Station Name	2004	2005		2006		2007		2008
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm
Merced River @ Santa Fe	x	x	x	x	x	x	x	x
Mustang Creek @ East Ave					x	x	x	x
Prairie Flower Drain @ Crows Landing Rd		x	x	x	x	x	x	x
Silva Drain @ Meadow Dr					x	x	x	x
South Slough @ Quinley Rd					x	Dry	x	x
Hatch Drain @ Tuolumne Rd							x	x
Livingston Drain @ Robin Ave							x	x
Miles Creek @ Reilly Rd							x	x
Westport Drain @ Vivian Rd							x	x

Storm Season Monitoring 2008

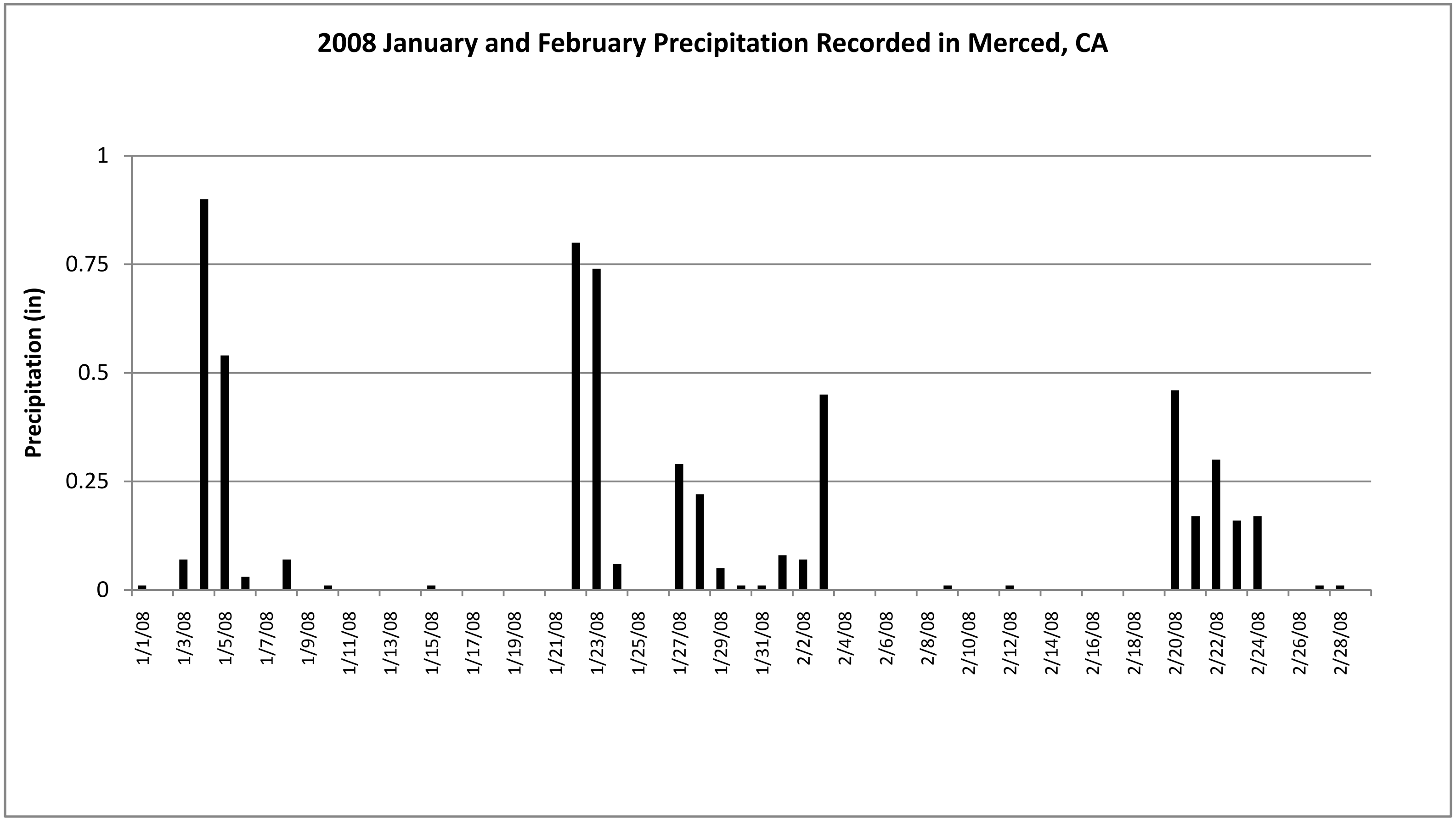
Coalition monitoring is conducted in both the winter storm runoff season and the summer irrigation season. This report covers only monitoring conducted between the months of November and March, 2008, during the storm season. The winter storm season sampling is designed to characterize the discharge from irrigated agriculture as a result of storm runoff. Sampling during the storm season is triggered by a storm event of 0.25 inches of rain or greater, after the dormant season sprays occur. In general, dormant sprays do not occur until December and therefore the first storm event with enough rainfall to trigger sampling usually occurs in January. Below is a description of each of the two storm events that occurred for the 2008 monitoring season.

The first storm sampling event for the ESJWQC began on January 24, 2008 and continued to January 25, 2008. This storm was separated from the previous substantial precipitation on January 4th and 5th by twelve days of zero recorded rainfall, which allowed ample time for farmers to apply dormant season pesticides and herbicides. Rainfall during the precipitation event varied over the geographic sample area but surpassed the 0.5” in 24 hours on January 22 and 23. During these 48 hours 1.54” of rain fell in Merced, which produced measurable runoff across the region. This storm event was the second substantial rain of 2008 during a wet January; the statewide average of 6.02” of rainfall made January 2008 the 24th wettest January in the 113 years of the California Climate Tracker. It should be noted that this storm appeared suddenly and was not forecasted until approximately three days prior to the first rain on January 22. The precipitation predictions also increased within those three days from showers to rain. During this second storm the sub-tropical moisture landed on coastal central California, crossed the southern San Joaquin Valley and spun north along the foothills of the Sierra Nevada. It then returned to the San Joaquin Valley as it continued pushing north. Rain continued to fall across the region for the nine days after sampling, with an additional 1.18" recorded in Merced.

The second storm sampling event for the ESJWQC began on February 25, 2008 and continued to February 26. This storm was separated from the previous major precipitation event (and the previous sampling event) by 14 days without any measureable precipitation. Again, the dry period allowed ample time for further dormant season pesticide and herbicide application. This storm produced less rain than the first and began with 0.46" of rain on February 20, 2007. Over the next five days 1.26" of rain fell in Merced. As with the first event, rainfall varied across the region but remained sufficient to generate runoff throughout most of the region. The moisture for this second event followed the jet stream in from the northern Pacific and entered central California just south of the San Francisco Bay, then distributed rain to the north and the south.

Figure 7. Local weather conditions during the first two months of 2008.

