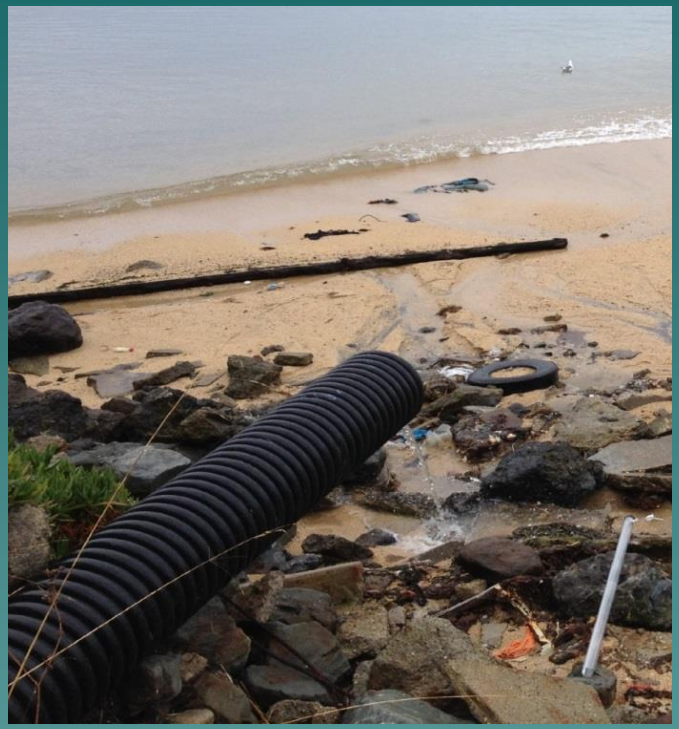
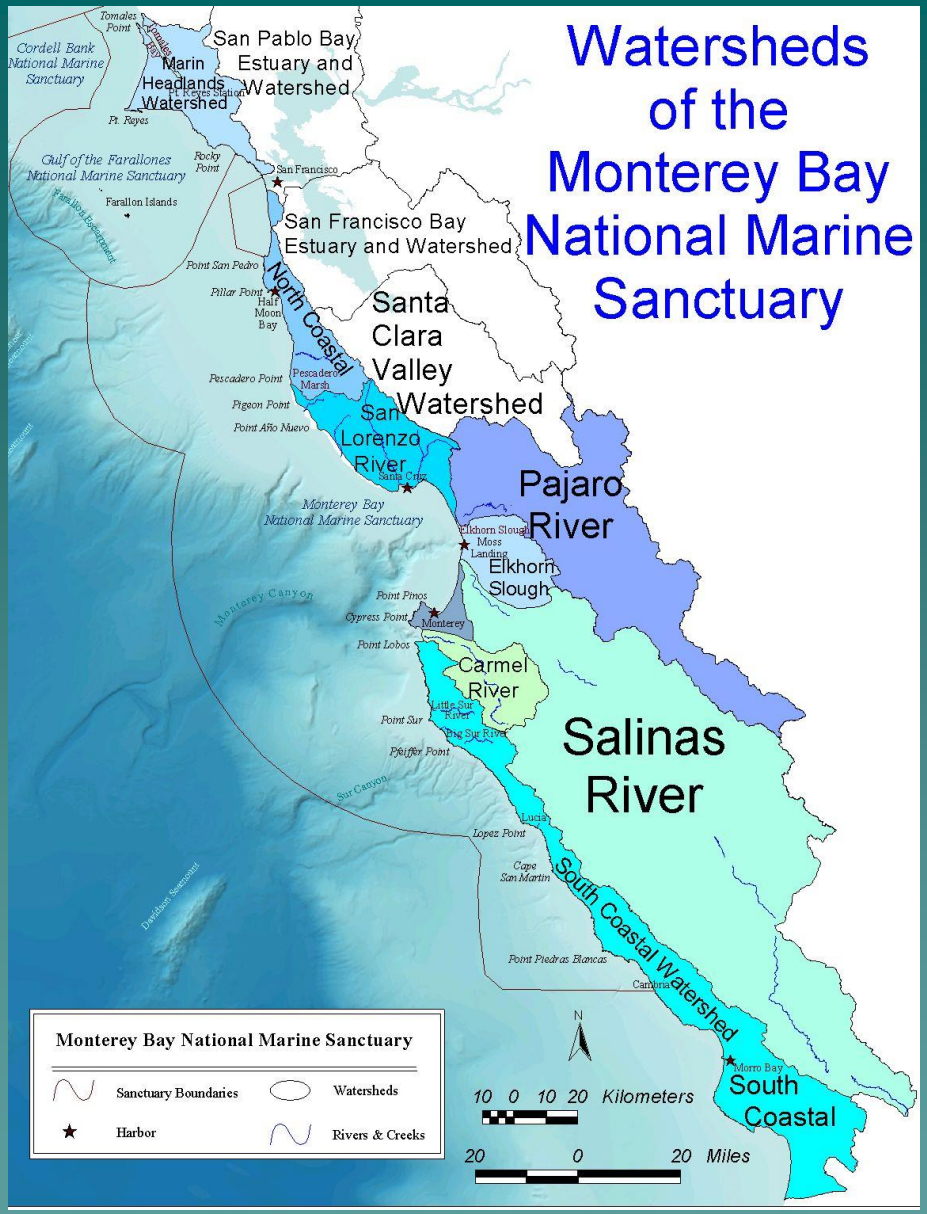
First Flush 2015: Midcoast Storm Drains

SAN MATEO COUNTY
RESOURCE
CONSERVATION
DISTRICT

What is First Flush?

- First big rain of the season
- Freshwater runoff enters storm drains
- High pollution
- Sampled at outfall to ocean
- Nov 2nd: 0.64 in





Partners

NATIONAL MARINE SANCTUARIES
MONTEREY BAY

SEWER AUTHORITY MID-COASTSIDE
WASTEWATER TREATMENT FACILITY
Sewer Authority Mid-Coastside
SAM

Surfrider Foundation

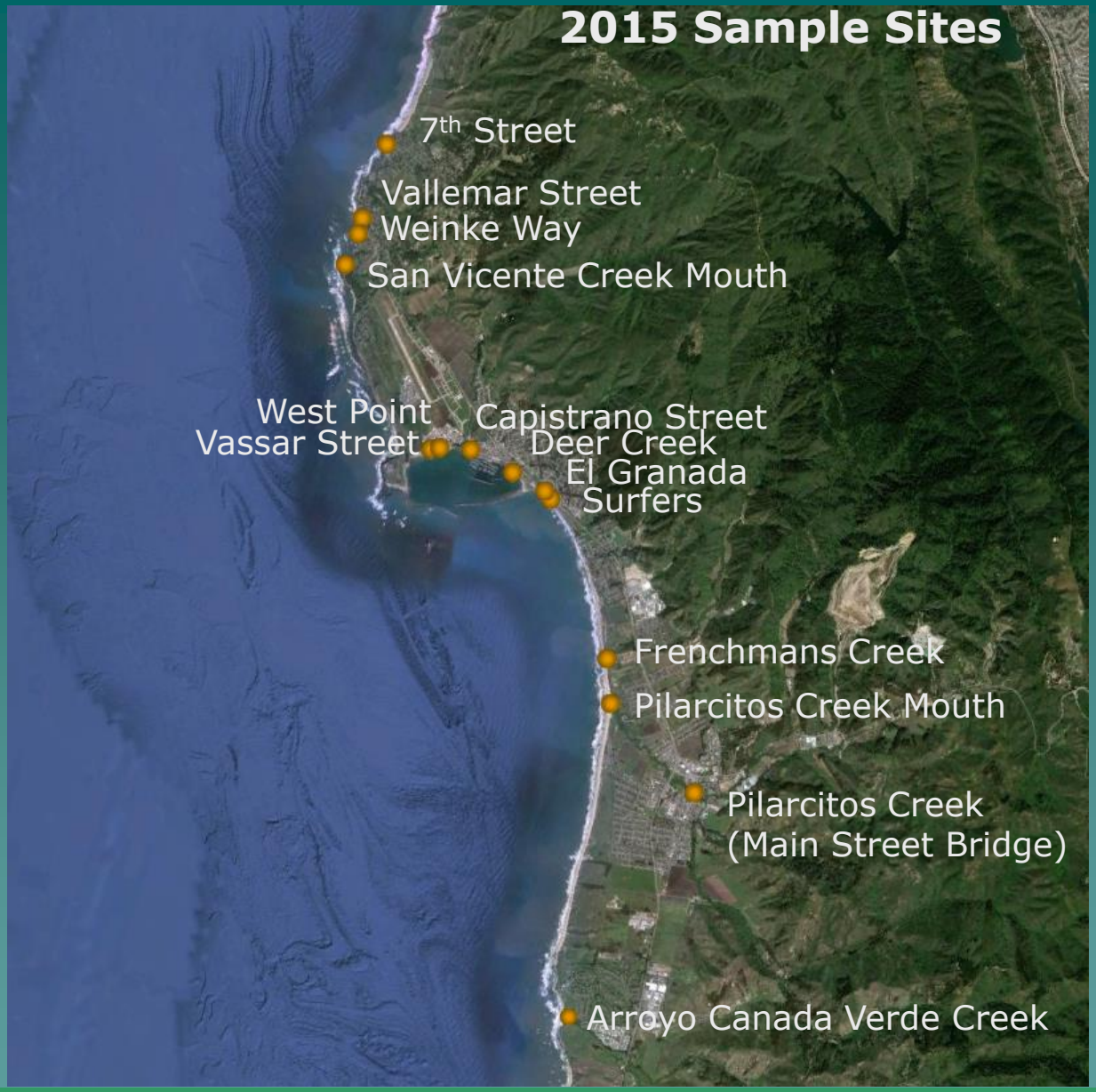
SAN MATEO COUNTY HARBOR DISTRICT
CALIFORNIA

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



San Mateo County Resource Conservation District

2015 Sample Sites

202-MOSD-01: 7th Street
202-MOSD-02: Vallemar Street
202-MBSD-01: Weinke Way
202-MBSD-05: San Vicente Creek Mouth
202-MBSD-04: West Point
202-EGSD-04: Vassar Street
202-EGSD-03: Capistrano Steet
*202-PPSD-09: Deer Creek
202-EGSD-01: El Granada
202-EGSD-02: Surfers Beach
202-HMB-03: Frenchmans Creek
202-HMB-02: Pilarcitos Creek (Mouth)
202-HMB-01: Pilarcitos Creek (Main Street Bridge)
202-HMB-04: Arroyo Canada Verde Creek

* Did not sample due to tidal inundation.

