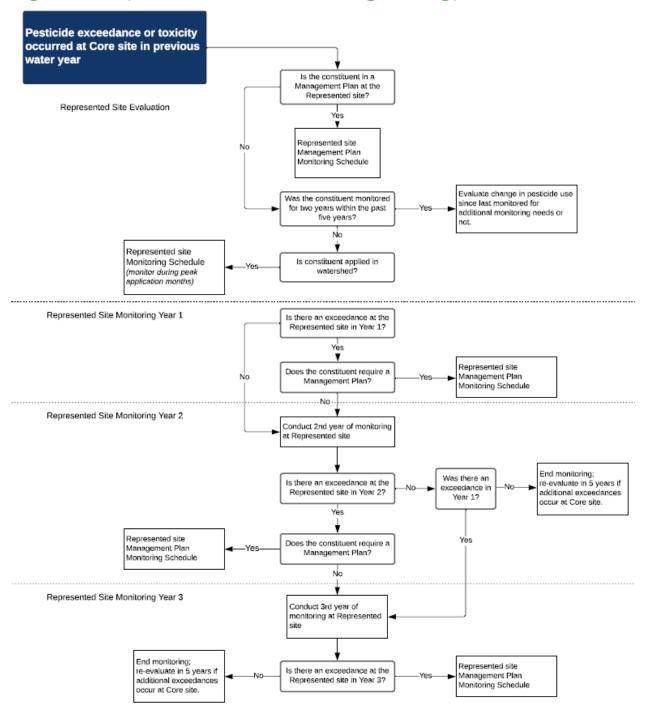
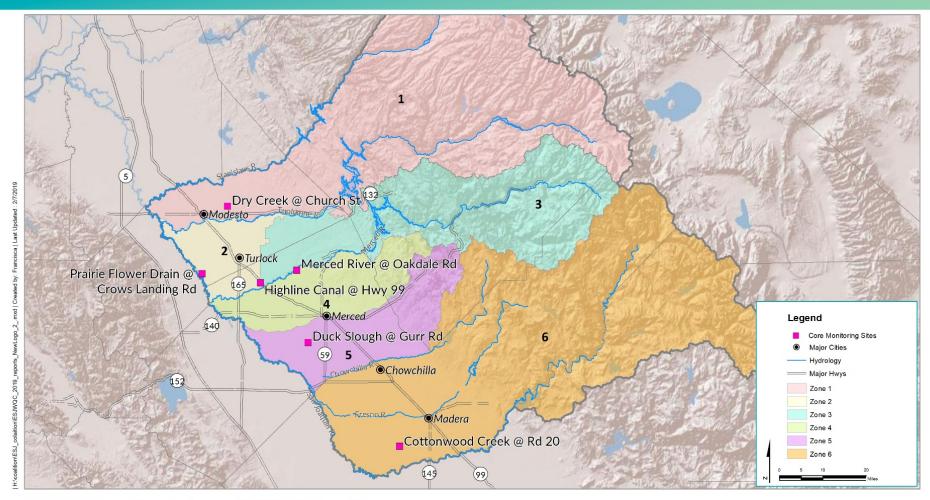


Figure 2. Represented Site Monitoring Strategy Flowchart



#### **REFERENCE MAPS**

Figure 3. Map of East San Joaquin Water Quality Coalition with Zone Boundaries and Core sites



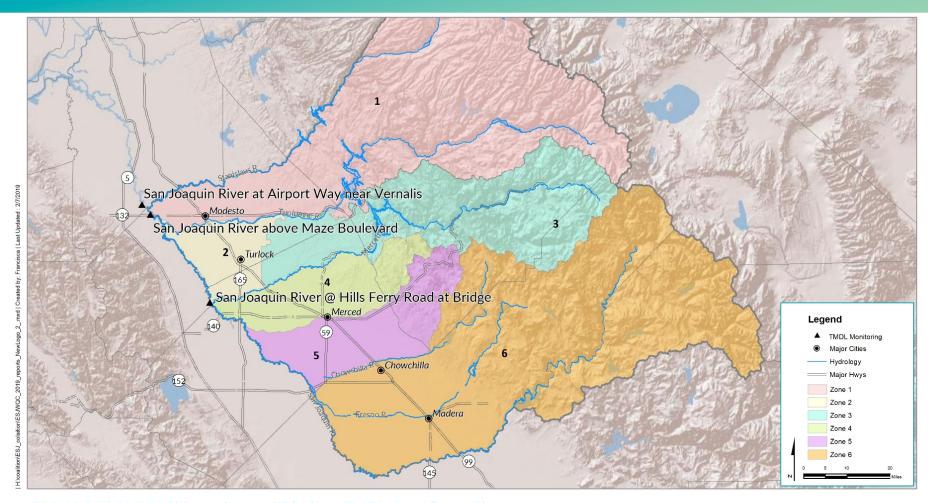
ESJWQC Zone Boundaries and 2018 WY Core Sites

**ESJWQC** 

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet Projection: property\*-Lambert Conformal Conic. Units: Foot US Service Layer Credits: Shaded Relief: Copyright-0-2014 Earl Hedrology\*- NHU hydrodata, 124,000-scale, http://rindusgs.gov/