The first storm sampling event on January 24-25; the second event was on February 25-26. All data recorded in Merced, CA and reported on weatherunderground.com.



The objectives of the ESJWQC monitoring program are to:

- Determine the concentration and load of waste in discharges to surface waters
- Evaluate compliance with existing narrative and numeric water quality objectives to determine if implementation of additional management practices is necessary to improve and/or protect water quality
- Assess the impact of waste discharges from irrigated agriculture to surface water
- Determine the degree of implementation of management practices to reduce discharge of specific wastes that impact water quality in watersheds within the coalition region
- Determine the effectiveness of management practices and strategies to reduce discharges of wastes that impact water quality

In order to achieve the objectives listed above, the ESJWQC monitored water quality at 23 sites in the Coalition region during the 2008 storm runoff season. The Coalition sampled for numerous water quality variables and constituents including 39 pesticides, *E. coli*, physical parameters (total dissolved solids, color and turbidity), eight metals, total organic carbon, nutrients, field parameters (dissolved oxygen, pH, electrical conductivity), water toxicity to three test species including *Ceriodaphnia dubia*, *Pimephales promelas* and *Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca*. Monitoring constituents are established by the MRP (Order No. R5-2005-0833) and are discussed in more detail below.

Because the amount of runoff was low across the Coalition region, especially the southern portions of the region, water was unable to be collected at 4 sites (documented in the section on Precision and Accuracy). Consequently, no data from those sites are available. All dry sites were documented by photographs which are available on request.

Pesticides and Toxicity

Pesticides can end up in the water column or sediment as a result of applications that occur during the winter including dormant and pre-emergent sprays. Runoff from fields can move sediment and chemicals to surface waters. The concentrations can be compared to numeric and narrative water quality triggers to determine if exceedances have been experienced. Toxicity testing is complementary to chemical analyses and can provide an independent and more direct assessment of the level of impairment in the water body. The objective of the Coalition is to use the results of toxicity testing along with water chemistry analysis to assess the impact of discharges from irrigated agriculture.

Nutrients and Physical Parameters

Excessive nutrients can cause eutrophication of surface waters resulting in elevated total organic carbon, color content, and turbidity. All of these factors can independently cause impairment of surface waters. The Coalition's objective is to determine if exceedances are occurring and to determine if potential sources can be identified through analysis of monitoring data. However, sources of nutrients, organic carbon, color, and low dissolved oxygen are difficult to identify. If current monitoring data are not sufficient, the Coalition may conduct further investigations to identify sources. Such investigations may include special studies where they are determined to be cost effective. By understanding the sources of constituents responsible for the exceedances, the Coalition can properly recommend management practices to address exceedances of nutrients and physical parameters.

Field Parameters

Much like physical parameters, exceedances of water quality objectives for pH, dissolved oxygen (DO), and electrical conductivity (EC) are difficult to track to sources. All of these parameters are non-conserved meaning that they can increase or decrease in concentration as water moves downstream. These parameters are the result of processes occurring in the water column and sediment and can vary diurnally. As with nutrients and physical parameters, the Coalition's objective is to determine if exceedances are occurring and to investigate potential sources through analysis of monitoring data and special studies where they are cost effective. By understanding the sources of constituents that may affect field parameters, the Coalition can properly recommend management practices to address the exceedances.

E. coli

E. coli inhabits the intestinal tracts of animals and is voided in fecal material. *E. coli* may persist in the presence of oxygen in the environment for periods of time after being voided. The bacteria are also known to reproduce and magnify in the environment. However, conditions under which this occurs are not well understood and require additional research. Any species of vertebrate that voids feces can contribute *E. coli* to surface waters, including humans, companion animals such as dogs and cats, cows, chickens, waterfowl (ducks and geese), raccoons, otters, ground squirrels, feral pigs, and in some locations deer. Consequently, there may be a large amount of bacteria in any environmental sample that is collected.

As a result of *E. coli* detections in samples collected for Coalition monitoring, a special study was conducted in 2006 to identify the contributing sources of *E. coli* in Coalition water bodies. Results from this study indicated that the most prominent source of bacteria being discharged into water bodies is human, with smaller contributions coming from bovine and chicken. A full report of the *E. coli* special study was submitted to the CVRWQCB on September 9, 2007.

E. coli from humans can enter aquatic systems from leaky septic systems, leaky sanitary sewer lines, improperly treated discharge from waste water treatment plants, application of biosolids to agricultural land, and direct inputs from individuals who defecate in or near water bodies. Input from cows can occur from dairies, grazing in irrigated pastures, and various manure sources. *E. coli* from chickens can enter from poultry operations or manure sources. Irrigated agriculture is responsible for management if *E. coli* contamination is the result of runoff from irrigated pasture or manure applications for fertilizer.

Metals

The Coalition samples for four basic classes of metals: 1) those that are naturally present because of underlying geologic materials but generally not applied by agriculture (boron, selenium), 2) those that are naturally present because of underlying geologic materials but are applied by agriculture (copper, zinc, nickel), 3) those that may be legacy pesticides but also have numerous nonagricultural sources (lead, arsenic), and 4) those that are found solely as a result of nonagricultural anthropogenic sources (cadmium). These categories are not all mutually exclusive and in fact, all metals belong to the first category. For example, nickel is a plant micronutrient that may be incorporated into fertilizer mixes, although normally there is a sufficient quantity of nickel in soils to supply the needs of crops. As a result, although it may be applied by agriculture, exceedances would be expected to primarily be a result of natural weathering of soils.

Natural weathering of geologic materials can release to surface waters metals and metalloid elements such as selenium, arsenic, and boron. Selenium salts are naturally elevated in the southwest portion of the San Joaquin Valley and are transported to surface waters during storm runoff. These salts are so problematic that there is a prohibition of discharge of irrigation return flows in some locations in the Valley. Arsenic appears to be naturally elevated in several locations in the San Joaquin Valley. Zinc and nickel are also found in soils and can be found in surface waters at levels that reflect background concentrations. Both of these metals can be applied during agricultural operations as well, and the difference between applications and natural weathering must be understood to properly manage the amounts reaching surface waters. Understanding background levels of these elements will be an important task for the Coalition when trying to understand the impacts of agricultural inputs to surface waters.

While all other metals can be released as a result of the weathering of geologic materials, elevated levels of most metals are a result of anthropogenic inputs. Lead was used as a pesticide during the last century but was used in declining amounts over the last several decades before being prohibited in the 1990s. Lead was also used in gasoline until the early 1980s when it was replaced by other fuel oxygenates. Lead-based paint was routinely used until the latter parts of the last century but is still present in many old buildings and structures. Lead is also a component of batteries, and is the material in solder in numerous electronic devices including televisions, computers, and cell phones. These sources can be distinguished through sophisticated analytical tests that are beyond the capabilities of the Coalition. Copper is routinely used by agriculture on a number of crops and could be found in surface waters as a result of applications. Additional sources include road surfaces where wearing of brake pads can result in substantial loading to surface waters.

