



## **Summary of AMAFCA's MS4 Dissolved Oxygen Program FY 2022 (July 1, 2021 – June 30, 2022)**

NPDES Permit No. NMR04A000

Part I.C.1.d - Special Conditions, Compliance with Water Quality Standards and  
Part I.C.3.a - Endangered Species Act (ESA) Requirements - Dissolved Oxygen Strategy

AMAFCA monitors and evaluates the potential effect of stormwater discharges related to dissolved oxygen (DO) in the Rio Grande. The DO of stormwater discharges to the Rio Grande at the North Diversion Channel (NDC) outfall has been monitored by AMAFCA and cooperative Municipal Separate Storm Sewer System (MS4) agencies, with communication with the United States Fish and Wildlife Service (USFWS) and EPA, since 2004. Several strategies and constructed modifications to the NDC Embayment have been implemented from 2011-2016. Currently, in normal river flow conditions, water from the Rio Grande will not stagnate in the NDC Embayment and create low DO conditions. These improvement projects provided control measures to eliminate conditions that cause or contribute to exceedances of applicable DO water quality standards.

In FY 2022, the quality assurance project plan (QAPP), the field sampling plan (FSP), and related Standard Operating Procedures (SOPs) for AMAFCA's stormwater quality monitoring program were reviewed and updated. The format and contents of these documents are modeled after the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB) water quality management programs to facilitate sharing of data between the agencies. These documents provide a framework and detailed methods for the collection and analysis of environmental data as well as provide guidance for generating data that is of the precision, accuracy, and completeness necessary for AMAFCA's program.

In accordance with AMAFCA's Stormwater Management Program (SWMP), AMAFCA has and will continue to assess the potential effect of stormwater discharges into the Rio Grande by collecting and evaluating additional DO data.

### AMAFCA MS4 Sonde Program Summary

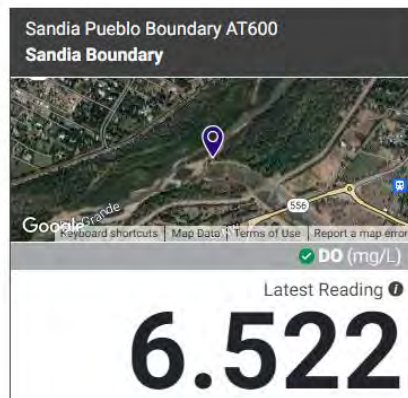
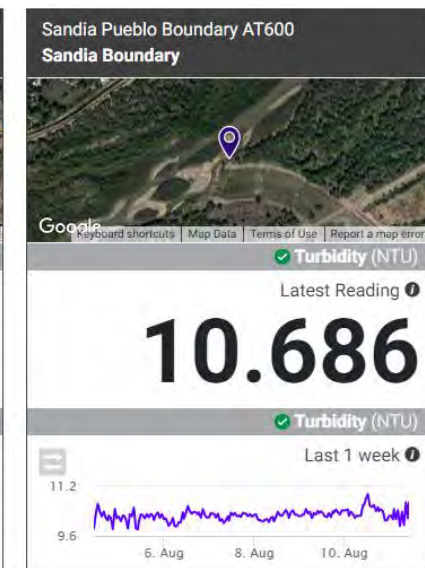
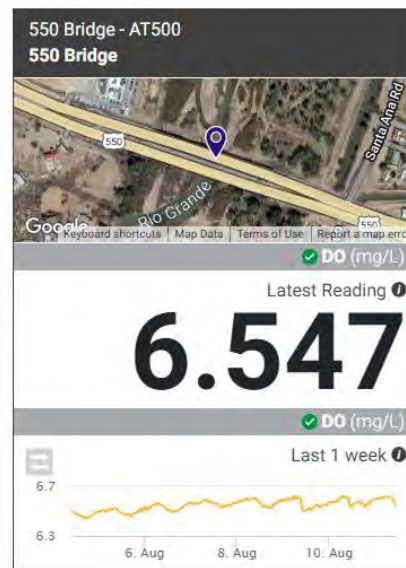
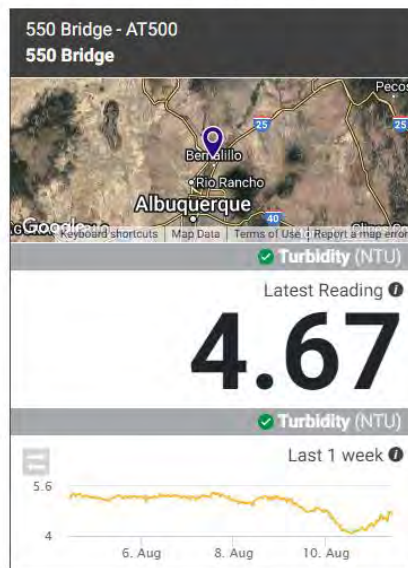
The purpose of AMAFCA's Sonde Monitoring Program is to obtain surface water quality data within the Rio Grande to support AMAFCA and the cooperative MS4 agencies with the assessment of surface water quality parameters, as required by the Endangered Species Act requirements incorporated into the MS4 Permit. In addition, the Sonde Monitoring Program data supports determination of long-term surface water quality trends, related to stormwater impacts and impairments, within the Middle Rio Grande. The sondes monitor temperature, barometric pressure, pH, turbidity, DO, DO saturation (%), and water depth above each sonde. AMAFCA has improved the Sonde Program through the years with current access to real-time online data using the HydroVu data management application, allowing quicker response and solutions to maintenance issues.



