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White Paper

Proposed Sustainable Management Criteria

for the

Degraded Water Quality Sustainability Indicator

Introduction and Purpose

This white paper presents proposed sustainable management criteria (SMC) for the degraded water quality sustainability indicator for the Upper Ventura River Basin (UVRB) groundwater sustainability plan (GSP or Plan). The purpose of this document is to provide information to facilitate public feedback on the proposed SMC.

Definitions of Key Sustainable Groundwater Management Act Terms

"Measurable Objectives" refer to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.

"Minimum Threshold" refers to a numeric value for each sustainability indicator used to define undesirable results.

"Sustainability Indicator" refers to any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x). (Degraded water quality is one of six sustainability indicators included in the Sustainable Groundwater Management Act.)

"Undesirable Results" refers to *significant and unreasonable effects* for any of the sustainability indicators *caused by groundwater conditions* *occurring throughout the basin*.

Overview

The Sustainable Groundwater Management Act (SGMA) requires that Groundwater Sustainability Agencies (GSAs) address impacts on beneficial uses caused by groundwater pumping that spreads contaminant plumes or causes dissolved constituent concentrations to increase to levels that significantly and unreasonably impact beneficial uses.

Thankfully, there are no known contaminant plumes in the UVRB. However, nitrate, a non-point source contaminant, has impacted public and private potable water system wells in the Mira Monte area. Elevated nitrate concentrations in this area are currently mitigated by blending with other water sources. The vast majority of the remaining wells in the Basin typically have median Nitrate-N concentrations below 5 mg/L.

Boron concentrations are locally elevated in the Kennedy Area and northern Robles Area (please see Attachment A for Hydrogeologic Areas). Groundwater in these areas is reportedly unsuitable for some agricultural beneficial uses at times. The source of boron is natural springs in the upper drainages of the watershed, which contribute to surface water flow that ultimately percolates into the UVRB. Boron concentrations increase during droughts when base flow emanating from the upper drainages makes up a larger fraction of the Basin recharge. Boron concentrations are lower south of the northern Robles Area.

Overall, UVRB groundwater water quality does not appear to pose any widespread significant and unreasonable effects on beneficial uses across the Basin. However, concentrations of constituents of potential concern are known to generally increase with decreasing groundwater levels. Therefore, significant and unreasonable effects on beneficial uses related to pumping could potentially occur if the basin was to be managed such that groundwater levels are kept at consistently low levels by high rates of pumping over extended periods of time (many years). However, given historical pumping patterns, this outcome seems unlikely for the foreseeable future. Nonetheless SGMA requires that the GSP include SMC for the degraded water quality sustainability indicator because a potential cause-and-effect relationship between water quality and groundwater levels exists and the fact that pumping could potentially increase during the 50-year SGMA implementation period.

Sustainable Management Criteria Requirements

The following sections step through the required elements of the SMC for the degraded water quality sustainability indicator.

Undesirable Results

The term "Undesirable Results" is central to the goal of SGMA, which is to manage groundwater basins to avoid undesirable results. SGMA defines undesirable results as *significant and unreasonable effects* for sustainability indicators *caused by groundwater conditions* *occurring throughout the basin*. The underlined text emphasizes the three elements that must be present in order to have undesirable results as defined by SGMA:

1. *Significant and Unreasonable Effects*: Undesirable results are significant and unreasonable effects related to a sustainability indicator. For example, water quality so poor that it cannot be used for one or more beneficial uses might be considered a significant an unreasonable effect. UVRGA is required to determine what conditions would constitute significant and unreasonable effects for the UVRB.

2. *Caused by Groundwater Conditions*: The significant and unreasonable effects must be caused by managed groundwater conditions. Many interpret this to mean that the significant and unreasonable effects must be directly caused by pumping or that pumping is a significant contributing factor. For example, localized elevated boron concentrations caused by natural inflows in the Kennedy Area and elevated nitrate concentrations in the Mira Monte Area caused by land use practices are not cause by pumping and would not be considered undesirable results under SGMA. However, if boron or nitrate concentrations increase in other areas as a result of high rates of pumping that cause consistently low groundwater levels, that might be considered an undesirable result.

3. *Throughout the Basin*: The significant and unreasonable effects must occur throughout a large portion of the basin to be considered an undesirable result.

It is the GSA's responsibility to determine what conditions would constitute undesirable results using the factors provided above. We know that current groundwater quality supports beneficial uses throughout most of the UVRB. The localized exceptions for boron and nitrate noted earlier are arguably significant and unreasonable effects, but they are not occurring "*throughout the basin*" and are not the direct result of groundwater pumping (i.e. not "*caused by groundwater conditions*"). Therefore, it is concluded that there are no undesirable results for the degraded water quality sustainability indicator in the UVRB at present.

It is important to note that a GSA's failure to prevent undesirable results by the 20th year of GSP implementation is grounds for probation. Probation status can trigger State Water Resources Control Board (SWRCB) intervention into basin management. SWRCB could take over management of the Basin (at a cost to the groundwater users) until the deficiency is corrected.

Causes of Groundwater Conditions that Could Lead to Undesirable Results

SGMA requires GSAs to identify the causes of groundwater conditions that could lead to undesirable results. As explained earlier, concentrations of constituents of potential concern are known to generally increase with decreasing groundwater levels. Therefore, significant and unreasonable effects on beneficial uses related to pumping could potentially occur if the basin was to be managed such that groundwater levels are kept at consistently low levels by high rates of pumping over extended periods of time (many years). However, given historical pumping patterns, this outcome seems unlikely for the foreseeable future.

Potential Effects on Beneficial Uses and Users

SGMA requires GSAs to identify potential effects on beneficial uses and users. Potential effects on municipal beneficial uses associated with water quality degradation could include increased costs for treatment or blending to meet drinking water standards. Potential effects on domestic beneficial uses associated with water quality degradation could include health effects (nitrate)

and increased costs for alternative water supplies, treatment, or blending to meet drinking water standards. Potential effects on agricultural beneficial uses could include lower quality crops, increased water use to meet leaching requirements, implementation of treatment or blending, or use of more expensive alternative sources of water for irrigation. All of the potential effects on agricultural beneficial uses would result in increased costs and potential impacts on lease rates and land values.

Criteria Used to Define Undesirable Results

SGMA requires GSAs to develop a quantitative description of the combination of minimum threshold exceedances that indicate undesirable results. At present, there are only nine wells or closely spaced groups of wells that are regularly sampled for water quality analysis (please see attached map in Attachment A). In areas where closely spaced wells exist, a primary (representative) well is identified to prevent overemphasis of data from a particular area of the Basin. The nine primary monitoring locations will be used to quantitatively evaluate whether undesirable results are occurring. It is noted that some areas of the Basin lack water quality monitoring. These data gap areas will be filled as part of GSP implementation and the criteria used to indicate undesirable results will be updated.

For total dissolved solids (TDS), sulfate, chloride, and boron, SGMA undesirable results are considered to be occurring when two-thirds (2/3) of the nine primary water quality monitoring wells exceed a minimum threshold concentration continuously for two years and UVRGA determines that the exceedances are caused by groundwater pumping. The 2/3 criterion is intended to indicate that significant and unreasonable effects are widespread enough to be considered present "*throughout the Basin.*" The nitrate MTs will be evaluated in two distinct areas of the Basin representing predominantly percolating groundwater conditions versus predominantly rising groundwater conditions. The 2/3 criterion applies separately within each of the two areas for nitrate.