Figure 4. Map of ESJWQC and Chlorpyrifos and Diazinon TMDL Compliance sites



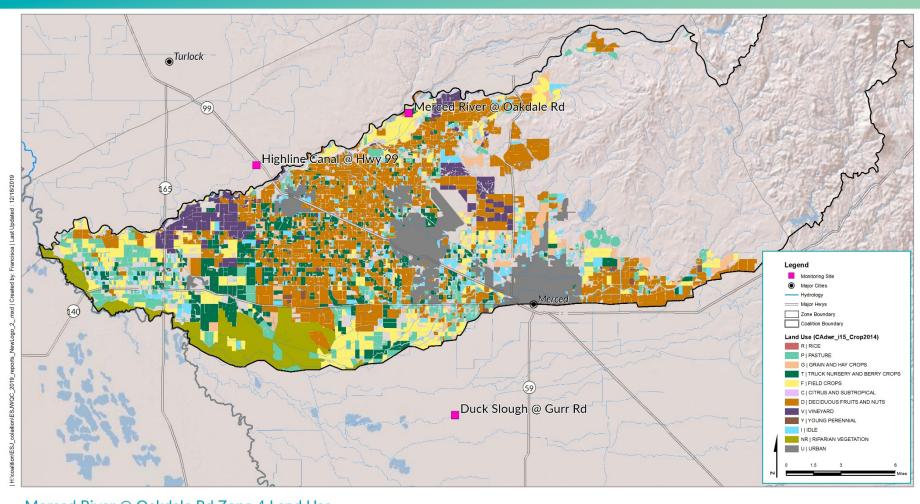
ESJWQC 2018 WY Chlorpyrifos and Diazinon TMDL Compliance Sites

**ESJWQC** 

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet Projection: property-1 ambert Conformal Conic Units: Foot US Service Layer Credits: Shaded Relief: Copyrights 0.2014 Earl Hydrology: "NHD hydrodota, 124,000-scale, http://mbd.usgs.gov/



Figure 5. Map of Zone 4 Land Use



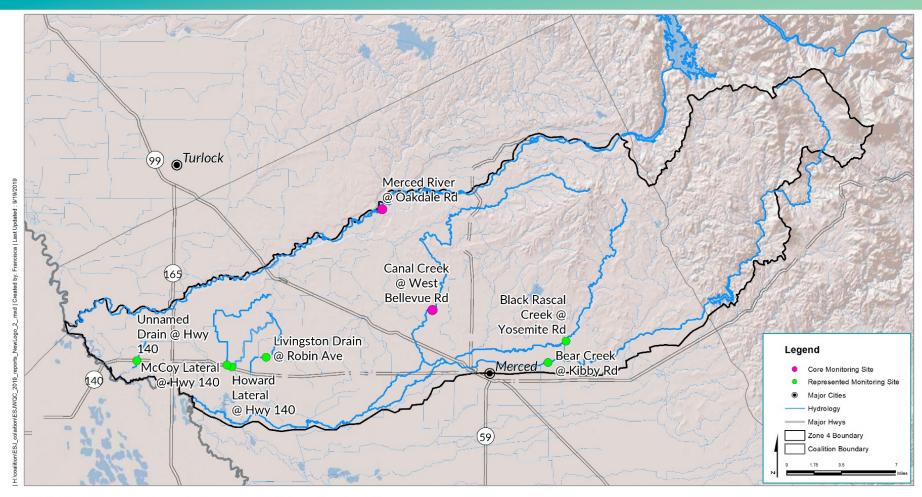
Merced River @ Oakdale Rd Zone 4 Land Use

ESJWQC

coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet rojection: property-Lambert Conformal Conic inits: Foot US service Layer Credits: Shaded Noter: Copyright(c) 2014 Esri lydroblags: NIB hydrodusia, 125(000-Scale, http://indusps.gov/



Figure 6. Map of Zone 4 Core and Represented waterbodies



ESJWQC Zone 4 Core & Represented Monitoring Sites

**ESJWQC** 

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#### FIELD TOUR MONITORING SITE INFORMATION

#### STOP 1: SAN JOAQUIN RIVER (CHLORPYRIFOS AND DIAZINON COMPLIANCE SITE)

- Total Site Subwatershed Acreage: 947,555
- Total Irrigated Acreage: 741,725 (78% of total acreage)
- Crop types: Field crops, pasture, deciduous fruit and nut trees, nursery/berry crops, grain/hay crop

The San Joaquin River at Hills Ferry Road site is monitored for chlorpyrifos and diazinon Total Maximum Daily Load compliance. This area drains lands west of the San Joaquin River upstream from Hills Ferry Rd to Fremont Ford and includes the region west of San Joaquin River for Merced and the northern part of Fresno County.

#### Irrigation Event Photo (8/15/2017)



#### Storm Event Photo (1/10/2017)



# San Joaquin River at Hills Ferry Rd at Bridge Monitoring History

• TMDL Monitoring: 2010-Present

# Exceedances: All exceedance concentration ranges for constituent (year of last exceedance)

- DO: 5.28-6.95 mg/L (2019)
- pH: 8.53-8.58 (2015)
- SC: 800-1692 μS/cm (2019)

#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temperature)
- Pesticides (Chlorpyrifos and Diazinon)

#### Chart of Exceedances (2010 - 2019 WY)

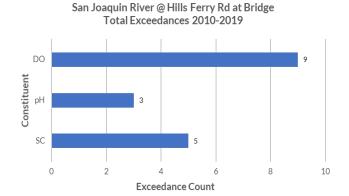
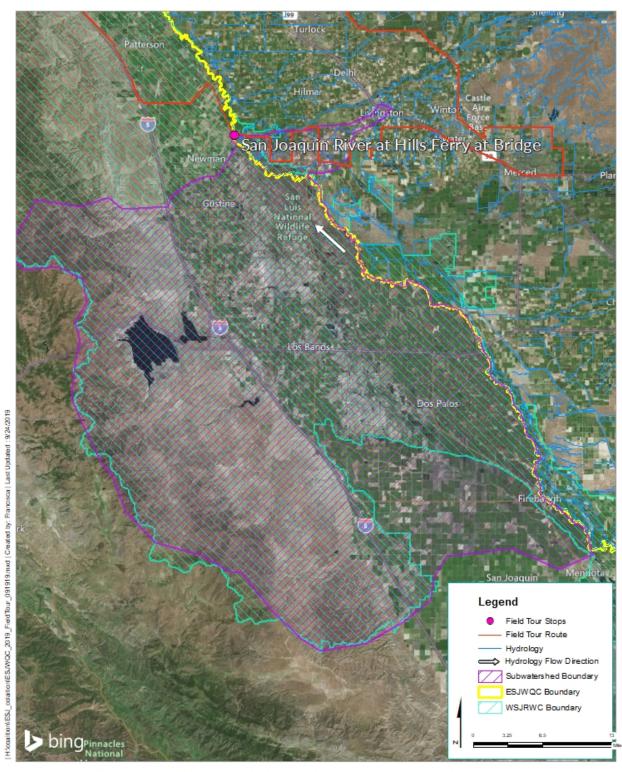