Because fertilizer applications and the micronutrient constituents included in fertilizer mixes are not reported, there is no way the Coalition can distinguish between natural and anthropogenic sources with normal monitoring data. Several of these metals can be identified to source using sophisticated analytical equipment and techniques, but these tests are beyond the capabilities of the Coalition. Consequently, the Coalition will use monitoring data to determine if exceedances are occurring, and will attempt to establish background concentrations of some metals in surface waters to determine if concentrations are a result of natural or anthropogenic inputs to the water. In addition, if it is concluded that it is necessary to determine if the metals are bioavailable, additional analyses may be used to determine the amount of soluble metals as compared to particulate bound metals.

Sampling Site Descriptions

The site names, codes and locations of the 23 sites monitored during the 2008 storm season are provided in Table 5. A narrative description of each site subwatershed with respect to hydrology and agricultural production follows below.

Table 5. ESJWQC irrigation 2008 sampling locations.

Site Name	Station Code	Latitude	Longitude
Ash Slough @ Ave 21	545XASAAT	37.0545	-120.4158
Bear Creek @ Kibby Rd†	535XBCAKR	37.3128	-120.4138
Berenda Slough along Ave 18 1/2	545XBSAAE	37.0182	-120.3265
Black Rascal Creek @ Yosemite Rd	535BRCAYR	37.33208	-120.3947
Cottonwood Creek @ Rd 20†	545XCCART	36.8686	-120.1818
Deadman Creek @ Gurr Rd	535XDCAGR	37.1936	-120.5612
Deadman Creek @ Hwy 59	535DMCAHF	37.1981	-120.4869
Dry Creek @ Rd 18	545XDCARE	36.9818	-120.2195
Dry Creek @ Wellsford Rd†	535XDCAWR	37.6602	-120.8743
Duck Slough @ Gurr Rd†	535XDSAGR	37.2142	-120.5596
Duck Slough @ Hwy 99†	535XDSAHN	37.2501	-120.4100
Hatch Drain @ Tuolumne Rd	535XHDATR	37.5149	-121.0122
Highline Canal @ Hwy 99†	535XHCHNN	37.4153	-120.7557
Highline Canal @ Lombardy Ave†	535XHCALR	37.4556	-120.7207
Hilmar Drain @ Central Ave†	535XHDACA	37.3906	-120.9582
Livingston Drain @ Robin Ave	535XLDARA	37.3169	-120.7423
Merced River @ Santa Fe†	535XMRSFD	37.4271	-120.6721
Miles Creek @ Reilly Rd	535XMCARR	37.2582	-120.4755
Mustang Creek @ East Ave	535XMCAEA	37.4918	-120.6839
Prairie Flower Drain @ Crows Landing Rd†	535XPFDCL	37.4422	-121.0024
Silva Drain @ Meadow Dr	535XSDAMD	37.4291	-120.6261
South Slough @ Quinley Rd	535XSSAQR	37.2699	-120.5971
Westport Drain @ Vivian Rd	535XWDAVR	37.5368	-121.0486

† indicates sites that have been monitored for at least two years

Site Subwatershed Descriptions

Descriptions of the 23 site subwatersheds are provided below alphabetically.

Ash Slough @ Avenue 21 (27,704 irrigated acres) – Agriculture upstream includes vineyards, field crops, and deciduous nuts. Ash Slough flows just north of Chowchilla but there appears to be a buffer of agricultural land between Ash Slough and Chowchilla. Dairies are located upstream.

Bear Creek @ Kibby Road (6,715 irrigated acres) – This site subwatershed drains an eastern portion of the Coalition region in Merced County. 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 towns of Planada, through Merced and eventually to the San Joaquin River. The primary irrigated agriculture in the site subwatershed includes deciduous nuts, field crops, truck crops, and irrigated pasture.

Berenda Slough along Road 18 ½ (25,006 irrigated acres) – Berenda Slough flows through the northern portion of Madera County and empties into the Eastside Bypass. The primary agriculture is orchards and vineyards with small amounts of pasture and field crops.

Black Rascal Creek @ Yosemite Road (744 irrigated acres) – The headwaters of Black Rascal Creek originate in the Sierra foothills. It is located just to the north of the Bear Creek site subwatershed and to the east of the city of Merced. Citrus and field crops make up the majority of the agriculture in the site subwatershed.

Cottonwood Creek @ Road 20 (40,699 irrigated acres) – This site subwatershed is at the very southern edge of the Coalition region in Madera County and drains into the Eastside Bypass. The immediate upstream agriculture is vineyards and there are deciduous nuts farther to the east. There are only a few dairies in the Cottonwood Creek site subwatershed.

Deadman Creek @ Gurr Rd (52,091 irrigated acres) - This site subwatershed is a downstream site from Deadman Creek @ Hwy 59. The primary agriculture in the site subwatershed is orchards and row crops with some irrigated pasture upstream.

Deadman Creek @ Highway 59 (38,231 irrigated acres) – Deadman Creek flows out of the Sierra foothills and confluences with Dutchman's Creek in the vicinity of Highway 59. The primary agriculture in the site subwatershed is orchards and row crops with some irrigated pasture upstream.

Dry Creek @ Road 18 (23,299 irrigated acres) – Dry Creek originates in the Sierra foothills and flows to the north of the city of Madera eventually draining into the San Joaquin River through various channels and irrigation ditches. Deciduous crops are the primary irrigated agriculture in the upper portion of the site subwatershed whereas vineyards predominate in the lower portions. There are field crops scattered throughout the site subwatershed.

Dry Creek @ Wellsford Road (23,339 irrigated acres) – This site subwatershed is in the northern part of the Coalition region and drains a combination of field crops, deciduous nuts, and vineyards. Dry Creek originates to the east of Modesto and drains into the Tuolumne River. This site subwatershed samples Dry Creek at the furthest downstream location that collects agricultural drainage prior to flowing through the urban areas of Modesto. Dairies are located upstream of this site and the town of Waterford may contribute an urban signal.

Duck Slough @ Gurr Road (28,712 irrigated acres) – This site subwatershed is a monitoring location downstream from Duck Slough @ Hwy 99. Located to the south and west of Merced, this site drains field crops immediately upstream and deciduous nuts further upstream as well as some irrigated pasture. The city of Merced delivers treated water to Duck Slough a few miles upstream of the Gurr Road site. Duck Slough flows west eventually becoming Deadman Creek in the western portion of the Coalition region. The slough eventually flows into the San Joaquin River via Deadman Creek and Deep Slough.