What are we testing?

Pollutant	Potential Sources	Effects
Fecal Indicator Bacteria (E. Coli, Enterococcus)	Feces of warm blooded animals	Indicator for human pathogens
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-daylight hours only
- pH
- Electrical conductivity
- Water temperature
- Observations: trash, odor, bubbles, scum, oil

Train and Mobilize Volunteers

Data Analysis

- Dry Run vs. First Flush
- 13 SMC sites in 2015
- 9 were historic sites (2008-2015)
  - Analyzed over time
  - Note no data for 2013
- Qualitative Location Comparison
- 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

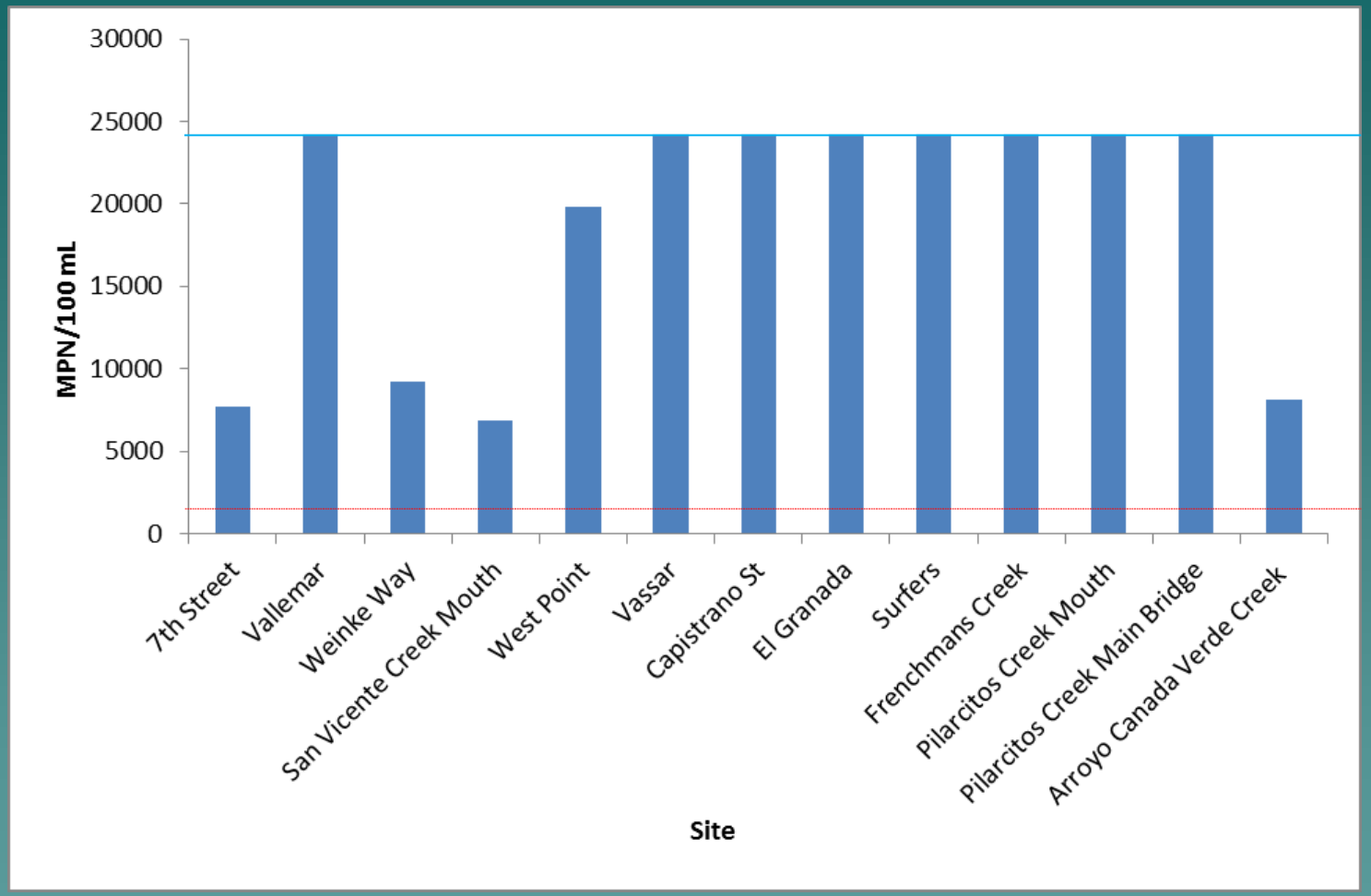
Dry Run vs First Flush

San Vicente Creek Mouth

Parameter	Dry Run	First Flush	Water Quality Objective
E. Coli *(MPN/100 mL)*	1595	6867	<235 MPN/100 mL
Entercoccus (MPN/100 mL)	149	12033	<104 MPN/100 mL
NO_3-N (mg/L)	0.1	0.5	< 2.25 mg/L
O-PO_4-P (mg/L)	ND	ND	<0.12 mg/L
Copper (µg/L)	ND	5	<30 µg/L
Lead (µg/L)	ND	ND	<30 µg/L
Zinc (µg/L)	ND	11	< 200 µg/L
TSS (mg/L)	ND	473	<500 mg/L

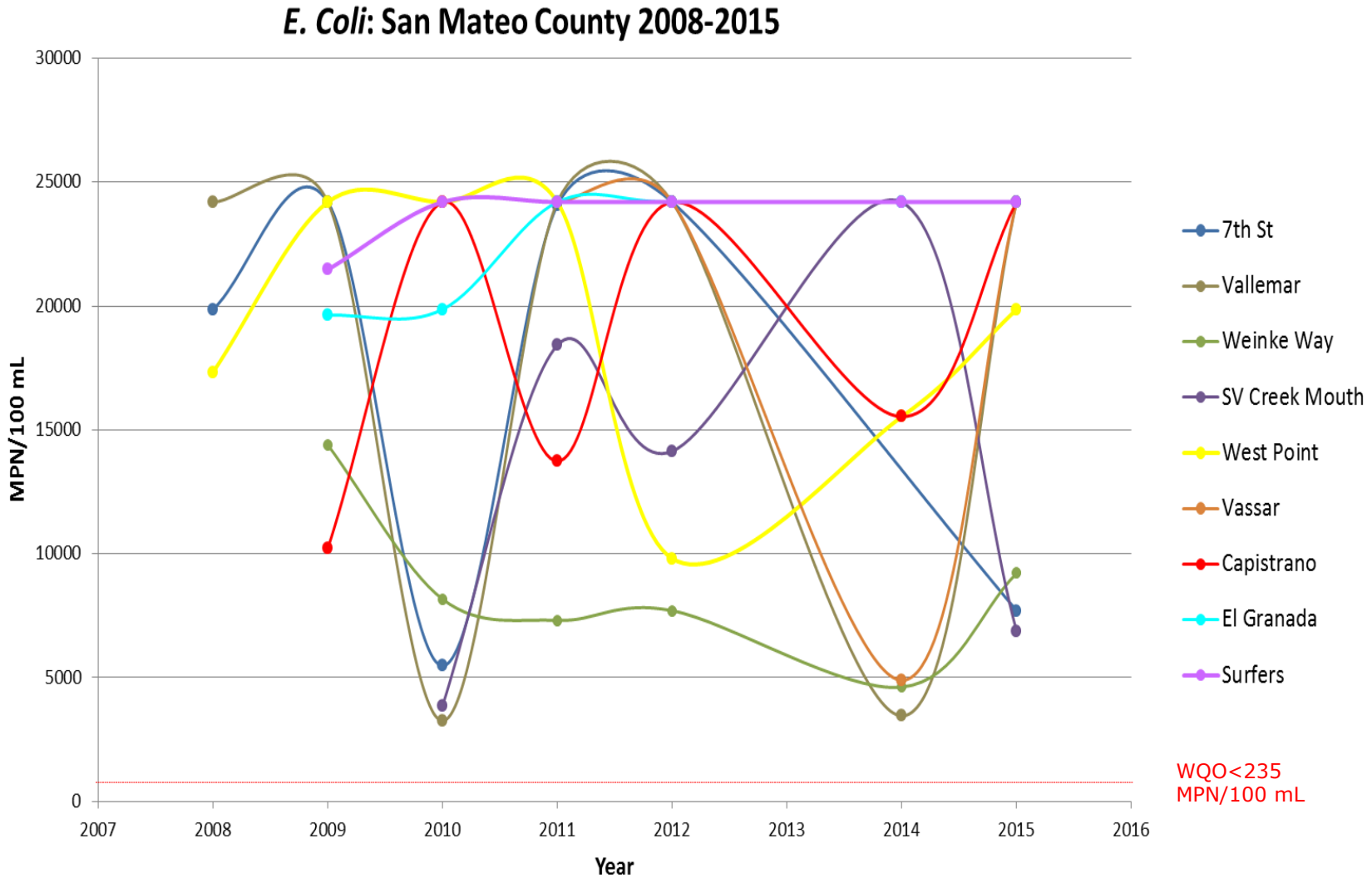
* Red indicates exceedance of water quality objectives

