ESJWQC

SYSTEM HYDROLOGY MERCED COUNTY

August 24, 2020

Parry Klassen

Executive Director

Items to help better understand system hydrology:

1. Description of the conduits that connect Core and Represented stations with eventual waterways

2. Evidence for the assertion that farm fields don't drain to surface waters
   - What is known about the apportionment of water sources when the surface waters sampled in the ESJ program are flowing

3. The recurrence interval for storms that are large enough to generate field runoff.

PANEL REQUEST OF ESJWQC FOR ADDITIONAL INFORMATION

Irrigation Districts in ESJWQC Region

District	Established	County	Miles of Canals	Water Sources
Modesto Irrigation District	1887 (1904)	Stanislaus	208	Tuolumne River and groundwater
Turlock Irrigation District	1887	Stanislaus/Merced	250	Tuolumne River and groundwater
Merced Irrigation District	1919	Merced	531	Merced River and groundwater
Chowchilla Water District	1949	Merced and Madera	150	San Joaquin River/Chowchilla River
Madera Irrigation District	1920	Madera	300	Big Creek; Willow Creek; Fresno River

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PANEL QUESTIONS

Modesto Irrigation Network

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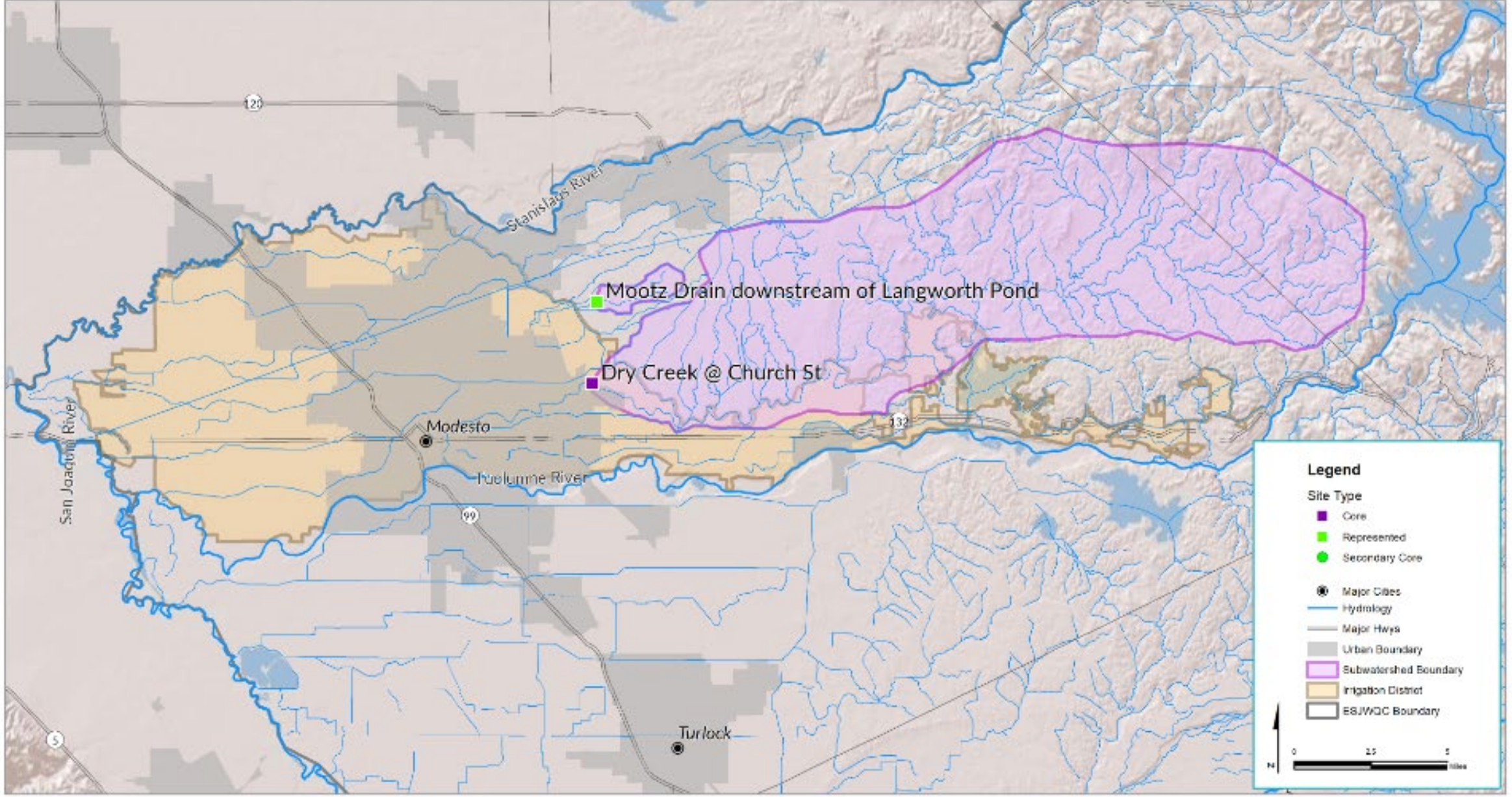
MLJ ENVIRONMENTAL