Figure 7. San Joaquin River Drainage Map



### SJR @ Hills Ferry at Bridge Drainage map

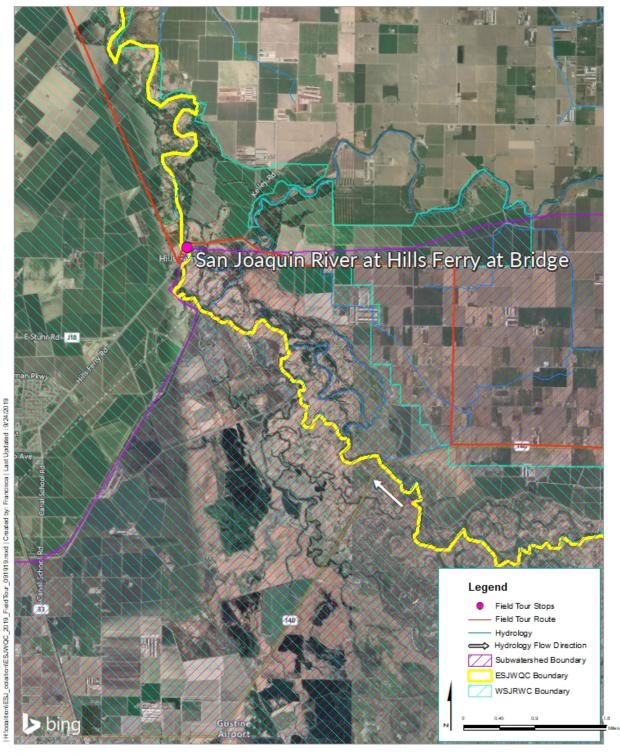
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Figure 8. San Joaquin River Drainage Map (zoomed in)



### SJR @ Hills Ferry at Bridge Drainage map

#### **ESJWQC**

Coordinate System: NAO 1985 StatePlane California III FIP 5 0405 Fee Projection: property=Lambert Conformal Conic

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#### **STOP 2: UNNAMED DRAIN**

• Total Site Subwatershed Acreage: 521

• Total Irrigated Acreage: 319 (61% of total acreage)

Crop types: Field crops and pasture

Unnamed Drain at Hwy 140 is a Represented site in Zone 4 and originates from the East Side Irrigation Canal flowing into Old Channel then into the San Joaquin River.

#### **Irrigation Event Photo (9/12/2019)**



#### Storm Event Photo (1/10/2017)



#### **Unnamed Drain at Hwy 140 Monitoring History**

Monitoring: 2013–2017

Assessment Monitoring (full suite): 2013

Management Plan Monitoring: NA

# **Exceedances: All exceedance concentration** ranges for constituent (year of last exceedance)

• DO: 5.7-6.86 mg/L (2013)

pH: 8.94-9.06 (2013)

E. coli: 250-440 MPN/100 mL (2013)

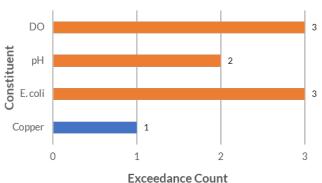
#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temp)
- Sediment Toxicity (H. azteca, grain size, TOC based on Core site exceedances)

#### **Chart of Exceedances (2013)**

Active and Completed Management Plans shown below.

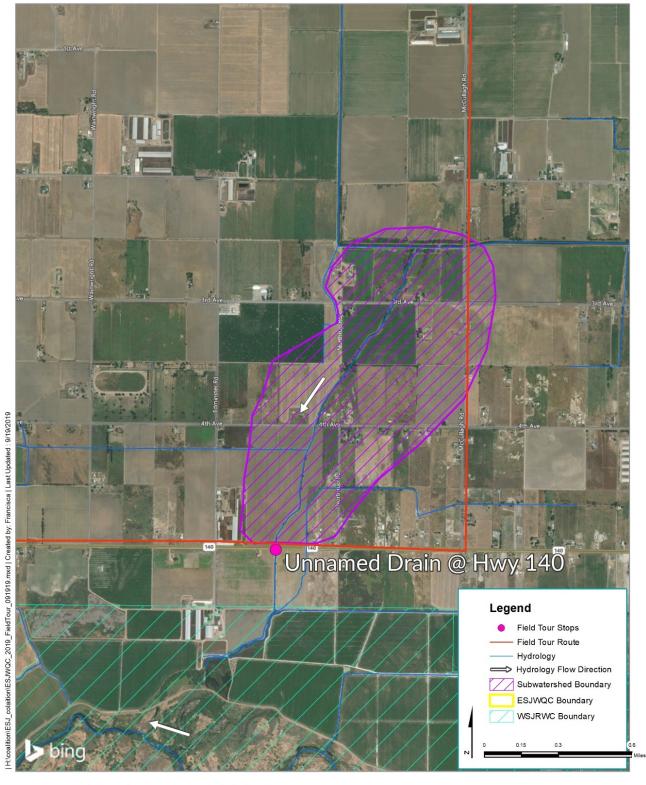
Unnamed Drain @ Hwy 140 Total Exceedance Count 2013