E. coli 2015

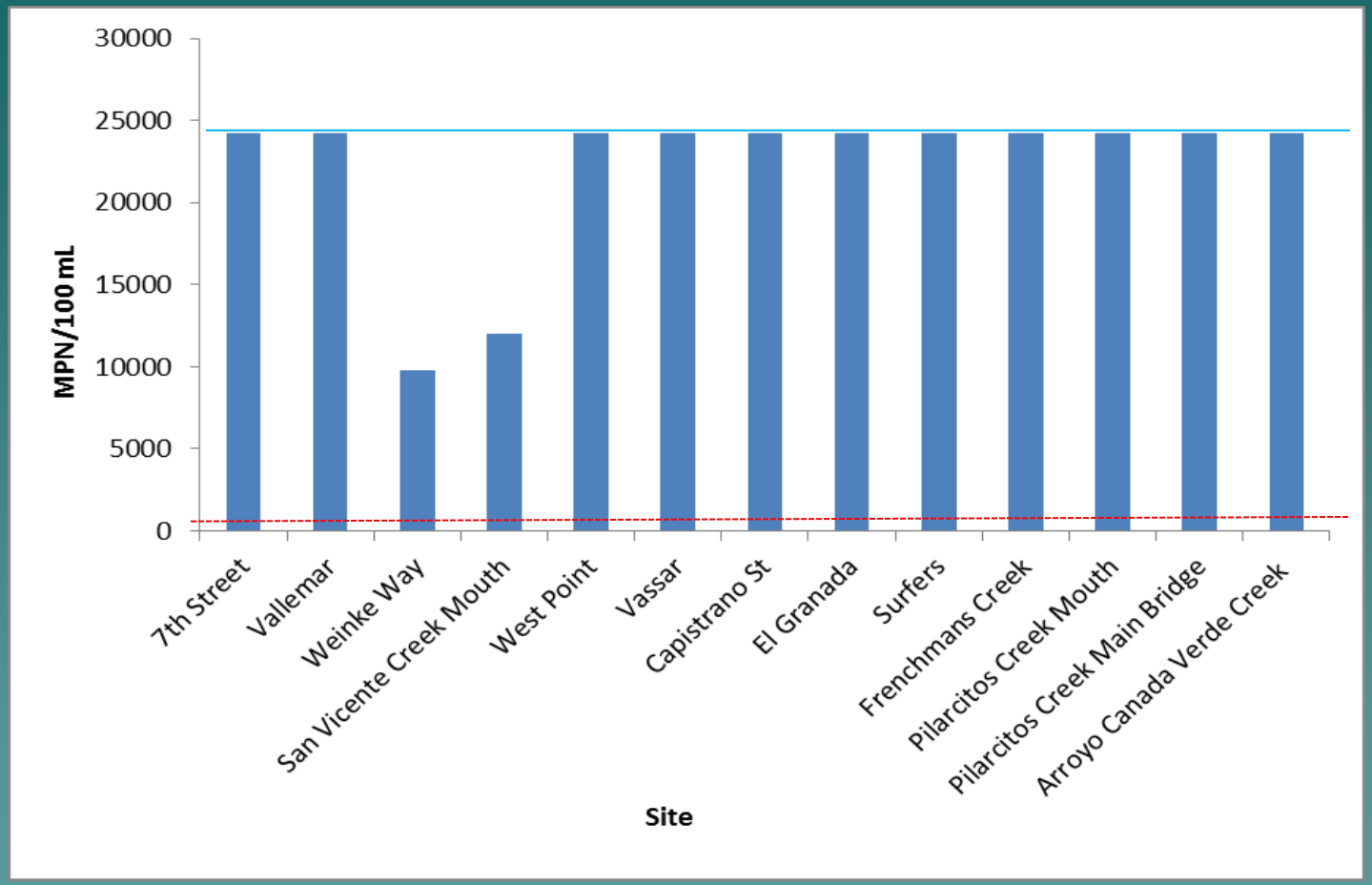


Detection Limit: 24,196 MPN/100 mL

WQO<235 MPN/100 mL

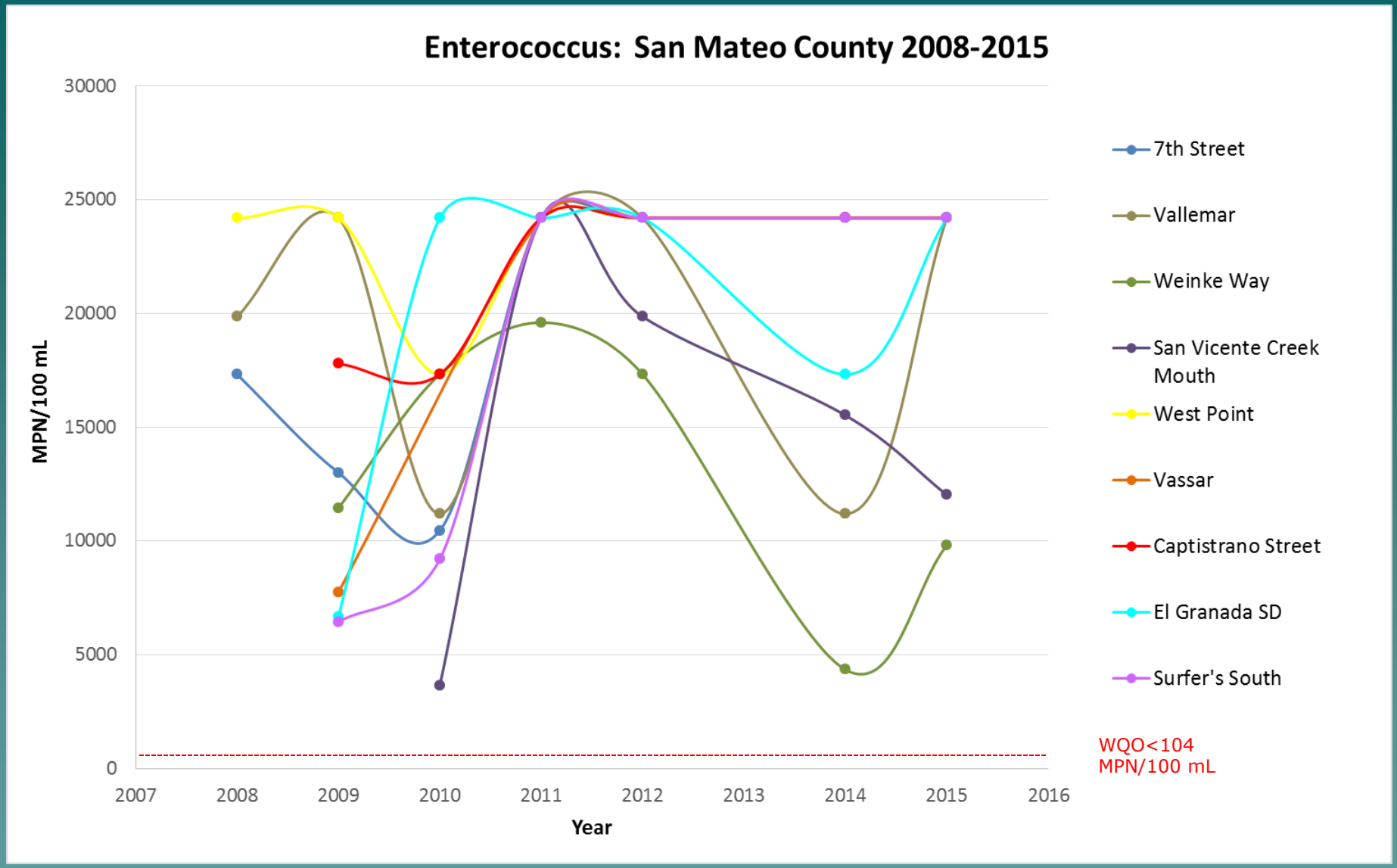

E. Coli: San Mateo County 2008-2015
MPN/100 mL
30000
25000
20000
15000
10000
5000
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
7th St
Vallemar
Weinke Way
SV Creek Mouth
West Point
Vassar
Capistrano
El Granada
Surfers
WQO<235
MPN/100 mL