Duck Slough @ Hwy 99 (15,622 irrigated acres) – This site subwatershed is located upstream of the Duck Slough @ Gurr Road site and was selected to determine relative contribution of water quality impairments in the upstream portion of the Duck Slough subwatershed. Duck Slough originates in the Sierra foothills and flows west eventually joining with Deadman Creek in the western portion of the coalition region. The monitoring site is located just east of Highway 99 south of Planada and Merced. Irrigated agriculture in this site subwatershed is primarily deciduous nuts, with truck crops and irrigated pasture the next most common land uses.

Hatch Drain @ Tuolumne Rd (553 irrigated acres) – This small site subwatershed is located in the western portion of the Coalition region in Stanislaus County. The two major crops are citrus and field crops.

Highline Canal @ Highway 99 (35,003 irrigated acres) – The Highline Canal is a conveyance of the Turlock Irrigation District and carries both clean irrigation water and irrigation return flow during the summer, and storm water runoff during the winter. This site was selected as a downstream companion site to the Highline Canal @ Lombardy Road site. This site subwatershed is monitored to determine the relative contribution of the upstream and downstream site subwatersheds to water quality impairments. The sampling site is located just south of Delhi as the canal crosses the highway. The irrigated agriculture is primarily deciduous nuts, and these are located at the lower end of the site subwatershed. A small number of vineyards are also present.

Highline Canal @ Lombardy Road (29,941 irrigated acres) – The Highline Canal is a conveyance of the Turlock Irrigation District and carries both clean irrigation water and irrigation return flow during the summer, and storm water runoff during the winter. The main upstream tributary of the Highline Canal is Mustang Creek. The Highline Canal flows west and eventually drains into the Merced River. Dairies are present upstream and Mustang Creek, a major tributary during the dormant season, passes immediately to the southeast of the Turlock Airport. The main agricultural crop upstream is deciduous nuts.

Hilmar Drain @ Central Ave (2,106 irrigated acres) – This site subwatershed is located toward the western edge of the Coalition region near the San Joaquin River. This is a small site subwatershed containing primarily field crops and a large number of dairies with irrigated pasture. Hilmar Drain originates at Williams Ave and Washington Road and eventually drains into the San Joaquin River.

Livingston Drain @ Robin Ave (3,656 irrigated acres) – Livingston Drain is located in the west central portion of the Coalition region in Merced County. It is located west of Atwater and Livingston. The agriculture is almost entirely citrus.

Merced River @ Santa Fe Drive (27,796 irrigated acres) – This water body is designated as a major water body and is 303d listed. It was selected as an integrator site for several of the drains and tributaries in the vicinity. The Merced River originates in the high Sierra encountering several dams and impoundments as it flows west. The Merced River eventually drains into the San Joaquin River near Hatfield State Park. Upstream agriculture includes some field crops in the immediate vicinity of the river and deciduous nuts, primarily almonds.

Miles Creek @ Reilly Rd. (9,664 irrigated acres) – Miles Creek is located just north of Duck Slough and drains into Owen's Creek. The primary agriculture includes field crops, deciduous nut & fruit, pasture and truck, nursery and berry. Within the subwatershed are also urban drainages, dairies and hay and pasture lands.

Mustang Creek @ East Ave (12,400 irrigated acres) – Mustang Creek originates in the foothills of the Sierra Nevada and flows into the upper portion of the Highline Canal. Mustang Creek is ephemeral with flow found primarily during winter runoff events. Summer flows are intermittent. Citrus and deciduous nut crops are the main agriculture with smaller amounts of field crops and grains and hay.

Prairie Flower Drain @ Crows Landing Road (4,080 irrigated acres) – Relative to other drains in the western portion of the Coalition region, Prairie Flower Drain is longer and appears to drain mostly irrigated agriculture. Dairies and feedlots are ubiquitous in this part of the Coalition region and this drain may receive runoff from several dairies immediately upstream. Upstream agriculture is field crops.

Silva Drain @ Meadow Drive (69 irrigated acres) – This is a very small site subwatershed that joins with Jones Drain just upstream of the confluence of Jones Drain with the Merced River. The primary agriculture is citrus orchards with small amounts of field crops and irrigated pasture. Large dairies are found in the site subwatershed.

South Slough @ Quinley Road (1,137 irrigated acres) – South Slough begins just west of Merced and eventually flows into Bear Creek. Pasture, deciduous nuts, and citrus are the primary crops in the site watershed.

Westport Drain @ Vivian Road (1,474 irrigated acres) – This site subwatershed is located adjacent to the Hatch Drain subwatershed in the western portion of the Coalition region. The primary agriculture in this site subwatershed is citrus and field crops.

Monitoring and Analysis

Tables 6 and Table 7 specify the constituents monitored at each site subwatershed. The Coalition monitoring program consists of a mix of Phase I and Phase II monitoring elements at various sites. As a result, the sites added to the Coalition monitoring program in May 2006 (e.g. Berenda Slough, Black Rascal Creek, Deadman Creek @ Hwy 59, Mustang Creek, Silva Drain and South Slough) do not require sampling for metals or nutrients as outlined in Table 1 of the CVRWQCB's MRP document. Four sites were also added during the 2007 irrigation season, however all constituents were monitored at those sites. Although pesticides other than those identified by 303d listings are not required to be monitored, the Coalition is monitoring all Phase II pesticides during Phase I and Phase II.

Additionally, because two years of sampling resulted in no exceedances of *E. coli* or sediment toxicity at the Merced River @ Santa Fe sample site, both of these tests were withdrawn from the suite of analytes monitored at that site in 2006. It was brought to the attention of the Coalition after this storm season that the Coalition was not approved by the Executive Officer of the Regional Board to drop this constituent and therefore the Coalition resumed monitoring for *E. coli* during the irrigation season of 2008.

On November 19, 2007 the Coalition submitted a proposal to the Regional Board to drop constituents at sites that had been monitored for two or more full years which did not have a single exceedance of a water quality trigger limit. On December 14, 2007 the Coalition was notified by the Executive Officer that the Coalition would no longer need to monitor at the listed locations for the following constituents:

- Bear Creek @ Kibby Rd: pyrethroids and *Selenastrum capricornutum* toxicity,
- Cottonwood Creek @ Rd 20: pyrethroids and *Selenastrum capricornutum* toxicity,
- Dry Creek @ Wellfsford Rd: pyrethroids,
- Duck Slough @ Hwy 105: pyrethroids,
- Merced River @ Santa Fe: pyrethroids,
- Prairie Flower Drain @ Crows Landing Rd: pyrethroids.

Table 6. ESJWQC storm 2008 sampling constituents for field parameters, metals, nutrients, total organic carbon (TOC), physical parameters, *E.coli*, water column toxicity (WCT) and sediment toxicity.

