First Flush 2019 Water Quality Results

SAN MATEO RESOURCE CONSERVATION DISTRICT

Presentation to:
San Mateo RCD Board
February 20, 2020

Resource Conservation District

Non-Regulatory Technical Assistance

Water

Climate

Wildlife

Agriculture

What is First Flush?

- First big rain of the season
- Freshwater runoff enters creeks, storm drains, and the ocean
- High pollution

Why is First Flush So Polluted?

Why Do We Care? Why Do We Do This?

- Helps identify what pollutants are of greatest concern and where
- Establishes a continuous and consistent water quality dataset
- Provides information to support water quality improvements
- Allows informed management
- Good stewardship!

First Flush Partners

Sewer Authority Mid-Coastside

SAM

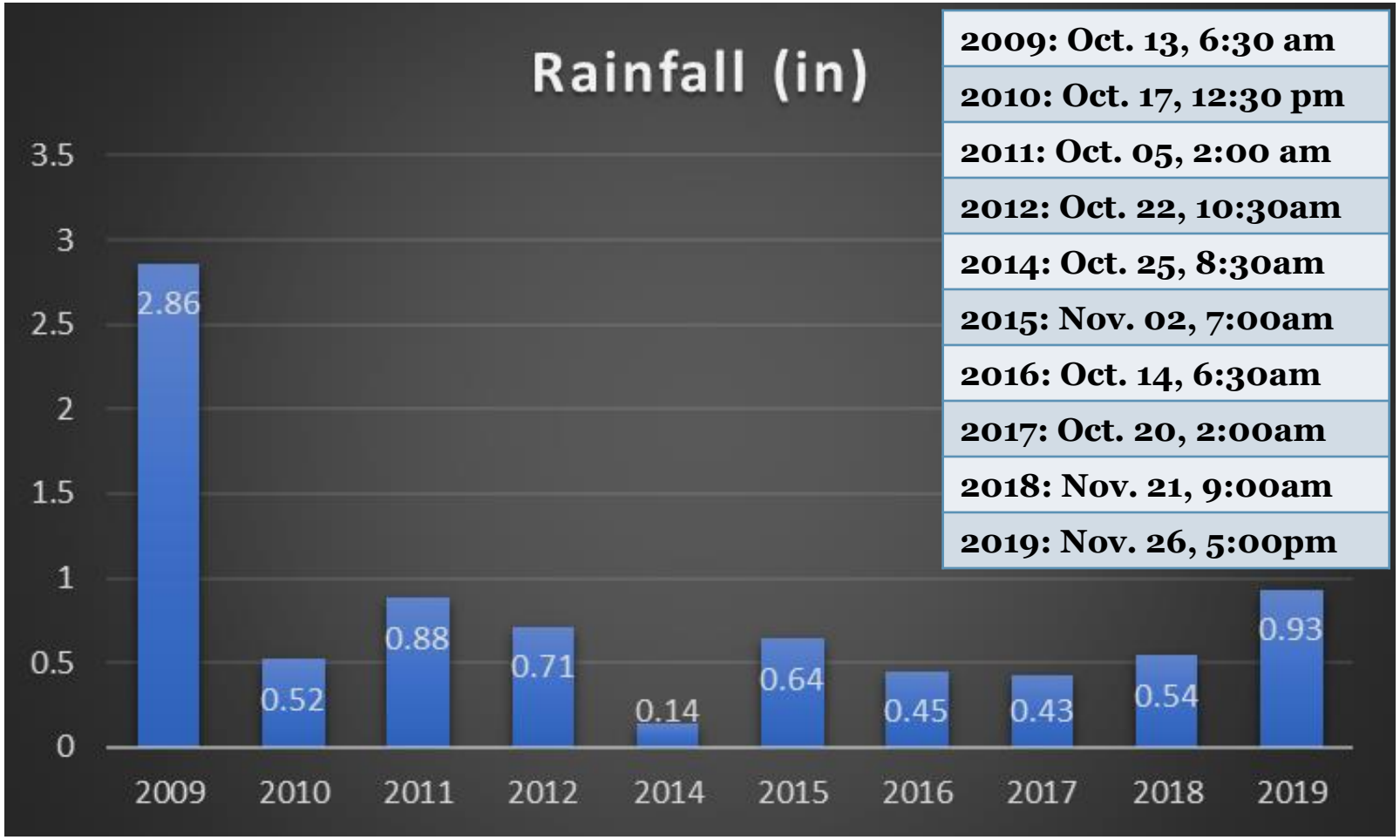
Volunteers!

Rely completely on volunteer involvement.
Thank you to all our volunteers!

Citizen science

Conduct training to teach protocol

First Flush Precipitation History

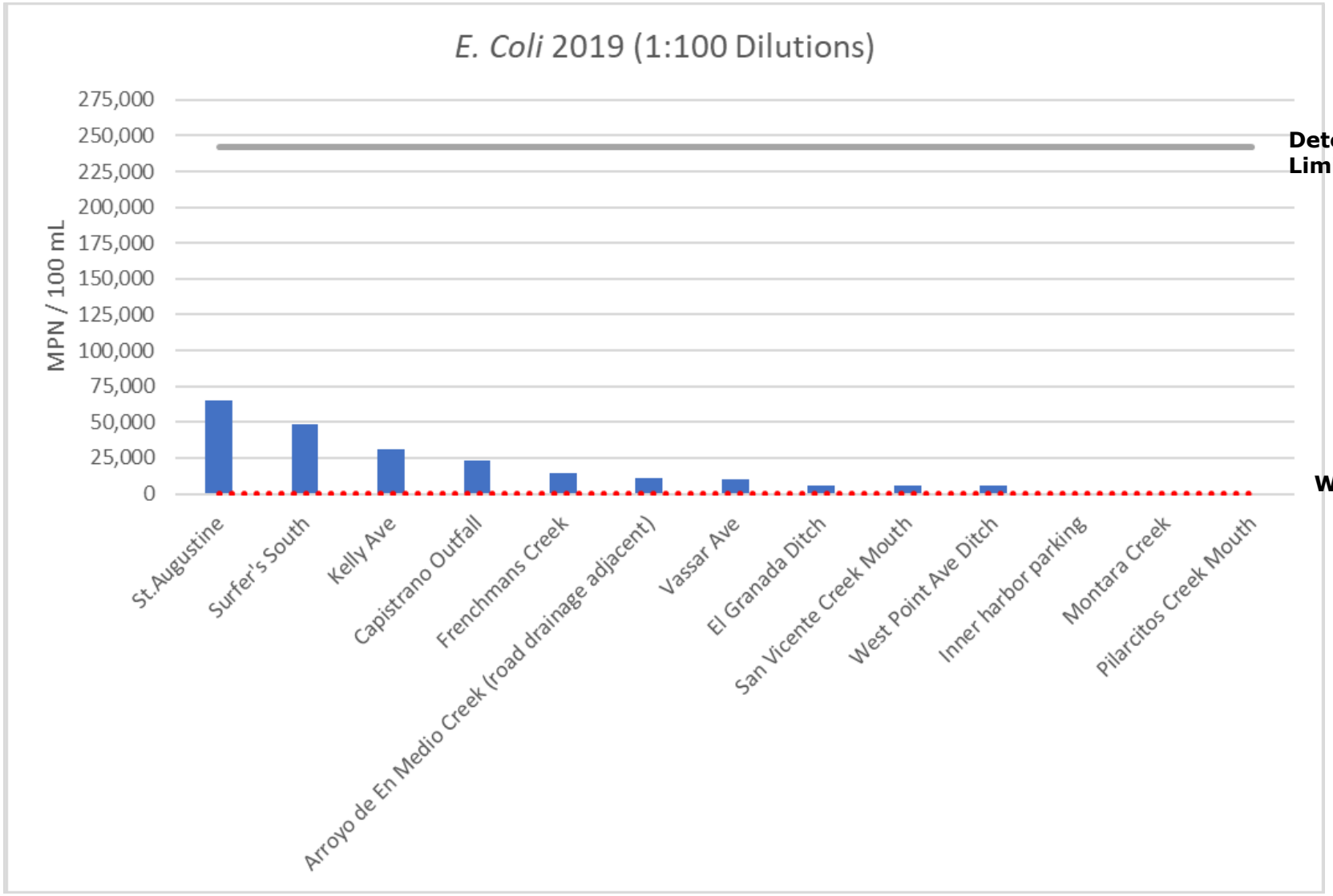


2009: Oct. 13, 6:30 am
2010: Oct. 17, 12:30 pm
2011: Oct. 05, 2:00 am
2012: Oct. 22, 10:30am
2014: Oct. 25, 8:30am
2015: Nov. 02, 7:00am
2016: Oct. 14, 6:30am
2017: Oct. 20, 2:00am
2018: Nov. 21, 9:00am
2019: Nov. 26, 5:00pm

Rain Decides!
This year was November 26

What did we test for?

Pollutant	Potential Sources	Effects
Fecal Indicator Bacteria (*E.Coli, Enterococcus*)	Feces of warm blooded animals (Humans, dogs, horses, etc.)	Indicator for pathogens that can harm human health
Nutrients(Nitrate, Orthophosphate)	Fertilizers, pesticides, detergents	Ecosystem and recreation impacts
Metals (Copper, Zinc, Lead)	Gutters/roofs, brake pads, tires, industrial waste, paint, fires	Human health impacts, reduced reproduction and mortality of marine organisms
Total Suspended Solids	Construction, erosion, agricultural runoff, fires	Marine organism impacts (ex: respiratory effects in aquatic organisms)
Physical Measurements: Electrical conductivity, Water temperature, observations	Rain influenced, minerals (salts),	Conductivity tells us if we captured the rain. High temperatures have ecological impacts, observations give context to data


E. Coli 2019 (1:100 Dilutions)
MPN / 100 mL
275,000
250,000
225,000
200,000
175,000
150,000
125,000
100,000
75,000
50,000
25,000
0
Detection Limit: 24,196
WQO<320
St.Augustine
Surfer's South
Kelly Ave
Capistrano Outfall
Frenchmans Creek
Arroyo de En Medio Creek (road drainage adjacent)
Vassar Ave
El Granada Ditch
San Vicente Creek Mouth
West Point Ave Ditch
Inner harbor parking
Montara Creek
Pilarcitos Creek Mouth