Enterococcus 2015

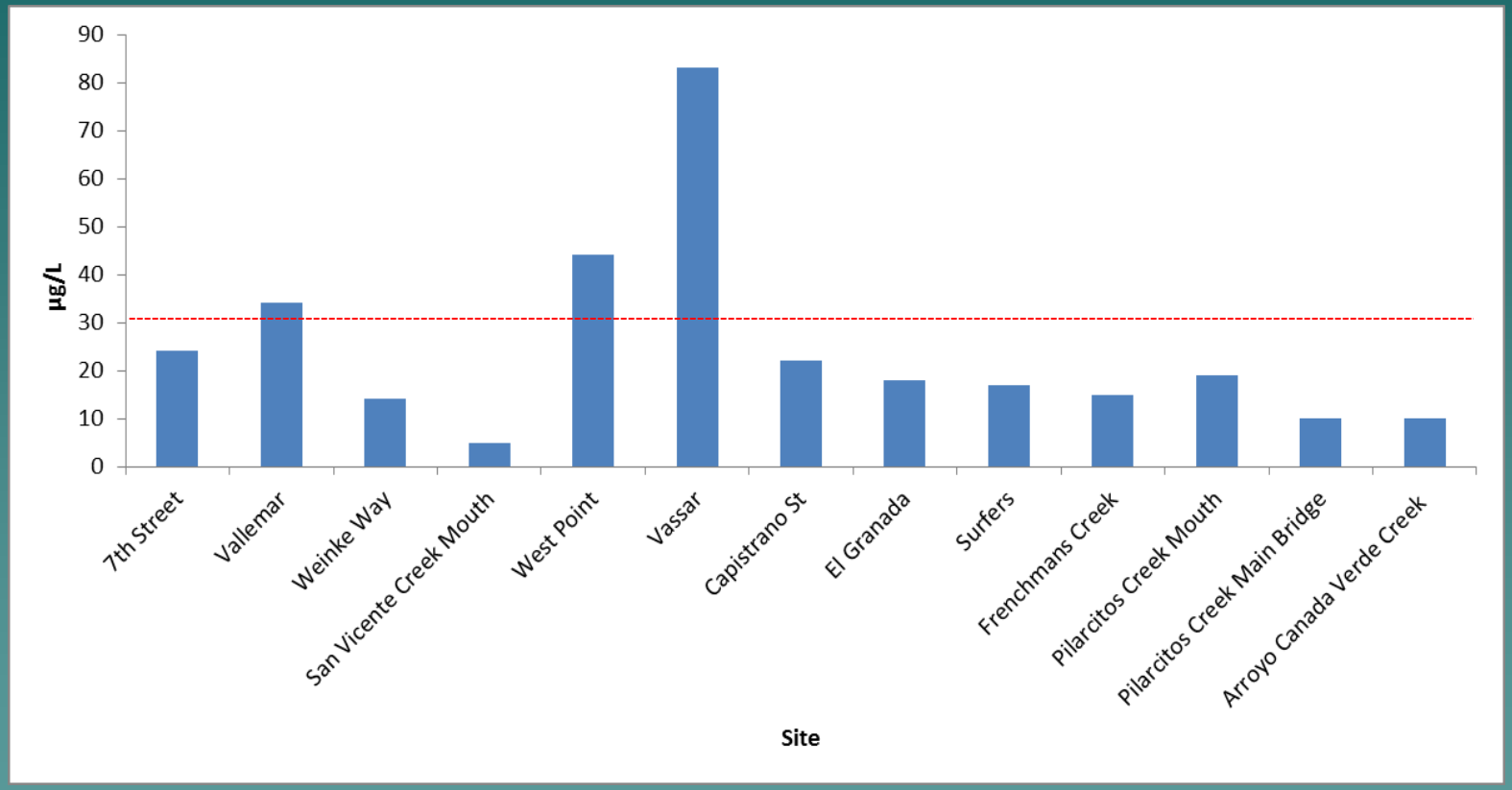


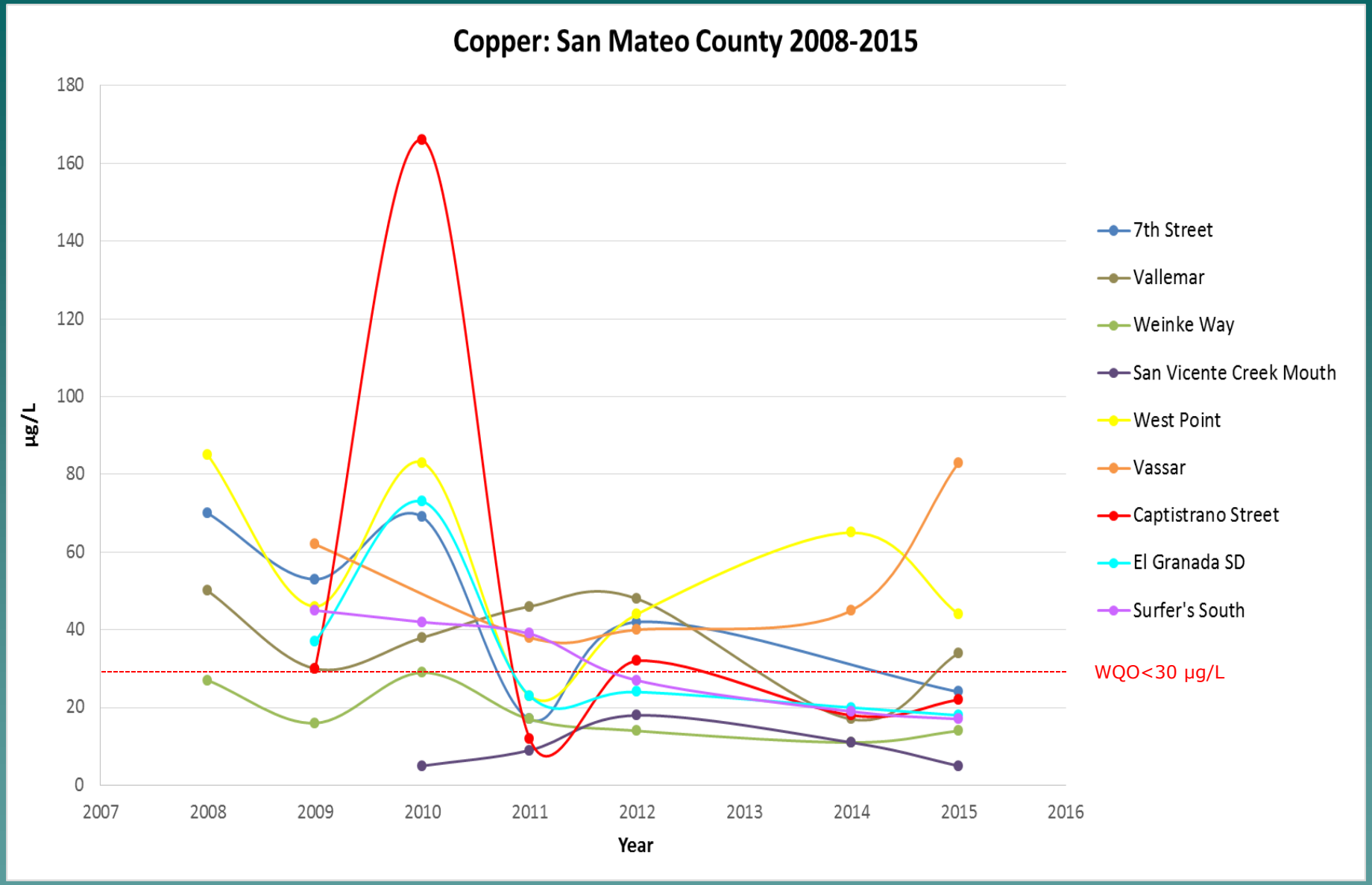
Detection Limit: 24,196 MPN/100 mL

WQO<104 MPN/100 mL

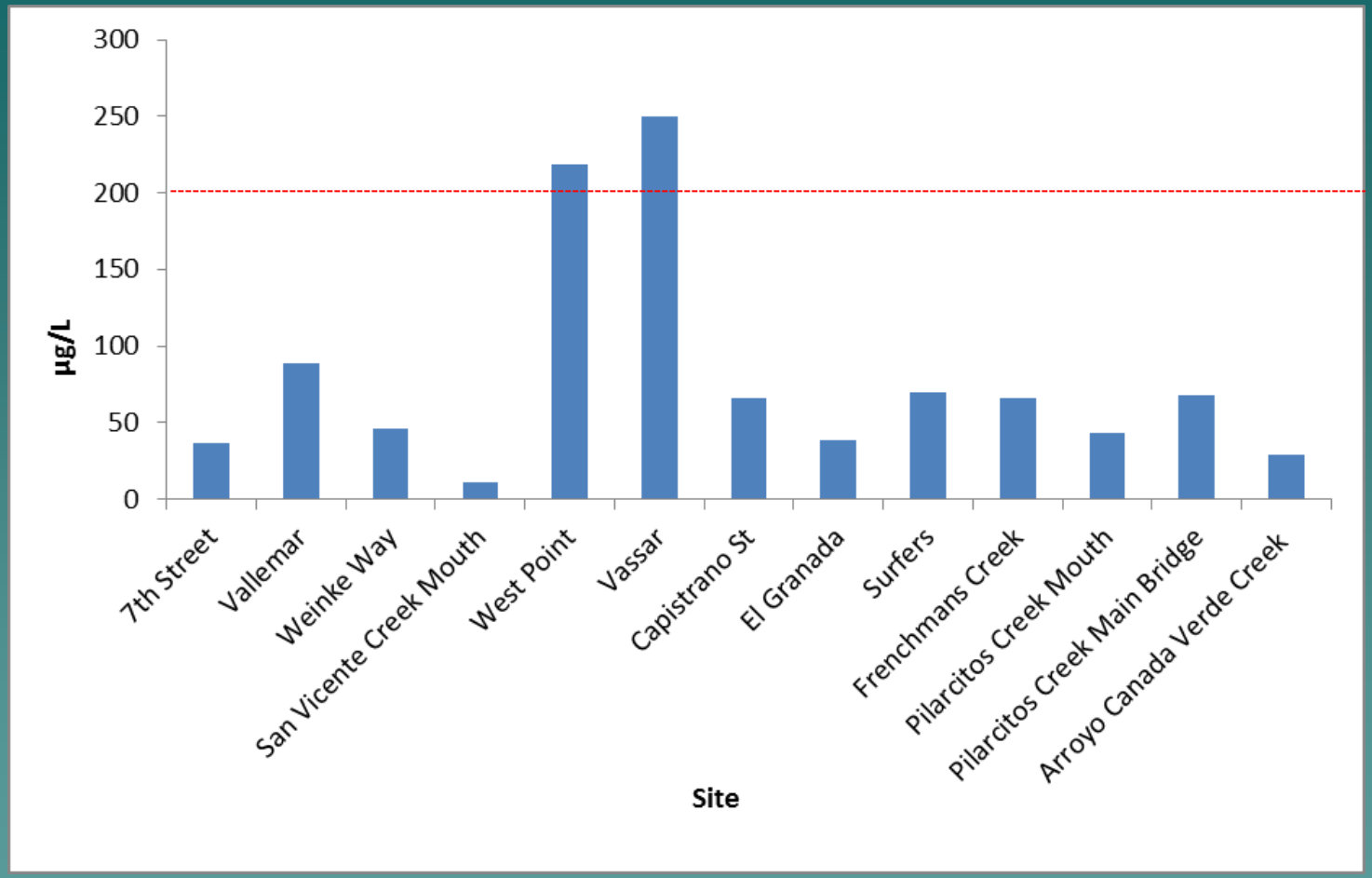

Enterococcus: San Mateo County 2008-2015
30000
25000
20000
15000
10000
5000
0
MPN/100 mL
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Captistrano Street
El Granada SD
Surfer's South
WQO<104
MPN/100 mL