*Photos of AMAFCA Sondes*

AMAFCA Rio Grande WQ Sondes ▾

Refresh Data ⓘ Edit

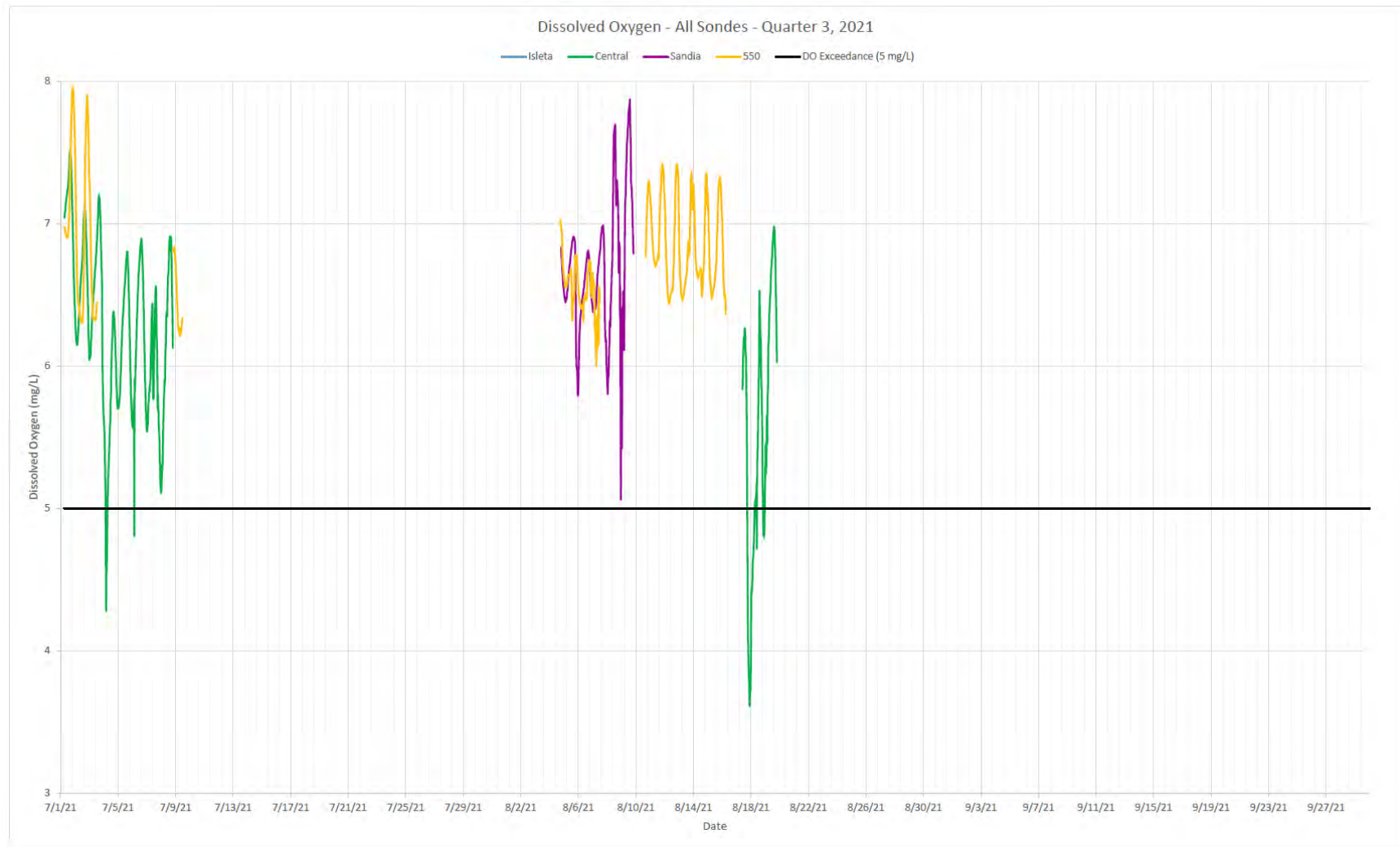


*Image of Online HydroVu Portal Allowing AMAFCA Access to Real-Time Sonde Data in the Rio Grande*

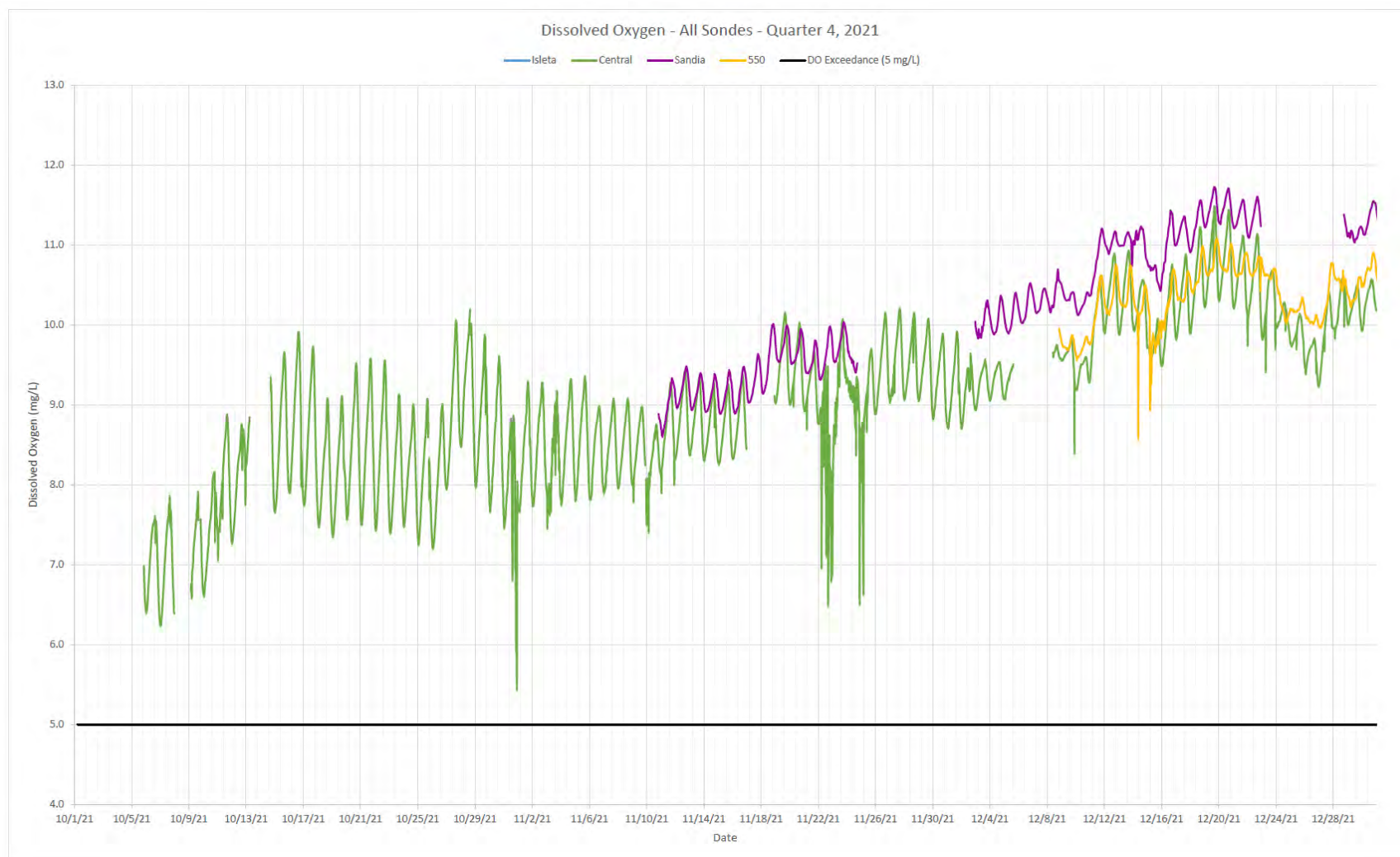
From the AMAFCA FY 2022 In-Stream Water Quality Monitoring Memos, which report on the AMAFCA sonde data, the DO fell slightly below 5 mg/L related to storm events within the watershed for the following locations:

- Central Ave. Bridge – Five dates in FY 2022 (July 2021, August 2021, and June 2022), for a total of approximately 37 hours (0.4 % of the year) – the DO was in the range of 2.1 – 4.8 mg/L.
- Isleta Dam – At various times between June 18, 2022 and June 25, 2022, the DO was below 5 mg/l, in the range of 0.9 – 4.3 mg/L, for approximately 60 hours during these dates. The low DO for 60 hours represents 0.7 % of the year.