Site Name	Field Parameters	Metals	Nutrients	TOC	Physical Parameters	*E. coli*	WCT	Sediment Toxicity
Ash Slough @ Ave 21	x	x	x	x	x	x	x	x
Berenda Slough along Ave 18 1/2	x			x	x	x	x	x
Bear Creek @ Kibby Rd*	x	x	x	x	x	x	x	x
Black Rascal Creek @ Yosemite Rd	x			x	x	x	x	x
Cottonwood Creek @ Rd 20	x	x	x	x	x	x	x	x
Deadman Creek @ Gurr Rd[†]	x	x	x	x	x	x	x	x
Deadman Creek @ Hwy 59	x			x	x	x	x	x
Dry Creek @ Rd 18	x	x	x	x	x	x	x	x
Dry Creek @ Wellsford Rd	x	x	x	x	x	x	x	x
Duck Slough @ Gurr Rd[†]	x	x	x	x	x	x	x	x
Duck Slough @ Hwy 99	x	x	x	x	x	x	x	x
Hatch Drain @ Tuolumne Rd	x	x	x	x	x	x	x	x
Highline Canal @ Hwy 99	x	x	x	x	x	x	x	x
Highline Canal @ Lombardy Ave	x	x	x	x	x	x	x	x
Hilmar Drain @ Central Ave	x	x	x	x	x	x	x	x
Livingston Drain @ Robin Ave	x	x	x	x	x	x	x	x
Merced River @ Santa Fe[†]	x	x	x	x	x		x	
Miles Creek @ Reilly Rd	x	x	x	x	x	x	x	x
Mustang Creek @ East Ave	x			x	x	x	x	x
Prairie Flower Drain @ Crows Landing Rd	x	x	x	x	x	x	x	x
Silva Drain @ Meadow Dr	x			x	x	x	x	x
South Slough @ Quinley Rd	x			x	x	x	x	x
Westport Drain @ Vivian Rd	x	x	x	x	x	x	x	x

[†] indicates sites that have been monitored for at least two years
*not analyzed for *Selenastrum* toxicity

Table 7. ESJWQC storm 2008 sampling constituents for pesticides.

Site Name	Organo-phosphates	Pyrethroids	Carbamates	Herbicides	Organo-chlorines	Glyphosate	Paraquat
Ash Slough @ Ave 21	x	x	x	x	x	x	x
Berenda Slough along Ave 18 1/2	x	x	x	x	x	x	x
Bear Creek @ Kibby Rd	x		x	x	x	x	x
Black Rascal Creek @ Yosemite Rd	x	x	x	x	x	x	x
Cottonwood Creek @ Rd 20	x		x	x	x	x	x
Deadman Creek @ Gurr Rd	x	x	x	x	x	x	x
Deadman Creek @ Hwy 59	x	x	x	x	x	x	x
Dry Creek @ Rd 18	x	x	x	x	x	x	x
Dry Creek @ Wellsford Rd	x		x	x	x	x	x
Duck Slough @ Gurr Rd†	x	x	x	x	x	x	x
Duck Slough @ Hwy 99	x		x	x	x	x	x
Hatch Drain @ Tuolumne Rd	x	x	x	x	x	x	x
Highline Canal @ Hwy 99	x	x	x	x	x	x	x
Highline Canal @ Lombardy Ave	x	x	x	x	x	x	x
Hilmar Drain @ Central Ave	x	x	x	x	x	x	x
Livingston Drain @ Robin Av	x	x	x	x	x	x	x
Merced River @ Santa Fe†	x		x	x	x	x	x
Miles Creek @ Reilly Rd	x	x	x	x	x	x	x
Mustang Creek @ East Ave	x	x	x	x	x	x	x
Prairie Flower Drain @ Crows Landing Rd	x		x	x	x	x	x
Silva Drain @ Meadow Dr	x	x	x	x	x	x	x
South Slough @ Quinley Rd	x	x	x	x	x	x	x
Westport Drain @ Vivian Rd	x	x	x	x	x	x	x

† indicates sites that have been monitored for at least two years

Location Maps of Sample Sites and Land Use

All site subwatersheds in Table 8 and Table 9 drain agricultural land in the Coalition region. The tables provided include the land use acreage for each major crop or land use type and indicate whether the land area is irrigated or non-irrigated. Land use maps are provided in Figure 8 – Figure 11, (a legend for land use is provided in Figure 12), and included parcel specific land use data in each of the site subwatersheds as well as the hydrology within the site subwatershed that drains those parcels. Not included are roadside ditches that may drain fields to the nearest surface water body. Ditches are constructed to move water draining from roads adjacent to the fields and are not generally constructed to move water draining from agricultural fields. The site subwatershed sizes (listed as total and irrigated acres) may have changed due to updated information on the boundary of each subwatershed. Land use information was obtained from data provided by California Department of Water Resources (http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm).

Table 8. Land use acreage of site subwatersheds monitored during the 2008 storm season.

The land uses are designated as irrigated/non-irrigated (I/NI). Sites are listed alphabetically from Ash Slough to Hatch Drain.

Land Use	I/NI	Ash Slough @ Ave 21	Bear Creek @ Kibby Rd	Beranda Slough along Ave 18 1/2	Black Rascal Creek @ Yosemite Rd	Cottonwood Creek @ Rd 20	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Dry Creek @ Wellsford Rd	Dry Creek @ Rd 18	Duck Slough @ Gurr Rd	Duck Slough @ Hwy 99	Highline Canal @ Hwy 99	Highline Canal @ Lombardy Ave.	Highline Canal (Stanislaus)	Hilmar Drain @ Central Ave.	Hatch Drain @ Tuolumne Rd
Citrus	I		48.1	96.7		570.6	7.3	7.3	7.6	421.7					76.7		
Deciduous nut and fruit	I	6,888.9	2,934.7	15,573.5	53.9	10,325.6	11,333.2	10,246.3	8,064.3	12,103.0	8,766.3	8,290.2	7,988.6	4,012.0	12,563.6	31.7	210.6
Field crop	I	9,101.3	1,581.2	3,048.0	241.1	3,724.4	16,221.1	11,457.9	4,515.7	1,105.3	7,974.9	2,768.3	929.8	684.9	5,976.4	1,365.2	169.6
Field crop	NI					314.2											
Grain and hay	I	726.5	223.0	1,803.7		664.1	3,120.9	2,366.3	216.0	1,657.3	1,271.0	415.8	550.7	550.7	75.6		
Grain and hay	NI		242.4	1,413.1		2,009.0	1,164.7	1,152.7	2,179.0		321.6	258.6					
Idle	I	33.0		261.0		1,172.5	671.7	665.6	238.5	495.4	831.6	314.7	221.4	80.4			
Idle	NI																
Wild vegetation	NI	998.8	237.7	3,791.6	12.5	11,329.5	12,060.0	7,318.2	39,705.9	3,916.7	3,153.7	422.5	184.6	142.0	365.2		
Water surface	NI	274.2		267.0		615.1	392.5	295.6	204.1	104.3	172.0	94.4	18.9	18.9	163.8	11.7	
Pasture	I	4,935.9	1,414.2	1,695.0	389.9	846.8	14,833.4	8,740.0	7,346.4	637.5	7,378.4	2,444.6	791.4	734.6	4,034.6	708.6	169.7
Pasture	NI						21.5		1,310.3		75.7	66.0	335.7	335.7	16.4		
Rice	I						913.9		1,187.9		318.1						
Feedlot, dairy, farmstead	NI	712.1	66.8	720.1		561.5		626.1	1,414.3	446.1	1,056.4	438.7	353.8	189.9	993.7	223.0	16.5
Truck, nursery, berry	I	635.0	514.2	115.7	59.3	85.3	3,393.0	3,328.8		169.4	2,171.8	1,388.4	261.1		110.0		2.7
Urban	NI	1,310.8	10.1	1,621.6		10,061.8	389.6	312.3	486.2	4,614.4	675.7	474.3	456.7	192.1	146.1		55.0
Golfcourse, cemetery, landscape	NI	32.8		23,334.9		25.0					17.0		4.1	1.2			
Vineyard	I	5,383.2		2412.1		23,309.9	1,596.5	1,418.2	1,762.3	6,709.7			599.2	217.0	824.0		
Total acres		**31,032.4**	**7,272.4**	**56,154.1**	**756.8**	**65,615.3**	**66,119.4**	**47,935.4**	**68,638.3**	**32,380.6**	**34,184.0**	**17,376.5**	**12,695.9**	**7,159.4**	**25,346.2**	**2,340.2**	**624.1**
Irrigated acres		**27,703.8**	**6,715.4**	**25,005.7**	**744.3**	**40,699.2**	**52,091.1**	**38,230.5**	**23,338.6**	**23,299.2**	**28,711.8**	**15,622.1**	**11,342.2**	**6,279.5**	**23,660.9**	**2,105.5**	**552.6**

