APPENDIX A

Summary of Surface Water Quality for the Central Valley

Content:

- Table 64449-A and Table 64449-B from Title 22 of the California Code of Regulations (Secondary Maximum Contaminant Levels).

- Tables A-1 to A-3 summarizes surface water quality data for constituents with secondary MCLs for the following regions:
    - A-1 Sacramento River Hydrologic Region
    - A-2 San Joaquin River Hydrologic Region
    - A-3 Tulare Lake Hydrologic Region

- Figures A-1 to A-39 summarizes water quality for specific constituents organized by regions. For each constituent, graphs may include a scatter graph and/or box plot.
    - Sacramento River Hydrologic Region (Figures A-1 to A-14)
        - Conductivity
        - Nitrate
        - Aluminum (dissolved and total)
        - Iron (dissolved and total)
        - Manganese (dissolved and total)
    - San Joaquin River Hydrologic Region (Figures A-15 to A-25)
        - Conductivity
        - Nitrate
        - Aluminum (dissolved)
        - Iron (dissolved)
        - Manganese (dissolved)
    - Delta Hydrologic Region (Figures A-26 to A-35)
        - Conductivity
        - Nitrate
        - Aluminum (dissolved and total)
        - Iron (dissolved and total)
        - Manganese (dissolved and total)
    - Tulare Lake Hydrologic Region (Figures A-36 to A-39)
        - Conductivity
        - Nitrate

Data and detailed analyses utilized in the development of tables and figures can be found in the final CV-SALTS Salt and Nitrate Management Plan (CV-SALTS SNMP 2016) at: https://www.cvsalinity.org/docs/central-valley-snmp/final-snmp.html

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Title 22. Social Security
Division 4. Environmental Health
Chapter 15. Domestic Water Quality and Monitoring Regulations

Article 16. Secondary Drinking Water Standards

§64449. Secondary Maximum Contaminant Levels and Compliance.

(a) The secondary MCLs shown in Tables 64449-A and 64449-B shall not be exceeded in the water supplied to the public by community water systems.

Table 64449-A
Secondary Maximum Contaminant Levels
"Consumer Acceptance Contaminant Levels"

Constituents	Maximum Contaminant Levels/Units
Aluminum	0.2 mg/L
Color	15 Units
Copper	1.0 mg/L
Foaming Agents (MBAS)	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Methyl-*tert*-butyl ether (MTBE)	0.005 mg/L
Odor – Threshold	3 Units
Silver	0.1 mg/L
Thiobencarb	0.001 mg/L
Turbidity	5 Units
Zinc	5.0 mg/L

Table 64449-B
Secondary Maximum Contaminant Levels
"Consumer Acceptance Contaminant Level Ranges"

Constituents, Units	Recommended	Upper	Short Term
Total Dissolved Solids, mg/L or	500	1,000	1,500
Specific Conductance, µS/cm	900	1,600	2,200
Chloride, mg/L	250	500	600
Sulfate, mg/L	250	500	600

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Table A - 1. Summary of surface water quality data for the Sacramento River Hydrologic Region for constituents with secondary MCLs.

Analyte	Units	Secondary MCL	Sacramento River	
			Number of Samples	Median
Aluminum, Dissolved	µg/L	--	27	12.9
Aluminum, Total	µg/L	200	45	130.7
Chloride, Dissolved	mg/L	--	300	1.87
Chloride, (Form not specified) [a]	mg/L	--	40	4.02
Chloride, Total	mg/L	250 (recommended)	28	0.05[b]
Copper, Dissolved	µg/L	--	422	2.11
Copper, Total	µg/L	1,000	632	3.54
Iron, Dissolved	µg/L	--	16	55.7
Iron, Total	µg/L	300	143	415.5
Manganese, Dissolved	µg/L	--	27	4.3
Manganese, Total	µg/L	50	155	32.5
MBAS, Total	µg/L	500	50	10.7
Silver, Dissolved	µg/L	--	95	0.001
Silver, Total	µg/L	100	180	0.004
Sulfate, Dissolved	µg/L	--	296	1.98
Sulfate, Form not specified [a] (mg/L)	µg/L	--	40	3.07
Sulfate, Total	mg/L	250 (recommended)	198	6.62
Thiobencarb, Total	µg/L	1	306	0.00044
Turbidity	NTU	5	5,717	5.55
Zinc, Dissolved	µg/L	--	241	2.12
Zinc, Total	µg/L	5,000	484	4.86

Source: CEDEN, as cited and presented in Larry Walker Associates 2016a.
Notes:
[a] Values indicate probable representation of "total" fraction for analyte.
[b] Limited amount of data compared to dissolved, resulting in lower "total" fraction value.

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Table A - 2 Summary of surface water quality data for the San Joaquin River Hydrologic Region for constituents with secondary MCLs.

Analyte	Units	Secondary MCL	San Joaquin River	
			Number of Samples	Median
Aluminum, Dissolved	µg/L	--	4	9.48
Aluminum, Total	µg/L	200	---	---
Chloride, Dissolved	mg/L	--	177	3.3
Chloride, Form not specified [a]	mg/L	--	1,321	64.7
Chloride, Total	mg/L	250 (recommended)	33	0.13
Copper, Dissolved	µg/L	--	2,372	1.38
Copper, Total	µg/L	1,000	3,851	3.44
Iron, Dissolved	µg/L	--	15	47
Iron, Total	µg/L	300	14	572
Manganese, Dissolved	µg/L	--	25	4.03
Manganese, Total	µg/L	50	25	24.9
MBAS, Total	µg/L	500	10	40.4
Silver, Dissolved	µg/L	--	59	0.0013
Silver, Total	µg/L	100	58	0.0034
Sulfate, Dissolved	µg/L	--	126	2.38
Sulfate, Form not specified [a] (mg/L)	µg/L	--	1,323	74.89
Sulfate, Total	mg/L	250 (recommended)	11	0.99 [b]
Thiobencarb, Total	µg/L	1	957	ND [c]
Turbidity	NTU	5	7,305	13.49
Zinc, Dissolved	µg/L	--	2,097	0.99
Zinc, Total	µg/L	5,000	3,510	4.95

Source: CEDEN, as cited and presented in Larry Walker Associates 2016a.
Notes:
[a] Values indicate probable representation of "total" fraction for analyte.
[b] Limited amount of data compared to dissolved, resulting in lower "total" fraction value.
[c] ND = non-detect; less than 10 percent of data reported with a detectable concentration.

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Table A - 3. Summary of surface water quality data for the Tulare Lake Hydrologic Region for constituents with secondary MCLs.

Analyte	Units	Secondary MCL	Tulare Lake Basin	
			Number of Samples	Median
Aluminum, Dissolved	µg/L	--	---	---
Aluminum, Total	µg/L	200	---	---
Chloride, Dissolved	mg/L	--	167	1.7
Chloride, Form not specified [a]	mg/L	--	49	4.17
Chloride, Total	mg/L	250 (recommended)	4	32.2
Copper, Dissolved	µg/L	--	476	1.5
Copper, Total	µg/L	1,000	368	5.33
Iron, Dissolved	µg/L	--	139	18.6
Iron, Total	µg/L	300	49	145
Manganese, Dissolved	µg/L	--	139	1.7
Manganese, Total	µg/L	50	44	14.2
MBAS, Total	µg/L	500	---	---
Silver, Dissolved	µg/L	--	---	---
Silver, Total	µg/L	100	---	---
Sulfate, Dissolved	µg/L	--	167	2.74
Sulfate, Form not specified [a] (mg/L)	µg/L	--	49	5.64
Sulfate, Total	mg/L	250 (recommended)	---	---
Thiobencarb, Total	µg/L	1	177	ND [c]
Turbidity	NTU	5	1,124	3.01
Zinc, Dissolved	µg/L	--	279	1.82
Zinc, Total	µg/L	5,000	392	7.14

Source: CEDEN, as cited and presented in Larry Walker Associates 2016a.
Notes:
[a] Values indicate probable representation of "total" fraction for analyte.
[b] Limited amount of data compared to dissolved, resulting in lower "total" fraction value.
[c] ND = non-detect; less than 10 percent of data reported with a detectable concentration.

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Figure A - 1. Sacramento River Hydrologic Region, Conductivity Observations in Sacramento River Tributaries

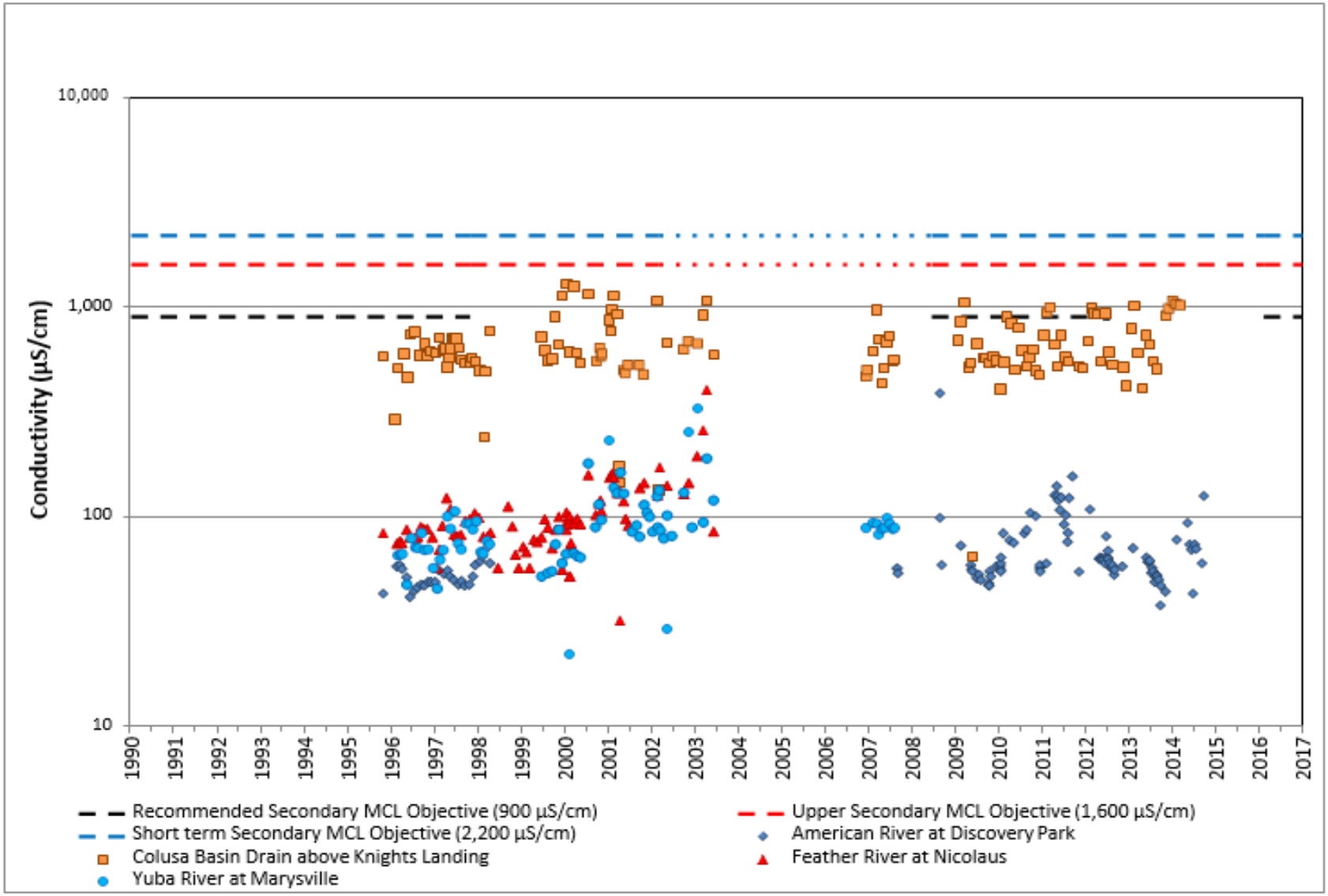

Figure A - 2. Sacramento River Hydrologic Region, Conductivity Observations in Sacramento River

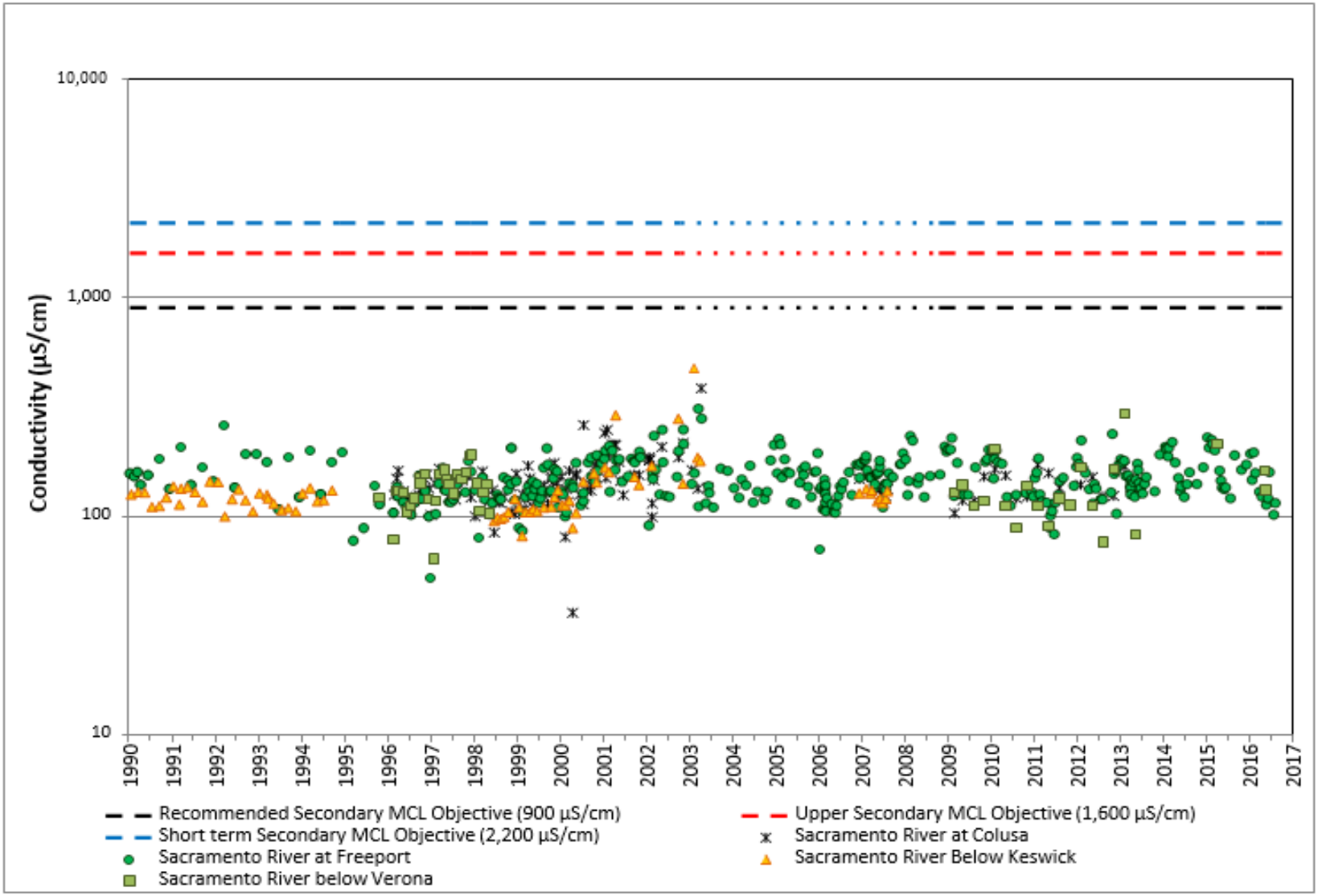

Figure A - 3. Sacramento River Hydrologic Region, Median Conductivity Values

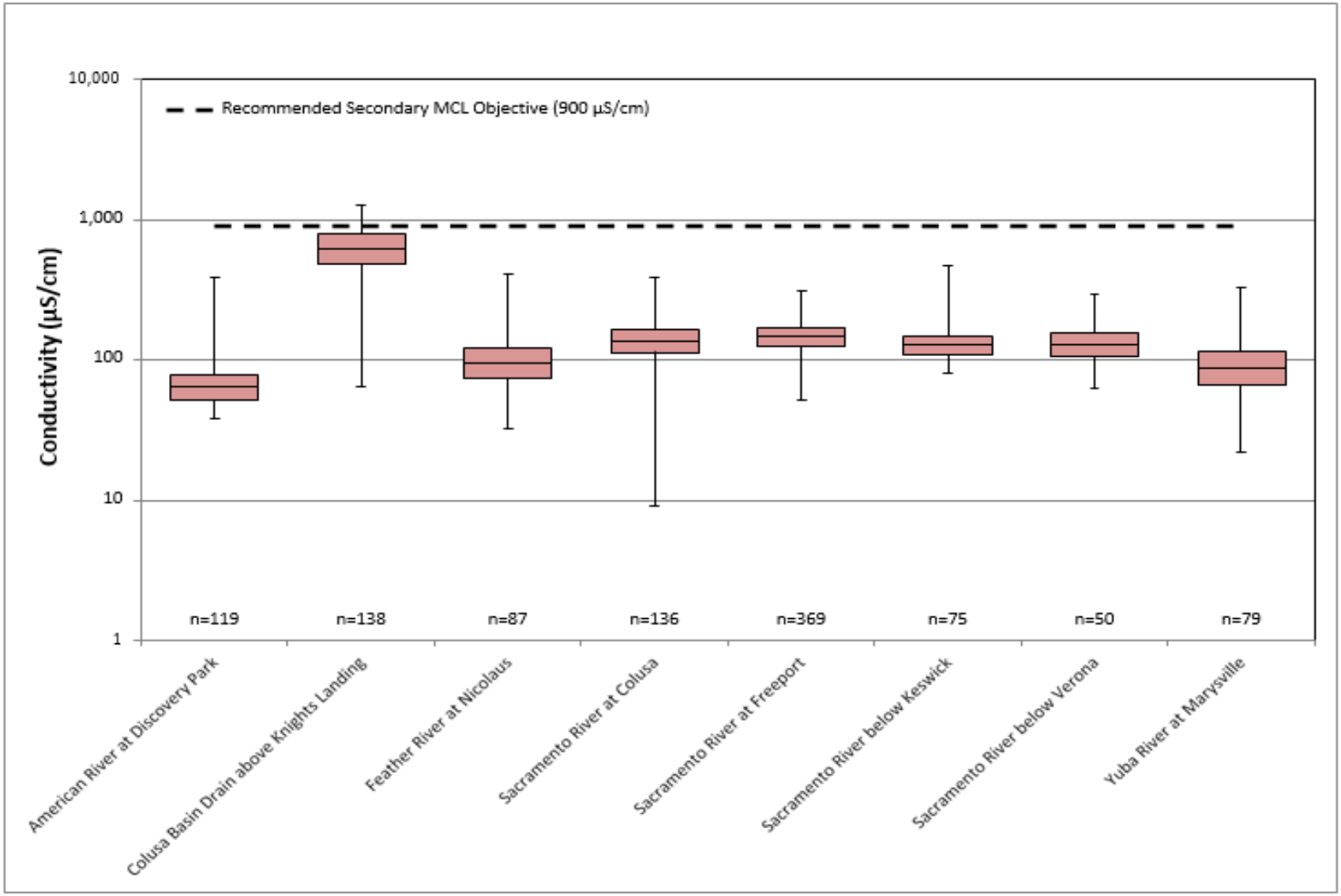

Figure A - 4. Sacramento River Hydrologic Region, Nitrate as N Observations in Sacramento River Tributaries

