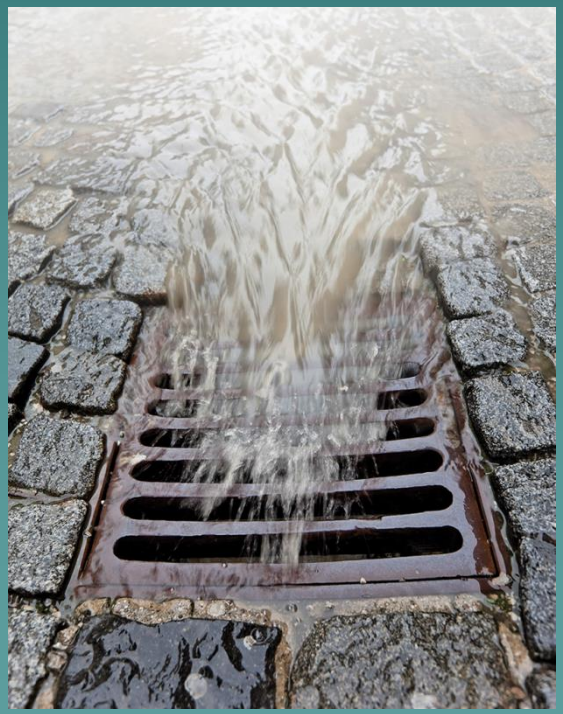
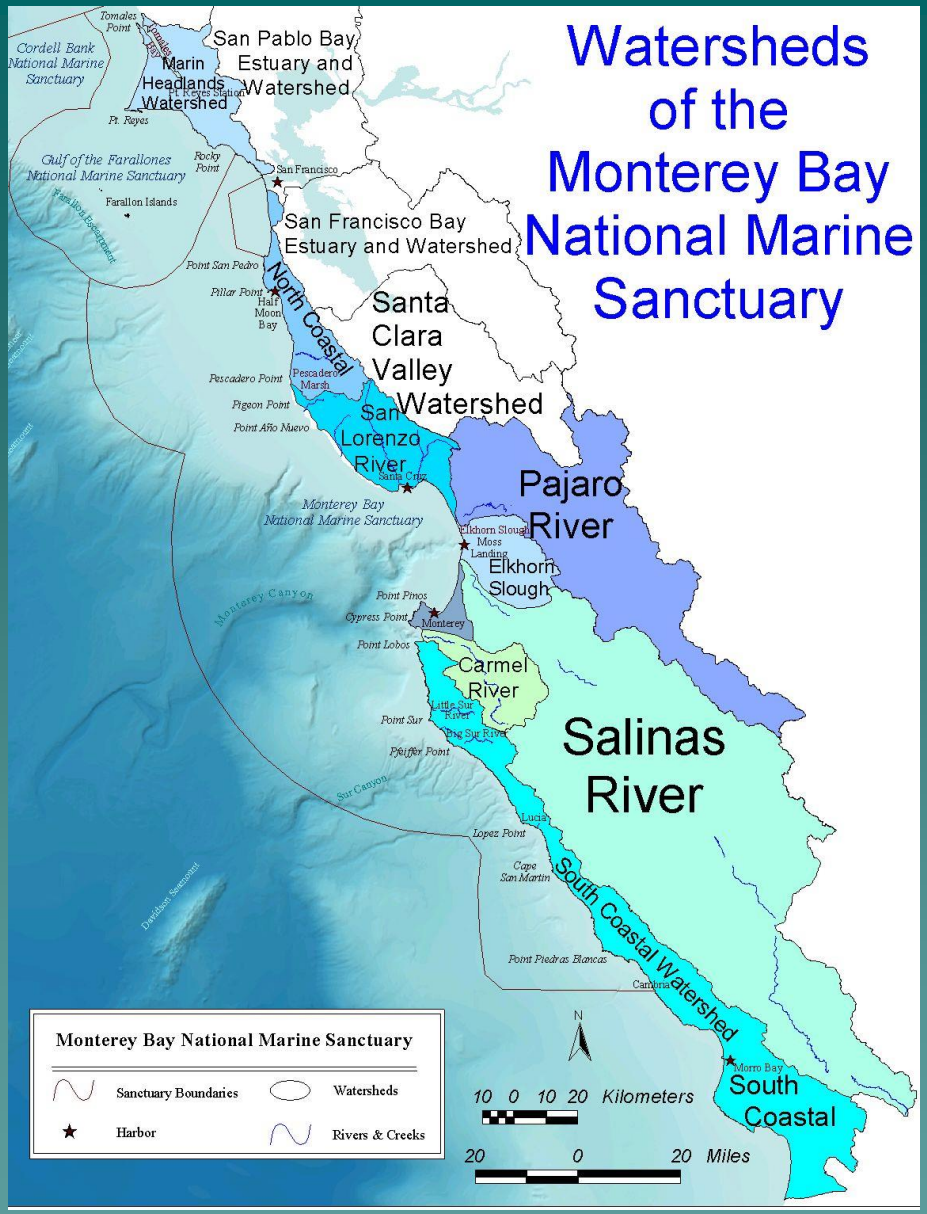
First Flush Water Quality Results 2016



SAN MATEO COUNTY
RESOURCE
CONSERVATION
DISTRICT

What is First Flush?

- First big rain of the season
- Freshwater runoff enters storm drains
- High pollution
- Sample at outfalls to ocean
- Oct 14th: 0.45 in



Partners

National Marine Sanctuaries
Monterey Bay

Sewer Authority Mid-Coastside
SAM

Surfrider Foundation

San Mateo County Harbor District
California

County of San Mateo
Founded 1856
San Mateo County Health System

San Mateo County Resource Conservation District

Objectives

- Better understand pollutant loads during the first significant rain of the season
- Identify what pollutants are of greatest concern and where
- Provide information to support water quality improvements
- Establish a continuous and consistent water quality dataset

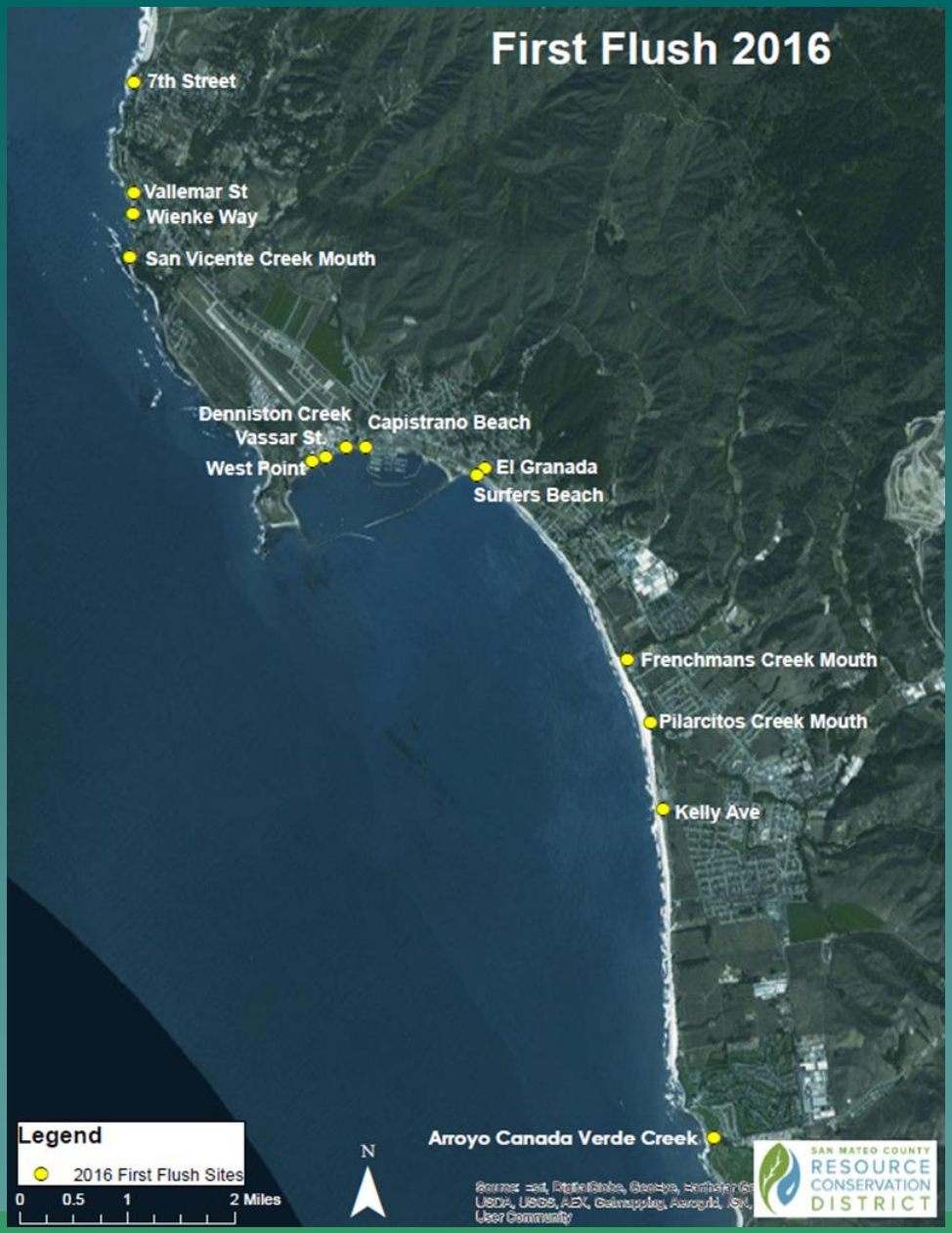
2016 Sample Sites

Montara/Moss Beach:
7th Street
Vallemar Street
Weinke Way
San Vicente Creek Mouth

Pillar Point Harbor:
West Point Ave
Vassar Street
Capistrano Street
Denniston Creek

El Granada:
El Granada Storm drain
Surfers Beach

Half Moon Bay:
Frenchmans Creek
Pilarcitos Creek Mouth
Arroyo Canada Verde Creek
Kelly Ave



San Mateo County Resource Conservation District

What are we testing?