Modesto I.D. Boundary and Associated Subwatersheds

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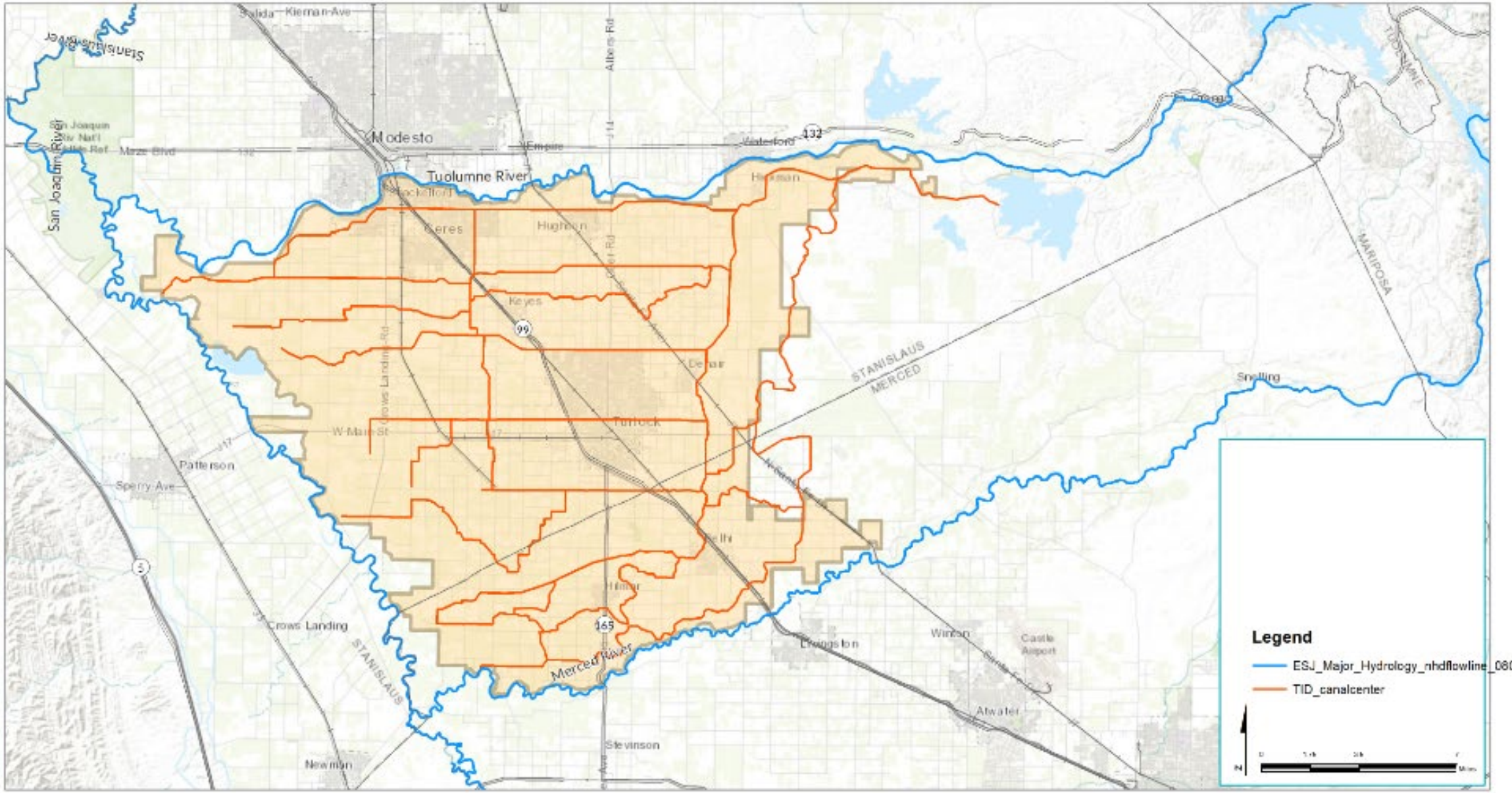