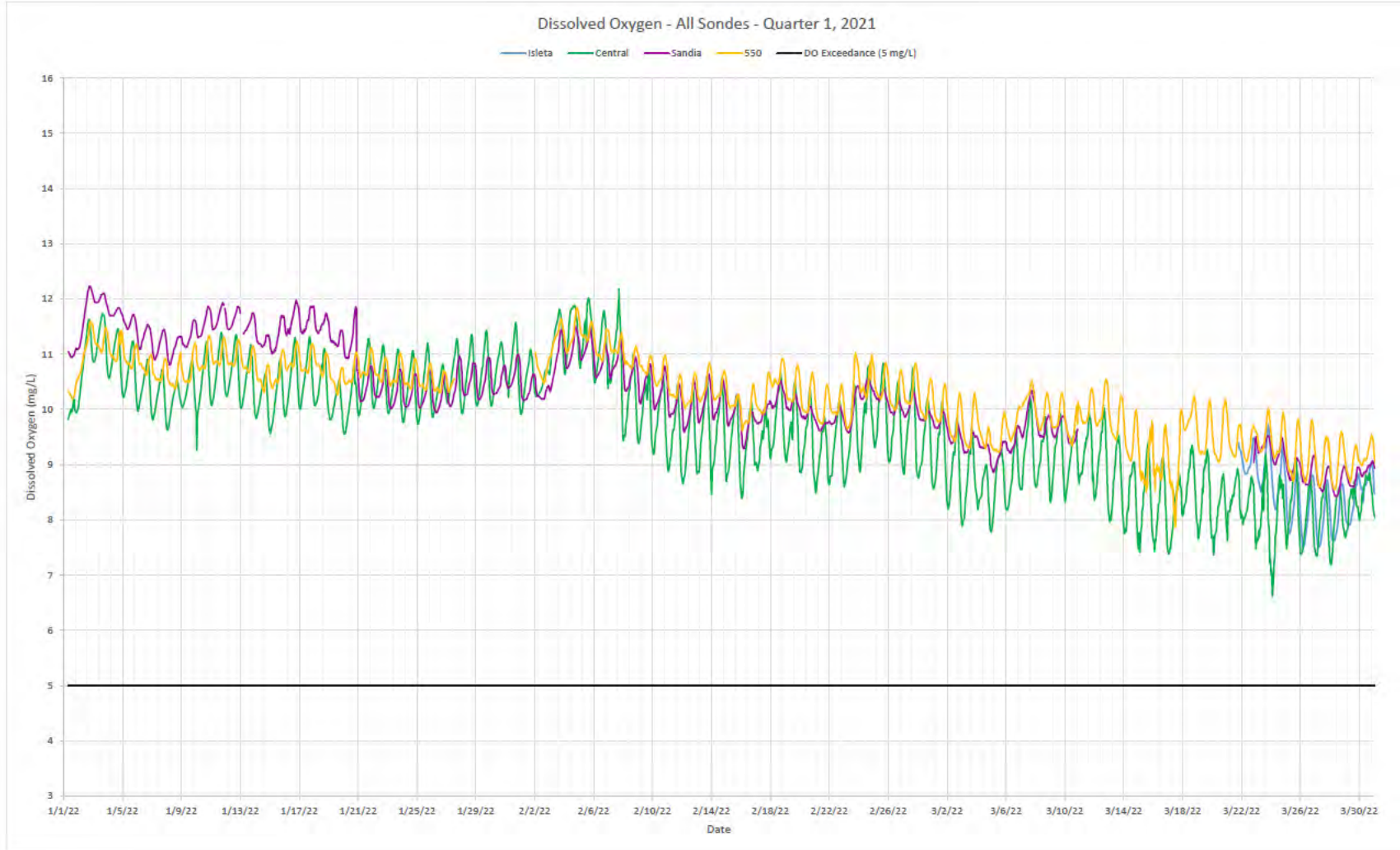




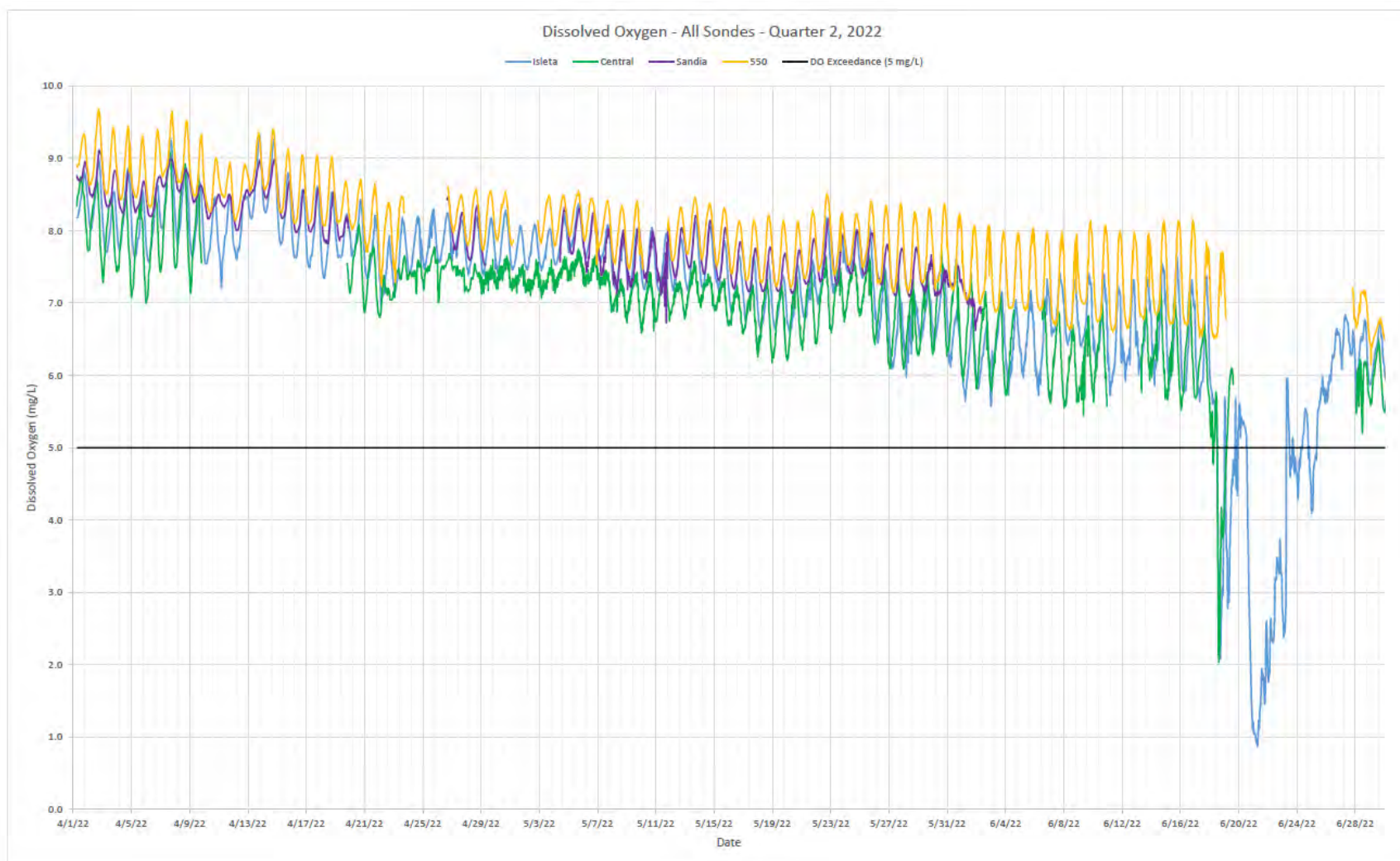
*Plot of DO Data Collected From Sondes Deployed During FY 2022 (July – September 2021)*



*Plot of DO Data Collected From Sondes Deployed During FY 2022 (October – December 2021)*



*Plot of DO Data Collected From Sondes Deployed During FY 2022 (January – March 2022)*



*Plot of DO Data Collected From Sondes Deployed During FY 2022 (April – June 2022)*



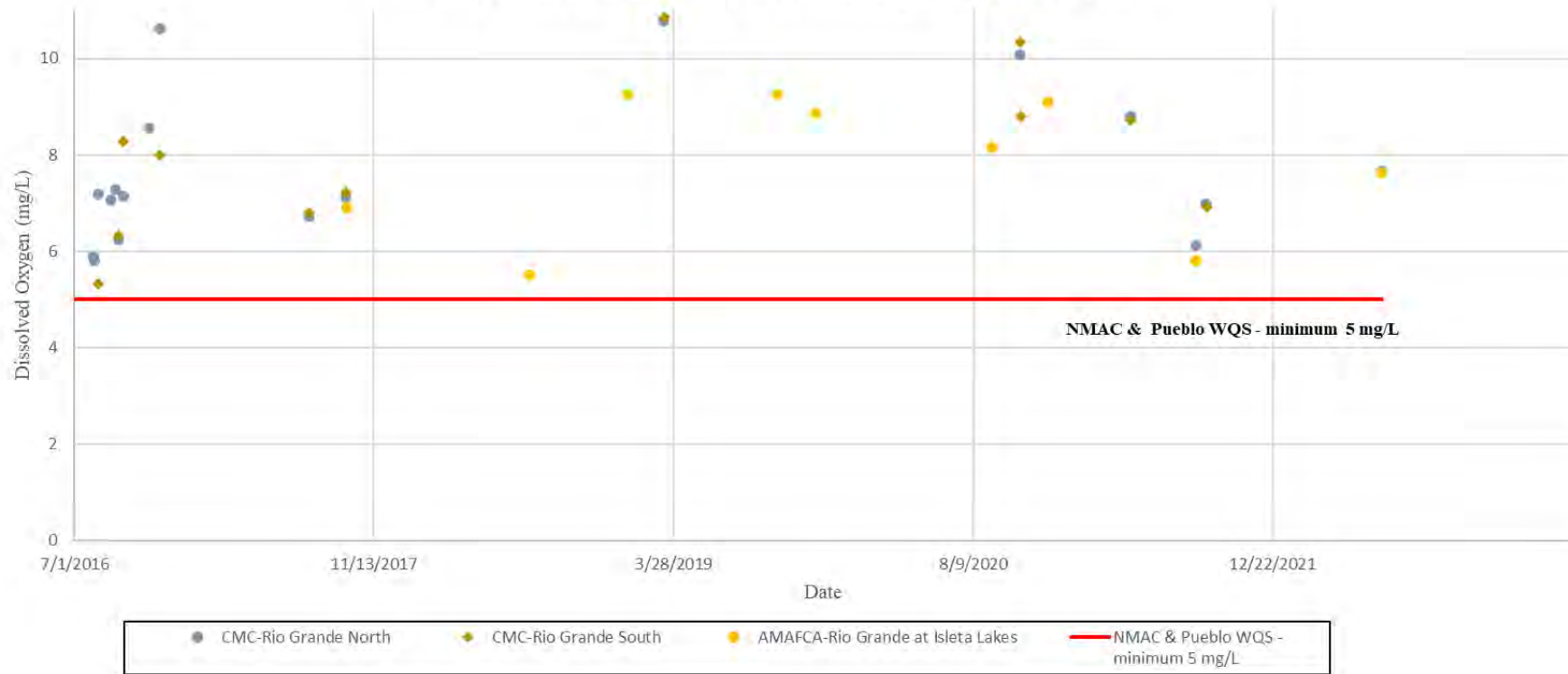
### CMC and AMAFCA Water Quality Monitoring Program Summary for DO