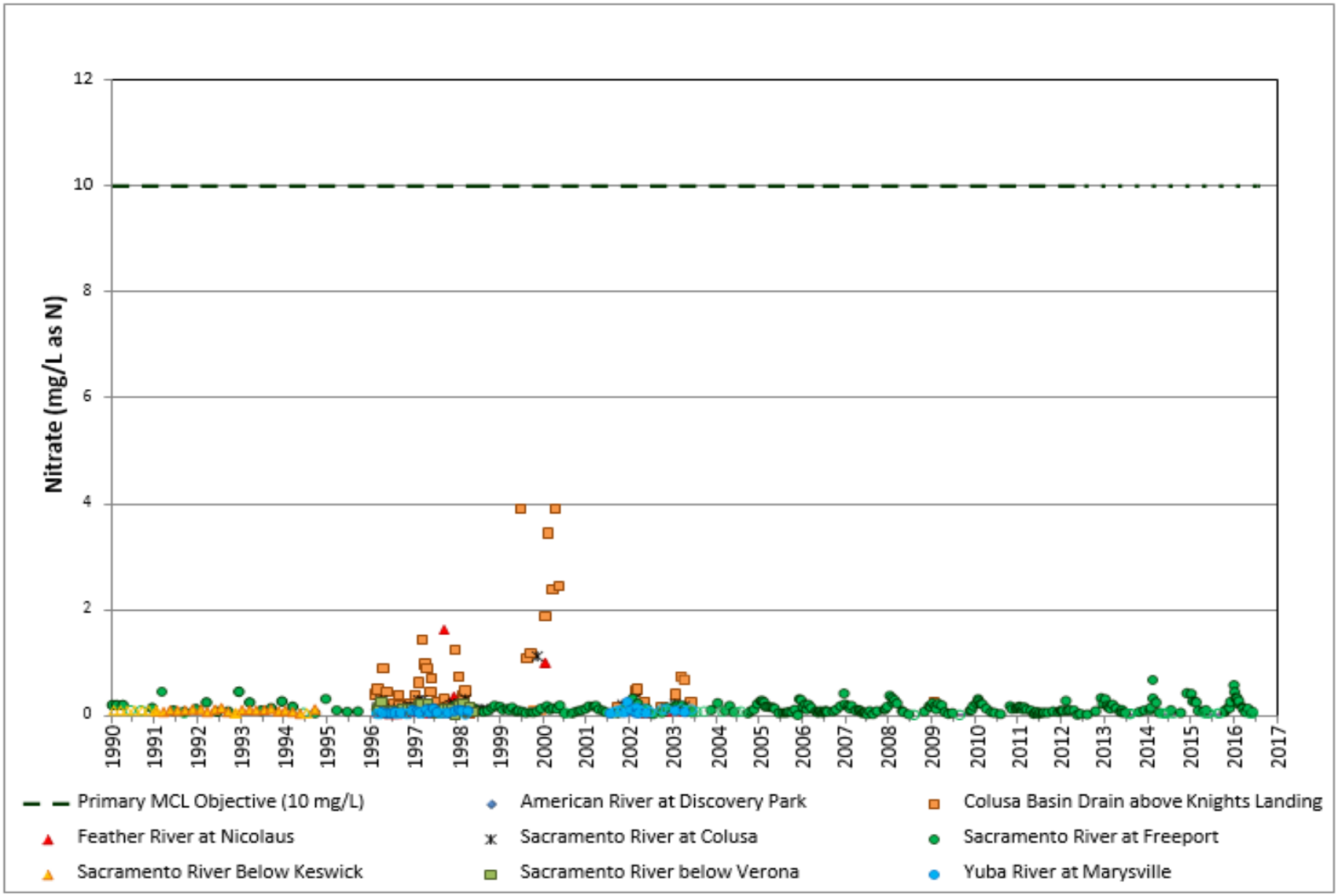

Figure A - 5. Sacramento River Hydrologic Region, Median Nitrate as N Values

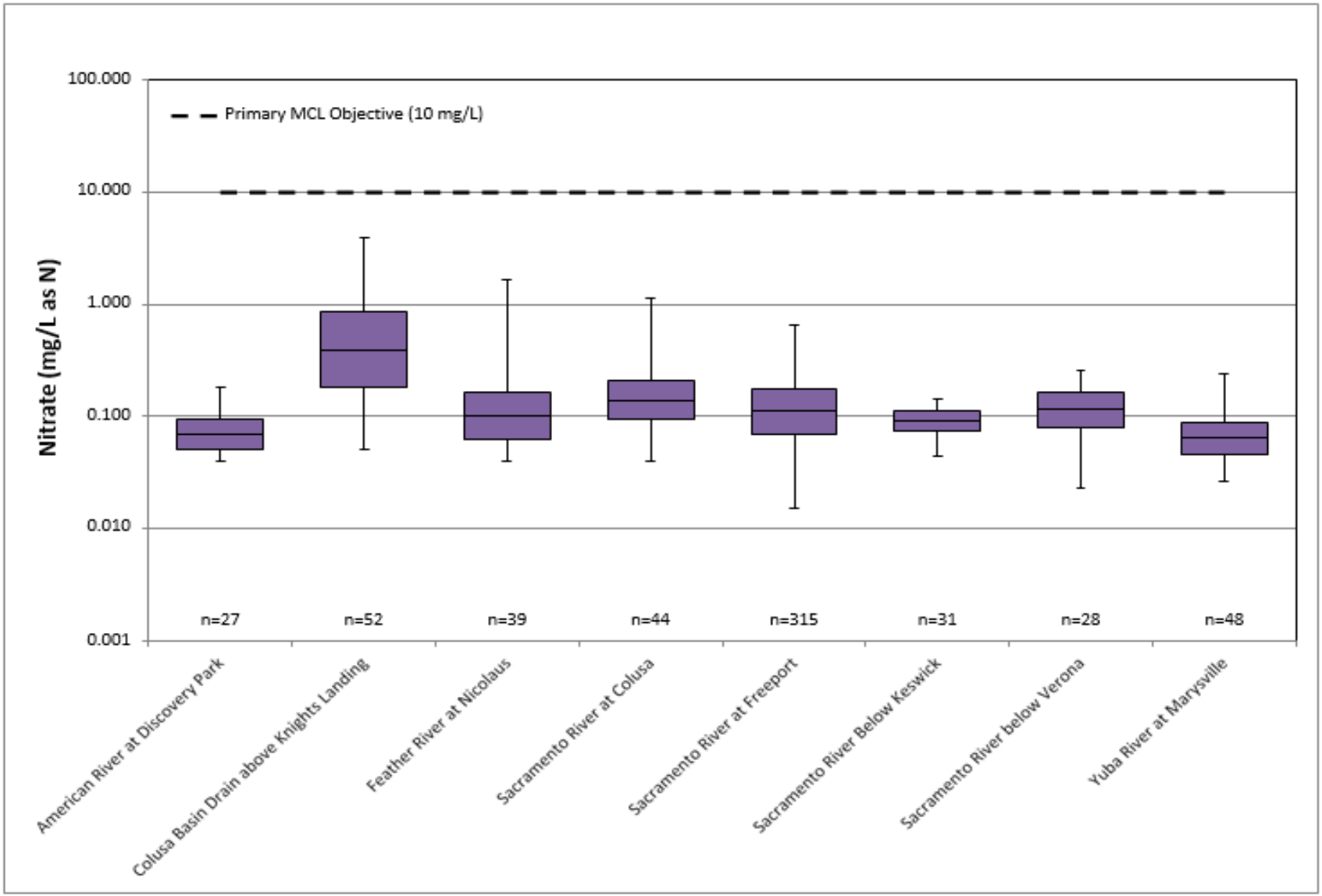

Figure A - 6. Sacramento River Hydrologic Region, Aluminum (dissolved) Observations in Sacramento River Tributaries

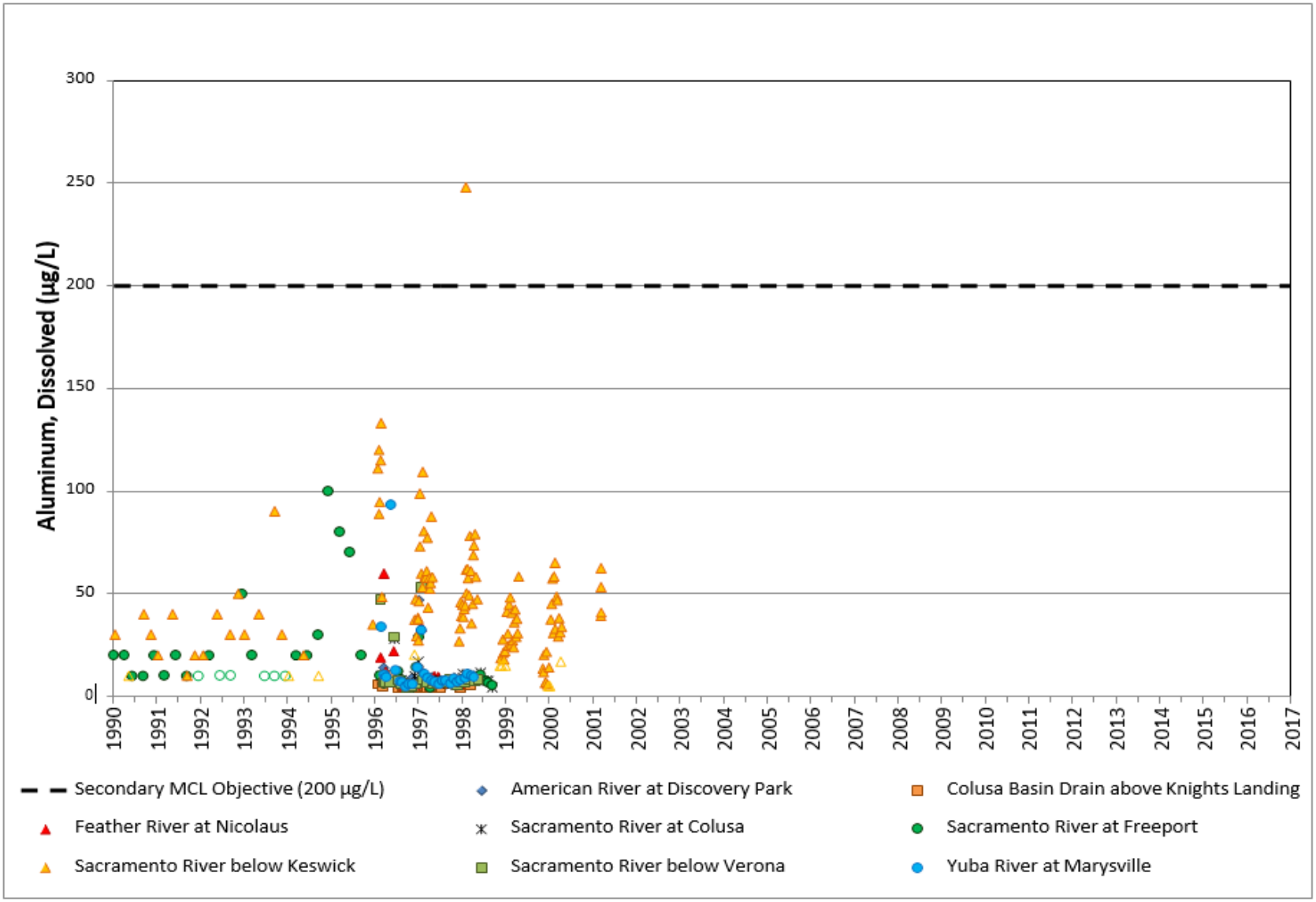

Figure A - 7. Sacramento River Hydrologic Region, Aluminum (total) Observations in Sacramento River

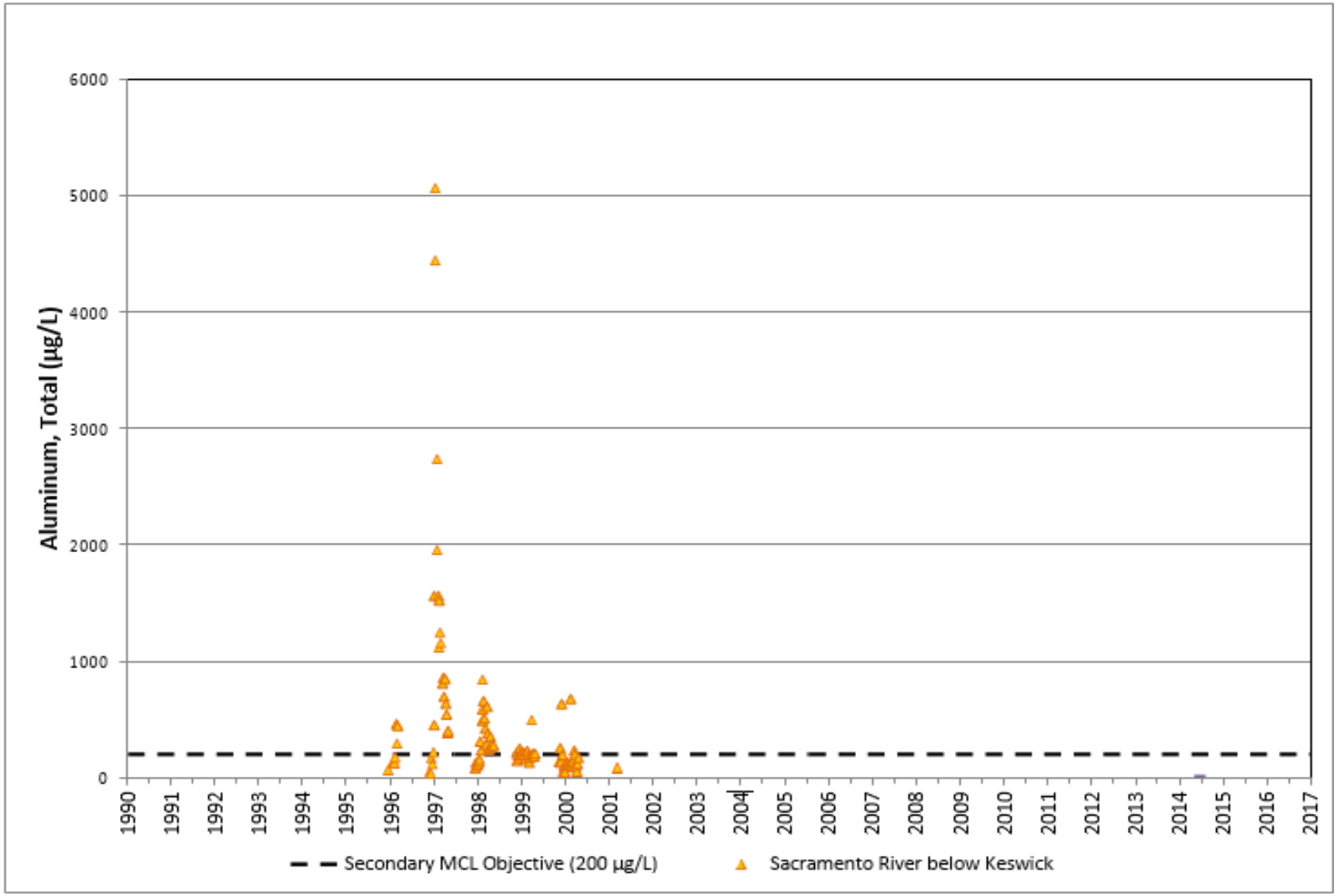

Figure A - 8. Sacramento River Hydrologic Region, Median Aluminum (dissolved and total) Values

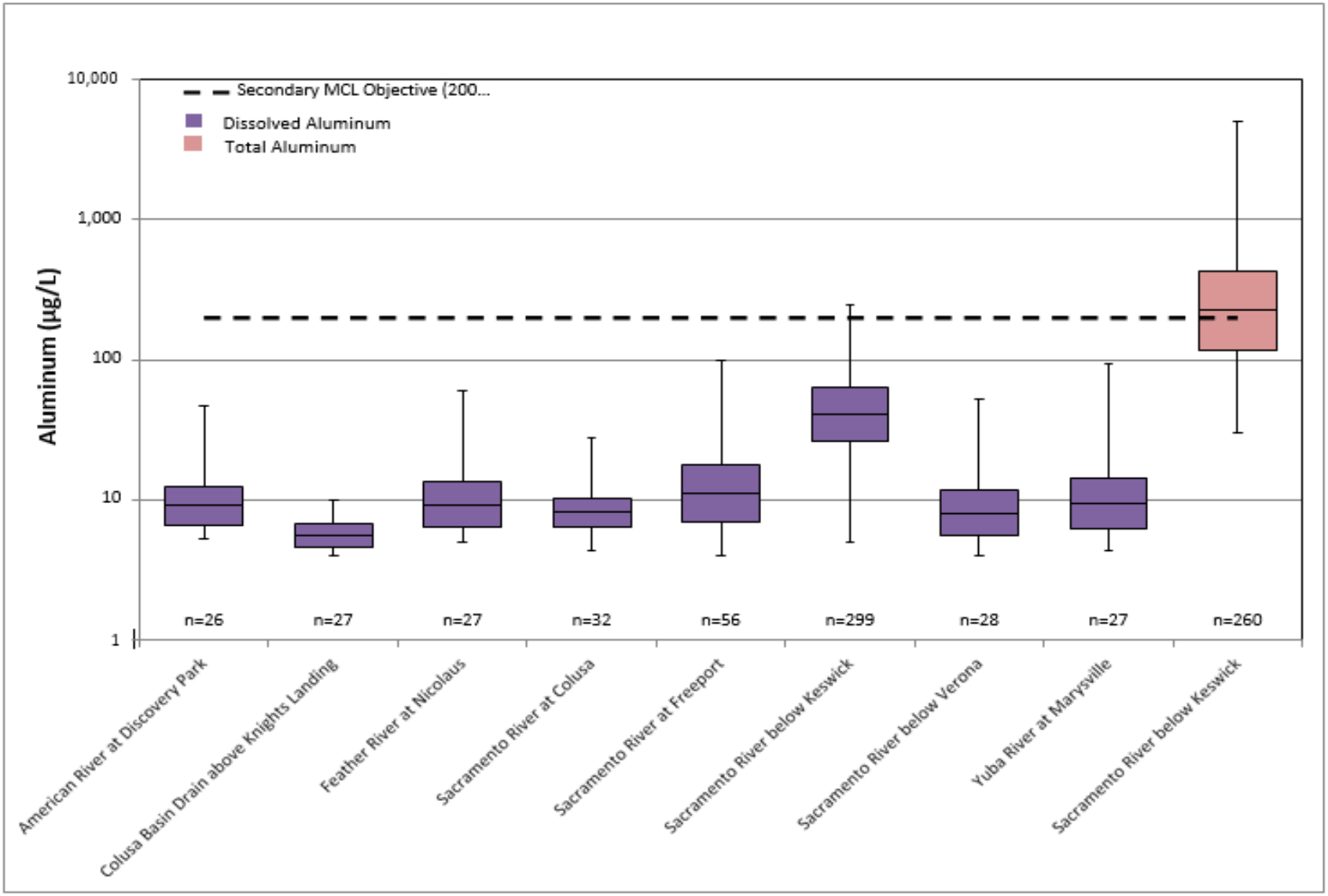

Figure A - 9. Sacramento River Hydrologic Region, Iron (dissolved) Observations in Sacramento River Tributaries