Site tour

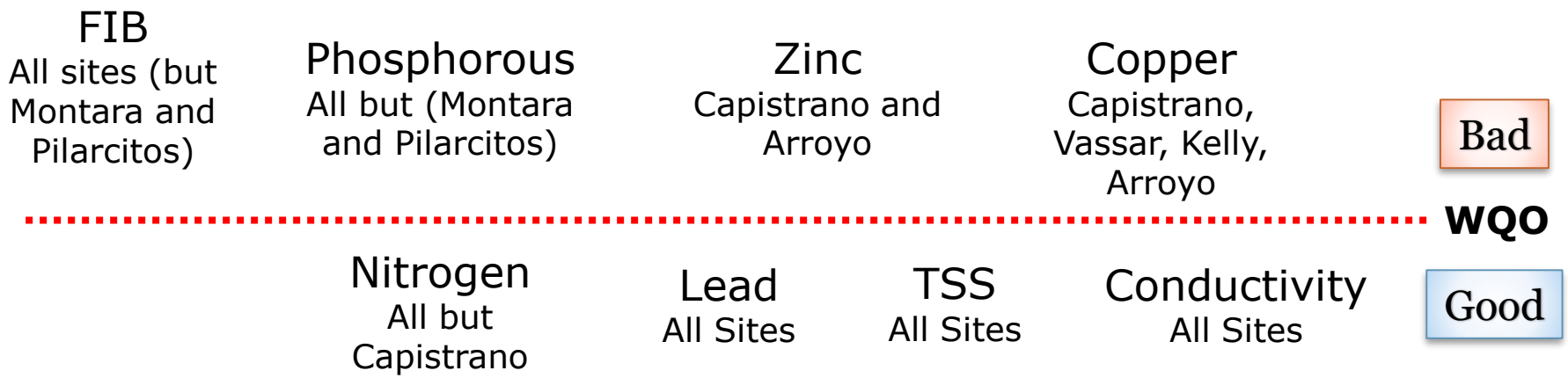
Now we know what we look for.
Lets see where we collected data and what we found:

First Flush 2019 Site and Results Tour

2019 Pollutant Summary

- Pollutants are compared to Water Quality Objectives (WQOs) which are the upper limits of recommended ranges

Which contaminants were above and below their Water Quality Objectives:



What can you do?

Slow it. Spread it. Sink it!

A Homeowner's Guide to Greening Stormwater Runoff

What can you do?

Collect your roof water in a **RAIN BARREL**.

Cost: LOW
Installation difficulty: EASY
See page 24

Plant a **RAIN GARDEN** in your landscape.

Cost: LOW to MODERATE
Installation difficulty: EASY to INTERMEDIATE
See page 27

Install a **WATERBAR** on your driveway.

Cost: MODERATE
Installation difficulty: INTERMEDIATE
See page 35

Use **PERVIOUS PAVERS** when renovating your patio.

Cost: MODERATE - HIGH
Installation difficulty: INTERMEDIATE
See page 30

Next Steps

- Raise Awareness
- Distribute Data
- Recruit for Next Year

Continue First Flush and other education/outreach initiatives (FY20-FY22)

SAM Estimate=$20,000 for 3 years= $60,000 total
PPH Estimate = $10,000 for 3 year= $30,000 total