#### **Completed Management Plans**

None

Figure 9. Unnamed Drain drainage map



### Unnamed Drain @ Hwy 140 Drainage map

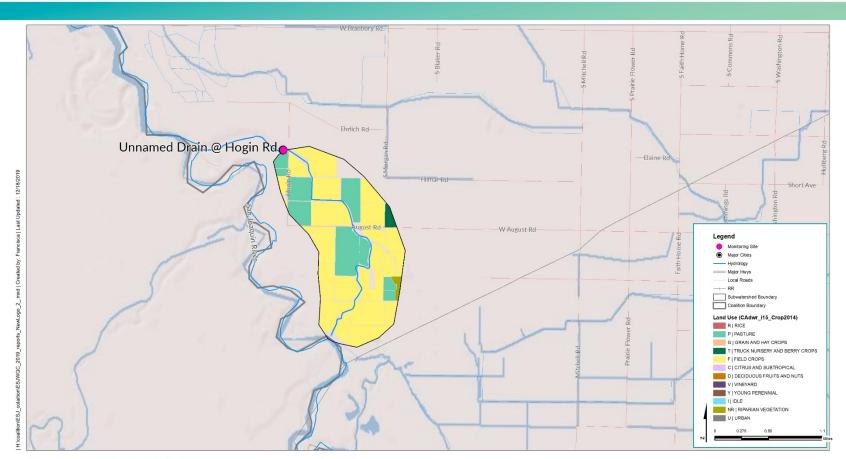
#### ESJWQC

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet Projection: property-Lambert Conformat Conic Units: Fort US Service Layer Credits: Bing Maps Hybrid: © 2019 Microsoft Corporatio Hydrology - NHD hydrodata, 124,000 scale, http://nhd.wsgs.gov/Roads, highways, rallroads - ESM1

Service Layer Credits: Bing Maps Hybrid: © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS © 2019 HERE Hydrology: -NHD hydrodata, 1:24,000-scale, http://nhd.usgs.gov/ Zorde highwayer collegeds -ESP1



Figure 10. Unnamed Drain at Hwy 140 land use map



Unnamed Drain @ Hogin Rd

**ESJWQC** 

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#### **STOP 3: HOWARD LATERAL**

- Total Site Subwatershed Acreage: 8,749
- Total Irrigated Acreage: 6,039 (69% of total acreage)
- Crop types: Deciduous fruit and nut trees, nursery/berry crops, pasture, and field crops

Howard Lateral at Hwy 140 is a Represented site in Zone 4 and is located just southwest of Livingston Drain in the central portion of the Coalition region in Merced County. Water flows north to south before draining into the East Side Irrigation Canal.

**Irrigation Event Photo (7/9/2019)** 



#### Storm Event Photo (1/7/2019)



#### Howard Lateral at Hwy 140 Monitoring History

- Monitoring: 2008–2011, 2013-Present
- Assessment Monitoring (full suite): 2010
- Management Plan Monitoring: 2011, 2013– 2019

# **Exceedances: All exceedance concentration** ranges for constituent (year of last exceedance)

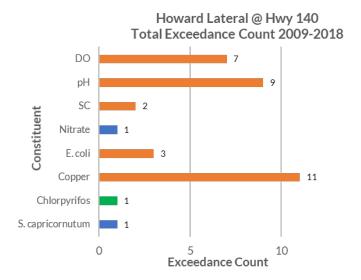
- DO (2017): 0.86-6.77 mg/L
- pH (2016): 6.09-9.28
- SC (2015): 810-838 μS/cm
- E. coli (2010): 240-330 MPN/100 mL
- Copper (2018): 1.1-7.2 µg/L

#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temp, hardness)
- Metals (Copper, MPM)
- Sediment Toxicity (H. azteca, grain size, TOC based on Core site exceedances)

# Chart of Exceedances (2009-2018 WY)

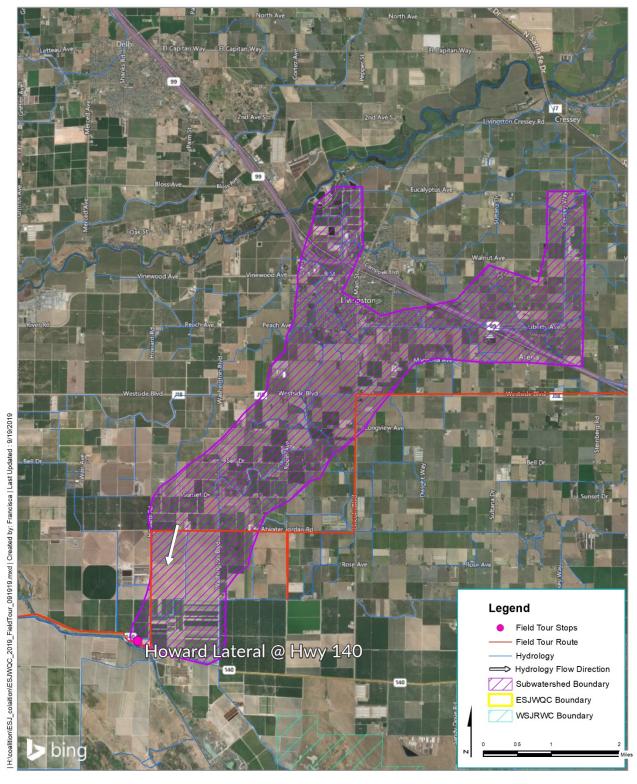
Active and Completed Management Plans shown below.