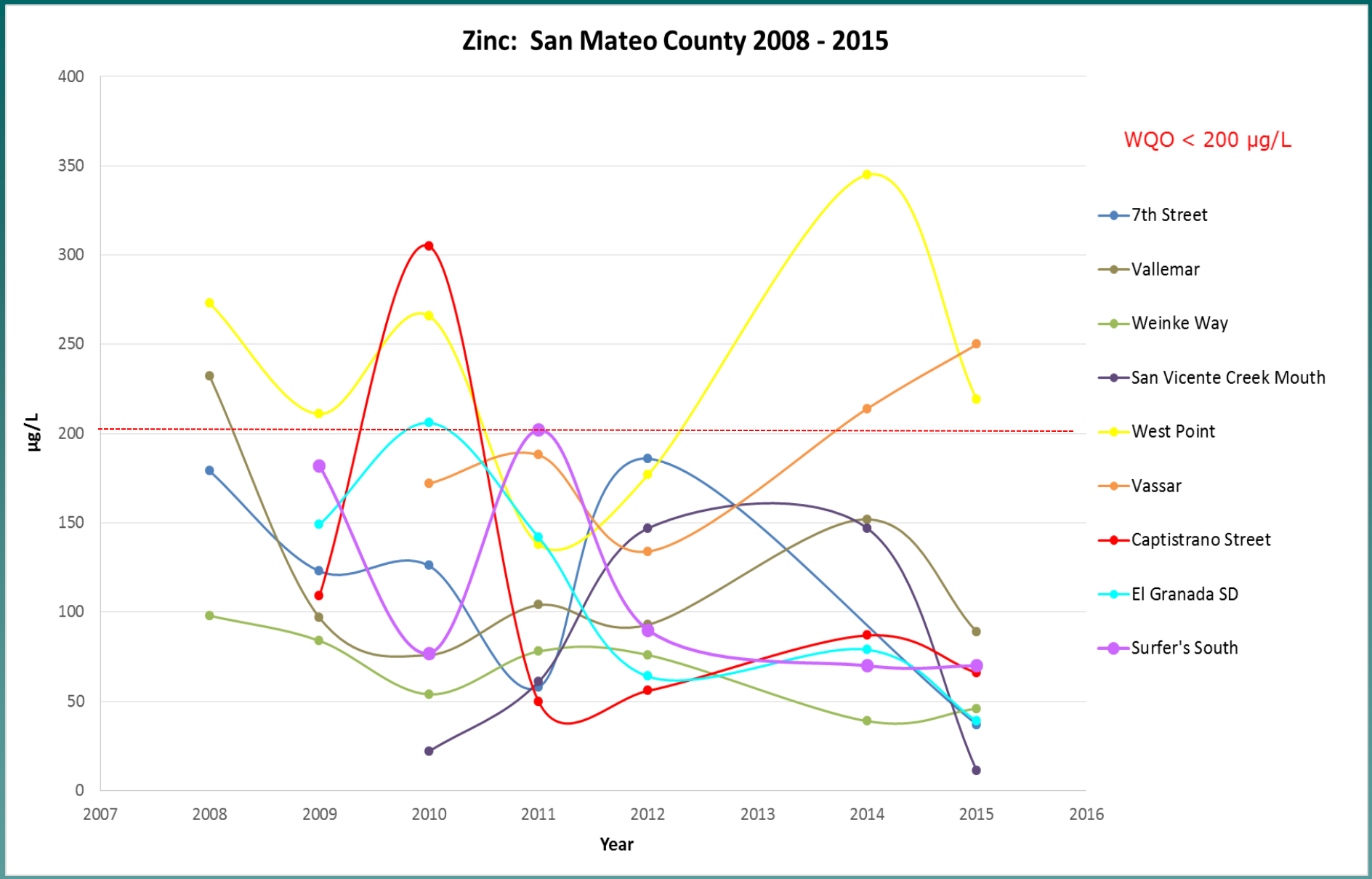
Copper (Cu) 2015



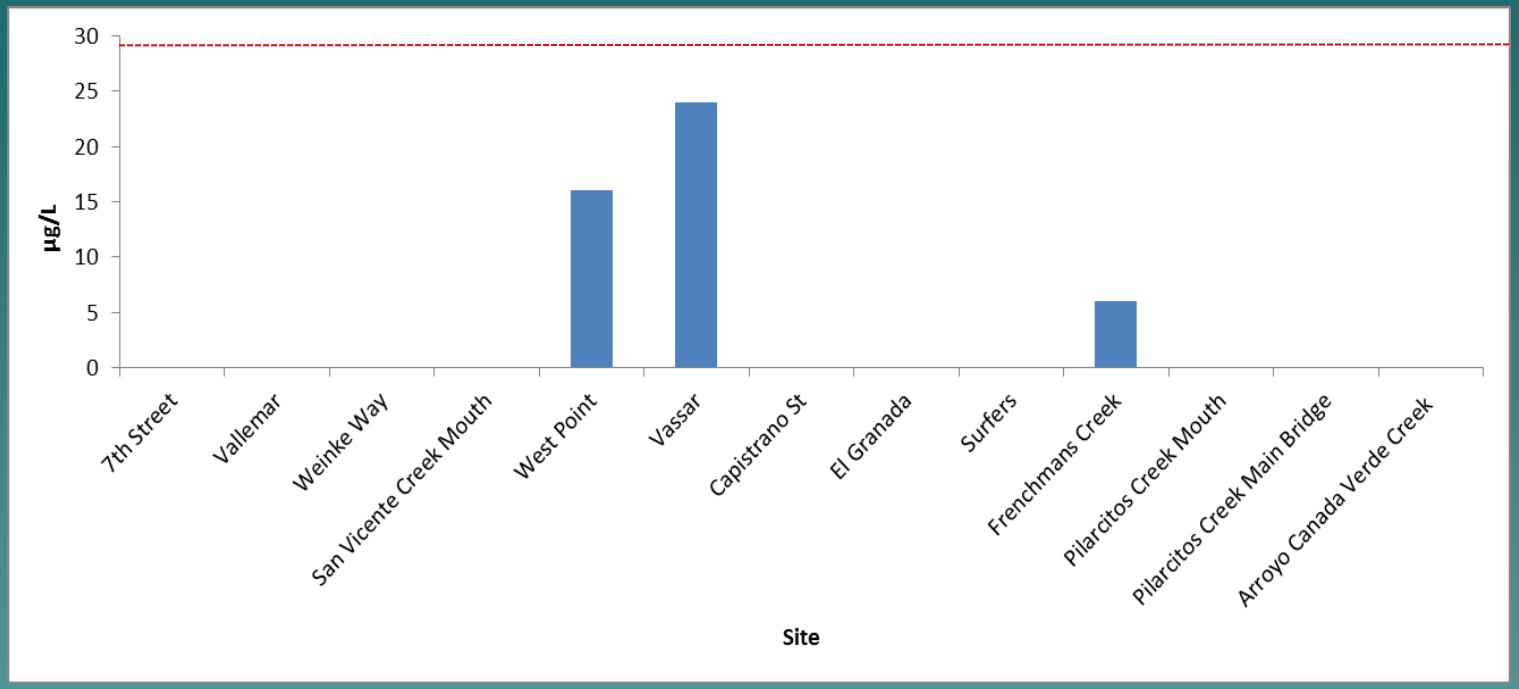

Copper: San Mateo County 2008-2015
180
160
140
120
100
80
60
40
20
0
µg/L
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Captistrano Street
El Granada SD
Surfer's South
WQO<30 µg/L