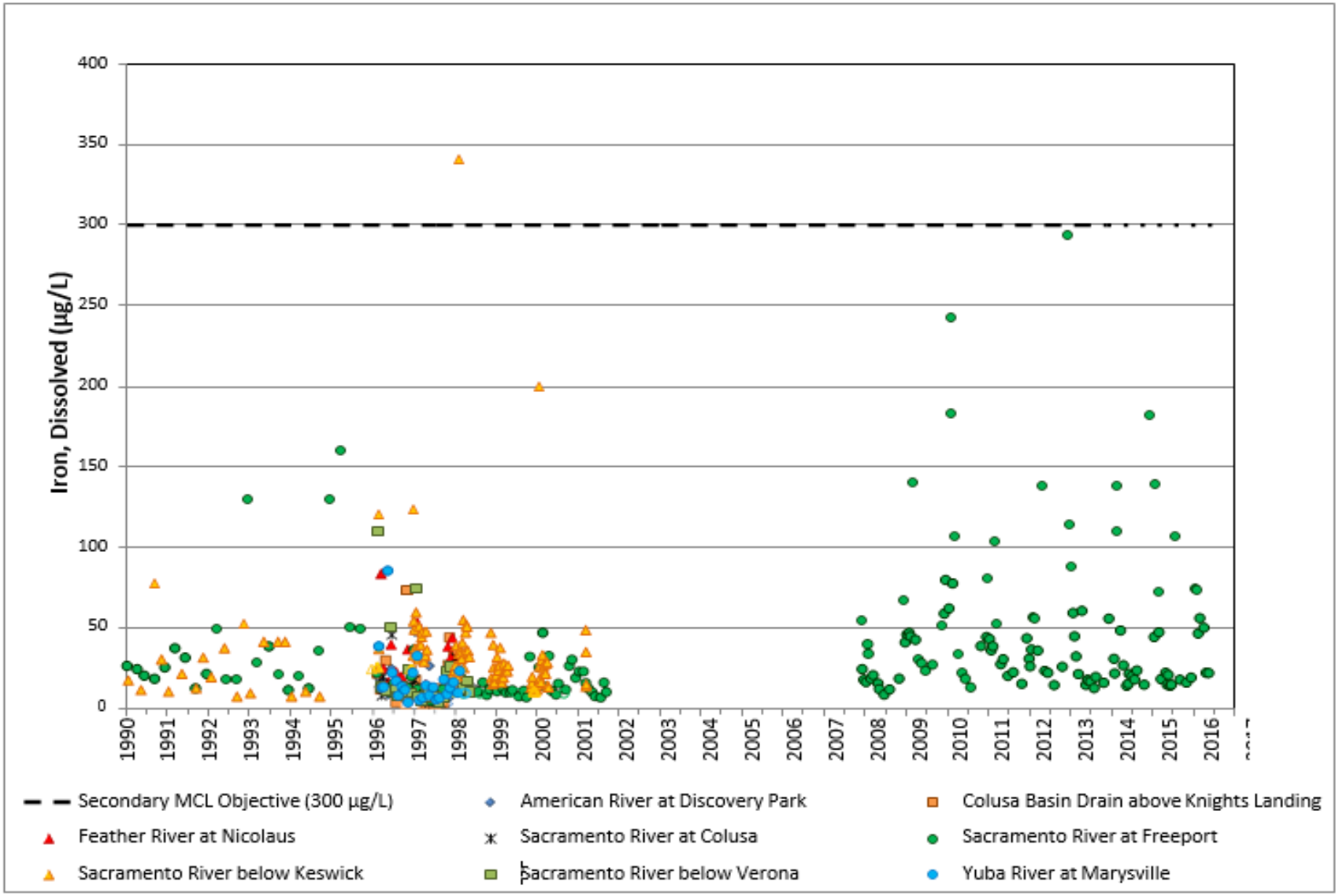

Figure A - 10. Sacramento River Hydrologic Region, Iron (total) Observations in Sacramento River

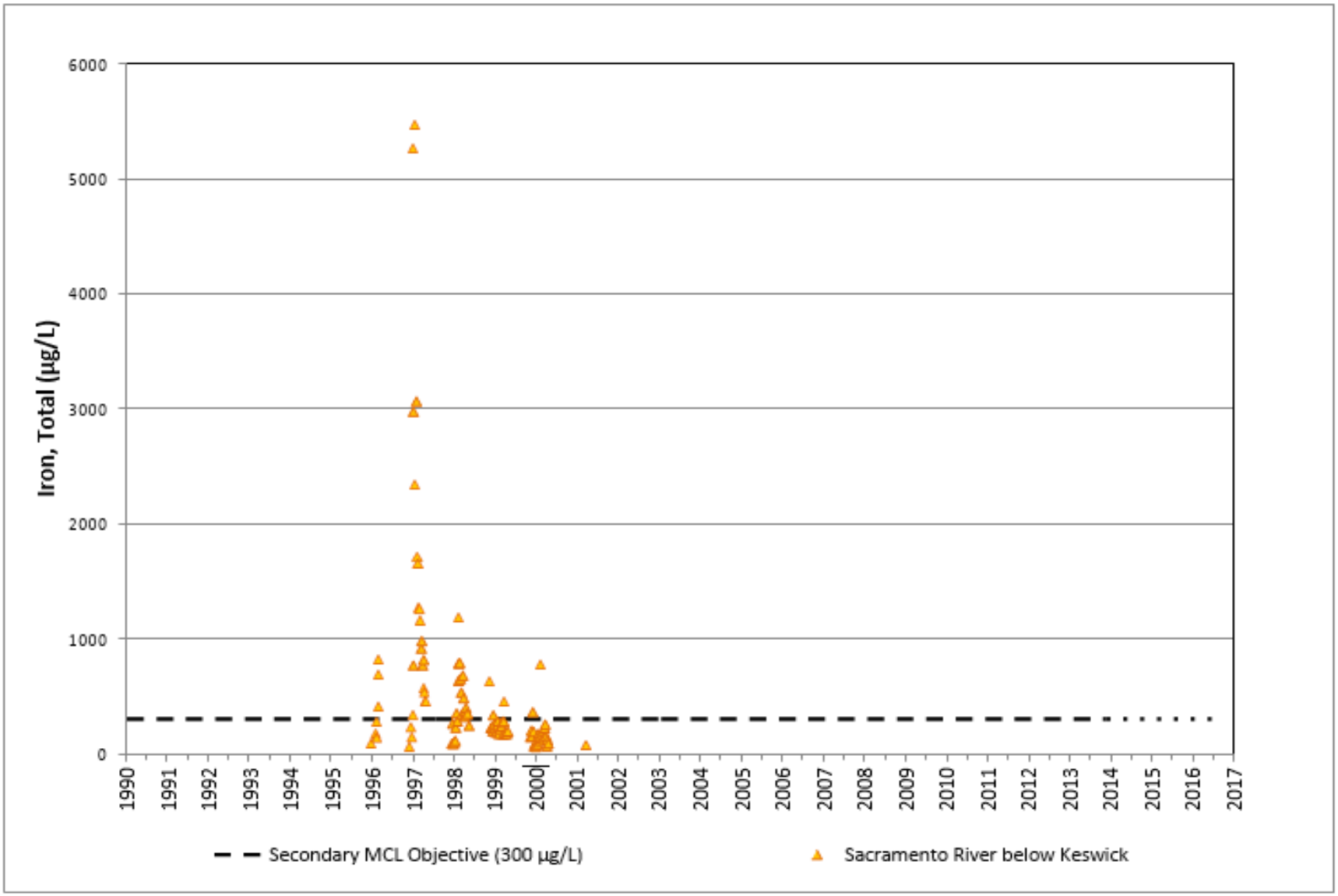

Figure A - 11. Sacramento River Hydrologic Region, Median Iron (dissolved and total) Values

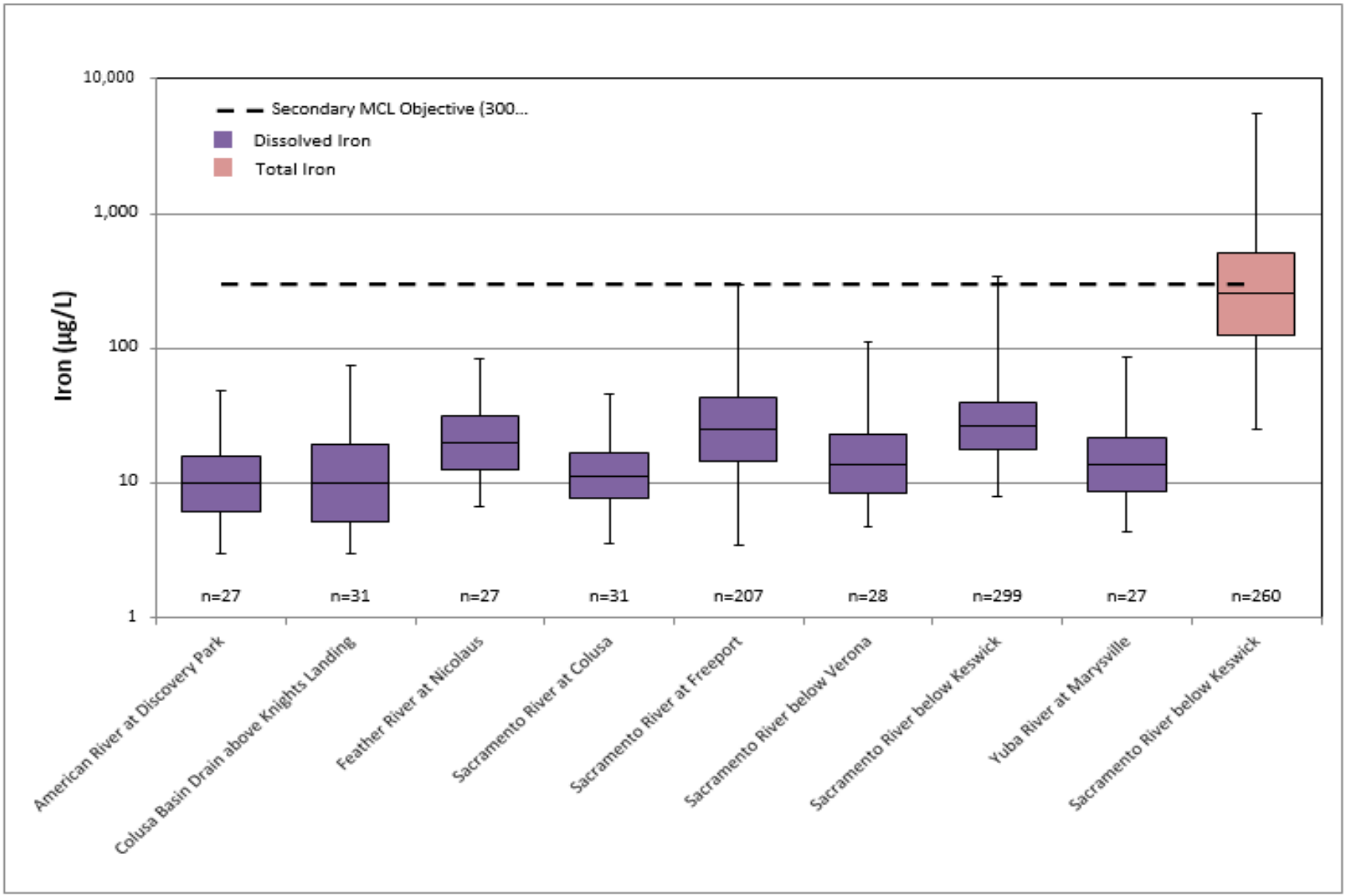

Figure A - 12. Sacramento River Hydrologic Region, Manganese (dissolved) Observations in Sacramento River Tributaries

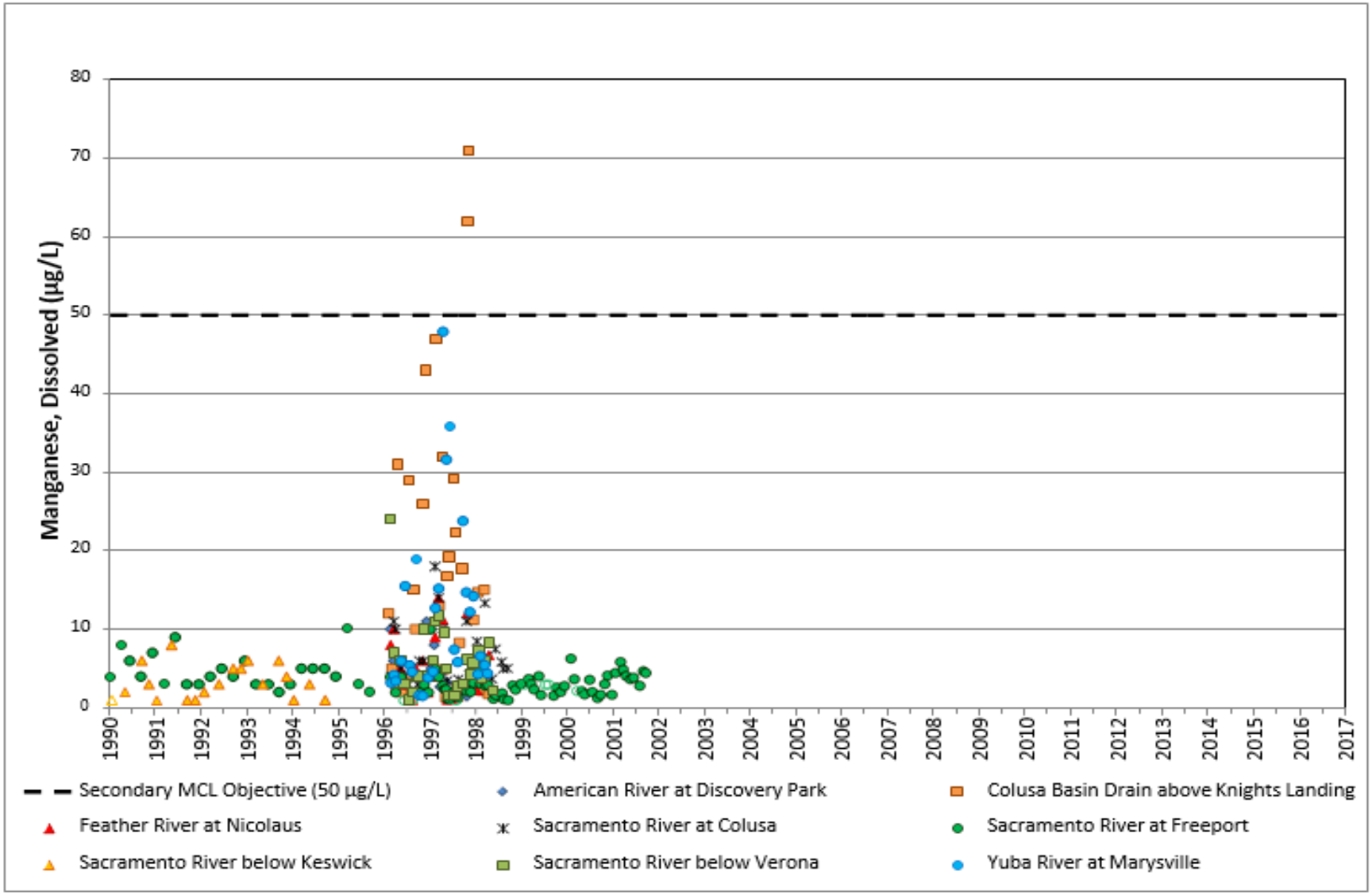

Figure A - 13. Sacramento River Hydrologic Region, Manganese (total) Observations in Sacramento River

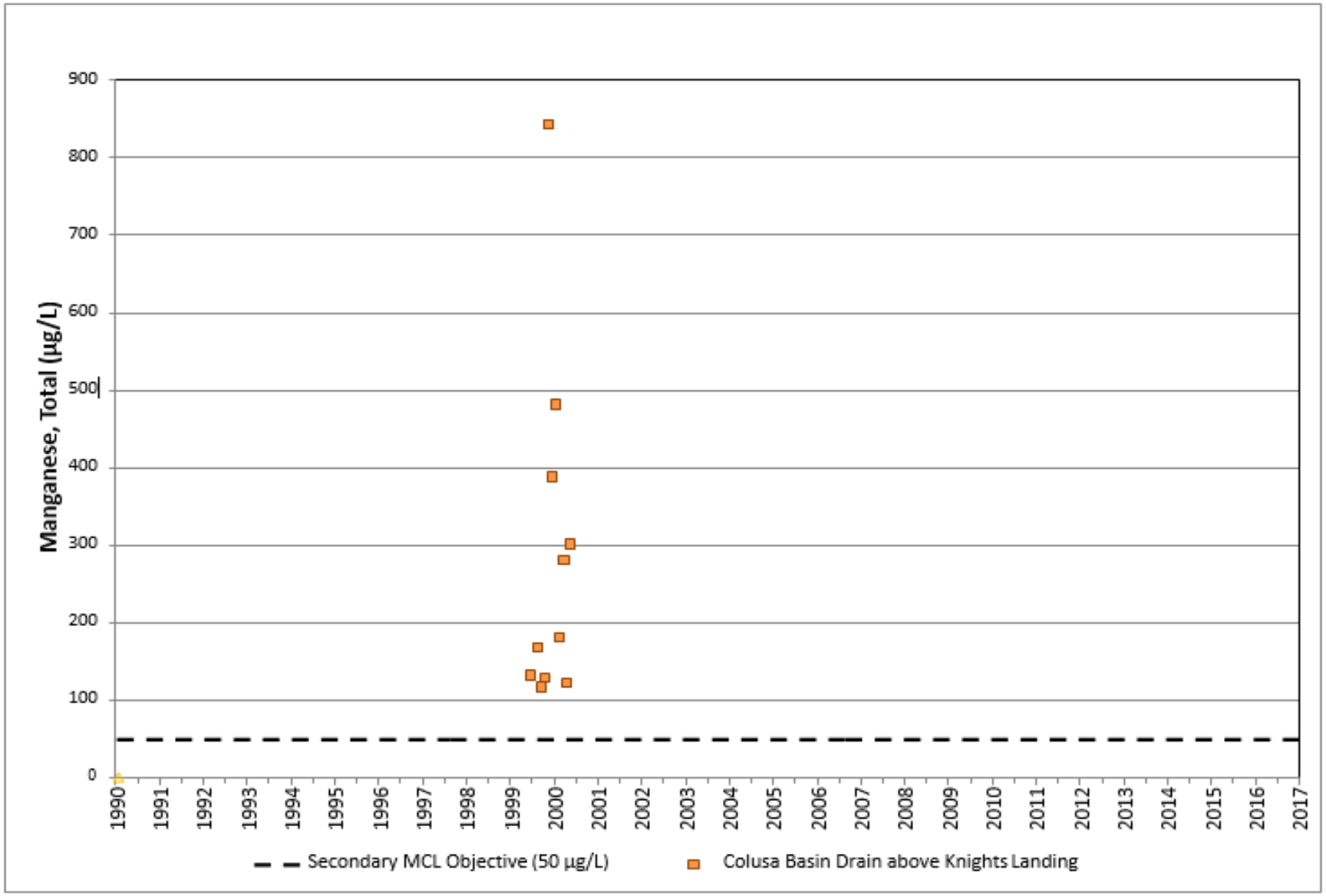

Figure A - 14. Sacramento River Hydrologic Region, Median Manganese (dissolved and total) Values