#### **Completed Management Plans**

Chlorpyrifos

Figure 11. Howard Lateral Drainage Map



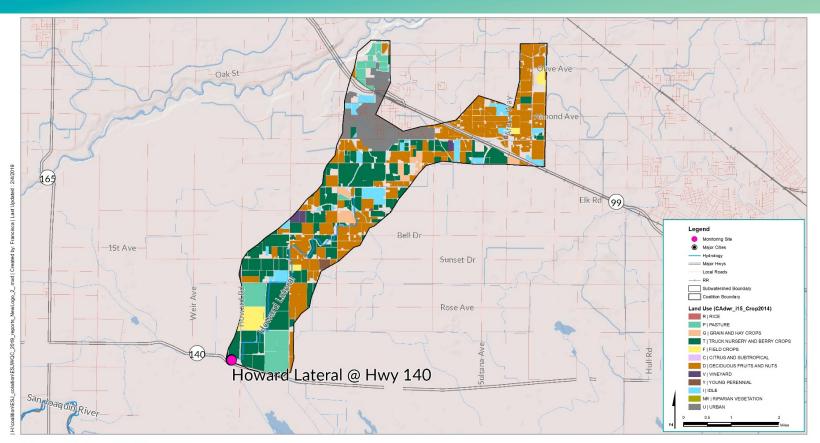
### Howard Lateral @ Hwy 140 Drainage map

#### ESJWQC

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Figure 12. Howard Lateral at Hwy 140 land use map



Howard Lateral @ Hwy 140

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#### **STOP 4: LIVINGSTON DRAIN**

- Total Site Subwatershed Acreage: 10,216
- Total Irrigated Acreage: 7,240 (52% of total acreage)
- Crop types: Deciduous fruit and nut trees, nursery/berry crops, pasture, and grain and hay crops

Livingston Drain at Robin Ave is a Represented site in Zone 4 and is in the west central portion of the Coalition region in Merced County, east of Howard Lateral. This site subwatershed is located west of Atwater and Livingston.

Irrigation Event Photo (9/12/2019)



#### **Storm Event Photo (11/30/2018)**



# **Livingston Drain at Robin Ave Monitoring History**

- Monitoring: 2007–2008, 2011–Present
- Assessment Monitoring (full suite): 2008
- Management Plan Monitoring: 2008, 2011– Present

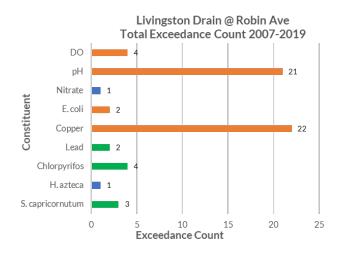
# Exceedances: All exceedance concentration ranges for constituent (year of last exceedance)

- DO: 5.47-6.45 mg/L (2016)
- pH: 8.54-9.44 (2017)
- E. coli: 440-1700 MPN/100 mL (2008)
- Copper: 1.7-110 µg/L (2019)

#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temp, hardness)
- Metals (Copper, MPM)
- Sediment Toxicity (H. azteca, grain size, TOC based on Core site exceedances)

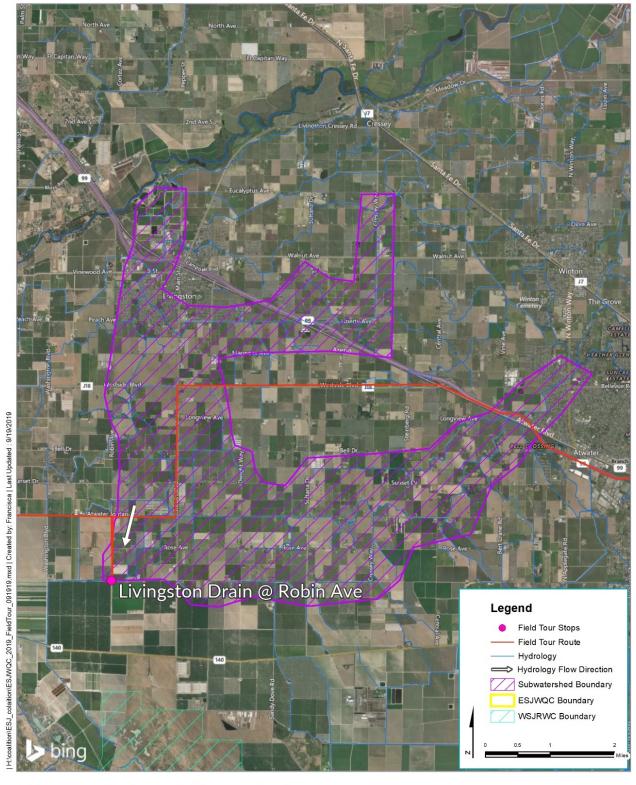
# Chart of Exceedances (2007-2019 WY) Active and Completed Management Plans shown below.



#### **Completed Management Plans**

- Lead
- Chlorpyrifos
- Water column toxicity to S. capricornutum

Figure 13. Livingston Drain at Robin Ave drainage map



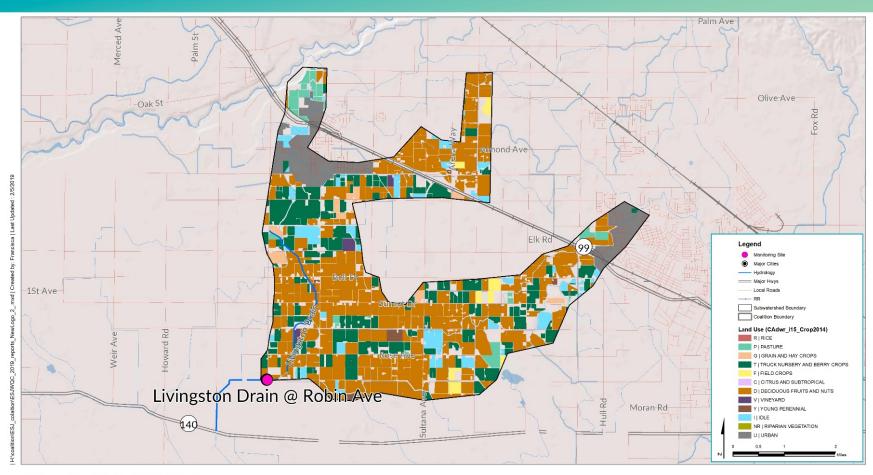
### Livingston Drain @ Robin Ave Drainage map