In addition to the Sonde Program, both AMAFCA and the Middle Rio Grande Compliance Monitoring Cooperative (CMC) collect grab samples within the Rio Grande during storm events. Field data is measured, including DO, for these samples. For MS4 Permit compliance, the Middle Rio Grande CMC has two monitoring points where DO field measurements are collected, north and south of the urbanized portion of the river. The AMAFCA Monitoring Program collects samples in the Rio Grande at the downstream (south) end of the watershed (Rio Grande at Isleta Lakes). The graph on page 10 shows the DO data from all AMAFCA and CMC samples collected from July 2016 – June 2022. None of the field DO data collected from these programs, from 2016 to 2022, have recorded DO in the Rio Grande during stormwater discharge events below the water quality standard of 5 mg/L for the Rio Grande (NMAC 20.6.4).



*Collecting a CMC sample from the Rio Grande at Angostura Diversion at the upstream (north) end of the Middle Rio Grande Watershed*

## Dissolved Oxygen in Rio Grande CMC and AMAFCA Monitoring - 2016 to 2022



*Plot of DO Data Collected from Grab Samples in the Rio Grande Through the AMAFCA and CMC Monitoring Programs*

## AMAFCA Annual Incidental Take Report Summary

The Annual Incidental Take Report estimates the potential Rio Grande Silvery Minnow (RGSM) harassments and lethality near the North Diversion Channel (NDC) outfall, using the method defined by the USFWS for the Biological Opinion (BO) completed in August 2014. This analysis calculates the frequency (number) of anoxic and hypoxic events and determines if the events meet the measurable goals provided in the December 2014 MS4 Permit No. NMR04A000. It also determines the number of RGSM mortalities and harassments using the BO specified methodology.

For the entire MS4 Permit term up until June 2022, including during administrative continuance, zero anoxic events and zero hypoxic events have been identified in the field or during the incidental take analysis. However, in June 2022 the flow conditions in the Rio Grande through Albuquerque were near dry conditions. The low flow conditions in the Rio Grande coupled with stormwater discharge did lead to the first hypoxic event (on June 22, 2022) reported during the permit term (refer to table below). Hypoxic events occur when the oxygen percent saturation in the river is less than 54.3%. Anoxic events occur when the oxygen percent saturation drop below 8.7%.

MRG Watershed MS4 Permit (issued 2014)	Annual Report Year	Measurable Goals Frequency of Anoxic Events/year	Actual No. of Anoxic Events for Year	Measurable Goals Frequency of Hypoxic Events/year	Actual No. of Hypoxic Events for Year
Permit Year 1	July 2015 - June 2016	18	0	36	0
Permit Year 2	July 2016 - June 2017	18	0	36	0
Permit Year 3	July 2017 - June 2018	9	0	18	0
Permit Year 4	July 2018 - June 2019	9	0	18	0
Permit Year 5	July 2019 - June 2020	9	0	18	0
Admin. Continuance	July 2020 - June 2021	9*	0	18*	0
Admin. Continuance	July 2021 - June 2022	9*	0	18*	1
Values in this table are from Table 1.c from MS4 Permit (p. 21 of part 1).					
* MS4 Permit expired and is in administrative continuance. The same measurable goals as Permit Year 5 are assumed.					

*Table Summarizing the Incidental Take Analysis Compared to the MS4 Permit  
Measurable Goals from 2015 – 2022*

ALBUQUERQUE NEWS

# Rio Grande at risk of running dry through Albuquerque

by: [Natalie Wadas](#)

Posted: Jul 21, 2022 / 04:37 PM MDT

Updated: Jul 25, 2022 / 07:54 AM MDT



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ALBUQUERQUE, N.M. (KRQE) – The [Rio Grande](#) is at risk of running dry through Albuquerque. Water management officials are warning about what this could mean for local farmers and wildlife.

According to measurements from July 21st, the water flow is about as weak as it's ever been over the past fifty years. "Given the drought conditions that we have and the current water situation that it's very likely that we're going to see drying on the Rio Grande through the Albuquerque area if we don't receive rain soon," says Jason Casuga, CEO and chief engineer for the Middle Rio Grande Conservancy District (MRGCD). Casuga says because of weak snowpack and lack of rain, they can't release water from the reservoirs upstream like Cochiti.

*Snip of News Article Related to Drying of the Rio Grande  
Through the Albuquerque Area in June 2022*



Incidental Take Statement for NDC Discharges to the Rio Grande FY 2022 (July 1, 2021 to June 30, 2022)