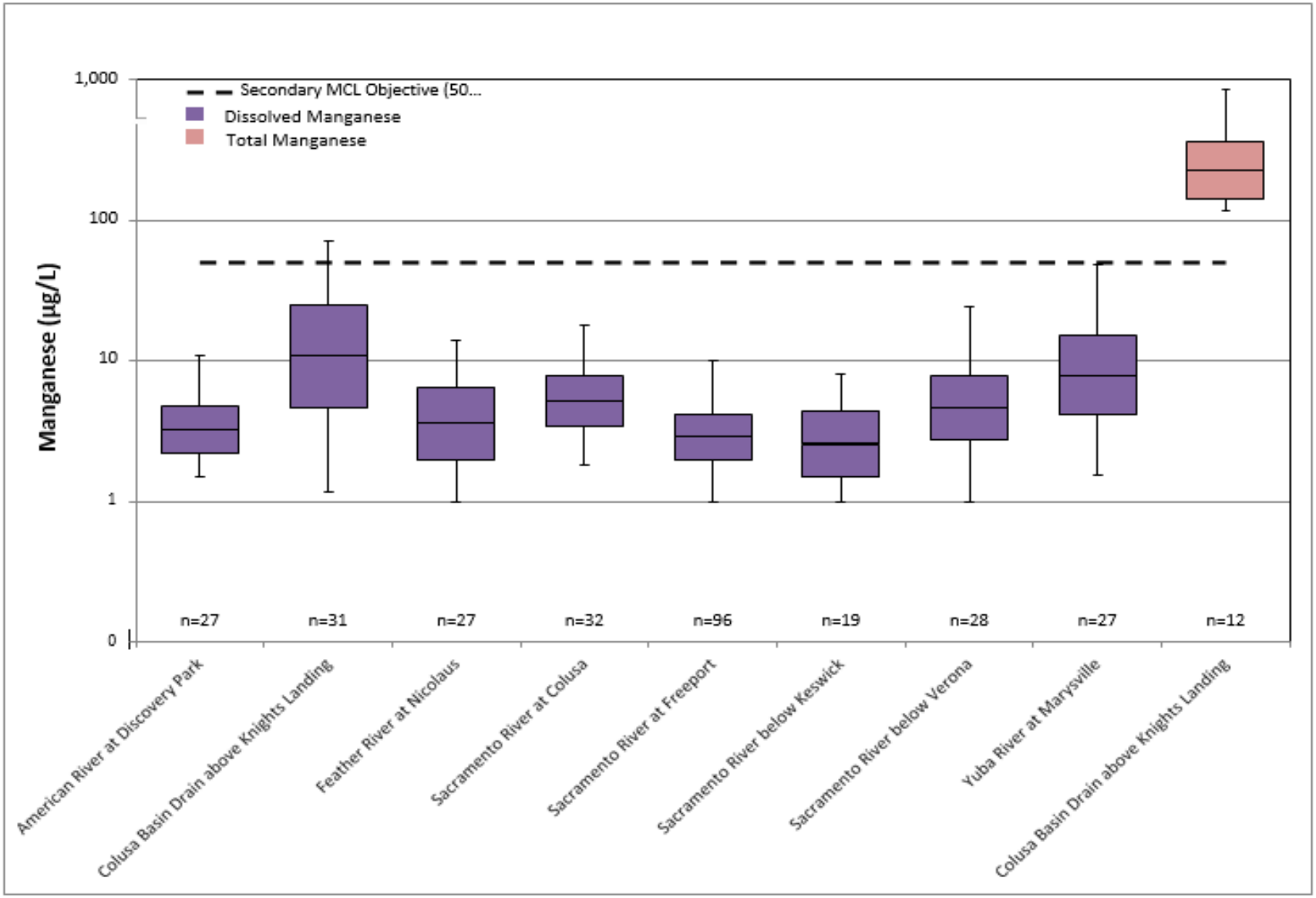

Figure A - 15. San Joaquin River Hydrologic Region, Conductivity Observations in San Joaquin River Tributaries

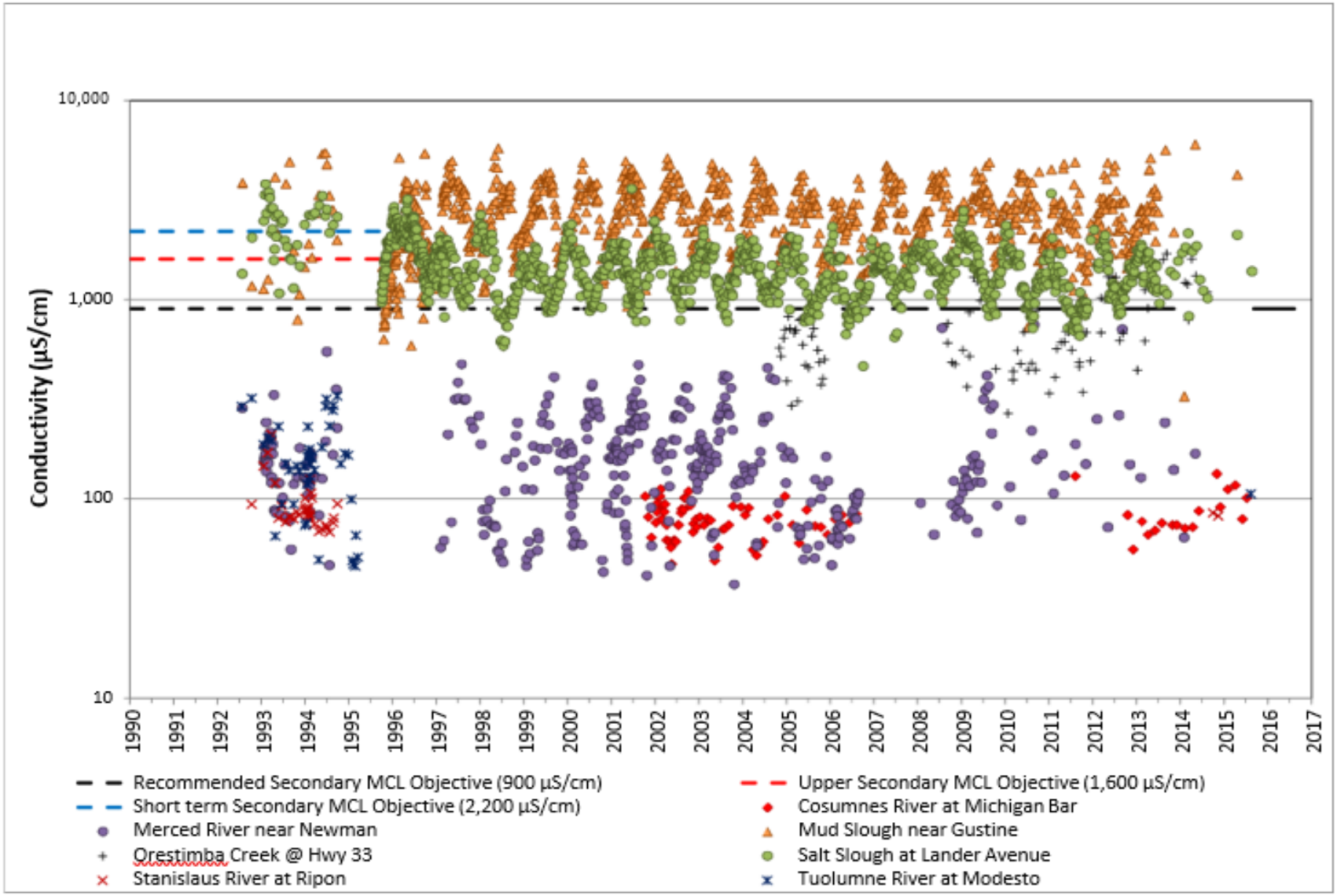

Figure A - 16. San Joaquin River Hydrologic Region, Conductivity Observations in San Joaquin River

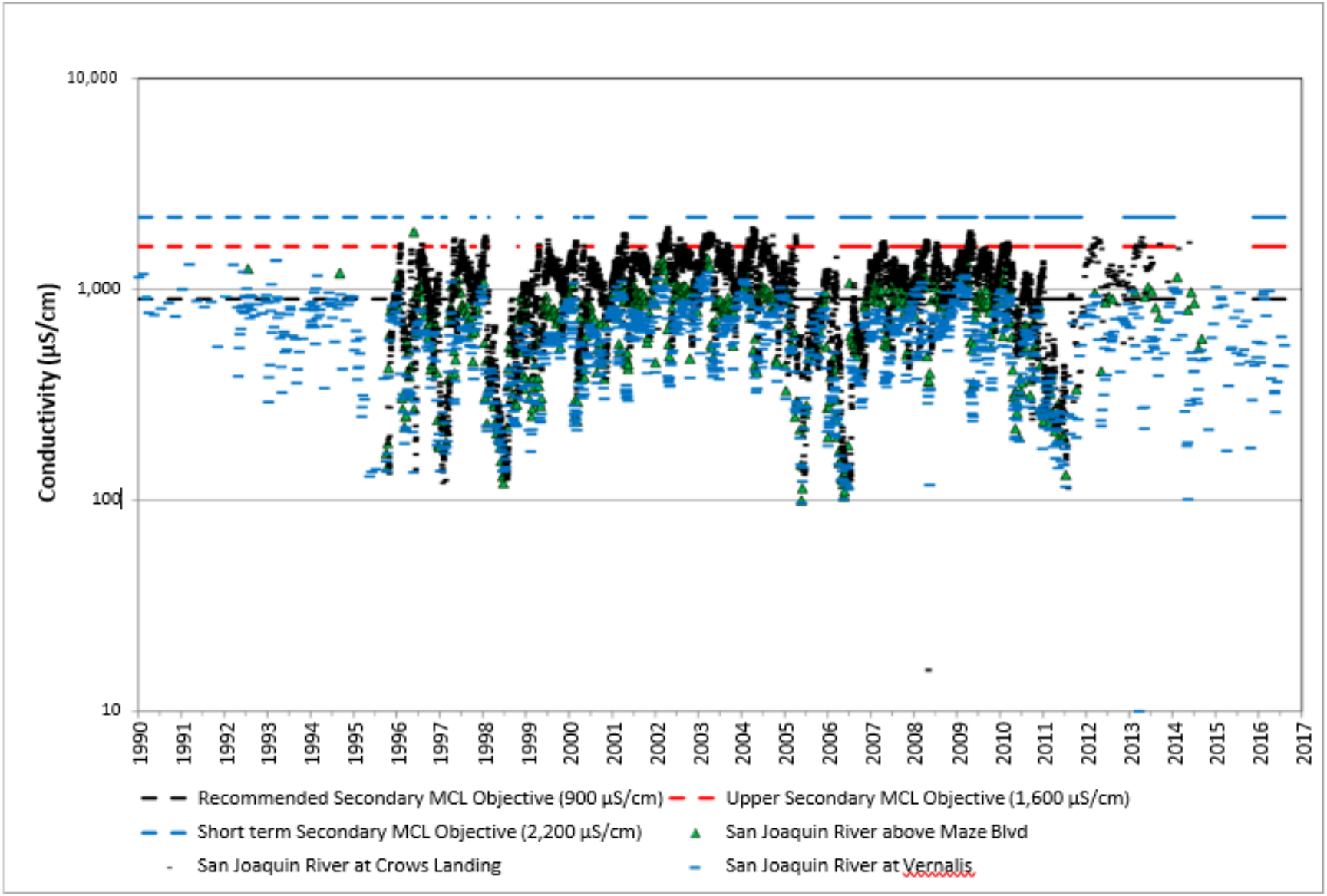

Figure A - 17. San Joaquin River Hydrologic Region, Median Conductivity Values

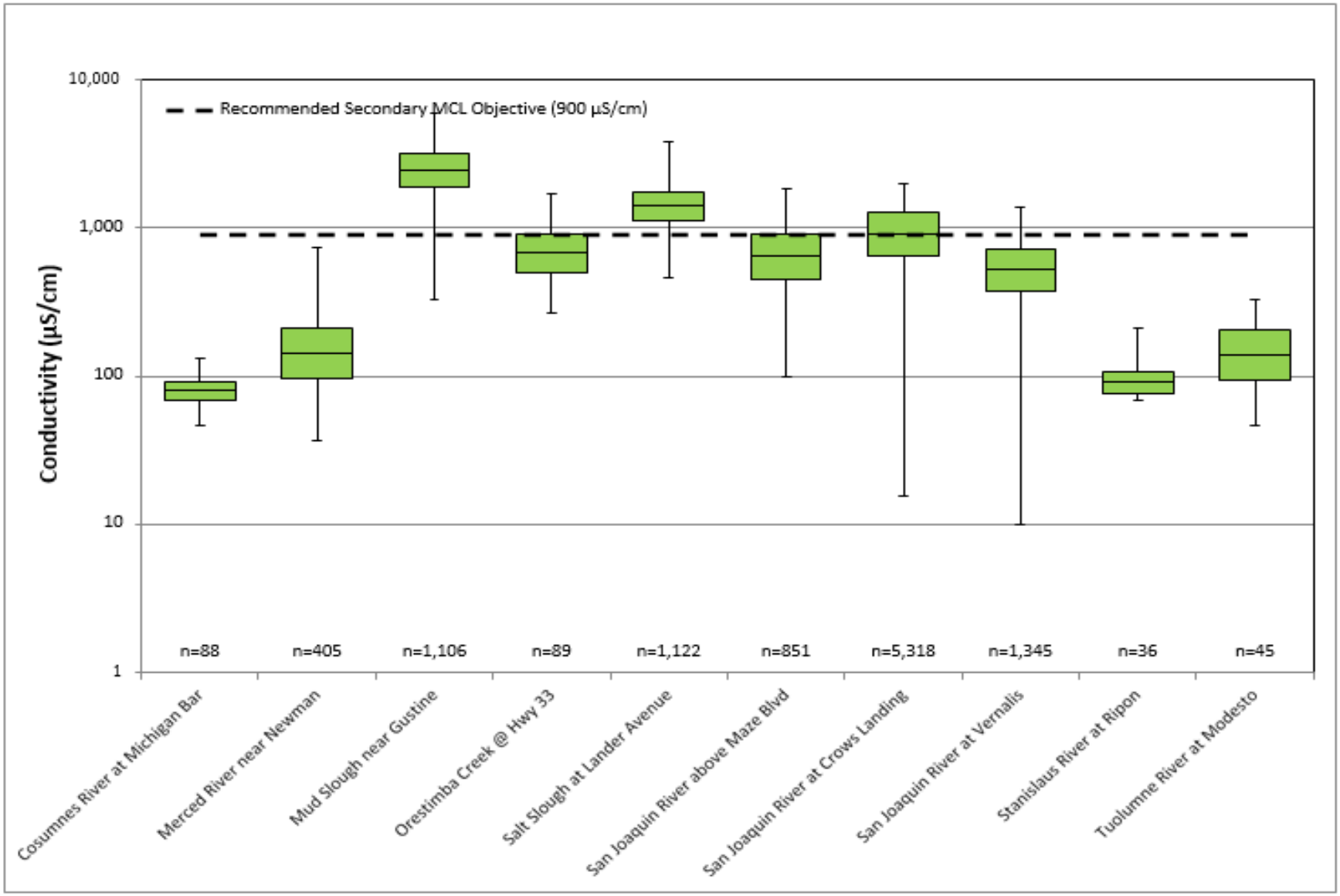

Figure A - 18. San Joaquin River Hydrologic Region, Nitrate as N Observations in San Joaquin River Tributaries

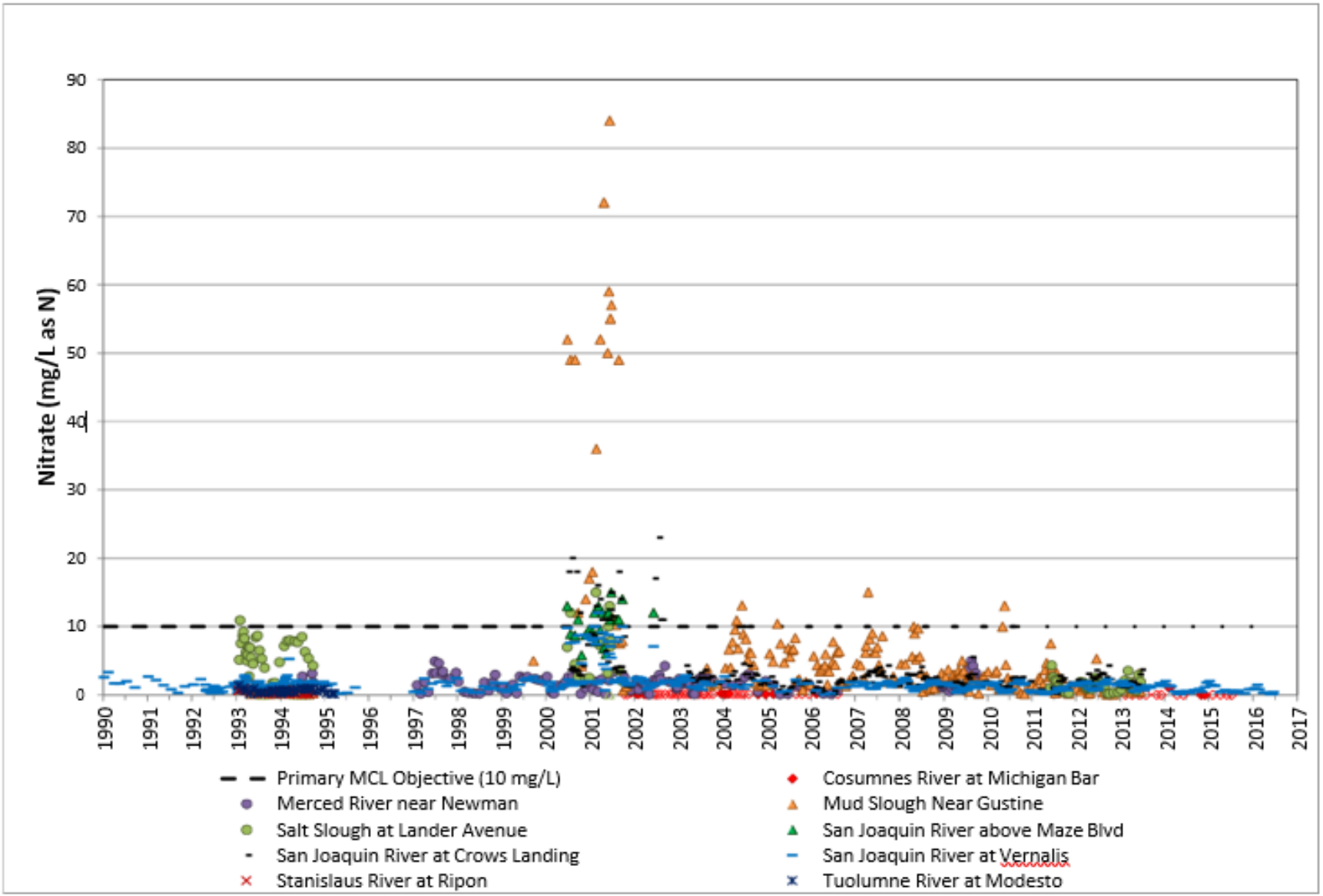

Figure A - 19. San Joaquin River Hydrologic Region, Median Nitrate as N Values

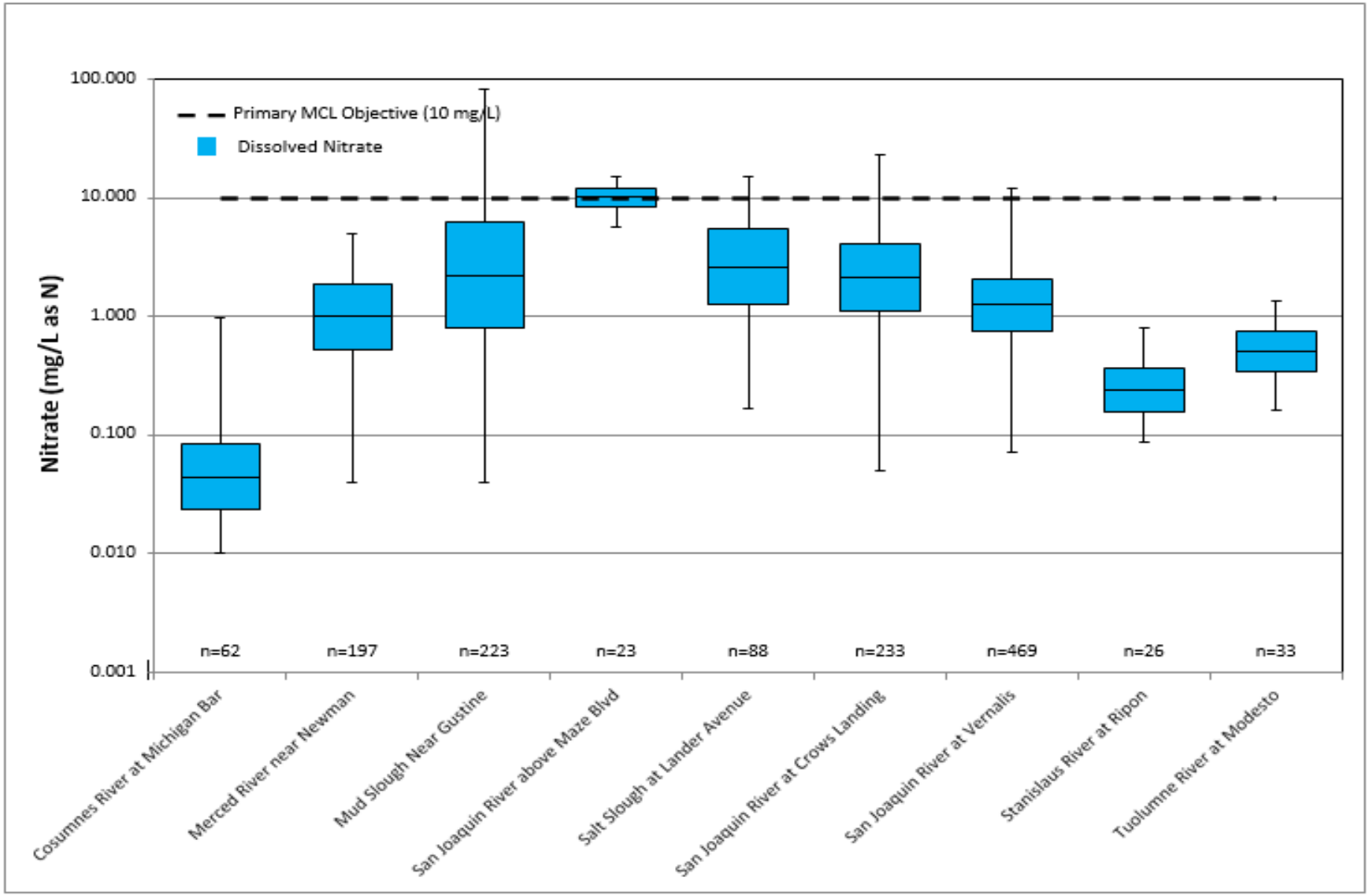

Figure A - 20. San Joaquin River Hydrologic Region, Aluminum (dissolved) Observations in San Joaquin River