Pollutant	Potential Sources	Effects
Fecal Indicator Bacteria (E. Coli, Enterococcus)	Feces of warm blooded animals (ex: pet waste, human sewage)	Indicator for human pathogens and health impacts
Nutrients (Nitrate, Orthophosphate)	Fertilizers, pesticides detergents, human waste	Eutrophication/harmful algal blooms-ecosystem and recreation impacts
Metals (Copper, Zinc, Lead)	Brake pads, tires, streets, industrial waste, roofs, gutters, downspouts	Impacts to aquatic organisms and human health
Total Suspended Solids	Construction sites, erosion, agricultural runoff	Sedimentation, respiratory effects in organisms

Physical Tests

- Transparency
- pH
- Electrical conductivity
- Water temperature
- Observations: trash, odor, bubbles, scum, oil

Train and Mobilize Volunteers

Data Analysis

- First Flush 2016 → 14 sites
- First Flush Historic (2008-2016) → 9 of the 14 sites
- Comparisons between sites, over time and against Water Quality Objectives (WQOs)

First Flush Precipitation History

Dates	Actual Rainfall
Nov 1, 2008	0.42 in
Oct 13, 2009	2.86 in
Oct 17, 2010	0.52 in
Oct 5,2011	0.88 in
Oct 22, 2012	0.71 in
Oct 31, 2014	0.14 in
Nov 2,2015	0.64 in
Oct 14, 2016	0.45 in

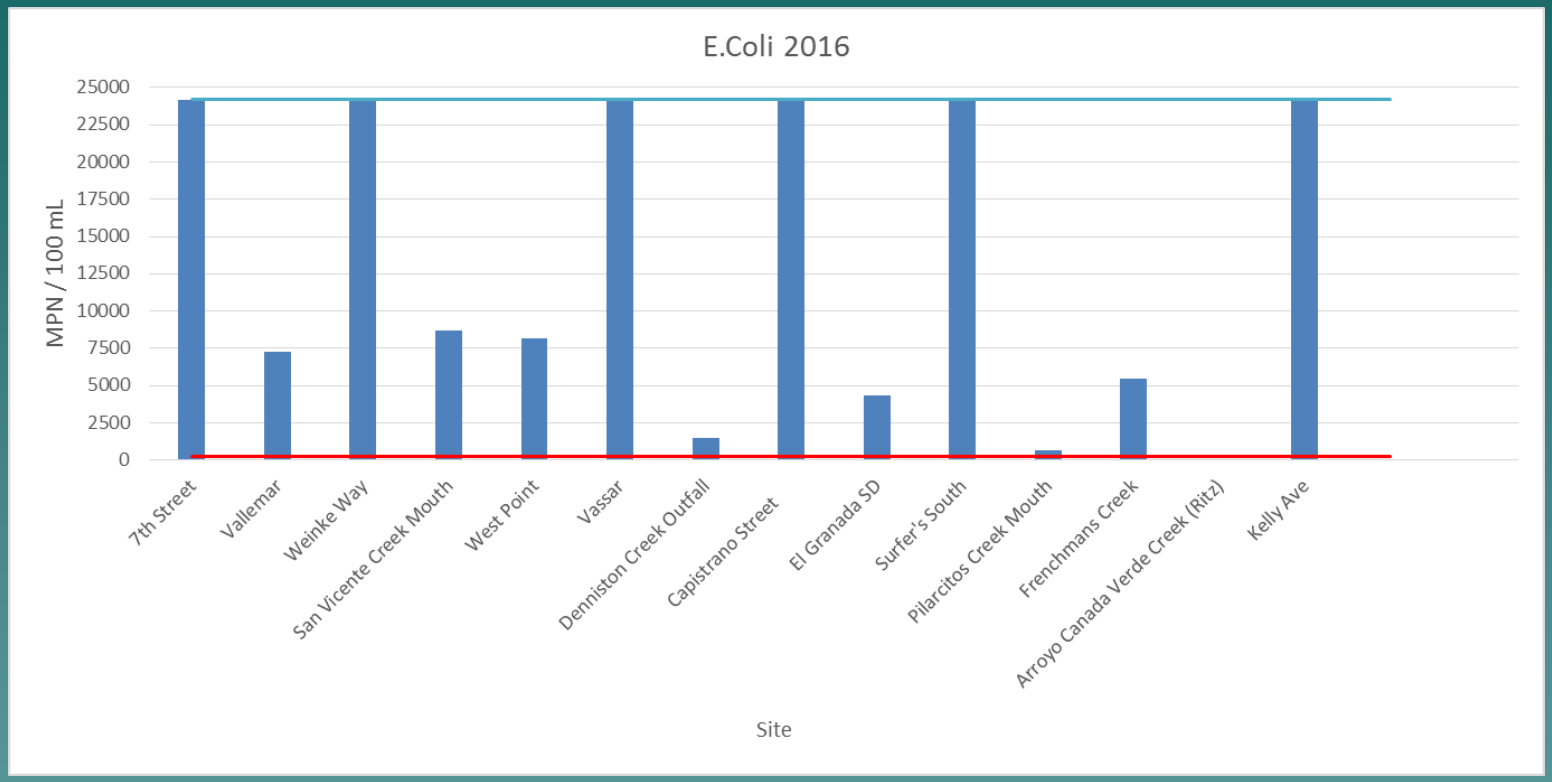
Dry Run vs First Flush

San Vicente Creek Mouth

Parameter	Dry Run	First Flush	Water Quality Objective
E. Coli *(MPN/100 mL)*	10	8664	<235 MPN/100 mL
Entercoccus (MPN/100 mL)	10	1723	<104 MPN/100 mL
NO_3-N (mg/L)	0.1	0.7	< 2.25 mg/L
O-PO_4-P (mg/L)	ND	0.1	<0.12 mg/L
Copper (µg/L)	ND	7	<30 µg/L
Lead (µg/L)	ND	ND	<30 µg/L
Zinc (µg/L)	ND	36	< 200 µg/L
TSS (mg/L)	ND	79	<500 mg/L