#### ESJWQC

Coordinate System: NAD 1983 StatePlane California III FIP'S 0403 Feet Projection: property\*-Lambert Conformal Conic Units: Four U.S 
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Figure 14. Livingston Drain at Robin Ave land use map



#### Livingston Drain @ Robin Ave

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#### **STOP 5: BEAR CREEK**

- Total Site Subwatershed Acreage: 24,283
- Total Irrigated Acreage: 7,840 (32% of total acreage)
- Crop types: Deciduous fruit and nut trees, field crops, pasture, grain and hay crops

Bear Creek at Kibby Rd is a Represented site in Zone 4. Bear Creek originates in the foothills of the Sierras with Burn's Creek as one of the major tributaries. Bear Creek drains to the east just north of the town of Planada, through Merced and eventually to the San Joaquin River.

Irrigation Event Photo (7/9/2019)



#### Storm Event Photo (1/14/2014)



#### **Bear Creek at Kibby Rd Monitoring History**

- Monitoring: 2005-2008, 2010-Present
- Assessment Monitoring (full suite): 2008
- Management Plan Monitoring: 2010–2014

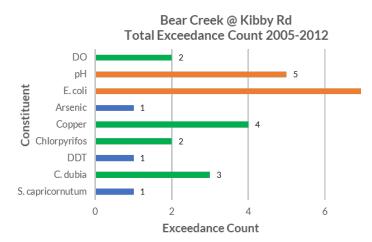
# **Exceedances: All exceedance concentration ranges for constituent (year of last exceedance)**

- pH: 8.59-9.00 (2012)
- E. coli: 280-2400 MPN/100 mL (2008)

#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temp)
- Pesticides (Chlorpyrifos based on Core site exceedances)
- Sediment Toxicity (H. azteca, grain size, TOC based on Core site exceedances)

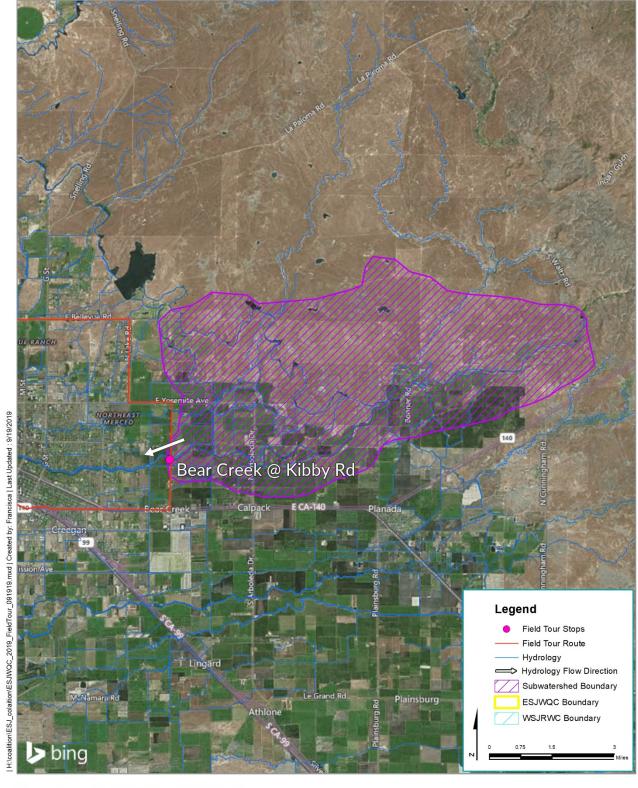
# Chart of Exceedances (2005-2012) Active and Completed Management Plans shown below.



#### **Completed Management Plans**

- DO
- Copper
- Chlorpyrifos
- Water column toxicity to C. dubia

Figure 15. Bear Creek at Kibby Rd drainage map (Zoomed)



## Bear Creek @ Kibby Rd Drainage map

ESJWQC

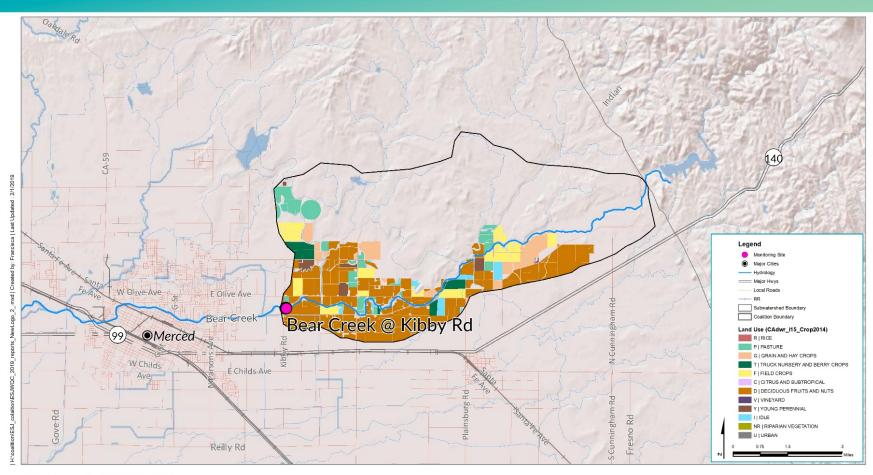
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Figure 16. Bear Creek at Kibby Rd land use map



#### Bear Creek @ Kibby Rd

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#### **STOP 6: CANAL CREEK**

- Total Site Subwatershed Acreage: 12,646
- Total Irrigated Acreage: 4,681 (37% of total acreage)
- Crop types: Deciduous fruit and nut trees, field crops, vineyard, and grain and hay crops

Canal Creek at West Bellevue Rd is a rotating Core site in Zone 4. Canal Creek originates in the lower foothills of Merced County.