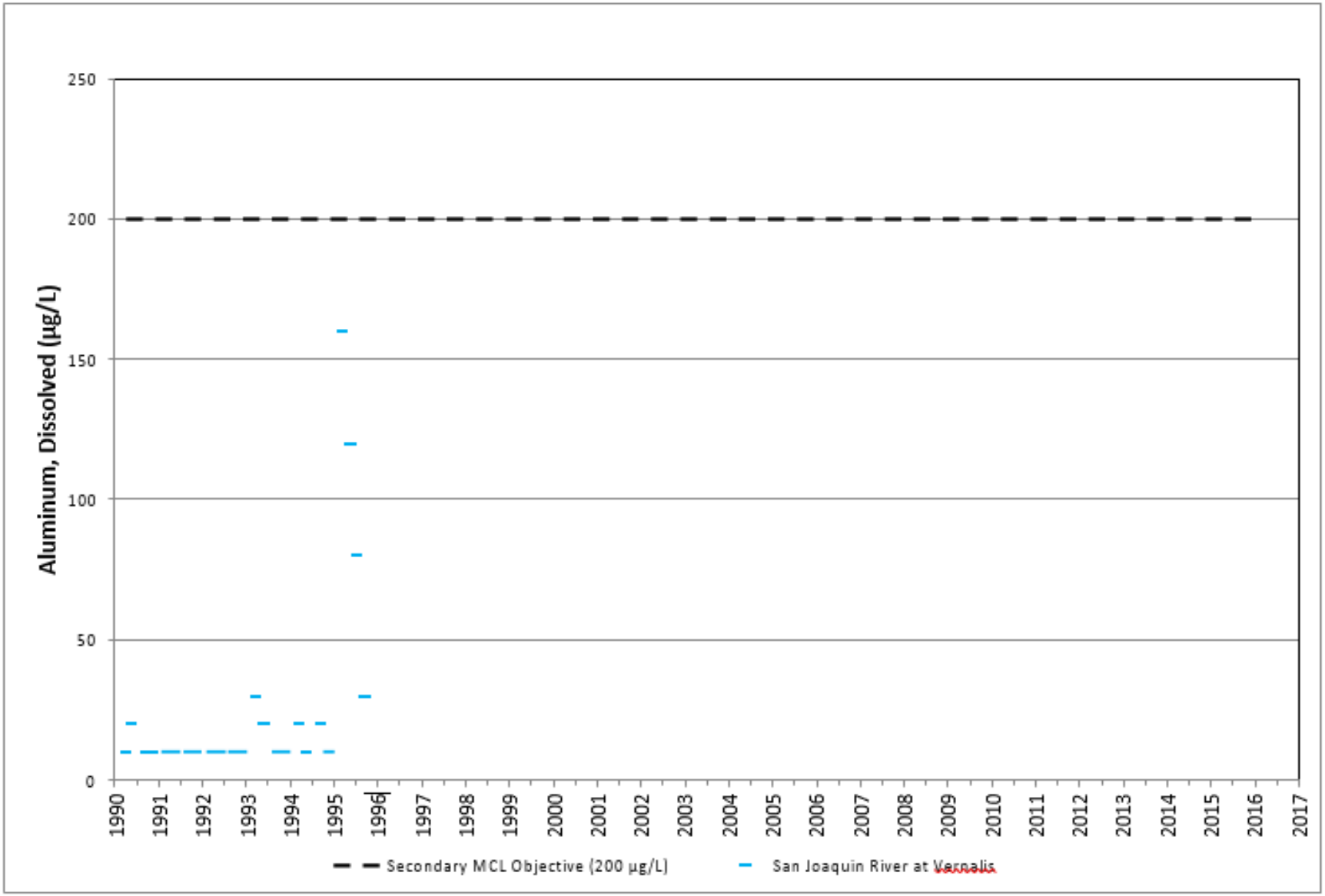

Figure A - 21. San Joaquin River Hydrologic Region, Median Aluminum (dissolved) Values

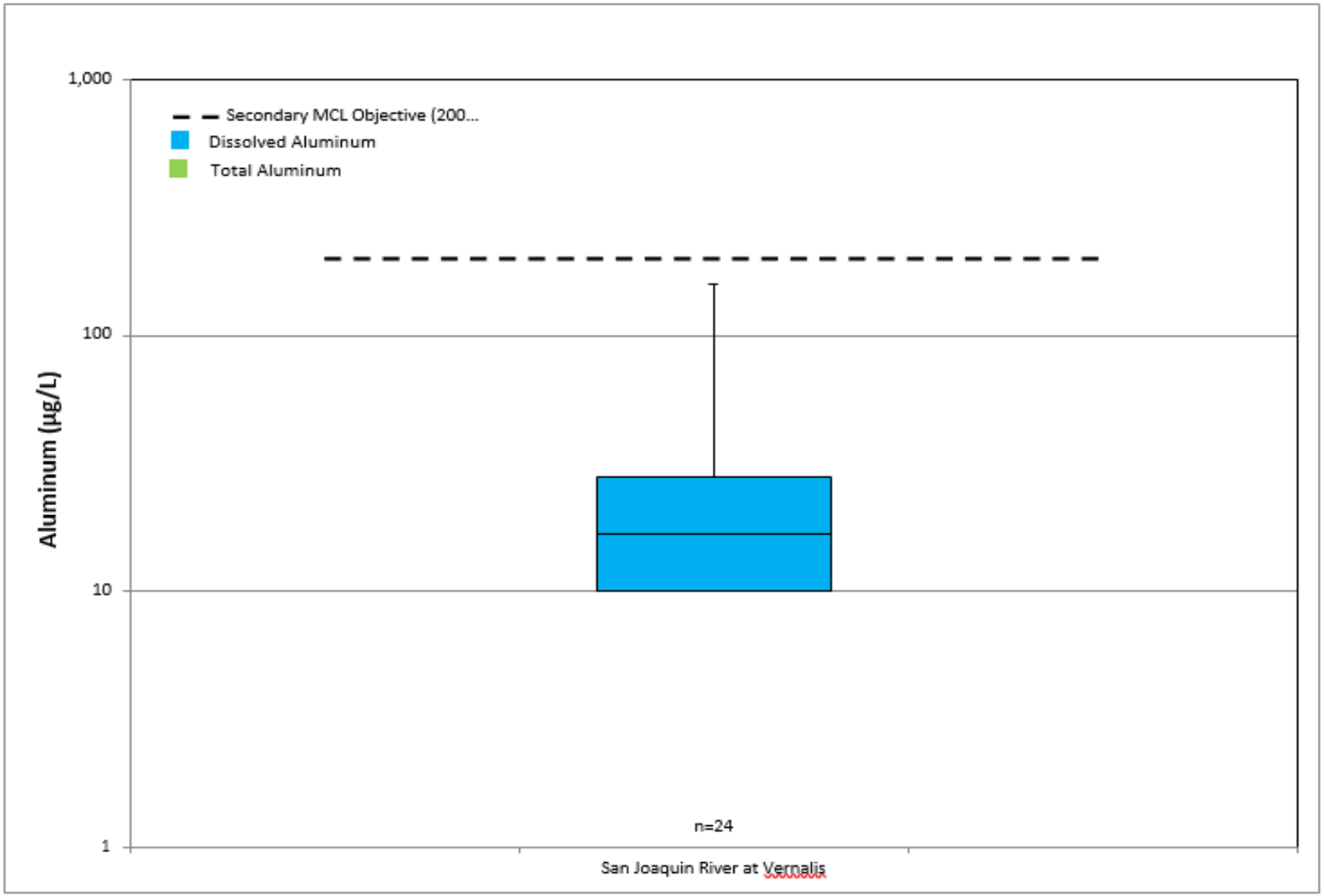

Figure A - 22. San Joaquin River Hydrologic Region, Iron (dissolved) Observations in San Joaquin River Tributaries

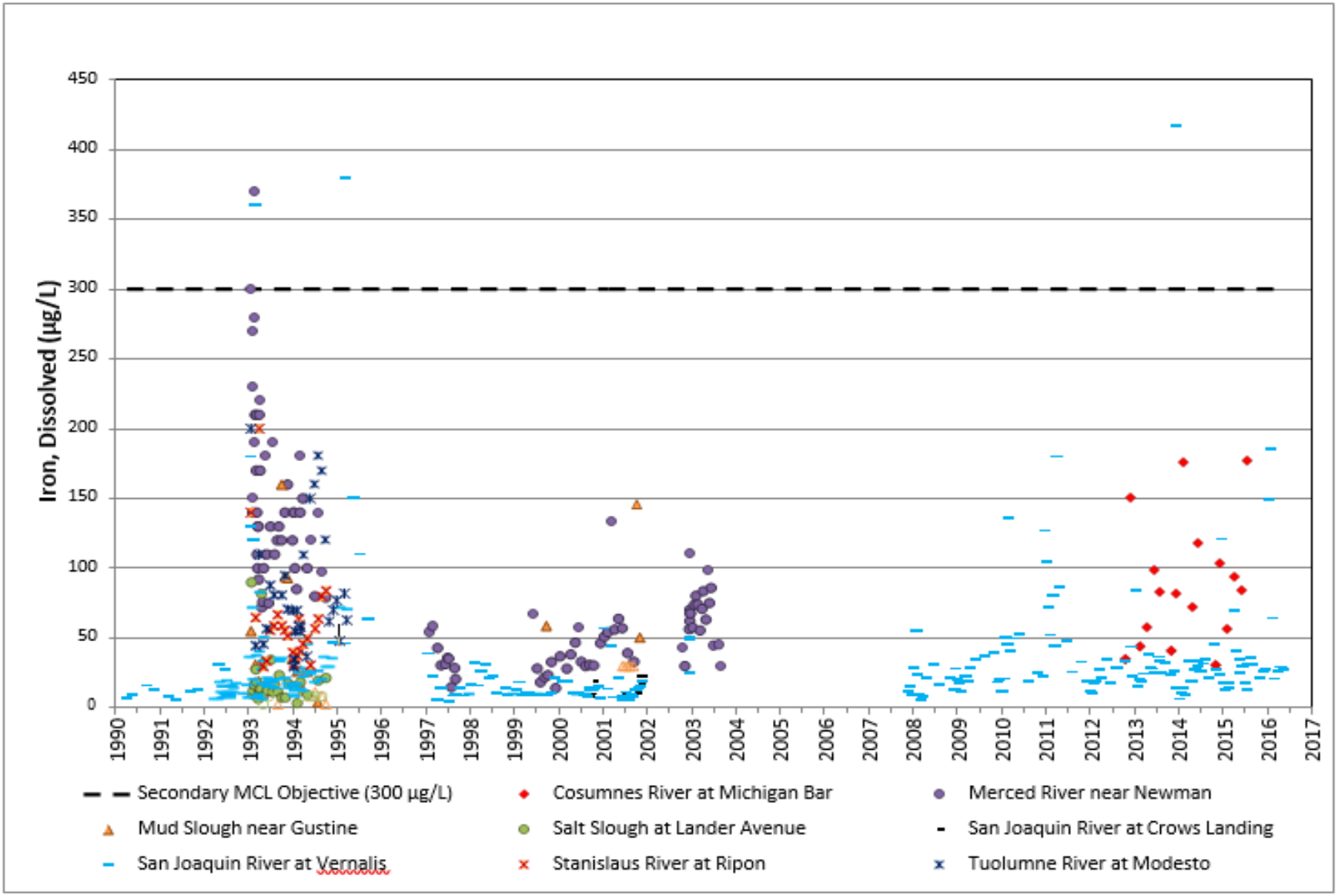

Figure A - 23. San Joaquin River Hydrologic Region, Median Iron (dissolved) Values

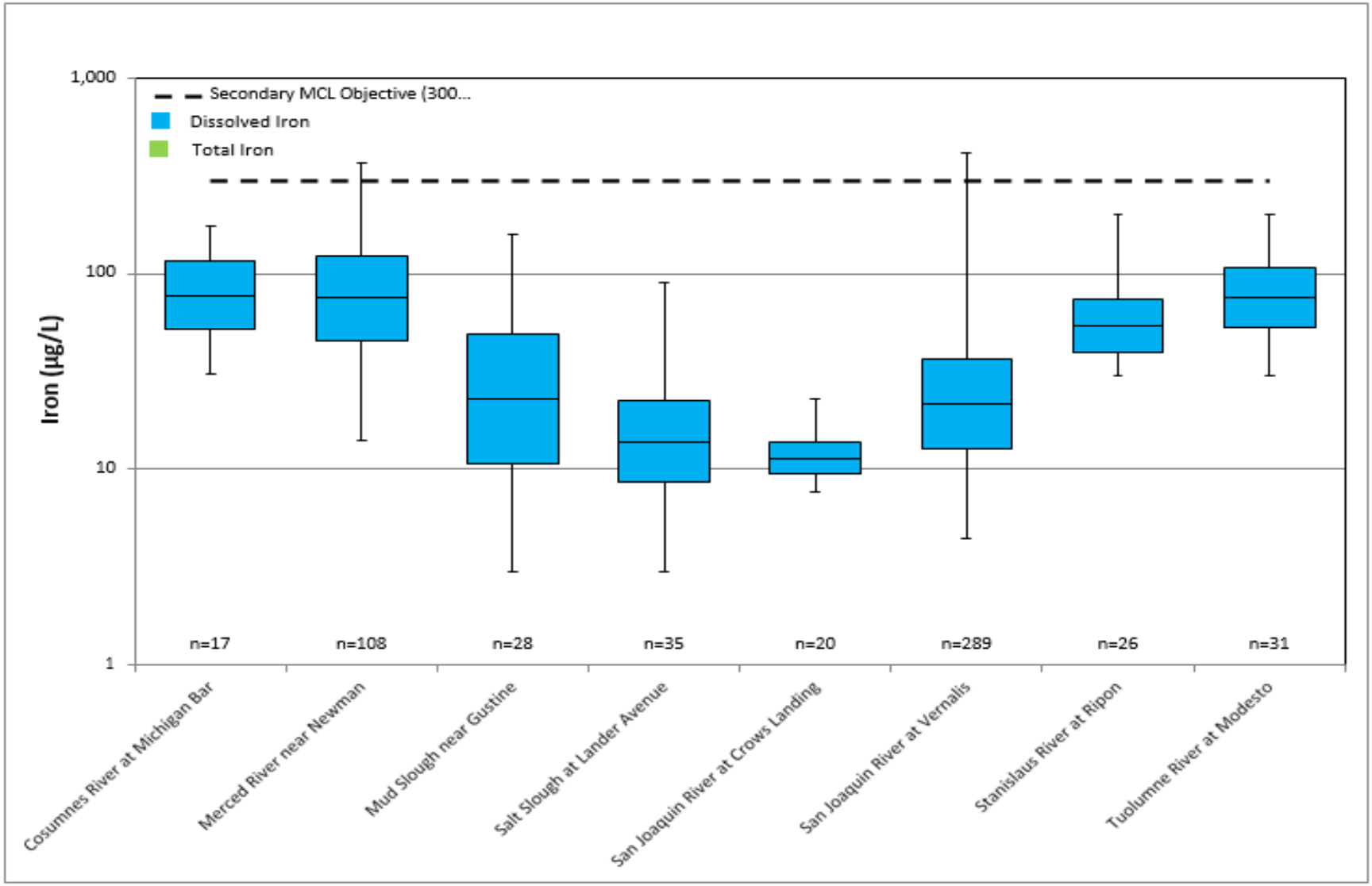

Figure A - 24. San Joaquin River Hydrologic Region, Manganese (dissolved) Observations in San Joaquin River Tributaries

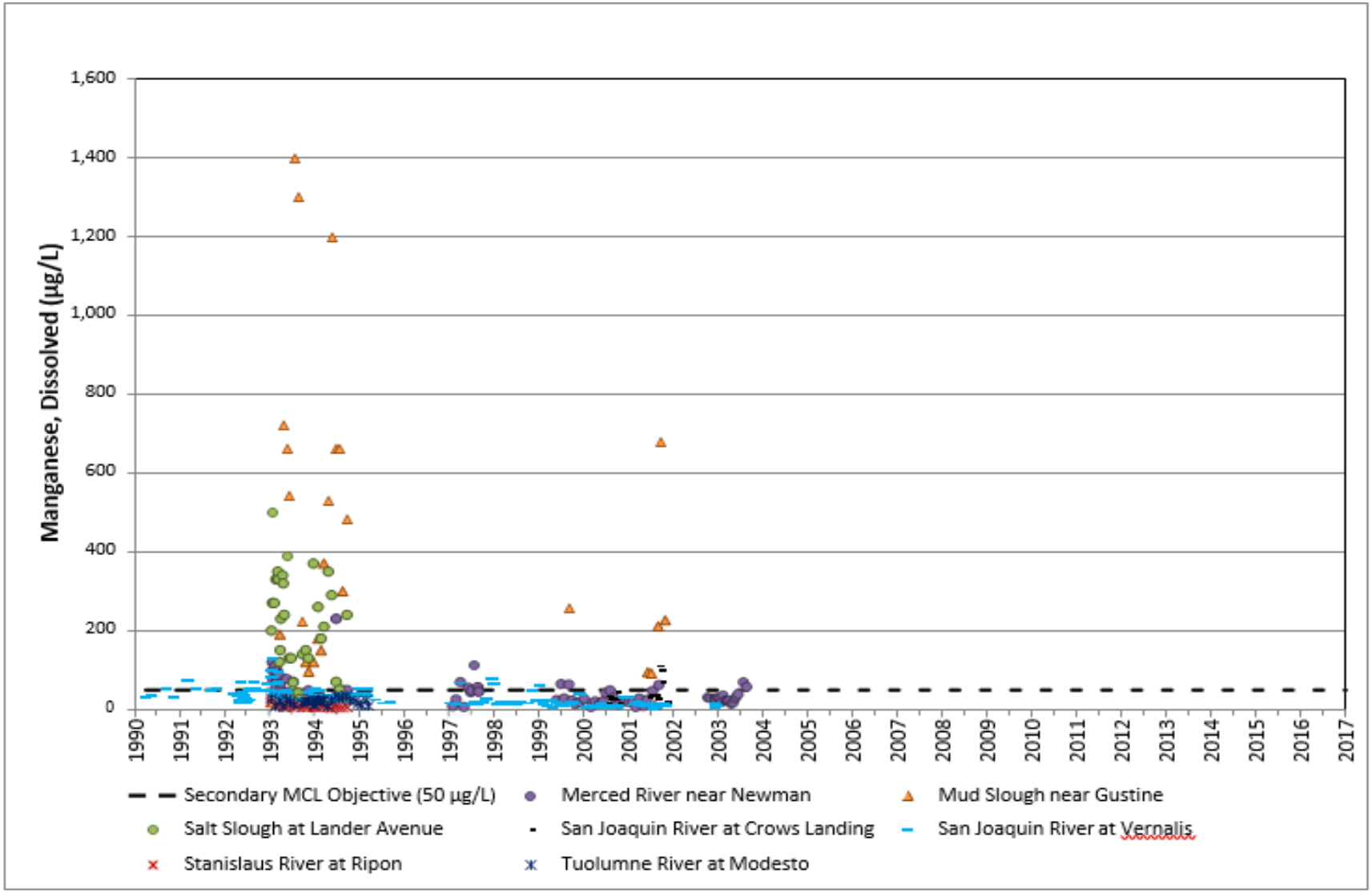

Figure A - 25. San Joaquin River Hydrologic Region, Median Manganese (dissolved) Values