Turlock Irrigation Network

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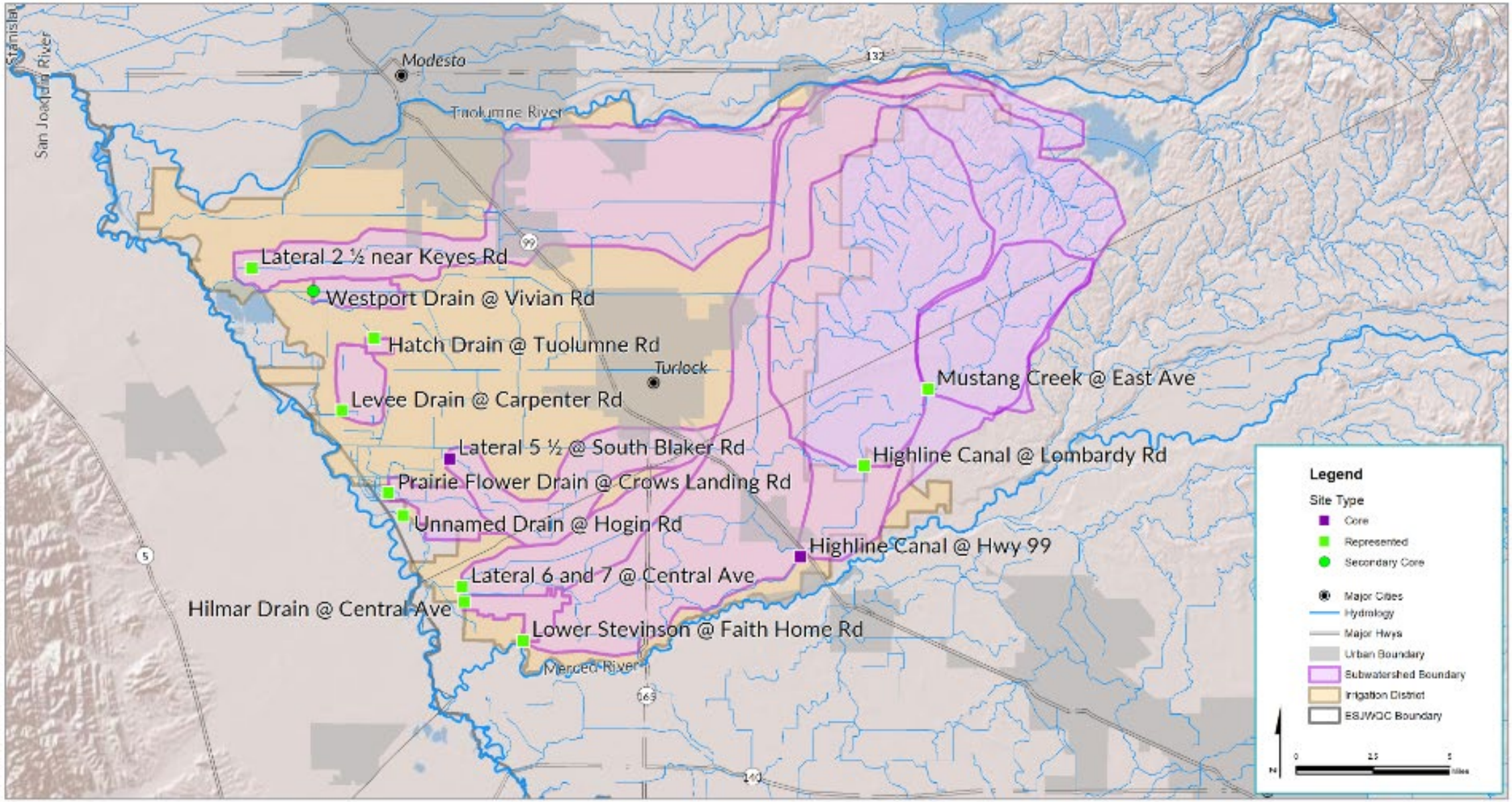

Turlock I.D. Boundary and Associated Subwatersheds

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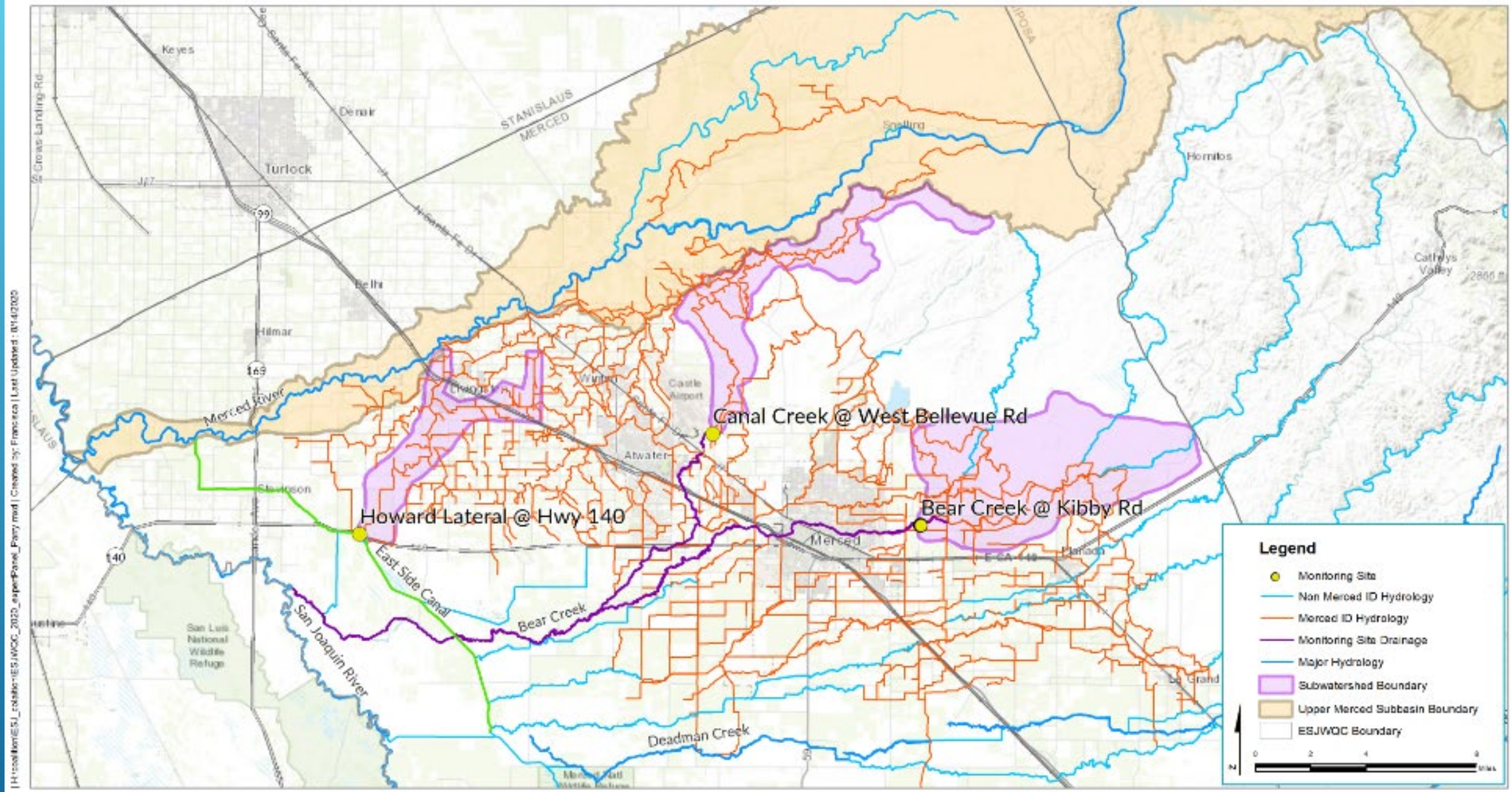

