EA Engineering, Science, and Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
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November 30, 2021

Mr. Jaben Richards
Ground Water Quality Bureau
New Mexico Environment Department
PO Box 5469
Santa Fe, NM 87502

Dear Mr. Richards:

On behalf of Doña Ana Dairies, Inc., EA Engineering, Science, and Technology, Inc., PBC is submitting this Quarterly Groundwater Monitoring Report for the dairies located in Mesquite, Vado, and Anthony, New Mexico. The report discusses the quarterly groundwater sampling event conducted to fulfill requirements of the Stage 2 Abatement Plan for Doña Ana Dairies.

Please let me know if you have any questions regarding the information provided in this report.

Sincerely,

Gina Mullen
Project Manager

Jay Snyder
Senior Hydrogeologist

Enclosure

Cc: Linda Armstrong, Doña Ana Dairies (electronic)
File

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QUARTERLY GROUNDWATER MONITORING REPORT DOÑA ANA DAIRIES MESQUITE, NEW MEXICO

Prepared for:

Doña Ana Dairies
Mesquite, New Mexico

Prepared by:

EA Engineering, Science,
and Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102

November 2021

EA Project No. 1464108.03

QUARTERLY GROUNDWATER MONITORING REPORT
DOÑA ANA DAIRIES
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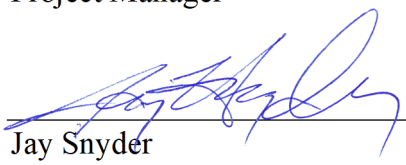
Project Manager

Date



November 30, 2021

Jay Snyder
Senior Hydrogeologist

Date

November 2021

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1.0 INTRODUCTION

On behalf of Doña Ana Dairies (Dairies), EA Engineering, Science, and Technology, Inc., PBC (EA) has prepared this Quarterly Monitoring Report for Doña Ana Dairies located south of Las Cruces, New Mexico (Figure 1). The report was completed in accordance with the *Stage 2 Abatement Plan* and the *Sampling and Analysis Plan, Doña Ana Dairies, Doña Ana County, New Mexico* dated November 7, 2013, and August 11, 2008, respectively, and the Conceptual Work Plan (CWP) dated February 1, 2008. All were prepared to satisfy requirements stated in the New Mexico Administrative Code (NMAC), Title 20, Chapter 6, Part 2, Sections 4106 through 4110 (20.6.2.4106 – 20.6.2.4110 NMAC). The Sampling and Analysis Plan was approved by the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) on September 25, 2008. On March 25, 2015, the stipulated agreement to additional requirements to the Dona Ana Dairies Stage 2 Abatement Plan was agreed upon by NMED, the Dairies, and the Rio Valle Concerned Citizens. The Stage 2 Abatement Plan was approved by NMED by Final Order on April 10, 2015. Document references are provided in Section 5.0.

1.1 Objective and Monitoring Scope

The objective of this monitoring program is to satisfy the requirements set forth in the Stage 2 Abatement Plan and the Stipulated Agreement and to satisfy the requirements set forth in 20.6.2.4110 NMAC.

The following work was performed to meet the objectives of the monitoring program:

- Representatives from D&H Petroleum and Environmental Services, Inc. (D&H) gauged discharge plan (DP) monitoring wells, abatement plan (AP) monitoring wells, and Anthony Waste Water Treatment Plant (WWTP) wells from August 4 through August 9, 2021. Organ Dairy wells were gauged by Glorieta Geosciences, Inc. (Glorieta) on August 11, 2021.

- From August 9, 2021 through September 8, 2021, D&H representatives collected groundwater samples from all AP and DP wells that contained sufficient water. Organ Dairy wells were sampled by Glorieta on August 11, 2021. Well DAD-06 was the only AP well that was dry. The samples were analyzed for nitrate, chloride, total dissolved solids (TDS), and total Kjeldhal nitrogen (TKN). Field parameters including specific conductance, pH, temperature, oxidation reduction potential (ORP), and dissolved oxygen were monitored and recorded on field forms during sampling.

- Organ Dairy water supply well LRG-458S was sampled by Glorieta on August 11, 2021. The sample was analyzed for nitrate, chloride, total dissolved solids (TDS), and total Kjeldhal nitrogen (TKN). Field parameters including specific conductance, pH, temperature, oxidation reduction potential (ORP), and dissolved oxygen were monitored and recorded on field forms during sampling. Water quality results were provided to EA.

1.2 Background

In correspondence dated April 7, 2006, NMED required a Stage 1 Abatement Plan for 13 dairies in Doña Ana County, based on analytical results from DP monitoring of on-site compliance monitoring wells that showed concentrations of nitrate, chloride and TDS exceeding ground water standards promulgated in New Mexico Water Quality Control Commission (NMWQCC) Regulations (20.6.2.3103 NMAC). On October 30, 2006, the Dairies notified NMED that they had reached an agreement to work as a group and submit a joint response to NMED's request (Doña Ana Dairies 2006). The Dona Ana Dairies consortium consisted of the 11 dairies until the departure from the group by River Valley Dairy in April 2019 and Gonzalez Dairy in October 2020. As a result, the consortium currently consists of the following 9 dairies: Big Sky, Bright Star, Buena Vista 2, Del Oro, Dominguez, Dominguez 2, Mountain View, Organ, and Sunset.

On December 11, 2006, on behalf of the Doña Ana Dairies, Golder Associates Inc. (Golder) submitted a Stage 1 and 2 Abatement Plan Proposal to address impacts to groundwater in the area of the Dairies (Golder 2006). The first major deliverable in the Abatement Plan Proposal was an Existing Data Report (EDR) to bring together in one document historical data and practices of the constituent dairies.

The EDR, submitted on February 1, 2008 (Golder 2008a), was intended to satisfy the Dairies commitment for compilation and submission of existing data identified in the 2006 Doña Ana Dairies response to the NMED requirement for Stage I Abatement Plans. Section 9 of the EDR outlined data gaps identified during the preparation of the report, as well as the actions recommended. To facilitate the discussion of the path forward after the submittal of the EDR and concurrent with the EDR submission, a CWP was prepared. (Golder 2008b).

On July 15, 2008, the Dairies, Golder and NMED met (Golder 2008c). During that meeting, plume maps presented in the EDR (Golder 2008a), new monitoring data, and knowledge of well locations and groundwater chemistry results at adjacent DP-regulated facilities were used to identify data gaps with respect to ground water flow direction and plume delineation. The agreed upon data gaps yielded well locations (including contingency locations) recorded in the meeting minutes (Golder 2008c) and depicted in the Sampling and Analysis Plan (SAP) dated August 8, 2008 (Golder 2008d). The SAP outlined the details of the field operations to be implemented for completion of data gaps, such that a Site Investigation Report (§4106.C.6) and Stage 2 Abatement Plan (§4106.D) could be prepared.

Groundwater gauging was conducted concurrent to discussions with NMED at the Dairies for four quarters, February 2008, June 2008, September 2008, and December 2008, to determine the current and historical site groundwater gradient.

In May 2009, field work was conducted as outlined in the SAP and ten (10) AP monitoring wells (DAD-01 through DAD-10) were installed. In July 2009, the Site Investigation Report was submitted to the NMED.

On February 9, 2012, the Final Site Investigation Report was submitted to NMED. The report summarized field activities that occurred from October 10 through October 14, 2011, and November 10 through 18, 2011, during which eleven soil borings were advanced at the site and

converted into monitoring wells DAD-12 through DAD-14, DAD-16 through DAD-22, and DP well 177-03A.

On August 16, 2012, soil boring/monitoring well DAD-15 was installed and on August 20, 2012, well DAD-15 was sampled. An addendum to the Final Site Investigation Report was submitted to NMED on September 7, 2012, which summarized DAD-15 field activities.

A Stage 2 Abatement Plan was submitted to NMED on March 13, 2013. Based on an NMED response in August 2013, a Revision to the Stage 2 Abatement Plan was submitted on November 7, 2013.

On March 25, 2015, the stipulated agreement to additional requirements to the Dona Ana Dairies Stage 2 Abatement Plan was agreed to by NMED, Dona Ana Dairies, and the Rio Valle Concerned Citizens. On April 10, 2015, the Stage 2 Abatement Plan with the stipulated agreement was approved by NMED by Final Order.

EA began implementation of the Stage 2 Abatement Plan and stipulated agreement as directed by the Final Order in December 2015. In order to meet objectives, four monitoring wells were installed (DAD-23 through DAD-26) and Del Oro Dairy discharge plan (DP) well 692-01 was plugged and abandoned. Details on implementation of these tasks are included in the *Stage 2 Implementation and Quarterly Groundwater Monitoring Report,* July 2016.

In accordance with the approved Stage 2 Abatement Plan and stipulated agreement, a baseline compound specific isotope analysis (CSIA) for nitrogen 14 and nitrogen 15 ($^{15}N/^{14}N$ [$\delta^{15}N$]) and total organic carbon (TOC) was completed for 16 wells in spring of 2016. Additionally, existing conditions concentrations were recalculated for the contaminants of concern. Results of these analyses are presented in the *Stage 2 Implementation and Quarterly Groundwater Monitoring Report,* July 2016. A five-year review containing results of repeated CSIA sampling and recalculated existing conditions concentrations was submitted to NMED in December 2020 (EA 2020).

A Stage 2 Abatement Plan Modification proposal was submitted to NMED on August 10, 2018, to address plume instability in the perched aquifer nitrate plume at Del Oro Dairy. Following discussions with NMED, a revised Stage 2 Abatement Plan Modification proposal was submitted on May 1, 2019. A public meeting to discuss the plan was held in Anthony, New Mexico on May 17, 2019. The Stage 2 Abatement Plan Modification proposal was revised based on additional input from NMED and the public and submitted on July 26, 2019. Public notice for the proposal was initiated on October 23, 2019 and closed on December 31, 2019. An addendum to the Stage 2 Abatement Plan Modification proposal was submitted on July 13, 2020. A revised addendum to the Stage 2 Abatement Plan Modification proposal was submitted on July 13, 2021 based on additional comments from the public.

2.0 GROUNDWATER MONITORING ACTIVITIES

Groundwater monitoring activities included gauging AP monitoring wells, DP monitoring wells for dairies that are a part of the DAD consortium, and Anthony WWTP monitoring wells. Groundwater samples were collected from AP monitoring wells and DP monitoring wells for dairies that are a part of the DAD consortium. One irrigation supply well was sampled at Organ Dairy. The DAD consortium currently consists of the following dairies: Big Sky, Bright Star, Buena Vista 2, Del Oro, Dominguez, Dominguez 2, Mountain View, Organ, and Sunset. Groundwater samples were analyzed for nitrate, chloride, TDS, and TKN. The resulting data from this groundwater monitoring event are compiled and are presented below.

2.1 Well Gauging

From August 4 through August 9, 2021, representatives from D&H gauged DP monitoring wells, AP monitoring wells, and Anthony WWTP wells with an electronic water level indicator. Organ Dairy wells were gauged by Glorieta on August 11, 2021. AP well DAD-15 could not be accessed during gauging due to flooding. Table 1 provides a summary of the groundwater gauging data collected from the monitoring network. Data obtained during gauging are shown on potentiometric surface maps included as Figures 2, 3, 4, and 5. Well gauging field forms are available in Appendix A.

2.2 Groundwater Sampling

D&H sampled all AP monitoring wells with sufficient water from August 25, 2021 through September 7, 2021. Well DAD-06 has been dry since August 2013 and was not sampled. The Stage 2 Abatement Plan proposal discusses plans for a drilling company to attempt to remove silt at the bottom of the well through redevelopment. Redevelopment will occur when the plan is approved. Groundwater sampling from AP wells was accomplished with new, disposable bailers. Three well casing volumes were purged unless the well contained insufficient water.

D&H sampled the DP wells from August 9, 2021, through August 31, 2021. Glorieta sampled Organ Dairy DP wells on August 11, 2021. Prior to sampling, all DP wells were purged of three well casing volumes, if practicable, by (1) hand-bailing with new, disposable bailers and twine, (2) pumping with a submersible pump and new polyethylene tubing, or (3) pumping with a dedicated pump and new polyethylene tubing. Due to a lower water table, several DP wells were dry or contained insufficient water for sampling.

The wells were sampled from historically clean to dirty to the extent possible to minimize cross-contamination potential. All non-dedicated or disposable equipment was decontaminated between wells with an Alconox™ solution to further ensure sample quality. All meters were calibrated and/or checked with standards in accordance with the manufacturer's specifications prior to daily use. Purge water was ground discharged.

When sufficient water was available, field parameters including specific conductance, temperature, pH, ORP, and dissolved oxygen were monitored using a water quality meter and recorded on field forms. Dissolved oxygen and ORP were only measured in the first set of readings. Field parameters from August 2015 to present are summarized in Table 2.

Initial samples collected for Sunset dairy, Buena Vista 2 dairy, and wells 624-01, 624-02, and 624-11 at Dominguez 1 dairy were not analyzed due to shipping complications and these wells were resampled. Field forms provided in the appendix represent the first sampling event. Field forms for the second sampling event are not available. The sampling field forms are presented in Appendix A.

All groundwater samples were collected immediately after purging. Sampling was either accomplished by carefully pouring groundwater from the bailer into the sample containers or by pumping groundwater through new polyethylene tubing into the sample container. Sample containers were provided by Hall Environmental Analysis Laboratory, Inc. (Hall). Container size, type, sample preservatives, analytical methods, and holding times are specified in Table 3. All samples were preserved in accordance with method requirements, labeled, then immediately cooled to <6°C with ice and delivered under chain-of-custody to Hall in Albuquerque, New Mexico. All analytical laboratory reports are provided in Appendix B.

2.3 Irrigation/Supply Well Groundwater Sampling

Organ dairy supply well LRG-458S was sampled on August 11, 2021 by Glorieta rather than on-schedule with other irrigation wells in March 2021 due to scheduling difficulties. The sample was analyzed for nitrate, chloride, TDS, and TKN. The well was sampled by collecting a grab aliquot from a faucet located nearest to the pump outlet. No purging was completed as the pump was pumping at the time of sampling.

3.0 GROUNDWATER MONITORING RESULTS

3.1 Hydraulic Gradient and Direction of Groundwater Flow

This quarter, groundwater was present beneath the site at depths ranging from 13.80 feet below top-of-casing (ft btoc) in Sunset well 257-03 and AP well DAD-03 to 133.90 ft btoc in Dominguez 2 well 42-12. Groundwater was encountered at shallower depths near the Mesquite Drain and at greater depths near I-10 where the topographic elevation increases.

AP monitoring well DAD-25 may have been completed in a perched aquifer, as groundwater elevations have consistently measured several feet higher than groundwater elevations in surrounding wells. As a result, this groundwater elevation has not been used in contouring for the central area potentiometric surface map.

Potentiometric surface maps were completed using the monitoring well gauging data for the northern, central, and southern portions (perched and regional aquifers) of the Dairies. Groundwater elevation data are provided in Table 1 and potentiometric surface maps are provided as Figures 2, 3, 4, and 5. Hydrographs were completed for select monitoring wells in each area and are provided in Appendix C. On average, regional aquifer groundwater elevations decreased by approximately one-half foot in the northern and southern areas. In the central area, groundwater elevations decreased an average of 0.8 foot. In the southern perched aquifer, groundwater elevations decreased by an average of 0.3 foot. Water levels in select monitoring wells in the southern perched aquifer are significantly higher than historical water levels as a result of a suspected water line leak located at the intersection of E O'Hara Road and Anthony Drive.

During the most recent gauging event, groundwater flow direction in the northern area was to the east-northeast, except in the southern portion of the northern area where groundwater flowed to the southeast. In the central region, groundwater flow direction was generally to the southeast. Flow direction in the southern regional aquifer was to the south. Flow direction in the southern perched aquifer is radiating out from the southwest corner of Del Oro Dairy to the west and south.

The hydraulic gradient across the Dairies in the regional aquifer was approximately 0.001 ft/ft and the hydraulic gradient in the perched aquifer in the southern area was approximately 0.004 ft/ft.

3.2 Groundwater Field Parameters

Field parameters from the most recent monitoring event including specific conductance, pH, temperature, ORP, and dissolved oxygen were recorded on the sampling field forms (Appendix A) and are summarized in Table 2. Specific conductance, dissolved oxygen, and ORP trends for select wells are presented in Appendix D. Though dissolved oxygen and ORP measurements from wells containing a dedicated pump were recorded, these measurements are not considered representative of aquifer conditions. As noted in Section 2.2, dissolved oxygen and ORP are only recorded in the first set of readings. This is because hand bailing agitates the aquifer and the ORP and dissolved oxygen measurements are not considered representative once agitation begins.

3.3 Groundwater Analytical Results

3.3.1 Abatement Plan Well Results

Groundwater analyte concentrations were below the 10 milligram per liter (mg/L) NMWQCC standard for nitrate as nitrogen in 11 of the 25 AP monitoring wells sampled. The following 14 AP wells had nitrate concentrations at or above the standard: DAD-01, DAD-05, DAD-07, DAD-08, DAD-09, DAD-11 (vertical delineation well), DAD-12 (vertical delineation well), DAD-14, DAD-15, DAD-19 (vertical delineation), DAD-20, DAD-21, DAD-22, and DAD-23.

Nitrate concentrations decreased or were the same in AP wells DAD-03, DAD-07, DAD-08, DAD-11 (vertical delineation well), DAD-13, DAD-16, DAD-17, DAD-18 (vertical delineation well), DAD-21, DAD-23 and DAD-26, compared to the previous sampling event. The largest decrease in nitrate was observed in DAD-21 which decreased from 120 mg/L in May 2021 to 64 mg/L in September 2021. The largest increase was observed in DAD-09 which increased from 24 mg/L in May 2021 to 42 mg/L in September 2021 and DAD-05 which increased from non-detect to 14 mg/L. During this sampling event, nitrate concentrations in the AP wells ranged from 64 mg/L in well DAD-21 to below the laboratory RL of 1.0 mg/L in wells DAD-03 and DAD-16.

Both chloride and TDS concentrations equaled or exceeded their respective NMWQCC standards in most AP wells. Exceptions include wells DAD-09, DAD-17, and DAD-25, where chloride was below the 250 mg/L standard at concentrations of 93 mg/L, 130 mg/L, and 140 mg/L, respectively. TDS was also below the standard of 1,000 mg/L at concentrations of 785 mg/L, 742 mg/L, and 880 mg/L in wells DAD-09, DAD-17, and DAD-25, respectively. The highest chloride and TDS concentrations in the AP wells were found in well DAD-08, where respective concentrations were 1,900 mg/L and 4,580 mg/L.

Table 4 and Figures 6 through 9 present the analytical results for AP monitoring wells. Analytical laboratory reports are provided in Appendix B. Nitrate, chloride, and TDS concentration trends for select AP wells are presented by area in Appendix E.

3.3.2 Dairy Results by Area

DP groundwater analytical results are presented in Table 5. Nitrate, chloride, and TDS concentration trends for the AP wells by area are presented in Appendix E. Analytical data for all sampled wells are plotted on Figures 6 through 9. Analytical laboratory reports are included in Appendix B. Discussions of upgradient/downgradient conditions that reflect current groundwater flow directions are discussed in Section 3.1. The following discussions summarize the results by area at the Dairies.

Northern Portion

Upgradient well 86/340-01 (located to the north) has been below the nitrate standard since February 2018; historically, concentrations in this well were consistently above the nitrate standard. Nitrate concentrations in upgradient well 70/86/340-01 (Northern Land Application area well) have historically been above the nitrate standard, but were below the standard in August 2021 with a concentration of 3.9 mg/L. The nitrate concentrations are below NMWQCC

standard of 10 mg/L in the following additional wells: Organ Well 126-12, Dominguez Dairy 2 wells 42-10, 42-11, 42-12, Dominguez Dairy wells 624-02, 624-09, and AP wells DAD-02 and DAD-13. These wells define the extent of nitrate contamination. Nitrate contamination is undefined to the east in the vicinity of DAD-01 and to the west at Dominguez 624-10 and Dominguez #2 well 42-02. The highest nitrate concentration in the northern portion was observed in Dominguez Dairy #2 well 42-06 with a concentration of 200 mg/L.

The chloride concentrations in DP wells were generally at or above the 250 mg/L standard in wells sampled within the northern portion of the Dairies. Exceptions include chloride detected below the standard at Northern Land Application Area well 86/340-01 and Dominguez 2 well 42-08 at concentrations of 240 mg/L and 220 mg/L, respectively. TDS concentrations were above the 1,000 mg/L standard in all wells sampled within the northern portion of the Dairies. The highest concentrations of chloride and TDS were observed in Northern Land Application area well 70-03 at concentrations of 1,800 mg/L and 4,770 mg/L, respectively.

Central Portion

The highest nitrate concentration in the central portion was 150 mg/L, observed in Big Sky Dairy well 833-09. The upgradient extent of the central portion nitrate plume is defined by Buena Vista Dairy II well 74-03 where nitrate was not detected above the laboratory RL. The downgradient extent is defined by Las Cruces Community Farms (formerly McAnally Enterprises) well MW-4, with a below-standard concentration of 1.8 mg/L. Historically, the eastern cross-gradient extent of the plume was defined by wells DAD-07 and DAD-15. Nitrate in these wells exceeded the standard at concentrations of 18 mg/L and 17 mg/L, respectively. The western extent is defined by AP wells DAD-04 and DAD-16; nitrate concentrations remain below the standard in these wells.

Chloride and TDS concentrations were generally at or above standards in wells within the central portion of the Dairies. Chloride was below the standard in downgradient AP wells DAD-17 and DAD-25 at concentrations of 130 mg/L and 140 mg/L, respectively. TDS was below the standard in downgradient AP wells DAD-17 and DAD-25 at concentrations of 742 mg/L and 880 mg/L, respectively. The highest chloride and TDS concentrations were observed at AP well DAD-08 at 1,900 mg/L and 4,580 mg/L, respectively. Well DAD-08 is located east of Sunset Dairy, adjacent to an irrigation well that is no longer in use. Since 2018, concentrations of chloride have generally been stable and TDS concentrations have been decreasing.

Southern Portion – Regional and Perched Aquifers

Wells completed in the regional aquifer in the southern portion of the dairies include AP well DAD-10 and Del Oro wells 692-05 through 692-09 (Figure 8). All of the sampled wells in the regional aquifer were below the NMWQCC standard for nitrate except for Del Oro well 692-05 which had a concentration of 18 mg/L. Chloride concentrations were above the NMWQCC standard and ranged from 400 mg/L in AP well DAD-10 to 590 mg/L in Del Oro Dairy well 692-07. TDS ranged from 1,370 mg/L in Del Oro Dairy well 692-09 to 1,760 mg/L in Del Oro well 692-07.

Wells completed in the perched aquifer in the southern portion that are sampled on a quarterly basis by DAD include wells 692-02, 629-04, DAD-09, DAD-20, DAD-21, DAD-22, and

DAD-26 (Figure 9). A water line located at the intersection of East O'Hara Road and Anthony Drive was suspected to have been compromised and to have impacted analyte concentrations in the perched aquifer. Based on groundwater elevation and groundwater concentration data, it is likely the water line started to leak before May 2019. Decreasing groundwater gradient and changes in analyte concentrations during the last several monitoring events suggest that the water line leak may have been repaired during the winter of 2020/2021.