Zinc (Zn) 2015

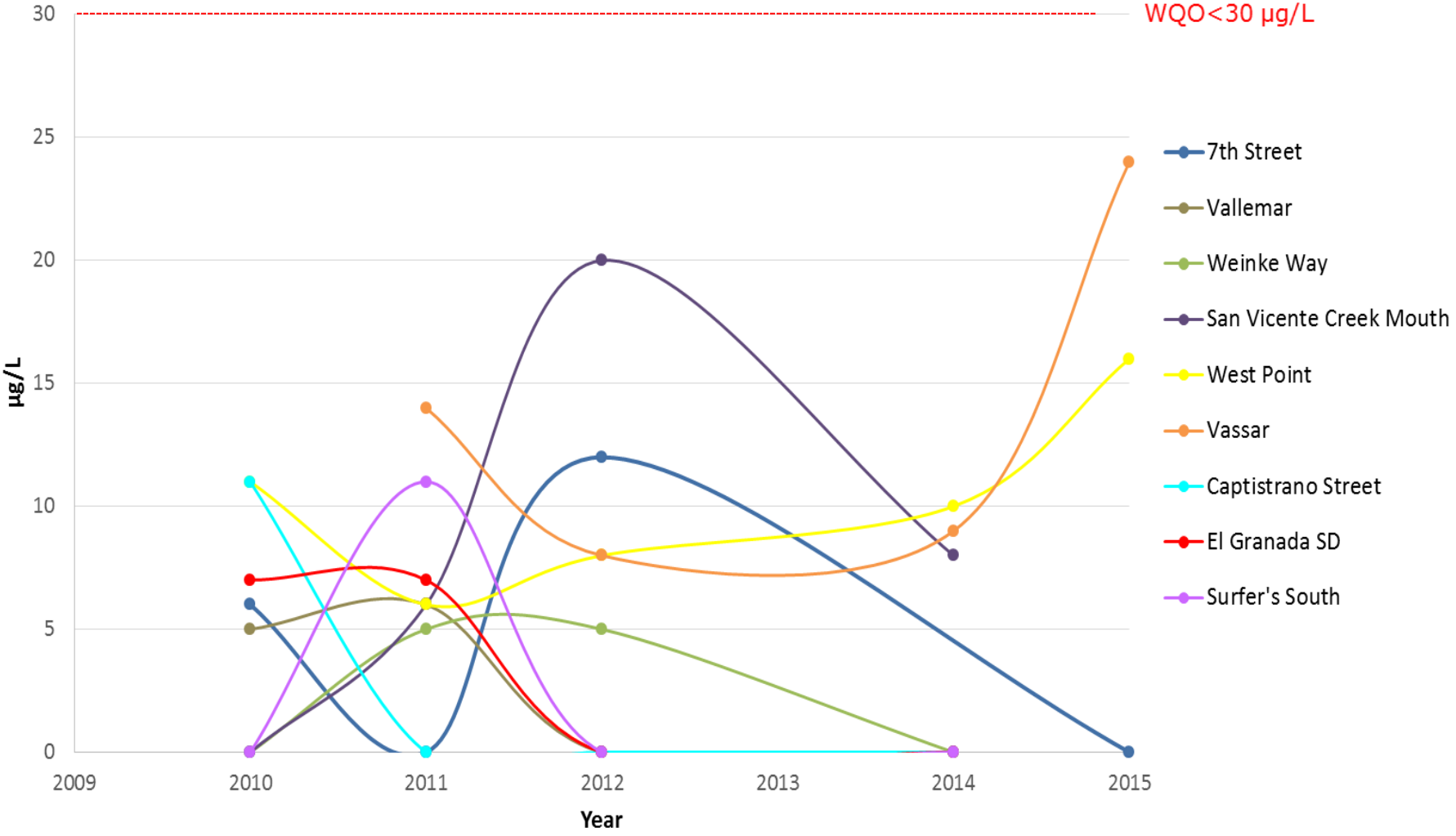

300
250
200
150
100
50
0
µg/L
WQO < 200 µg/L
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Capistrano St
El Granada
Surfers
Frenchmans Creek
Pilarcitos Creek Mouth
Pilarcitos Creek Main Bridge
Arroyo Canada Verde Creek
Site


Zinc: San Mateo County 2008 - 2015
400
350
300
250
200
150
100
50
0
µg/L
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
WQO < 200 µg/L
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Captistrano Street
El Granada SD
Surfer's South