Merced Irrigation Network

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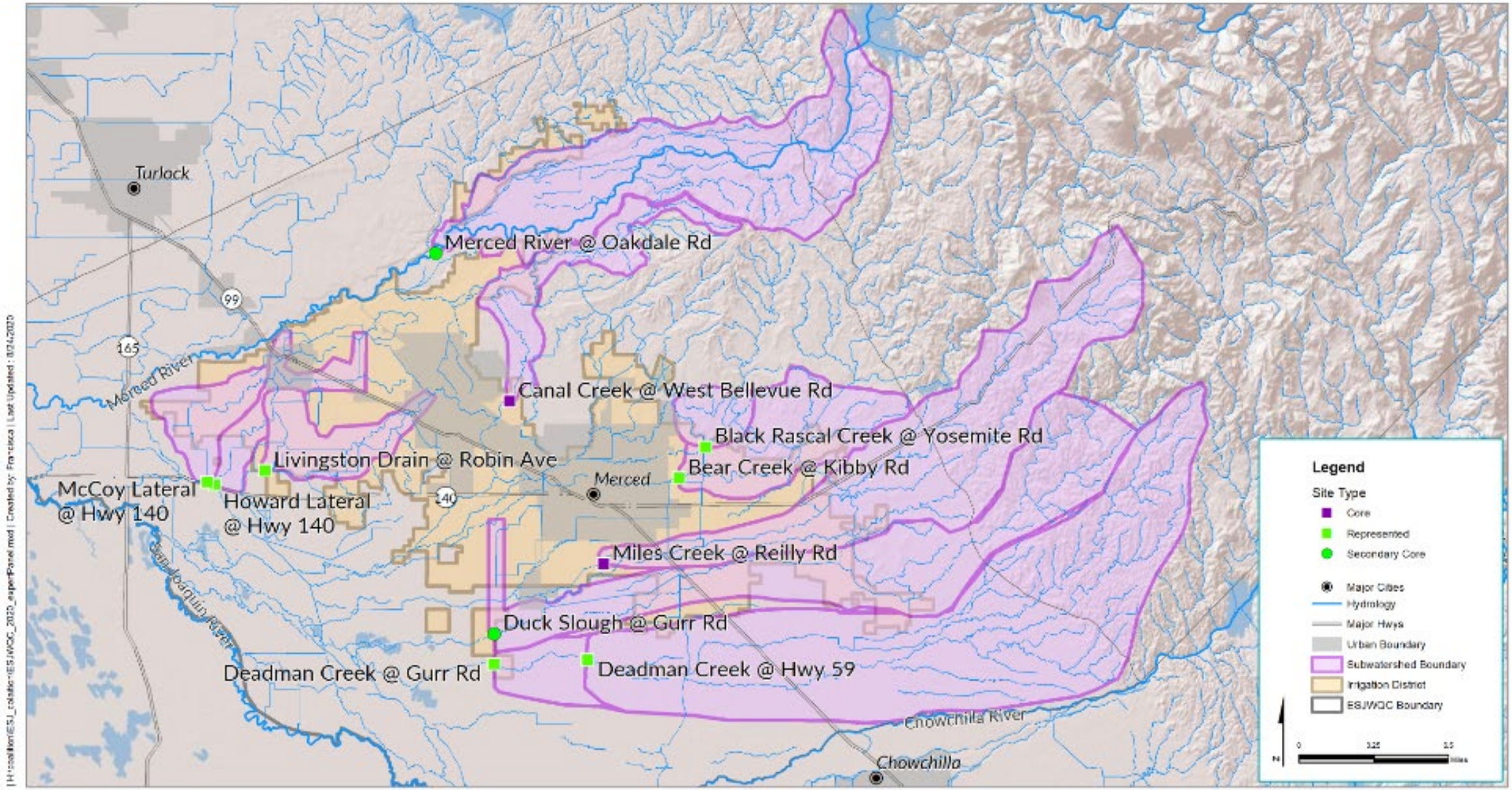