* Red indicates exceedance of water quality objectives

E. coli 2016

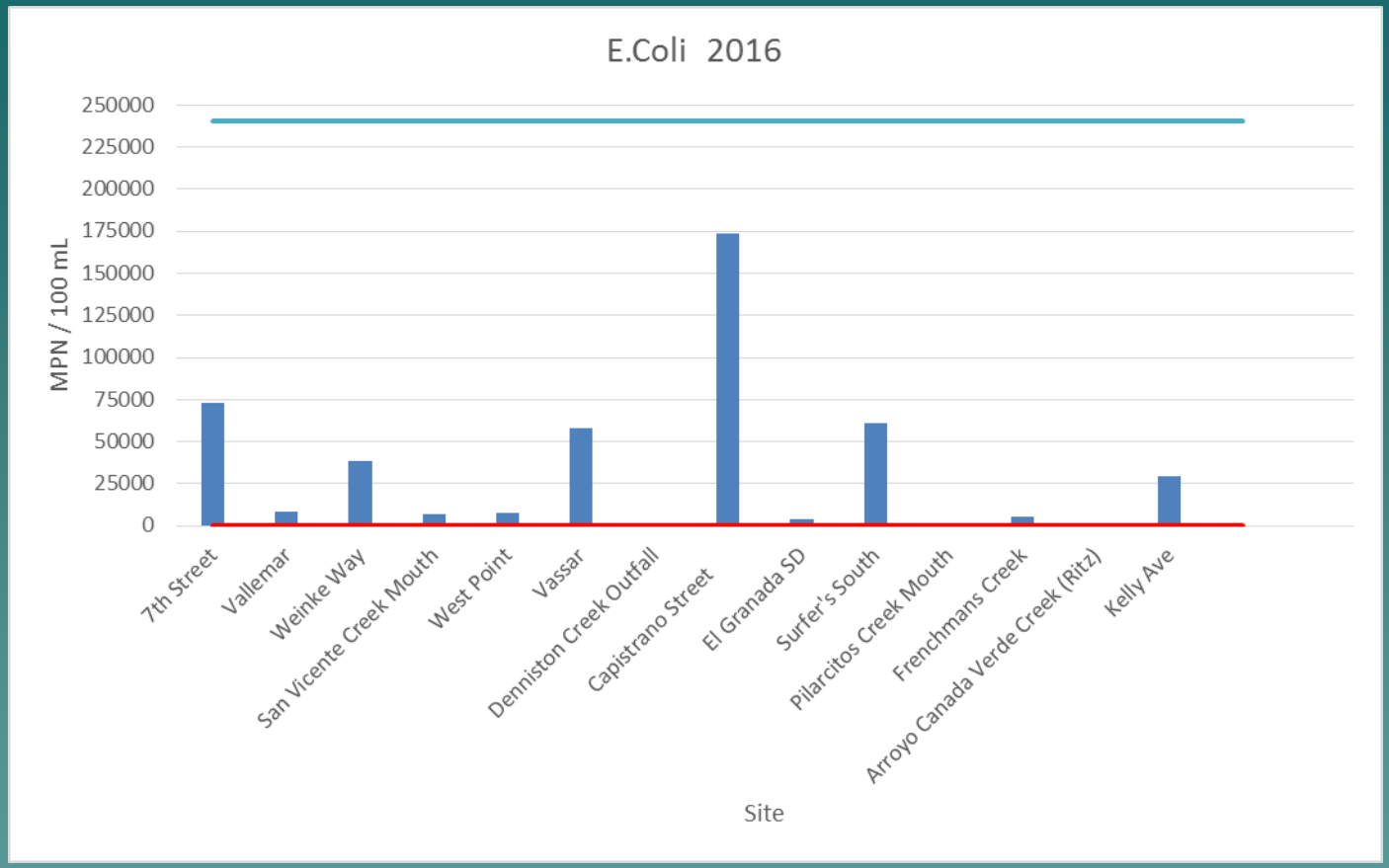


Detection Limit: 24,196

WQO<235

All sites exceeded WQO except Arroyo Canada Verde

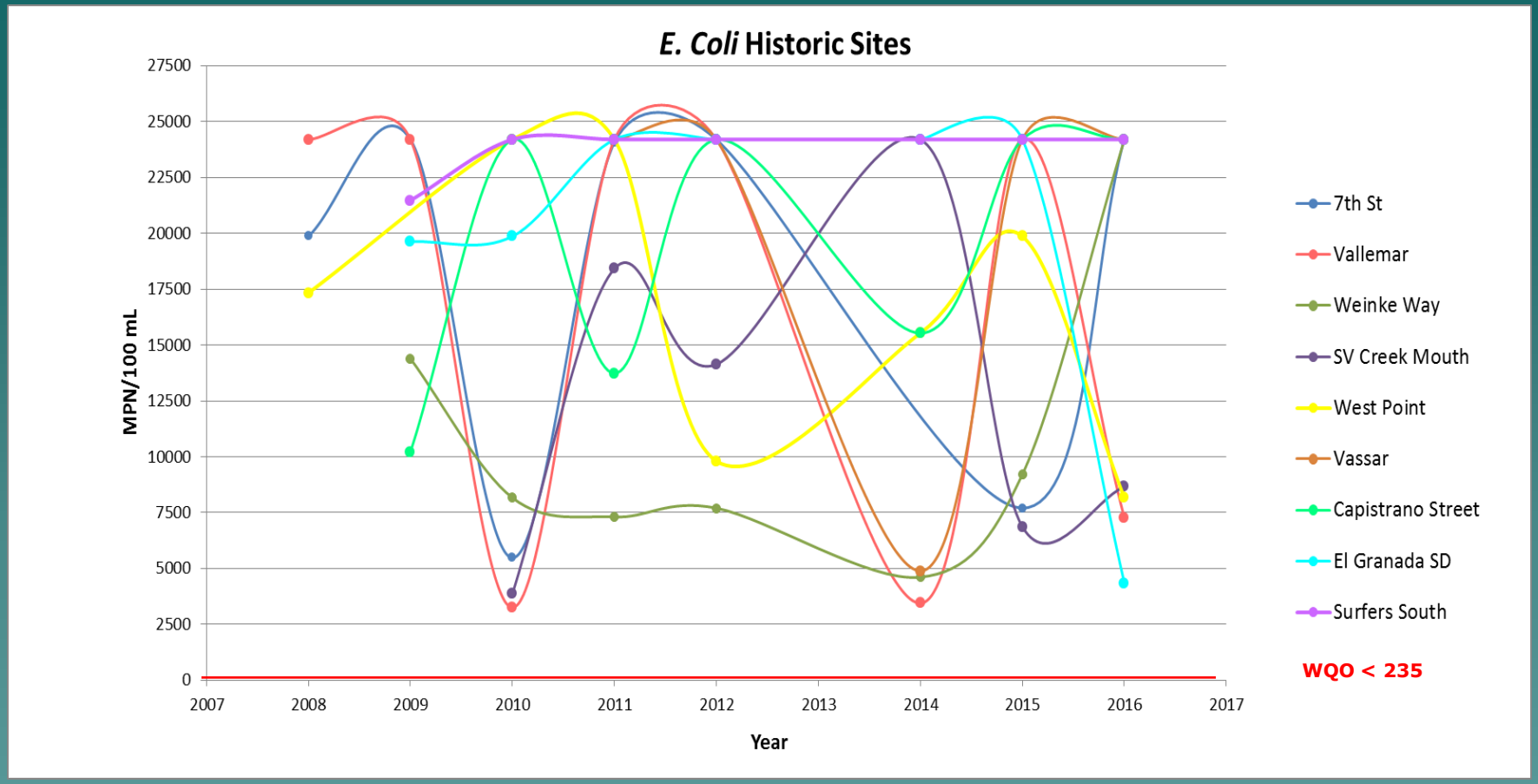
E. coli 2016 (1:100 Dilution)



Detection Limit: 241,960

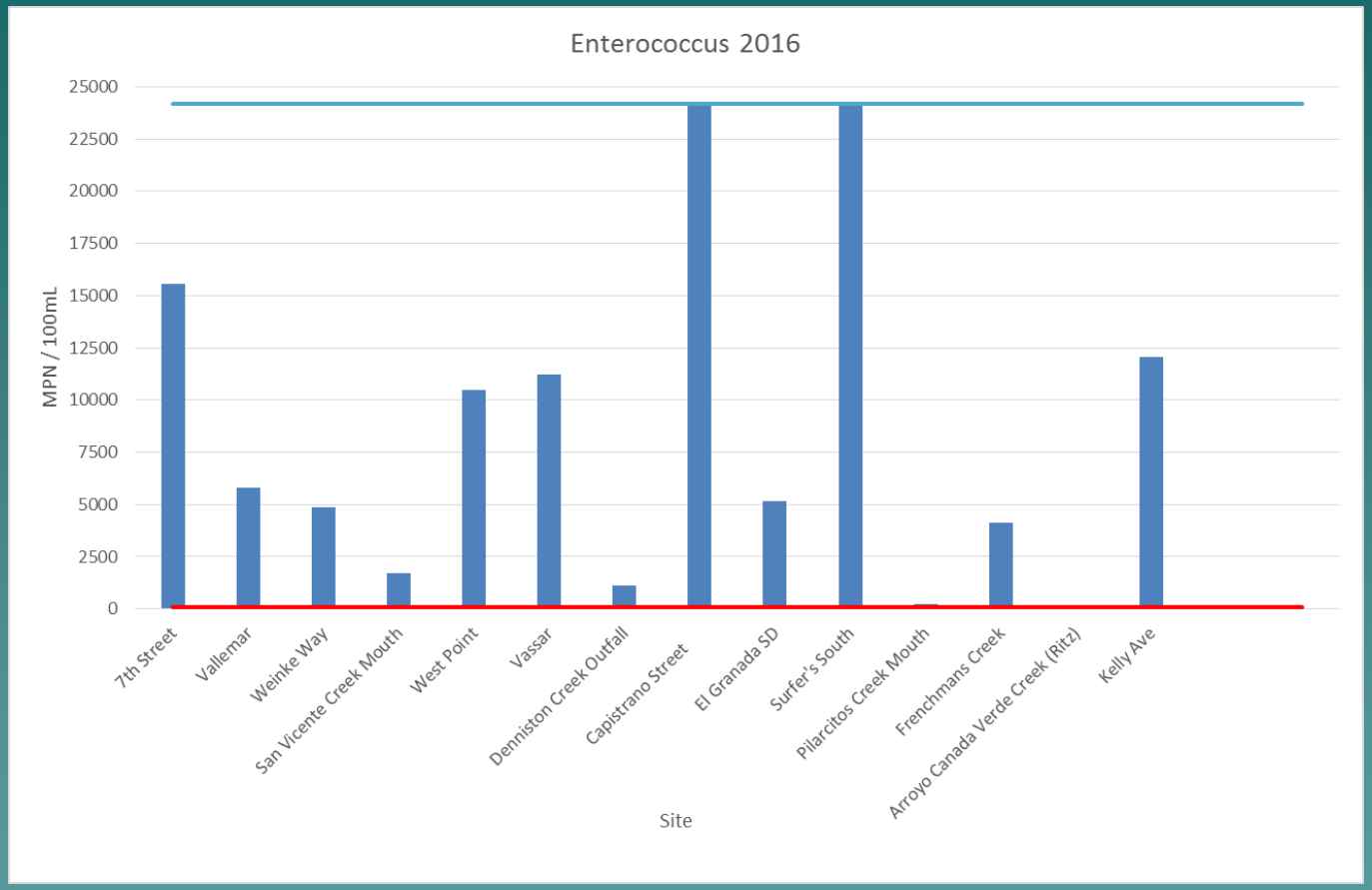
WQO<235

Capistrano St. highest of all sites in all counties (32 sites)