<u>Minimum Thresholds</u>

The minimum threshold (MT) refers to numeric values used to define the onset of significant and unreasonable effects in various areas of a basin. When developing SMC for the degraded water quality sustainability indicator, GSAs must consider local, state, and federal water quality standards. It is noted that GSAs are required to consider, but not necessarily adopt, such standards. Justification must be provided in cases where the SMC do not align with other regulatory standards. The applicable standards for consideration in the UVRB include Primary MCLs, Secondary MCLs, and Regional Water Quality Control Board (RWQCB) water quality objectives (WQOs). WQOs have been established for nitrate, total dissolved solids (TDS), chloride, sulfate, and boron. This list of constituents will be used in the UVRB GSP. The WQOs are set at levels determined by RWQCB to protect beneficial uses and/or preserve water quality in the Basin (RWQCB, 2019).

Criteria Used to Define Minimum Thresholds

- Primary MCLs: Applicable to nitrate only. It is desirable to maintain existing water quality at levels suitable potable water for human consumption for current and future beneficial uses. Consumption of water containing nitrate in excess of the MCL poses serious health risks to pregnant women and infants. Because there is currently no requirement for domestic well owners to test for nitrate, health effects could occur if nitrate exceeds the MCL at domestic well locations. Additionally some domestic well owners may not have the resources to respond to nitrate MCL exceedances even if they know about it. For these reasons, widespread occurrence of nitrate in excess of the MCL would be considered a significant and unreasonable effect.

- Secondary MCLs: Applicable to TDS, sulfate, and chloride. Division of Drinking water considers concentrations of these constituents in excess of their respective Upper Consumer Acceptance Levels to be acceptable only on a temporary basis for community and municipal water suppliers pending construction of treatment facilities. Because treatment costs are significant, a widespread increase in concentrations to levels exceeding the Upper Consumer Acceptance Level would be considered a significant and unreasonable degradation of water quality.

- RWQCB WQOs: These standards are designed to protect beneficial uses and preserve existing water quality at the time of RWQCB Basin Plan development from degradation, consistent with the Porter-Cologne Act and State Water Resources Control Board Antidegradation Policy (Resolution No. 68-16). RWQCB established WQOs for nitrate, total dissolved solids (TDS), chloride, sulfate, and boron (Table 1).

  A special consideration for the UVRB is groundwater that discharges to the Ventura River, predominantly in the Santa Ana and Casitas Springs Hydrogeologic Areas. The RWQCB Basin Plan has established a 5 milligram per liter (mg/L) WQO for nitrate (as N) in surface water to protect beneficial uses of surface water. This surface water WQO should be considered when establishing SMC for the Santa Ana and Casitas Springs Hydrogeologic Areas.

- Agricultural Thresholds: Certain crops grown in the Basin are sensitive to boron and chloride in irrigation water. Widespread boron and chloride concentrations in excess of toxicity thresholds would be considered a significant and unreasonable effect. The upper toxicity threshold for boron for commonly grown crops in the Basin is 0.75 mg/L (see footnote no. 5 on Table 1). A toxicity threshold of 100 mg/L for chloride is recommended based on literature review (see footnote no. 4 on Table 1).

- Existing Water Quality: With the exceptions noted earlier, existing groundwater quality is known to support beneficial uses in the Basin. Therefore, minimum thresholds should be set equal to or greater than existing water quality to recognize the absence of significant an unreasonable effects in much of the basin at present.

Measurable Objectives

Measurable objectives (MOs) are quantitative metrics designed to reflect desired conditions. GSAs are required to meet the MOs within 20 years of GSP implementation. Therefore, the MOs should be set at concentrations that are attainable. MOs must be established using the same metrics and monitoring sites as are used to define the MTs. Those metrics were described above.

Proposed Sustainable Management Criteria

The proposed MTs and MOs are listed in Table 1 and are depicted on the water quality plots attached to this staff report (Attachment B). The groundwater quality monitoring locations are shown on the map attached to this staff report (Attachment A).

The proposed MOs (i.e. desirable condition for the UVRB) have been set equal to or lower than the RWQCB WQOs to reflect a preference to preserve existing water quality to the extent practicable. It is proposed that the sustainability goal for degraded water quality for a given constituent be considered to be met when measured concentrations in at least one-third (1/3) of the primary monitoring wells are less that the MO. Nitrate would be evaluated in two distinct areas of the basin representing predominantly percolating vs predominantly rising groundwater (please Table 1 for further explanation). The 1/3 criterion would apply separately within each of the two areas for nitrate. Application of the 1/3 criterion to the historical data reveals that the sustainability goal for degraded water quality has been met historically.

The proposed MTs have been set at concentrations considered to indicate likely significant and unreasonable effects to one or more beneficial uses of groundwater in the UVRB, if occurring throughout the Basin and caused by pumping. For total dissolved solids, sulfate, chloride, and boron, undesirable results are considered to occur when two-thirds (2/3) of all nine primary water quality monitoring wells exceed the minimum threshold concentration continuously for two years and UVRGA determines the exceedances are the result of groundwater pumping. The 2/3 criterion is selected intended to indicate that significant and unreasonable effects are widespread enough to be considered present "throughout the Basin." The nitrate MTs will be evaluated in two distinct areas of the basin representing predominantly percolating vs predominantly rising groundwater (please Table 1 for further explanation). The 2/3 criterion applies separately within the two areas for nitrate.

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Upper Ventura River GROUNDWATER AGENCY SUSTAINABLE MANAGEMENT

Table 1. Proposed Minimum Thresholds and Measurable Objectives

Constituent	MCL (mg/L)	Sec. MCL (R/U/ST)[1] (mg/L)	RWQCB WQO (mg/L)	Range of Average Historical Concentrations for Primary Wells (mg/l)	Proposed MT[2] (mg/L)	MT Rationale	Proposed MO[3] (mg/L)	MO Rationale
TDS	N/A	500/1,000/1,500	800	407 - 760	1,000	Prevent significant and unreasonable impact to municipal and domestic beneficial uses of groundwater consistent with Upper Consumer Acceptance Level.	800	Preserve existing groundwater quality for agricultural, municipal, and domestic beneficial uses consistent with RWQCB WQO.
Sulfate	N/A	250/500/600	300	35 - 300	500	Prevent significant and unreasonable impact to municipal and domestic beneficial uses of groundwater consistent with Upper Consumer Acceptance Level.	300	Preserve existing groundwater quality for agricultural, municipal, and domestic beneficial uses consistent with RWQCB WQO.
Chloride	N/A	250/500/600	100	29 - 61	100	Prevent significant and unreasonable impact to agricultural beneficial use of groundwater for chloride sensitive crops[4].	75	Preserve existing groundwater quality for agricultural, municipal, and domestic beneficial uses.
Boron	N/A	N/A	0.5	0.09 - 0.77	0.75	Prevent significant and unreasonable impact to agricultural beneficial use of groundwater for boron sensitive crops.[5]	0.5	Preserve existing groundwater quality for agricultural beneficial use consistent with RWQCB WQO.
Nitrate (as N)								
Percolating Groundwater Areas (Kennedy, Robles, Mira Monte/Meiners Oaks, and Terraces Hydrogeologic Areas)								
Nitrate (as N)	10	N/A	10	0.6 – 12.6	10	Prevent significant and unreasonable impact to municipal and domestic beneficial uses of groundwater consistent with the MCL.	7.5	Preserve existing groundwater quality for municipal and domestic beneficial uses.
Areas with Rising Groundwater (Santa Ana and Casitas Springs Hydrogeologic Areas)								
Nitrate (as N)	10	N/A	5 (Surface Water)WQO)	1.0 – 1.5	10	Prevent significant and unreasonable impact to municipal and domestic beneficial uses of groundwater consistent with the MCL.	3	Preserve existing groundwater quality for municipal and domestic beneficial uses. Protect surface water beneficial uses consistent with the RWQCB surface water WQO (MO is lower than surface water WQO).