Merced I.D. Boundary and Associated Subwatersheds

ESJWQC

MLJ ENVIRONMENTAL

Irrigation District Canal Sampling (2004-2011

Five east side districts had own program to monitor canals and operational overflows into major rivers

- Districts did not want to participate in ESJWQC
- Conducted sampling of their own facilities
  - Focused on herbicides applied by districts to canal banks

In 2011, Regional Water Board asked districts to discontinue program and join ESJWQC

- 7 years of monitoring was showing virtually no exceedances
  - Some herbicides in storm events

TOUR STOPS

Stop	Location
1	San Joaquin River @ Hills Ferry
2	Unnamed Drain @ Hwy 140
3	Howard Lateral @ Hwy 140
4	Livingston Drain @ Robin Ave
5	Bear Creek @ Kibby Rd
6	Canal Creek @ West Bellevue Rd
7	Merced River @ Oakdale Rd

Merced Irrigation District

2015 Agricultural Water Management Plan

Topographic Characteristics

- Constructed canals and drains
  - 399 miles unlined canals
  - 132 natural channels (creeks and sloughs)
  - 107 miles lined canals
  - 181 miles pipeline
  - 32 miles drains
  - 851 miles total

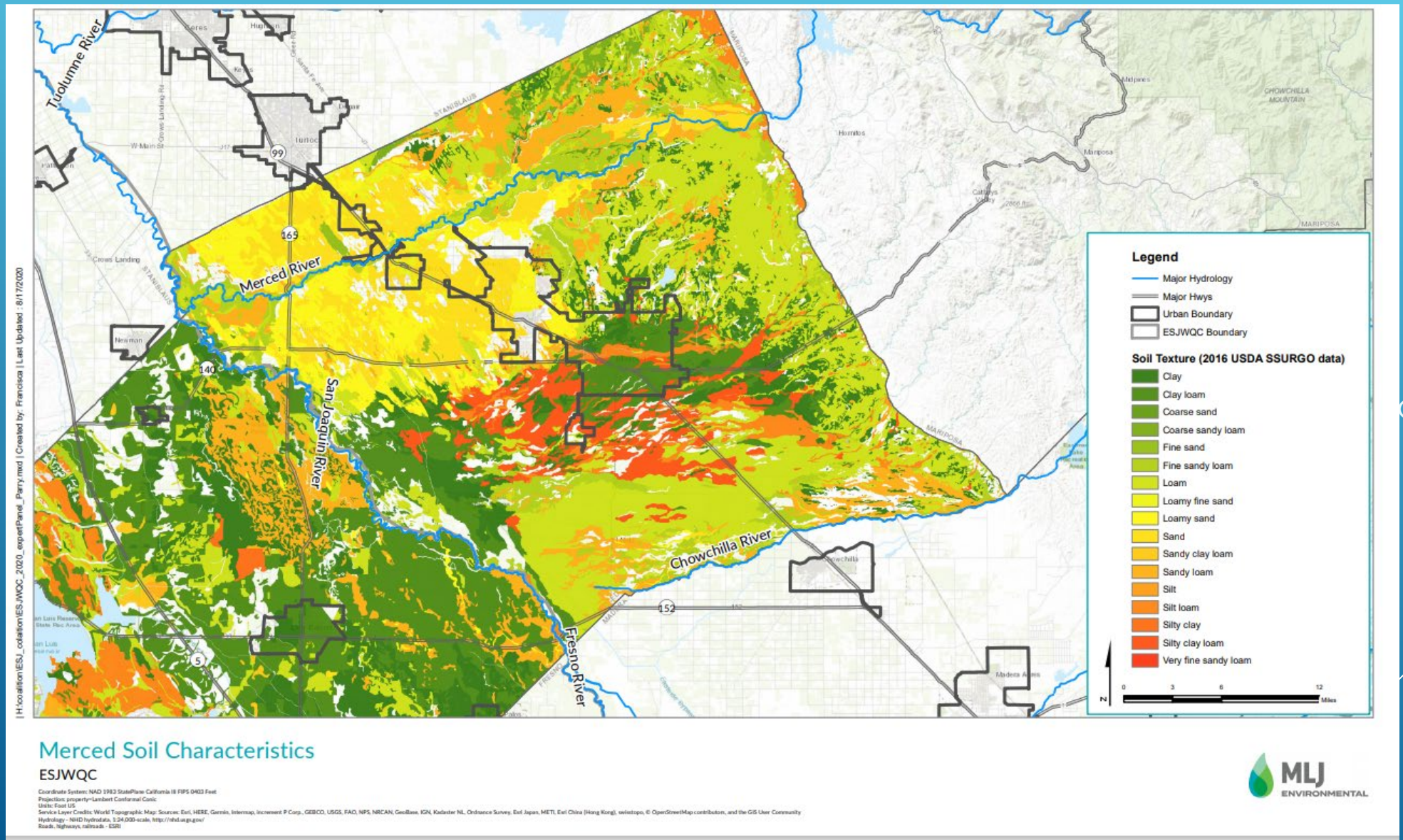
- Natural streams and sloughs
  - Integrated into MIDs delivery and drainage system
  - Natural channels used as conveyances in upstream reaches; may serve as drains downstream of the delivery service area (most conveyed to other districts/users)
  - Natural channels (and canals) convey stormwater during non-irrigation season