NDC Qualifying Storm Event ( >250 cfs and/or V > 13 af)			Q <sub>P</sub> NDC	Q <sub>P</sub> NDC	DO <sub>NDC</sub>	DO Saturation <sub>NDC</sub>	Barometric Pressure <sub>NDC</sub>	Temp <sub>NDC</sub>	DO <sub>Rio Grande</sub>	DO	Q <sub>Daily</sub> Rio Grande	Q <sub>Daily</sub> Rio Grande	No. of RGSM Killed	No. of RGSM Harassed	Was Event Anoxic?	Was Event Hypoxic?
Date	Time	Season														
		(Per BO Table 1)	Actual	Rounded	(Sandia Pueblo Sonde)	(Sandia Pueblo Sonde)	(Sandia Pueblo Sonde or Barologger)	(Sandia Pueblo Sonde or nearest sonde)	Rio Grande at Central	Saturation <sub>Rio Grande</sub>	Actual	Rounded	in Lethal Zone	in Impact Area	Enter 'I' if Yes, 'O' if No	Enter 'I' if Yes, 'O' if No
			08329900	(Per BO App. A)	(mg/L)	(%)	(mm Hg)	(°C)	(mg/L)	(%)	08330000	(Per BO Table 1)	DO % Sat < 8.7%, DO <0.7 mg/L	8.7 %< % DO Sat < 54.3 %, 0.7<DO<4.4 mg/L	(% Sat <= 8.7%; 50% lethality)	(8.7% > % Sat <= 54.3%)
07/03/21	9:15:00 PM	Summer	277	500	6.4	79.49	630.43 <sup>2</sup>	30.35	no data	No Data	1,050	1,000	N/A	N/A	0	0
07/06/21	9:25:00 PM	Summer	371	500	5.8	86.98	631.44 <sup>2</sup>	31.40	5.83	No Data	361	500	N/A	N/A	0	0
07/15/21	6:10:00 AM	Summer	655	500	No Data	82.14	635.00 <sup>3</sup>	No Data	No Data	No Data	91	0	N/A	N/A	0	0
07/18/21	6:20:00 PM	Summer	322	500	No Data	81.48	635.01 <sup>3</sup>	No Data	No Data	No Data	285	500	N/A	N/A	0	0
07/20/21	5:10:00 PM	Summer	2,250	2,500	No Data	81.84	633.08 <sup>3</sup>	No Data	No Data	No Data	122	0	N/A	N/A	0	0
07/27/21	5:25:00 PM	Summer	928	1,000	No Data	No Data	634.31 <sup>3</sup>	No Data	No Data	No Data	527	500	No Data	No Data	No Data	No Data
01/04/22	5:45:00 AM	Winter	1,249 <sup>4</sup>	1,000	11.7	103.67	630.2 <sup>3</sup>	3.1	10.8	No Data	565	500	N/A	N/A	0	0
01/05/22	6:45:00 AM	Winter	517 <sup>4</sup>	500	11.5	103.54	629.2 <sup>3</sup>	3.6	10.5	No Data	483	500	N/A	N/A	0	0
06/17/22	7:15:00 PM	Spring	715 <sup>4</sup>	500	6.2	94.46	630.2 <sup>2</sup>	22.3	6.2	No Data	233	0	N/A	N/A	0	0
06/17/22	11:00:00 PM	Spring	512 <sup>4</sup>	500	5.8	89.40	631.7 <sup>2</sup>	28.8	5.8	No Data	223	0	N/A	N/A	0	0
06/18/22	3:45:00 AM	Spring	252 <sup>4</sup>	500	5.3	74.81	630.4 <sup>2</sup>	23.7	5.3	No Data	217	0	N/A	N/A	0	0
06/19/22	10:45:00 AM	Spring	230 <sup>4</sup>	0	6.0	81.06	631.4 <sup>2</sup>	21.6	6.0	No Data	478	500	N/A	N/A	0	0
06/19/22	9:30:00 PM	Spring	470 <sup>4</sup>	500	4.6	69.37	630.2 <sup>2</sup>	26.8	No Data	No Data	250	500	N/A	N/A	0	0
06/19/22	11:30:00 PM	Spring	193 <sup>4</sup>	0	5.3	80.55 <sup>1</sup>	630.4 <sup>2</sup>	26.8	No Data	No Data	245	0	Calc. DO Sat. OK	Calc. DO Sat. OK	0	0
06/22/22	8:30:00 AM	Summer	1,021 <sup>4</sup>	1,000	2.3	30.79 <sup>1</sup>	634.0 <sup>2</sup>	20.5	No Data	No Data	233	0	Calc. DO Sat. OK	2,932	0	1
06/26/22	5:45:00 AM	Summer	303 <sup>4</sup>	500	6.0	81.86 <sup>1</sup>	635.3 <sup>2</sup>	21.6	No Data	No Data	286	500	Calc. DO Sat. OK	Calc. DO Sat. OK	0	0
06/27/22	1:00:00 AM	Summer	1,948 <sup>4</sup>	2,000	6.3	87.5 <sup>1</sup>	635.8 <sup>2</sup>	22.5	No Data	No Data	405	500	Calc. DO Sat. OK	Calc. DO Sat. OK	0	0
Total #s / Events:													0	2,932	0	1

NOTE: No. of RGSM Killed or Harassed (Columns O and P) is based on lookup tables from BO Appendix A. From BO, p. 72, if stormwater discharges containing less than 0.7 mg/L DO occur during the period of May 15 to 31, then up to 300 larval silvery minnow per year may also die. This did not occur from July 2021 to June 2022.

<sup>1</sup> Sondes did not report DO saturation values on these dates. Used pressure from Barologger data. Calculated DO saturation based on (<https://water.usgs.gov/software/DOTABLES/>).

<sup>2</sup> Barologger data not available for these dates (or are unreasonably high), pressure taken from NOAA climate data station at Albuquerque International Airport (WBAN: 23050). Data given in inHg, converted to mmHg using <https://www.convertunits.com/from/inHg/to/mmHg>. Data downloaded from: <https://www.ncdc.noaa.gov/cdo-web/datasets/LCD/stations/WBAN:23050/detail>

<sup>3</sup> The barometric pressure was not recorded by the Sandia Pueblo Sonde for these dates. The corresponding AMAFCA barologger data was used instead.

<sup>4</sup> No USGS flow data for the NDC available after 8/3/2021, remaining dates taken from AMAFCA Telemetry data. Telemetry data not available between 2/4/22-4/7/22 so qualifying events could not be determined. Review of USGS gage 08329835 (NDC at Embudo) indicates there may not have been qualifying events during this period.

Green Shading	No Incidental Take according to BO; DO in NDC Outfall > 4.4 mg/L and oxygen saturation of 54.3 %. Had sonde data available for complete analysis.
Gray Shading (Sonde Data not available). Incidental Take based on calculated DO concentration or DO saturation (Source: Sonde Data and Program memos from Weston)	Due to low flow conditions in the Rio Grande, no sondes were in the river on 7/27/22.
	Sandia Pueblo sonde was removed from the river on 6/2/22. Used Central sonde for Temp and DO data after 6/2/22. Central sonde stopped reporting after 6/19/22 15:00. Used Isleta sonde for Temp data for the remaining dates.
	Sondes from all locations removed from the river (550: 7/9/21-8/4/21, Sandia: 7/1/21-8/4/21, Central: 7/8/21-8/17/21, Isleta: 7/1/21-9/30/21). No DO or Temp data available for these dates.
Blue Shading	Sondes did not report percent saturation; calculated using <a href="http://water.usgs.gov/software/DOTABLES/">http://water.usgs.gov/software/DOTABLES/</a>
Purple Shading	NDC (Sandia Pueblo) Sonde did not report DO concentration or temperature, used nearest available Sonde DO concentration data and temperature (Central or Isleta).

No. Events w/ Takes for Year:		0	
Estimated Incidental Take			
July 2021 to June 2022		Allowed Per Year	Allowed Over 5-Year Permit Term
Mortalities =	0	2,280	10,410
Harassments =	2,932	32,616	163,080

Incidental Take Allowance Source: Biological Opinion for U.S. Environmental Protection Agency General NPDES Permit No. NMR04A000, Aug. 2014, USFWS

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**Summary of AMAFCA's MS4  
Temperature Program  
FY 2022 (July 1, 2021 – June 30, 2022)**

NPDES Permit No. NMR04A000

Part I.C.1.f - Special Conditions, Compliance with Water Quality Standards

AMAFCA monitors and evaluates the potential effect of stormwater discharges related to temperature in the Rio Grande. AMAFCA and the original Municipal Separate Storm Sewer System (MS4) co-permittees (the City of Albuquerque, New Mexico Department of Transportation, and the University of New Mexico) assembled and analyzed temperature data from 1982 to 2012. This data analysis proved the assertion that the receiving waters of the Rio Grande are not adversely affected by the temperature of stormwater from the Albuquerque MS4. This data was presented in an initial report that was submitted to EPA on May 1, 2012.

Since 2012, the MS4 permittees have continued to collect and submit temperature data, with each Annual Report, showing that the Rio Grande (receiving water for the Middle Rio Grande watershed) is not adversely affected by the temperature of stormwater from the Albuquerque MS4. AMAFCA has collected data from 2012 to 2022 using tidbit probes and sondes. In accordance with AMAFCA's Stormwater Management Program (SWMP), AMAFCA has and will continue to assess the potential effect of stormwater discharges into the Rio Grande by collecting and evaluating additional temperature data.

In FY 2022, the quality assurance project plan (QAPP), the field sampling plan (FSP), and related Standard Operating Procedures (SOPs) for AMAFCA's stormwater quality monitoring program were reviewed and updated. The format and contents of these documents are modeled after the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB) water quality management programs to facilitate sharing of data between the agencies. These documents provide a framework and detailed methods for the collection and analysis of environmental data as well as provide guidance for generating data that is of the precision, accuracy, and completeness necessary for AMAFCA's program.