Nitrate was at or above the standard in monitoring wells in the perched aquifer except Del Oro well 692-02 and AP well DAD-26, which are located near or downgradient of the suspected water line leak. The highest concentration was detected at AP well DAD-21 with a concentration of 64 mg/L; however, this concentration decreased significantly from the previous sampling event in May 2021 when the nitrate concentration was 120 mg/L. The concentration of nitrate at downgradient AP well DAD-26 is below the NMWQCC standard, however, concentrations remain above standard at downgradient AP wells DAD-20 and DAD-22. A modified Abatement Plan proposal to address nitrate in the perched aquifer has been submitted to NMED. Chloride concentrations ranged from 93 mg/L in AP well DAD-09 to 920 mg/L in AP well DAD-21. TDS in the perched aquifer ranged from 785 mg/L in AP well DAD-09 to 3,030 mg/L in AP well DAD-21.

3.3.3 Irrigation/Supply Well Results

Groundwater analytical results for Organ Dairy water supply well LRG-458S are presented in Table 6. Analytical results are included in Figures 6. Analytical laboratory reports are provided in Appendix B.

Concentrations of analytes were lower than historical results. Nitrate was not detected at the reporting limit of 1 mg/L. Chloride and TDS were detected at concentrations of 91 mg/L and 497 mg/L, respectively; these concentrations are an order of magnitude lower than historical concentrations.

4.0 CONCLUSION AND RECOMMENDATIONS

This groundwater monitoring event included the gauging of all accessible DP and AP wells and sampling of all accessible wells that contained sufficient water. Based on the data collected, the following conclusions and recommendations are presented:

- Depth to groundwater ranged from 13.80 ft btoc in Sunset well 257-03 and AP well DAD-03 to 133.90 ft btoc in Dominguez 2 well 42-12.

- All areas of the regional aquifer and the southern perched aquifer saw a decrease in groundwater elevations relative to May 2021.

- The groundwater flow direction in the northern area varied from southeast to east-northeast. In the central area, groundwater flowed generally to the southeast. Groundwater flow direction in the southern regional aquifer was to the south. Groundwater flow direction in the southern perched aquifer is radially west and south from Del Oro well 692-02 where there is a suspected water line leak.

- The hydraulic gradient across the Dairies in the regional aquifer was approximately 0.001 ft/ft and was approximately 0.004 ft/ft in the perched aquifer.

- Nitrate was below the NMWQCC standard of 10 mg/L in 11 of the 25 groundwater samples collected from the AP wells.

- Chloride and TDS generally remain at or above standards in regional aquifer wells upgradient of the northern, central, and southern portions of the plumes at the Dairies.

- A modified Abatement Plan proposal to address the nitrate plume at Del Oro Dairy has been submitted to NMED.

- When the Stage 2 Abatement Plan modification is approved, DAD-06 will be redeveloped to remove the silt that is in the bottom of the well so that groundwater can be collected for analysis.

- Elevated water levels in the southern perched aquifer are likely the result of a former water line leak.

5.0 REFERENCES

Doña Ana Dairies. 2006. Letter Regarding Agreement for Joint Stage 1 and Stage 2 Abatement Plan and Storm Water and Wastewater Pond Upgrades. Letter from Mr. Michael Weatherly, Chairman, Doña Ana Dairies, to Mr. William Olson, Chief, Ground Water Quality Bureau. 30 October.

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Golder Associates, Inc. (Golder). 2006. *Stage 1 and 2 Abatement Plan Proposal, prepared for New Mexico Environment Department, Remediation Oversight Section, on behalf of Doña Ana Dairies*. 11 December.

Golder. 2008a. *Existing Data Report and Conceptual Work Plan, Doña Ana Dairies, Mesquite, New Mexico*. 1 February.

Golder. 2008b. *Conceptual Work Plan. Doña Ana Dairies, Mesquite, New Mexico*. February 1.

Golder. 2008c. Notes for the Meeting Regarding New Monitoring Well Installation. Meeting Participants: Doña Ana Dairy representative, DAD technical representatives, and NMED staff. 28 July.

Golder. 2008d. Sampling *and Analysis Plan. Doña Ana Dairies, Mesquite, New Mexico*. 11 August.

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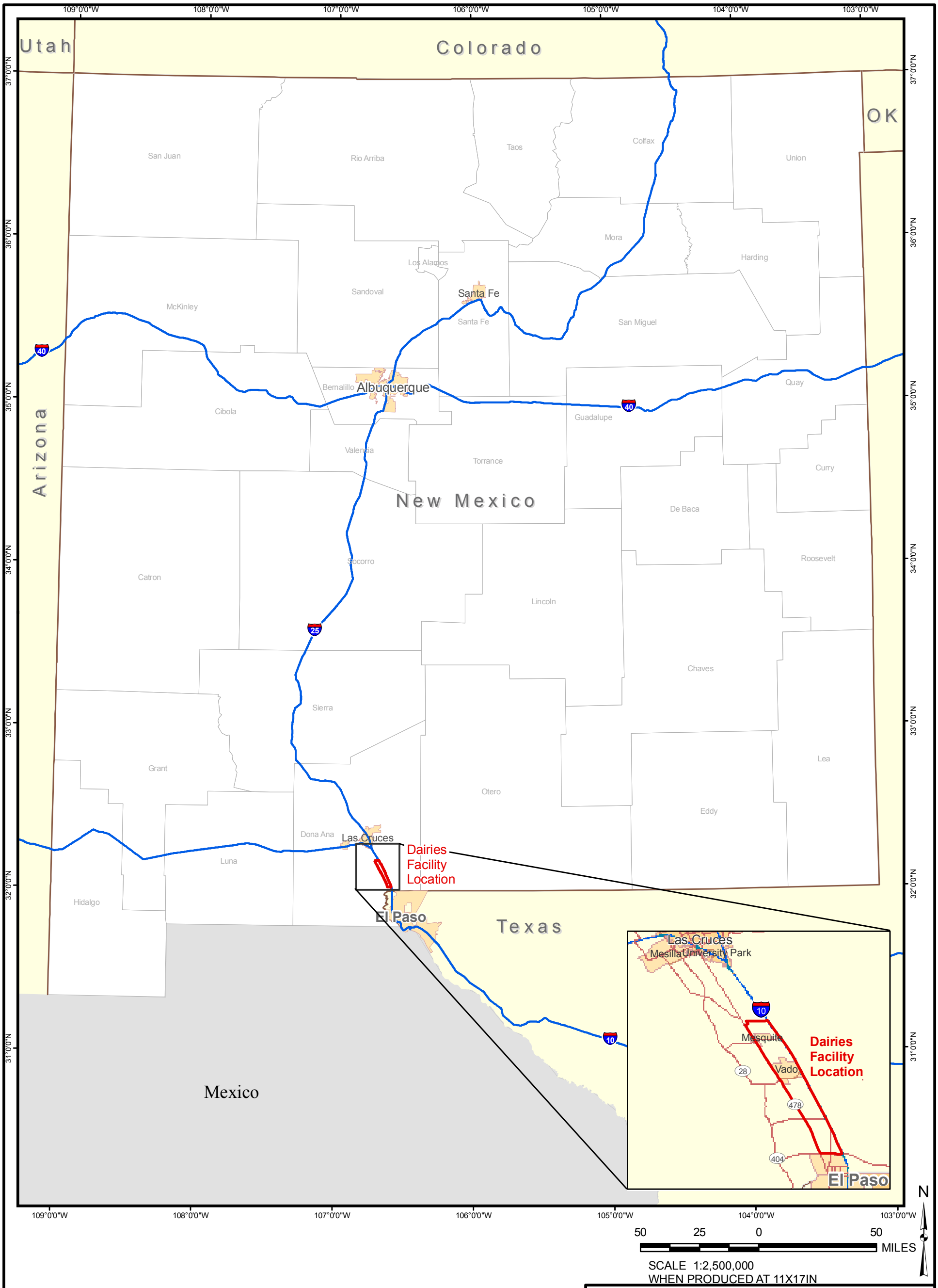
NMED. 2008. Approval of Sampling and Analysis Plan for the Doña Ana Dairies, Stage 1 Abatement Plan, Doña Ana County, New Mexico. 25 September.

NMED, Doña Ana Dairies, and Rio Valle Concerned Citizens. 2015. Stipulated Agreement, Dona Ana Dairies Stage 2 Abatement Plan. 25 March.

TABLES
(Provided in Electronic Format via CD Located on Front Cover of Report)

FIGURES



SCALE 1:2,500,000
WHEN PRODUCED AT 11X17IN

LEGEND:

Facility Boundary

REFERENCES
Base Data: ESRI, 2008.

PROJECT

DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE

SITE LOCATION MAP

PROJECT No.		11x17_siteloc.mxd
DESIGN		SCALE AS SHOWN / REV 0
GIS		FIGURE 1
CHECK		
REVIEW		

106°41'0"W 106°40'0"W 106°39'0"W 106°38'0"W

32°11'0"N 32°10'0"N 32°9'0"N 32°8'0"N 32°7'0"N

LEGEND

- Discharge Plan Well With Water Elevations (Feet MSL)
- Abatement Plan Well With Water Elevations (Feet MSL)
- Abatement Plan Vertical Delineation Monitoring Well with Water Elevation (Feet MSL)
- Discharge Plan Well - Plugged and Abandoned or Destroyed
- Drain Crossing Location
- Potentiometric Contour
- Potentiometric Contour - Assumed
- Interstate Highway
- State Highway
- Other Road
- Land Owned by Dairies
- Land Application on Non-Dairy Property
- Stage 2 Abatement Plan Area
- Public Land Survey System

Note(s):
Feet MSL = Feet above mean sea level
NM = Not measured

Bright Star & Buena Vista I LAA
Mountain View Dairy LAA
Organ Dairy
Mountain View Dairy
Buena Vista Dairy I
Bright Star Dairy
Dominguez Dairy 2
Dominguez Dairy 1
Gonzalez Dairy
Buena Vista Dairy II
Big Sky Dairy
River Valley Dairy

86-340-01 3,818.13
624-09 3,815.82
624-10 3,819.18
624-08 Plugged and Abandoned
123-12 3,816.28
126-09 3,812.75
70-03 3,813.25
126-13 3,813.57
70-02 3,813.49
126-07 3,814.39
126-04 3,813.71
70-01 3,813.89
70-04 3,813.92
126-05 3,814.52
86-02 3,815.49
86-01 3,814.30
340-01 3,814.92
340-02 3,814.91
42-10 3,812.28
42-12 3,811.93
42-11 3,811.85
42-07 Plugged and Abandoned
42-02 3,817.79
42-06 3,816.91
624-05 Plugged and Abandoned
42-08 3,817.48
42-09 Plugged and Abandoned
42-13 3,815.10
42-03 3,812.81
624-01 3,816.50
624-04 Plugged and Abandoned
624-06 Plugged and Abandoned
624-11 3,812.96
624-07 Plugged and Abandoned
624-02 3,815.98
177-01 NM
177-05 NM
177-06 NM
177-02 NM
177-04 NM
177-03A NM
177-07 Plugged and Abandoned
177-07R NM
74-03 3,806.39
74-04 3,803.55
74-01 3,803.31
74-05 3,802.85
74-02 3,802.38
167-06 NM
DAD-01 3,812.56
DAD-12 3,815.21
DAD-11 3,813.19
DAD-13 3,810.04
DAD-15 3,811.62
DAD-21 3,810.05
DAD-18 3,808.90
DAD-03 3,806.79
DAD-04 3,803.37
DAD-05 Dry
DX1 DX1W DX2 DX25 DX26 DX27 DX28 DX29 DX30 DX31 DX5 DX4 DX3 DX20

3818 3817 3816 3815 3814 3813 3819 3818 3817 3816 3815 3814 3813 3812 3811 3810 3809 3808 3807 3806 3805 3804 3803

228 10 478 28 189

REFERENCES

Roads: Doña Ana County, 2001
Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

500 250 0 500 FEET

SCALE 1:9,000 1 " = 750 FT
WHEN PRODUCED AT 34X44IN

N

PROJECT
DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE
POTENTIOMETRIC SURFACE MAP, AUGUST 2021, NORTHERN PORTION

PROJECT No. 1464108.03
DESIGN NA
GIS RMM
CHECK
REVIEW
SCALE AS SHOWN REV 0

FIGURE 2

2021-11-02 P:\gis\Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 2 Dairies_North_Pot_20211B.mxd EA Albuquerque rmullen

106°39'0"W
106°38'0"W
106°37'0"W
32°41'0"N
32°40'0"N
32°39'0"N
32°38'0"N
32°37'0"N
32°36'0"N

LEGEND

- Discharge Plan Well with Water Elevation (Feet MSL)
- Abatement Plan Well With Water Elevations (Feet MSL)
- Abatement Plan Vertical Delineation Well
- Discharge Plan Well - Plugged and Abandoned
- Drain Crossing Location
- Potentiometric Contour
- Potentiometric Contour - Assumed
- Land Owned by Dairies
- Land Application on Non-Dairy Property
- Public Land Survey System

Note:
* = Well not used in contouring
Feet MSL = Feet above mean sea level
NM = Not measured

Buena Vista Dairy II
River Valley Dairy
Big Sky Dairy
River Valley Dairy LAA
Sunset Dairy

74-03 3,806.39
74-04 3,803.55
74-01 3,803.31
74-05 3,802.85
74-02 3,802.38
167-06 NM
167-03 NM
167-07 NM
167-01A NM
167-02 NM
167-01 NM
167-04 NM
833-04 3,801.71
833-06 3,801.85
833-03 Plugged and Abandoned
833-02 3,800.15
833-08 3,800.25
833-01 Plugged and Abandoned
833-05 3,799.21
833-07 3,798.73
167-08 NM
167-09 NM
833-09 3,797.79
257-03 3,800.94
167-05 NM
257/260-01 Plugged and Abandoned
833-10 3,798.48
257-01 3,798.22
257-02 3,797.46
MW-04 NM
Bruce1 NM

DAD-03 3,803.79
DAD-04 3,803.37
DAD-05 3,797.76
DAD-06 3,797
DAD-15 NM
DAD-16 3,797.67
DAD-18 3,797.89
DAD-19 3,795.76
DAD-24 3,795.01
DAD-07 3,800.26
DAD-08 3,801.25
DAD-25 3,801.21
DAD-17 3,796.76

DX3 DX4 DX5 DX6 DX8 DX9 DX10 DX11 DX17 DX18 DX20 DX21 DX22 DX23 DX24

3807 3806 3805 3804 3803 3802 3801 3800 3799 3798 3797 3800

478 10

REFERENCES

Roads: Doña Ana County, 2001
Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

500 250 0 500 FEET
SCALE 1:9,000 1 " = 750 FT
WHEN PRODUCED AT 34X44IN

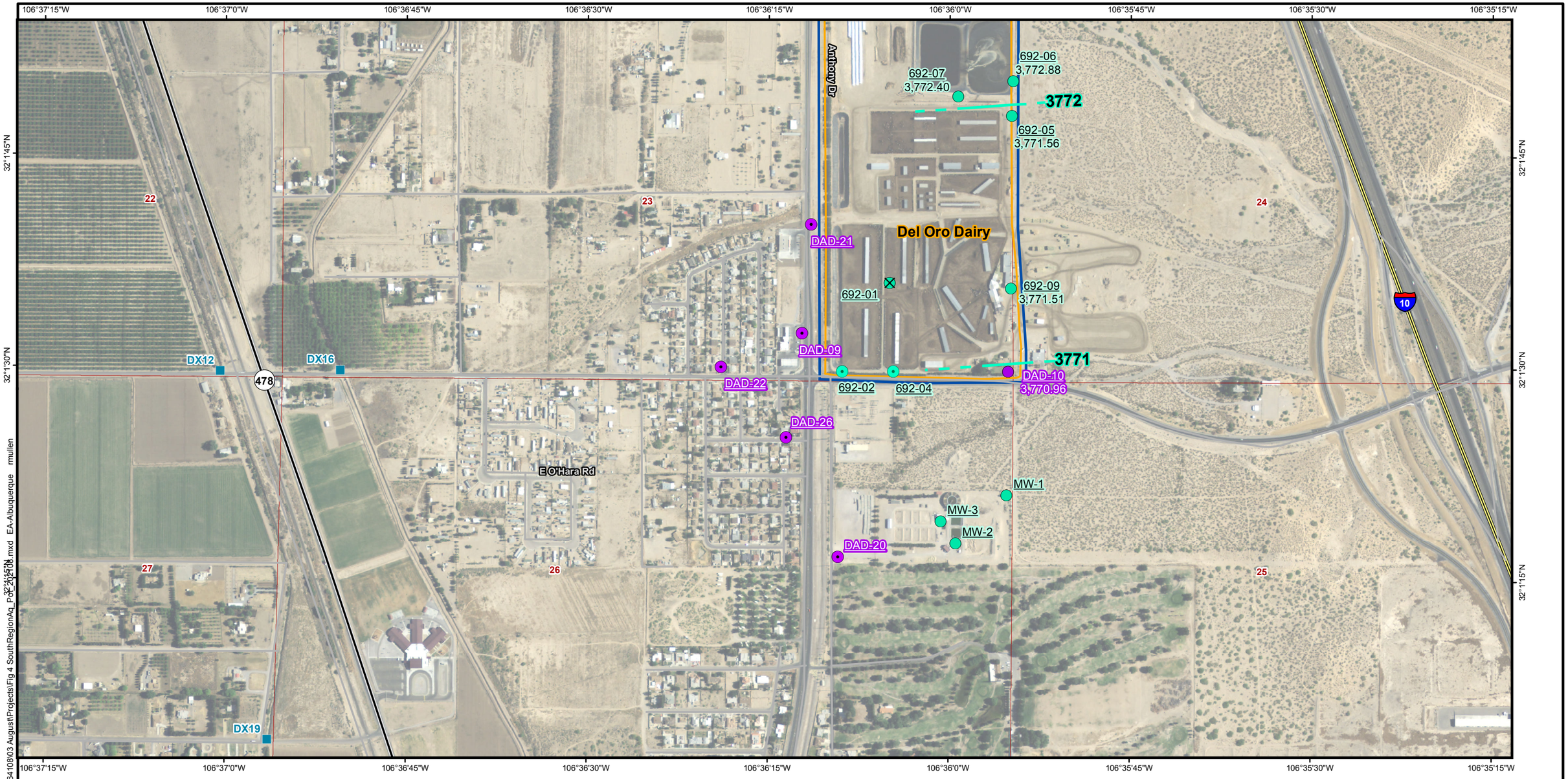
N

PROJECT
DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE
POTENTIOMETRIC SURFACE MAP AUGUST 2021, CENTRAL PORTION

PROJECT No. 1464108.03
DESIGN NA
DRAWN RMM
CHECK
REVIEW
SCALE AS SHOWN
REV 0
FIGURE 3

2021 - 10-13 P:\gis\2Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 3 Dairies_Central_Pot_202108.mxd EA-Albuquerque mullen



LEGEND:

- Drain Crossing Location

Perched Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Discharge Plan Well - Plugged and Abandoned

Regional Aquifer Monitoring Well

- Abatement Plan Well With Water Elevations (Feet Above Mean Sea Level)
- Discharge Plan Well with Water Elevation (Feet Above Mean Sea Level)

- Potentiometric Contour
- Potentiometric Contour - Assumed
- Land Owned by Dairies
- Stage 2 Abatement Plan Area
- Public Land Survey System

* Anomalous water level not used in contouring

700 350 0 700 FEET

SCALE 1:8,400 1 " = 700 FT
WHEN PRODUCED AT 11X17IN

N

REFERENCES

Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

PROJECT

DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE

POTENTIOMETRIC SURFACE MAP AUGUST 2021, SOUTHERN PORTION REGIONAL AQUIFER

PROJECT No.	1464108.03		Fig 4 SouthRegionAq_Pot.mxd	
DESIGN	NA		SCALE AS SHOWN	REV 0
GIS	RMM		FIGURE 4	
CHECK				
REVIEW				

2021 -10-11 P:\gis2\Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 4 SouthRegionAq_Pot_210708.mxd EA-Albuquerque rmullen

106°37'15"W 106°37'0"W 106°36'45"W 106°36'30"W 106°36'15"W 106°36'0"W 106°35'45"W 106°35'30"W 106°35'15"W

32°2'0"N 32°1'45"N 32°1'30"N 32°1'15"N

Anthony Dr

692-08
692-06
692-07
692-05
692-01
692-09
692-02
692-04
3,782.79
3,782.26
DAD-10
Del Oro Dairy

DAD-21
3,783.50

DAD-09
3,782.27

DAD-22
3,780.38

DAD-26
3,779.80

DAD-20
3,776.76

MW-3*
3,782.83

MW-1
3,779.01

MW-2
3,777.70

3782
3780
3778

DX12
DX16
E O'Hara Rd

22 23 24 25 26 27

2021-11-30 P:\gis2\Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 5 SouthPerchAq_Pot_202108.mxd EA-Albuquerque rmullen

LEGEND:

- Drain Crossing Location

Perched Aquifer Monitoring Well

- Abatement Plan Monitoring Well With Water Elevations (Feet Above Mean Sea Level)
- Discharge Plan Monitoring Well With Water Elevations (Feet Above Mean Sea Level)
- Discharge Plan Well - Plugged and Abandoned

Regional Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well

- Potentiometric Contour
- Potentiometric Contour - Assumed
- Land Owned by Dairies
- Stage 2 Abatement Plan Area
- Public Land Survey System

Note:
* = Not used in contouring.

700 350 0 700 FEET

SCALE 1:8,400 1 " = 700 FT
WHEN PRODUCED AT 11X17IN

N

REFERENCES

Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

PROJECT

DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE

POTENTIOMETRIC SURFACE MAP AUGUST 2021, SOUTHERN PORTION PERCHED AQUIFER

PROJECT No. 1464108.03					
DESIGN	NA		SCALE AS SHOWN	REV 0	FIGURE 5
GIS	RMM				
CHECK					
REVIEW					

106°41'0"W
106°40'0"W
106°39'0"W
32°11'0"N
32°10'0"N
32°9'0"N
32°8'0"N

LEGEND:

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Discharge Plan Monitoring Well, Plugged and Abandoned or Destroyed
- Abatement Plan Vertical Delineation Monitoring Well
- Interstate Highway
- State Highway
- Other Road
- Land Owned by Dairies
- Land Application on Non-Dairy Property
- Stage 2 Abatement Plan Area
- Public Land Survey System

Notes:
Units are in milligrams per liter.