Surfers South consistently high

Enterococcus 2016

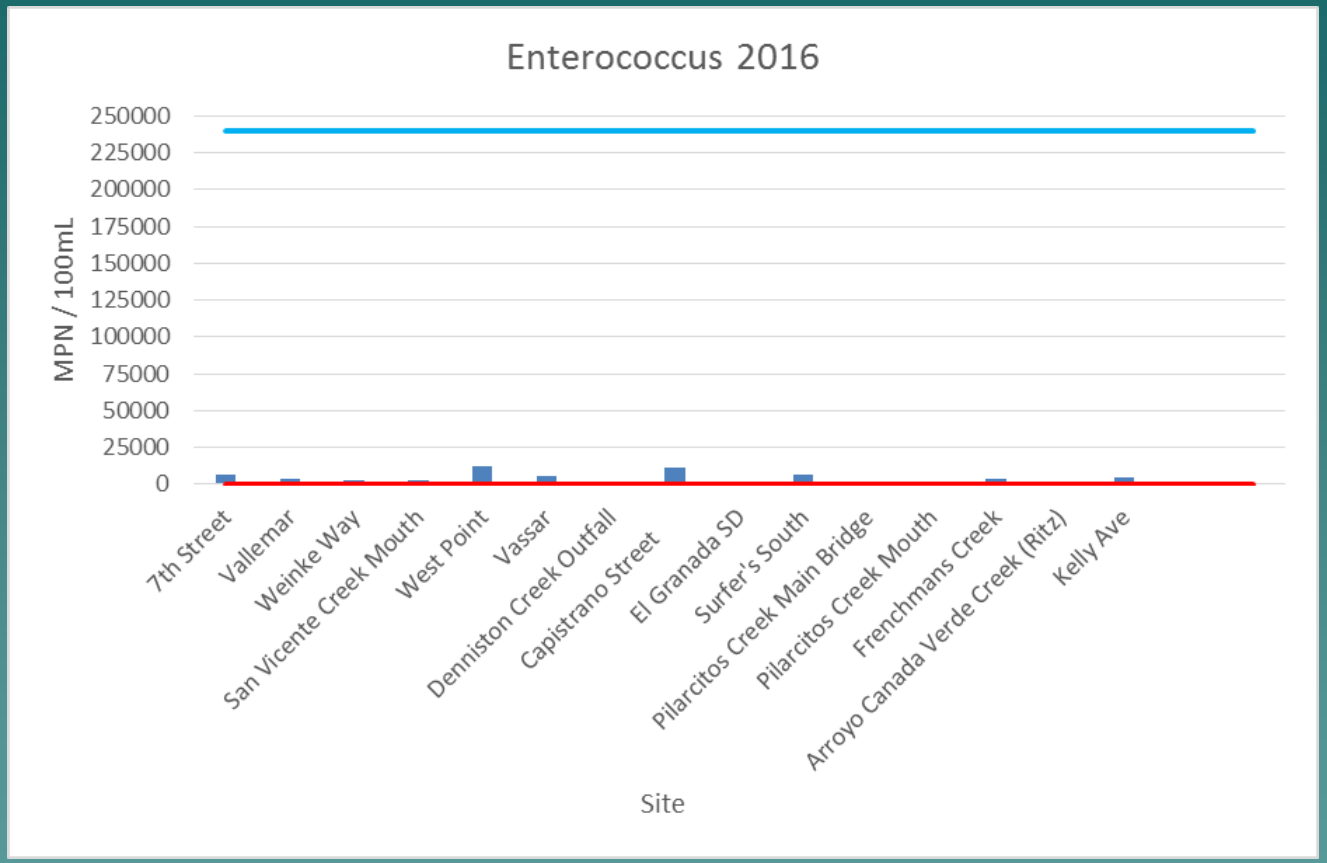


Detection Limit: 24,196

WQO<104

All sites exceeded WQO

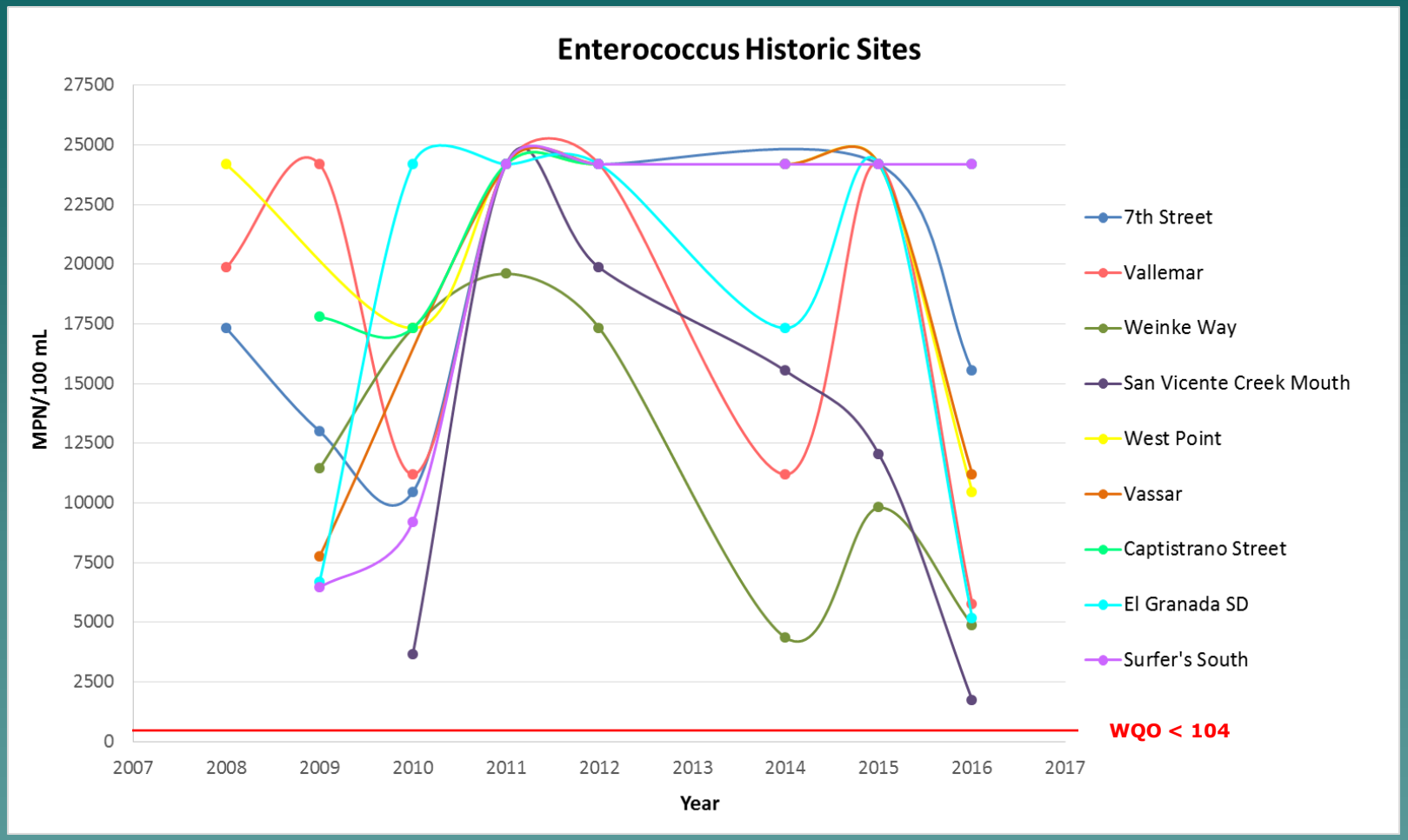
Enterococcus 2016 (1:100 Dilution)