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From the AMAFCA FY 2022 In-Stream Water Quality Monitoring Memos, which report on the AMAFCA sonde data, the temperature was below the water quality standard 32.2 °C, which is the maximum temperature water quality standard for Marginal Warmwater Aquatic for the Rio Grande (NMAC 20.6.4) for all (4) four sondes, for all data related to storm events within the watershed except for two (2) instances. There were two (2) temperature exceedances (max. temperature reported of 33.3 °C) indicated by the sondes in July 2021, both occurring at the Central Ave. Bridge sonde. There was precipitation in the watershed when the two (2) exceedances occurred.



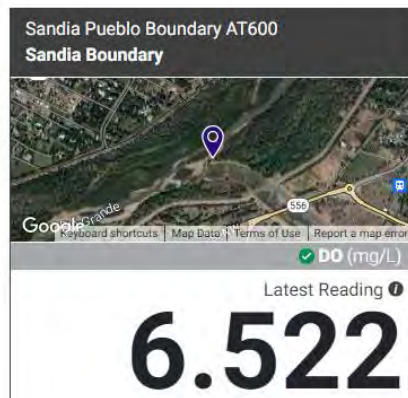
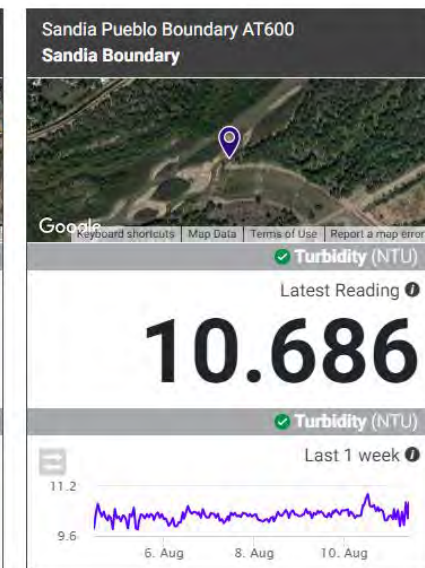
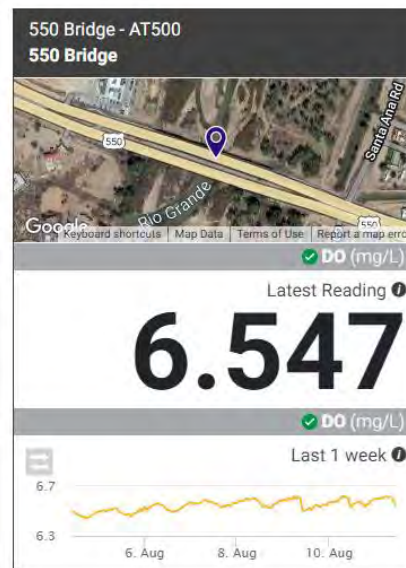
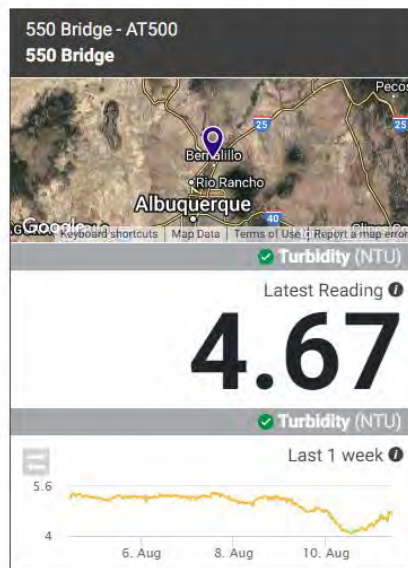