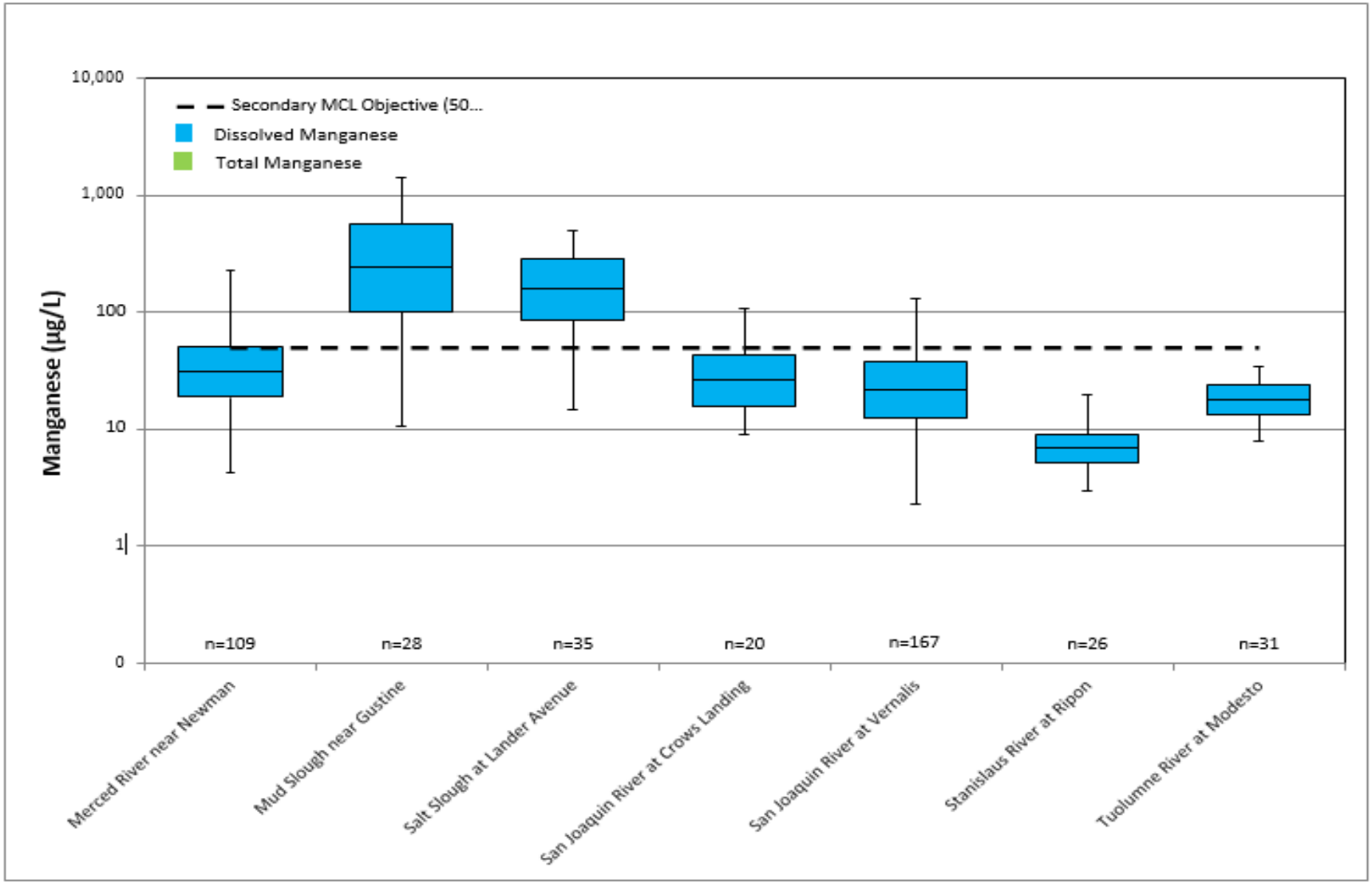

Figure A - 26. Delta Region, Conductivity Observations

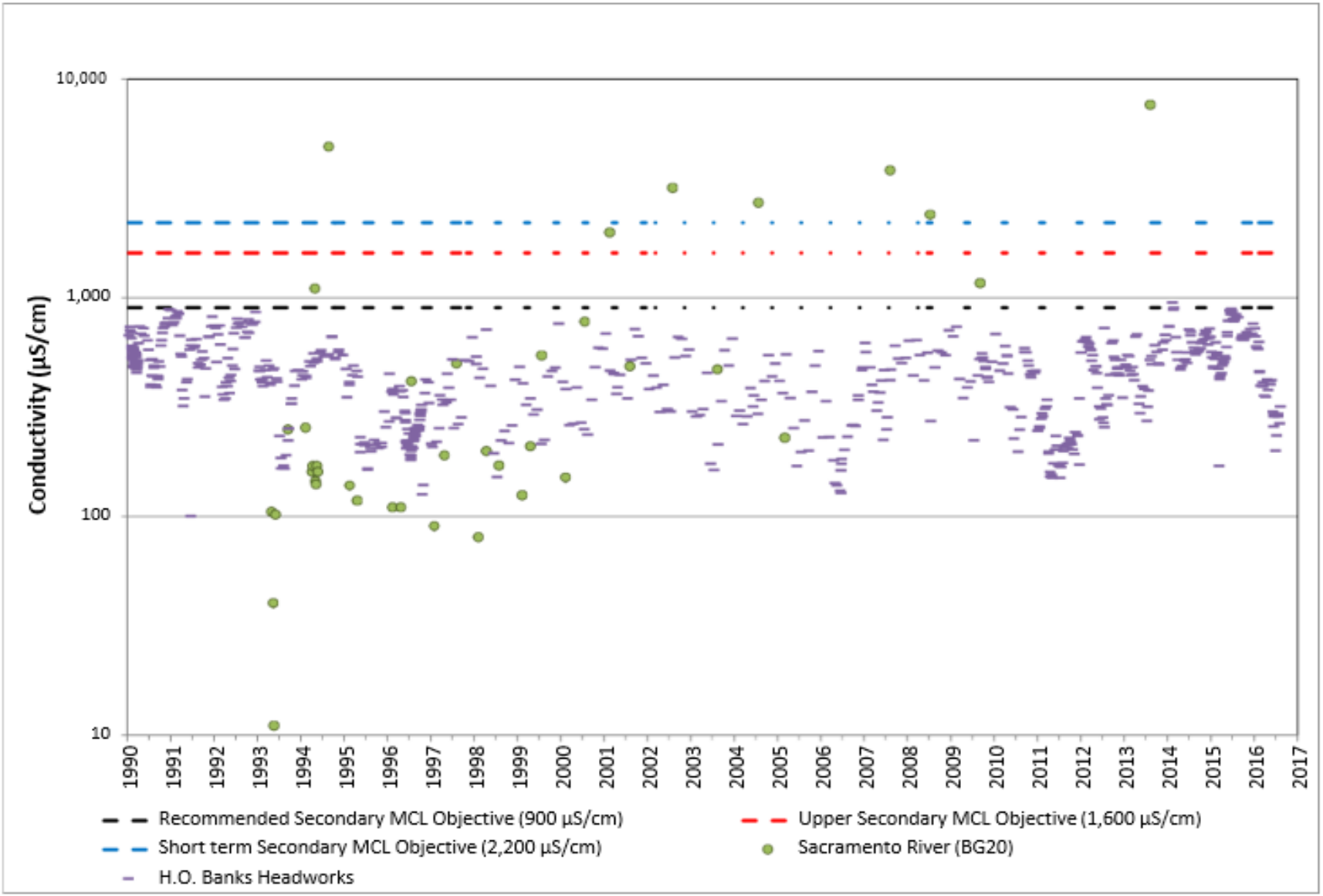

Figure A - 27. Delta Region, Median Conductivity Values

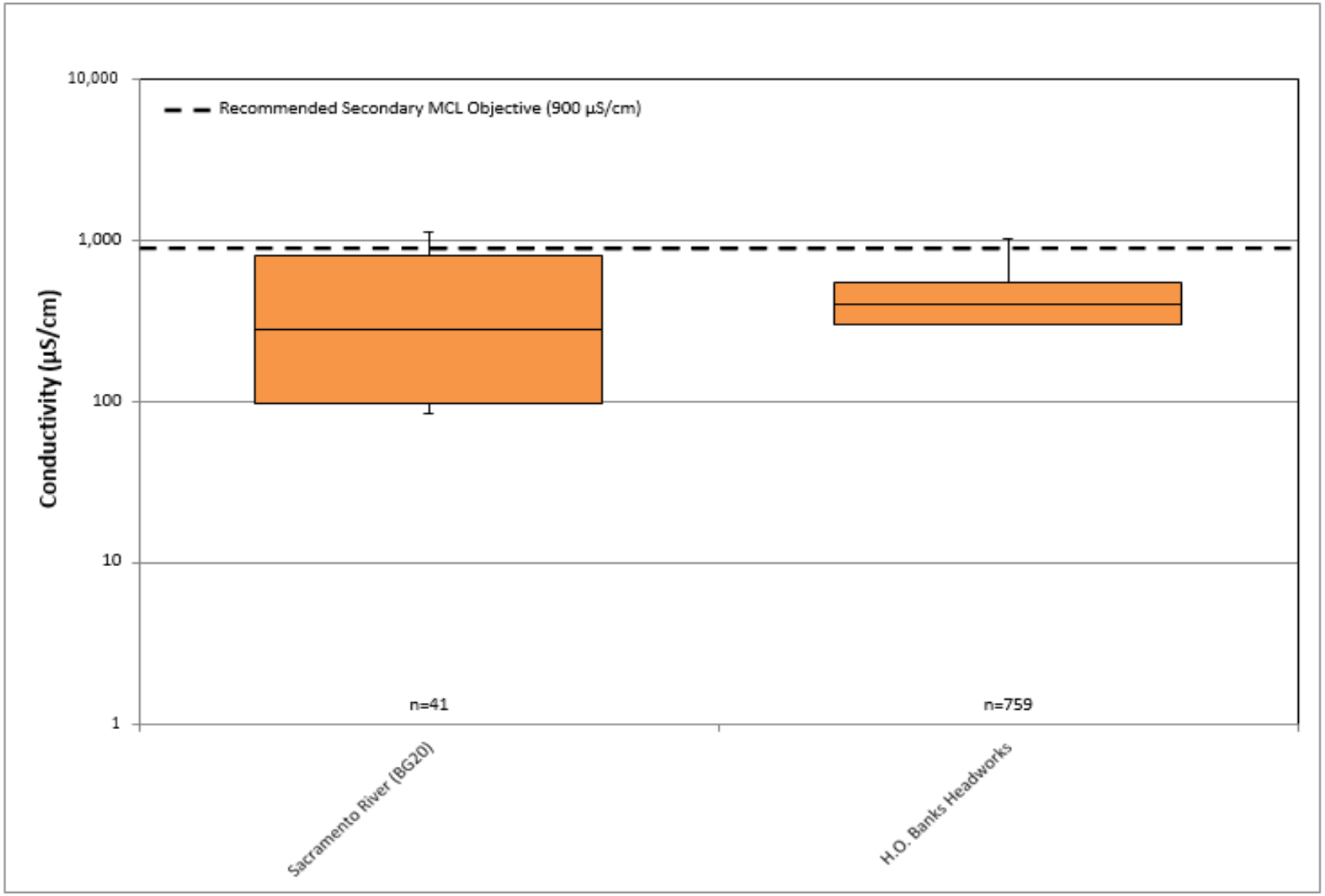

Figure A - 28. Delta Region, Nitrate as N Observations

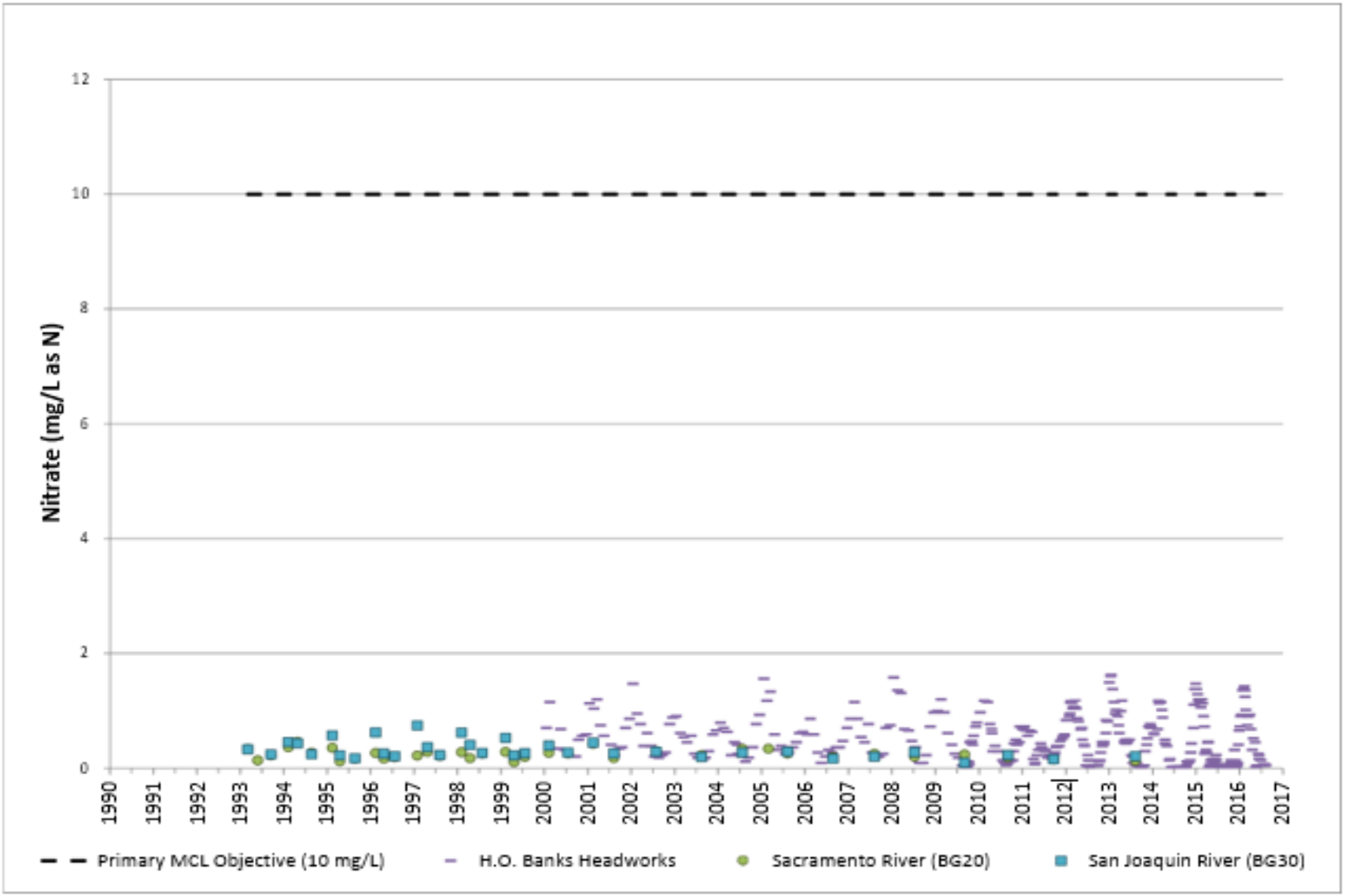

Figure A - 29. Delta Region, Median Nitrate as N Values

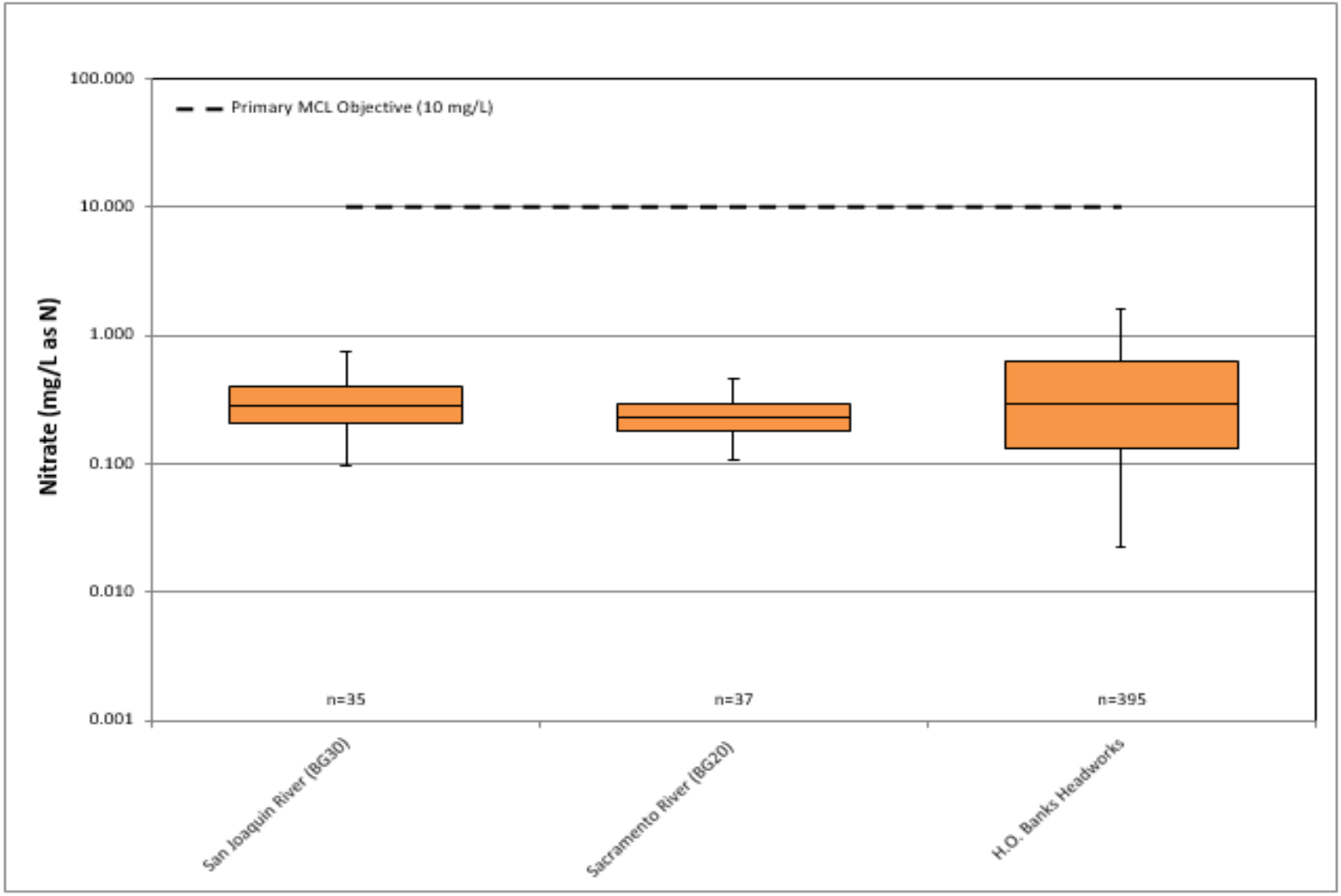

Figure A - 30. Delta Region, Aluminum Observations

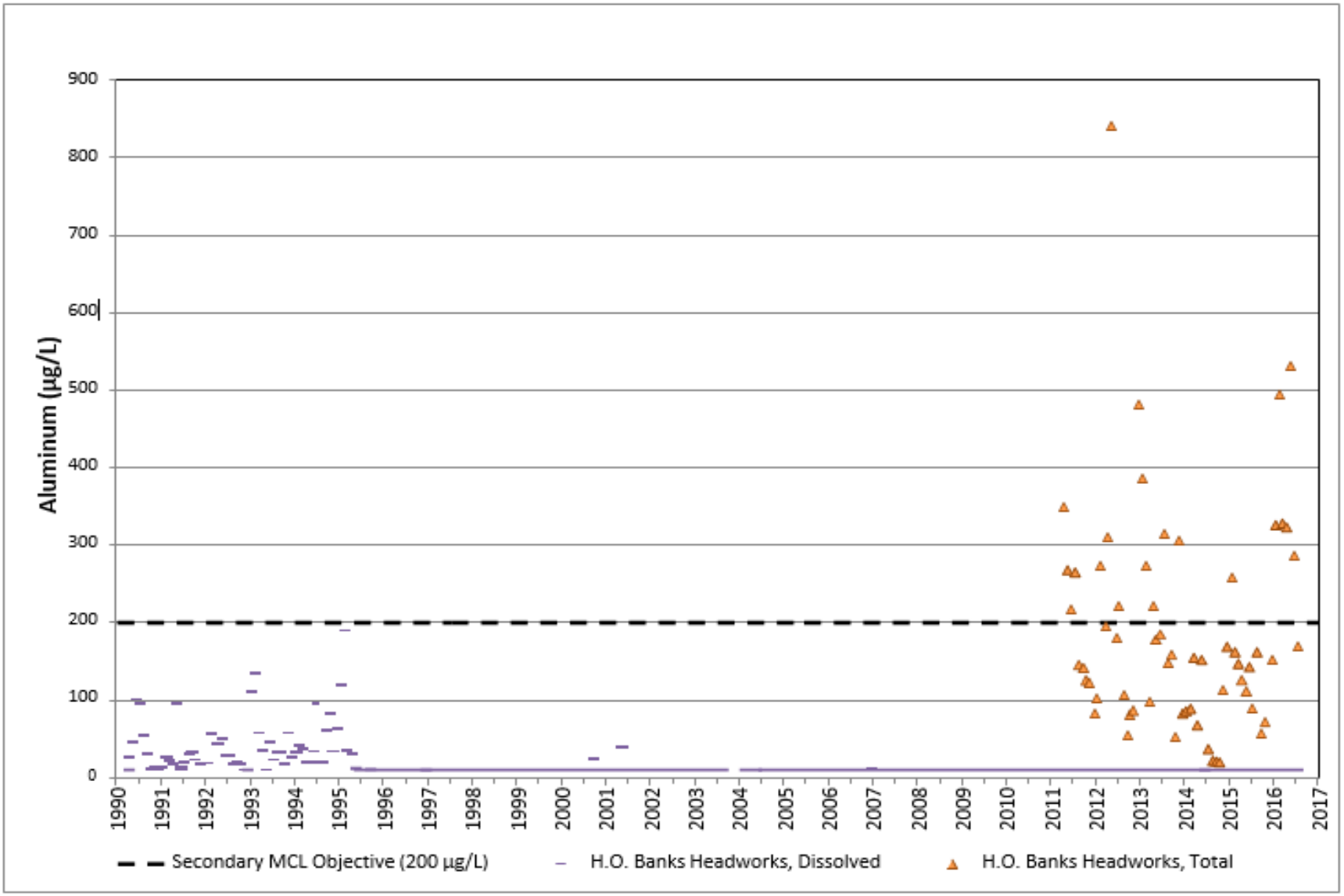