Detection Limit: 241,960

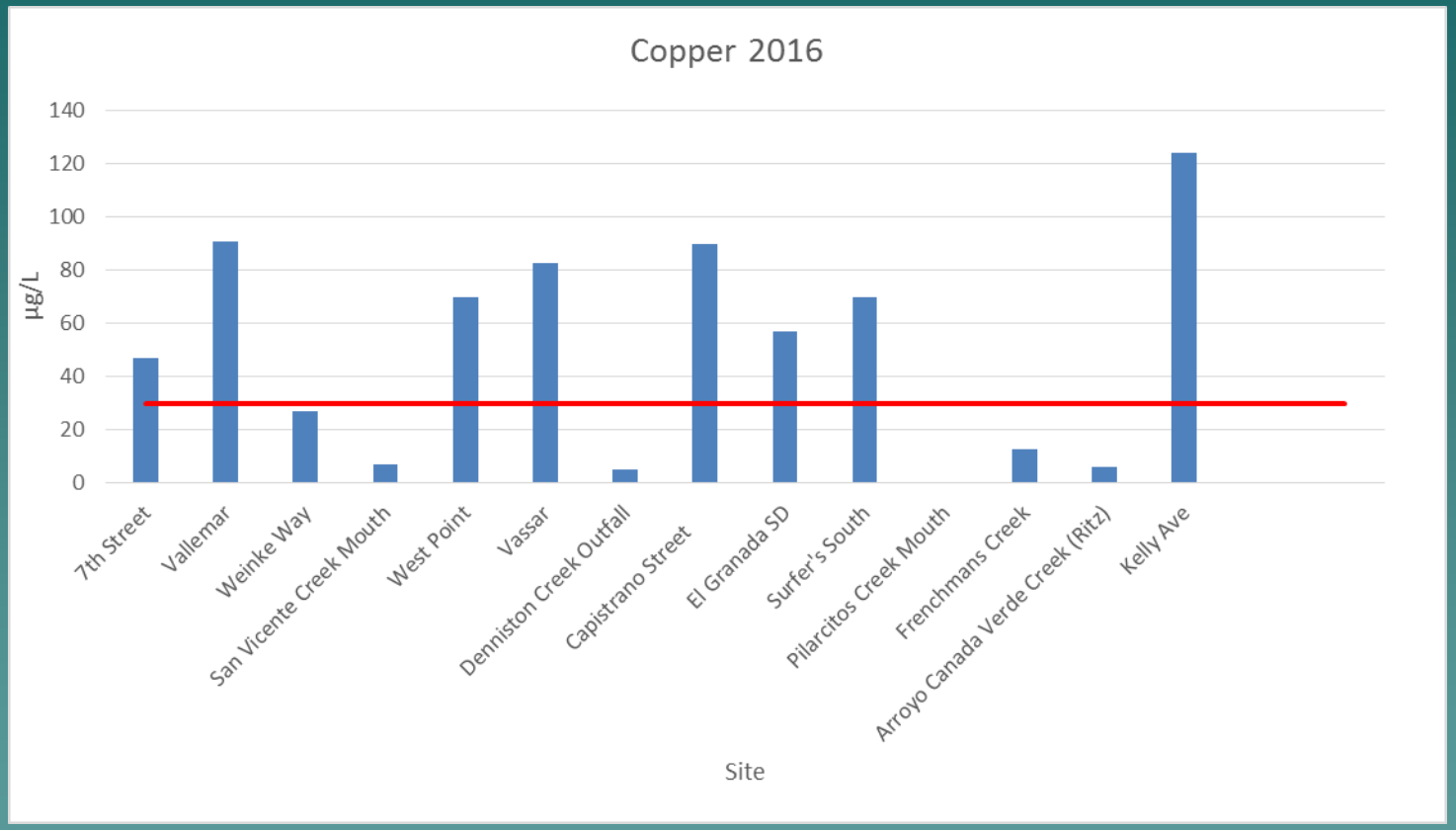
WQO<104

All sites exceeded WQO

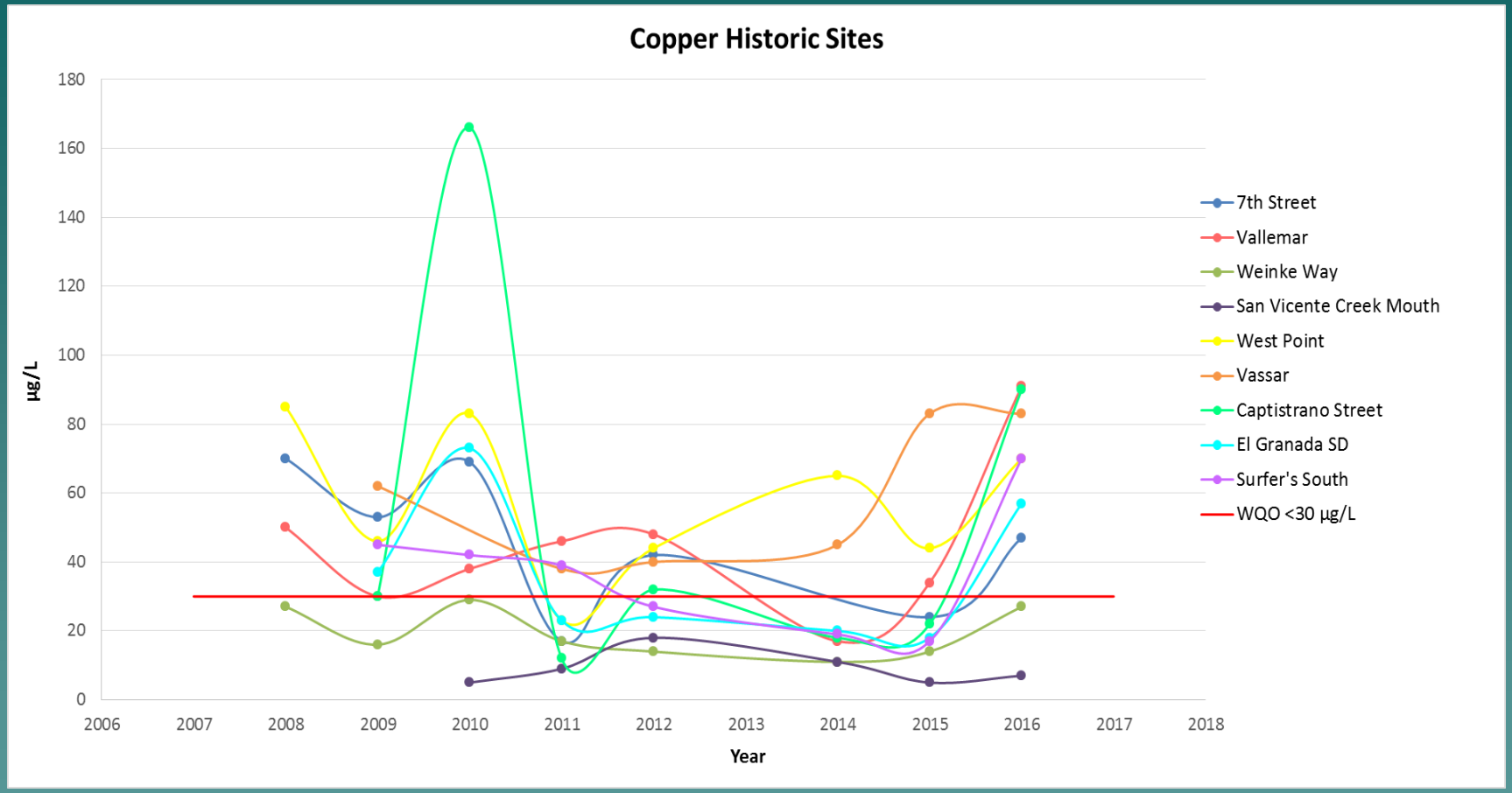


Capistrano Street consistently high

Copper 2016

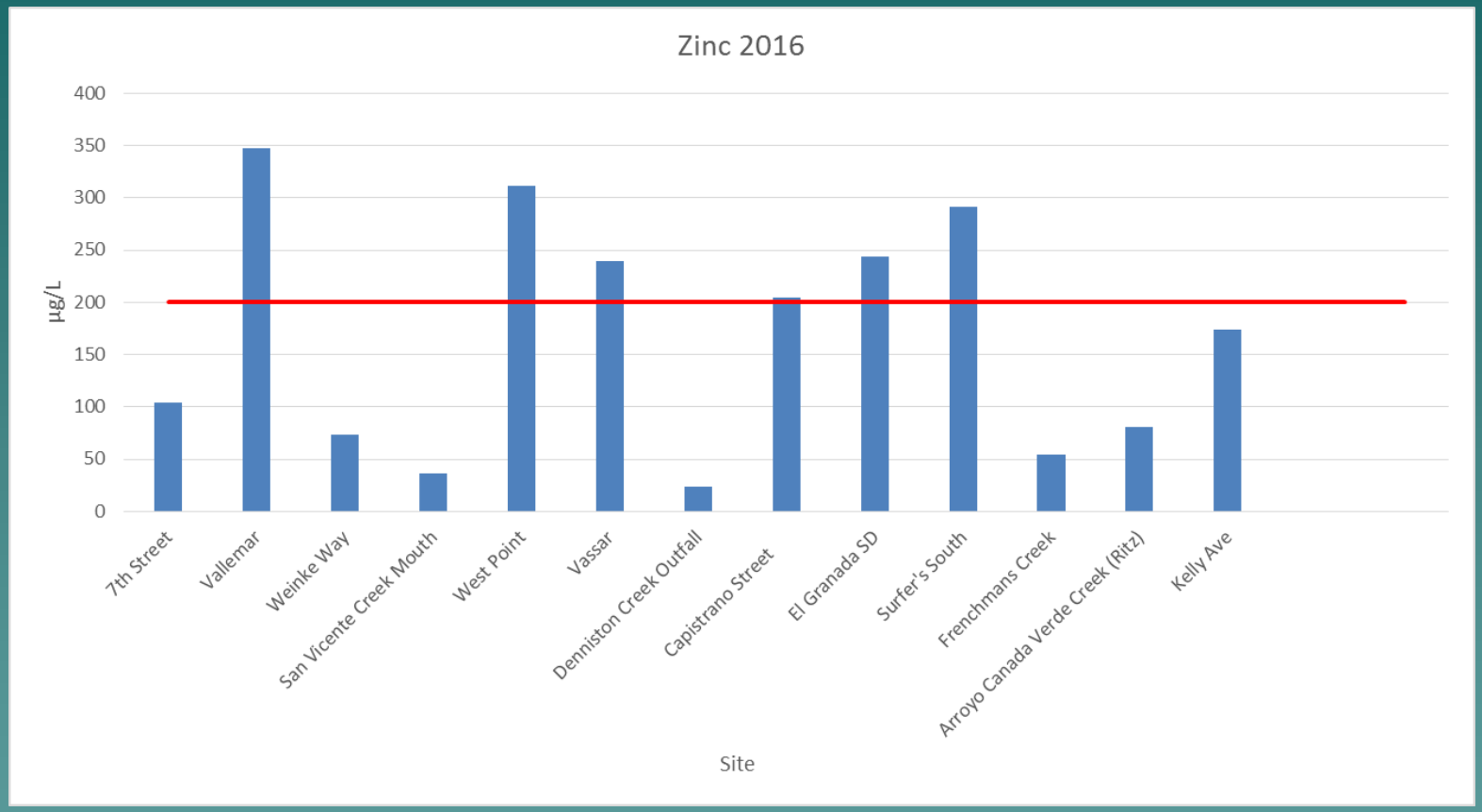


WQO<30

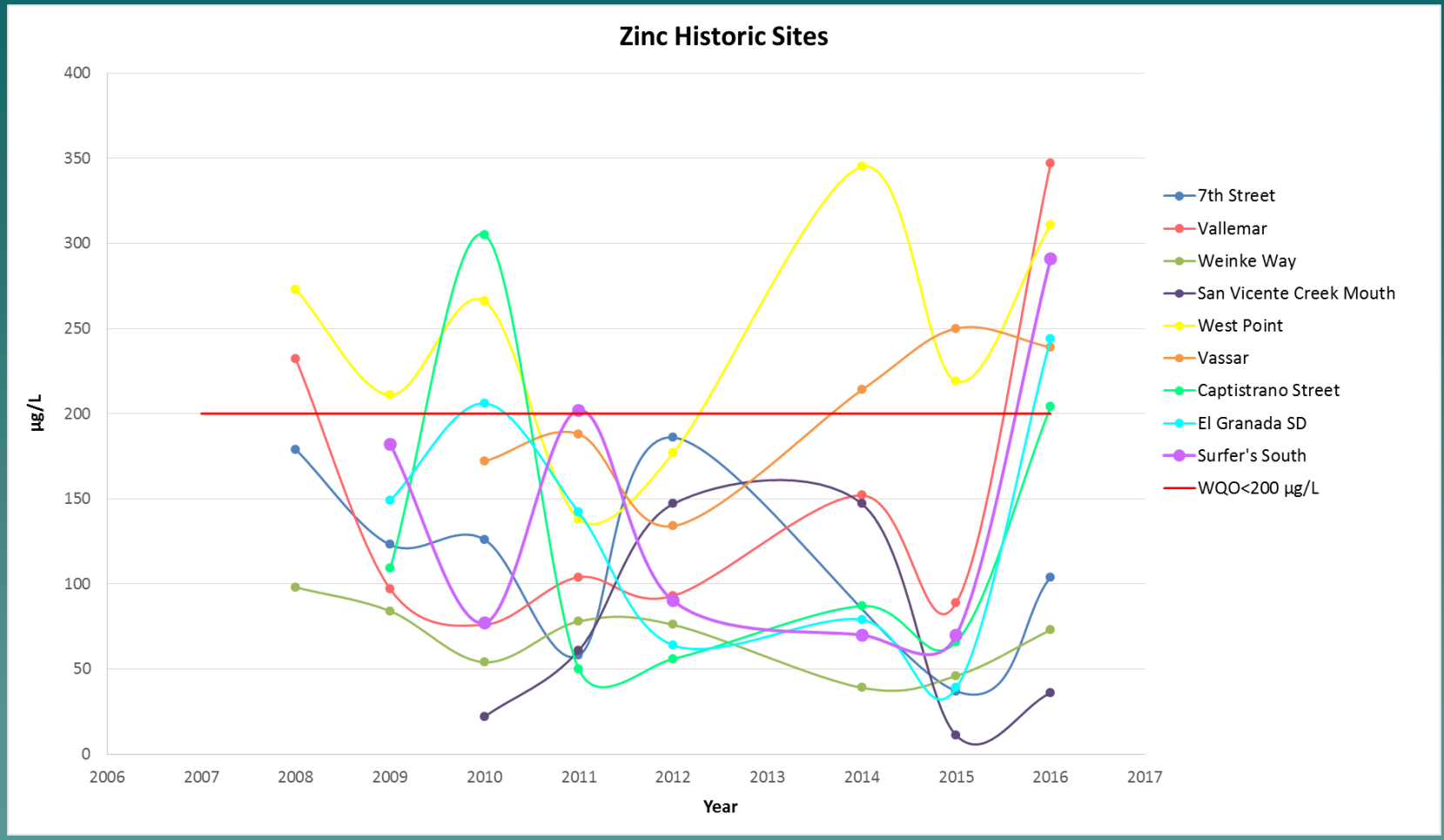


Vassar exceeded WQO every year

Zinc 2016

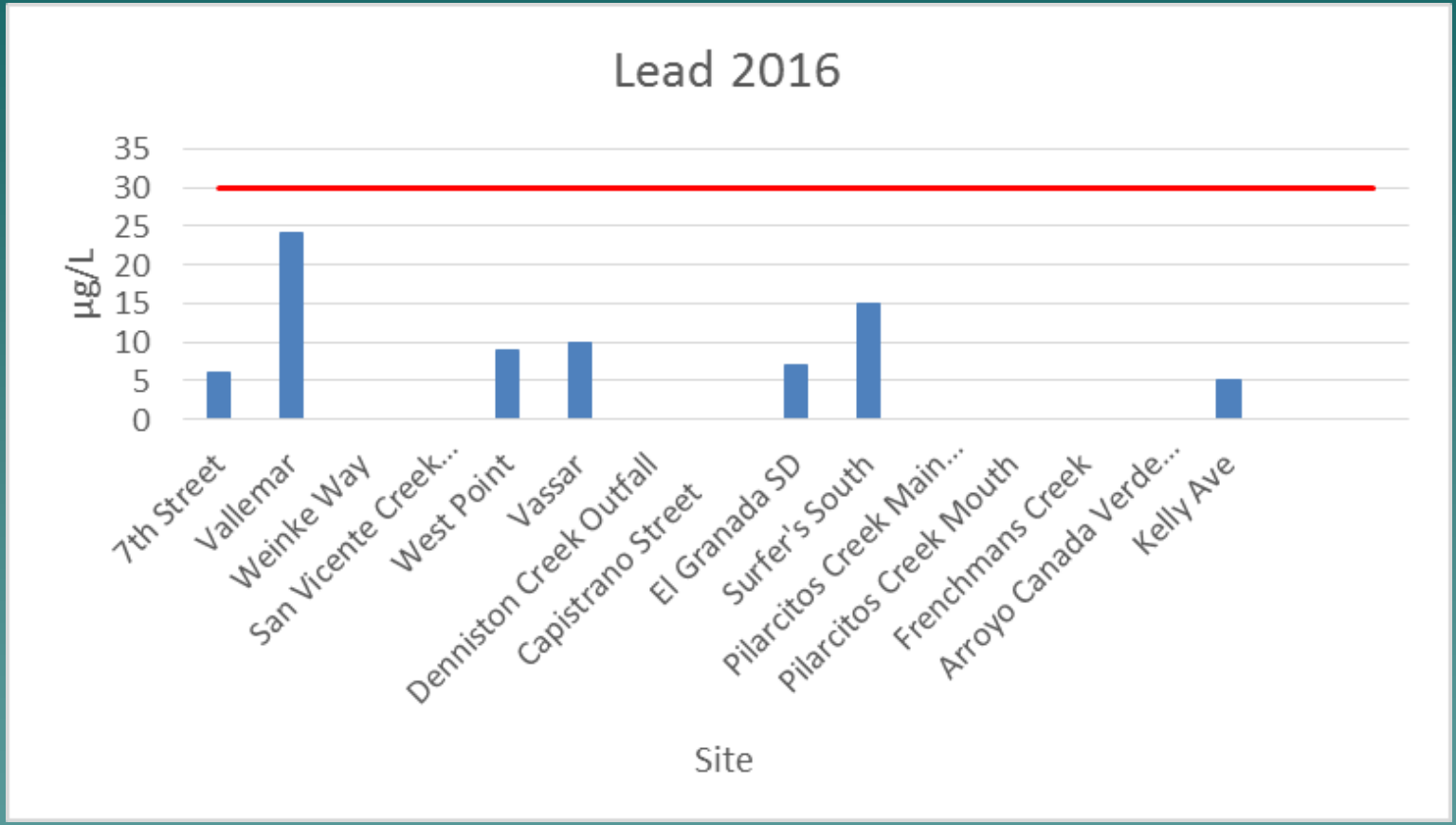