*Photos of AMAFCA Sondes*

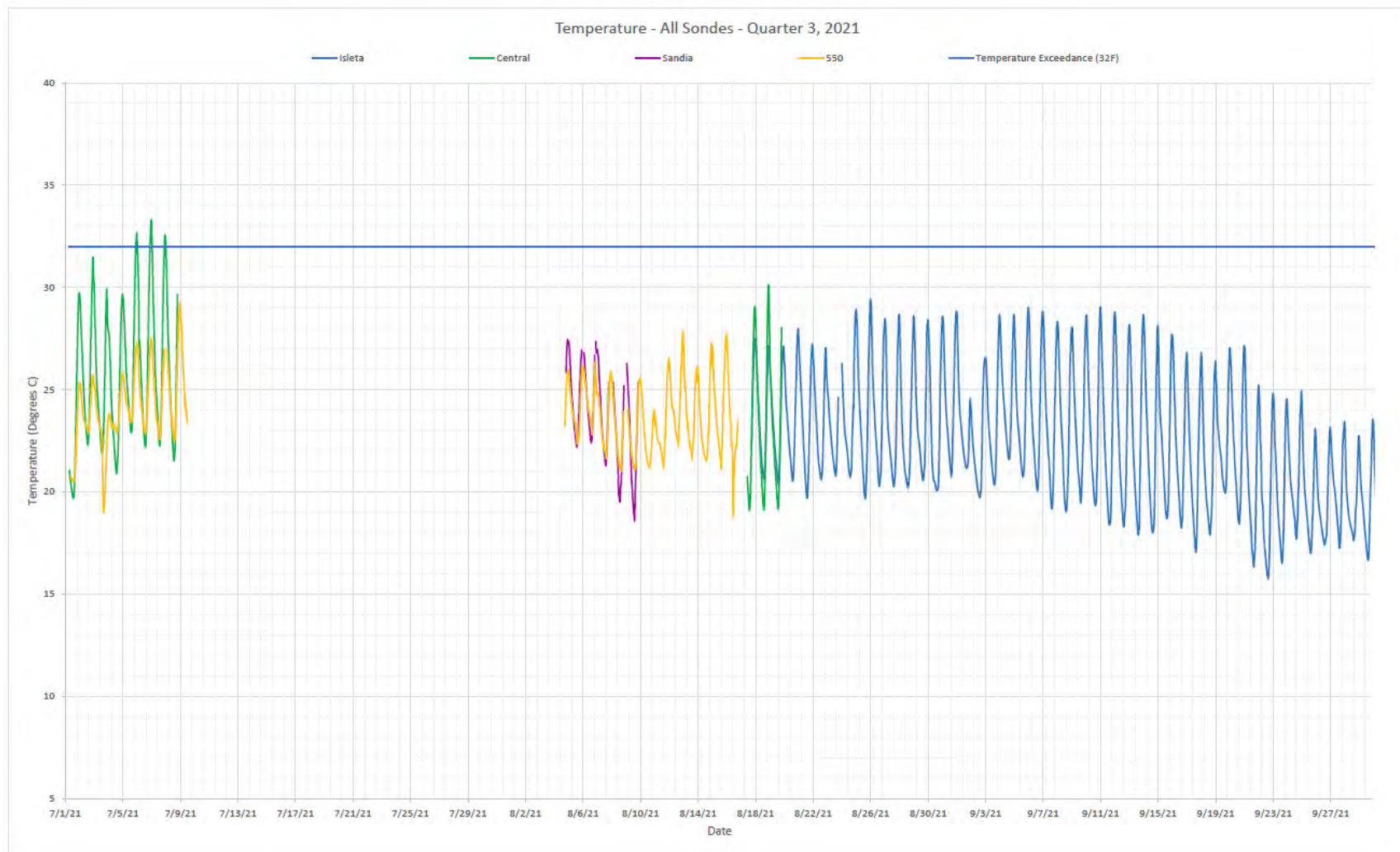


AMAFCA Rio Grande WQ Sondes ▾

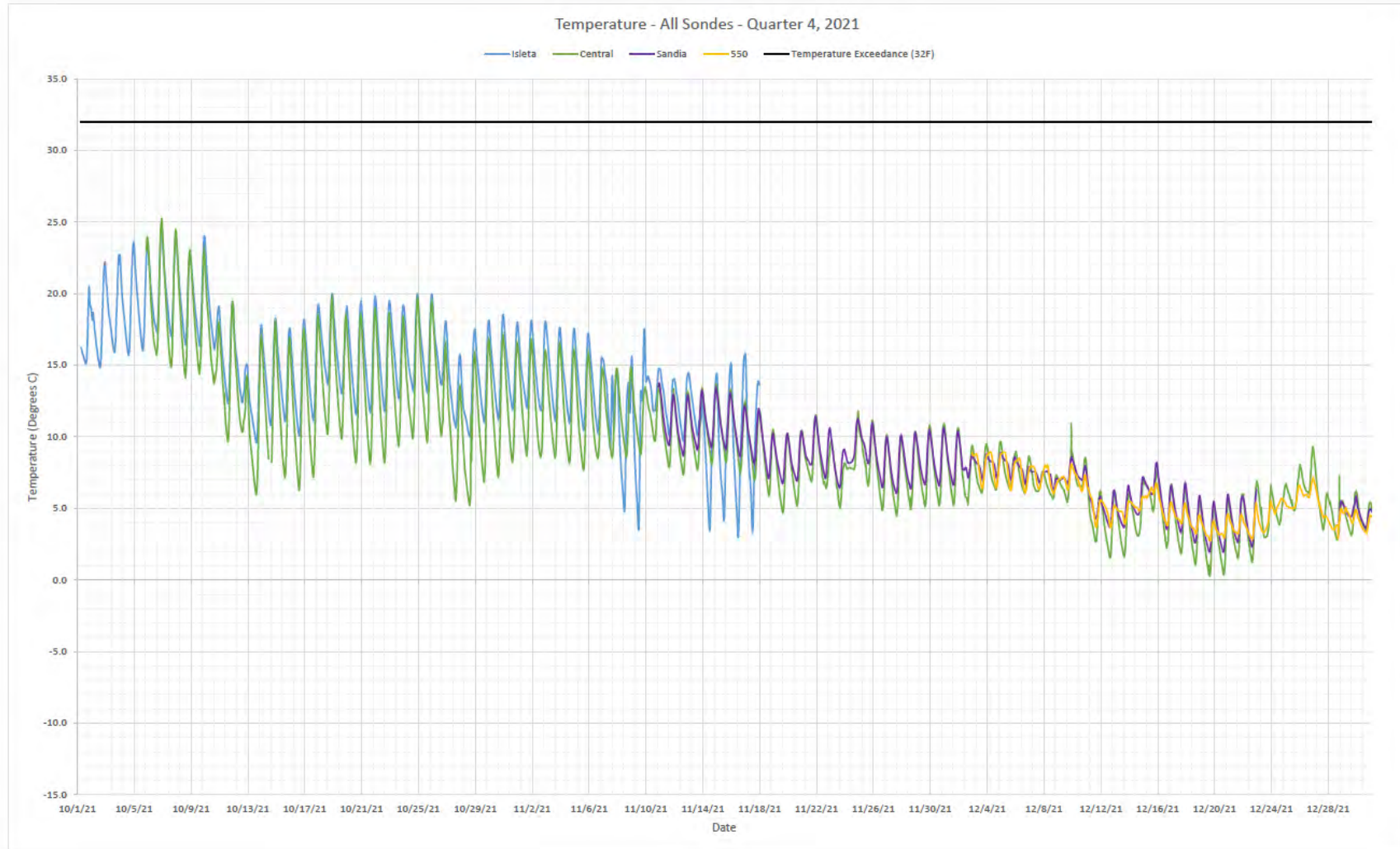
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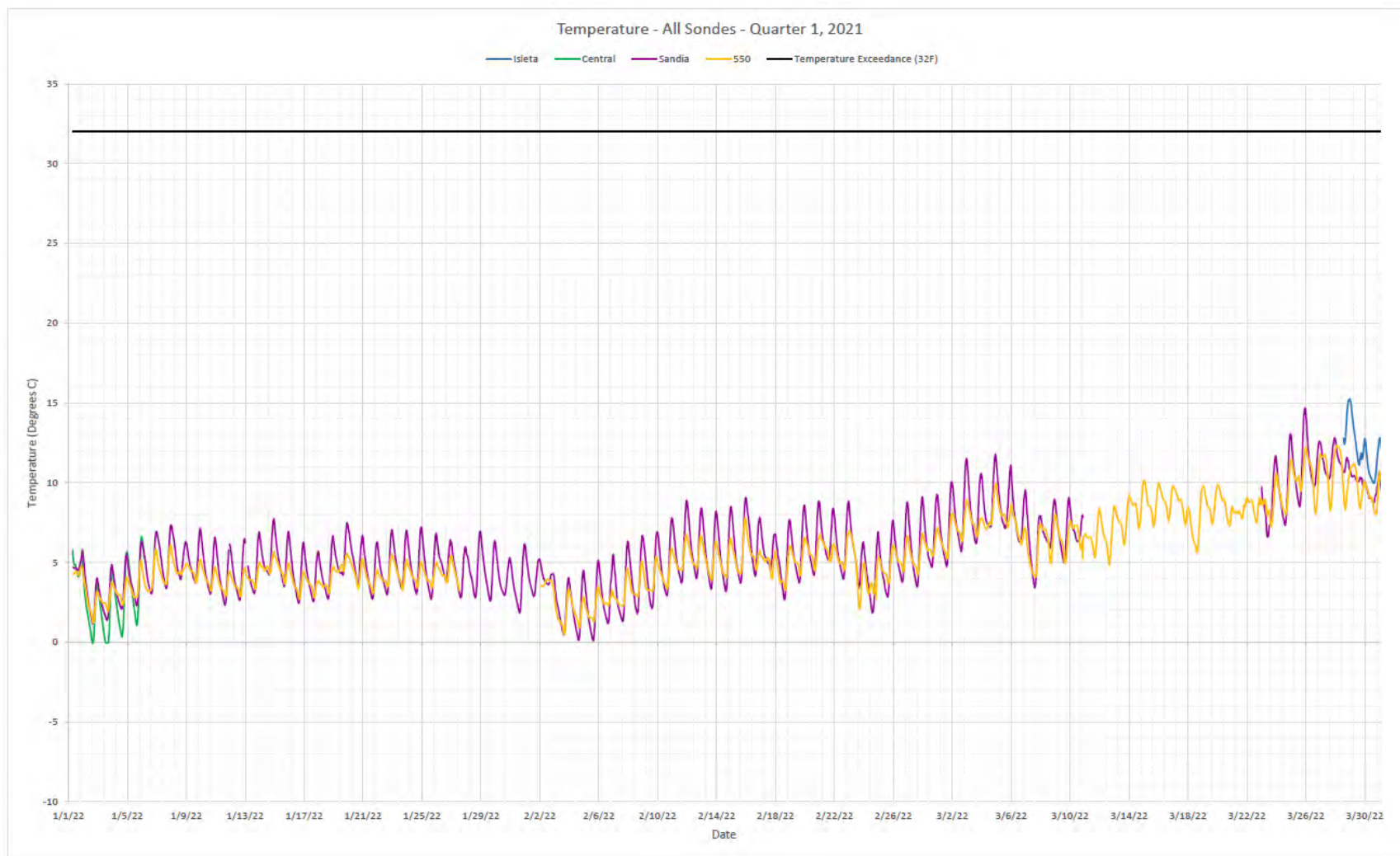
*Image of Online HydroVu Portal Allowing AMAFCA Access to Real-Time Sonde Data in the Rio Grande*



*Plot of Temperature Data Collected From Sondes Deployed During FY 2022 (July – September 2021)*