[1] Consumer Acceptance Levels, where R = Recommended, U = Upper, and ST = Short Term

[2] Undesirable results for TDS, sulfate, chloride, and boron are considered to occur when two-thirds (2/3) of the primary monitoring wells exceed the minimum threshold concentration for a constituent continuously for two years and are determined by UVRGA to be the result of groundwater pumping. Undesirable results for nitrate are evaluated in the two distinct areas noted in the table. The 2/3 criterion applies separately within the two areas for nitrate.

[3] Sustainability Goal for TDS, sulfate, chloride, or boron is considered to be met when at least one-third (1/3) of the primary monitoring wells are below the measurable objective for the constituent being considered.

[4] Avocados are a chloride sensitive crop grown in the Basin and is used as a proxy. The Avocado Production Handbook states that "When chloride and sodium exceed 100 ppm in the water there should be an alerted concern for ensuring adequate leaching of the root zone." Accordingly it is concluded that significant and unreasonable effects may occur at concentrations in excess of 100 mg/L https://ucanr.edu/sites/alternativefruits/Avocados/Literature/

[5] Upper limit of boron tolerance for citrus and avocado is 0.75. US Department of Agriculture: https://www.ars.usda.gov/pacific-west-area/riverside-ca/agricultural-water-efficiency-and-salinity-research-unit/docs/databases/boron-tolerance-of-crops/

Total Dissolved Solids

As can be seen in the TDS plot included in Attachment B, TDS concentrations at the nine primary monitoring locations have generally ranged from approximately 400 to approximately 900 milligrams per liter (mg/L). TDS concentrations have been somewhat higher during the recent drought as compared to the 1990s and 2000s, but are expected to decline during the next wet period.

The RWQCB WQO for TDS of 800 mg/L is met most of the time by most wells and is proposed as the MO for consistency with RWQCB's Basin Plan and to express a preference to preserve existing water quality to the extent practicable.

The proposed MT (indicator of potential significant and unreasonable effects) is set equal to the Upper Consumer Acceptance Level value of 1,000 mg/L. The proposed MT is considered indicative of potential significant and unreasonable effects because Division of Drinking water considers concentrations of Upper Consumer Acceptance Level to be acceptable only on a temporary basis for community and municipal water suppliers pending construction of treatment facilities. Because of the significant cost for treatment, widespread occurrence of TDS in excess of the Upper Consumer Acceptance Level is considered a significant and unreasonable effect.

Sulfate

As can be seen in the sulfate plot included in Attachment B, sulfate concentrations at the nine primary monitoring locations have generally ranged from approximately 40 to approximately 300 mg/L. Sulfate concentrations have been somewhat higher during the recent drought as compared to the 1990s and 2000s, but are expected to decline during the next wet period.

The RWQCB WQO for sulfate of 300 mg/L is met most of the time by most wells and is proposed as the MO for consistency with RWQCB's Basin Plan and to express a preference to preserve existing water quality to the extent practicable.

The proposed MT (indicator of potential significant and unreasonable effects) is set equal to the Upper Consumer Acceptance Level value of 500 mg/L. The proposed MT is considered indicative of potential significant and unreasonable effects because Division of Drinking water considers concentrations of Upper Consumer Acceptance Level to be acceptable only on a temporary basis for community and municipal water suppliers pending construction of treatment facilities. Because of the significant cost for treatment, widespread occurrence of sulfate in excess of the Upper Consumer Acceptance Level is considered a significant and unreasonable effect.

Chloride

As can be seen in the chloride plot included in Attachment B, chloride concentrations at the nine primary monitoring locations have generally ranged from approximately 20 to approximately 75 mg/L. Chloride concentrations have been highest during the recent drought as compared to the 1990s and 2000s, but have declined toward historical levels in recent years.

The RWQCB WQO for chloride of 100 mg/L has been met all of the time by all nine wells. A lower concentration (75 mg/L) is proposed as the MO to reflect a preference to preserve existing water quality to the extent practicable.

The proposed MT (indicator of potential significant and unreasonable effects) is 100 mg/L. This value is based on sensitivity of avocados to chloride as a proxy for agricultural beneficial uses. The Avocado Production Handbook[6] states: "when chloride and sodium exceed 100 ppm in the water there should be an alerted concern for ensuring adequate leaching of the root zone." Accordingly, it is concluded that significant an unreasonable effects on agricultural beneficial uses may occur at concentrations in excess of 100 mg/L.

Boron

As can be seen in the boron plot included in Attachment B, boron concentrations at the nine primary monitoring locations have generally ranged from approximately non-detect to approximately 1.3 mg/L. Boron concentrations have generally been higher during the recent drought as compared to the 1990s and 2000s, but are expected to decline somewhat during the next wet period.

The RWQCB WQO for boron of 0.5 mg/L is met by at least 1/3 of the primary monitoring wells at all times. Accordingly, the proposed MO is 0.5 mg/L for consistency with RWQCB's Basin Plan and to express a preference to preserve existing water quality to the extent practicable.

The proposed MT (indicator of potential significant and unreasonable effects) is 0.75 mg/L for the following reasons. Available data show that boron concentrations are notably higher in the northernmost part of the UVRB (Kennedy and upper Robles Areas shown on the map in Attachment A). Concentrations in this area commonly range from 0.8 to 1.3 mg/L (see light blue squares on the boron plot in Attachment B). It has been reported that groundwater is unsuitable for agricultural use in this area. Therefore, it is concluded that significant and unreasonable effects on agricultural beneficial uses occur with concentrations in the 0.8 to 1.3 mg/l range. According to the United States Department of Agriculture (USDA), the upper limit of boron tolerance for citrus and avocado is 0.75 mg/L[7]. Based on the basin-specific observation and

[6] https://ucanr.edu/sites/alternativefruits/Avocados/Literature
[7] https://www.ars.usda.gov/pacific-west-area/riverside-ca/agricultural-water-efficiency-and-salinity-research-unit/docs/databases/boron-tolerance-of-crops/

USDA information, the proposed MT for boron is 0.75 mg/L. In other words, it is concluded that significant an unreasonable effects on agricultural beneficial uses may occur at boron concentrations in excess of 0.75 mg/L and, if widespread and caused by pumping, would constitute a SGMA undesirable result.