Table 9. Land use acreage of site subwatersheds selected for monitoring during the 2008 storm season.

The land uses are designated as irrigated/non-irrigated (I/NI). Sites are listed alphabetically from Highline Canal to Westport Drain.

Land Use	I/NI	Highline Canal @ Hwy 99	Highline Canal @ Lombardy Ave.	Highline Canal - Stanislaus County portion	Hilmar Drain @ Central Ave.	Livingston Drain @ Robin Ave	Merced River @ Santa Fe	Miles Creek @ Reilly Rd	Mustang Creek @ East Ave.	Mustang Creek - Stanislaus County portion	Prairie Flower Drain @ Crows Landing Rd.	Silva Drain @ Meadow Dr	South Slough @ Quinley Ave.	Westport Drain @ Vivian Rd
Citrus	I			76.7			45.4	3.3					299.2	
Deciduous nut and fruit	I	7,988.6	4,012.0	12,563.6	31.7	2,366.7	14,109.4	1,767.0	3,304.2	695.9			593.2	432.0
Field crop	I	929.8	684.9	5,976.4	1,365.2	58.3	5,421.8	3,927.4	1,595.4	194.9	2,673.6	60.7		575.3
Field crop	NI						140.1						330.7	
Grain and hay	I	550.7	550.7	75.6		176.1	700.3	547.5	701.3	343.9				
Grain and hay	NI						226.3	535.9					62.0	
Idle	I	221.4	80.4			17.9	141.1	144.8						
Idle	NI						276.2							
Wild vegetation	NI	184.6	142.0	365.2		130.9	5,005.6	568.1	193.4					
Water surface	NI	18.9	18.9	163.8	11.7	2.3	256.2	81.7	5.0		30.4		645.3	
Pasture	I	791.4	734.6	4,034.6	708.6	57.5	4,483.5	2,200.7	320.0		1,406.3	7.9		264.1
Pasture	NI	335.7	335.7	16.4		19.8	100.9							
Rice	I												201.5	
Feedlot, dairy, farmstead	NI	353.8	189.9	993.7	223.0	145.7	1,098.9	474.9	31.1		442.6		145.7	126.3
Truck, nursery, berry	I	261.1		110.0		921.9	278.4	1,072.8					42.7	
Urban	NI	456.7	192.1	146.1		37.1	338.6	860.3						
Golfcourse, cemetery, landscape	NI	4.1	1.2				3.9	15.0						7.0
Vineyard	I	599.2	217.0	824.0		57.8	2,616.0		1,327.7	3,916.5				202.4
Total acres		**12,695.9**	**7,159.4**	**25,346.2**	**2,340.2**	**3,991.8**	**35,242.5**	**12,199.6**	**7,478.1**	**5,151.1**	**4,552.8**	**68.7**	**2,320.2**	**1,607.1**
Irrigated acres		**11,342.2**	**6,279.5**	**23,660.9**	**2,105.5**	**3,656.1**	**27,795.8**	**9,663.5**	**7,248.6**	**5,151.1**	**4,079.9**	**68.7**	**1,136.6**	**1,473.8**

Figure 8. Coalition map showing all site subwatersheds identified for sampling in 2008 storm season.

Land use designations are provided in Figure 12.