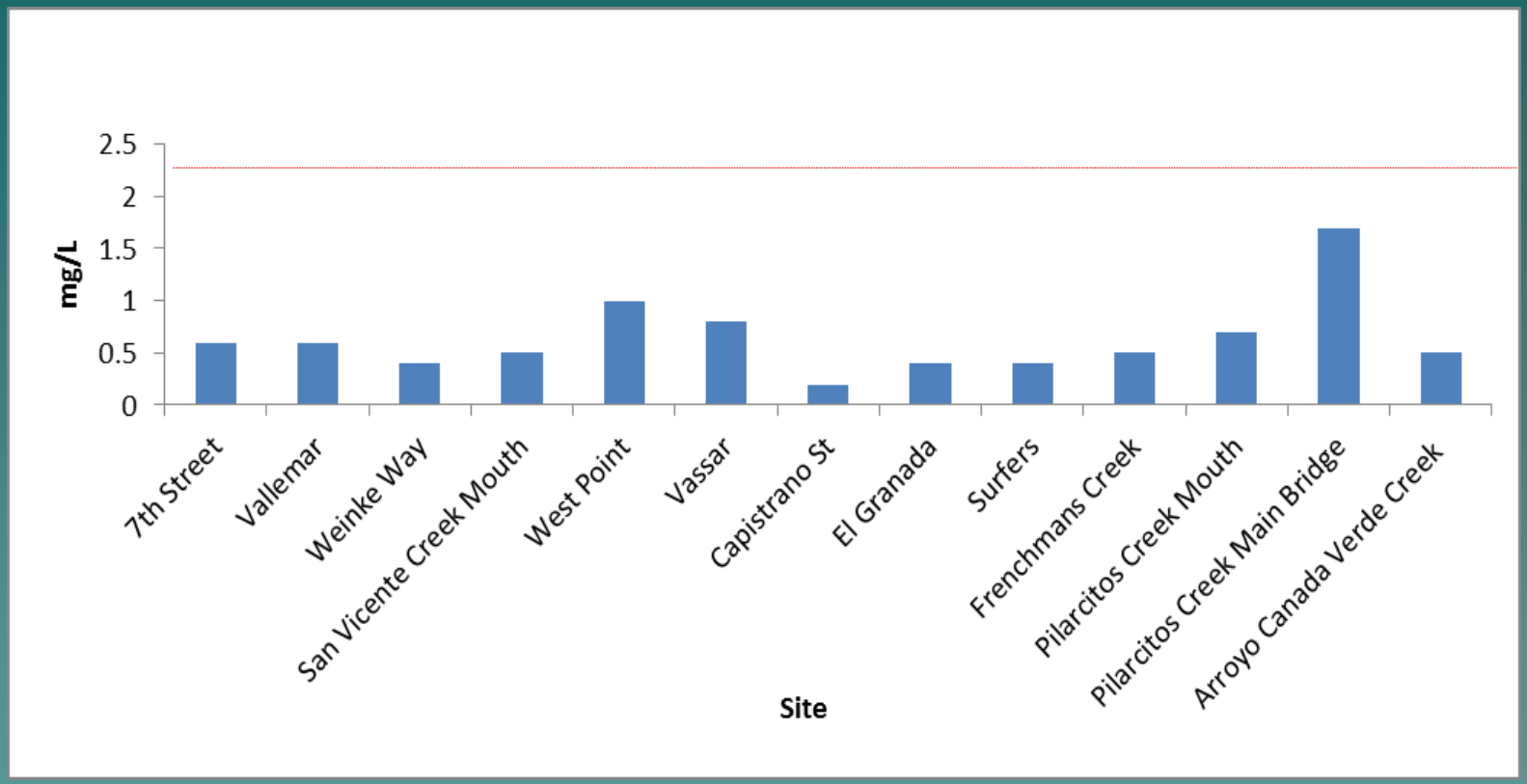
Lead (Pb) 2015

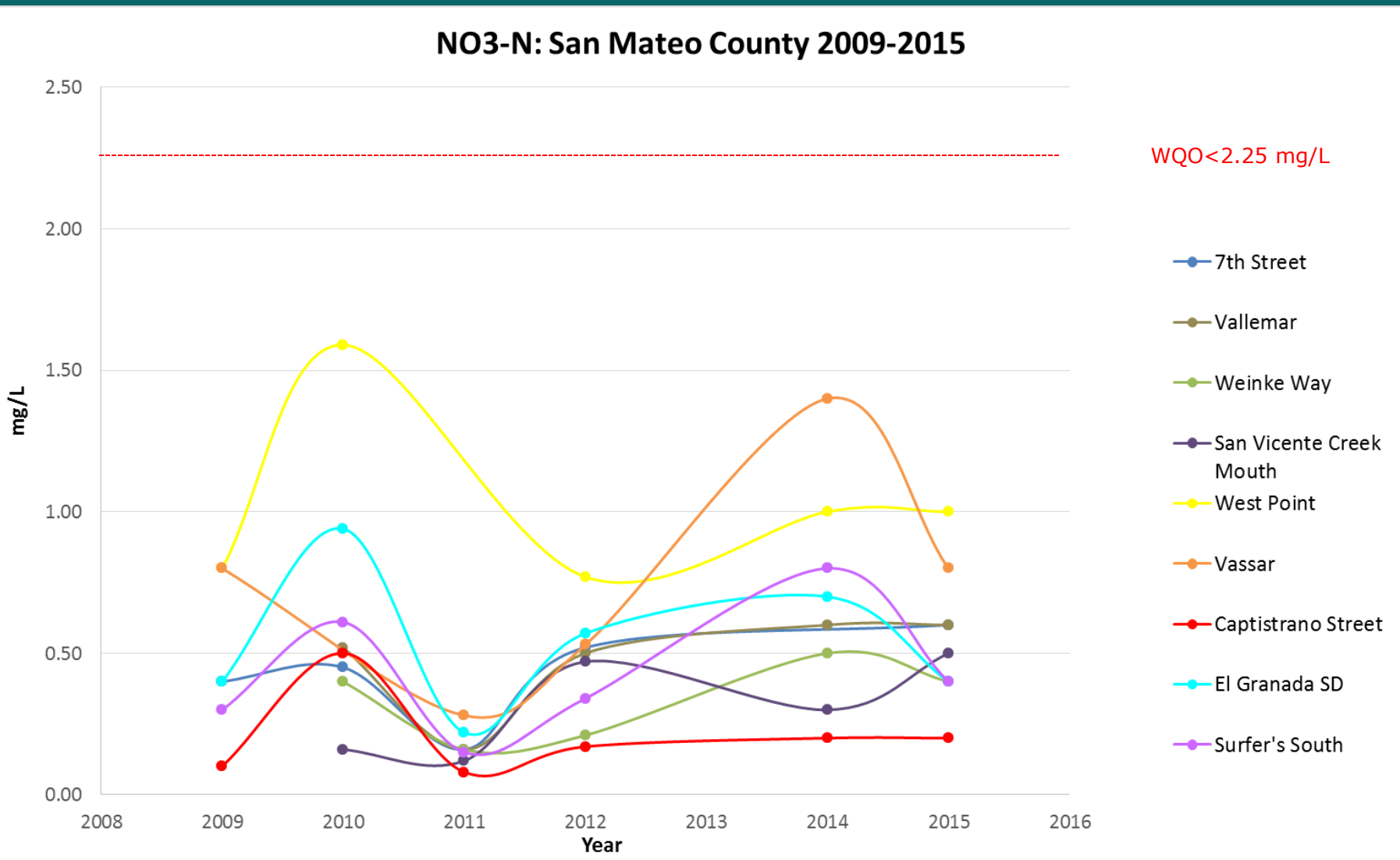


WQO<30 µg/L

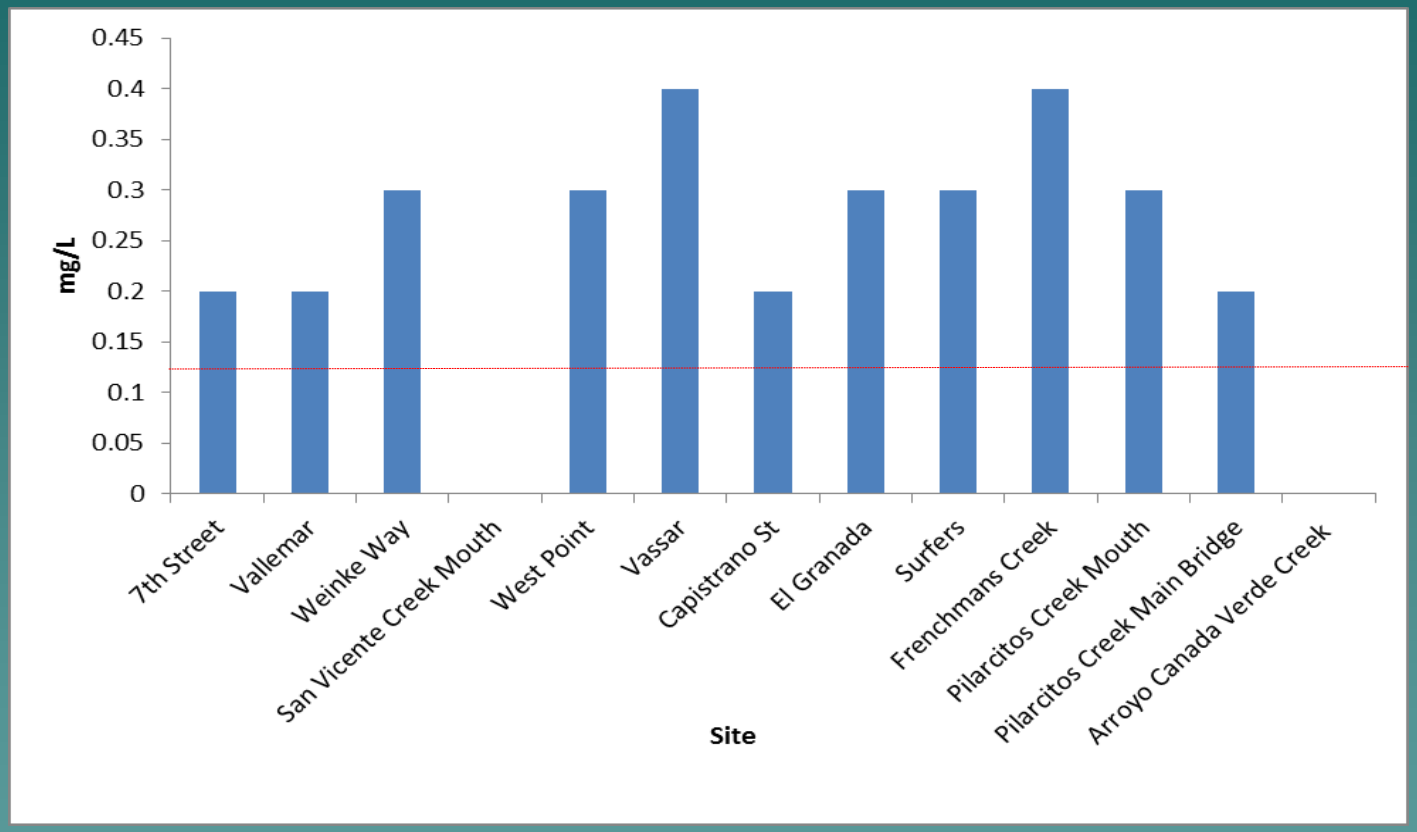

Lead: San Mateo County 2010-2015
WQO<30 µg/L
µg/L
30
25
20
15
10
5
0
2009
2010
2011
2012
2013
2014
2015
Year
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Captistrano Street
El Granada SD
Surfer's South

Nitrate (NO3-N) 2015

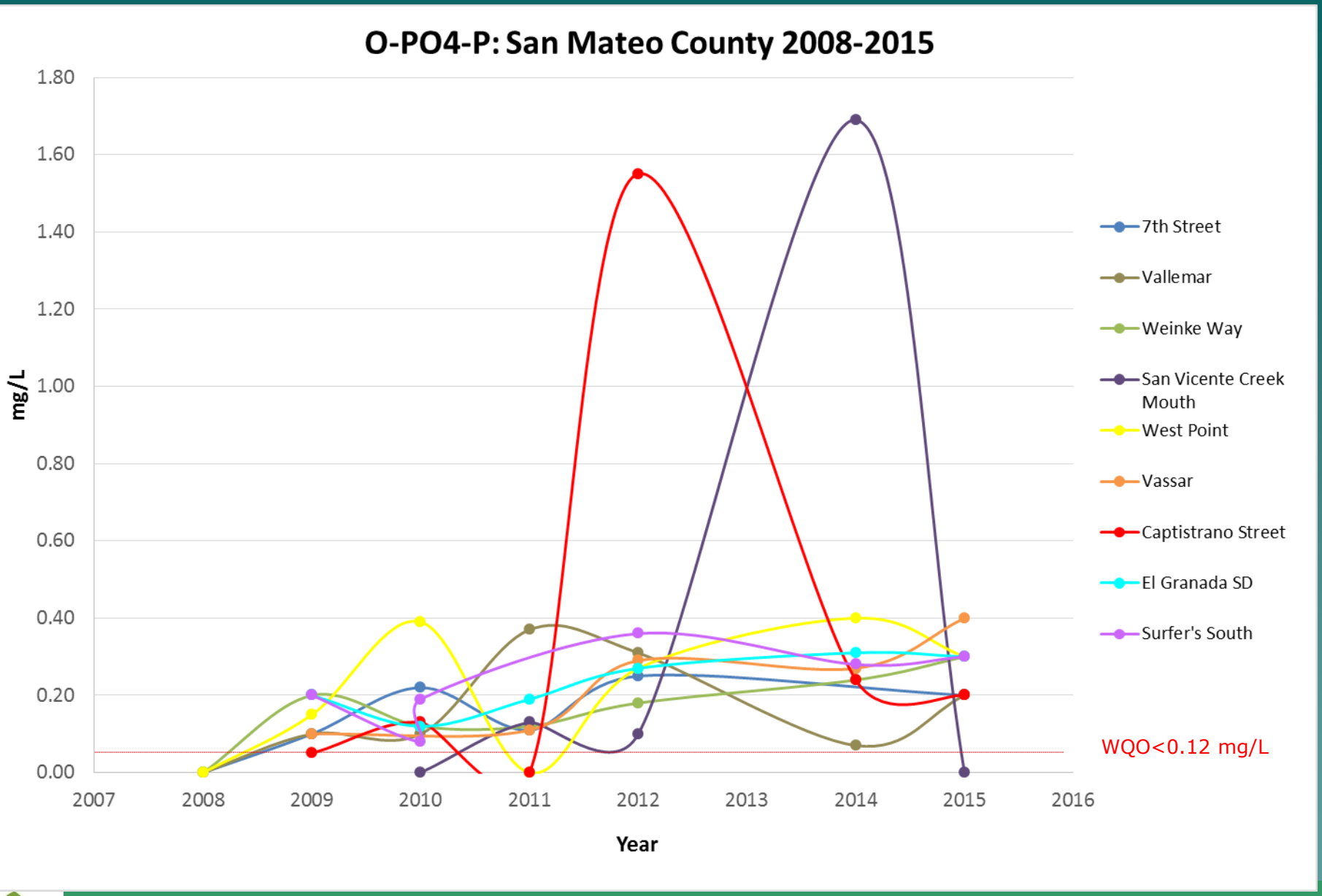



NO3-N: San Mateo County 2009-2015
2.50
2.00
1.50
1.00
0.50
0.00
mg/L
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
WQO<2.25 mg/L
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Captistrano Street
El Granada SD
Surfer's South