*Nitrate in Percolating Ground*water *Areas (Kennedy, Robles, Mira Monte/Meiners Oaks, and Terraces Hydrogeologic Areas)*

As can be seen in the nitrate plot for percolating groundwater areas included in Attachment B, nitrate concentrations (as nitrogen) at the six primary monitoring locations have generally ranged from approximately non-detect to over 17 mg/L. The Primary MCL and RWQCB WQO for nitrate of 10 mg/L (as nitrogen) is met with few exceptions in 2/3 of the wells (4 out of 6). The other two wells regularly exceed the MCL and are located in the Mira Monte area, a localized area that has routinely exhibited elevated nitrate concentrations. Elevated nitrate in the Mira Monte area impacts several public and private potable water system wells. The well operators currently manage nitrate by blending with surface water from Lake Casitas.

The RWQCB WQO and Primary MCL for nitrate of 10 mg/L (as nitrogen) is generally met by the primary monitoring wells located outside of the Mira Monte area. A lower concentration (7.5 mg/L (as nitrogen)) is proposed as the MO for the percolating groundwater areas to reflect a preference to preserve existing water quality to the extent practicable throughout the remainder of the percolating groundwater areas. The MO represents the approximate typical upper bound of nitrate concentrations outside of the Mira Monte area.

Consumption of water containing nitrate in excess of the MCL poses serious health risks to pregnant women and infants. Because there is currently no requirement for domestic well owners to test for nitrate, health effects could occur if nitrate exceeds the MCL at domestic well locations. Additionally some domestic well owners may not have the resources to respond to nitrate MCL exceedances even if they know about it. For these reasons, widespread occurrence of nitrate in excess of the MCL would be considered a significant and unreasonable effect. Thus, the proposed MT for nitrate in the percolating groundwater areas is equal to the Primary MCL of 10 mg/L (as nitrogen).

*Nitrate in Rising Ground*water *Areas (Santa Ana and Casitas Springs Hydrogeologic Areas)*

As can be seen in the nitrate plot for rising groundwater areas included in Attachment B, nitrate concentrations (as nitrogen) at the three primary monitoring locations have generally ranged from approximately non-detect to approximately 8 mg/L (as nitrogen).

The RWQCB WQO and Primary MCL for nitrate is 10 mg/L (as nitrogen). In addition, a special consideration for the rising groundwater areas is the surface water RWQCB WQO for nitrate. The surface water WQO is considered because groundwater rises and discharges to the Ventura River in this area. The RWQCB WQO for surface water is 5 mg/L and is designed to protect

beneficial uses of surface water. A lower concentration (3 mg/L (as nitrogen)) is proposed as the MO for the rising groundwater areas to reflect a preference to preserve existing water quality to the extent practicable. The MO represents the approximate upper bound of nitrate concentrations typically observed in the rising groundwater area (see plot in Attachment B).

Consumption of water containing nitrate in excess of the MCL poses serious health risks to pregnant women and infants. Because there is currently no requirement for domestic well owners to test for nitrate, health effects could occur if nitrate exceeds the MCL at domestic well locations. Additionally some domestic well owners may not have the resources to respond to nitrate MCL exceedances even if they know about it. For these reasons, widespread occurrence of nitrate in excess of the MCL would be considered a significant and unreasonable effect. Thus, the proposed MT for nitrate in the rising groundwater areas is equal to the Primary MCL of 10 mg/L (as nitrogen).

Interim Milestones

Interim milestones are used to show the anticipated progress or path to achieving the measurable objectives within 20 years. The GSA must define the interim milestones using the same metric as the measurable objective in increments of five years. Because the measurable objectives for all water quality constituents are already met, there is no need to show interim milestones.

Projects and Management Actions

Because the measurable objectives for all water quality constituents are already met, no projects or management actions are proposed for the degraded water quality sustainability indicator. However, consistent with Item 3h of the adopted Sustainability Goal, it is recommended that the GSP include a non-binding action to coordinate with and support efforts by RWQCB and others to address nitrate contamination sources in the Basin.

Consistency with Sustainability Goal

The proposed SMC for the degraded water quality sustainability indicator are consistent with applicable elements of the adopted Sustainability Goal.

OTHER RESOURCES

More information about water quality is available in the draft GSP Basin Setting section: https://uvrgroundwater.org/sgma-overview/

GSP Emergency Regulations can be viewed at: https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I39F024FCA7874BCE8FB056C895CDCFD5&transitionType=Default&contextData=%28sc.Default%29#I55673D782DE74CD5BA1E9A6CBC881A98

Additional information concerning SMC can be found in DWR's draft Sustainable Management Criteria Best Management Practice document (SMC BMP): https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf

ATTACHMENTS

A. Map Showing Groundwater Quality Monitoring Locations
B. Plots of Historical Groundwater Quality with Proposed MTs and MOs

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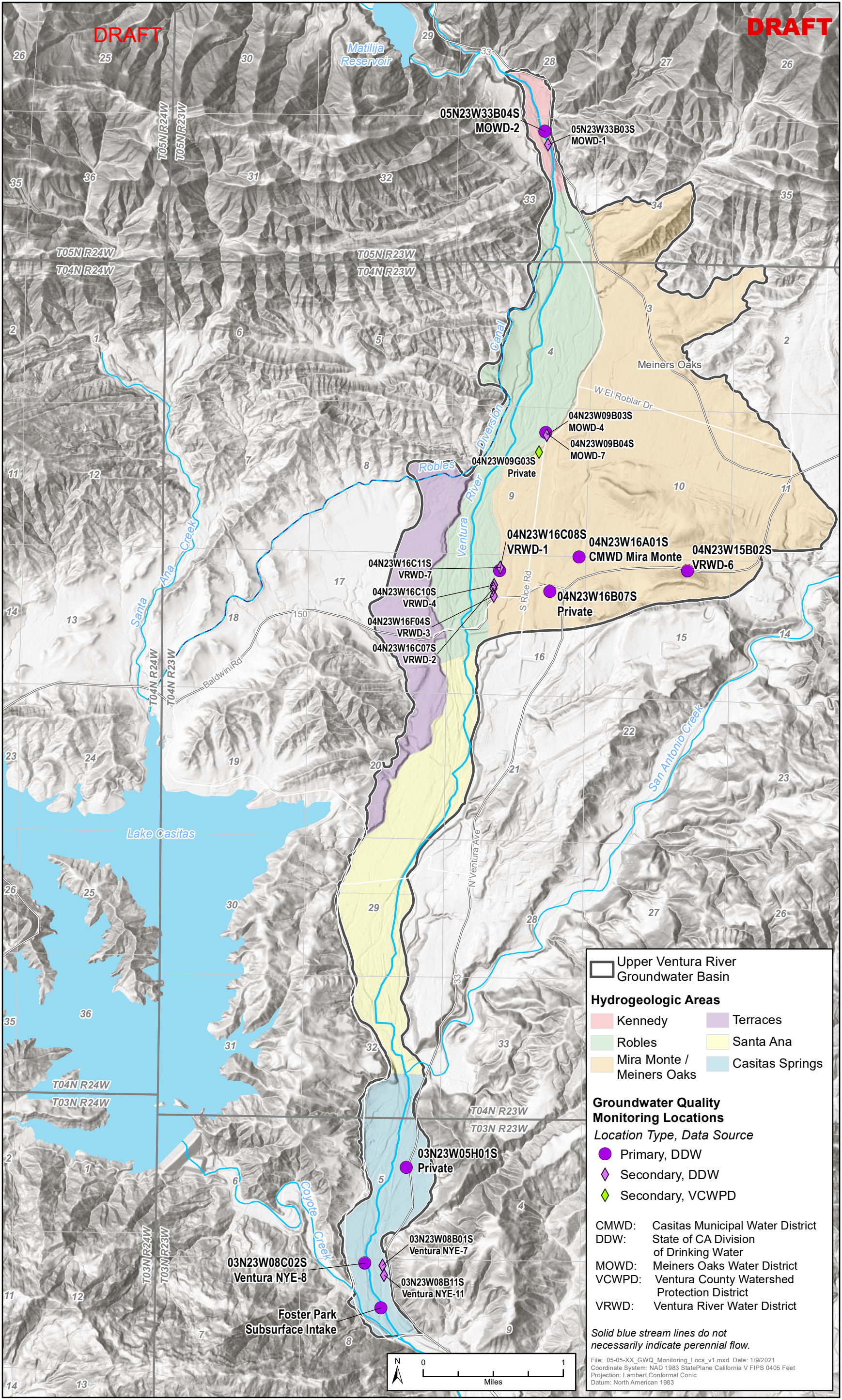
Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