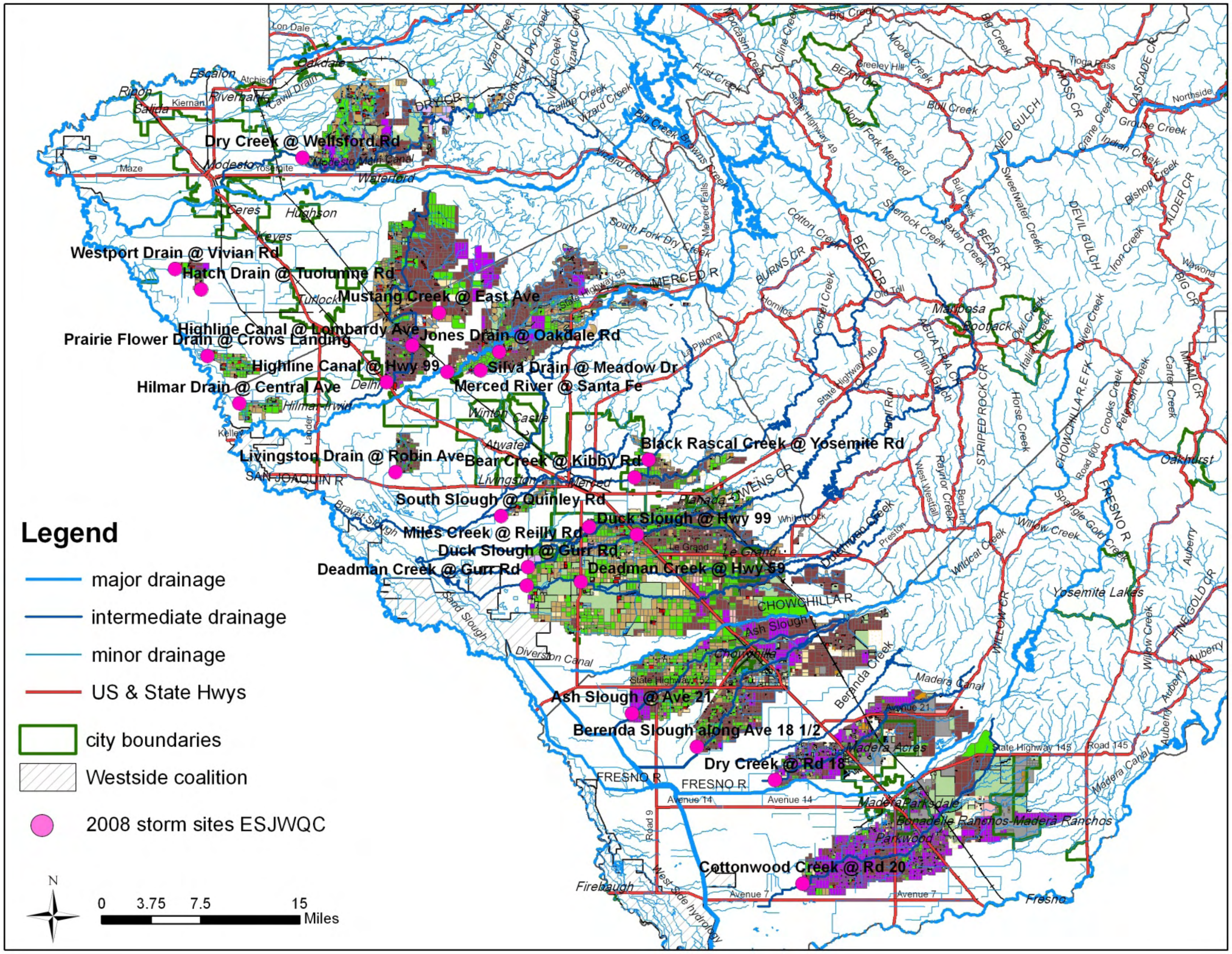


Figure 9. Land use for sampling sites in Stanislaus County.

Land use designations are provided in Figure 12.

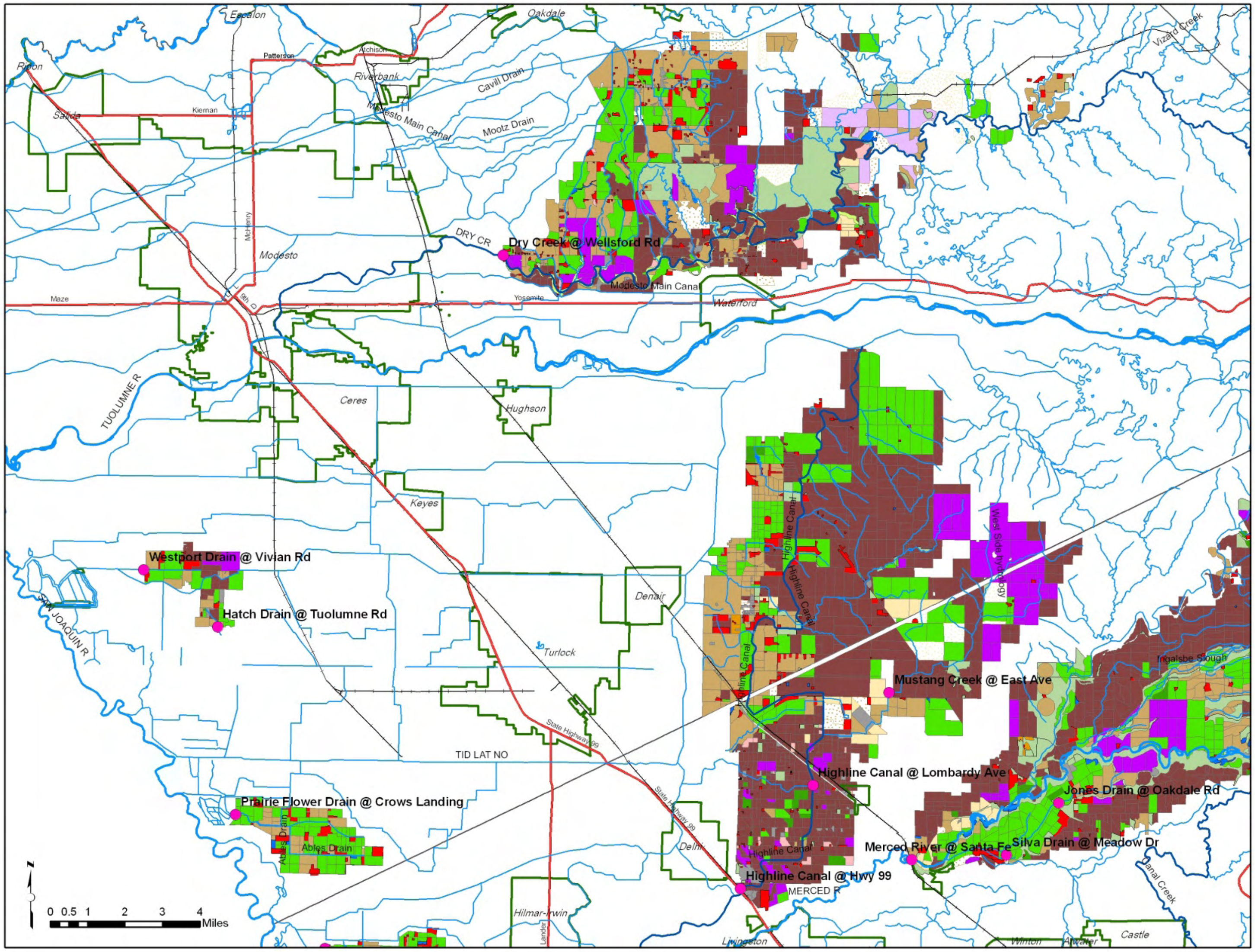


Figure 10. Land use for sampling sites in Merced County.

Land use designations are provided in Figure 12.