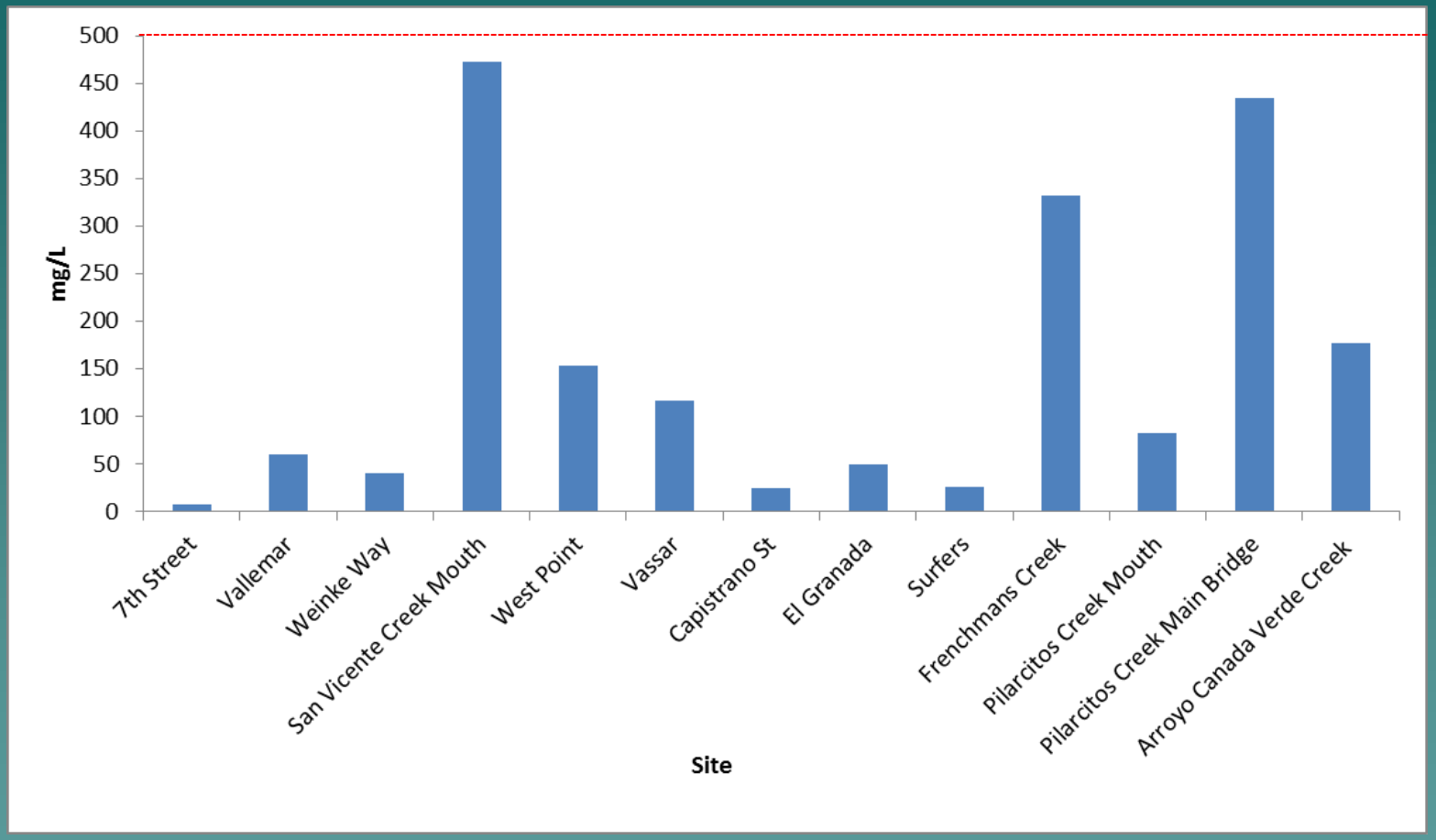
Orthophosphate (O-PO4) 2015

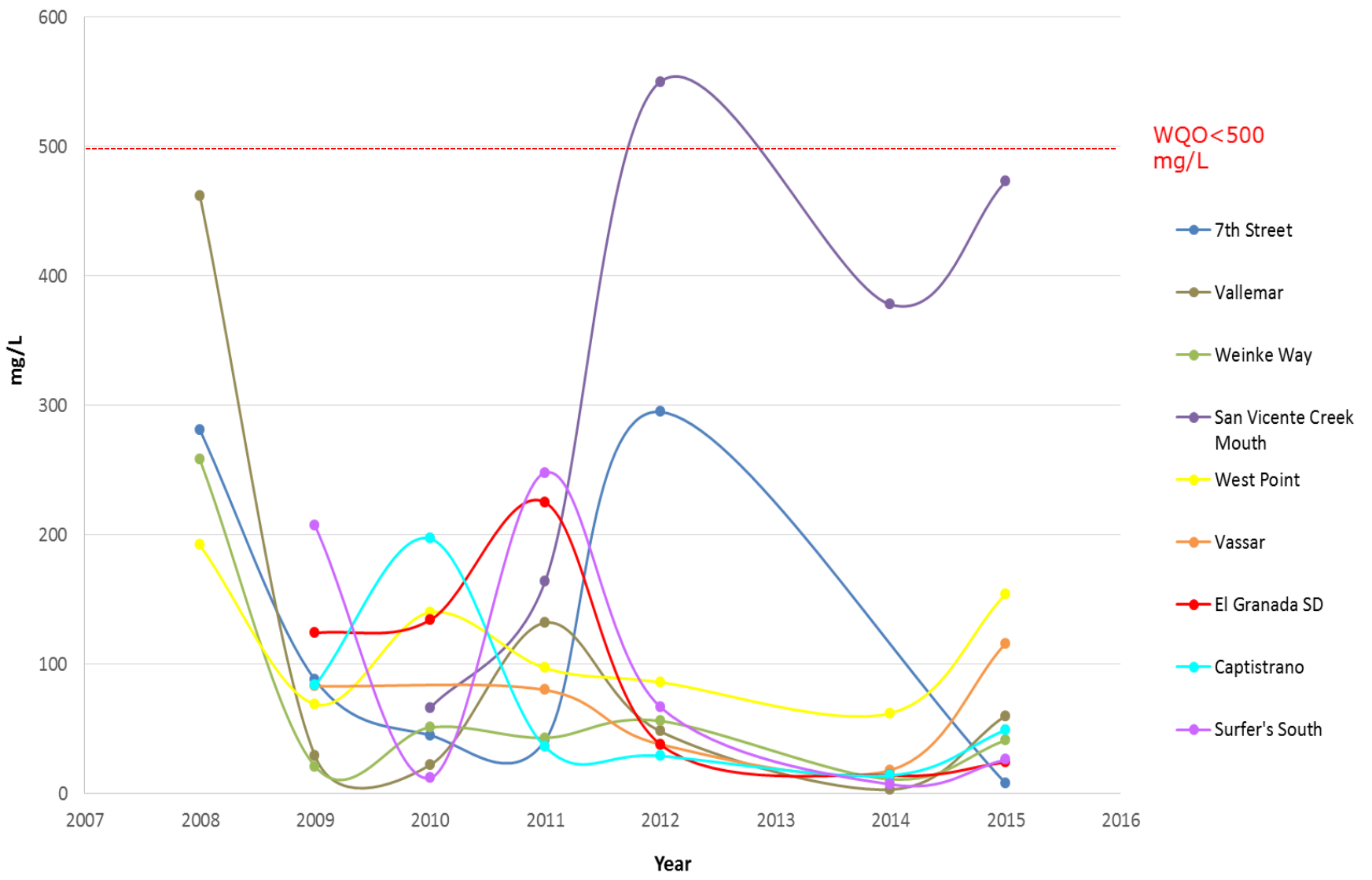


WQO<0.12 mg/L


O-PO4-P: San Mateo County 2008-2015
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
mg/L
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
7th Street
Vallemar
Weinke Way
San Vicente Creek Mouth
West Point
Vassar
Captistrano Street
El Granada SD
Surfer's South
WQO<0.12 mg/L

Total Suspended Solids 2015




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

SMC Results Summary

- **2015 summary (13 sites):**
  - Bacteria: 100% exceedance
  - O-PO4: 85% exceedance
  - Cu: 23% exceedance (West Point, Vassar, Vallemar)
  - Zn: 15% exceedance (West Point, Vassar)
  - Pb, NO3-N, TSS: 0% exceedance
- **2008-2015 summary (9 historic sites)**
  - Bacteria: 100% exceedance
  - O-PO4: 67% exceedance. El Granada every year
  - Cu: 47 % exceedance. Vassar every year
  - Zn: 16% exceedance. West Point exceeded most often
  - TSS: 2% exceedance
  - Pb, NO3-N: 0% exceedance

Historic Location Summary

- Metals & Nutrients: Lower nitrate and metals but similar O-PO4 to Monterey and Santa Cruz County
- Bacteria: SMC likely similar to Monterey County and Santa Cruz County?
  - Different detection limits

Next Steps

- **Implement Best Management Practices**
  - Vegetated swales, permeable surface, education/outreach
- **Continue program**
  - 7 years in San Mateo vs 16 years in Santa Cruz and Monterey Counties
  - Make comparisons over time
- **Multi-year funding for cost-effectiveness**

Thank you!

Questions?

Brittani Bohlke

Kaena Meyer

San Mateo County Resource Conservation District

Brittani@sanmateorcd.org

Kaena@sanmateorcd.org

650.712.7765