Cl = Chloride
NO_3 = Nitrate as N
NS = Not Sampled
TDS = Total Dissolved Solids

83-40-01
NO3: 21
Cl: 270
TDS: 2,100

Bright Star & Buena Vista I LAA
70-86-340-01
NO3: 3.9
Cl: 1,000
TDS: 3,000

Mountain View Dairy LAA
126-09
Not Sampled
70-03
NO3: 41
Cl: 1,000
TDS: 4,270

Organ Dairy
126-07
NO3: 22
Cl: 800
TDS: 3,010
126-13
NO3: 110
Cl: 830
TDS: 3,380
70-02
NO3: 16
Cl: 810
TDS: 2,000
70-01
NO3: 23
Cl: 750
TDS: 3,150
126-04
NO3: 21
Cl: 800
TDS: 2,930
70-04
NO3: 14
Cl: 810
TDS: 2,600
Mountain View Dairy
DAD-01
NO3: 20
Cl: 850
TDS: 1,520
126-05
NO3: 111
Cl: 700
TDS: 2,480
Buena Vista Dairy I
26-02
NS
26-01
NS
624-09
NO3: 24
Cl: 300
TDS: 2,070
624-10
NO3: 19
Cl: 350
TDS: 2,190
624-08
Plugged and Abandoned
126-12
NO3: 57
Cl: 750
TDS: 2,470
240-01
NO3: 46
Cl: 580
TDS: 2,900
240-02
NO3: 66
Cl: 760
TDS: 3,240
Bright Star Dairy
42-07
Plugged and Abandoned
42-10
NO3: 140
Cl: 400
TDS: 1,520
42-12
NO3: 118
Cl: 290
TDS: 1,110
42-11
NO3: <1.0
Cl: 800
TDS: 1,930
Dominguez Dairy 2
42-06
NO3: 200
Cl: 590
TDS: 2,500
42-02
NO3: 11
Cl: 520
TDS: 2,060
42-08
NO3: 136
Cl: 220
TDS: 1,700
42-13
NO3: 20
Cl: 1,000
TDS: 3,030
42-09
Plugged and Abandoned
42-03
NO3: 128
Cl: 1,100
TDS: 3,220
DAP-12
NO3: 18
Cl: 1,100
TDS: 3,300
624-05
Plugged and Abandoned
Dominguez Dairy 1
624-01
NO3: 10
Cl: 700
TDS: 2,400
624-04
Plugged and Abandoned
624-06
Plugged and Abandoned
624-11
NO3: 14
Cl: 1,000
TDS: 3,220
DAD-13
NO3: 18.1
Cl: 620
TDS: 2,130
624-07
Plugged and Abandoned
624-02
NO3: 14.1
Cl: 480
TDS: 2,160
177-01
NS
177-05
NS
177-06
NS
LRG-458 S
NO3: <1.0
Cl: 91
TDS: 497
177-02
NS
177-04
NS
Gonzalez Dairy
DAD-11
NO3: 12
Cl: 650
TDS: 2,700
177-03A
NS
177-07
Plugged and Abandoned
177-07R
NS
DAD-14
NO3: 18
Cl: 830
TDS: 2,800
DAD-23
NO3: 13
Cl: 200
TDS: 1,420
DAD-02
NO3: 8.8
Cl: 250
TDS: 1,000

REFERENCES

Roads: Doña Ana County, 2001
Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

600 300 0 600 FEET
SCALE 1:7,200 1 " = 600 FT
WHEN PRODUCED AT 34X44IN

N

PROJECT
DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE
GROUNDWATER ANALYTICAL RESULTS
AUGUST 2021
NORTHERN PORTION

PROJECT No. 14641080.05			Fig 6 Dairies_North_Analytical.mxd
DESIGN	NA		SCALE AS SHOWN REV 0
GIS	RMM		
CHECK			FIGURE 6
REVIEW			

2021-10-28 P:\gis\Commercial\Dona Ana Dairies - 14641080\03 August\Projects\Fig 6 Dairies_North_analytical_20210826.mxd EA-Dallas mullen

106°39'0"W

106°38'0"W

32°7'0"N

32°6'0"N

32°5'0"N

LEGEND:

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Discharge Plan Monitoring Well, Plugged and Abandoned
- Abatement Plan Vertical Delineation Monitoring Well
- Interstate Highway
- State Highway
- Other Road
- Land Owned by Dairies
- Land Application on Non-Dairy Property
- Stage 2 Abatement Plan Area
- Public Land Survey System

Notes:
Units are in milligrams per liter.

Cl = Chloride
NO_3 = Nitrate as N
NS = Not Sampled
TDS = Total Dissolved Solids

DAD-03
NO3: <1.0
Cl: 410
TDS: 1,930

74-03
NO3: <1.0
Cl: 240
TDS: 1,570

Buena Vista Dairy II

74-01
NO3: <1.50
Cl: 310
TDS: 2,030

74-01
NO3: 15
Cl: 600
TDS: 3,410

74-05
NO3: 114
Cl: 670
TDS: 2,150

DAD-04
NO3: 7.6
Cl: 450
TDS: 2,390

74-02
NO3: <0.50
Cl: 630
TDS: 2,550

167-06
NS

DAD-06
Dry

167-03
NS

833-04
NO3: 82
Cl: 830
TDS: 2,770

167-07
NS

167-01A
NS

167-01
NS

167-02
NS

833-06
NO3: 7.6
Cl: 860
TDS: 2,660

DAD-15
NO3: 8.7
Cl: 570
TDS: 2,230

167-04
NS

833-03
Plugged and Abandoned

833-02
NO3: 1.6
Cl: 1,300
TDS: 4,100

River Valley Dairy

DAD-16
NO3: <1.0
Cl: 530
TDS: 2,170

833-08
NO3: 8.1
Cl: 870
TDS: 2,300

Big Sky Dairy

DAD-19
NO3: 9.6
Cl: 1,000
TDS: 3,000

DAD-24
NO3: 8.6
Cl: 960
TDS: 2,980

833-05
NO3: 9.4
Cl: 1,300
TDS: 3,490

833-01
Plugged and Abandoned

DAD-07
NO3: 1.8
Cl: 660
TDS: 2,310

167-08
NS

833-07
NO3: 7.0
Cl: 1,100
TDS: 3,070

River Valley Dairy LAA

167-09
NS

833-09
NO3: 150
Cl: 1,100
TDS: 4,340

257-03
NS

167-05
NS

257/260-01
Plugged and Abandoned

DAD-05
NO3: 14
Cl: 410
TDS: 2,270

833-10
NO3: 1.5
Cl: 730
TDS: 2,750

Sunset Dairy

257-01
NO3: 3.6
Cl: 910
TDS: 3,500

DAD-18
NO3: 2.6
Cl: 640
TDS: 2,580

DAD-08
NO3: 1.6
Cl: 1,900
TDS: 4,530

257-02
NO3: 2.5
Cl: 1,000
TDS: 2,930

DAD-25
NO3: 1.6
Cl: 140
TDS: 830

DAD-17
NO3: 2.5
Cl: 130
TDS: 732

MW-4
NO3: 1.0
Cl: 1,400
TDS: 4,270

Las Cruces Community Farms

REFERENCES
Roads: Doña Ana County, 2001
Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

500 250 0 500 FEET

SCALE 1:6,000 1 " = 500 FT
WHEN PRODUCED AT 34X44IN

N

PROJECT
DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE
GROUNDWATER ANALYTICAL RESULTS AUGUST 2021 CENTRAL PORTION

PROJECT No. 1464108.02		Fig 7 Dairies_Central_Analytical.mxd	
DESIGN	NA	SCALE AS SHOWN	REV. 0
DR	RMM		
CHECK			
REVIEW			

FIGURE 7

2021-11-15 P:\gis2\Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 7 Dairies_Central_analytical_20210818.mxd EA-Dallas - mvillen

SCALE 1:4,800 1 " = 400 FT
WHEN PRODUCED AT 11X17IN

LEGEND:

Perched Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Discharge Plan Monitoring Well - Plugged and Abandoned

Regional Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Land Owned by Dairies
- Stage 2 Abatement Plan Area
- Public Land Survey System

Notes:
Units are in milligrams per liter.

Cl = Chloride
NO_3 = Nitrate as N
TDS = Total Dissolved Solids

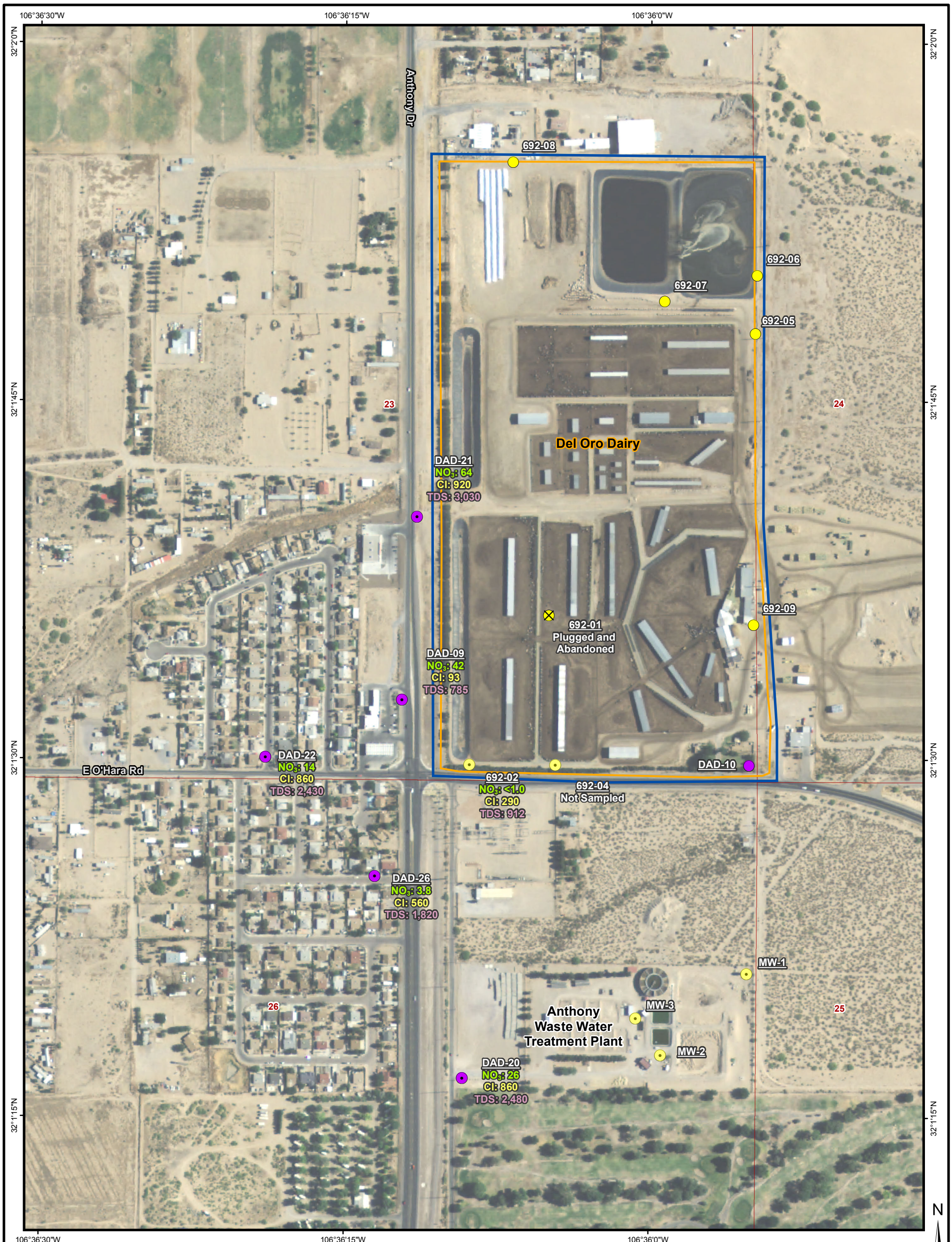
REFERENCES
Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

PROJECT
DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE
GROUNDWATER ANALYTICAL RESULTS
AUGUST 2021
SOUTHERN PORTION, REGIONAL AQUIFER

PROJECT No. 1464108.03			Fig8SouthRegionAq_Analytical.mxd
DESIGN	NA		SCALE AS SHOWN REV 0
GIS	RM		FIGURE 8
CHECK			
REVIEW			

2021 -11-15 P:\gis2\Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 8 SouthRegionAq_Analytical_202108.mxd EA-Albuquerque rmullen



LEGEND:

Perched Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Discharge Plan Monitoring Well - Plugged and Abandoned

Regional Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well

- Land Owned by Dairies
- Stage 2 Abatement Plan Area
- Public Land Survey System

Notes:
Units are in milligrams per liter.

Cl = Chloride
mg/L = Milligram(s) per liter
NO_3 = Nitrate as N
TDS = Total Dissolved Solids

REFERENCES
Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

SCALE 1:4,800 1 " = 400 FT
WHEN PRODUCED AT 11X17IN

PROJECT
DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

TITLE **GROUNDWATER ANALYTICAL RESULTS AUGUST 2021 SOUTHERN PORTION, PERCHED AQUIFER**

PROJECT No. 1464108.03				
DESIGN	NA		SCALE AS SHOWN	REV 0
GIS	RM		FIGURE 9	
CHECK				
REVIEW				

2021-10-26 P:\gis2\Commercial\Dona Ana Dairies - 1464108\03 August\Projects\Fig 9 SouthPerchAq_Analytical_202108.mxd EA-Dallas rmullen

APPENDIX A

SAMPLING FIELD FORMS
(Provided in Electronic Format via CD Located on Front Cover of Report)

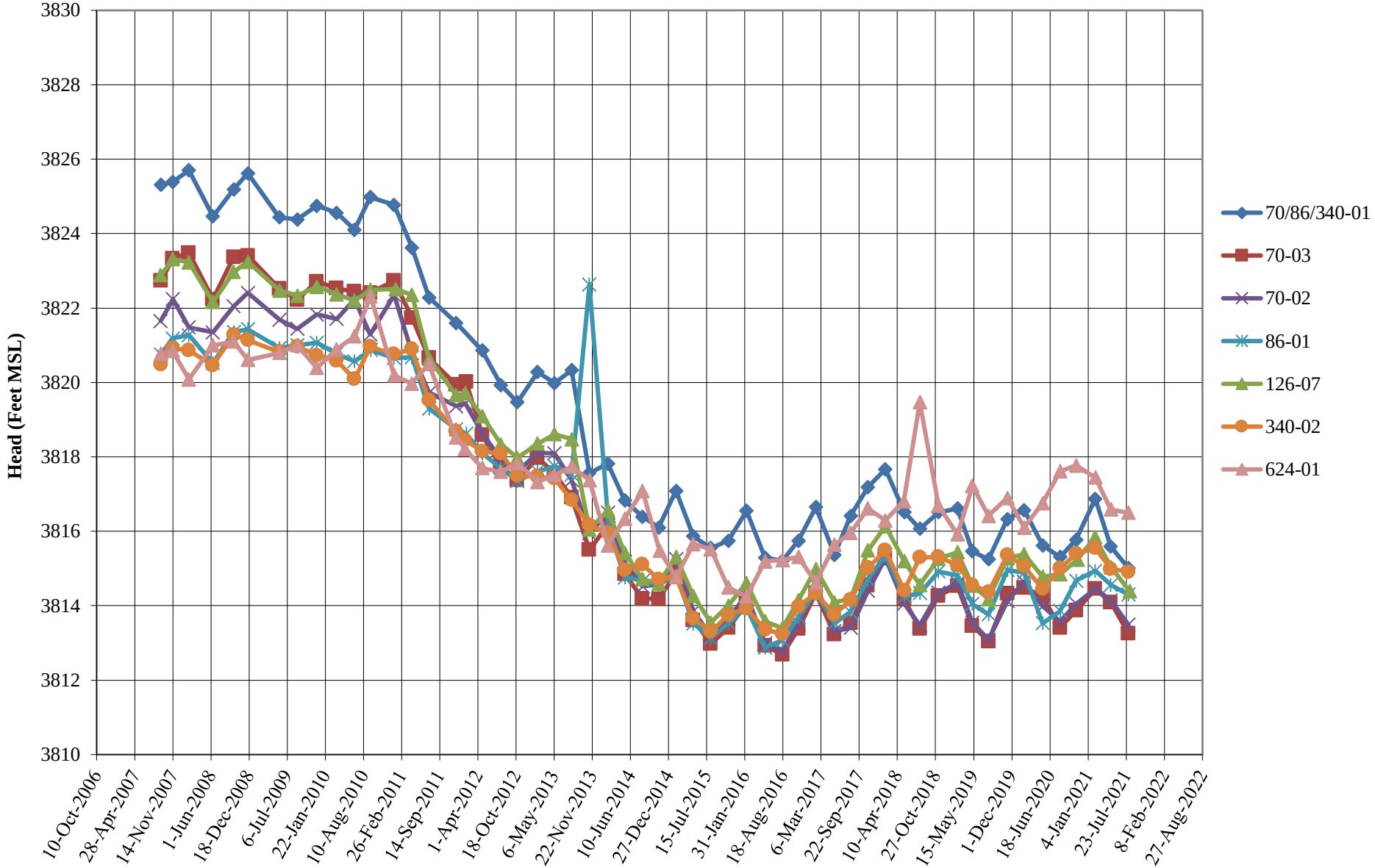
APPENDIX B

ANALYTICAL LABORATORY REPORTS
(Provided in Electronic Format via CD Located on Front Cover of Report)