Attachment A

Map Showing Groundwater Quality Monitoring Locations


DRAFT
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Foster Park
Subsurface Intake
N
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1
Miles
Upper Ventura River Groundwater Basin
Hydrogeologic Areas
Kennedy
Terraces
Robles
Santa Ana
Mira Monte / Meiners Oaks
Casitas Springs
Groundwater Quality Monitoring Locations
Location Type, Data Source
Primary, DDW
Secondary, DDW
Secondary, VCWPD
CMWD: Casitas Municipal Water District
DDW: State of CA Division of Drinking Water
MOWD: Meiners Oaks Water District
VCWPD: Ventura County Watershed Protection District
VRWD: Ventura River Water District
Solid blue stream lines do not necessarily indicate perennial flow.
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Projection: Lambert Conformal Conic
Datum: North American 1983

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Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

Attachment B

Plots of Historical Groundwater Quality with Proposed Minimum Thresholds and Measurable Objectives

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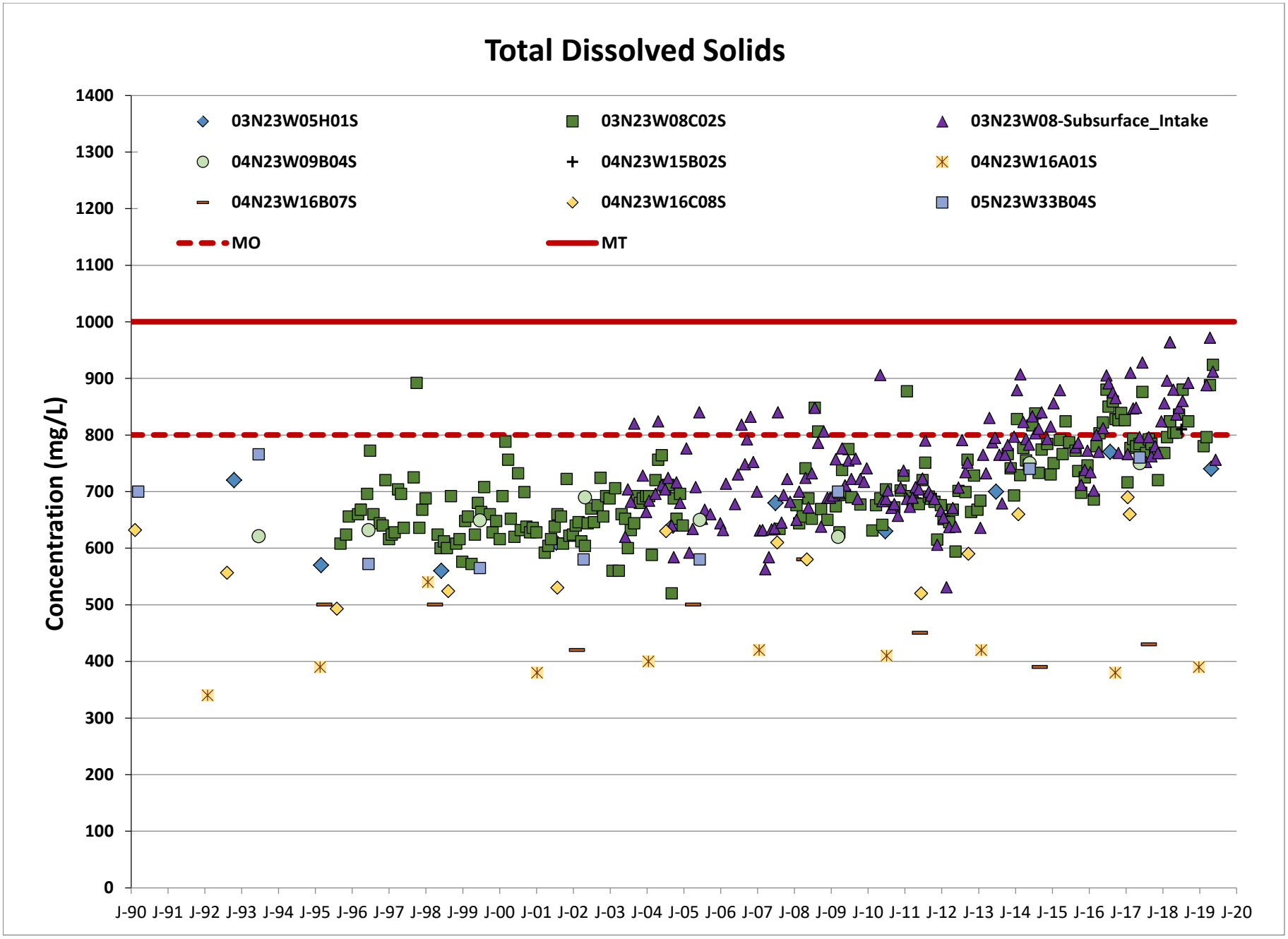
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1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
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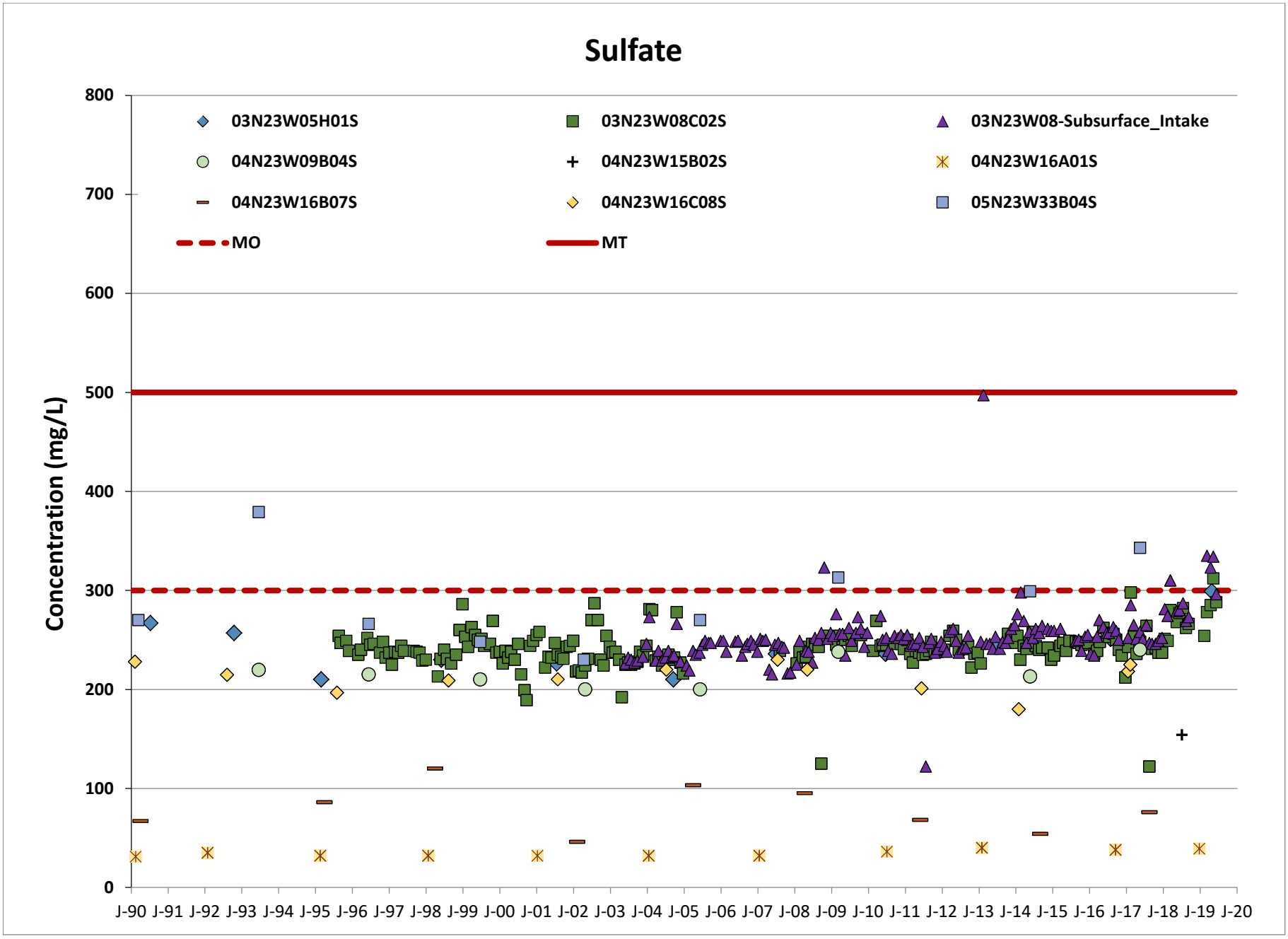
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MO
MT
Concentration (mg/L)
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700
600
500
400
300
200
100
0
J-90 J-91 J-92 J-93 J-94 J-95 J-96 J-97 J-98 J-99 J-00 J-01 J-02 J-03 J-04 J-05 J-06 J-07 J-08 J-09 J-10 J-11 J-12 J-13 J-14 J-15 J-16 J-17 J-18 J-19 J-20