Irrigation Event Photo (4/12/2016)



Storm Event Photo (2/9/2016)



#### Canal Creek at West Bellevue Rd Monitoring History

- Monitoring: 2014 WY-Present
- Assessment Monitoring (full suite): 2017 WY
- Management Plan Monitoring: 2020 WY

# **Exceedances: All exceedance concentration** ranges for constituent (year of last exceedance)

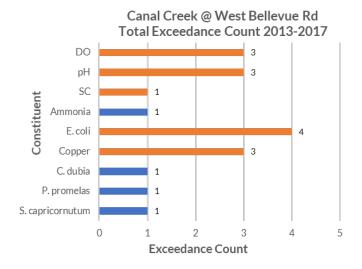
- DO: 6.00-6.84 mg/L (2015)
- pH: 8.63-8.82 (2016)
- SC: 794 µS/cm (2016)
- E. coli: 344.8-829.6 MPN/100 mL (2017)
- Copper: 2.9-34 µg/L (2017)

#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temp, DOC/TOC, TSS, Hardness, Turbidity)
- Nutrients (Ammonia, Nitrogen, OP)
- Pathogens (E. coli)
- Metals (Copper, MPM)
- Pyrethroids (based on PEP)
- Pesticides (based on PEP)
- Water Column Toxicity (*C. dubia* and *S. capricornutum* based on PEP)
- Sediment Toxicity (*H. azteca*, grain size, TOC)

### Chart of Exceedances (2013-2017 WY)

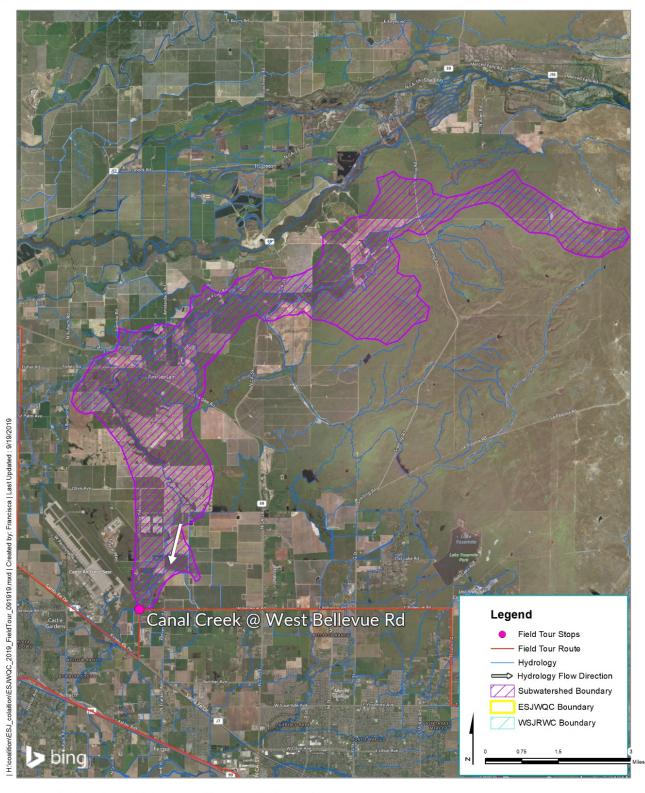
Active and Completed Management Plans shown below.



#### **Completed Management Plans**

None

Figure 17. Canal Creek at West Bellevue Rd drainage map



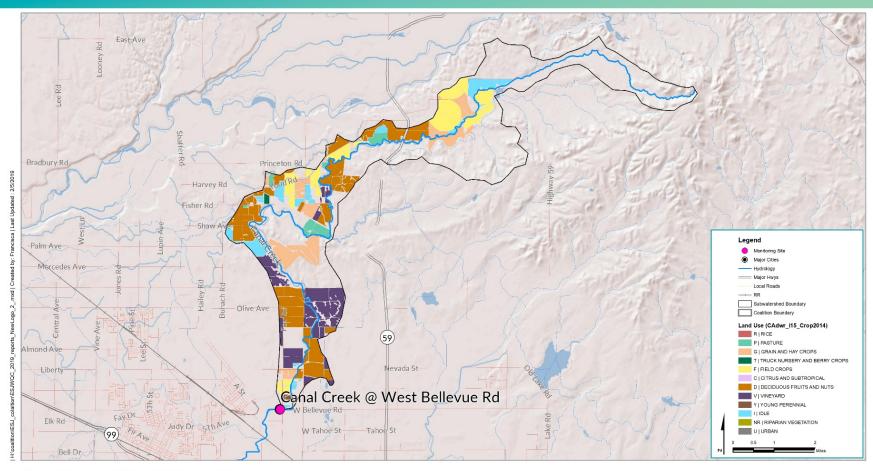
### Canal Creek @ West Bellevue Rd Drainage map

#### **ESJWQC**

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Figure 18. Canal Creek at West Bellevue Rd land use map



#### Canal Creek @ West Bellevue Rd

**ESJWQC** 

Coordinatie System: NAO 1993 State-Plane California III FIPS 0400 Fe Projection property-Lambert Conformal Conic Units: Foot US Service Layer Credits: Shaded Releft: Copyright © 2014 last! Hydrology - RHID hydrodras, 124,000 scale, http://rhid.urgs.gov/ Radish.jihipvass, ralloads



#### **STOP 7: MERCED RIVER**

- Total Site Subwatershed Acreage: 51,543
- Total Irrigated Acreage: 12,224 (24% of total acreage)
- Crop types: Deciduous fruit and nut trees, vineyards, pasture, and field crops

Merced River at Oakdale Rd is the new rotating Core site in Zone 4 and replaces Merced River at Santa Fe. Merced River at Oakdale Rd is located approximately four miles upstream of the Merced River at Santa Fe monitoring location. Merced River originates in the high Sierra, flowing west through several dams and impoundments eventually draining into the San Joaquin River near Hatfield State Park.