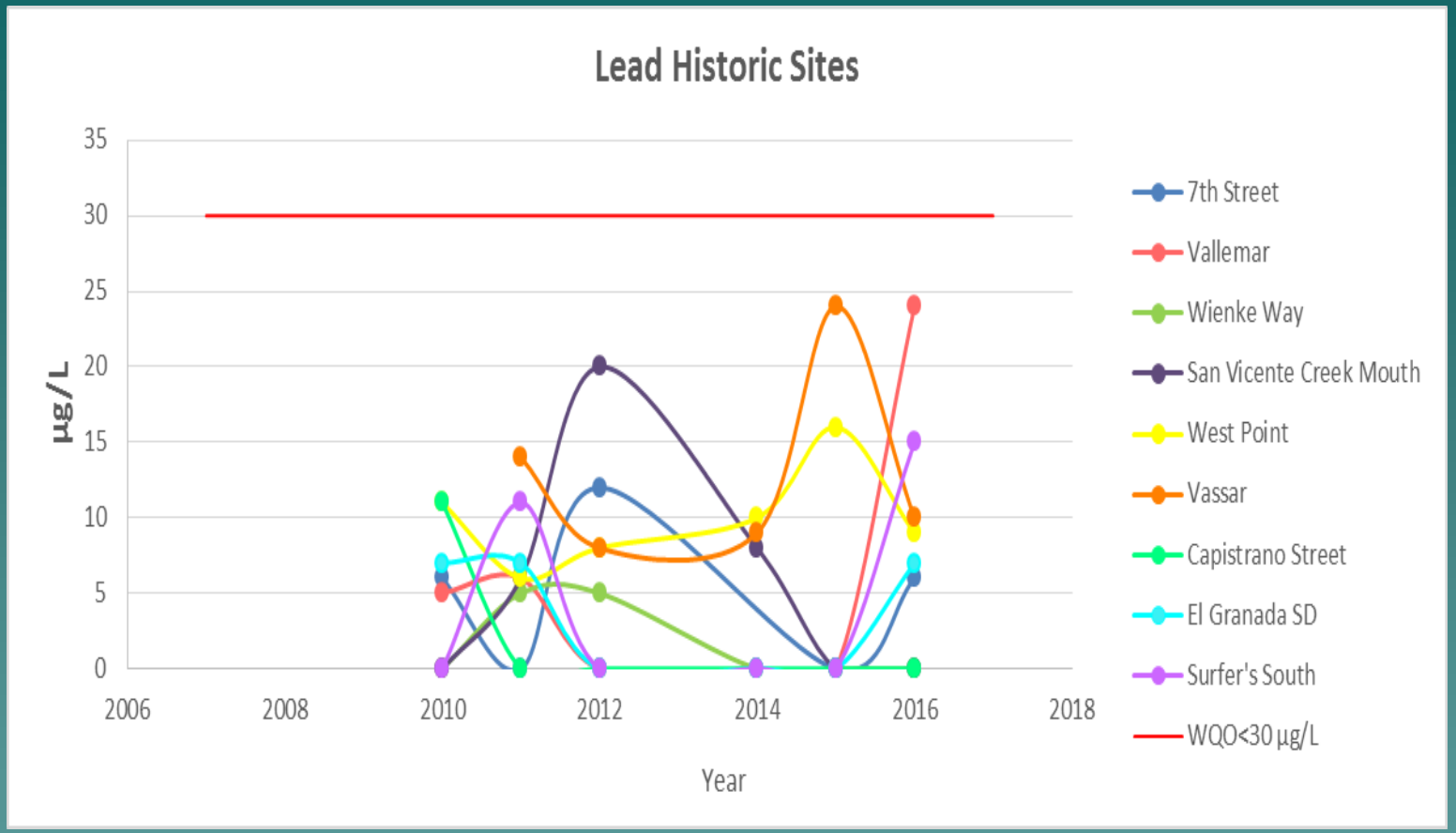
WQO < 200



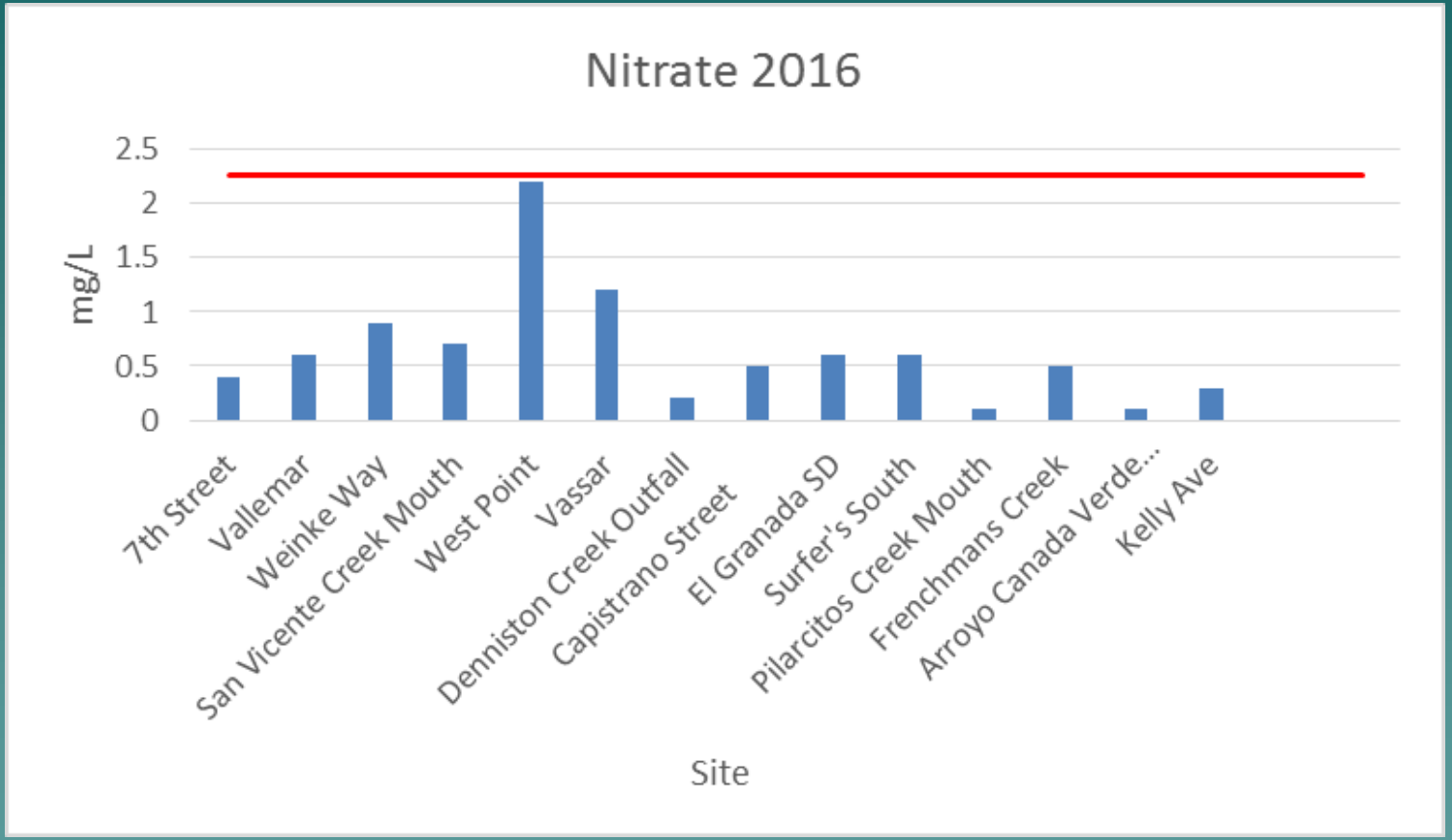
West Point exceeded WQO most frequently

Lead 2016


Lead 2016
µg/L
35
30
25
20
15
10
5
0
7th Street
Vallemar
Weinke Way
San Vicente Creek...
West Point
Vassar
Denniston Creek Outfall
Capistrano Street
El Granada SD
Surfer's South
Pilarcitos Creek Main...