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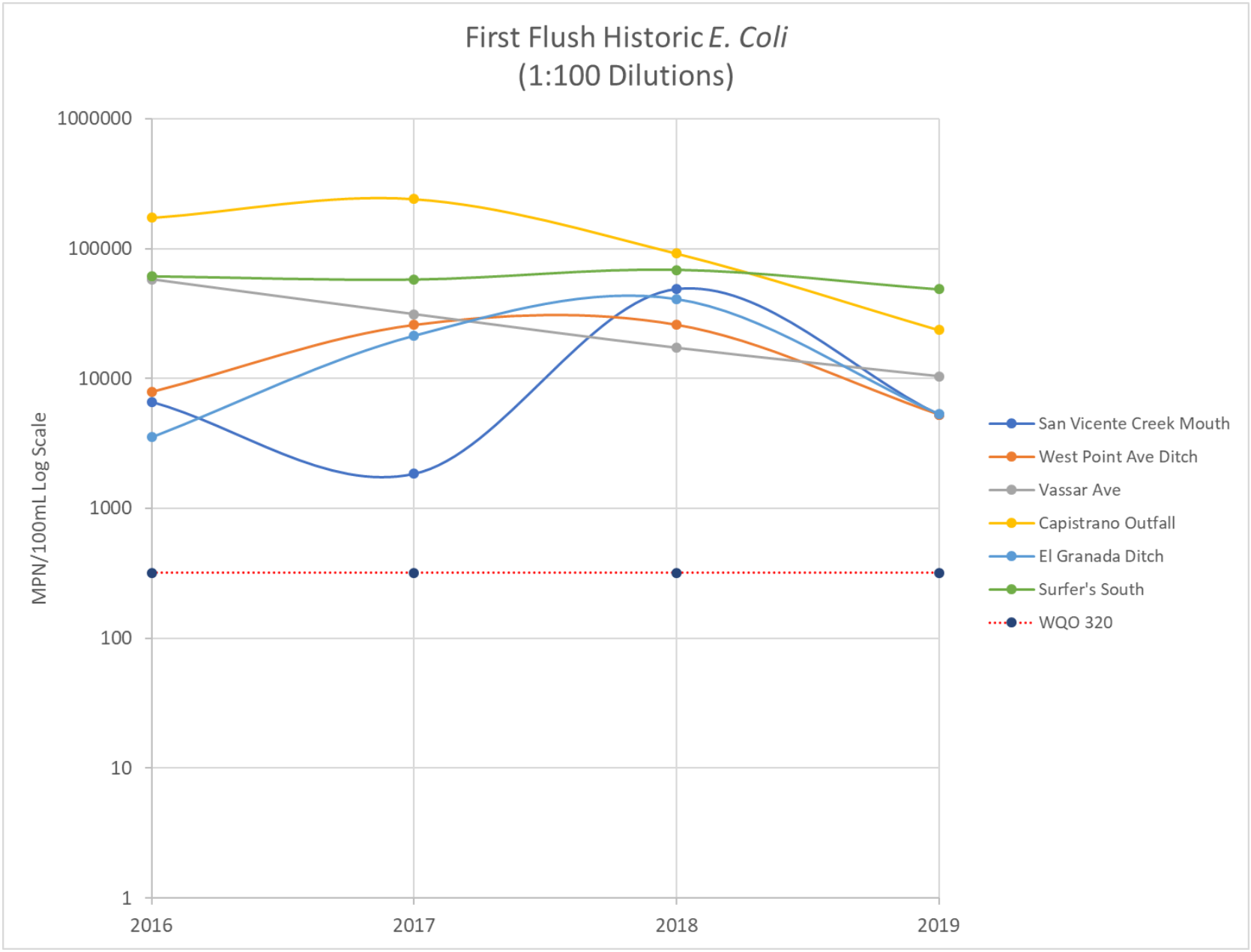
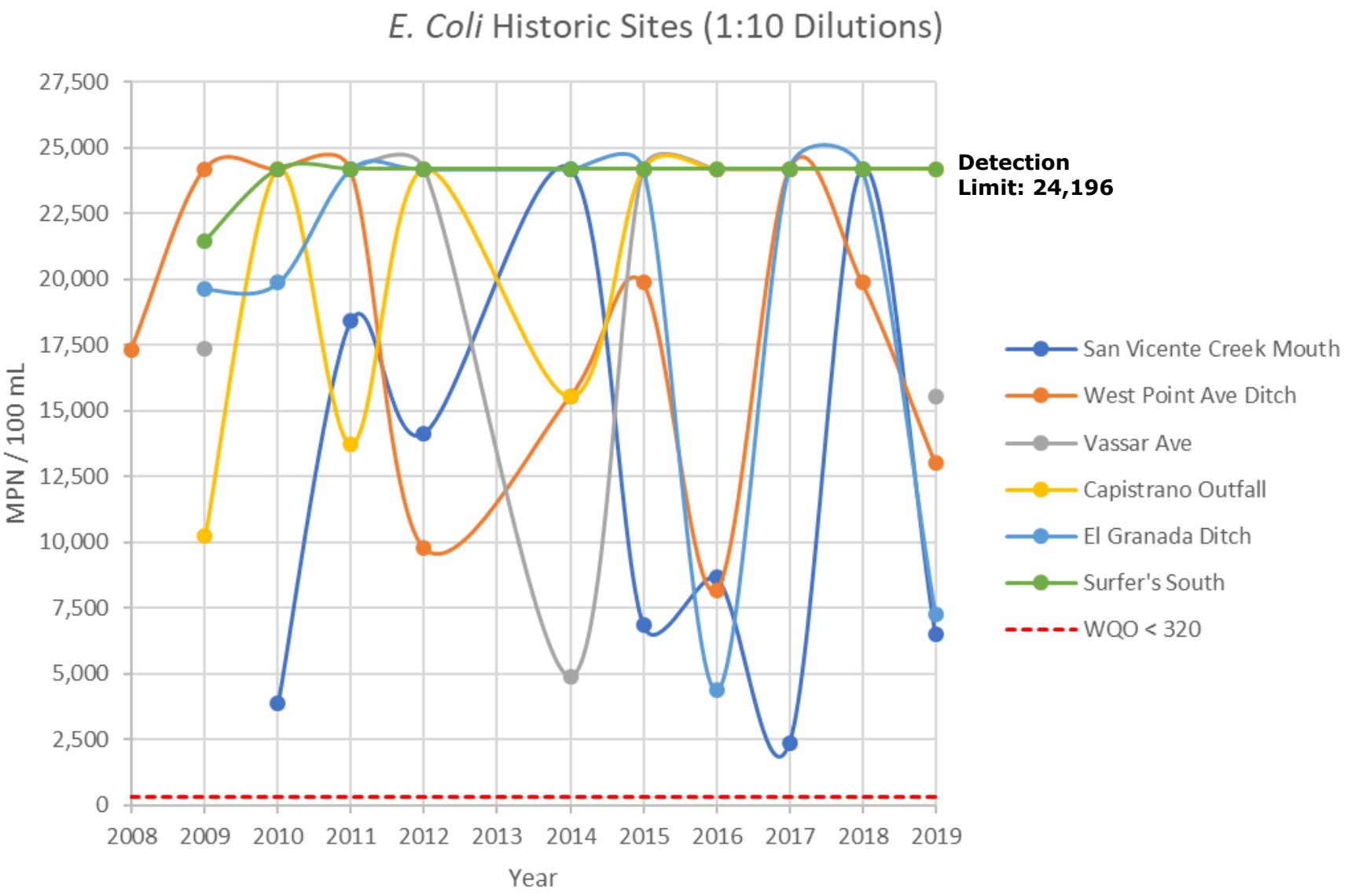
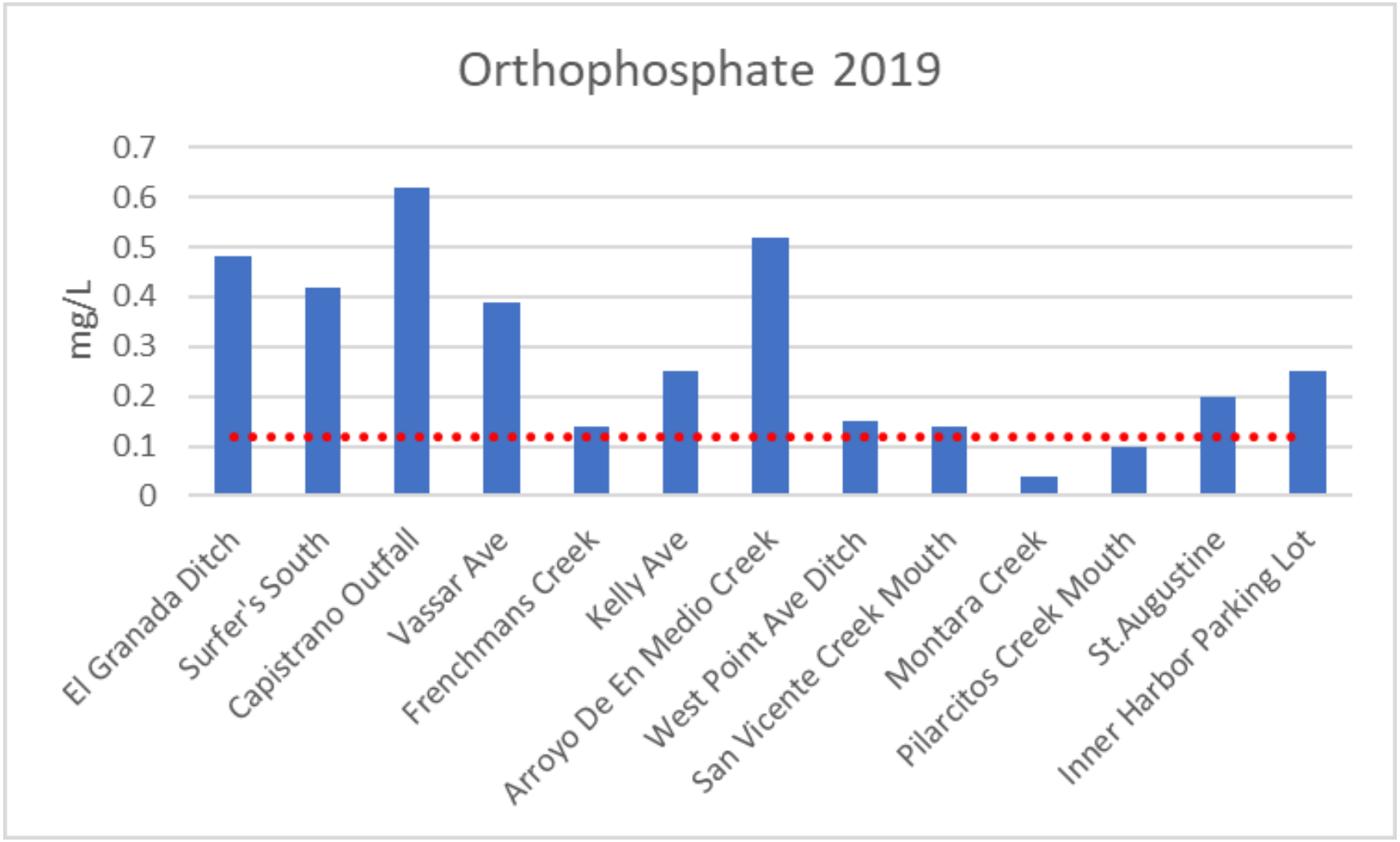
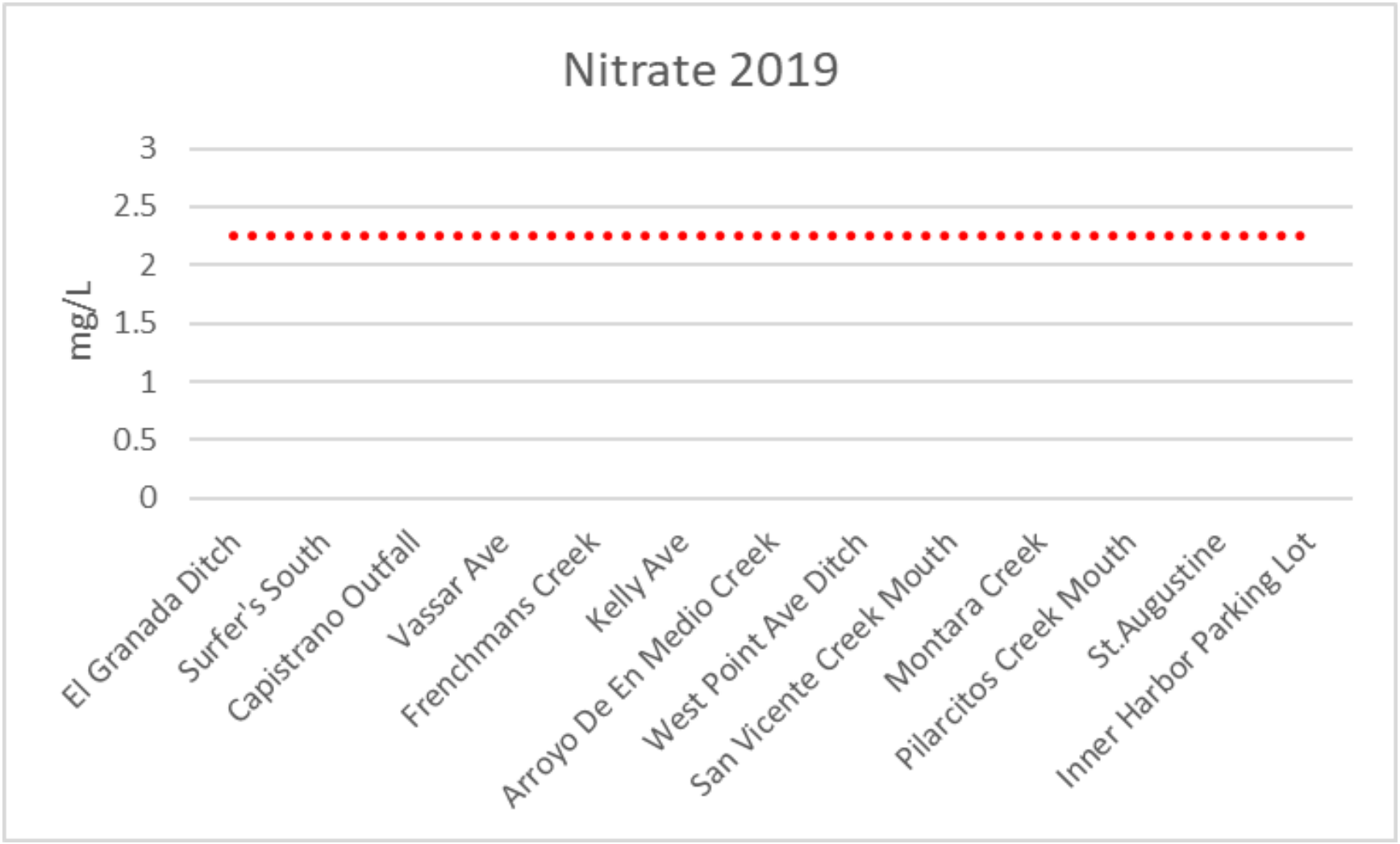
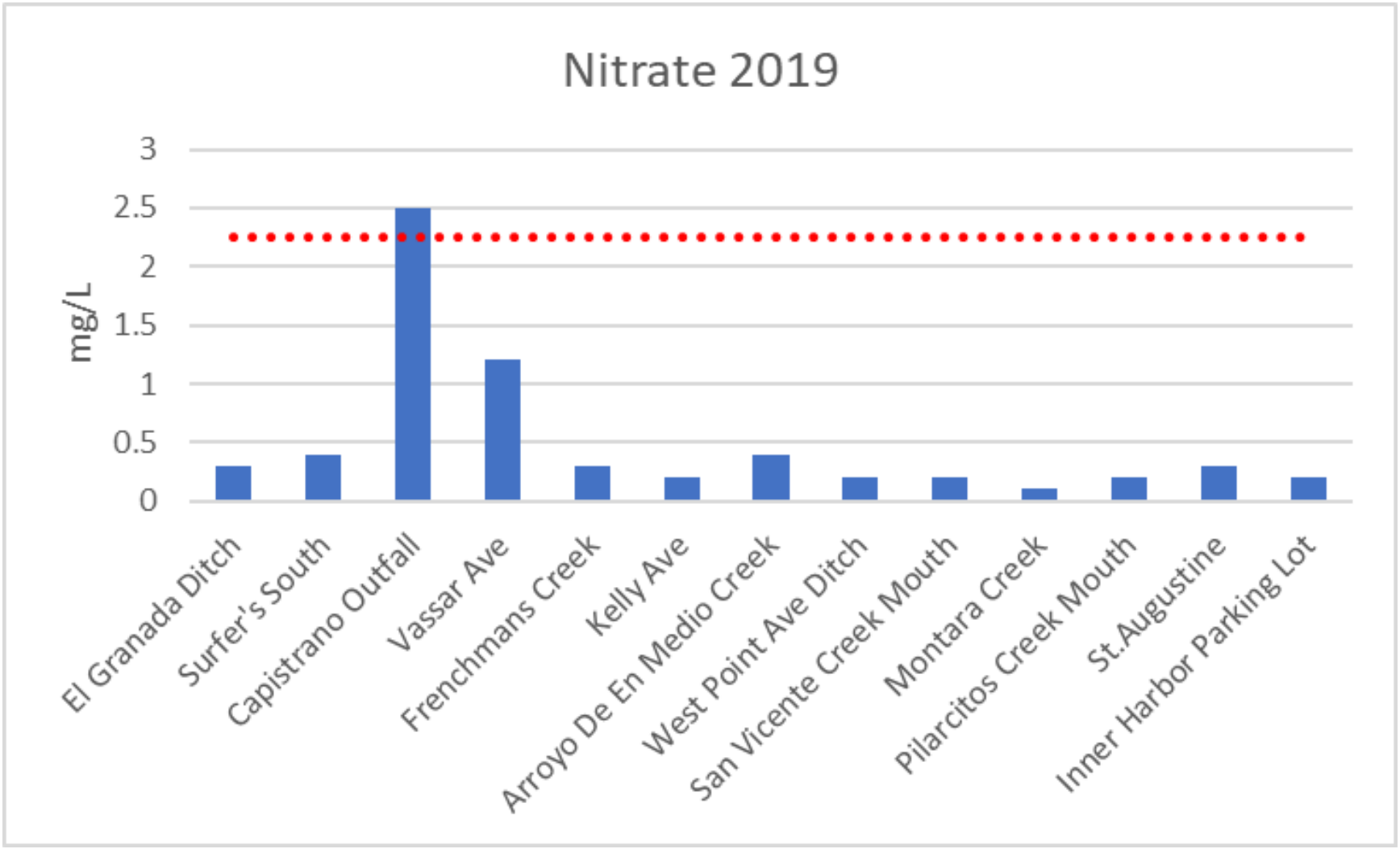
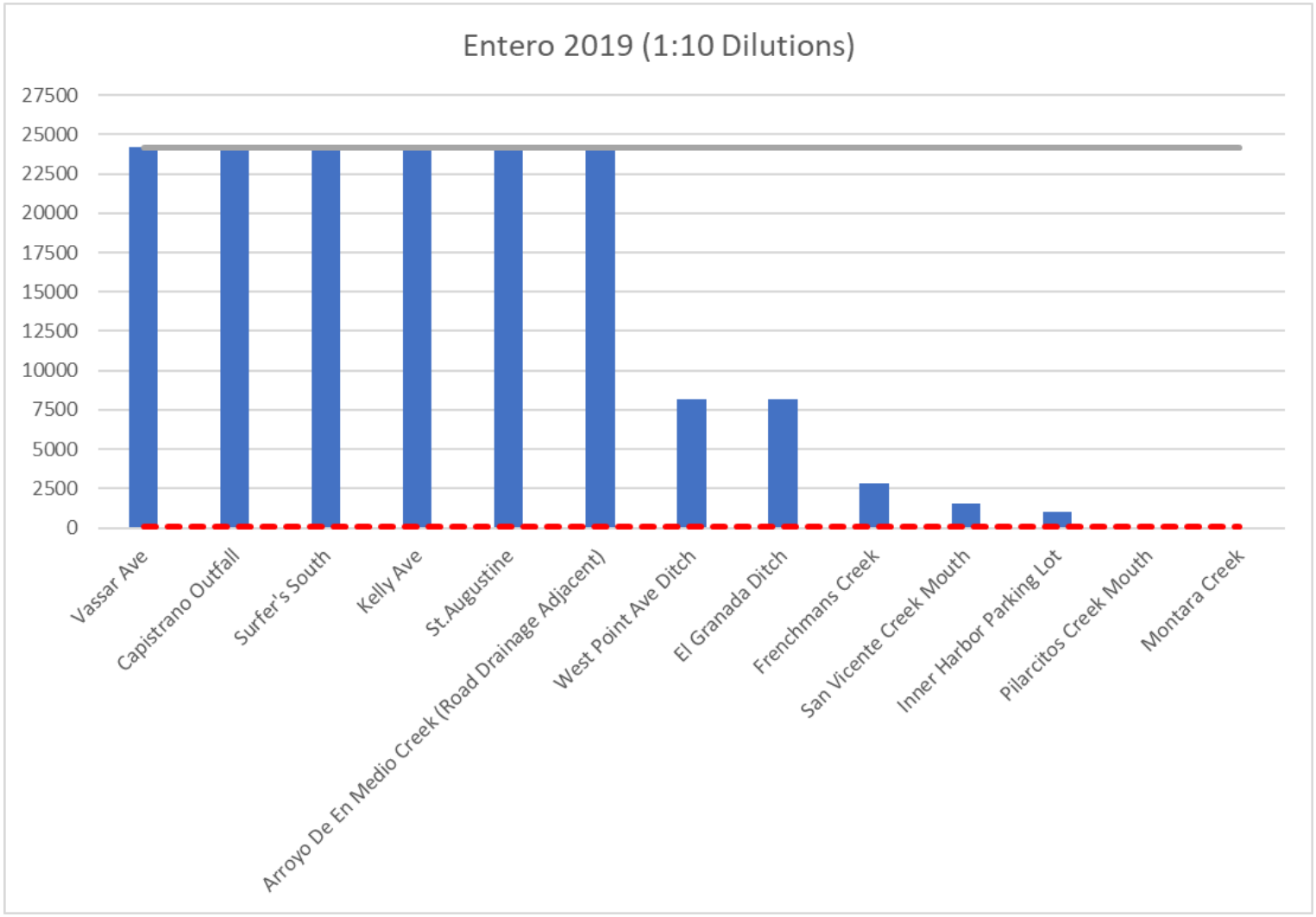