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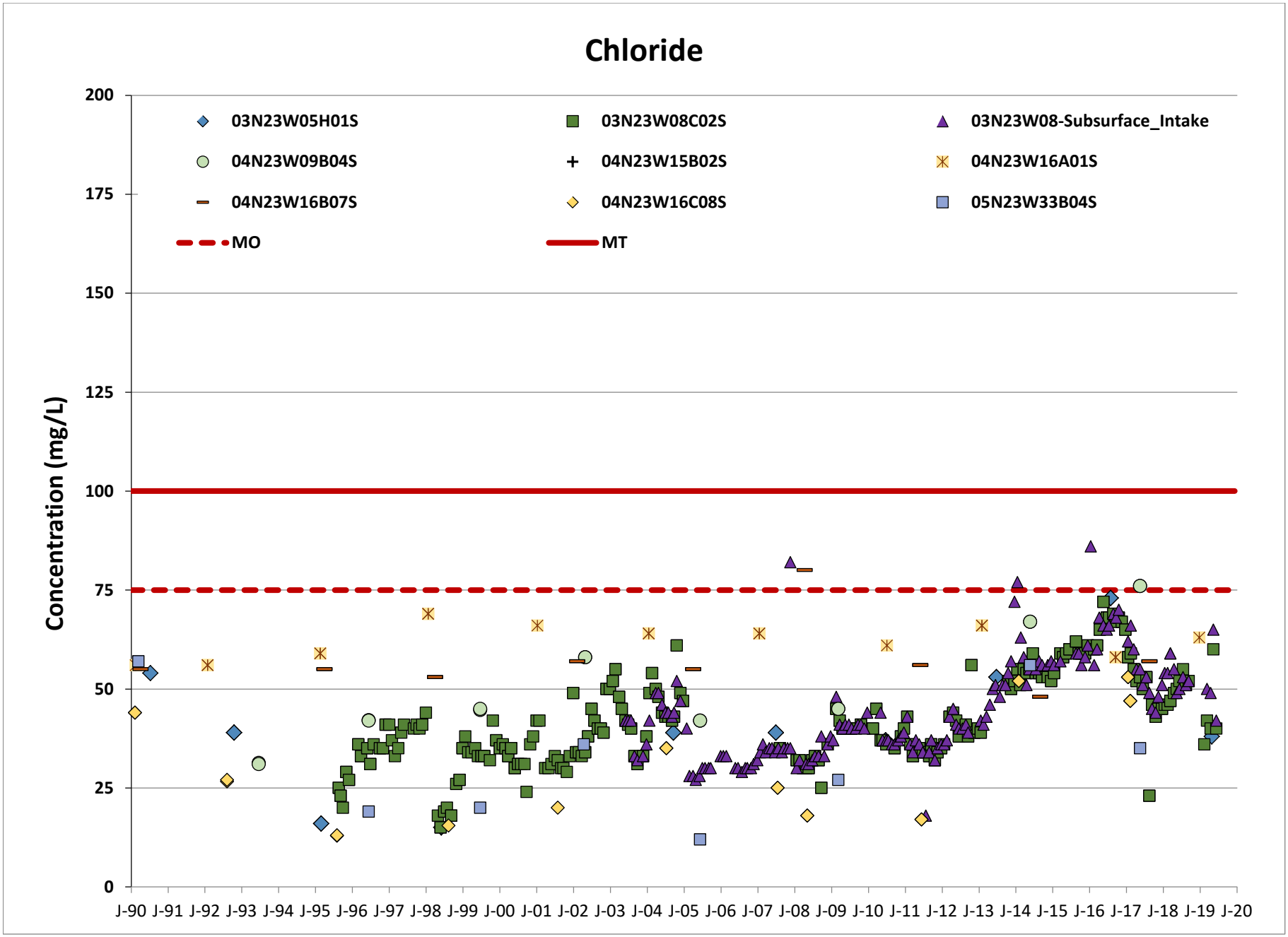
Chloride
Concentration (mg/L)
200
175
150
125
100
75
50
25
0
03N23W05H01S
03N23W08C02S
03N23W08-Subsurface_Intake
04N23W09B04S
04N23W15B02S
04N23W16A01S
04N23W16B07S
04N23W16C08S
05N23W33B04S
MO
MT
J-90 J-91 J-92 J-93 J-94 J-95 J-96 J-97 J-98 J-99 J-00 J-01 J-02 J-03 J-04 J-05 J-06 J-07 J-08 J-09 J-10 J-11 J-12 J-13 J-14 J-15 J-16 J-17 J-18 J-19 J-20