Pilarcitos Creek Mouth
Frenchmans Creek
Arroyo Canada Verde...
Kelly Ave
Site
WQO<30

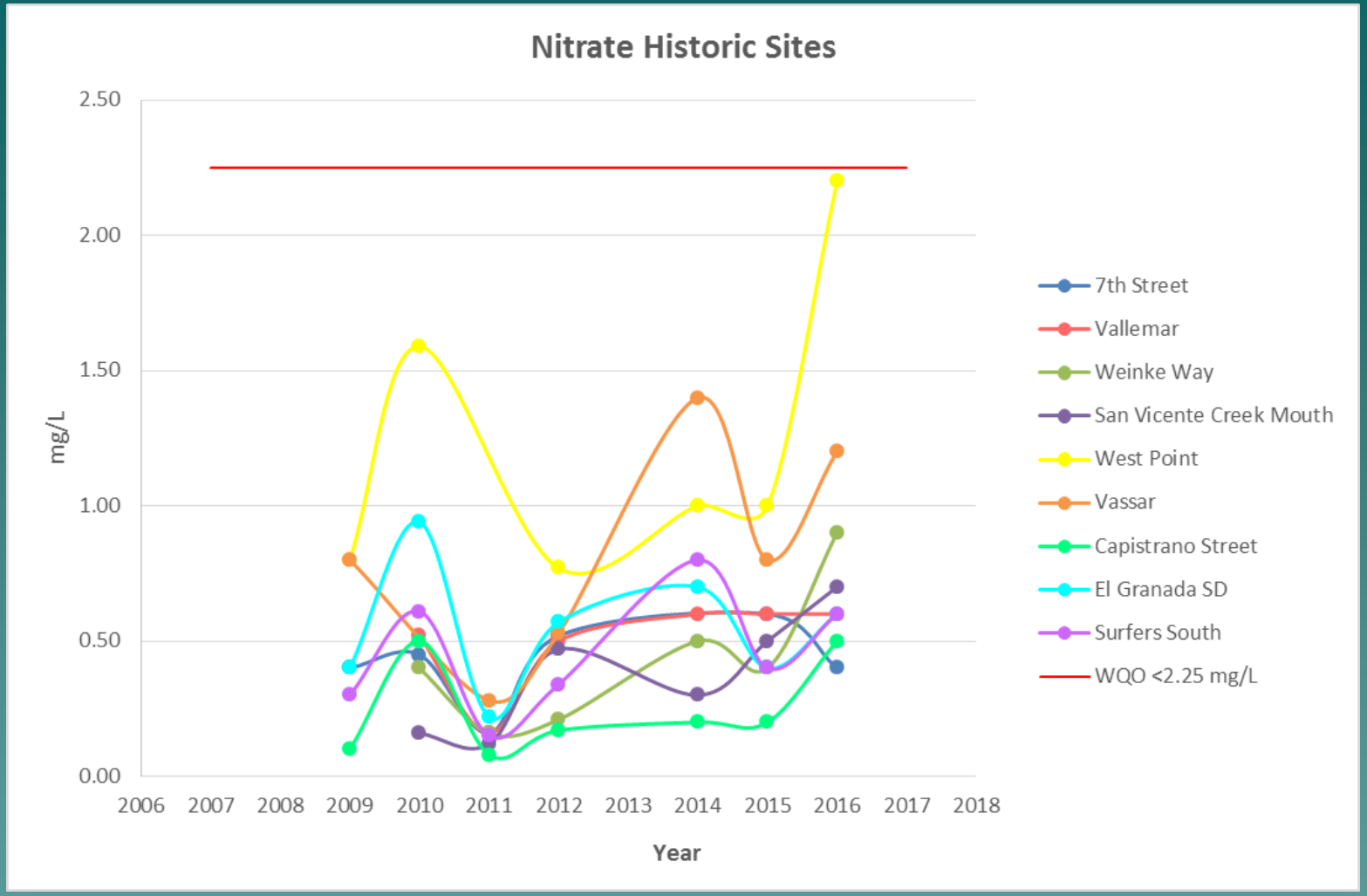

Lead Historic Sites
35
30
25
20
15
10
5
0
µg/L
2006
2008
2010
2012
2014
2016
2018
Year
7th Street
Vallemar
Wienke Way
San Vicente Creek Mouth
West Point
Vassar
Capistrano Street
El Granada SD
Surfer's South
WQO<30 µg/L