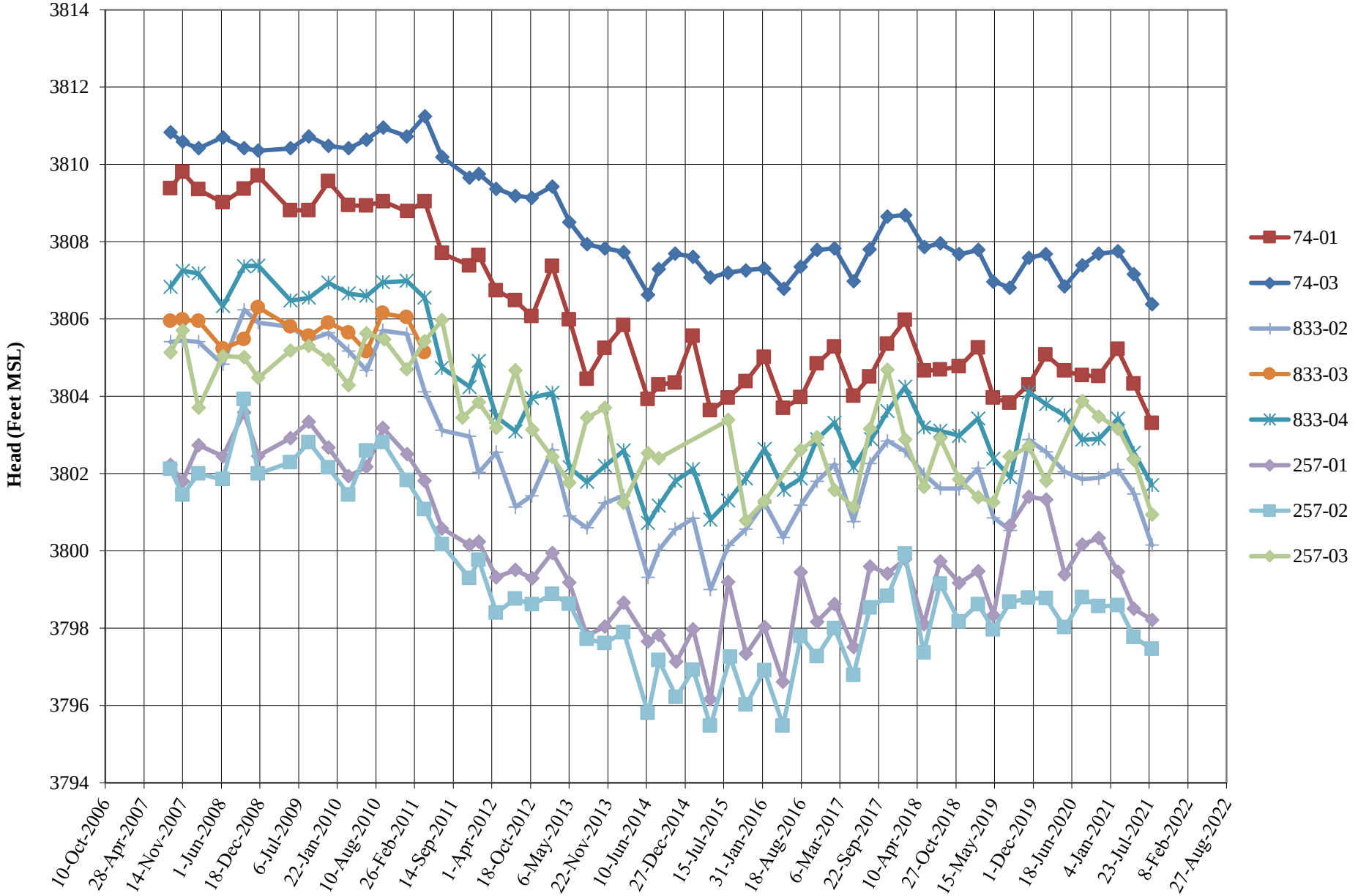
APPENDIX C

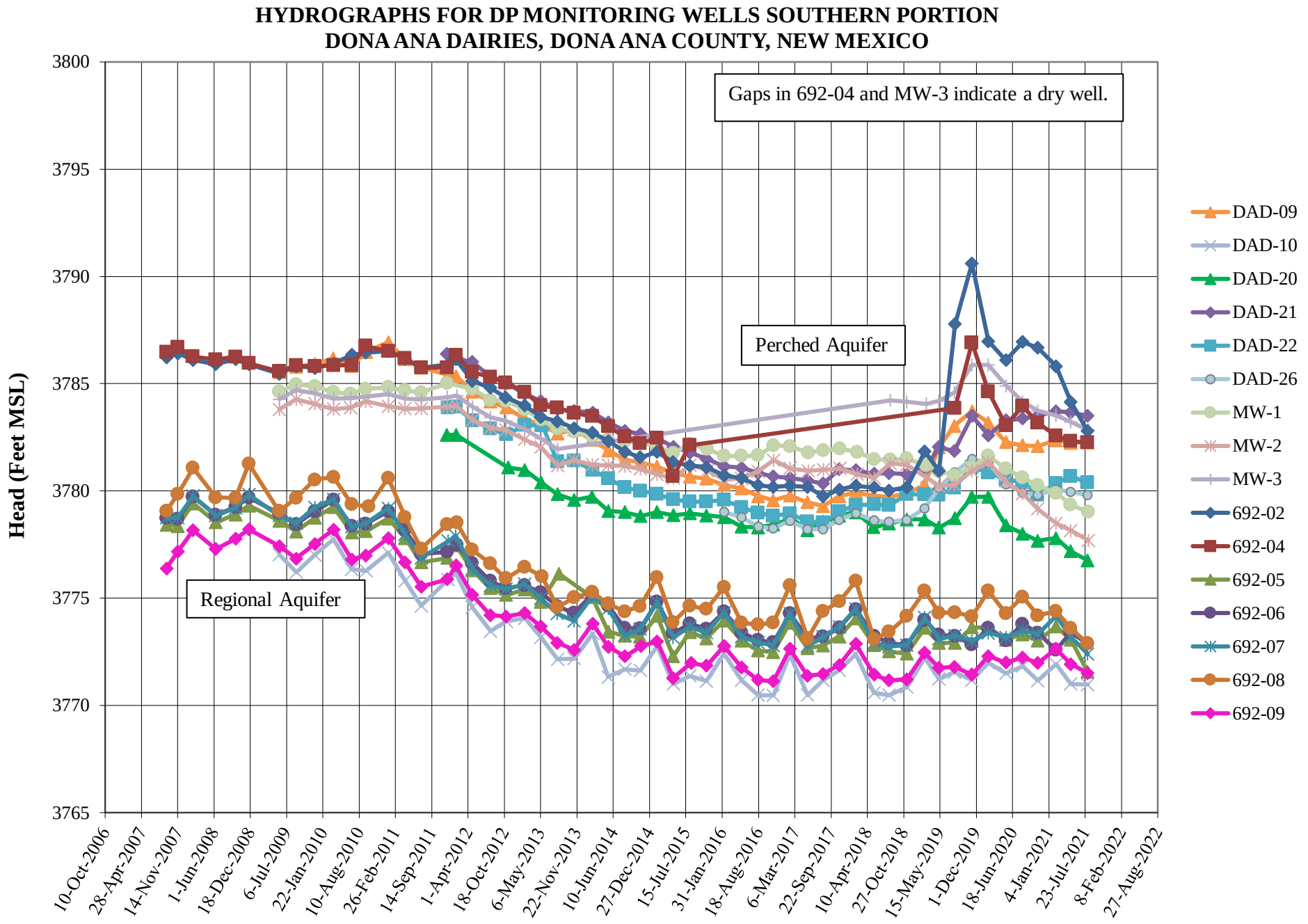
HYDROGRAPHS BY AREA

HYDROGRAPHS FOR SELECT DP MONITORING WELLS NORTHERN PORTION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



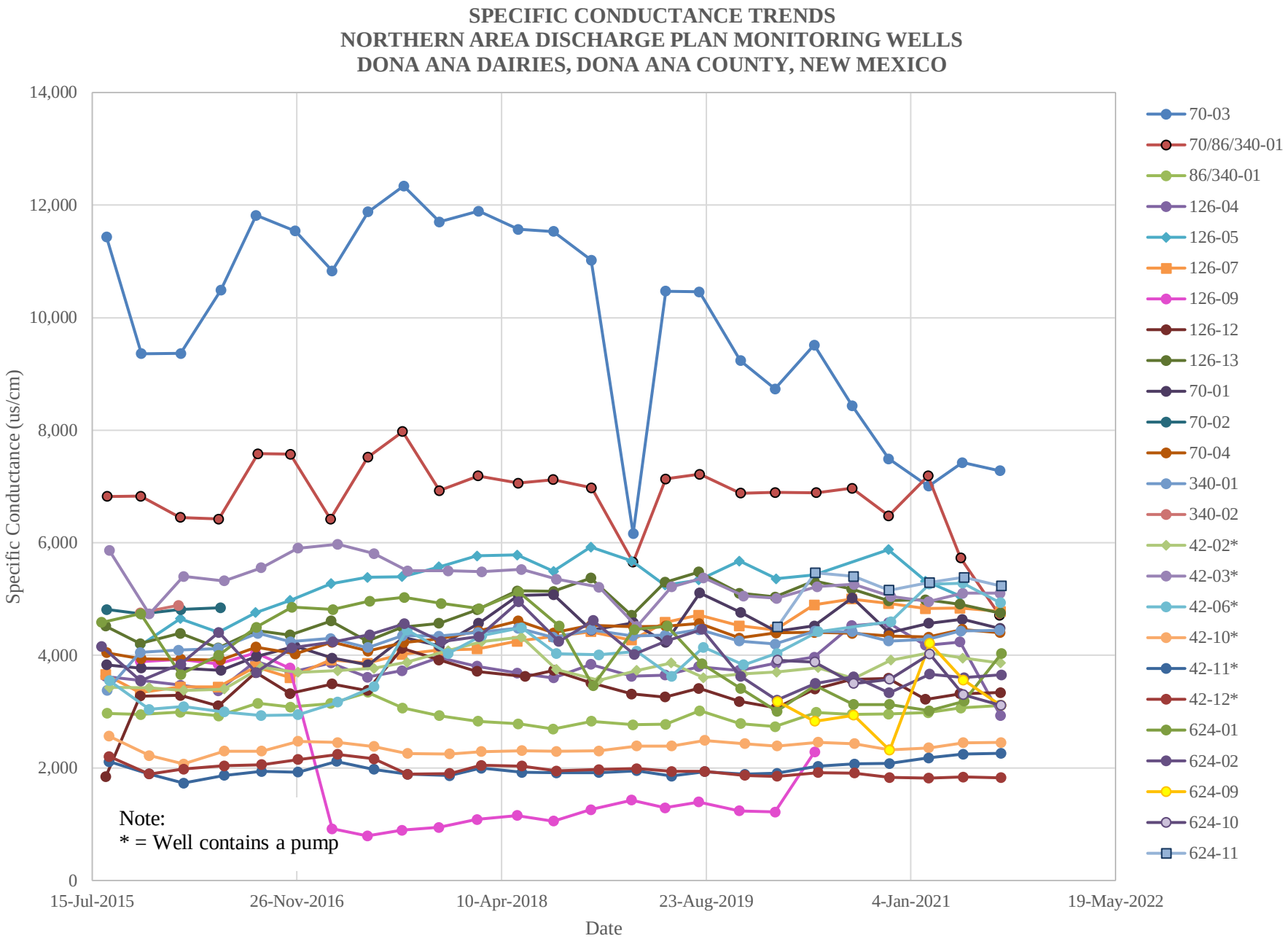
HYDROGRAPHS FOR SELECT DP MONITORING WELLS CENTRAL PORTION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



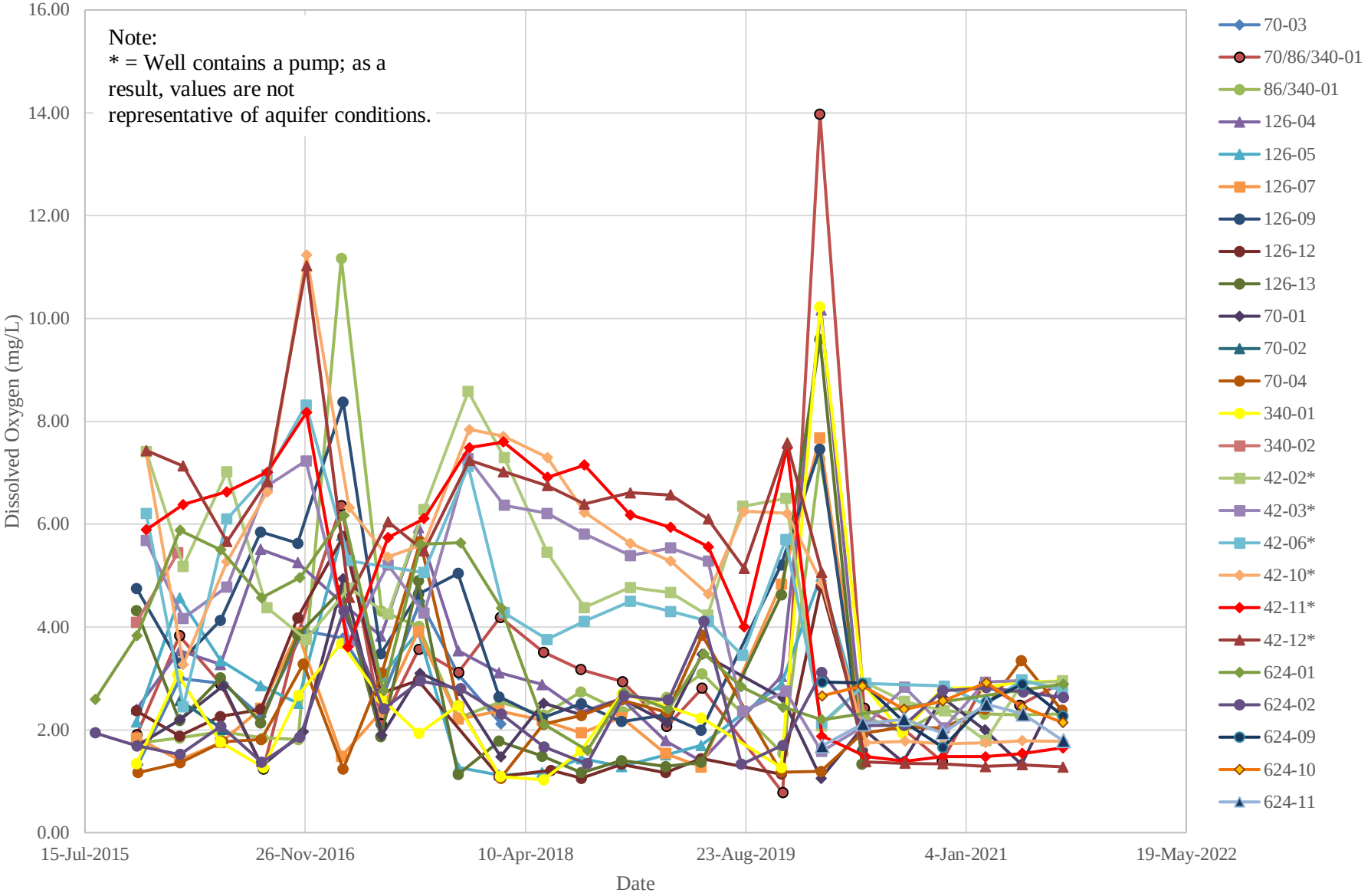

HYDROGRAPHS FOR DP MONITORING WELLS SOUTHERN PORTION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO
Gaps in 692-04 and MW-3 indicate a dry well.
Perched Aquifer
Regional Aquifer
Head (Feet MSL)
3800
3795
3790
3785
3780
3775
3770
3765
10-Oct-2006
28-Apr-2007
14-Nov-2007
1-Jun-2008
18-Dec-2008
6-Jul-2009
22-Jan-2010
10-Aug-2010
26-Feb-2011
14-Sep-2011
1-Apr-2012
18-Oct-2012
6-May-2013
22-Nov-2013
10-Jun-2014
27-Dec-2014
15-Jul-2015
31-Jan-2016
18-Aug-2016
6-Mar-2017
22-Sep-2017
10-Apr-2018
27-Oct-2018
15-May-2019
1-Dec-2019
18-Jun-2020
4-Jan-2021
23-Jul-2021
8-Feb-2022
27-Aug-2022
DAD-09
DAD-10
DAD-20
DAD-21
DAD-22
DAD-26
MW-1
MW-2
MW-3
692-02
692-04
692-05
692-06
692-07
692-08
692-09

APPENDIX D

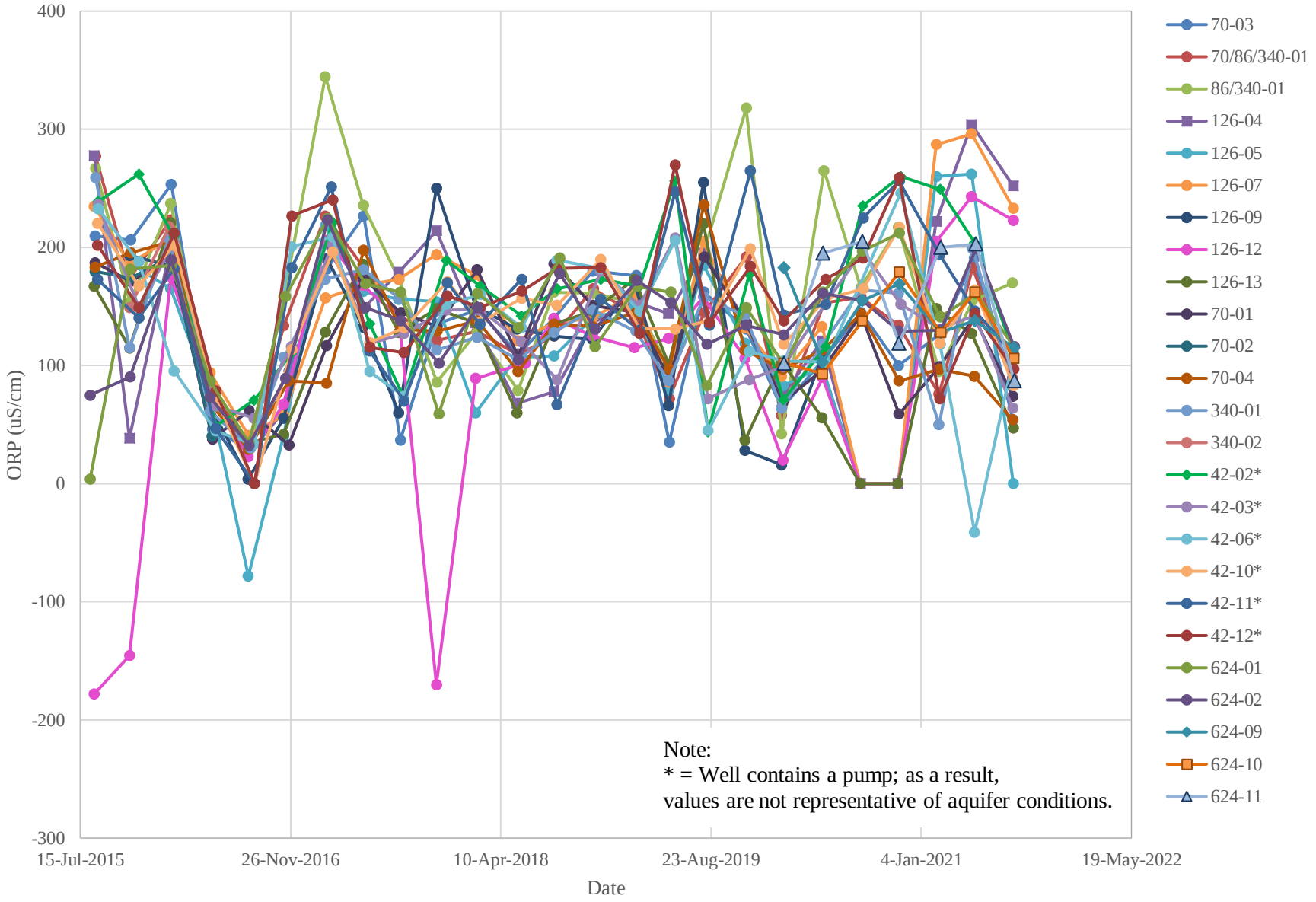
FIELD PARAMETER TRENDS BY AREA

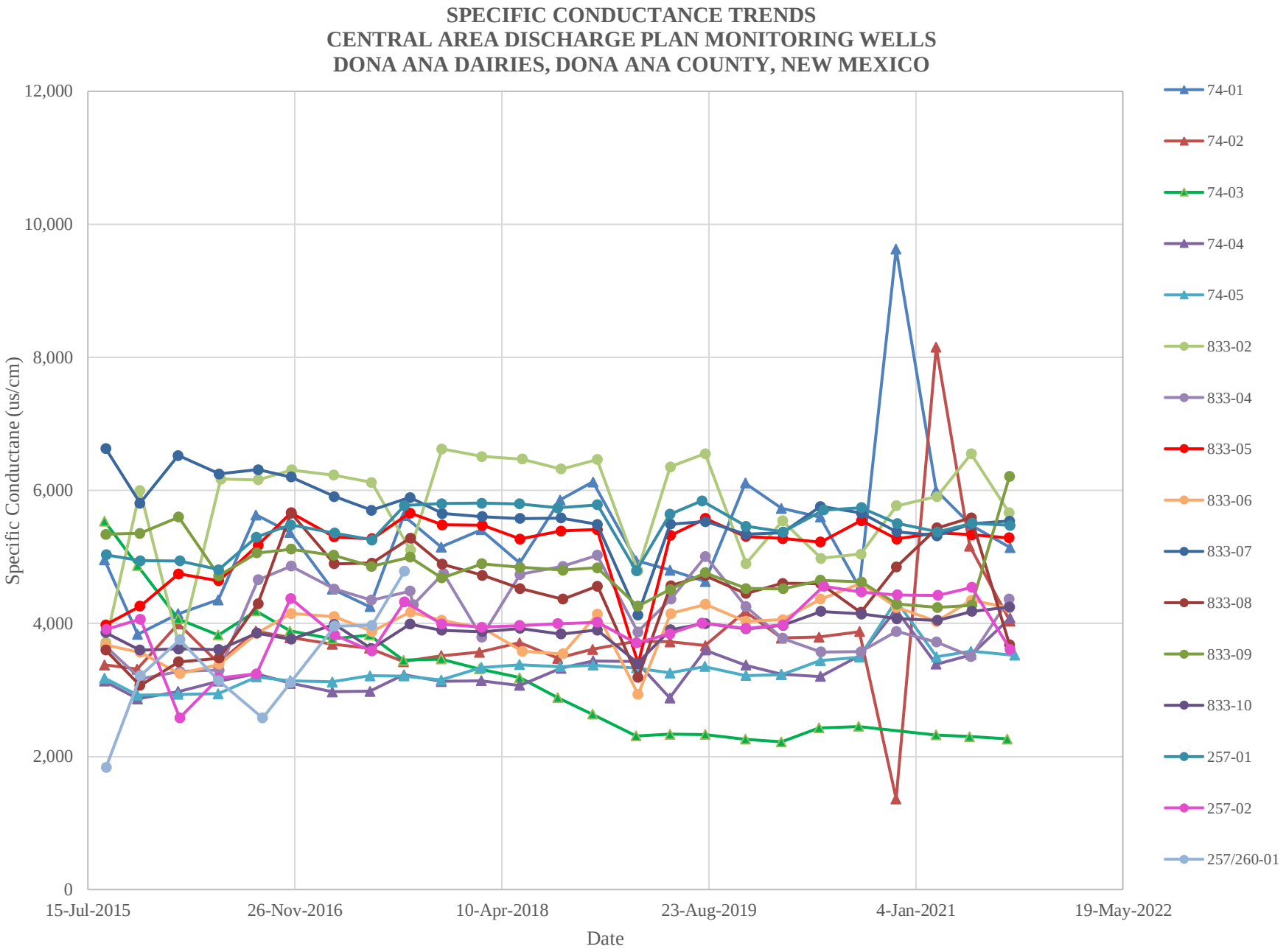

SPECIFIC CONDUCTANCE TRENDS
NORTHERN AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO
Specific Conductance (us/cm)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
15-Jul-2015
26-Nov-2016
10-Apr-2018
23-Aug-2019
4-Jan-2021
19-May-2022
Date
Note:
* = Well contains a pump
70-03
70/86/340-01
86/340-01
126-04
126-05
126-07
126-09
126-12
126-13
70-01
70-02
70-04
340-01
340-02
42-02*
42-03*
42-06*
42-10*
42-11*
42-12*
624-01
624-02
624-09
624-10
624-11

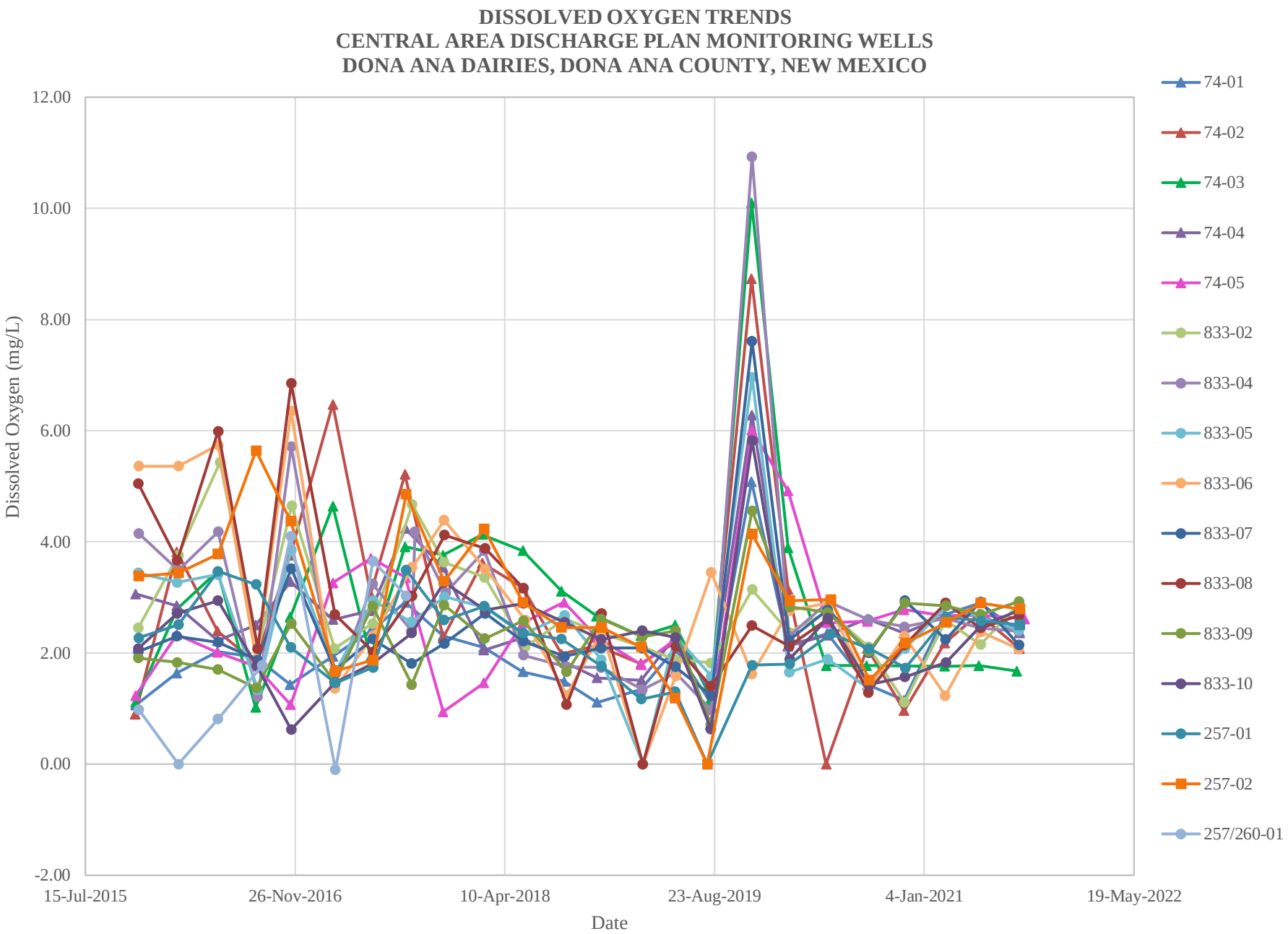
DISSOLVED OXYGEN TRENDS
NORTHERN AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



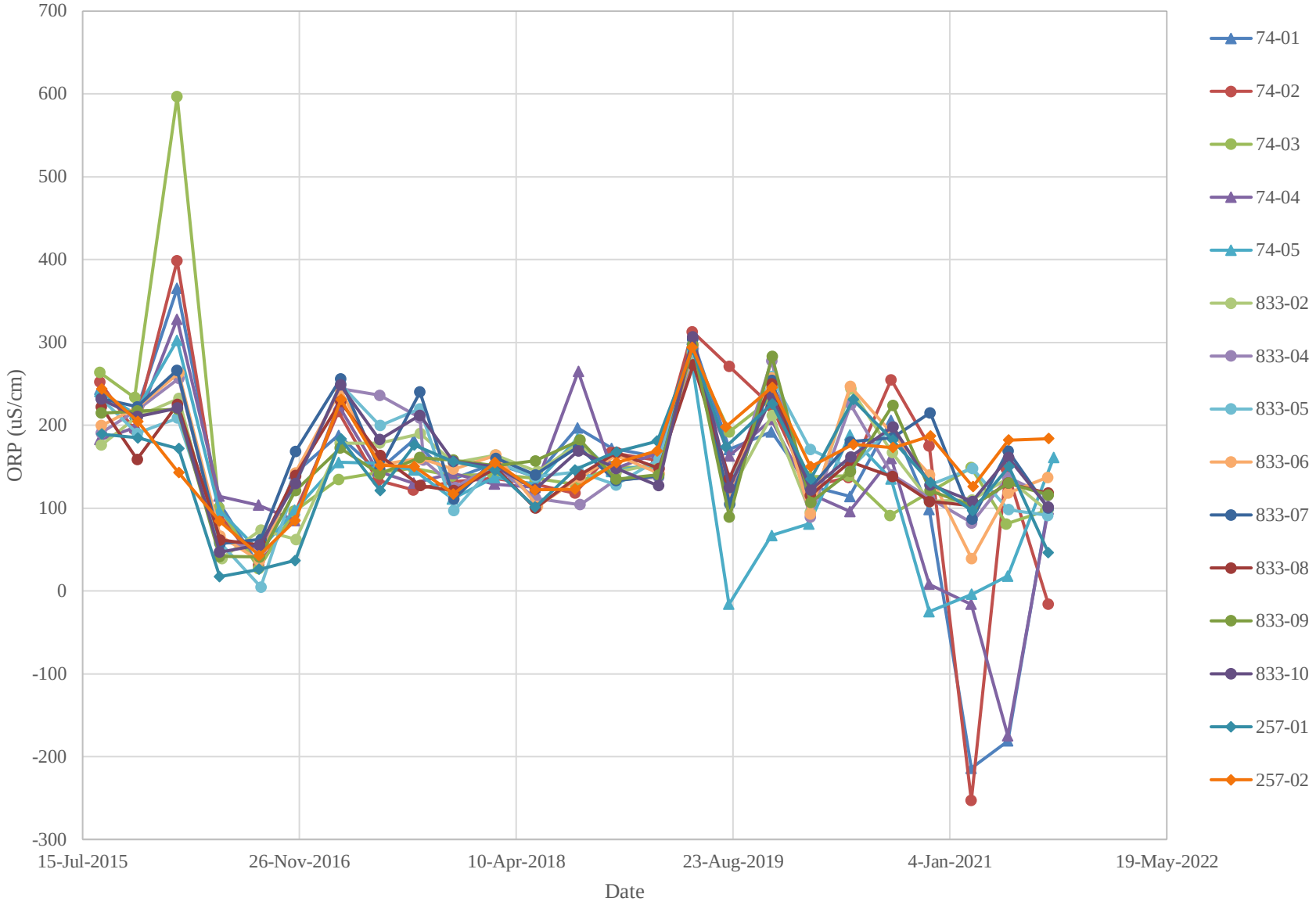
OXIDATION-REDUCTION POTENTIAL TRENDS
NORTHERN AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