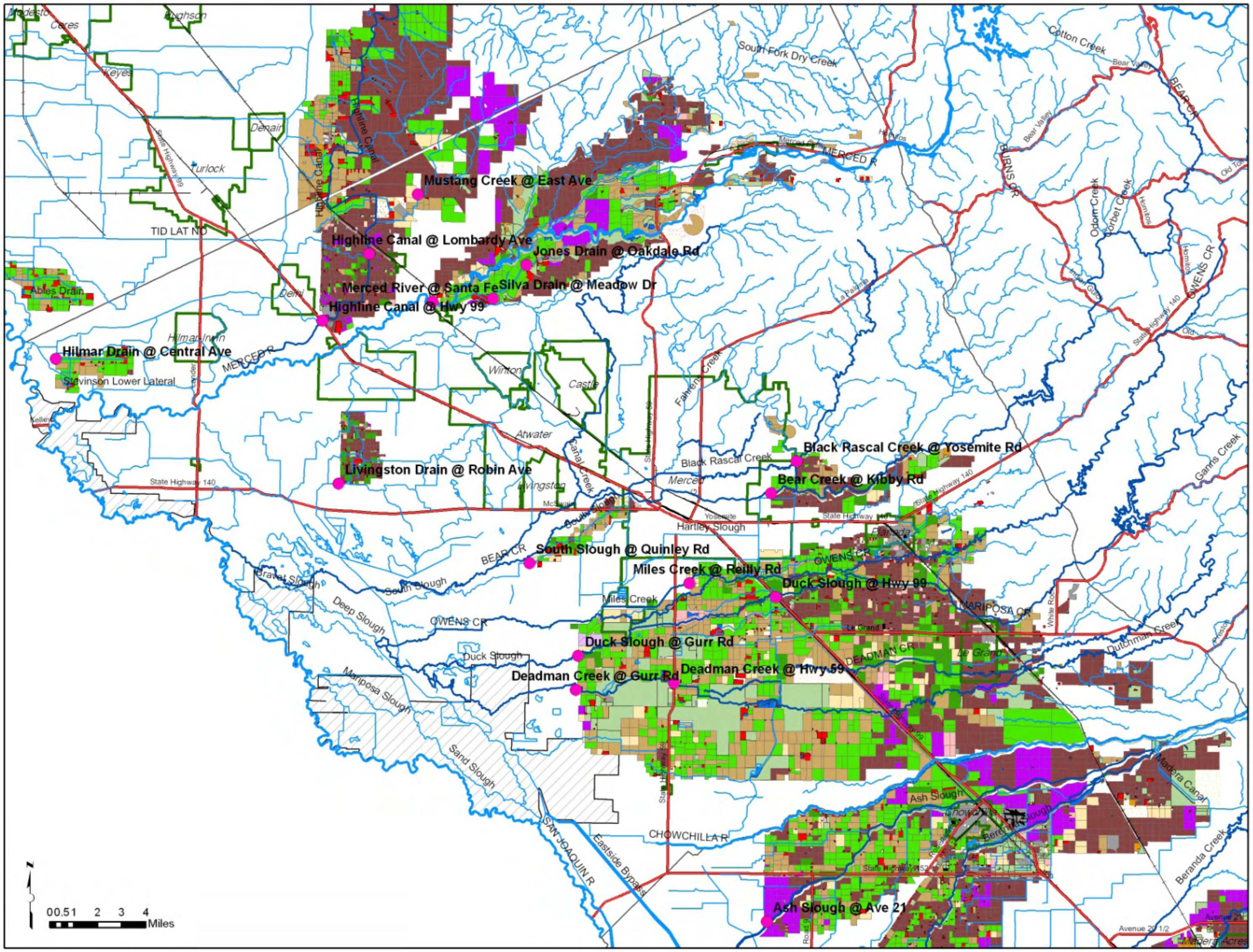


Figure 11. Land use for sampling sites in Madera County.

Land use designations are provided in Figure 12.

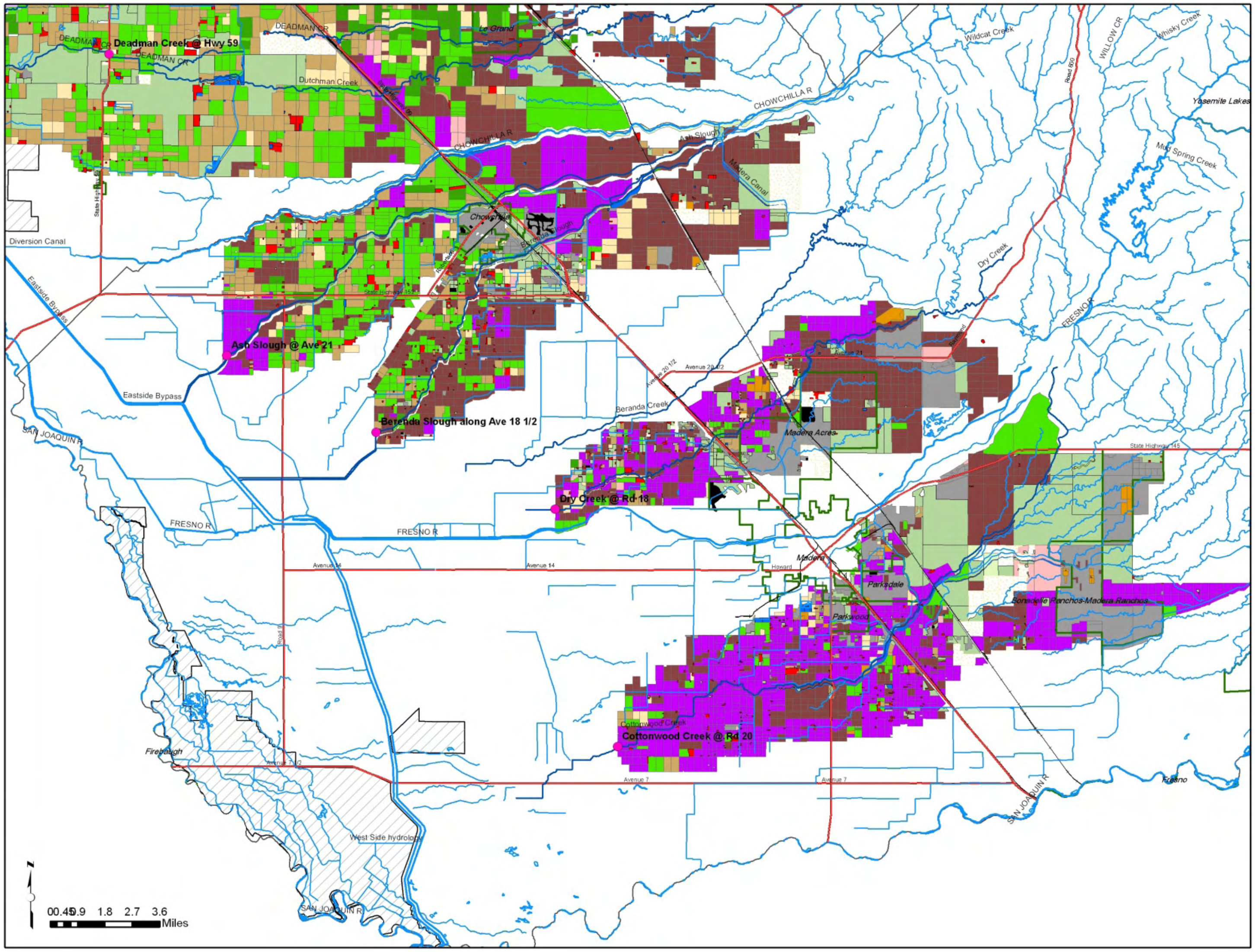


Figure 12. Legend for land use data.