Nitrate 2016



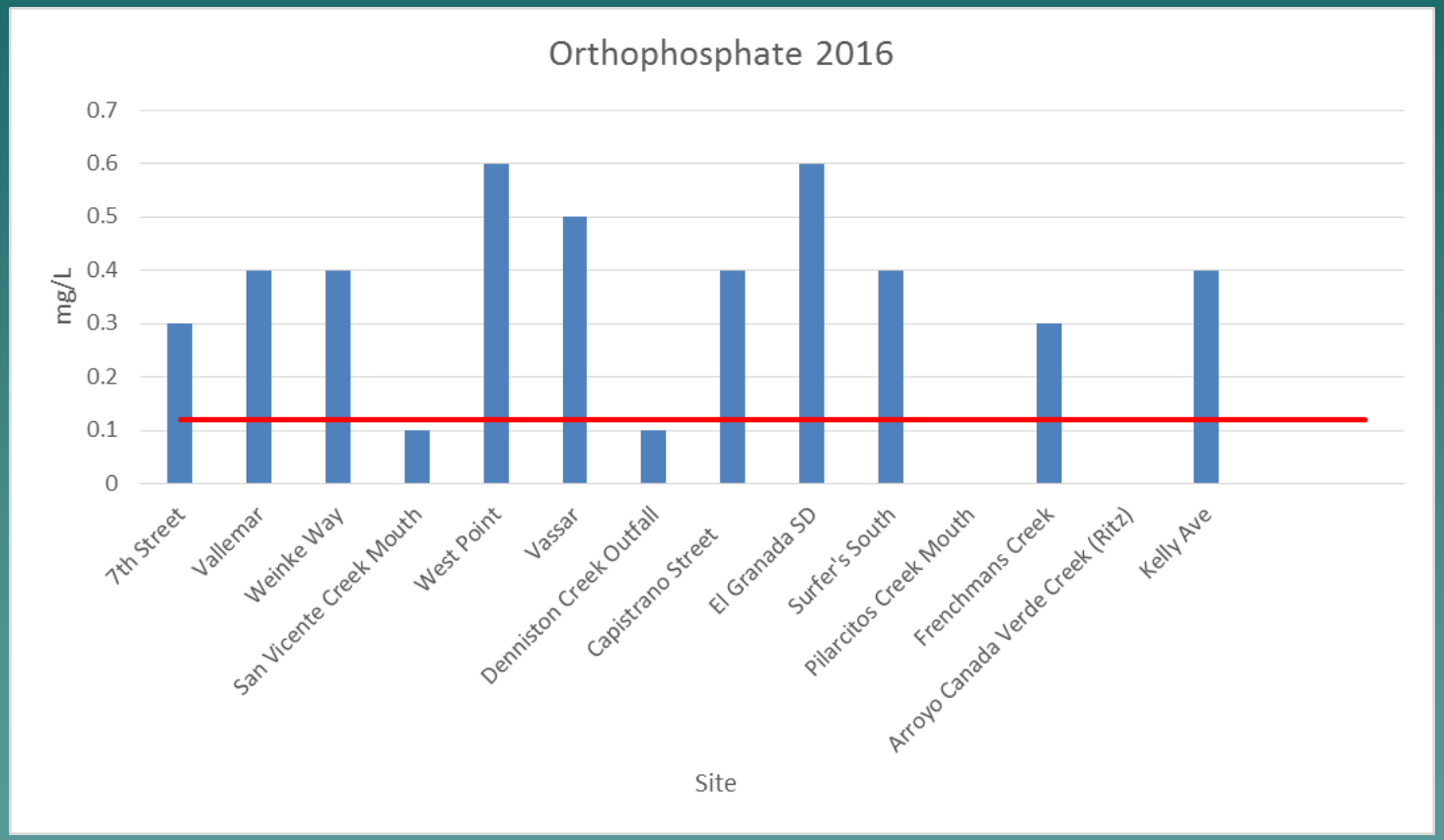
WQO< 2.25

West Point had highest concentration in all counties

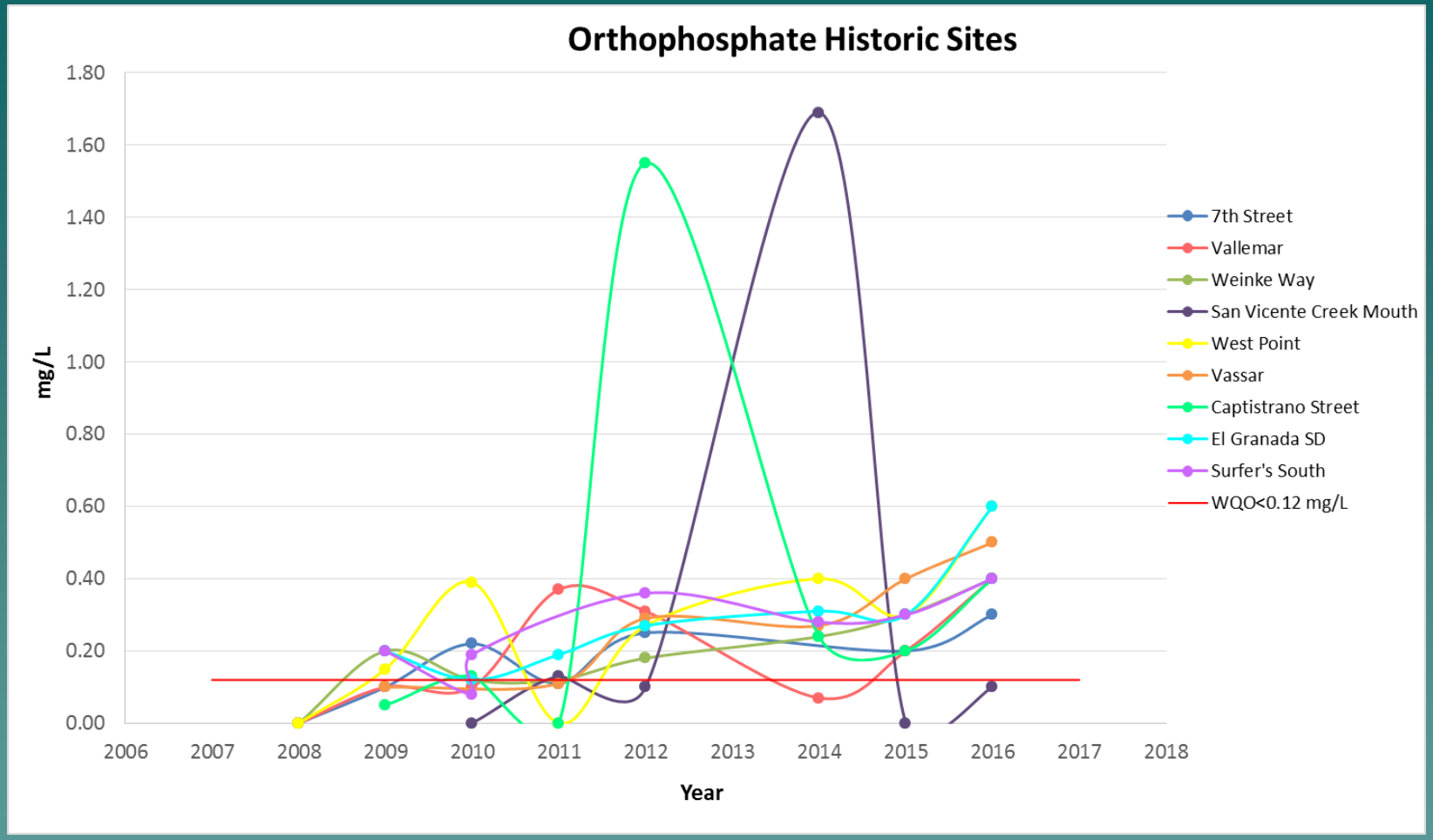


West Point consistently high

Orthophosphate 2016

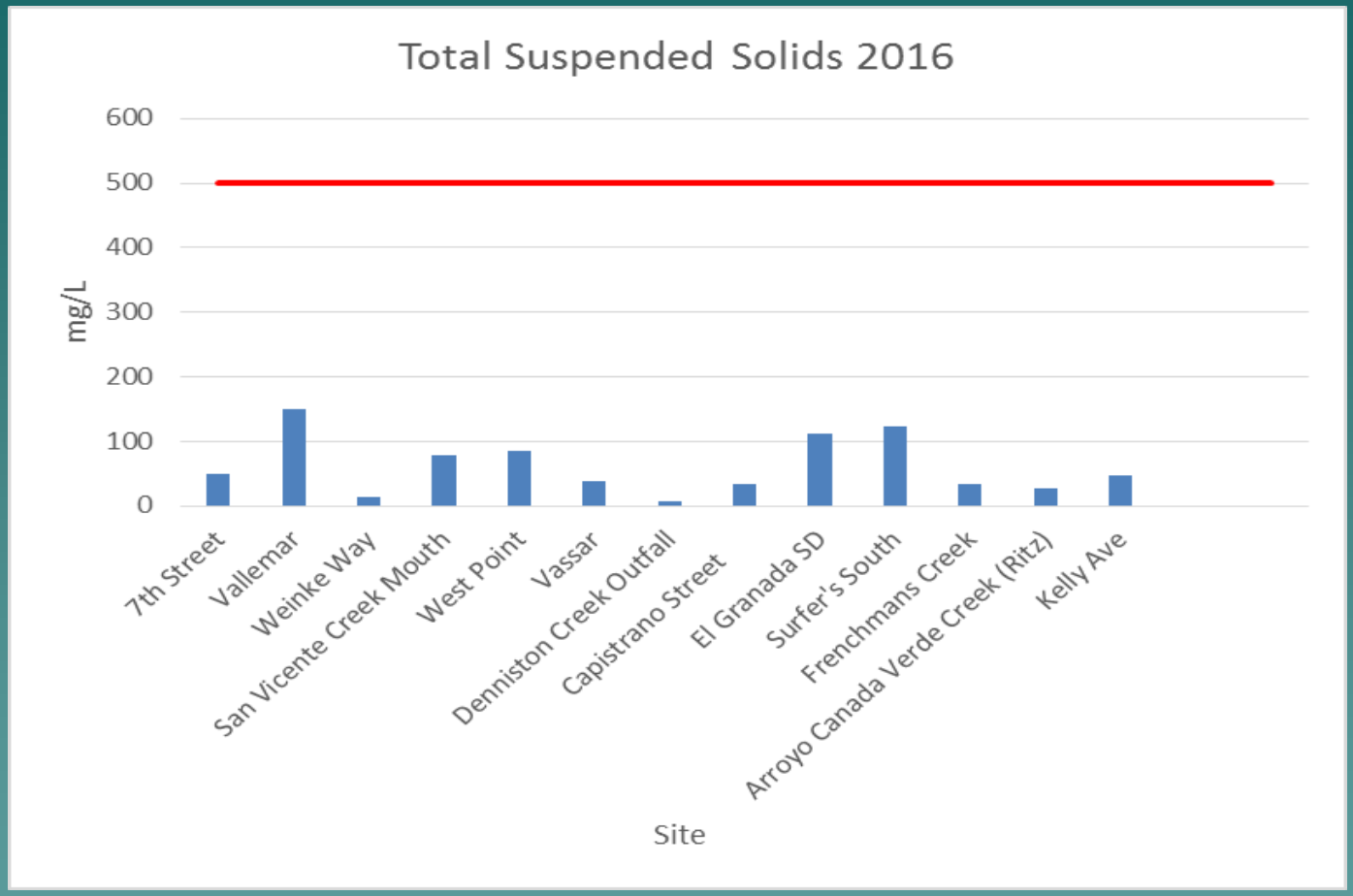


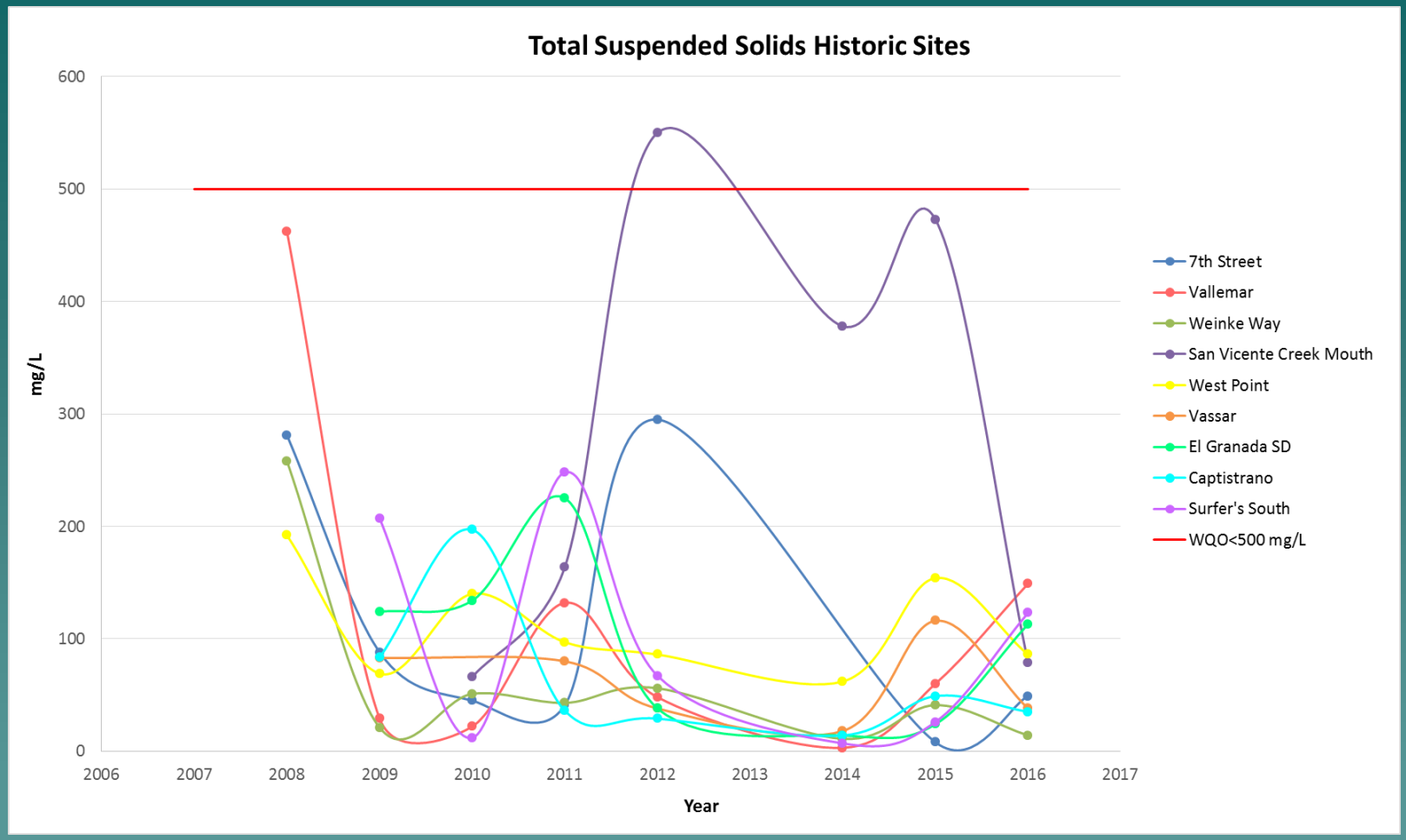
WQO<0.12



El Granada SD exceeded WQO every year

Total Suspended Solids 2016




Total Suspended Solids Historic Sites
mg/L
600
500
400
300
200
100
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
El Granada SD
Captistrano
Surfer's South
WQO<500 mg/L

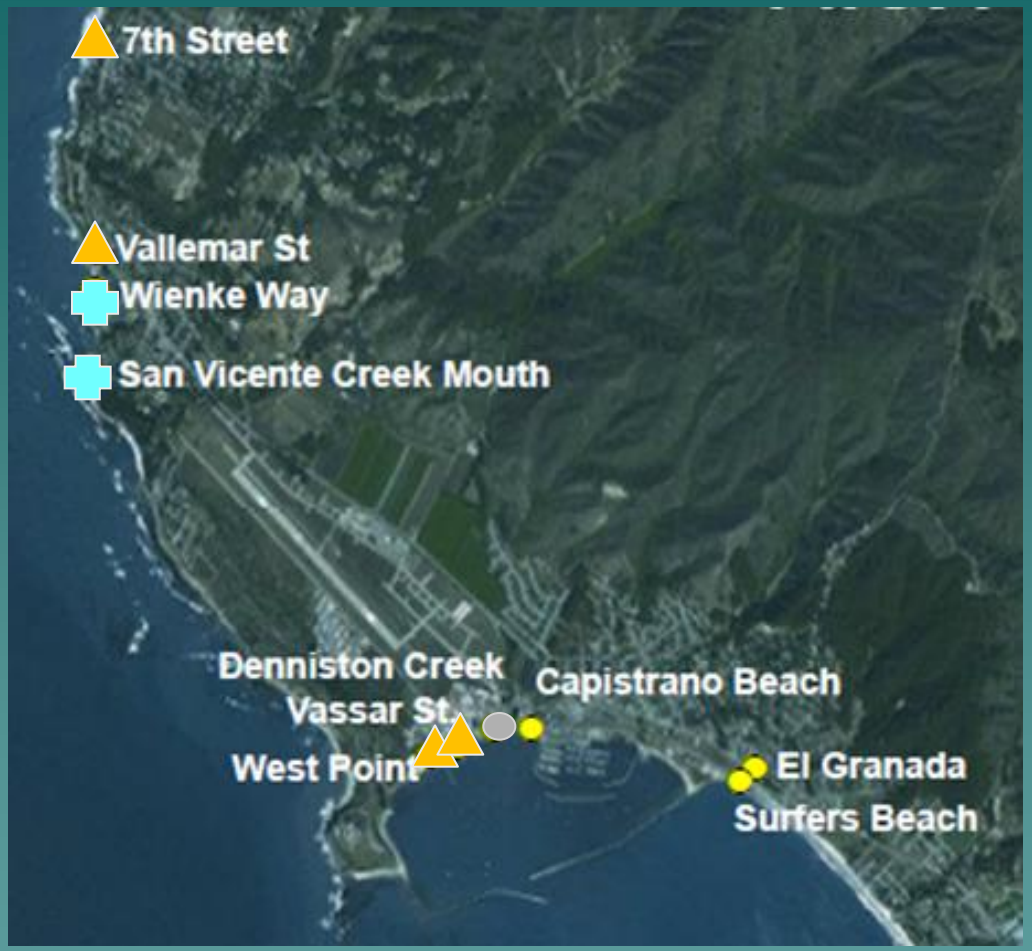
2016 Results Summary

- Bacteria (*E. Coli* and *Enterococcus*): 96% exceedance
- Metals
  - Copper: 57% exceedance
  - Zinc: 43% exceedance
  - Lead 0% exceedance
- Nutrients
  - Orthophosphate: 71% exceedance
  - Nitrate: 0% exceedance
- Total Suspended Solids: 0% exceedance

Historic Results Summary

Pollutant	Exceedance Rate (2008-2016)	Locations of most exceedances and/or highest values
Bacteria	100%	Surfers and Capistrano
Orthophosphate	72%	Surfers and El Granada
Copper	56%	West Point and Vassar
Zinc	27%	West Point and Vassar
TSS	2%	San Vicente Creek Mouth
Nitrate	0%	West Point
Lead	0%	Vassar

Historic Pollutants at Historic Sites



Pollutants numbered from highest priority to lowest

▲
1) Bacteria
2) Copper
3) Orthophosphate
4) Zinc

✚
1) Bacteria
2) Orthophosphate

●
1) Bacteria
2) Orthophosphate
3) Copper
4) Zinc

● Not a historic sampling site

Next Steps

- Continue collecting data during first flush to document trends along the San Mateo coast for a wide variety of pollutants

- Use data with other relevant information to promote efforts to reduce pollution in coastal SMC
  - Pinpoint sources for certain pollutants and areas of concern
  - Scope solutions and implement remediation measures

Thank you!

Questions?

Brittani Bohlke

San Mateo County Resource Conservation District

Brittani@sanmateorcd.org

650.712.7765 ext 104