Figure A - 31. Delta Region, Median Aluminum (dissolved and total) Values

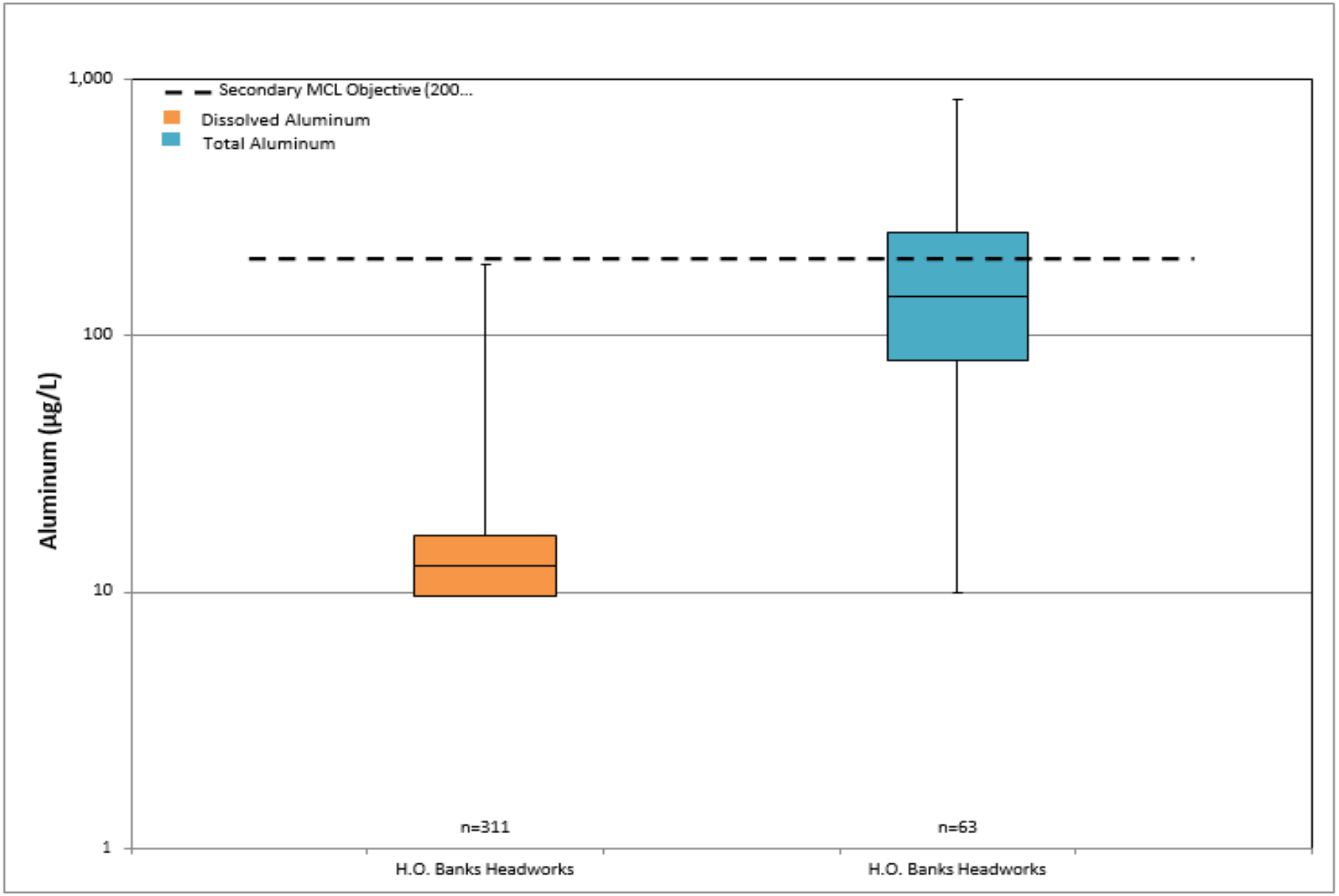

Figure A - 32. Delta Region, Iron Observations

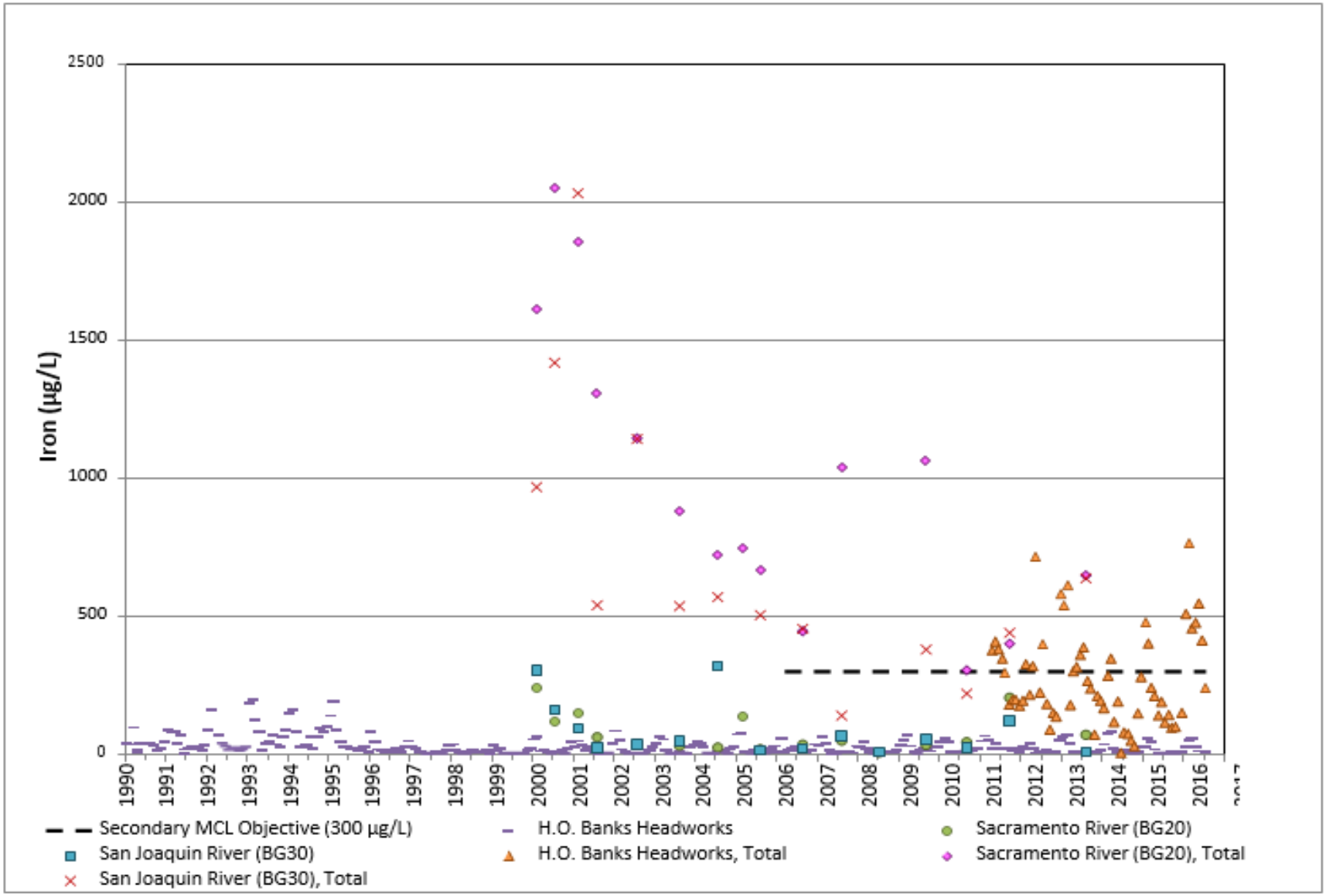

Figure A - 33. Delta Region, Median Iron (dissolved and total) Values

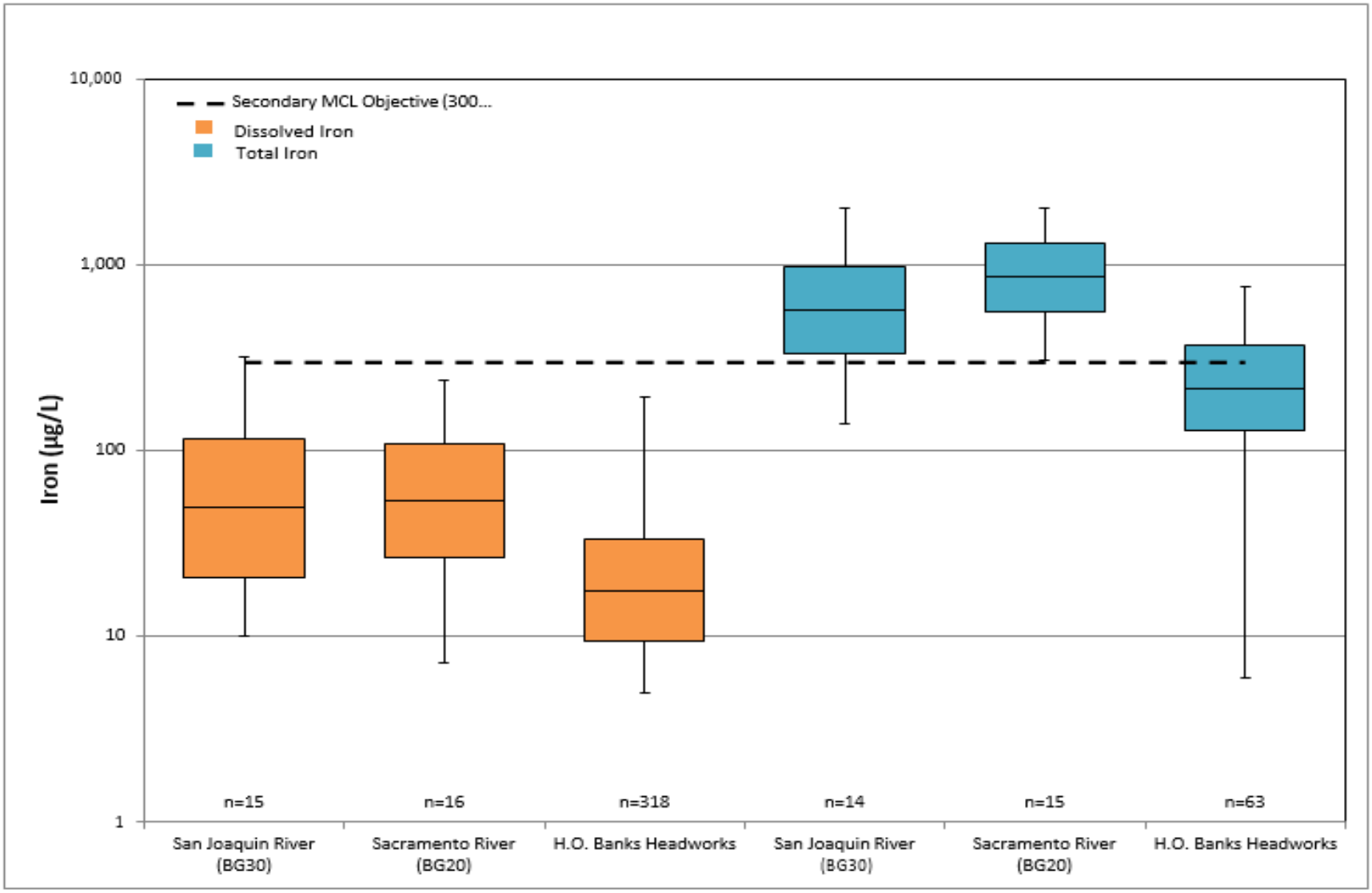

Figure A - 34. Delta Region, Manganese Observations

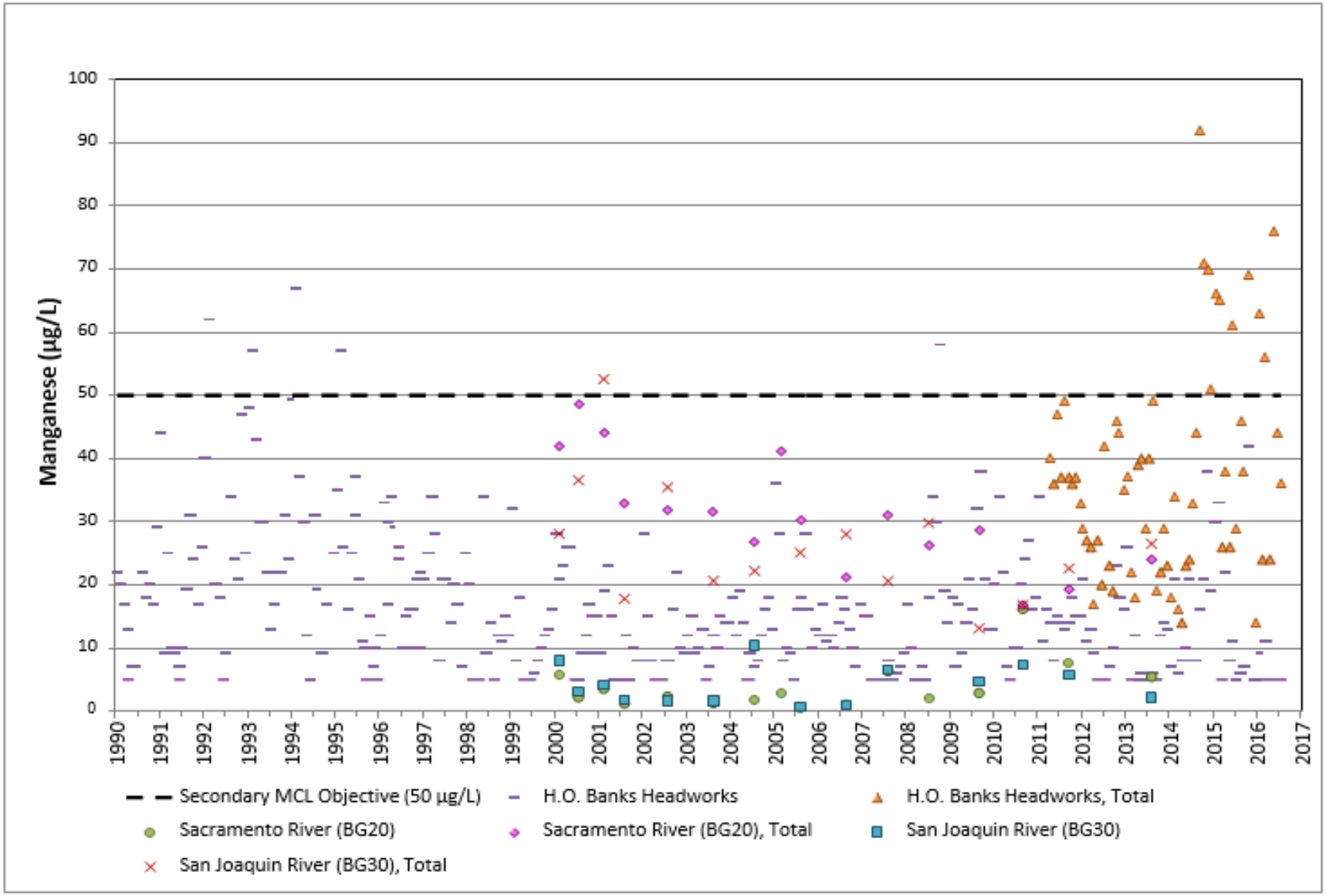

Figure A - 35. Delta Region, Median Manganese (dissolved and total) Values

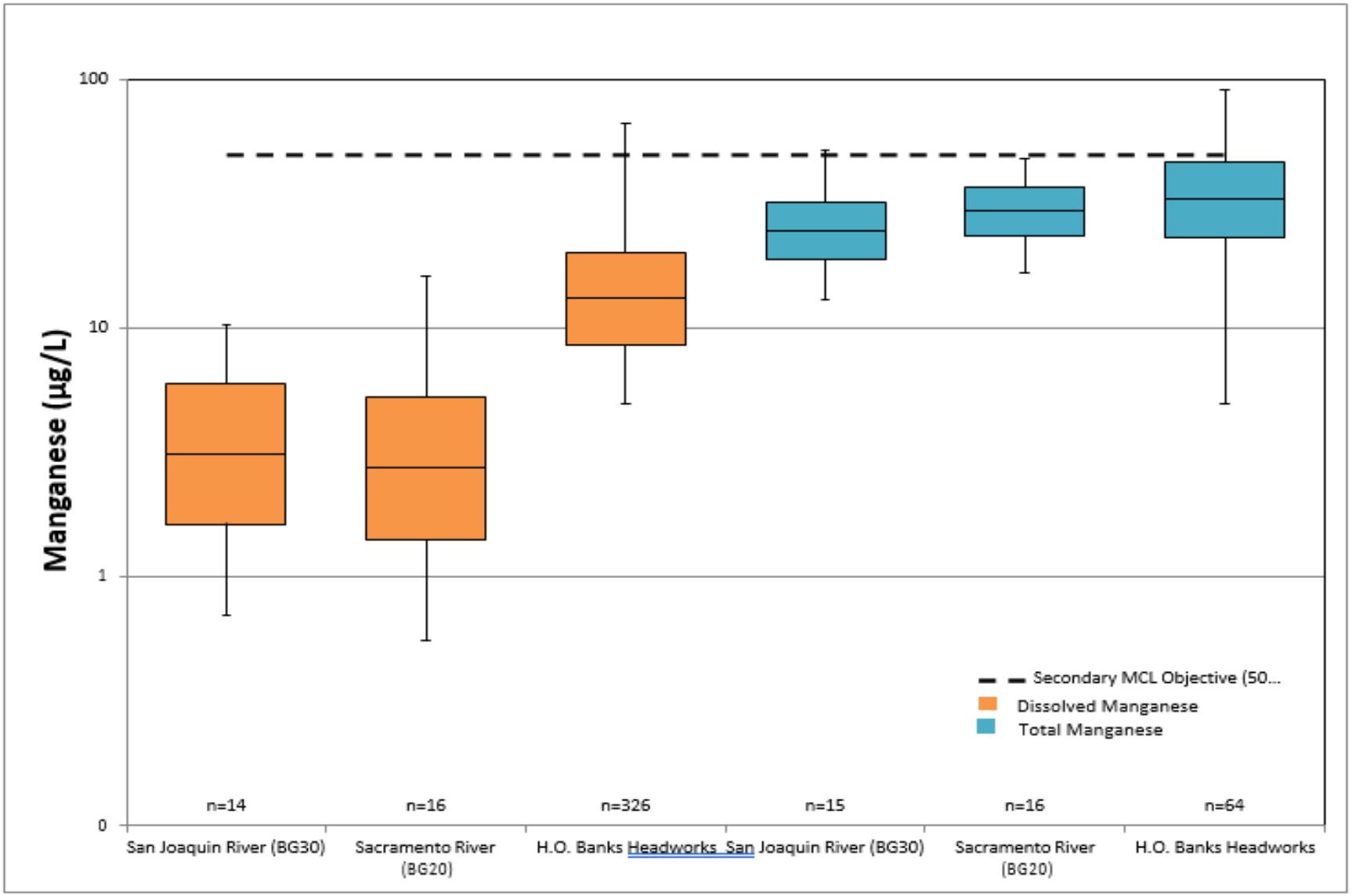