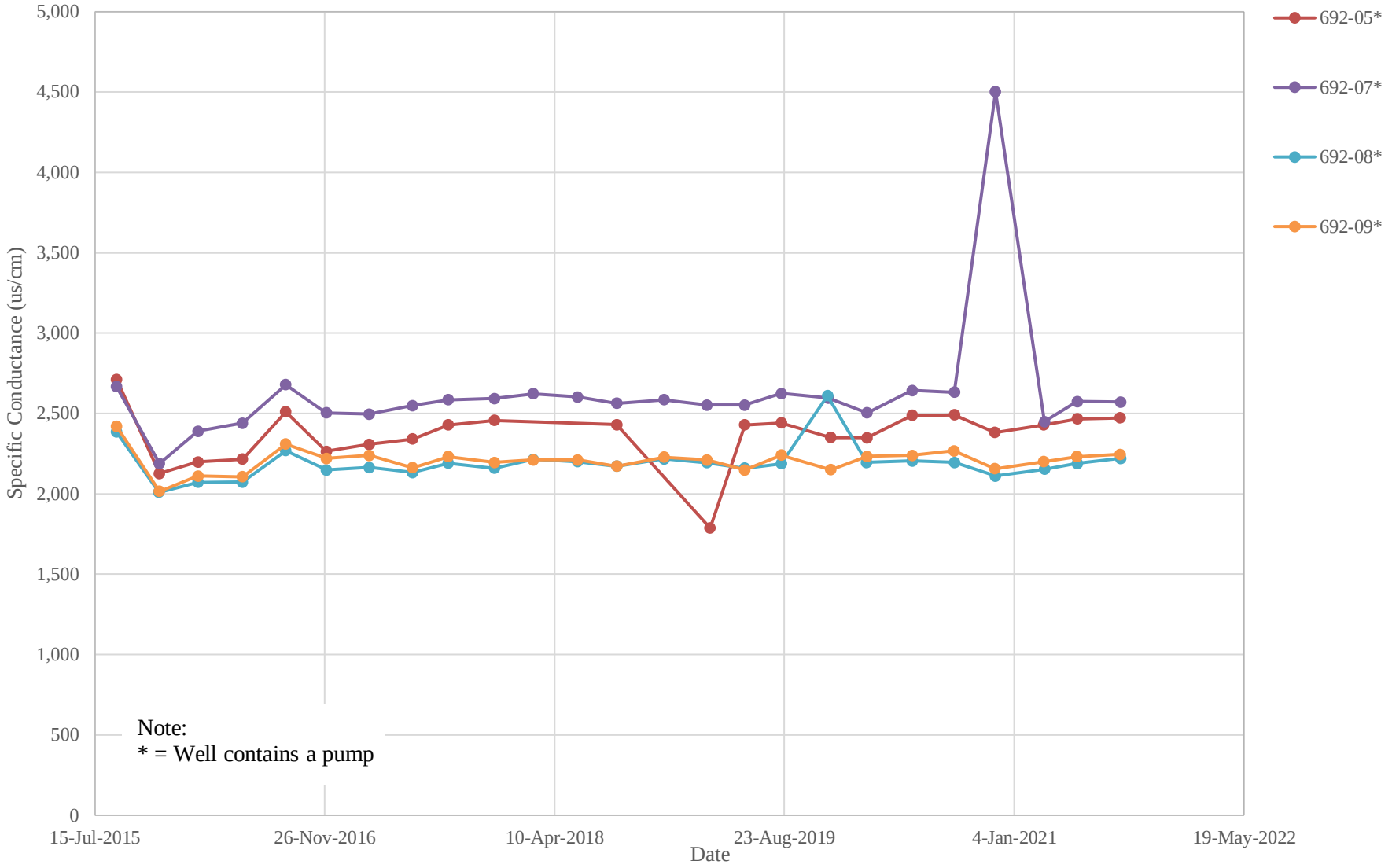

SPECIFIC CONDUCTANCE TRENDS
CENTRAL AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO
Specific Conductane (us/cm)
12,000
10,000
8,000
6,000
4,000
2,000
0
15-Jul-2015
26-Nov-2016
10-Apr-2018
23-Aug-2019
4-Jan-2021
19-May-2022
Date
74-01
74-02
74-03
74-04
74-05
833-02
833-04
833-05
833-06
833-07
833-08
833-09
833-10
257-01
257-02
257/260-01


DISSOLVED OXYGEN TRENDS
CENTRAL AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO
Dissolved Oxygen (mg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
15-Jul-2015
26-Nov-2016
10-Apr-2018
23-Aug-2019
4-Jan-2021
19-May-2022
Date
74-01
74-02
74-03
74-04
74-05
833-02
833-04
833-05
833-06
833-07
833-08
833-09
833-10
257-01
257-02
257/260-01

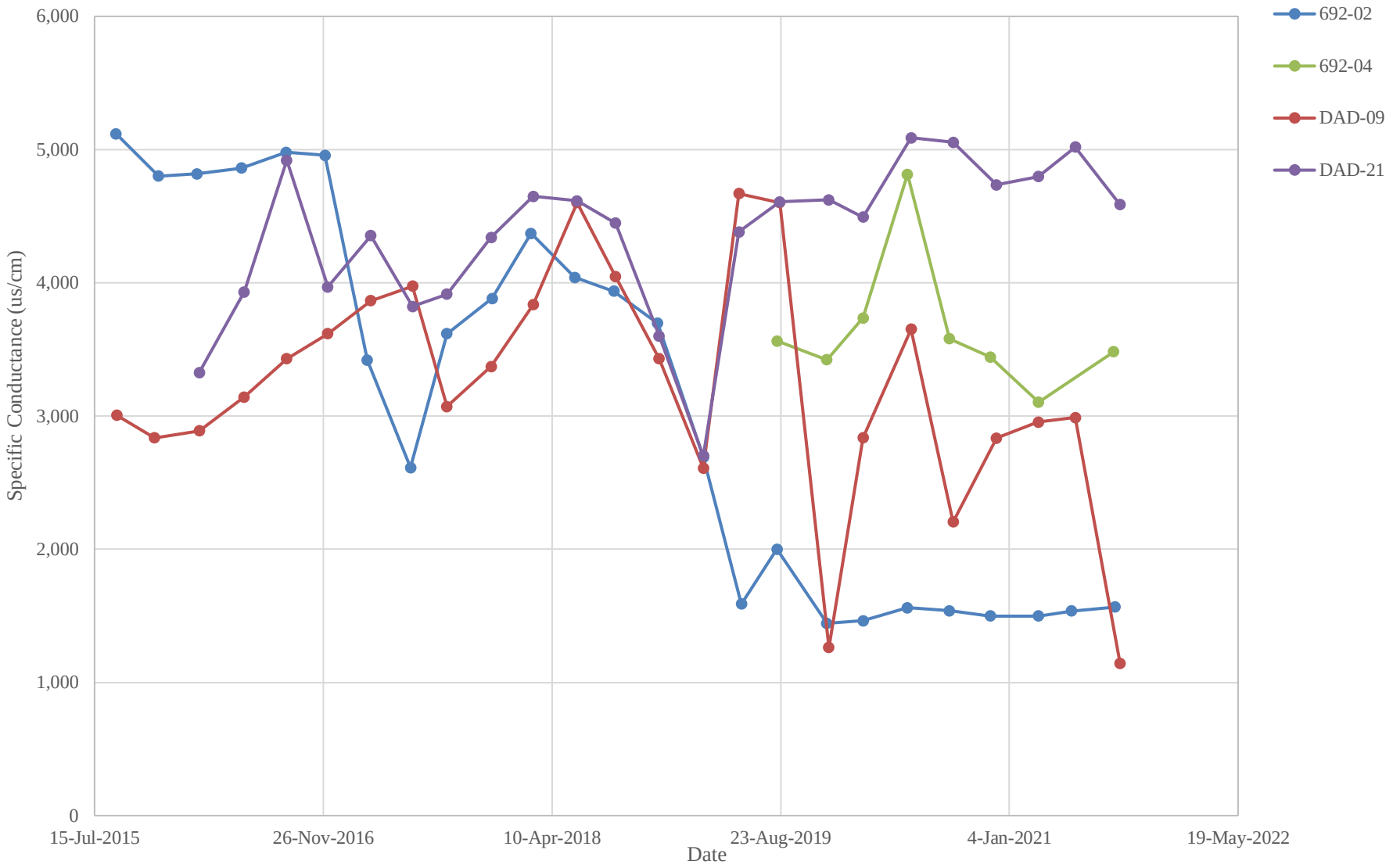
OXIDATION-REDUCTION POTENTIAL TRENDS
CENTRAL AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



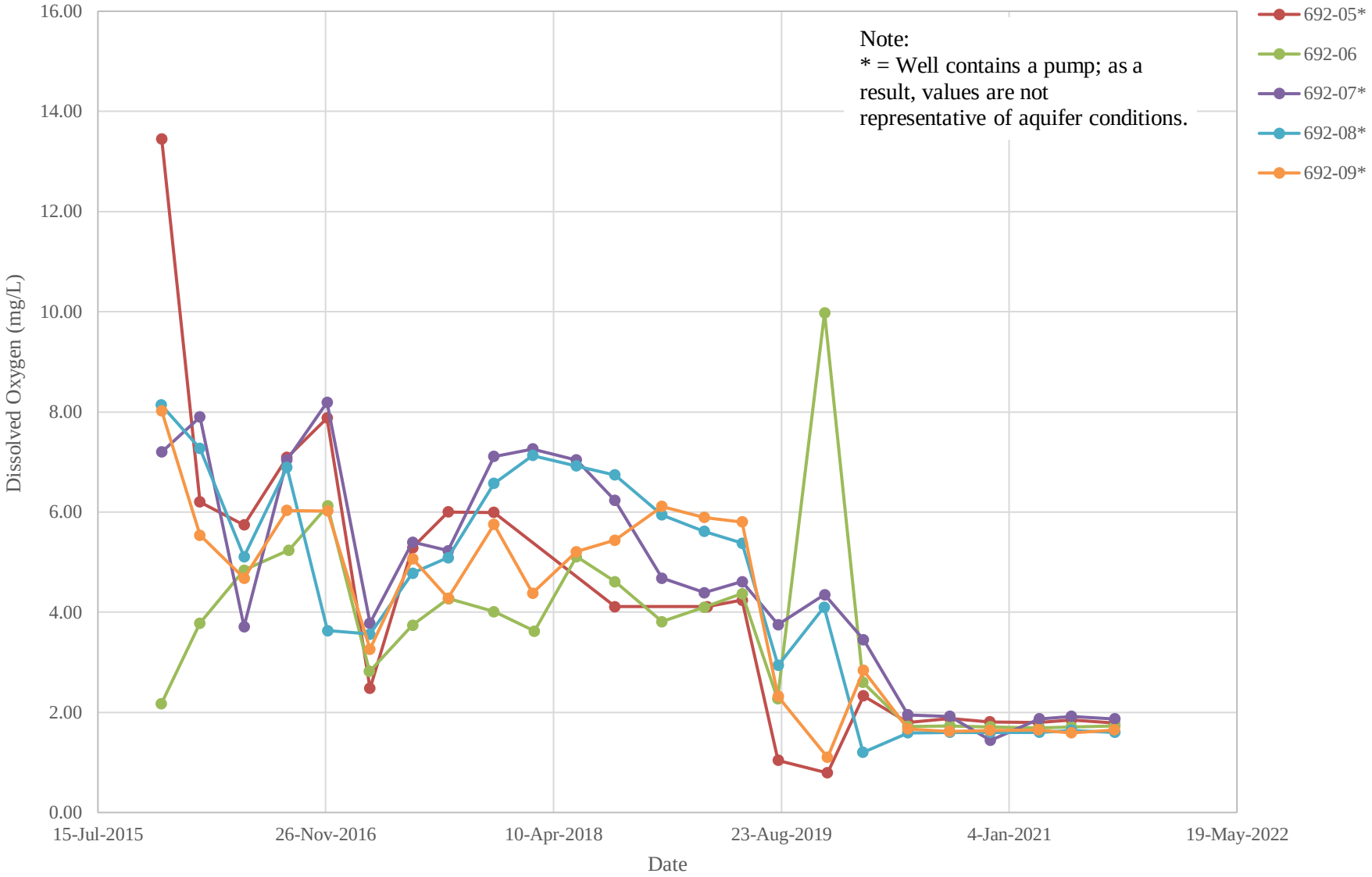
SPECIFIC CONDUCTANCE TRENDS
SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS
IN THE REGIONAL AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



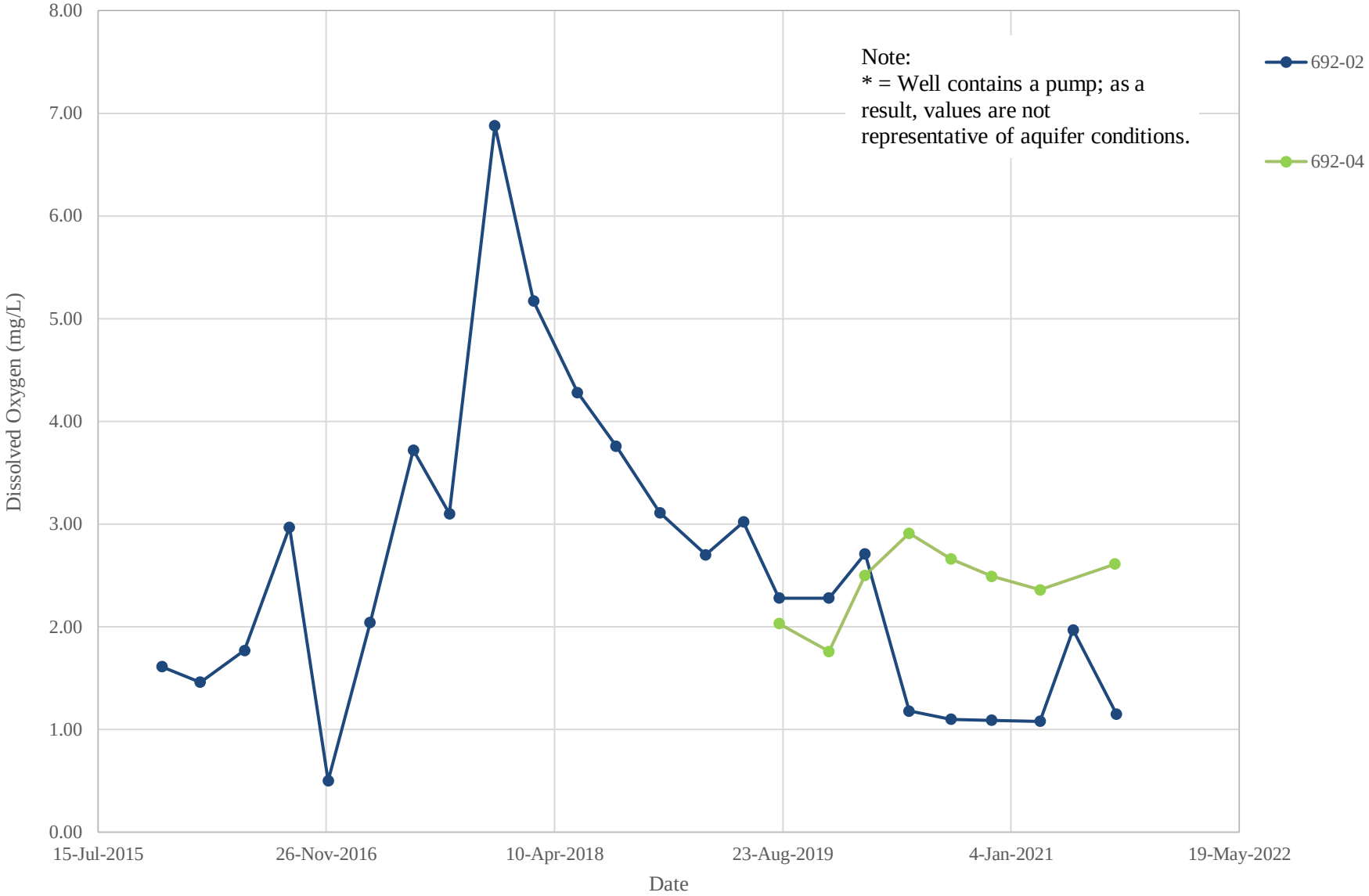
SPECIFIC CONDUCTANCE TRENDS
SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS
IN THE PERCHED AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



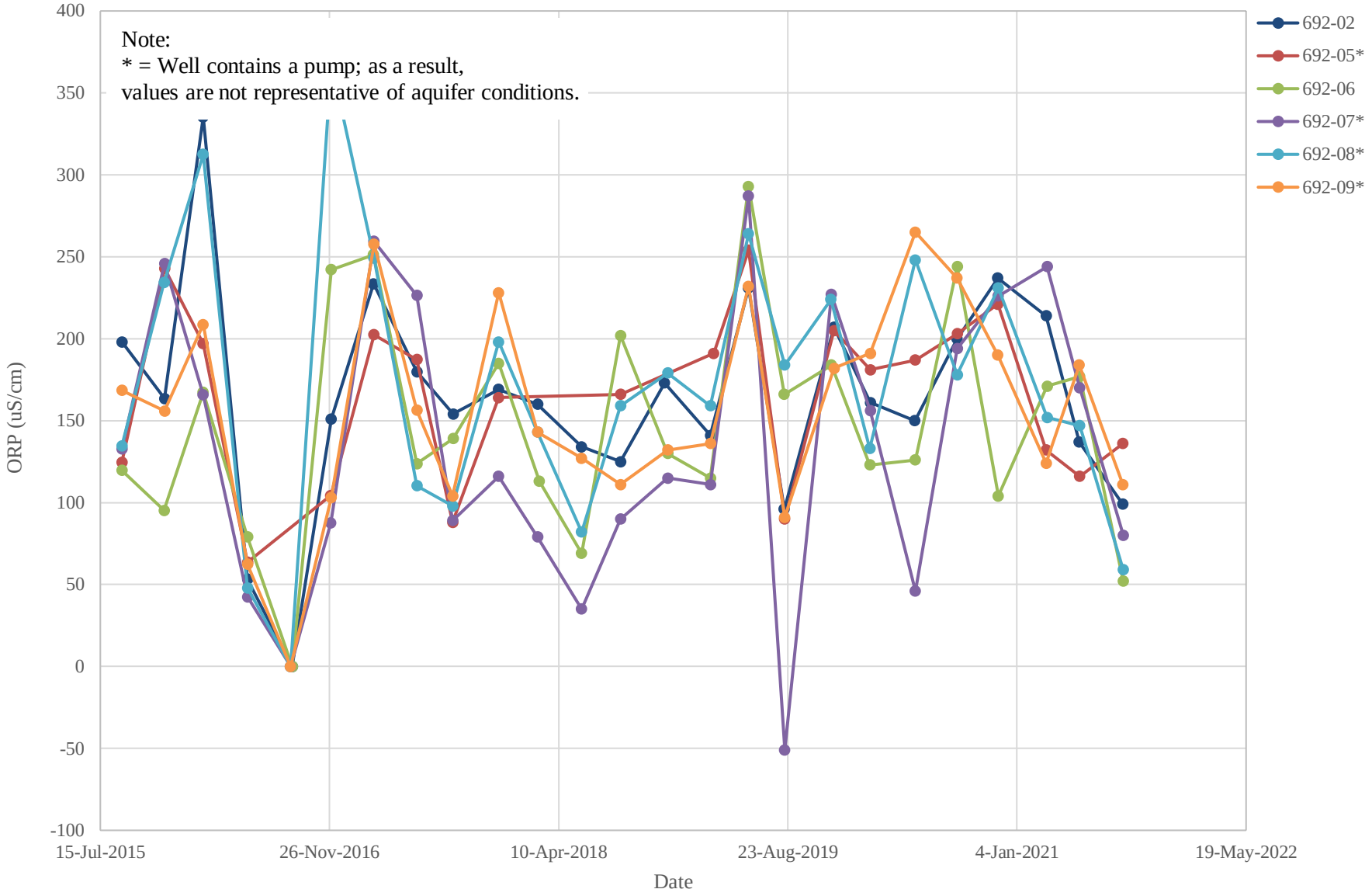
DISSOLVED OXYGEN TRENDS
SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS
IN THE REGIONAL AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