Merced Irrigation District

2015 Agricultural Water Management Plan

Soil Characteristics

- Eastern portion: typically clay based to loamy soils
- Western portion: typically loamy to sandy soils



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Merced Irrigation District

2015 Agricultural Water Management Plan

District Overflow/Operational Discharge Recovery System

- Most operational discharges are captured in creeks or interceptor canals where they are reused either within MID or downstream

Grower Tailwater/Operational Discharge Recovery

- Since 1985, MID has moratorium on drainage discharge to canals
- District gradually removing any grandfathered drains that discharge into canals
- Most farmers in western portion of MID have no offsite drainage
- Some farms in southwestern and eastern portion drain into natural sloughs
  - *Most historic drains shave been partially or entirely filled in*

Merced Irrigation District

2015 Agricultural Water Management Plan

Discharges to Eastside Canal on route to Stevinson WD deliveries (26,400 AF annually)

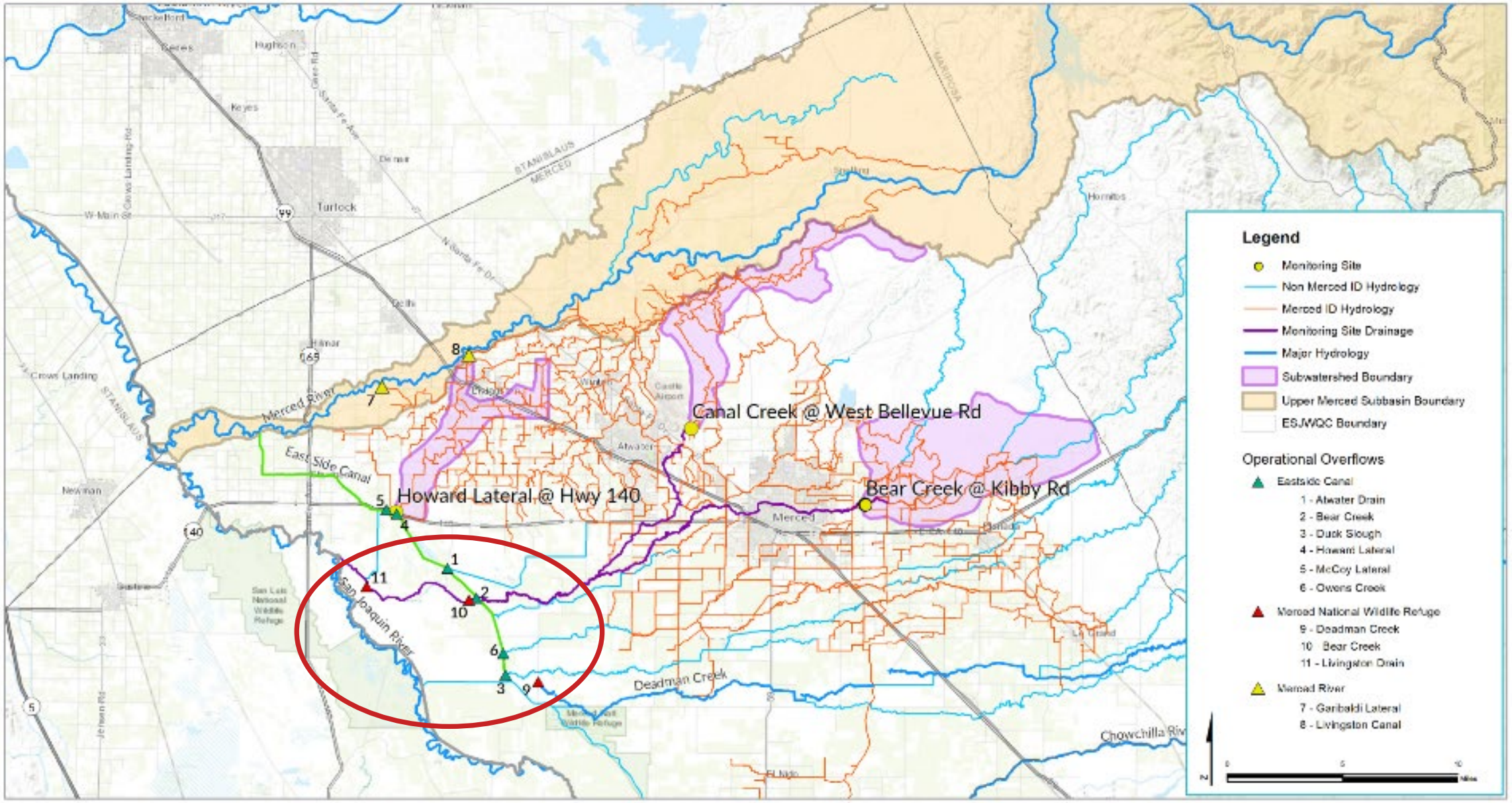
- Bear Creek, Owens Creek, Duck Slough, Howard Lateral, McCoy Lateral, Atwater drain

Discharges to Merced River

- Livingston Canal spill; Garibaldi Lateral spill: (only used for storm water discharges or emergencies)

Discharges to Merced National Wildlife Refuge

- Deadman Creek
- Bear Creek
  - Livingston Drain (new construction to divert into delivery canal)



Merced Irrigation District Operational Overflows

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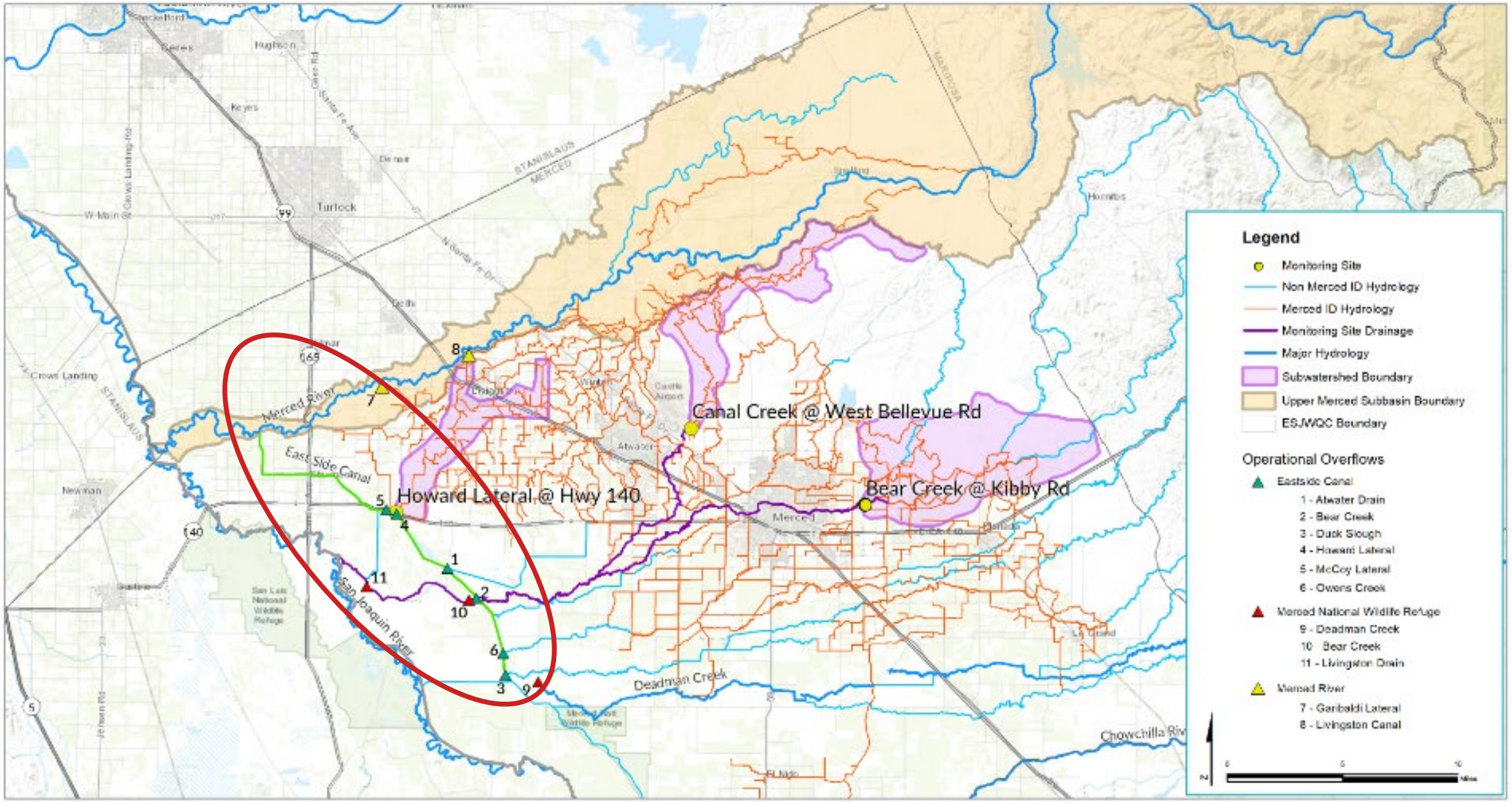

Merced Irrigation District Operational Overflows

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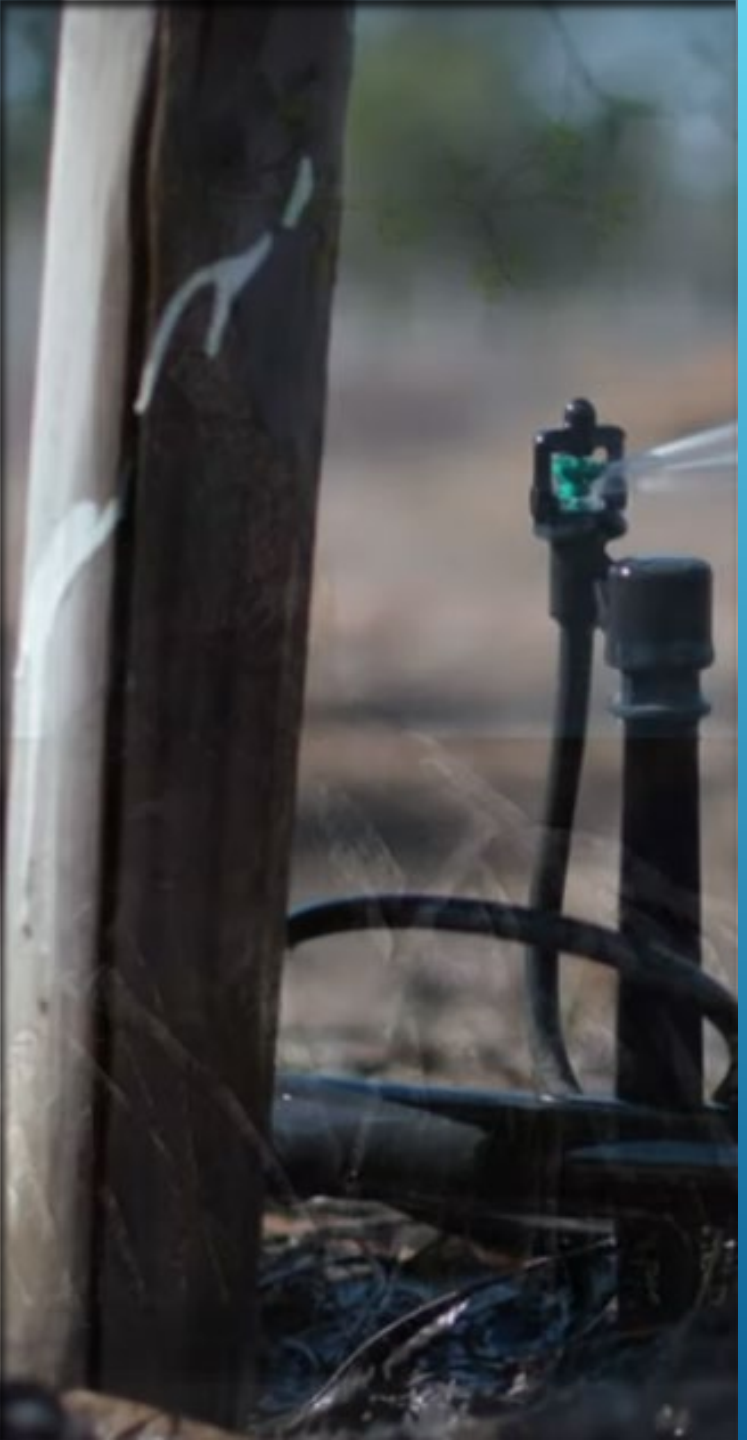
PANEL QUESTIONS

- Irrigation district supplies/groundwater pumping
  - Irrigation tailwater runoff
  - Subsurface tile drains

- Storm runoff
  - Sheet flows beyond soil holding capacity
  - Subsurface tile drains

POTENTIAL SOURCES OF FIELD RUNOFF



Winter Storm Events

- Runoff begins after clay/loamy soils are saturated later in winter
  - Typically February/March in "normal" year
  - Depends greatly on storm frequency and intensity of individual storms
- Sandy soils absorb rainfall

Irrigation Season

- Clay/clay loam soils with poor drainage
  - Amount of area with significant clay soils on the eastern side has been converted to drip
- Use of flood or furrow irrigation (drip/microsprinkler runoff rare to never)
  - Need conduit/direct connection to drain into
- Water shortage/water conservation big driver in discouraging any runoff

FACTORS THAT INFLUENCE FIELD RUNOFF

Trees and Vines

- Majority of acreage on drip and mircosprinkler irrigation
  - Virtually no irrigation runoff; some chance for storm runoff

Field and Rows Crops (Corn, alfalfa, small grains)

- Mostly planted southwestern and eastern portion of Merced ID
- Diverse soils; from sandy loam to clay loam
  - Furrow or flood irrigation
- None of the Irrigation Districts accept irrigation drainage
- Common for growers with drainage to install re-circulation systems

AGRICULTURAL PRODUCTION PRACTICES

MINIMIZING OFF SITE MOVEMENT OF WATER

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PANEL QUESTIONS

- During irrigation season, currently no way to differentiate irrigation supply water from return flows. However, return flow would be very minimal if at all.
- In non irrigation season when canals not "charged," assume water originates from storm runoff in foothills, urban conduits and dam releases (minor contribution from crop land sheet flows compared to other sources)

APPORTIONMENT OF WATER SOURCES WHEN SAMPLING

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PANEL QUESTIONS

QUESTIONS?