Figure A - 36. Tulare Lake Hydrologic Region, Conductivity Observations in Tulare Lake Tributaries

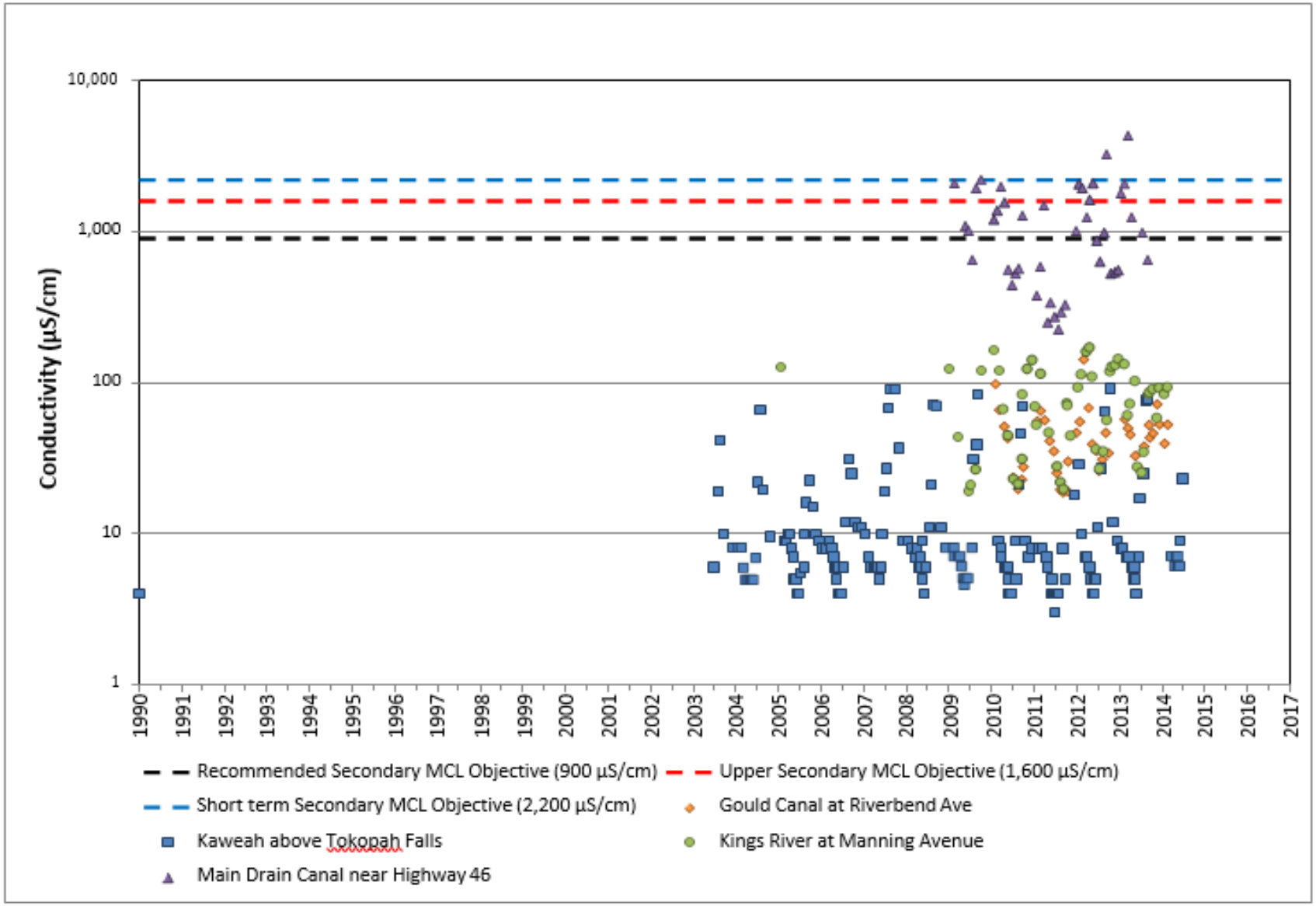

Figure A - 37. Tulare Lake Hydrologic Region, Median Conductivity Values

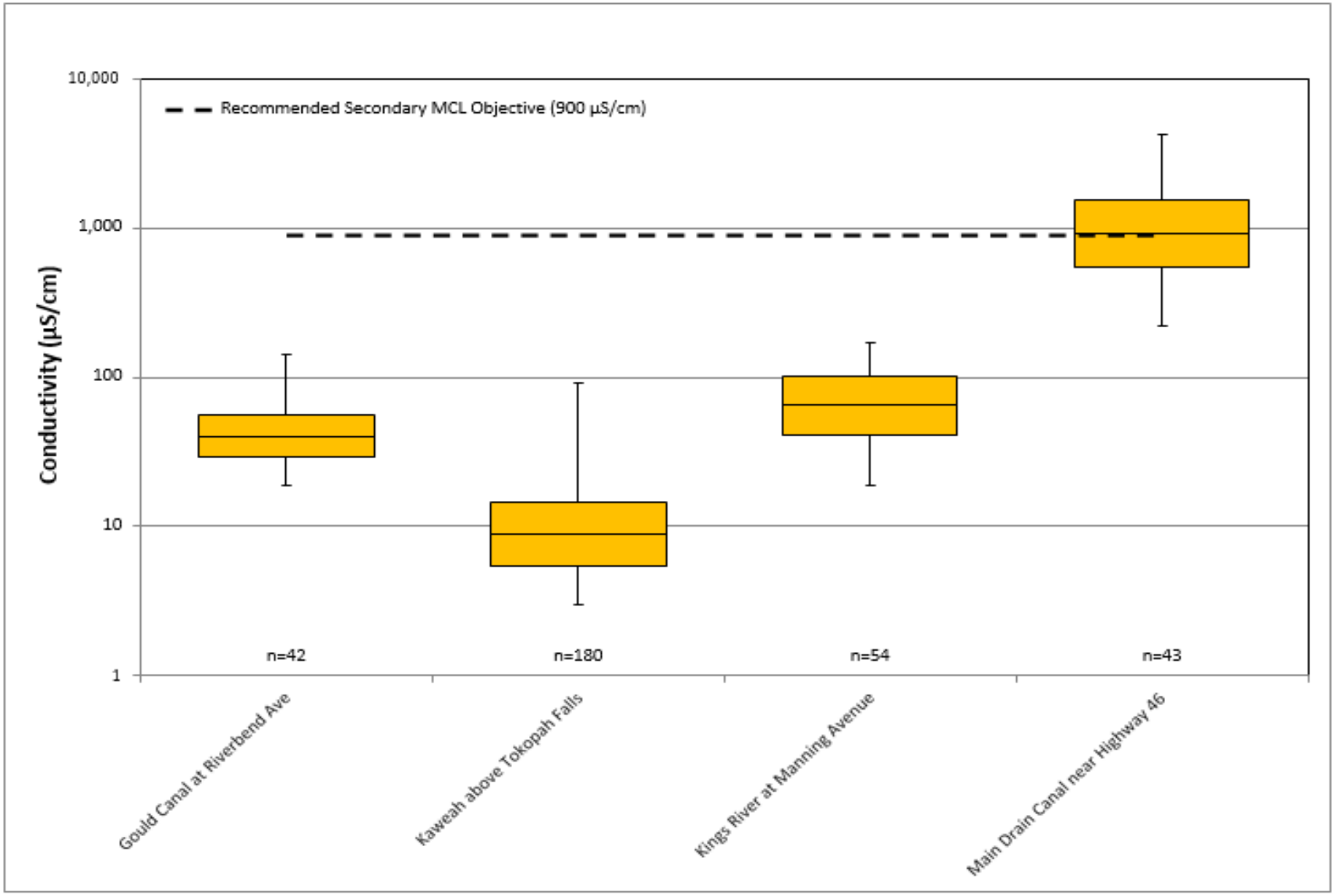

Figure A - 38. Tulare Lake Hydrologic Region, Nitrate as N Observations in Tulare Lake Tributaries

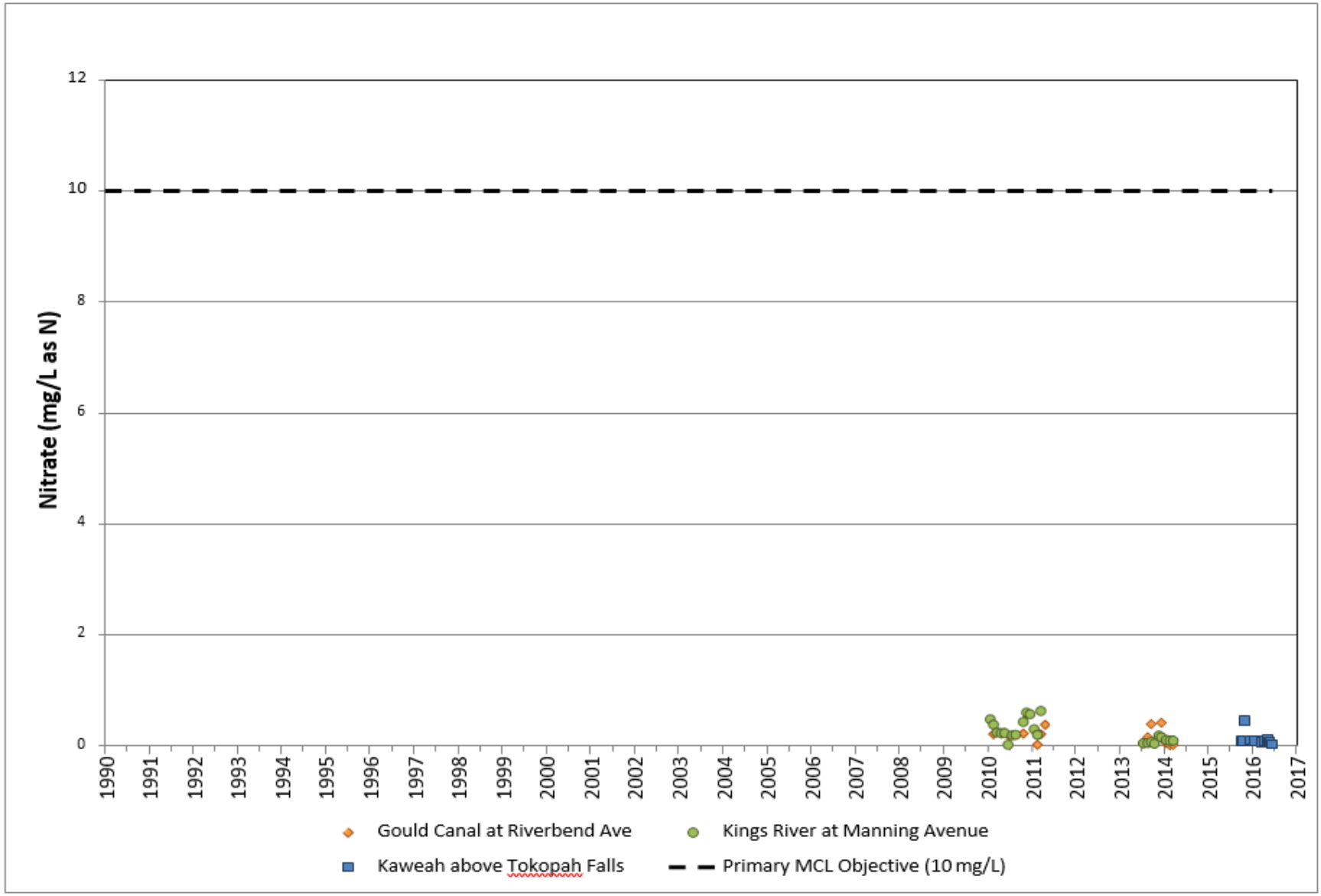
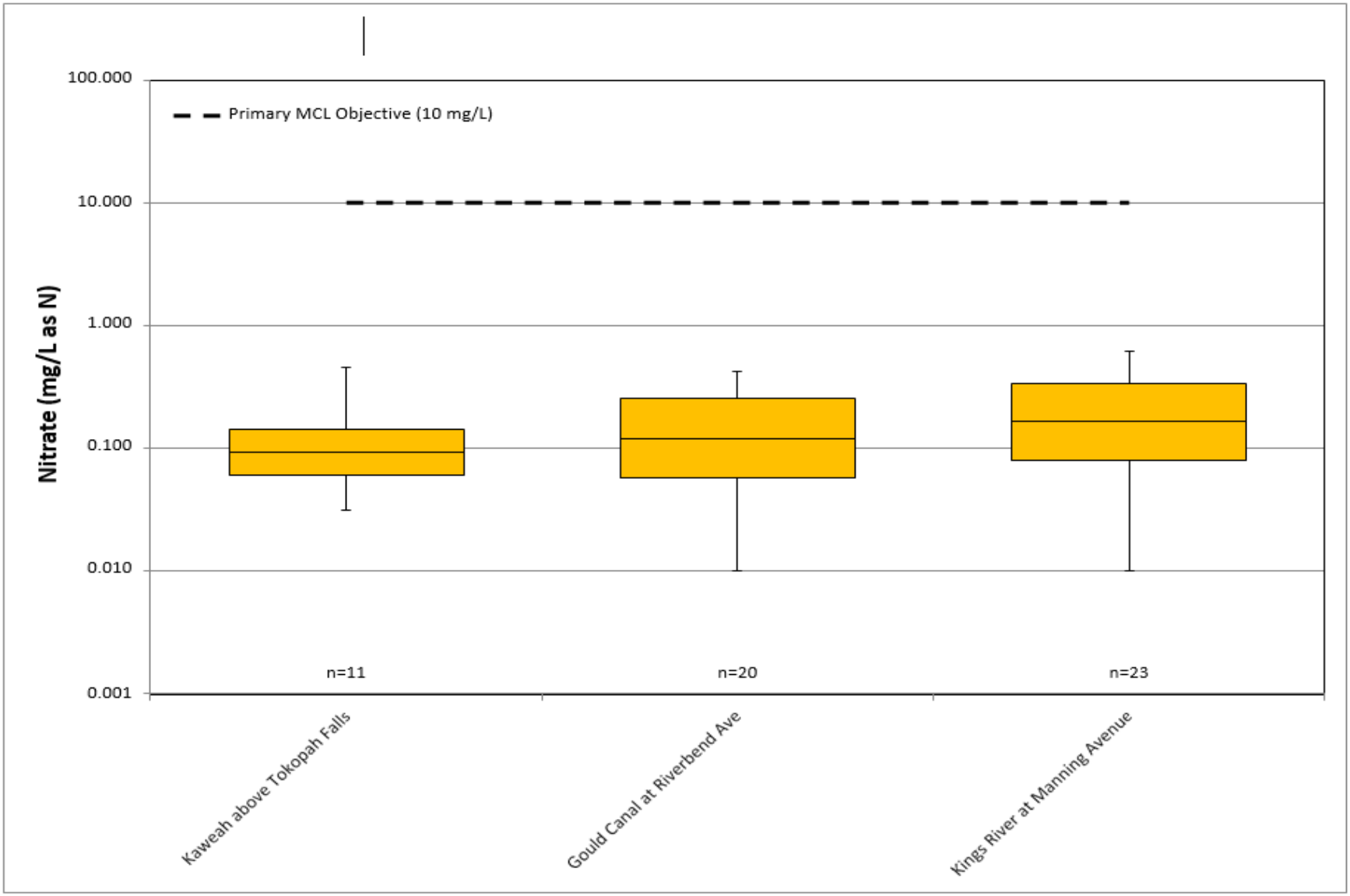
Figure A - 39. Tulare Lake Hydrologic Region, Median Nitrate as N Values