Irrigation Event Photo (6/11/2019)



Storm Event Photo (4/9/2018)



#### **Merced River Monitoring History**

- Monitoring: 2004-Present
- Assessment Monitoring (full suite): 2018
- Management Plan Monitoring: 2008, 2010, 2013-2019

#### **Exceedances:** All exceedance concentration ranges for constituent (year of last exceedance)

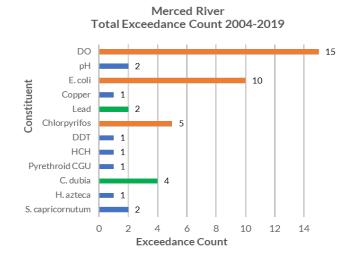
- DO: 4.82-6.38 mg/L (2019)
- E. coli: 261.3-2400 MPN/100 mL (2019)
- Chlorpyrifos: 0.018-0.59 µg/L (2017)

#### 2020 WY Monitoring Scheduled

- Field Parameters (DO, pH, SC)
- Physical Parameters (Temp)
- Pesticides (Chlorpyrifos, MPM)
- Sediment Toxicity (H. azteca, grain size, TOC based on Core site exceedances)

# Chart of Exceedances (2004-2019 WY)

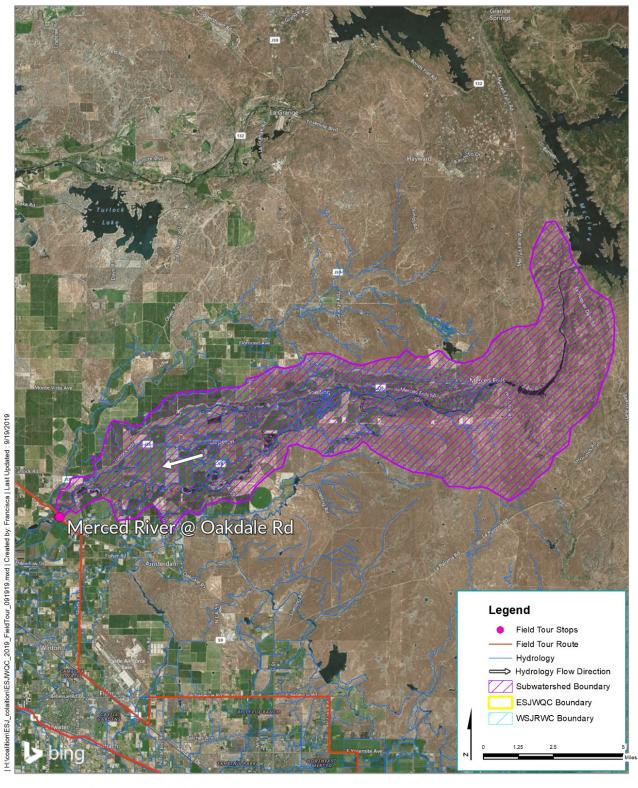
Active and Completed Management Plans shown below.



#### **Completed Management Plans**

- Lead
- Water column toxicity to C. dubia

Figure 19. Merced River at Oakdale Rd drainage map



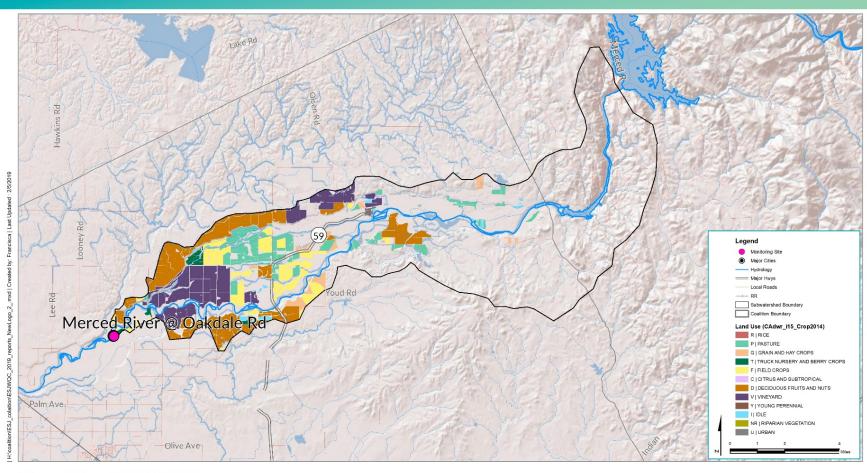
### Merced River @ Oakdale Rd Drainage map

#### ESJWQC

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
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Hydrology: HHD hydrodata, 124,000 scale, http://indusgs.gov/



Figure 20. Merced River at Oakdale Rd land use map



#### Merced River @ Oakdale Rd

**ESJWQC** 

Countinate System: NAD 1993 State-Plane California III FIPS 0403 Feet Projection properly—Lambert Conformal Curic Units: Tool US Service Layer Credits: Shaded Relief: Copyright © 2014 Earl Hydrology - NHD hydrodds, 124,000 scale. http://rhd.urgs.gov/ Radio, Bylmyst, Larinesta | SSIN |



### MAP OF FIELD TOUR ROUTE

https://goo.gl/maps/KwLphpZdxhH6JwUK8