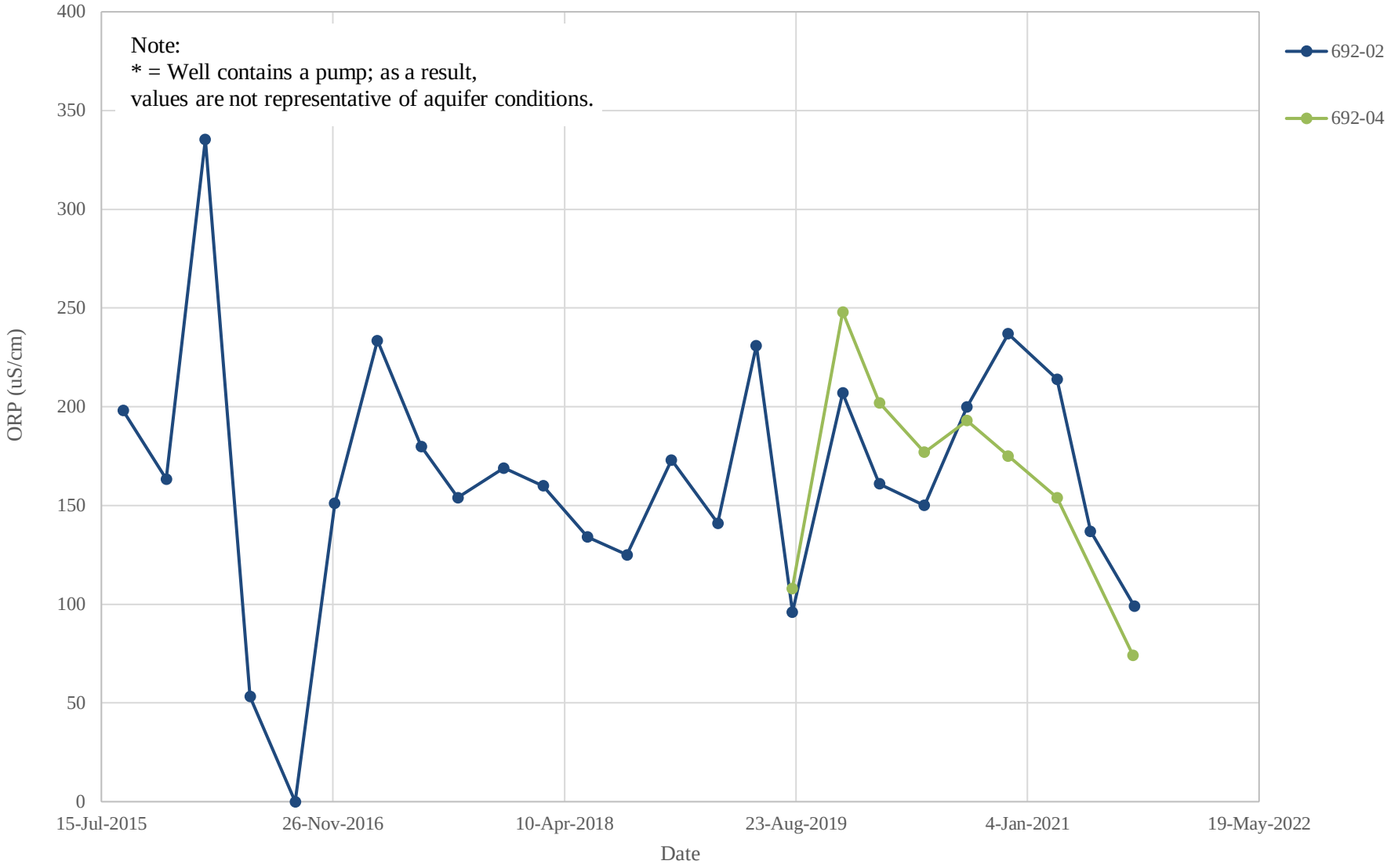
DISSOLVED OXYGEN TRENDS
SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



OXIDATION-REDUCTION POTENTIAL TRENDS
SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



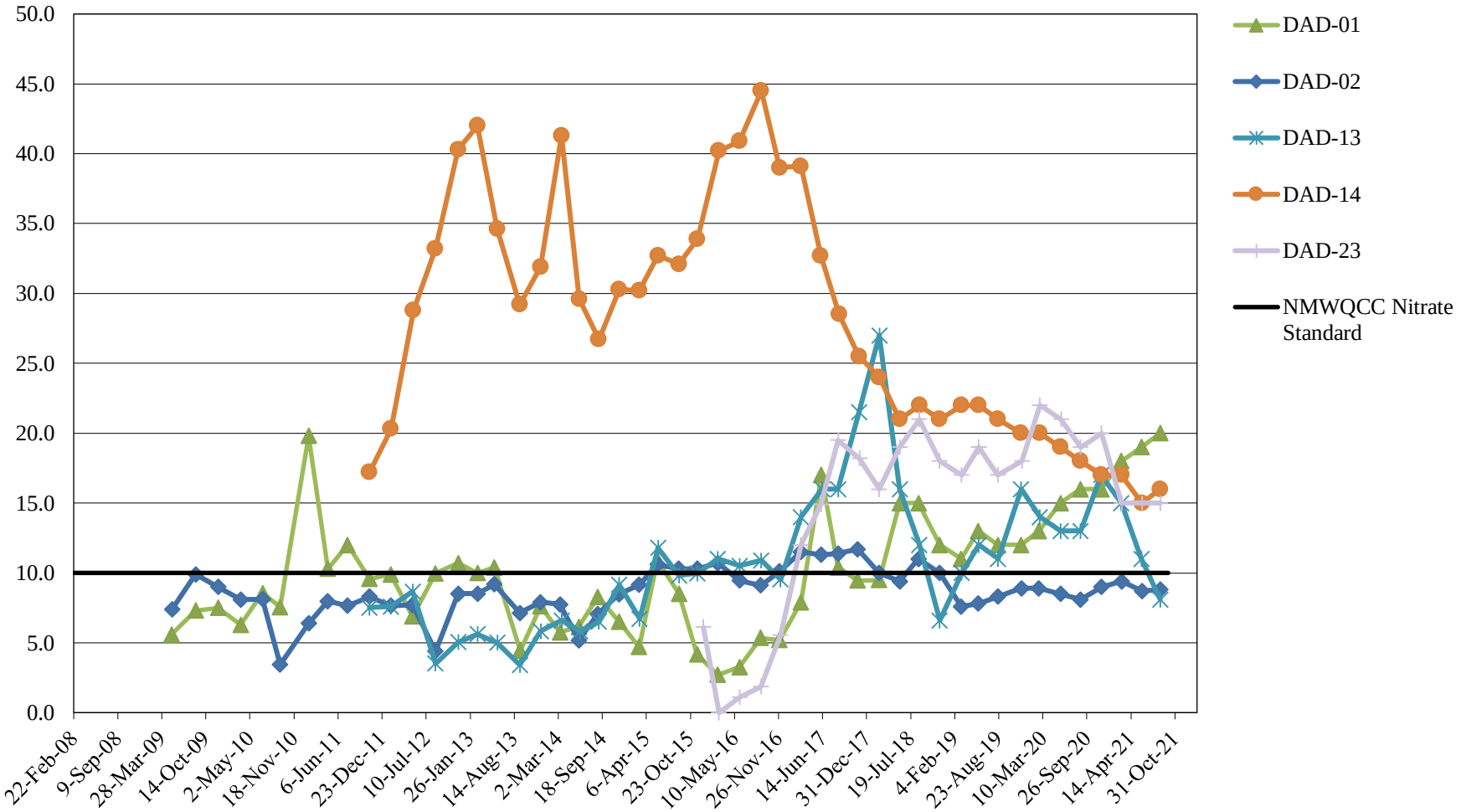
OXIDATION-REDUCTION POTENTIAL TRENDS
SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS
IN THE PERCHED AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



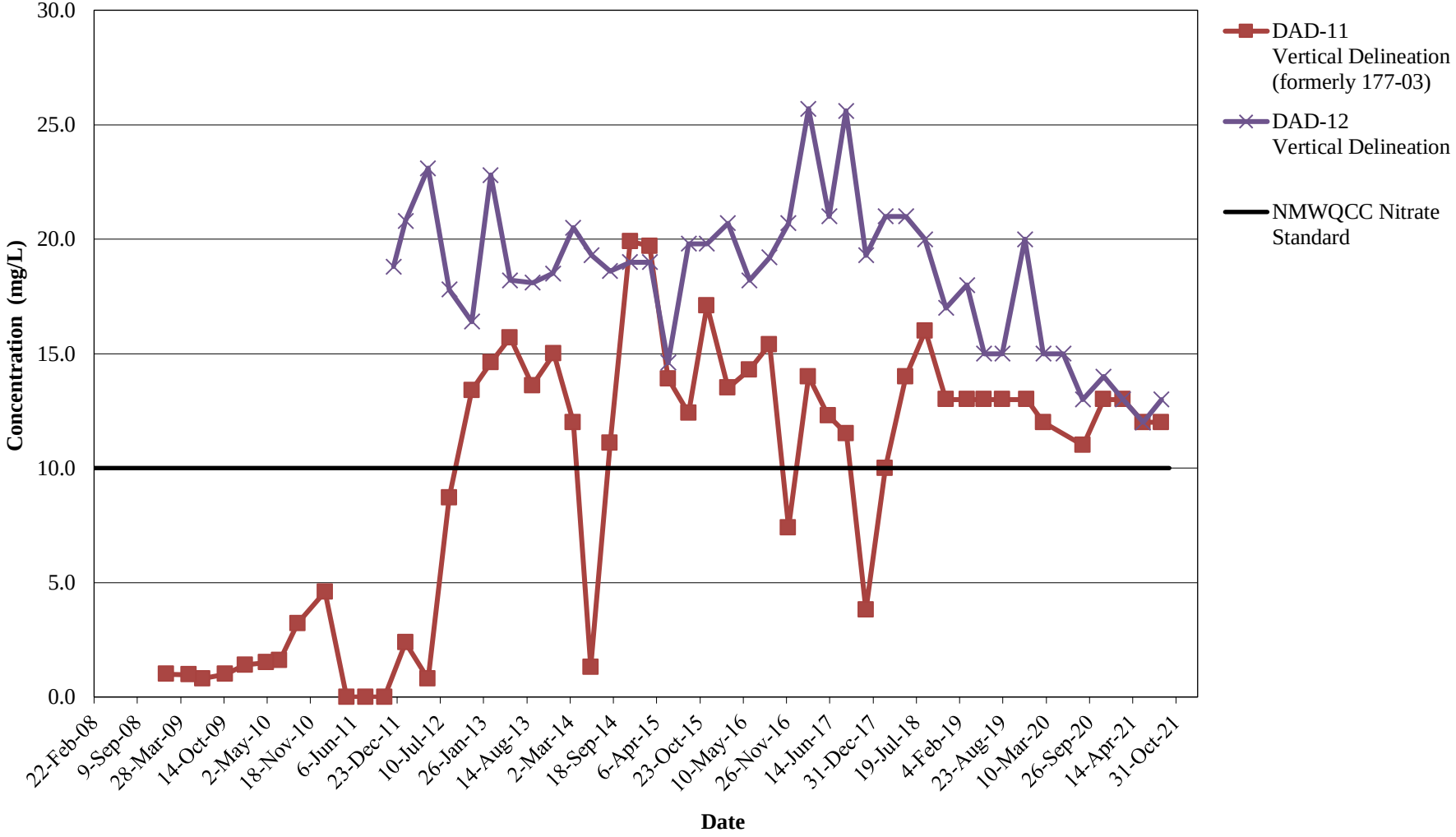
APPENDIX E

CONCENTRATION TRENDS BY AREA - ABATEMENT PLAN WELLS

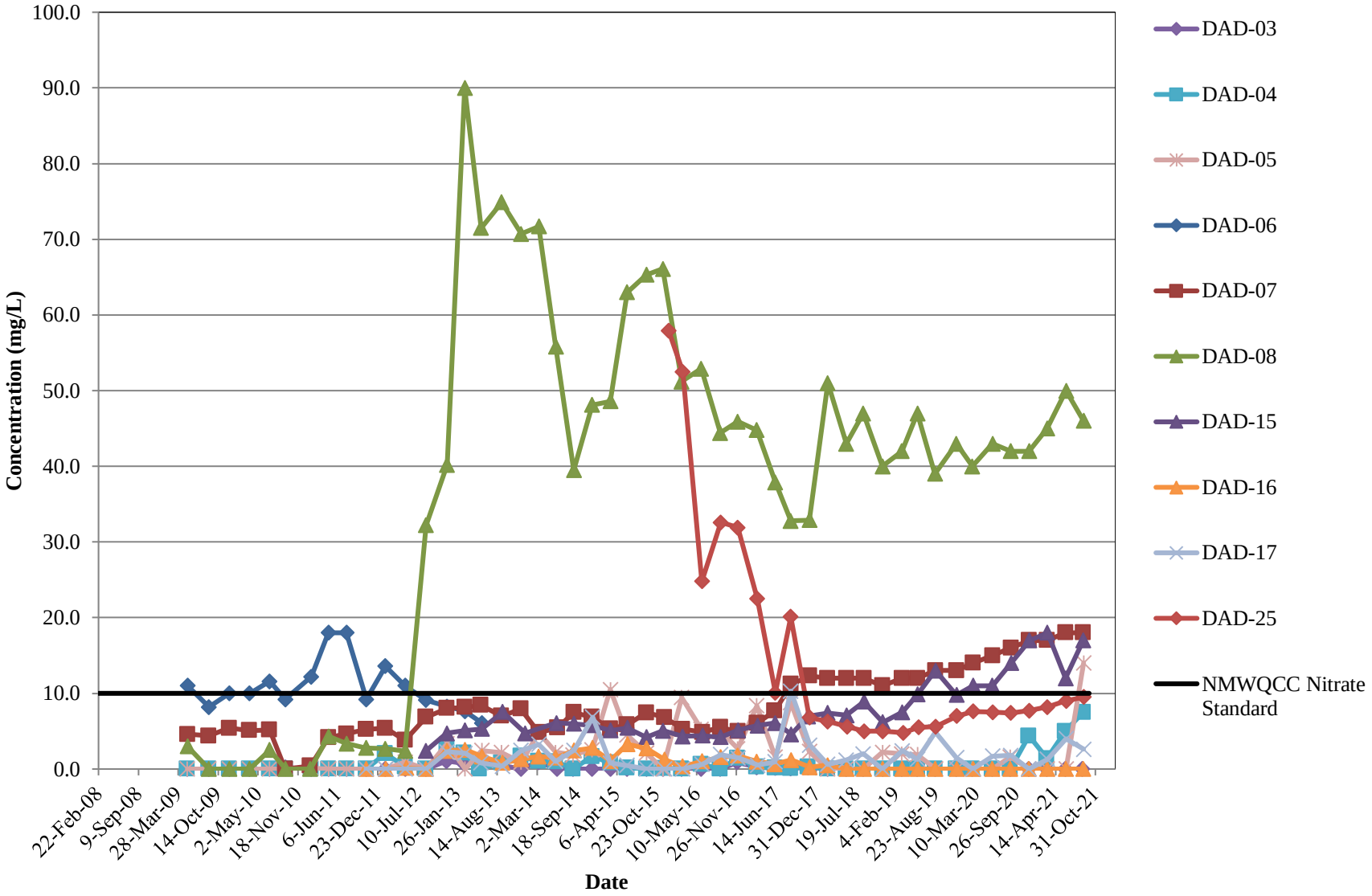
NITRATE CONCENTRATION TRENDS
NORTHERN ABATEMENT PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



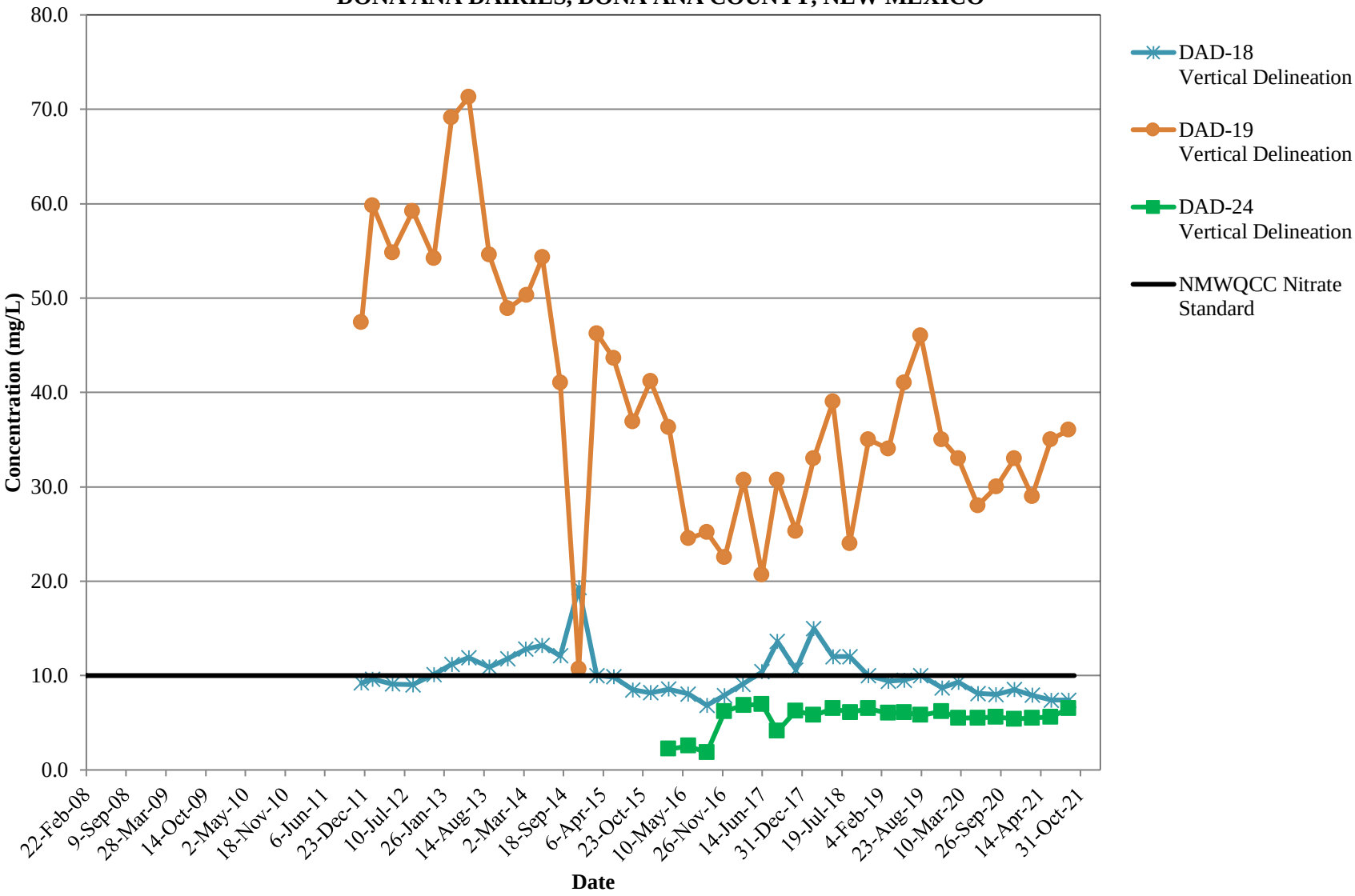
NITRATE CONCENTRATION TRENDS
NORTHERN ABATEMENT PLAN MONITORING WELLS -
VERTICAL DELINEATION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



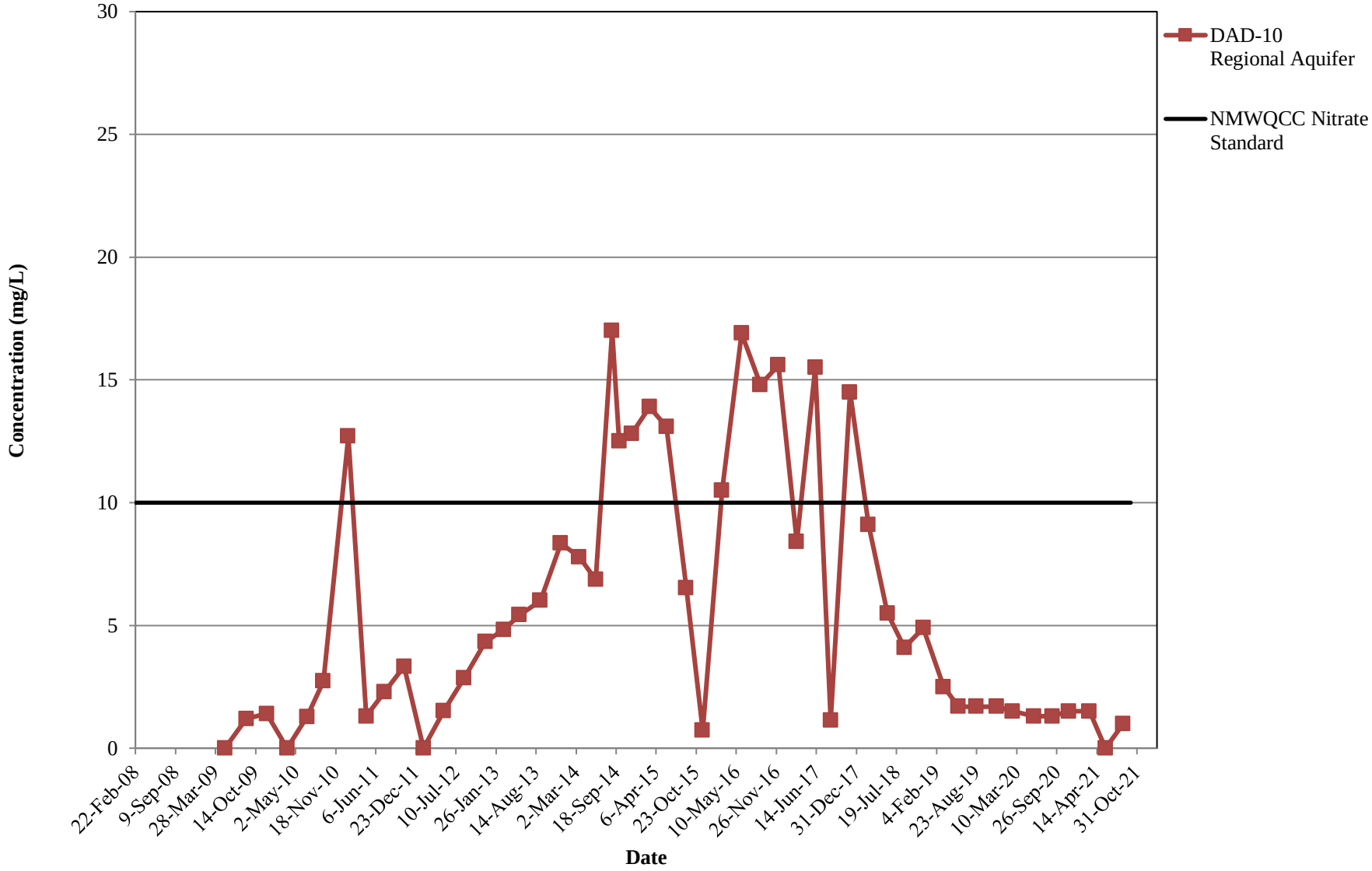
NITRATE CONCENTRATION TRENDS
CENTRAL ABATEMENT PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