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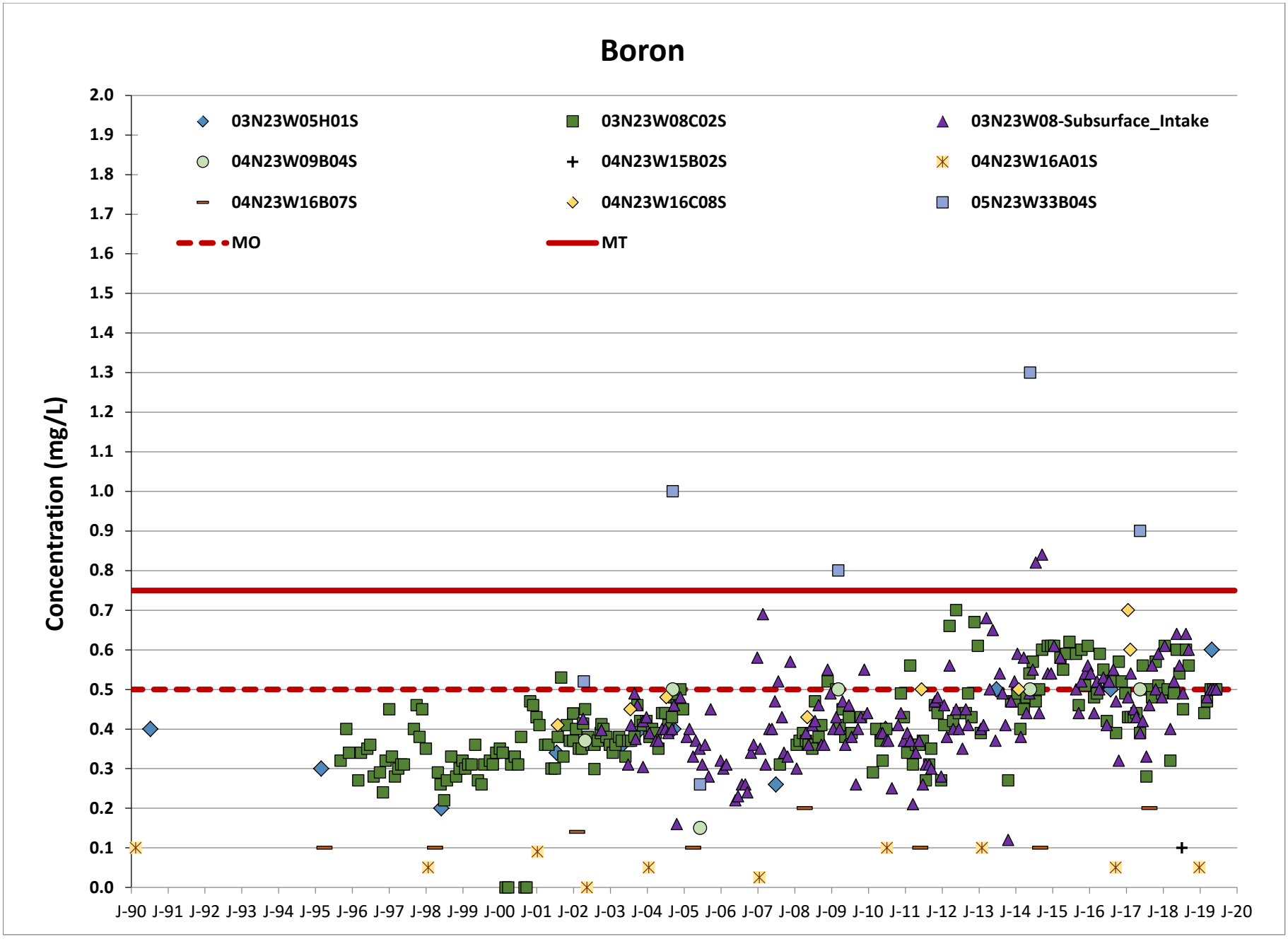
Boron
Concentration (mg/L)
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
03N23W05H01S
03N23W08C02S
03N23W08-Subsurface_Intake
04N23W09B04S
04N23W15B02S
04N23W16A01S
04N23W16B07S
04N23W16C08S
05N23W33B04S
MO
MT
J-90 J-91 J-92 J-93 J-94 J-95 J-96 J-97 J-98 J-99 J-00 J-01 J-02 J-03 J-04 J-05 J-06 J-07 J-08 J-09 J-10 J-11 J-12 J-13 J-14 J-15 J-16 J-17 J-18 J-19 J-20

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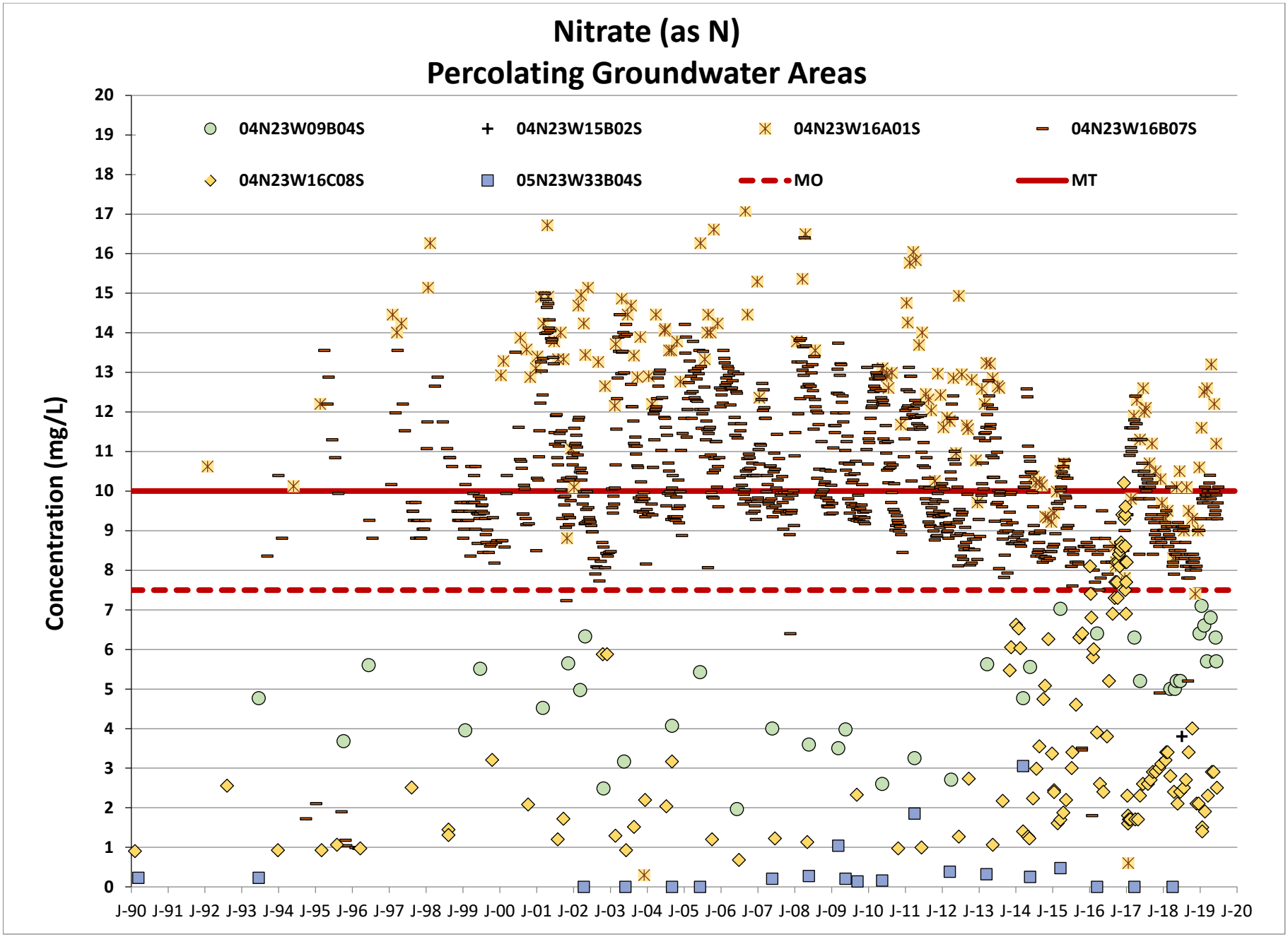
Nitrate (as N)
Percolating Groundwater Areas
Concentration (mg/L)
04N23W09B04S
04N23W15B02S
04N23W16A01S
04N23W16B07S
04N23W16C08S
05N23W33B04S
MO
MT
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
J-90 J-91 J-92 J-93 J-94 J-95 J-96 J-97 J-98 J-99 J-00 J-01 J-02 J-03 J-04 J-05 J-06 J-07 J-08 J-09 J-10 J-11 J-12 J-13 J-14 J-15 J-16 J-17 J-18 J-19 J-20

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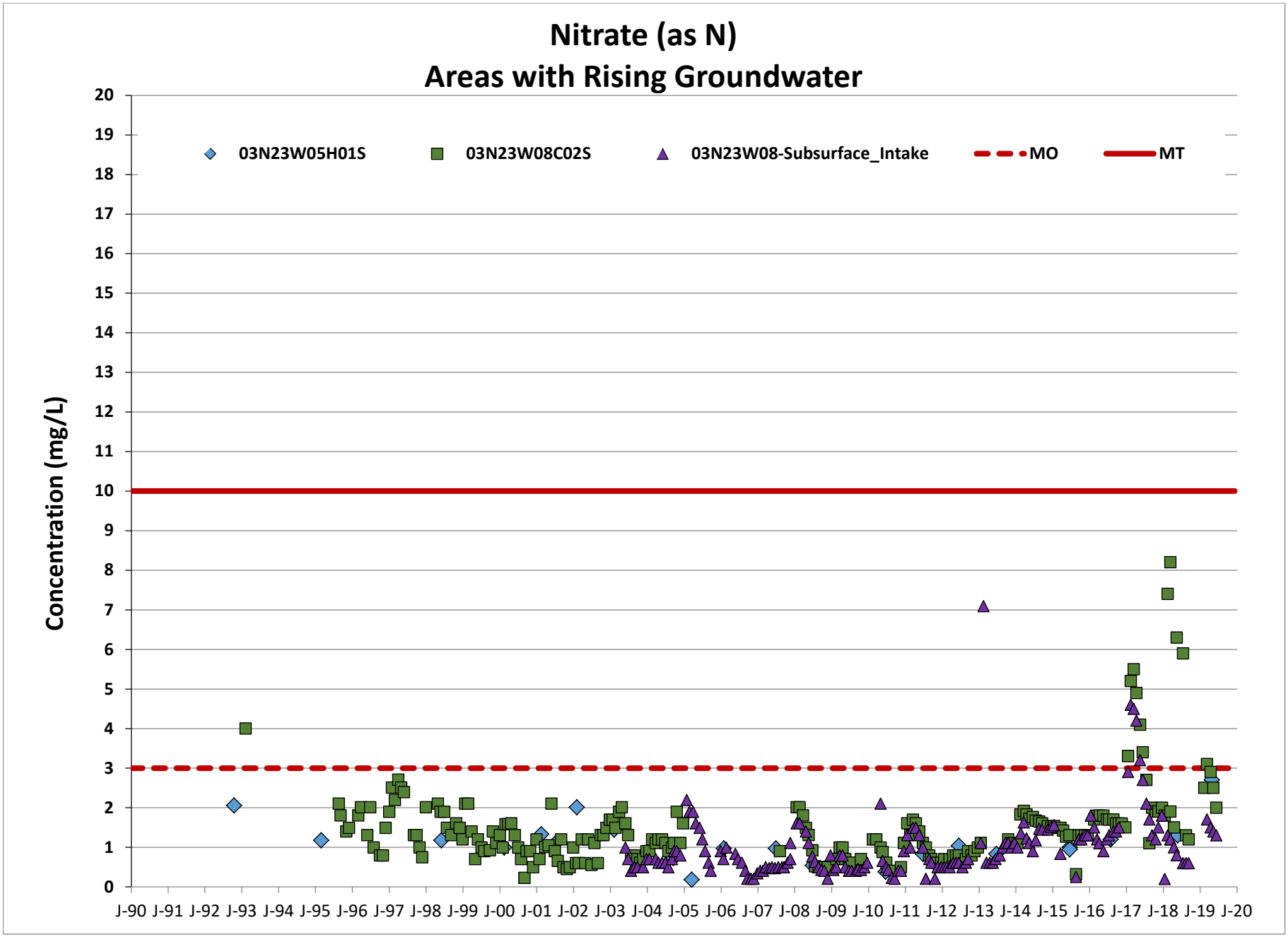
Nitrate (as N)
Areas with Rising Groundwater
Concentration (mg/L)
03N23W05H01S
03N23W08C02S
03N23W08-Subsurface_Intake
MO
MT
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
J-90 J-91 J-92 J-93 J-94 J-95 J-96 J-97 J-98 J-99 J-00 J-01 J-02 J-03 J-04 J-05 J-06 J-07 J-08 J-09 J-10 J-11 J-12 J-13 J-14 J-15 J-16 J-17 J-18 J-19 J-20