First Flush Historic E. Coli
(1:100 Dilutions)
MPN/100mL Log Scale
1000000
100000
10000
1000
100
10
1
2016
2017
2018
2019
San Vicente Creek Mouth
West Point Ave Ditch
Vassar Ave
Capistrano Outfall
El Granada Ditch
Surfer's South
WQO 320

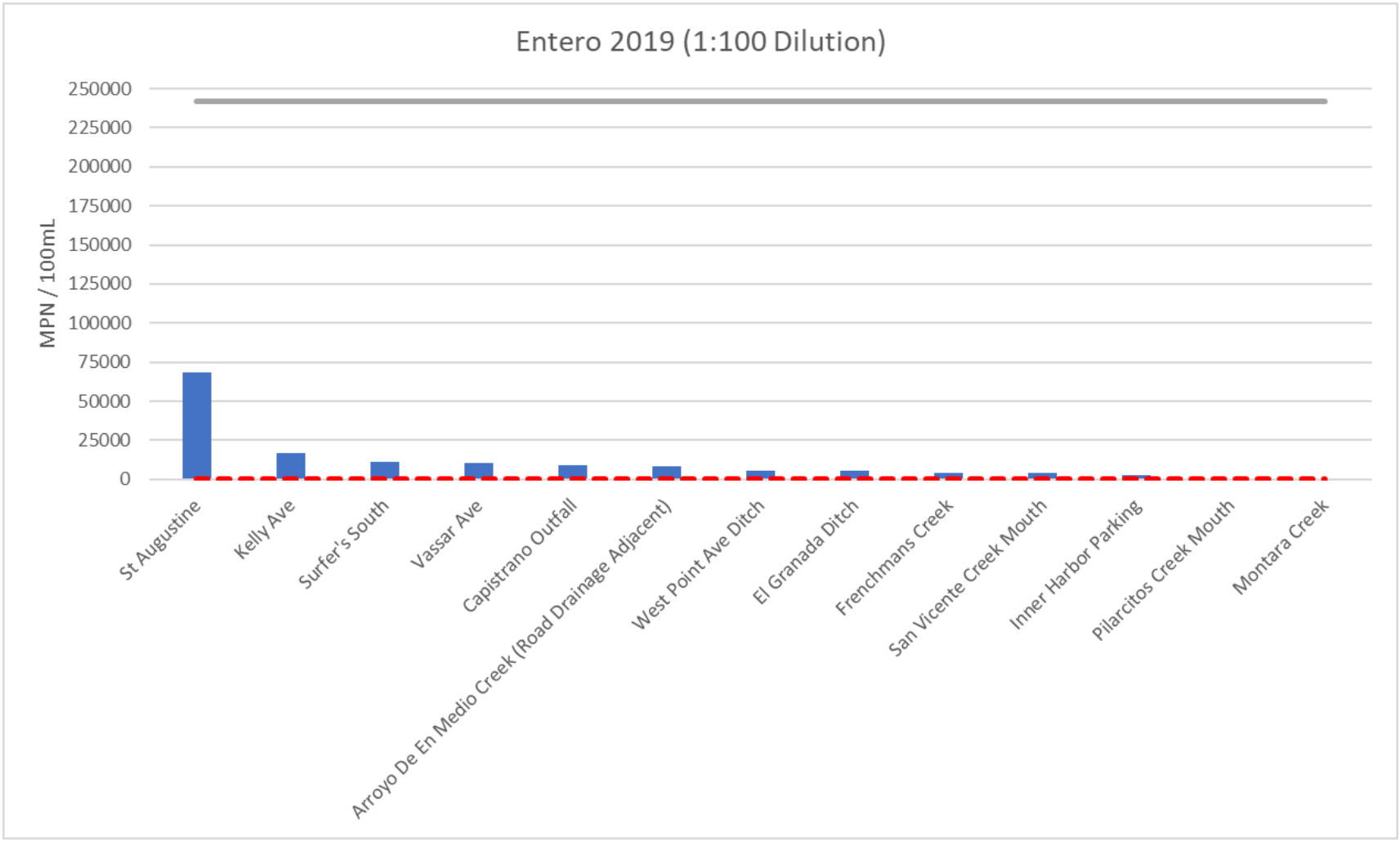

E. Coli Historic Sites (1:10 Dilutions)
MPN / 100 mL
27,500
25,000
22,500
20,000
17,500
15,000
12,500
10,000
7,500
5,000
2,500
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Detection Limit: 24,196
San Vicente Creek Mouth
West Point Ave Ditch
Vassar Ave
Capistrano Outfall
El Granada Ditch
Surfer's South
WQO < 320


Orthophosphate 2019
mg/L
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot

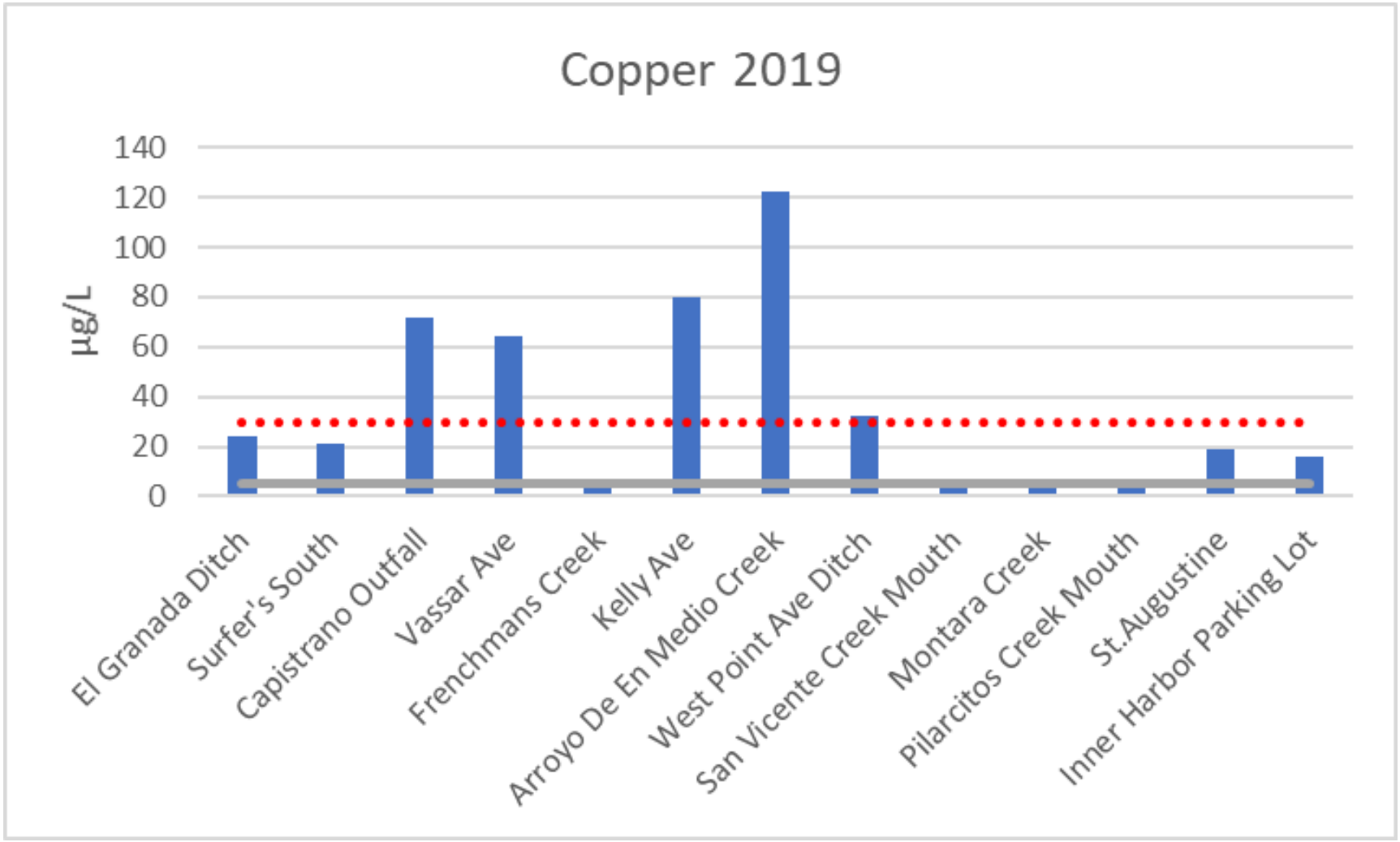

Nitrate 2019
mg/L
3
2.5
2
1.5
1
0.5
0
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot

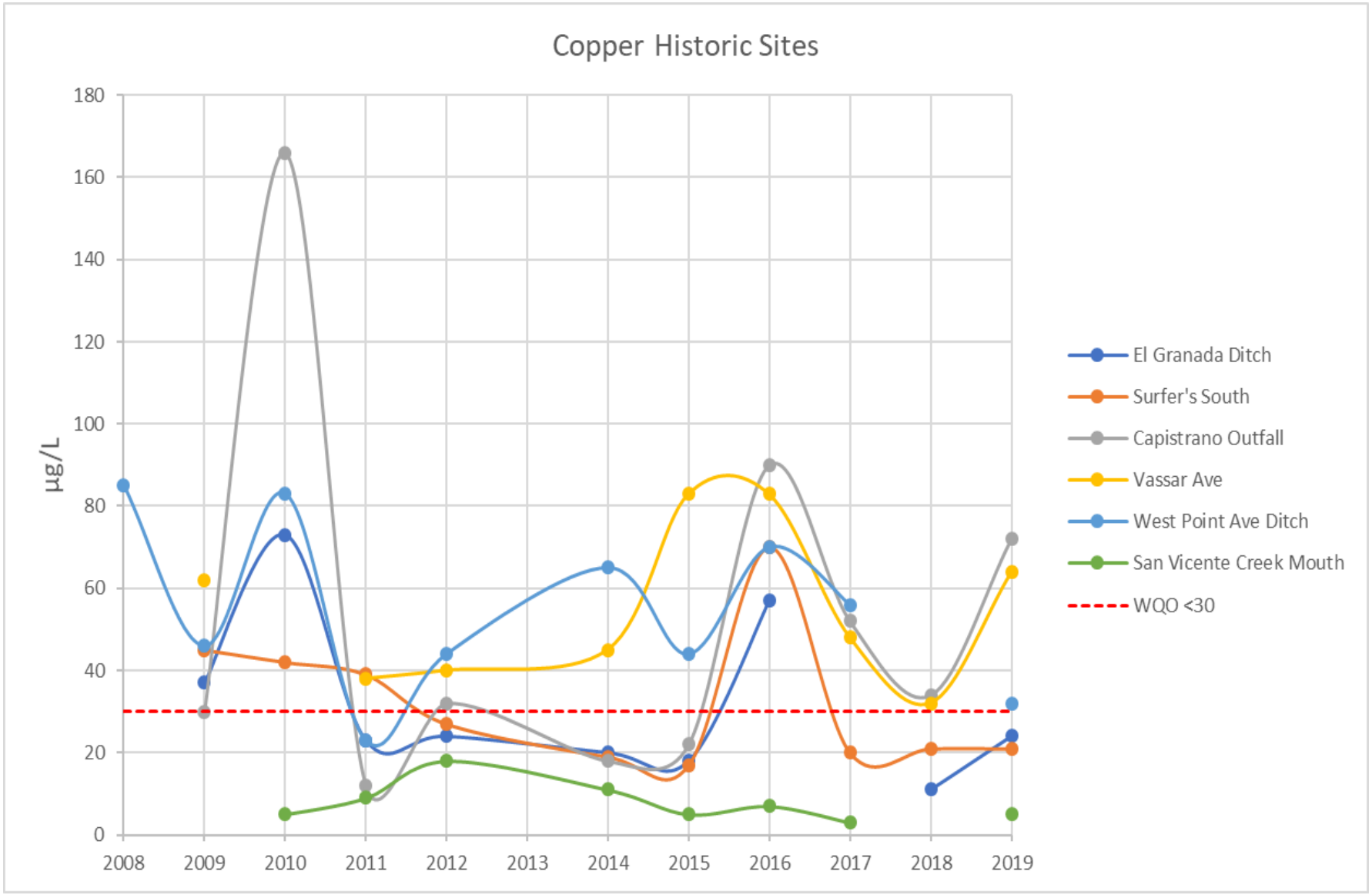

Nitrate 2019
mg/L
3
2.5
2
1.5
1
0.5
0
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot

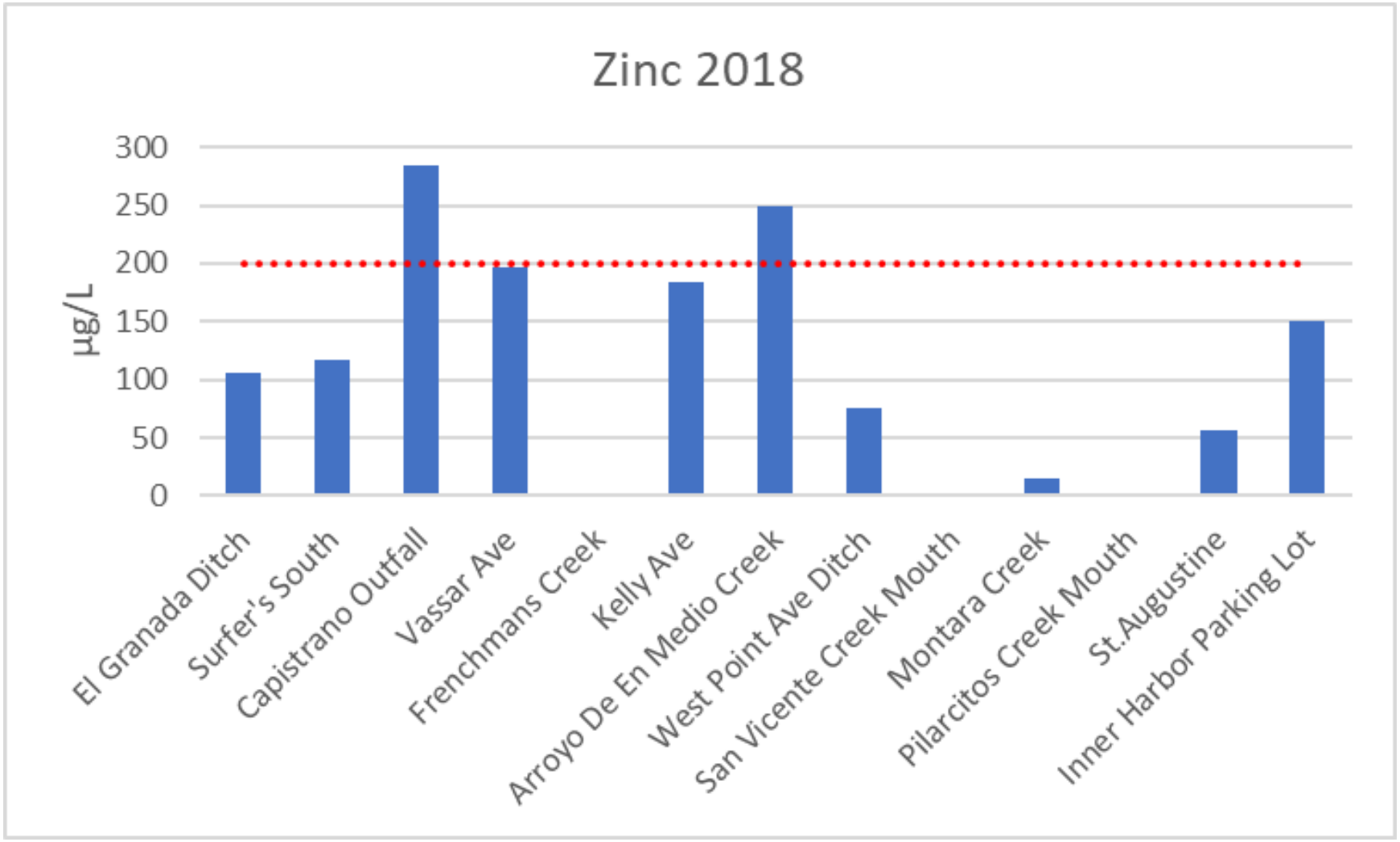

Entero 2019 (1:10 Dilutions)
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
Vassar Ave
Capistrano Outfall
Surfer's South
Kelly Ave
St.Augustine
Arroyo De En Medio Creek (Road Drainage Adjacent)
West Point Ave Ditch
El Granada Ditch
Frenchmans Creek
San Vicente Creek Mouth
Inner Harbor Parking Lot
Pilarcitos Creek Mouth
Montara Creek

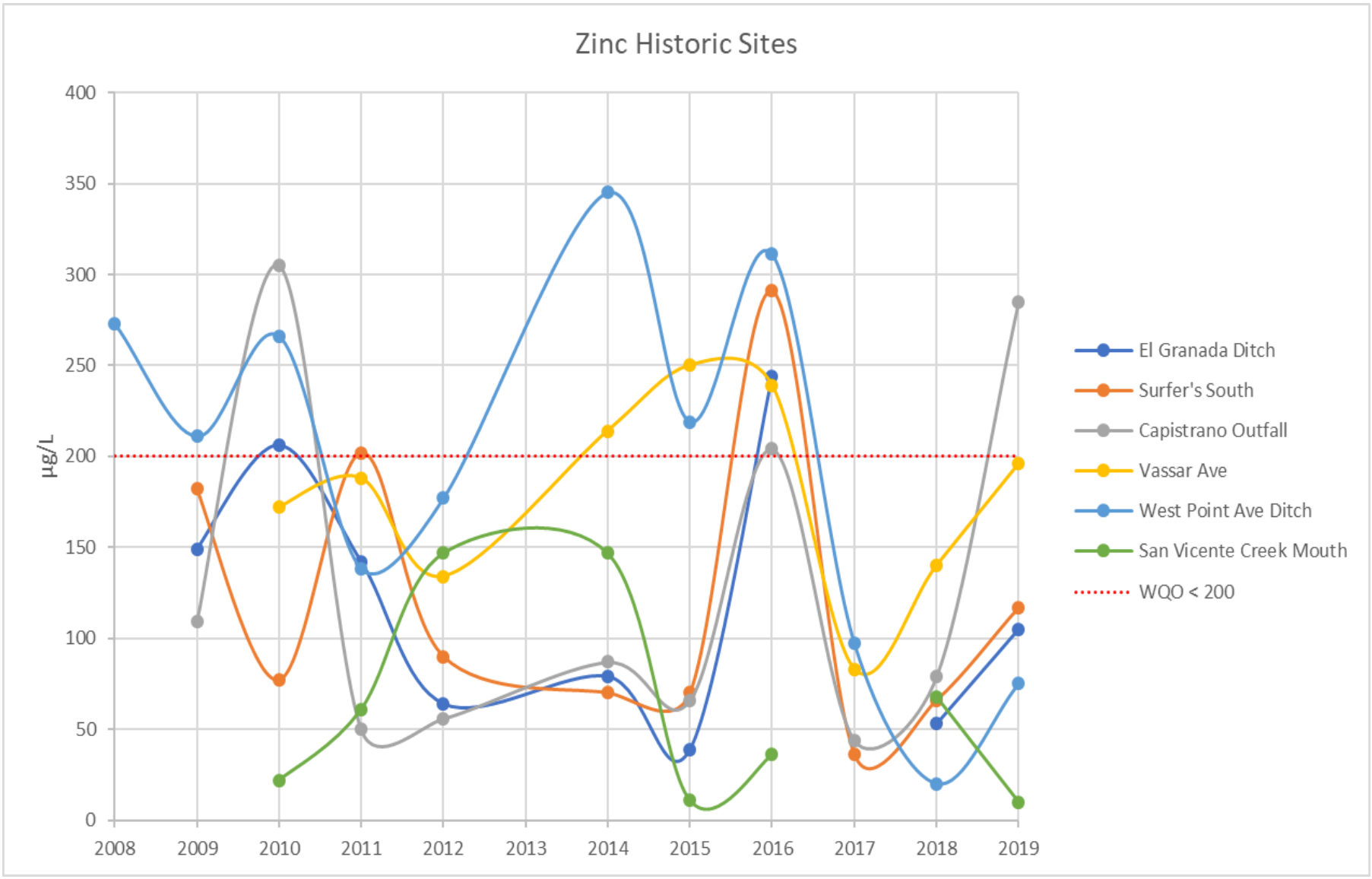

Entero 2019 (1:100 Dilution)
MPN / 100mL
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
St Augustine
Kelly Ave
Surfer's South
Vassar Ave
Capistrano Outfall
Arroyo De En Medio Creek (Road Drainage Adjacent)
West Point Ave Ditch
El Granada Ditch
Frenchmans Creek
San Vicente Creek Mouth
Inner Harbor Parking
Pilarcitos Creek Mouth
Montara Creek

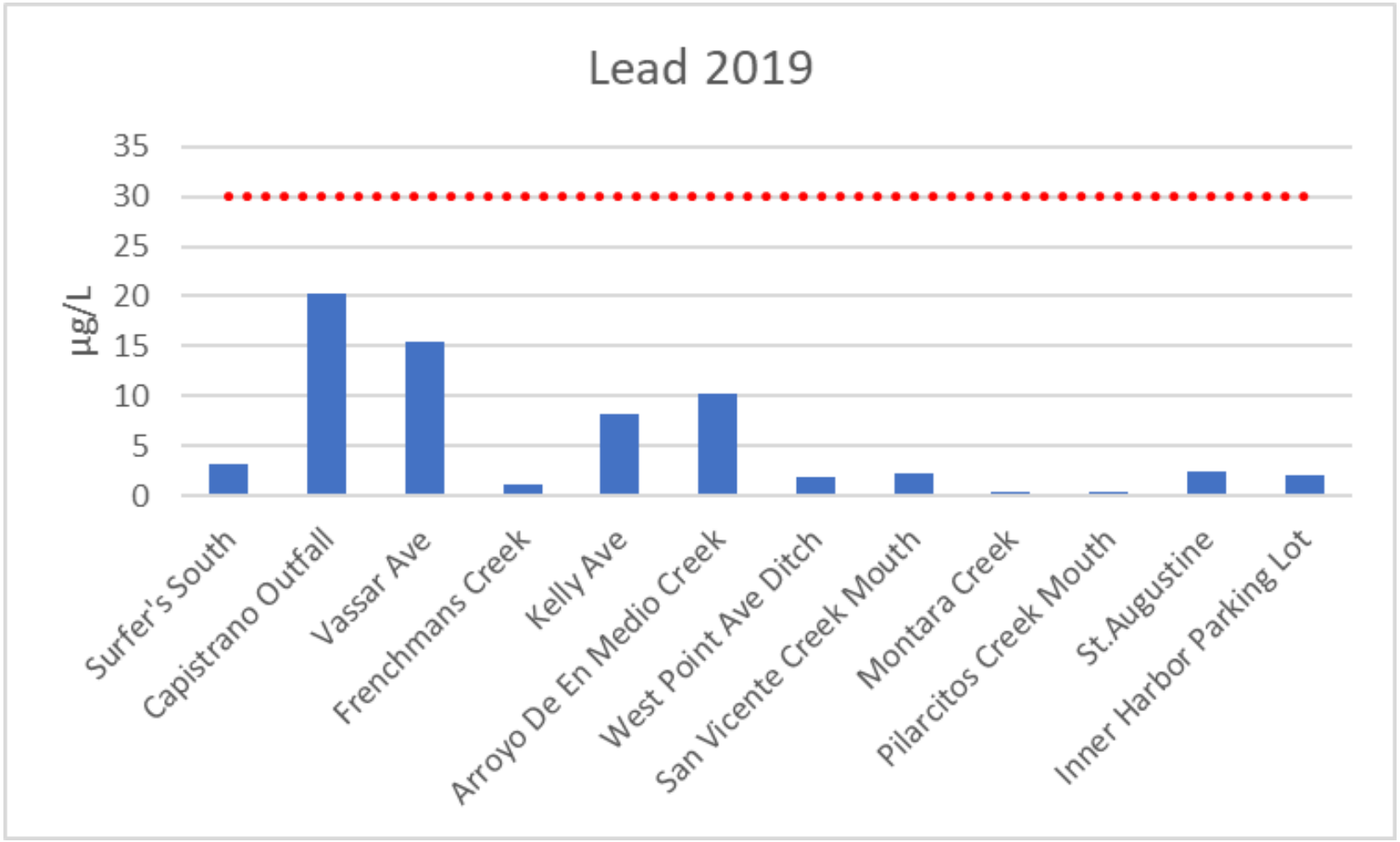

Enterococcus Historic Sites
MPN / 100mL
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
San Vicente Creek Mouth
West Point Ave Ditch
Vassar Ave
Capistrano Outfall
El Granada Ditch
Surfer's South
Threshold
WQO 104 MPN/100 mL

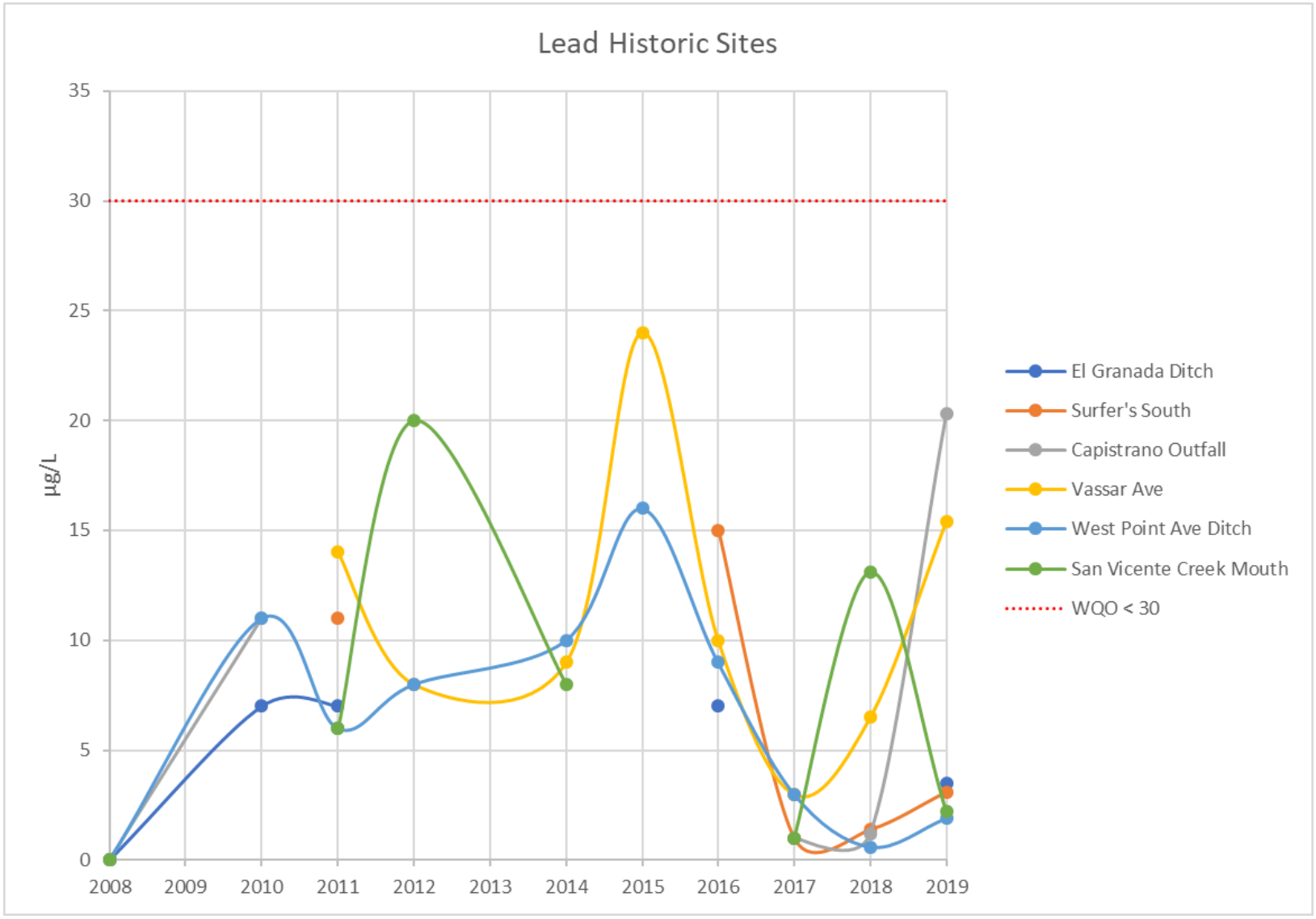

Copper 2019
µg/L
140
120
100
80
60
40
20
0
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot

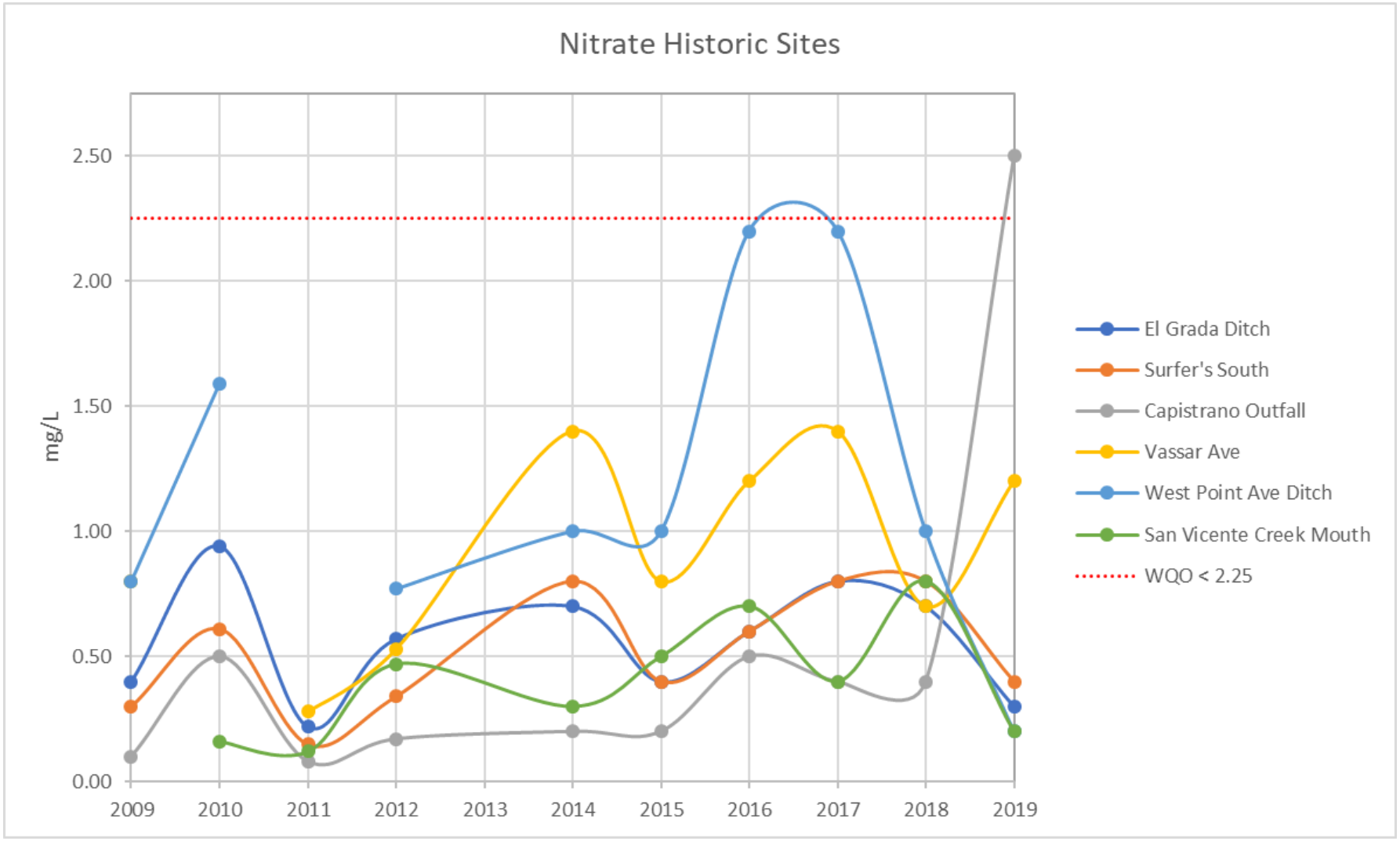

Copper Historic Sites
µg/L
180
160
140
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
West Point Ave Ditch
San Vicente Creek Mouth
WQO <30

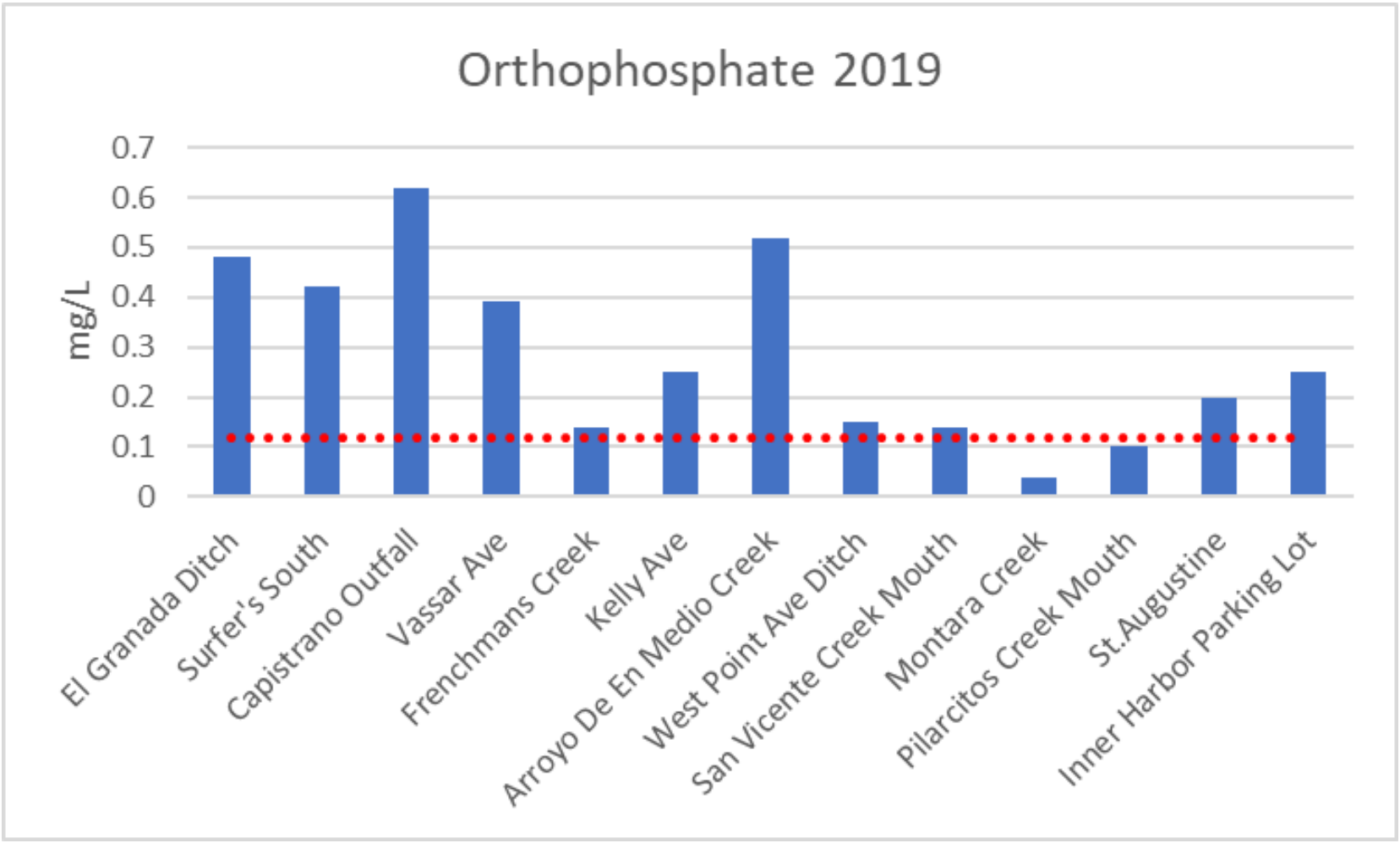

Zinc 2018
300
250
200
150
100
50
0
µg/L
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot

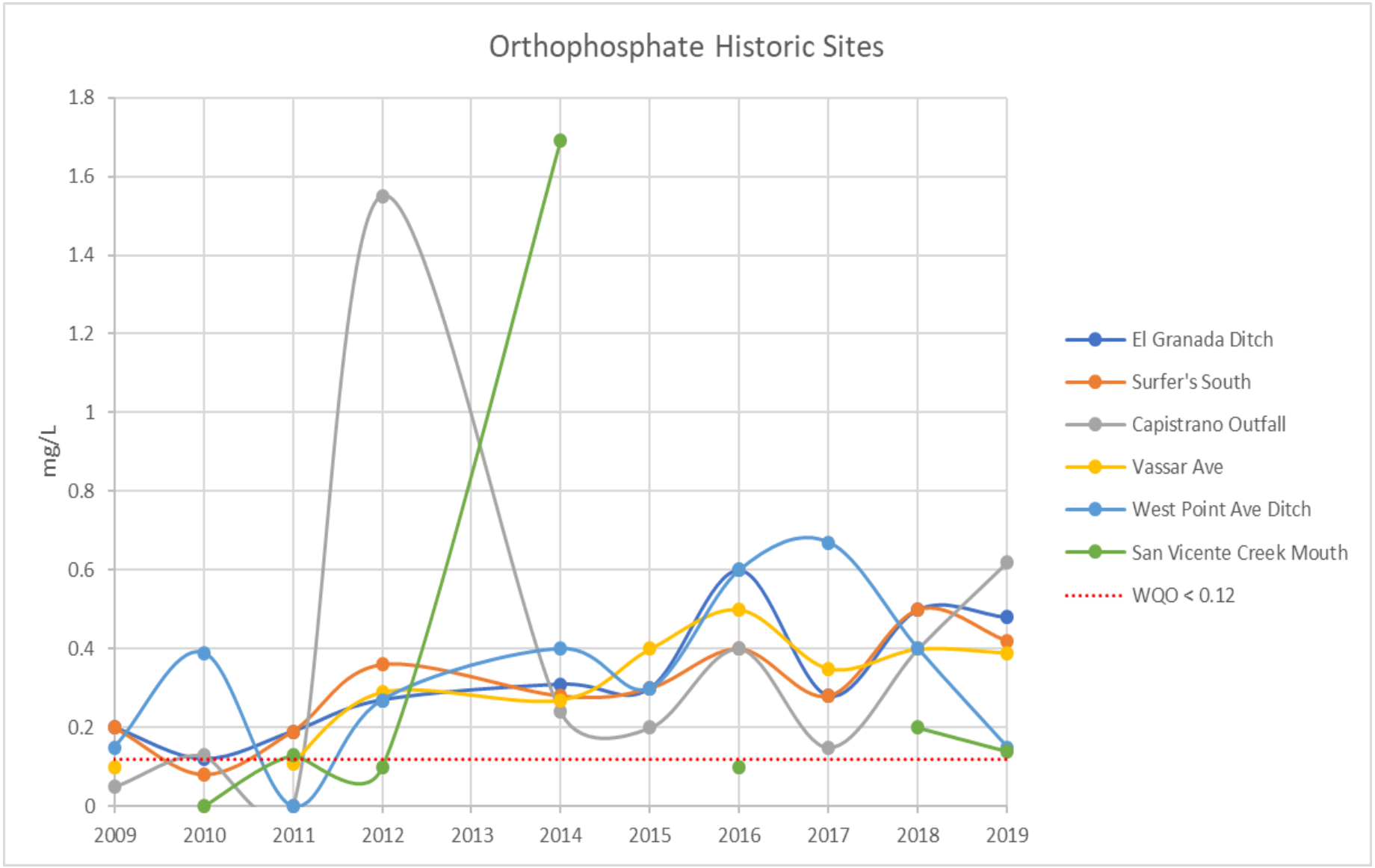

Zinc Historic Sites
µg/L
400
350
300
250
200
150
100
50
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
West Point Ave Ditch
San Vicente Creek Mouth
WQO < 200

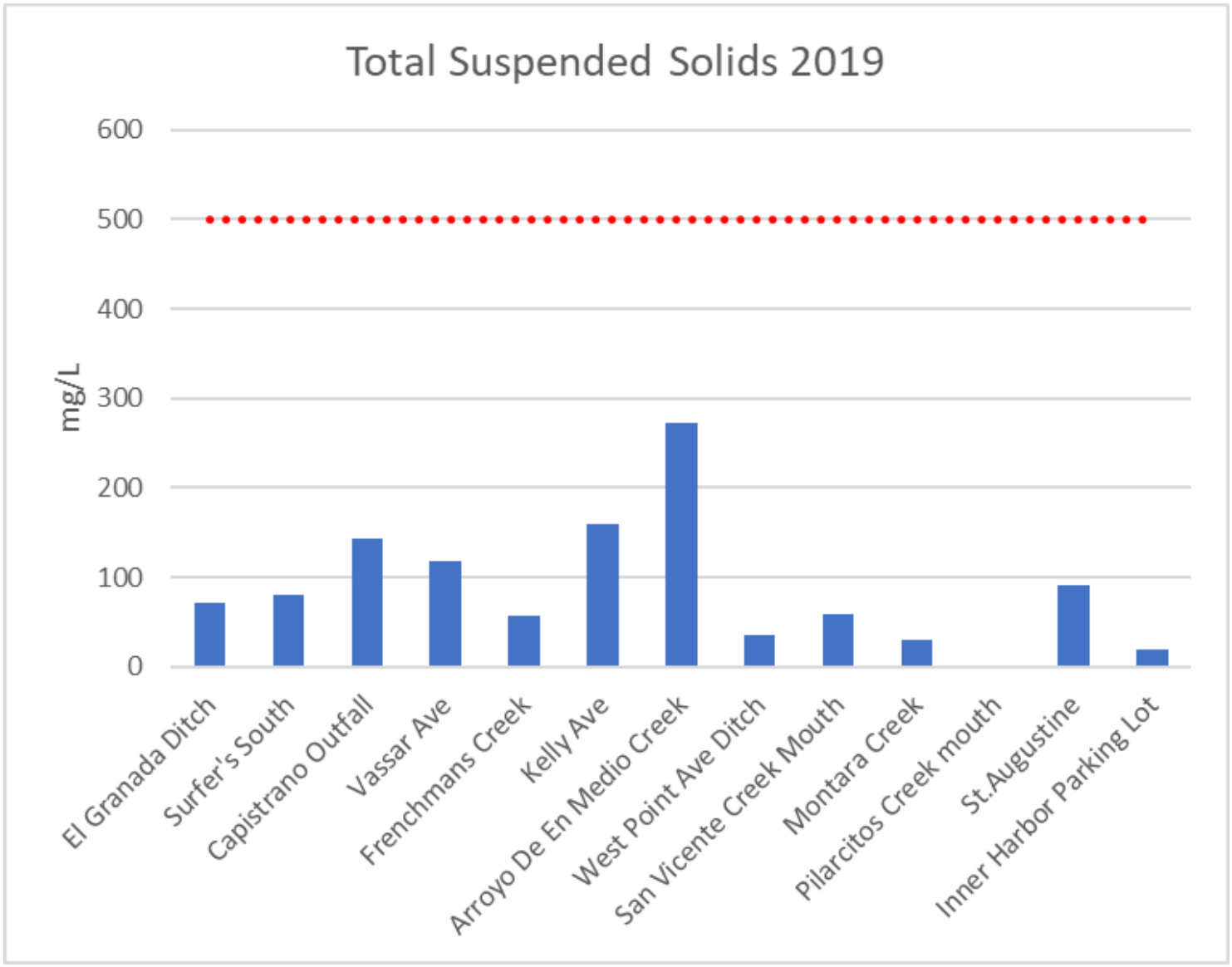

Lead 2019
35
30
25
20
15
10
5
0
µg/L
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot

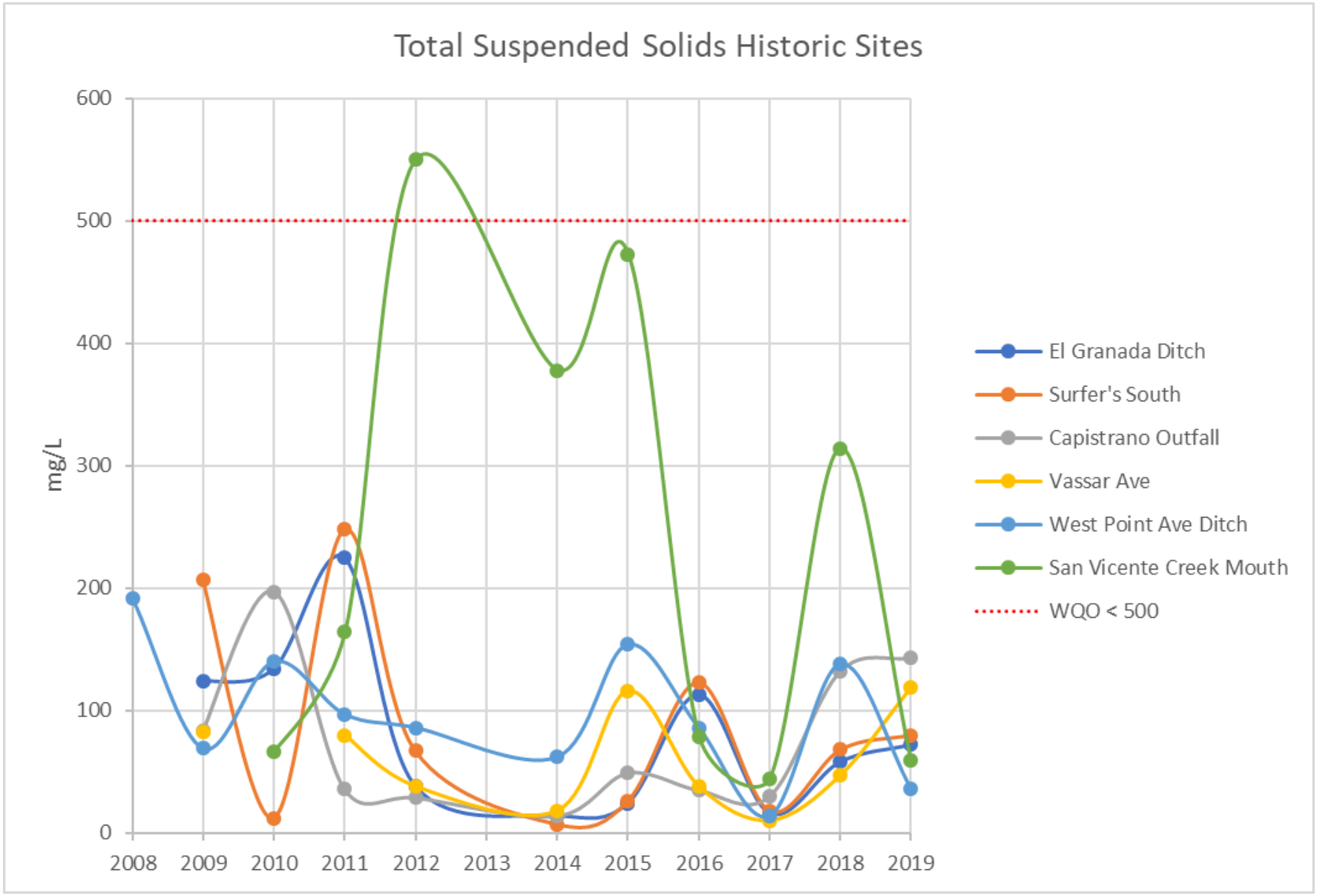

Lead Historic Sites
µg/L
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
West Point Ave Ditch
San Vicente Creek Mouth
WQO < 30


Nitrate Historic Sites
mg/L
2.50
2.00
1.50
1.00
0.50
0.00
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
El Grada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
West Point Ave Ditch
San Vicente Creek Mouth
WQO < 2.25


Orthophosphate 2019
mg/L
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek Mouth
St.Augustine
Inner Harbor Parking Lot


Orthophosphate Historic Sites
mg/L
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
West Point Ave Ditch
San Vicente Creek Mouth
WQO < 0.12


Total Suspended Solids 2019
600
500
400
300
200
100
0
mg/L
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
Frenchmans Creek
Kelly Ave
Arroyo De En Medio Creek
West Point Ave Ditch
San Vicente Creek Mouth
Montara Creek
Pilarcitos Creek mouth
St.Augustine
Inner Harbor Parking Lot


Total Suspended Solids Historic Sites
600
500
400
300
200
100
0
mg/L
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
El Granada Ditch
Surfer's South
Capistrano Outfall
Vassar Ave
West Point Ave Ditch
San Vicente Creek Mouth
WQO < 500