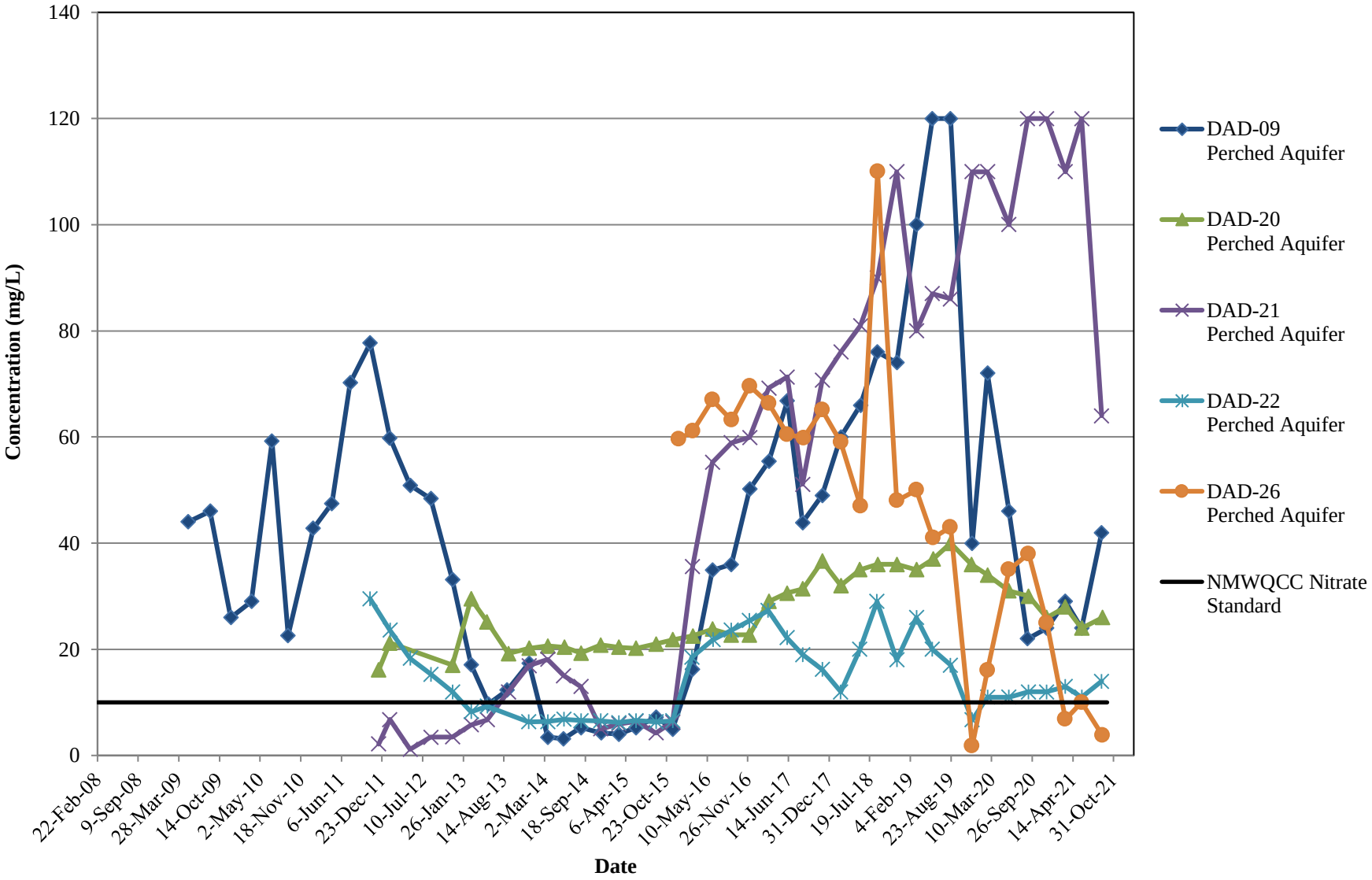
NITRATE CONCENTRATION TRENDS
CENTRAL ABATEMENT PLAN MONITORING WELLS -
VERTICAL DELINEATION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



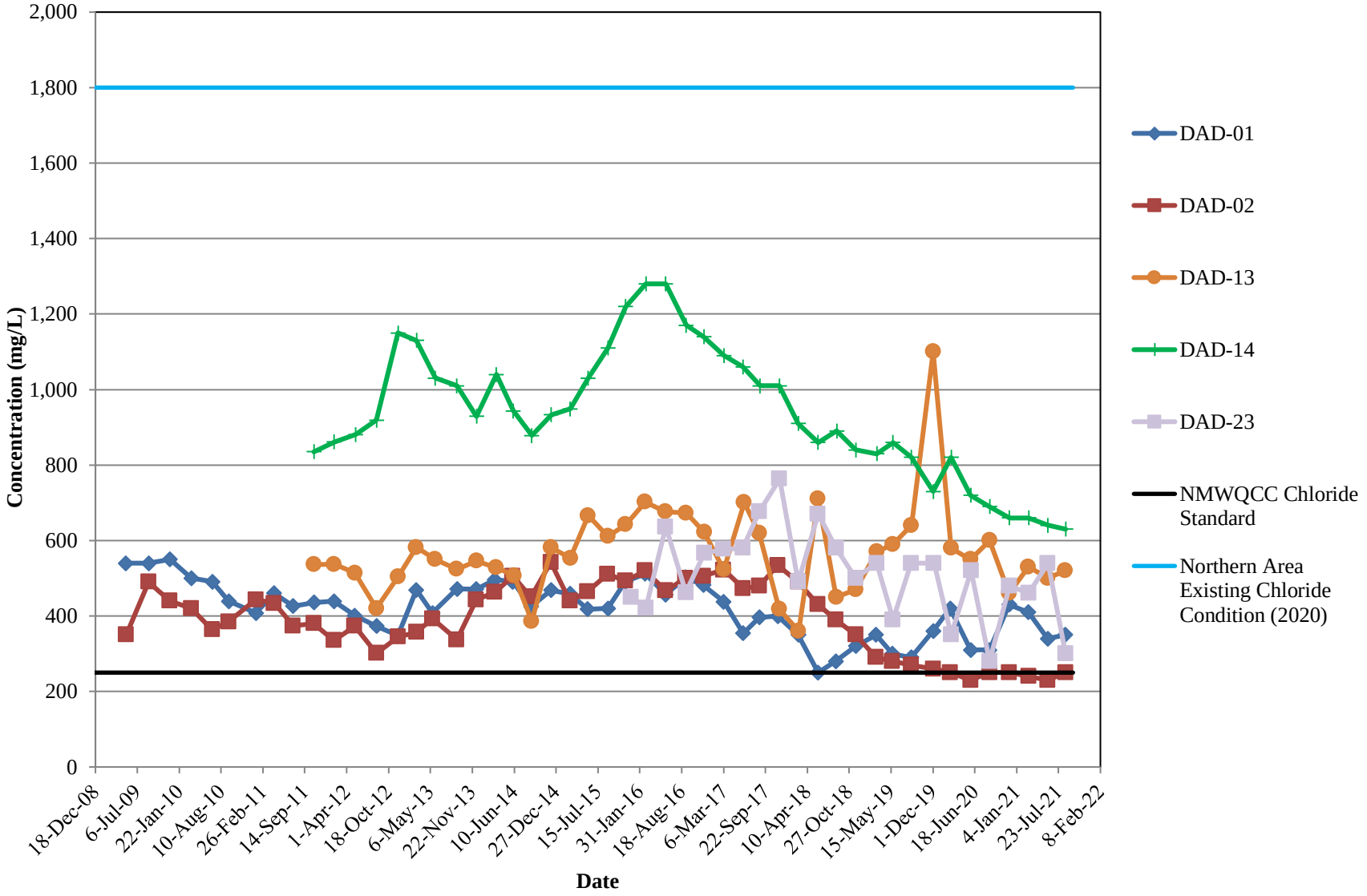
NITRATE CONCENTRATION TRENDS
SOUTHERN ABATEMENT PLAN MONITORING WELLS
IN THE REGIONAL AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



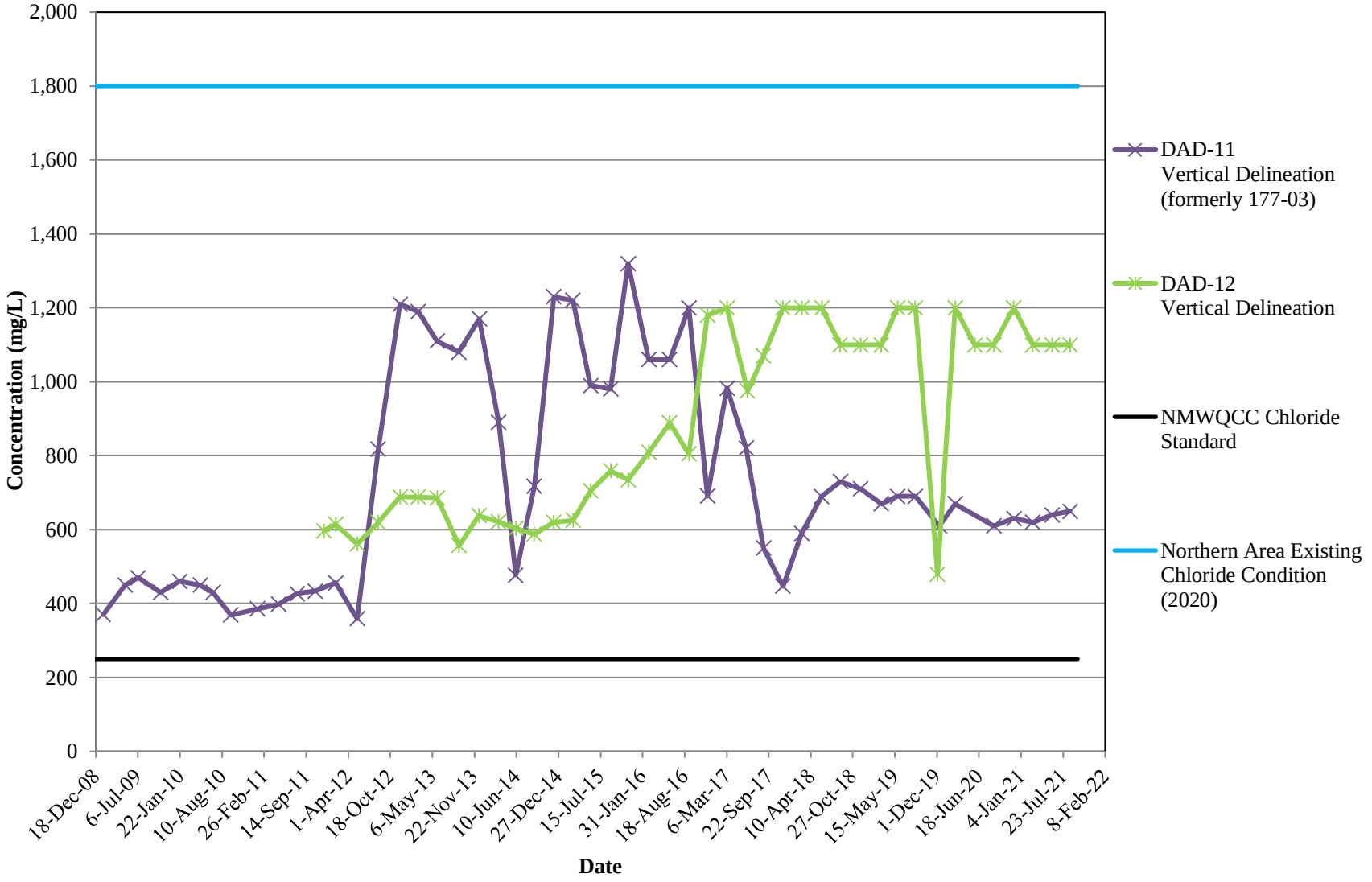
NITRATE CONCENTRATION TRENDS
SOUTHERN ABATEMENT PLAN MONITORING WELLS
IN THE PERCHED AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

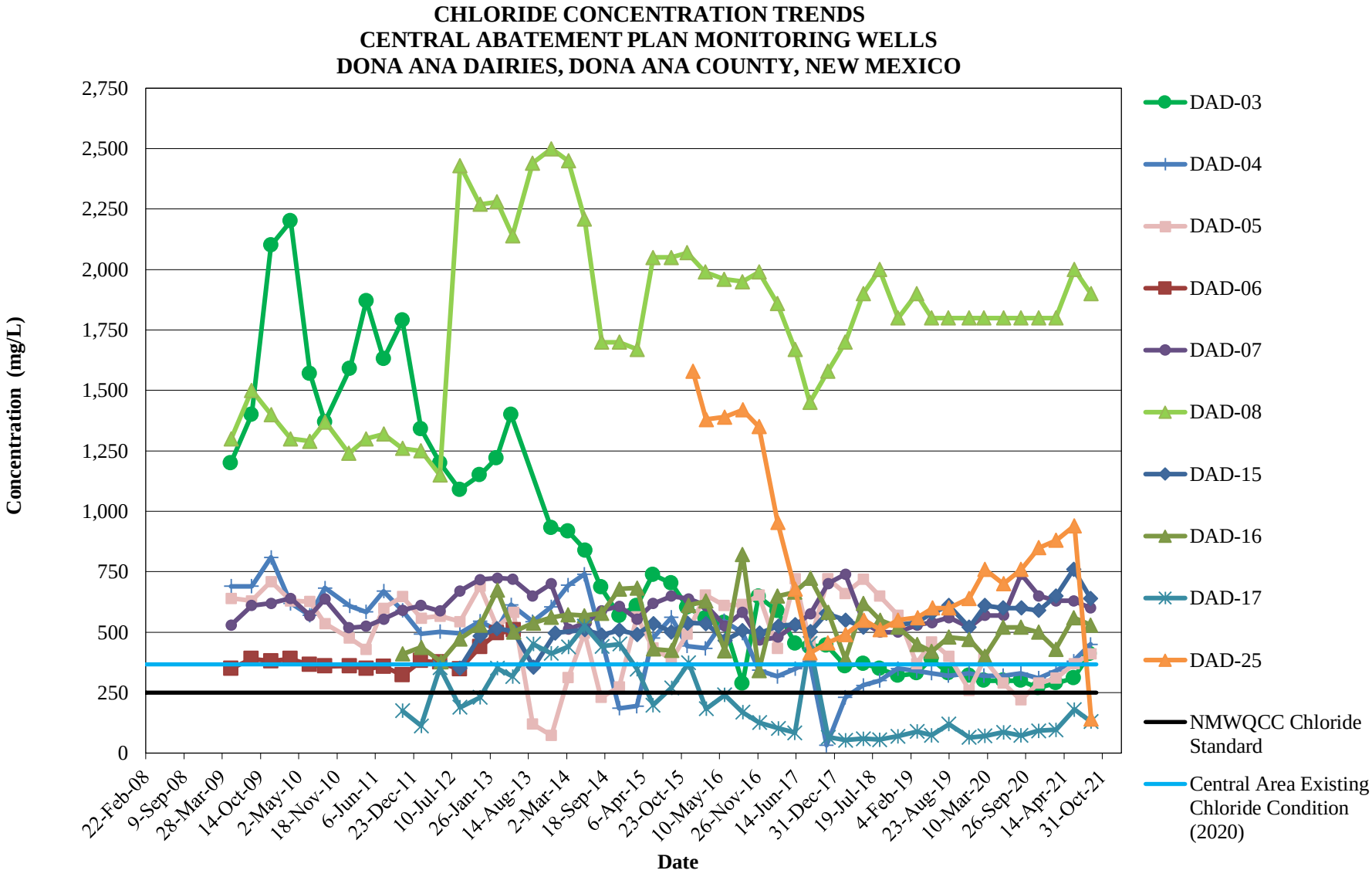


CHLORIDE CONCENTRATION TRENDS
NORTHERN ABATEMENT PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

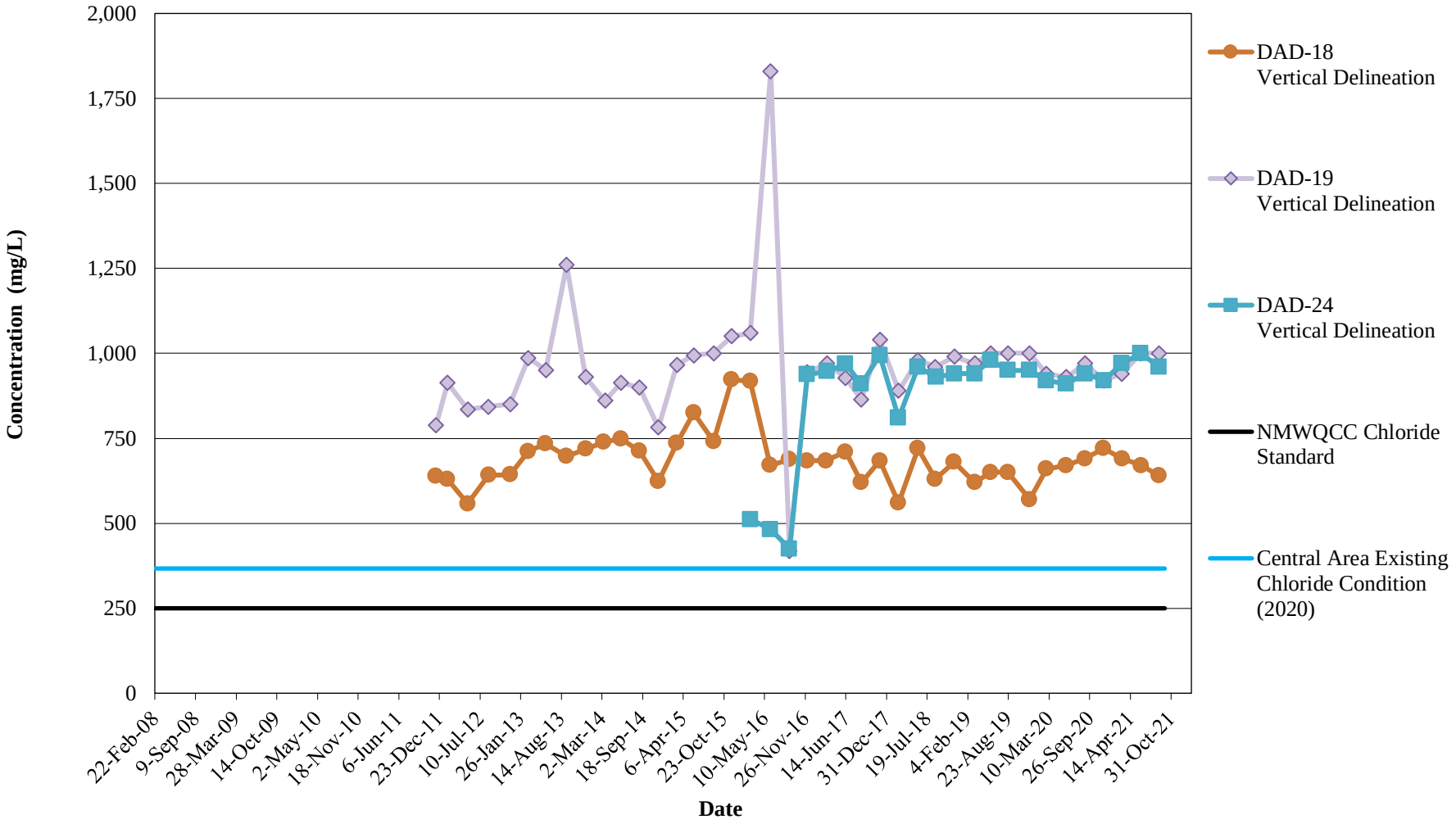


CHLORIDE CONCENTRATION TRENDS
NORTHERN ABATEMENT PLAN MONITORING WELLS -
VERTICAL DELINEATION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

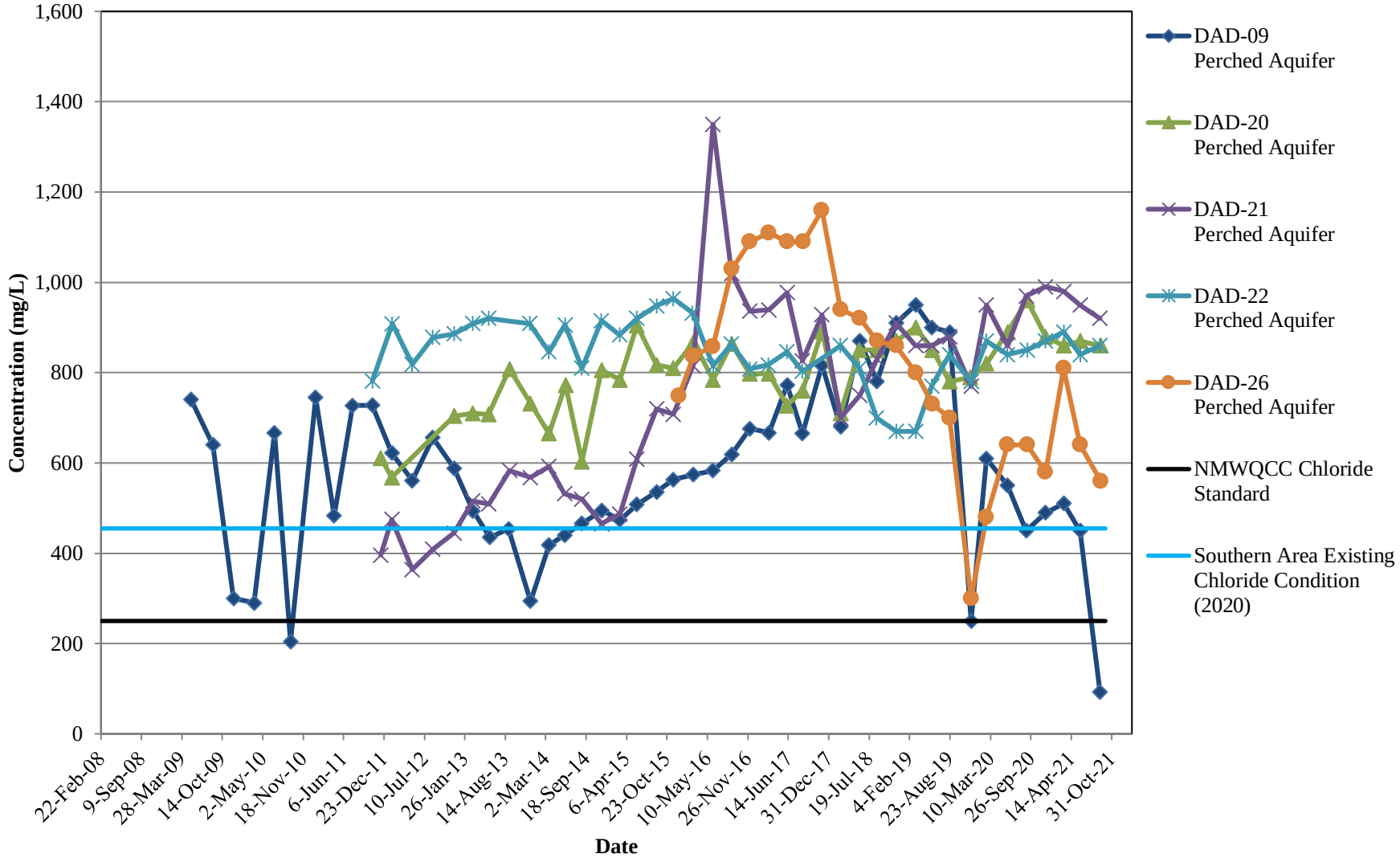



CHLORIDE CONCENTRATION TRENDS
CENTRAL ABATEMENT PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO
Concentration (mg/L)
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
22-Feb-08
9-Sep-08
28-Mar-09
14-Oct-09
2-May-10
18-Nov-10
6-Jun-11
23-Dec-11
10-Jul-12
26-Jan-13
14-Aug-13
2-Mar-14
18-Sep-14
6-Apr-15
23-Oct-15
10-May-16
26-Nov-16
14-Jun-17
31-Dec-17
19-Jul-18
4-Feb-19
23-Aug-19
10-Mar-20
26-Sep-20
14-Apr-21
31-Oct-21
Date
DAD-03
DAD-04
DAD-05
DAD-06
DAD-07
DAD-08
DAD-15
DAD-16
DAD-17
DAD-25
NMWQCC Chloride Standard
Central Area Existing Chloride Condition (2020)