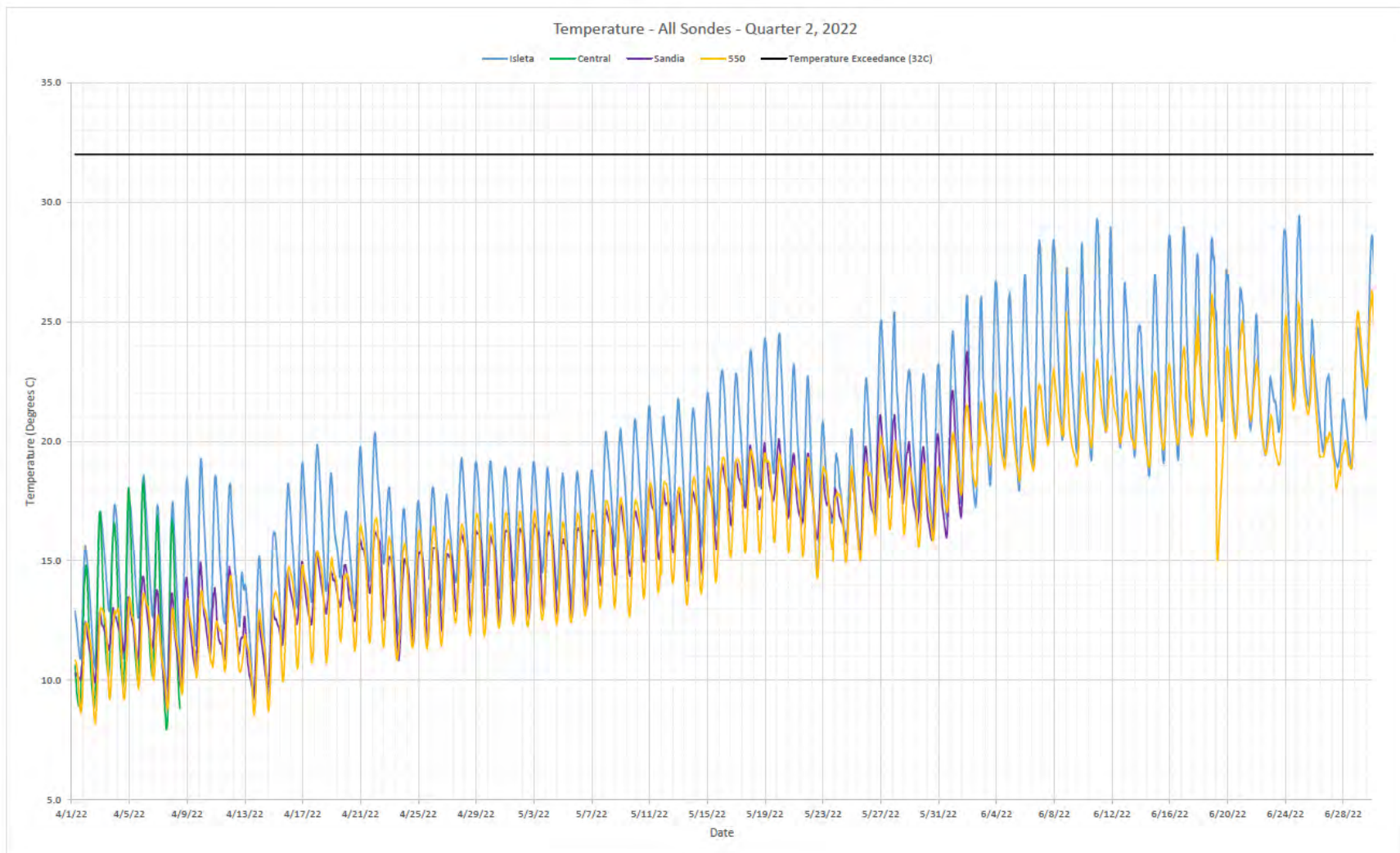


*Plot of Temperature Data Collected From Sondes Deployed During FY 2022 (October – December 2021)*



*Plot of Temperature Data Collected From Sondes Deployed During FY 2022 (January – March 2022)*





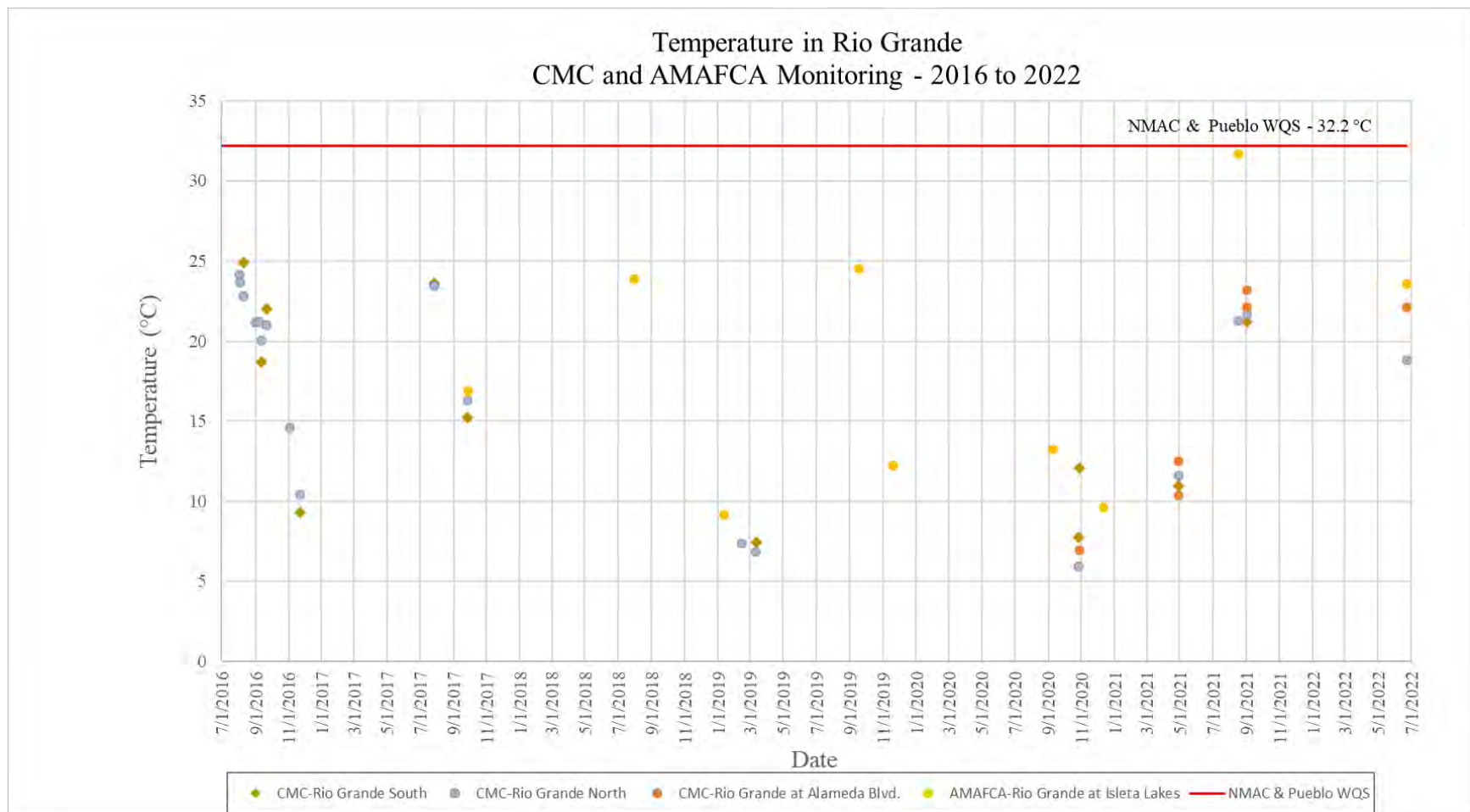
*Plot of Temperature Data Collected From Sondes Deployed During FY 2022 (April – June 2022)*

### CMC and AMAFCA Water Quality Monitoring Program Summary

In addition to the Sonde Program, both AMAFCA and the Middle Rio Grande Compliance Monitoring Cooperative (CMC) collect grab samples within the Rio Grande during storm events. Field data is measured, including temperature, for these samples. For MS4 Permit compliance, the Middle Rio Grande CMC has three (3) monitoring points, north and south of the urbanized portion of the river, as well at the Alameda Bridge. The AMAFCA Monitoring Program collects samples in the Rio Grande at the downstream (south) end of the watershed (Rio Grande at Isleta Lakes). The graph on page 9 shows the temperature data from all AMAFCA and CMC samples collected from July 2016 – June 2022. None of the field temperature data collected from these programs have recorded temperature in the Rio Grande during stormwater discharge events above the water quality standard of 32.2 °C.



*Collecting a CMC sample from the Rio Grande at  
Angostura Diversion at the upstream (north) end of the  
Middle Rio Grande Watershed*



*Plot of Temperature Data Collected From Grab Samples in the Rio Grande Through the AMAFCA and CMC Monitoring Programs*