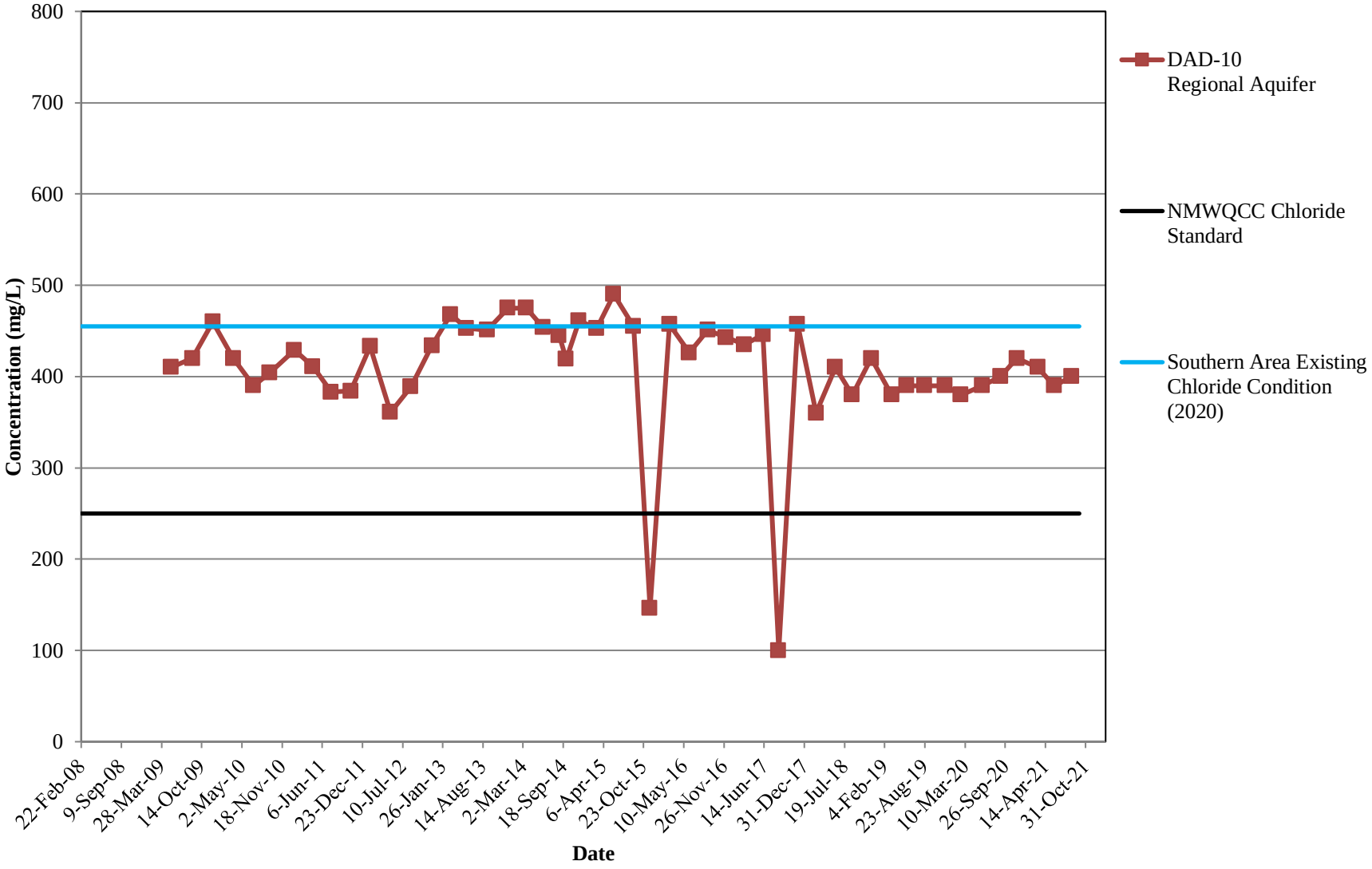
CHLORIDE CONCENTRATION TRENDS
CENTRAL ABATEMENT PLAN MONITORING WELLS -
VERTICAL DELINEATION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



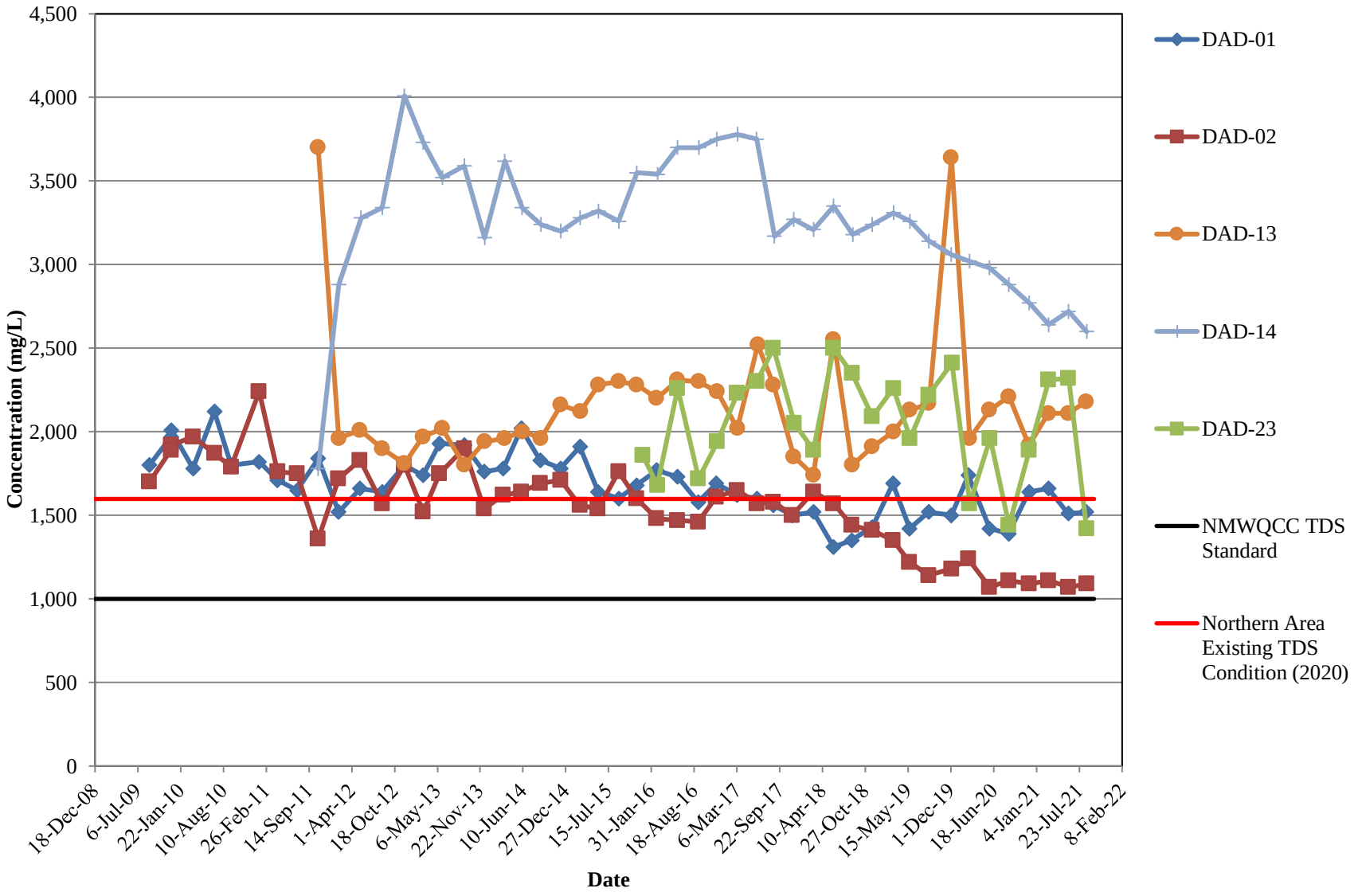
CHLORIDE CONCENTRATION TRENDS
SOUTHERN ABATEMENT PLAN MONITORING WELLS
IN THE PERCHED AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



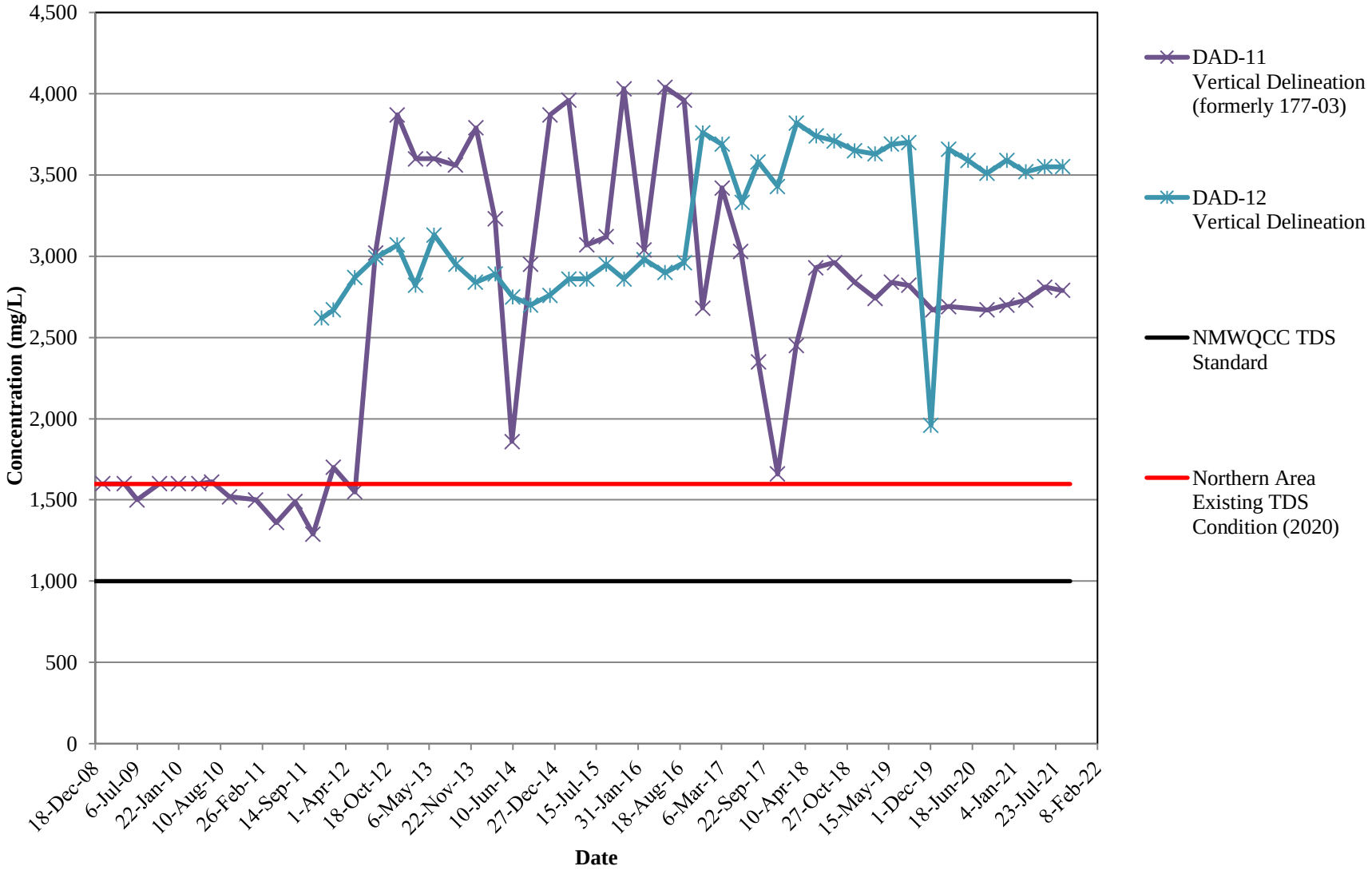
CHLORIDE CONCENTRATION TRENDS
SOUTHERN ABATEMENT PLAN MONITORING WELLS
IN THE REGIONAL AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



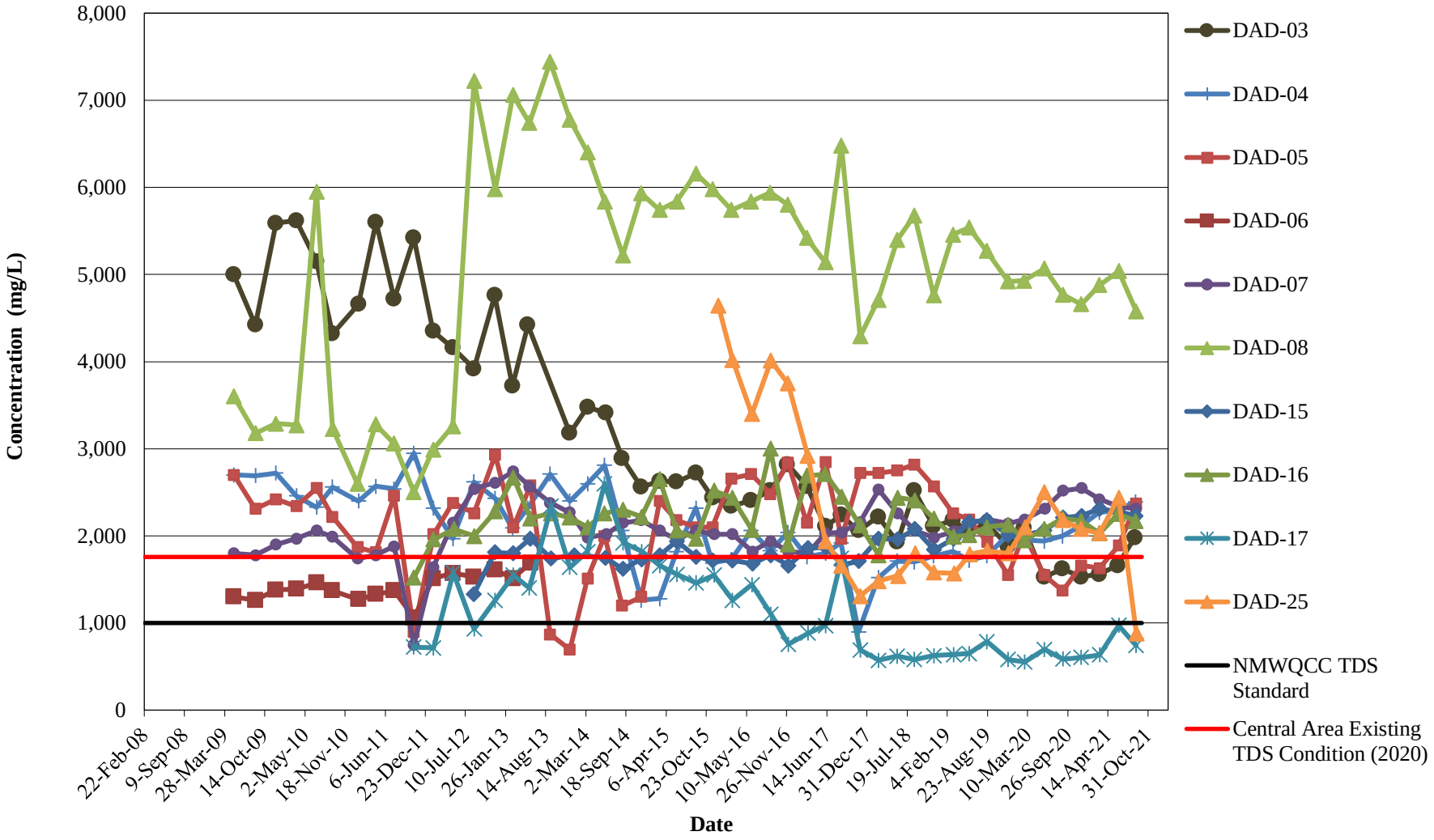
TDS CONCENTRATION TRENDS
NORTHERN ABATEMENT PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



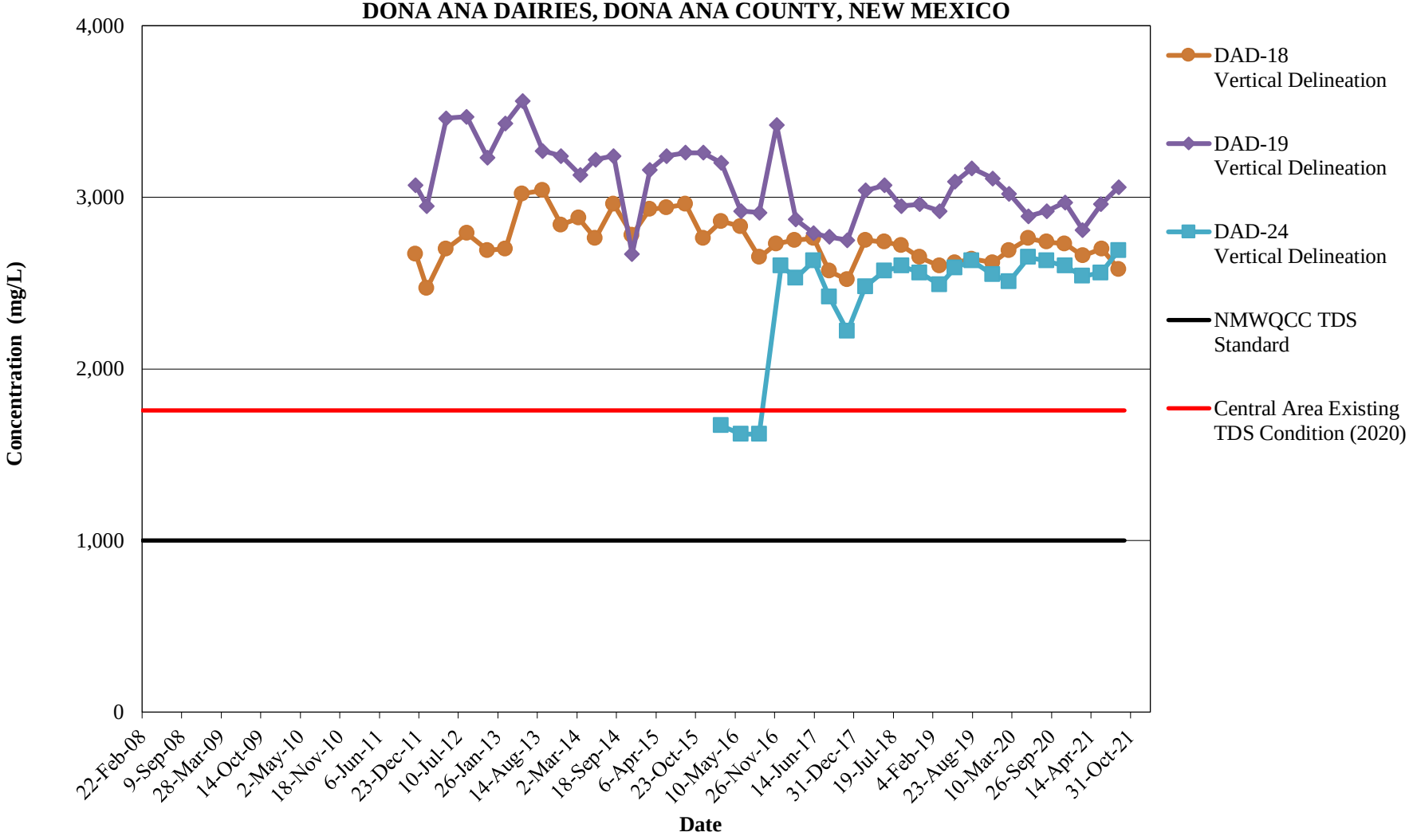
TDS CONCENTRATION TRENDS
NORTHERN ABATEMENT PLAN MONITORING WELLS -
VERTICAL DELINEATION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



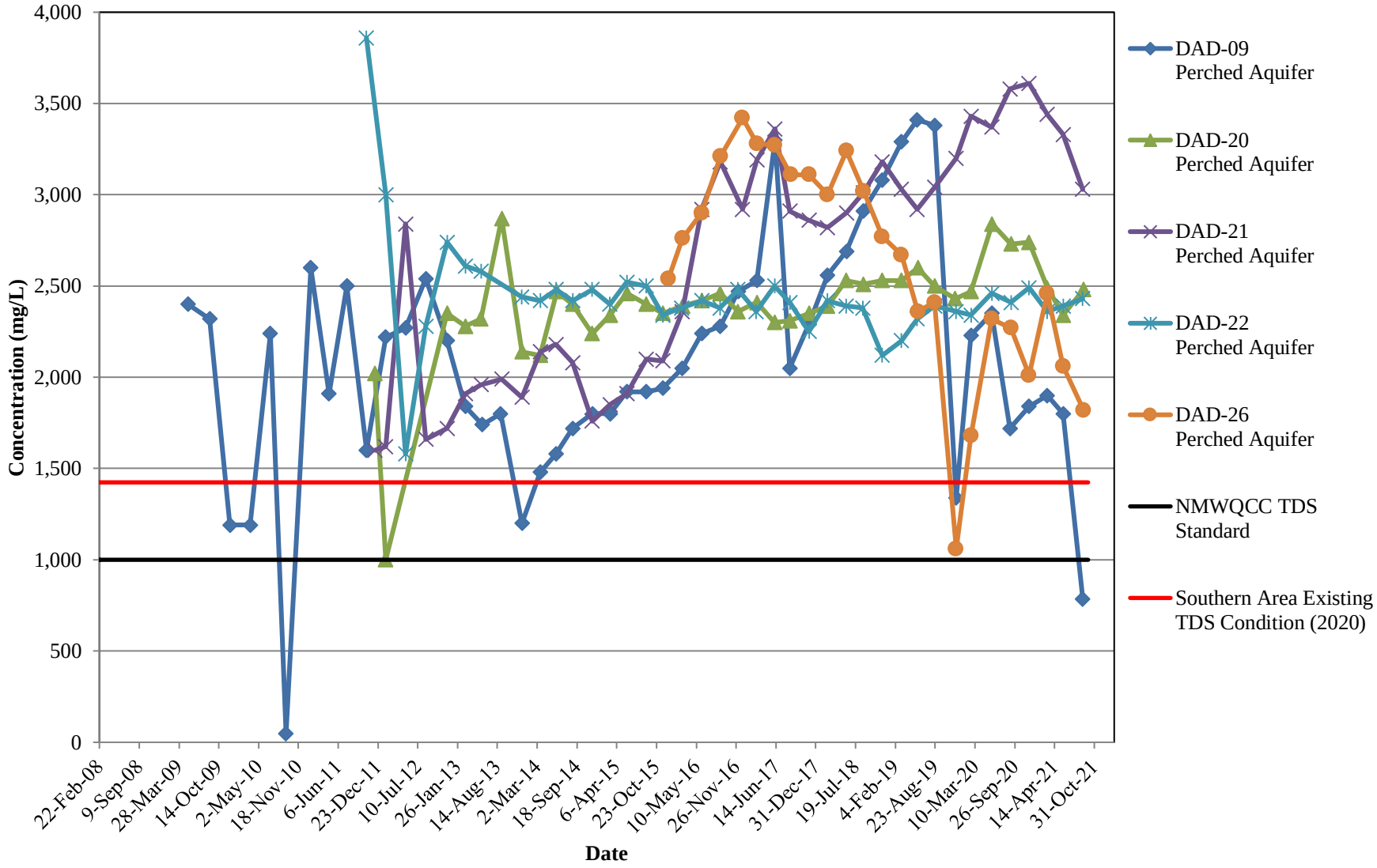
TDS CONCENTRATION TRENDS
CENTRAL ABATEMENT PLAN MONITORING WELLS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



TDS CONCENTRATION TRENDS
CENTRAL ABATEMENT PLAN MONITORING WELLS -
VERTICAL DELINEATION
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



TDS CONCENTRATION TRENDS
SOUTHERN ABATEMENT PLAN MONITORING WELLS
IN THE PERCHED AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



TDS CONCENTRATION TRENDS
SOUTHERN ABATEMENT PLAN MONITORING WELLS
IN THE REGIONAL AQUIFER
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO