



STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
WATER RESOURCE ALLOCATION PROGRAM
WATER RIGHTS DIVISION
DISTRICT IV, LAS CRUCES

LOWER RIO GRANDE WATER MASTER
ANNUAL REPORT
2020 ACCOUNTING YEAR



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INTRODUCTION

On December 3, 2004, the Lower Rio Grande (LRG) Water Master District was established by Order of the State Engineer (SE). The District encompasses a geographic area of 4,224 square miles, stretching from the northern extent at the base of Elephant Butte Reservoir in Sierra County, to the southern extent at the New Mexico/Texas/Mexico border in southern Doña Ana County. (See Figure 1 on Page 4). The District includes the Lower Rio Grande Administrative basin, the Hot Springs Administrative Basin, and the Las Animas Administrative Basin. There are several water users within the District. To name a few: the City of Las Cruces, City of Truth or Consequences, members of the Elephant Butte Irrigation District (EBID), New Mexico State University, New Mexico Spaceport Authority, NASA – Lyndon B. Johnson White Sands Test Facility, Public Utilities of New Mexico, & Union Pacific Intermodal Rail Yard. Additionally, the LRG Water Master District is home to one of the state’s largest agricultural producing regions that heavily contributes to the state’s \$3.44 Billion-dollar agricultural industry.

The counties within the district consistently maintain top tier national rankings for yield and cash value of crops sold eg., pecans (National Rank #1 with 87,800,000 lbs. produce valued at over \$165.06 Million dollars). Doña Ana County accounted for 24% of the nation’s total pecan production in 2019 and the state of New Mexico was the number 1 ranked state in the nation for production of pecans. Chile is also a major cash crop within the district. For the second year in a row, New Mexico surpassed California in 2019 as the #1 producing state for Chile peppers (National Rank #1 with 63 thousand tons produced in 2019 valued at \$50.0 million). Lastly, a third crop worth mentioning is New Mexico’s onion production ranking fifth in the nation with a 2019 crop value of \$102.6 Million dollars. Sierra & Doña Ana Counties account for a large portion of this production. *All the above referenced statistics according to the New Mexico Department of Agriculture’s 2019 Agricultural Statistics Bulletin.*

BACKGROUND

The surface and groundwater of the District are administered in accordance with all applicable New Mexico state laws and more specifically in accordance with all SE Order's, permits, licenses, hydrographic surveys, court adjudications, compacts, and settlement agreements, including the following:

- New Mexico Statutes Annotated, Chapters 72 & 73
- The Rio Grande Compact (March. 1938)
- The Lower Rio Grande Adjudication (*State of New Mexico v. EBID*)
- Lower Rio Grande Adjudication (SS-97-101)- Settlement Agreement and Third Judicial District Court Final Order (Aug. 2011)
- SE Order Number 168, First Initial Metering Order (Dec. 2004)
- SE Order Number 169, Creating the LRG Water Master District (Dec. 2004)
- SE Order Number 172, Amended Metering Order (Dec. 2005)
- SE Order Number 180, Supplemental Metering Order (March. 2007)
- The Hot Springs Hydrographic Survey (1958)
- The Las Animas Creek Adjudication, Cause No. 6427 (March. 1969)

New Mexico state law declares that the SE has a statutory responsibility to supervise, measure, appropriate, and distribute the waters of the state (*NMSA 1978, Section 72-1-1*). Additionally, New Mexico state law declares that the SE has the authority to appoint Water Masters, whose job is to appropriate, regulate and control the waters of such water districts if it is in the best interest of the public's safety, and the water user(s) of such water districts (*NMSA 1978, Section 72-3-1 & Section 72-3-2*). In accordance with the above referenced statute, the SE appointed a Water Master to the LRG Water Master District who is charged with administering and apportioning the waters of the District and whose specific duties include, but are not limited to:

- Curtailing illegal diversions

- Measuring and reporting water usage within the district
- Curtailing out-of-priority diversions
- Administering water usage according to agreements entered into by the water users of the district
- Coordinating where indicated, with the United State Bureau of Reclamation (BOR) and the EBID to ensure the appropriate regulation and control of groundwater withdrawals.

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MAP OF THE LOWER RIO GRANDE WATER MASTER DISTRICT



Figure 1.

The LRG Water Master group currently consists of five full time employees who maintain offices at the District IV Las Cruces Office of the State Engineer, 1680 Hickory Loop, Suite J. Members of the group include LRG Water Master Manager: Ryan J. Serrano, Senior Assistant LRG Water Master: Juan-Carlos Benavides, Assistant LRG Water Master: Demetrio Alanis, and Assistant LRG Water Master: Danny Carrillo. We currently have a vacant position for an Assistant LRG Water Master position out for advertisement. All members of the LRG Water Master group are direct employees of the SE and are compensated from the SE's general fund.

Field work of the Water Master group generally includes inspections of: groundwater points of diversion, surface water points of diversions, measurement devices and structures, water right places of use, and any illegal uses and/or waste of water. Field work also includes the utilization of Trimble GPS technology to acquire water right place(s) of use and well locations. .

Office work of the Water Master group generally includes preparation of technical reports, memoranda on water rights, and the metered diversions of those rights. The group processes and maintains approximately 14,000-meter records that are submitted to the District IV office annually. The maintenance and tabulation of diversion records, determinations of over diversions, compiling reports, general compliance notices and general correspondences providing customer assistance to the general public, coordinating compliance actions with the OSE's Administrative Litigation Unit (ALU) and attendance of various meetings.

OBJECTIVES

MEETINGS

In 2020, the LRG Water Master Supervisor and his staff participated in numerous one-on-one virtual and in-person meetings with water users both in the office and in the field. Discussions centered on groundwater diversion limits, reconciliation of accounts, settlement provisions, and metering issues. The Water Master Supervisor also participated in several virtual meetings with upper management to provide

updates and discuss strategy regarding activities within the district. Water Master staff also attended monthly board of directors meeting for the Elephant Butte Irrigation District.

ENFORCEMENT & COMPLIANCE

In 2020, the LRG Water Master group initiated 77 enforcement and compliance actions for varying degrees of non-compliance within the SE jurisdiction as set forth in the beginning of this report. Of the 77 enforcement and compliance actions initiated, 42 (54.54%) have been resolved at the District level, and the remaining 35 (45.45%) actions are still pending resolution. If compliance is not achieved on the remaining 35 actions within a timely fashion, these issues will be forwarded to the SE's ALU to pursue compliance orders in accordance with *NMSA 1978, Section 72-2-18* and enforcement of those orders in either the Third or Seventh Judicial District Courts.

IMPLEMENTATION OF SETTLEMENT TERMS

In addition to the ongoing enforcement and compliance efforts described above in 2020, Water Master staff also continued to actively implement the 2011 Settlement of LRG Irrigation Water Requirements and Final Judgment issued by the Third Judicial District Court. This Settlement and Judgment set limits on the amount of groundwater that can be diverted for irrigation purposes within the district. The Farm Delivery Requirement (FDR) was set at 4.5 acre-feet/acre, and the Consumptive Irrigation Requirement (CIR) was set at 2.6 acre-feet/acre. Implementation efforts have focused on accurate accounting of the FDR and accommodation of other specific provisions within the settlement that allow for joint management of groundwater rights associated with farms under the same ownership/management (OwMan). Joint management gives water users more flexibility in allocating groundwater pumping among farms (that is, one farm can pump more, if another farm pumps less), even if those farms have different water right file numbers. This provision can be used in managing groundwater on separate farms owned by the same party. This provision can also be utilized by a farmer who manages several farms, not all of which he or she owns, provided there is a written agreement between the farmers and the landowners.

Water Master staff have made considerable efforts in the last six accounting years to implement and effectively manage the basin-wide FDR and the other applicable provisions of the settlement, including but not limited to the OwMan provision. An example of these efforts included the development of accounting mechanisms in the New Mexico Water Rights Reporting System (NMWRRS) website for accurate tracking of diversion on a yearly basis. Other efforts included providing notice to water users of their specific allowable diversion based on their individual water rights and whether or not they had exceeded that allowable limit in any one accounting year. In January of 2020, Water Master staff tabulated the diversion amounts associated with each individual water right for the previous 2019 accounting year, taking into consideration all the variables associated with the diversion of groundwater within the district including water right specific FDR's, surface water allotments, and settlement provisions. From this tabulation, Water Master staff determined that approximately **3,857.19 acre-feet** of groundwater was diverted in excess of the total allowable diversion limit associated with the known water rights on file with this office.

In an effort to reconcile the exceeded amount of groundwater in a timely fashion, the Water Masters put into motion a stepped procedure for reconciling these diversions. This procedure was developed in coordination with the SE ALU & the SE Hearing Unit. The procedure includes notices to owners, voluntary repayment plans, initiation of compliance orders, and options for an expedited administrative hearing. This effort proved to be effective and resulted in **81.44%** of the exceeded diversion being successfully reconciled within one year. The details of this effort are summarized in *Figure 2. On Page 9.*

The reconciliation of each exceeded diversion occurred via one of four primary techniques. 1) Identifying and correcting inaccurate acreages in the WATERS database; 2) Verifying and correcting distribution errors (*mostly with a single well that serves multiple water rights*); 3) Grouping farms and associated diversions by averaging the use across several water right files using the OwMan provisions of SSI#101. This will only occur in extenuating circumstances where in-season demand dictated the use, and sufficient documentation and evidence can be provided, and/or 4) Utilizing a payback system via an

acceptable voluntary repayment plan. We have many instances where water right owners acknowledge their over diversion in which case, they are required to repay that overage by either reducing their overall diversion in 2020 through a voluntary fallowing, reductions in irrigated acreage, and/or securing other valid existing water rights to transfer permanently or temporarily via the OSE's application processes.

As a result of several obstacles related to extended public health orders during the year 2020, we were unable to fully reconcile the 2019 over-diversion. Inability to meet face to face with water right owners and review their records and practices either in the office or on farm limited the amount of progress we were able to achieve. Moving into the 2020 accounting year we will re-assess the unresolved 18.55% of the over-diversion from 2019 and determine if those issues self-corrected and/or if they need to be incorporated into the 2020 reconciliation that will occur throughout the spring and summer of 2021.

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Lower Rio Grande Groundwater Reconciliation Progress Accounting Year 2019

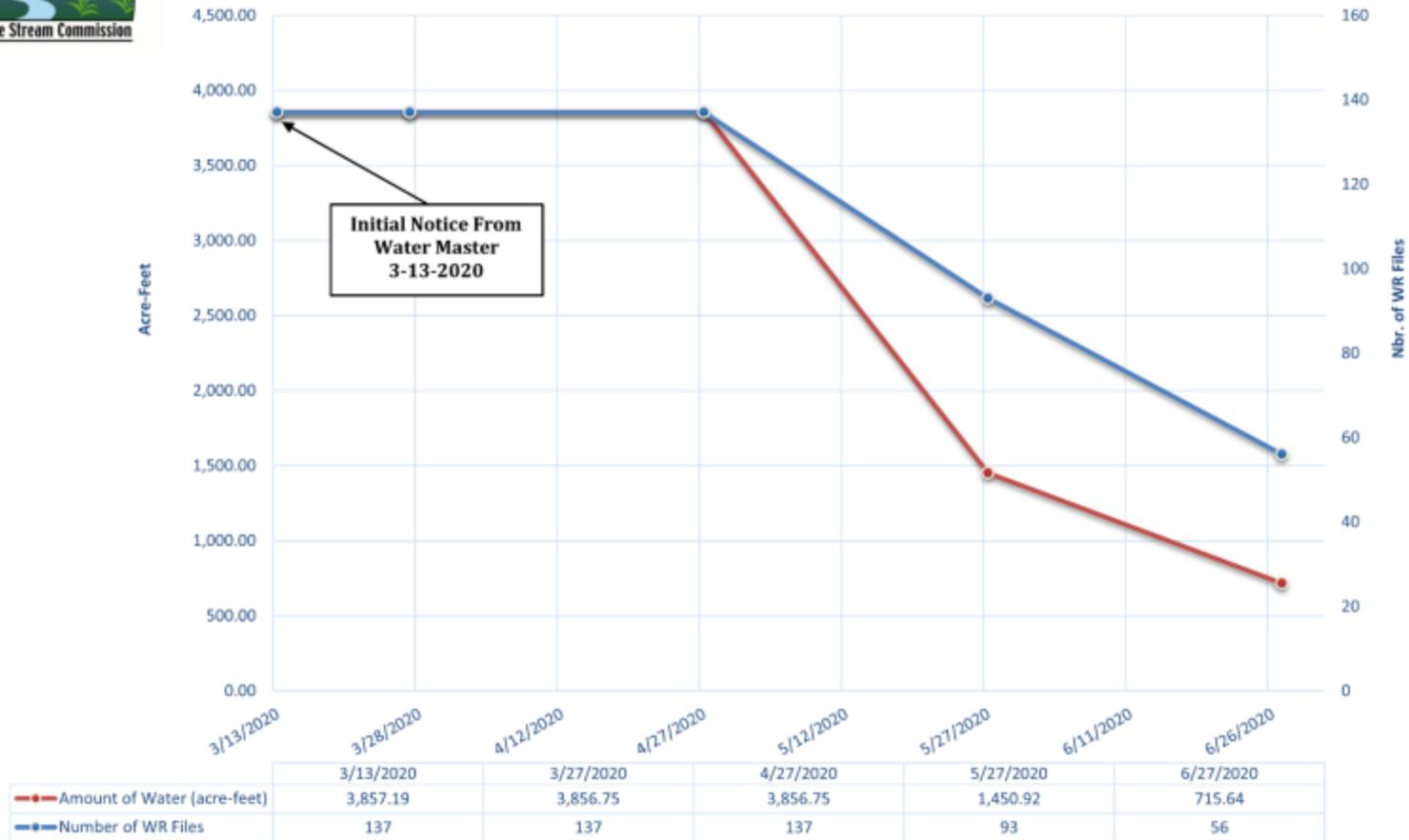


Figure 2.

The data depicted in this chart is preliminary and subject to change.
LRG Water Master Manager, RJS

GROUNDWATER METERING

In accordance with SE Order Number 172, it is the responsibility of the water right owners to submit meter readings to the SE on or before the tenth day of January, April, July, and October for the three preceding calendar months, unless otherwise ordered by the SE. In an effort to maintain high voluntary meter reading submittal rates and ensure a complete and accurate data record, the LRG Water Master group has taken three proactive steps. Those steps include the following:

STEP 1: Postcard Reminders – In December of each accounting year, LRG Water Master Staff sends a friendly reminder postcard to every water right owner with an actively metered well and/or diversion. The postcard serves as a general reminder to well owners for submittal of final meter reading for the accounting year.

STEP 2: Meter Reading Overdue Letter – In January of the following accounting year, Water Master staff sends out meter reading delinquency letters to those well owners who have failed to submit meter readings for the final reporting period of the year. The letter requires the water right owners to submit their meter reading(s) within 10 days of the receipt of the letter. The letter indicates that if any meter readings are not submitted within a timely manner, the issue would be forwarded to the SE's Administrative Litigation Unit.

STEP 3: Outstanding Meter Reading Enforcement – Normally there has been a small percentage of well owners who do not respond to Steps 1 or 2. In order to facilitate a complete data record, Water Master staff conduct field work and physically acquire a meter reading for each of the remaining wells for which a reading has not submitted by the well owners.

As a result of the LRG Water Master group efforts outlined above, **3,162 wells**, or **93%** of the actively metered irrigation wells within the LRG Water Master District have the meter readings entered into the WATERS databases to close out the accounting year 2020.

SURFACE WATER METERING

2020 was the fourth full year of operation for all five surface water measurement sites within the



LRG. The sites are fully functional and logging surface flow data daily. This data is housed locally at the OSE’s District IV office and is available to the public via the OSE’s Real-Time Water Measurement Information System website at:

<http://meas.ose.state.nm.us/district4.jsp>

Water Master staff regularly visits each site to ensure proper functionality, download data, and to collect verification measurements. The data is then checked for accuracy against field measurements, corrected if necessary and certified. A summary of the 2020 annual diversion totals for each site is listed in the table below.

Site Name	Basin	Average Daily flow (cfs)	Total Diversion -2020 (acre-feet)
San Miguel Community Ditch	Hot Springs	1.09	695.62
Paxton/Cates River Pump	Hot Springs	0	0
Las Palomas Community Ditch	Hot Springs	2.58	1,869.34
Las Animas Community Ditch	Las Animas	0.30	208.42
Holguin River Pump	Lower Rio Grande	0.79	573.49

Table 1.

The sites selected for measurement were identified as locations in critical need of measurement, not only for the purposes of this agency but for the users/managers of these surface water systems and the public at large. The construction of these sites was funded through the State of New Mexico’s Severance Tax Bond Program, and the Legislatures Capital Improvement award process.



ANALYSIS

2020 DIVERSIONS

For 2020, the EBID Board of Directors allotted 14.0 acre-inches (1.16 acre-feet per acre) of surface water to its constituents. This allocation equates to **105,142** acre-feet of Rio Grande Project surface water being put to beneficial use within the LRG Water Master District. This was the same amount of surface water allotted in 2019. This surface water supply from 2019 to 2020 is the result of above average snowpack and snowmelt runoff from the upper watershed and below average monsoonal rainfall in south and central New Mexico. Much of the usable Project water available in 2020 was the result of carry over-provisions of the Rio Grande operating manual. The identical surface water allotments between 2019 & 2020 resulted in sustained amounts of groundwater pumping during the 2020 accounting year.

The availability and amount of surface water and the timing of its delivery (*Late Mid-April 2020 to the Hatch/Rincon Valley and Mid May 2020 to the Mesilla Valley*) had a notable impact on the amount of early season supplemental groundwater pumping for irrigation purposes that was observed on early season crops such as onions, lettuce, cabbage, wheat, alfalfa, and other silage type crops. This staggered release of surface water has been deployed over the previous five irrigations seasons. This surface water delivery method has proven to be very effective in alleviating the need for early season supplemental groundwater pumping and has allowed many farmers, in some instances, to start and finish crops without supplemental groundwater particularly in the Hatch/Rincon Valley.

An almost nonexistent monsoon season and record-breaking high temperatures late in the summer and fall for the second year in a row has led to sustained rates of supplemental groundwater diversions for irrigation purposes later in the growing season. These groundwater diversions for irrigation purposes late in the season are necessary to finish late season crops such as cotton, alfalfa and pecans.

In 2020, a total of **265,794 acre-feet** of metered groundwater was diverted within the LRG Water Master District. This is a 0.25% increase in groundwater diversions compared to the 2019 accounting

year. For irrigation purposes **218,231 acre-feet** of groundwater was diverted. This is a 0.47% increase from 2019. For municipal and other drinking water purposes **40,164 acre-feet** was diverted. This is a 3.59% increase from 2019. *Table 2* on page 15 compares and summarizes groundwater diversion by category for the 2018, 2019 and 2020 accounting years. Additionally *Figure 4* on page 16 compares irrigation specific diversion totals for the 2014 through 2020 accounting years.

The Water Master supervisor fielded many requests in 2020, not only for basin-wide groundwater diversion data, but also for sub-basin specific diversion data. Seeing the benefit of further analysis at the sub-basin level we have included a further breakdown of sub-basin groundwater diversion hereto. For the purposes of this report sub-basins are defined according to the criteria set for the Lower Rio Grande Basin Hydrographic Survey Report (*Parsons Et. al, 2000*). There are four distinct sub-basins; the Rincon Valley Section (RIN), Northern Mesilla Valley Section (NMES), Southern Mesilla Valley Section, and the Outlying Areas Section (OUTLY). *Table 3* on page 17 details this sub-basin breakdown in greater detail¹.

In the Hot Springs Administrative Basin, a total of **2,598 acre-feet** of metered groundwater was diverted under the jurisdiction of the LRG Water Master in 2020 of which, **942 acre-feet** was diverted for irrigation purposes, and **1,497 acre-feet** was diverted for municipal purposes. This municipal use includes the water rights on file with the SE for the City of Truth or Consequences.

In the Las Animas Administrative Basin, a total of **396 acre-feet** of metered groundwater was diverted under the jurisdiction of the LRG Water Master in 2020, of which 391 acre-feet were diverted for irrigation purposes. Only 5 acre-feet of groundwater was diverted for use other than irrigation in the Las Animas Basin.

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¹ Note: Approximately 23 acre feet (0.01% of the total) of groundwater could not be assigned a sub-basin during data analysis. Therefore, a small discrepancy exists between *Table 2* & *Table 3* totals.



Three (3) Year Comparison and Summary of Metered Groundwater Diversions in the Lower Rio Grande Water Master District (Acre-Feet)

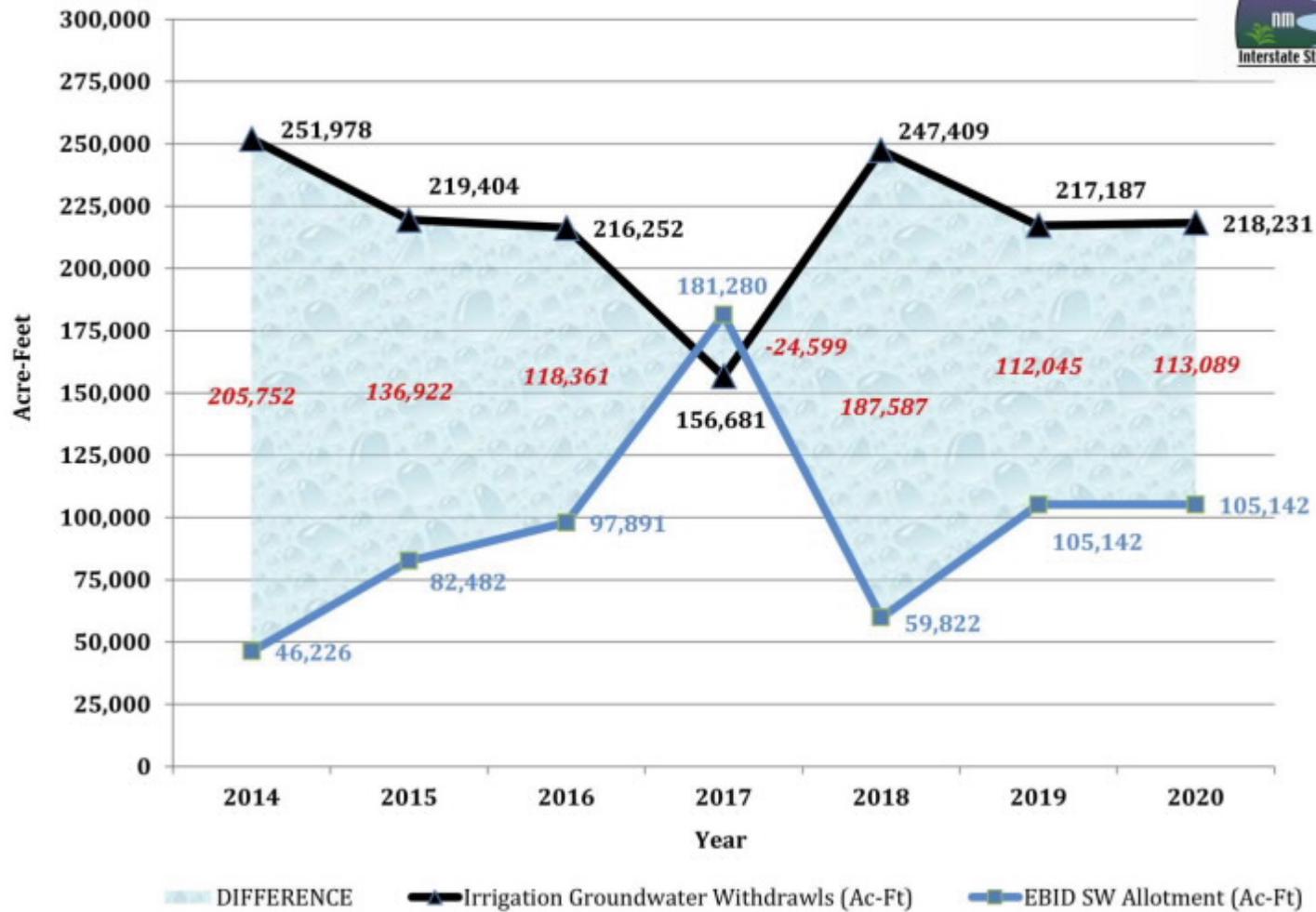


Category	2018		2019		2020		3-Year Total	
Irrigation	244,310	83.44%	217,187	81.91%	218,231	82.11%	679,728	82.52%
Drinking Water: Municipal, Mutual Domestic, and individual Domestic Supply (includes 2,400 AF of estimated unmetered domestic)	39,474	13.48%	38,719	14.60%	40,164	15.11%	118,357	14.37%
City of Las Cruces	22,158		21,316		21,401			
New Mexico State University	2,608		3,028		3,087			
Mutual Domestic	7,213		7,870		12,204			
Other Drinking Water	7,496		6,505		3,472			
Commercial/Industrial/Dairy	8,400	2.87%	7,997	3.02%	6,662	2.51%	23,059	2.80%
All Other Uses	618	0.21%	1,237	0.47%	738	0.28%	2,593	0.31%
Total	292,802		265,139		265,794		823,736	100%

Reasonable efforts have been made by the New Mexico Office of the State Engineer (OSE) to verify the accuracy of this data. However, this data may be subject to change if and when more information becomes available. 4-20-2021 RJS, LRG Water Master, Manager

Table 2.

Seven Year Comparison of Irrigation Groundwater Withdrawals to the EBID Surface Water Allotment (Acre-Feet)





**Lower Rio Grande Sub-Basin Breakdown
of Metered Groundwater Diversion (Acre-Feet) - 2020**



Category	RINCON		NMES		SMES		OUTLY	
Irrigation	47,027	96.79%	47,090	62.76%	123,458	90.53%	1,179	18.51%
Mutual Domestic, and individual Domestic Supply <i>(includes 2,400 Ac-Ft of estimated unmetered domestic/all four sub-basins)</i>	900	3.07%	26,803	35.72%	7,695	5.64%	4,294	67.43%
Commercial/Industrial/Dairy	60	0.12%	782	1.04%	4,992	3.66%	808	12.69%
All Other Uses	8	0.02%	356	0.47%	232	0.17%	87	1.37%
Sub-Basin TOTAL(s)	47,994	100.00%	75,030	100.00%	136,378	100.00%	6,369	100.00%

BASIN WIDE AGRREGATE		
	Metered Groundwater	% of Total
RINCON	47,994	18.06%
NMES	75,030	28.23%
SMES	136,378	51.31%
OUTLY	6,369	2.40%
TOTAL	265,771	100.00%

Reasonable efforts have been made by the New Mexico Office of the State Engineer (OSE) to verify the accuracy of this data. However, this data may be subject to change if and when more information becomes available. 4-20-2021 RJS, LRG Water Master. Manager

Table 3.

GROUNDWATER LEVEL OBSERVATIONS 2020-2025

Groundwater levels within the LRG Water Master district are monitored by a network of shallow groundwater monitoring wells that are drilled into the river valley alluvium and the underlying contiguous Santa Fe group geologic formation. These monitoring wells were drilled as part of a cooperative effort between the New Mexico Interstate Stream Commission (ISC) and the EBID. All of the monitoring wells are drilled in the central portion of the district within the Rio Grande valley alluvial flood plain between the east and west mesas (see map of monitoring well location on page 19).

For ease of data interpretation, we separated the monitoring wells into three (3) distinct geographic sub-basins: the Rincon (RIN), Northern Mesilla (NMES), and Southern Mesilla (SMES). The data collected at these monitoring wells is maintained by the EBID, and Water Master staff frequently download the data from EBID's hosted website (www.ebid-nm.org) to track groundwater level fluctuations throughout the accounting year.

In 2020 we moved into a new six-year data analysis cycle. Therefore, analytics detailed in this year's report will outline those observation for the first year in the cycle (2020). During 2020, groundwater levels in the RIN sub-basin witnessed an average rate of change of **-0.04 feet**, with the most notable variations shown at monitoring locations: RIN_4R & RIN_7R. (*RIN Hydrograph, page 22*). In the NMES sub-basin, groundwater levels were static, with very little measurable change observed over the course of the year. (*NMES Hydrograph, Page 24*). In the SMES sub-basin, groundwater levels increase by an average rate of change of **+0.02 feet**, with the most notable variations shown at monitoring locations: MES_6R, MES_2R, and MES_23R. (*Southern Mesilla Hydrograph page 26*).

For the purposes of this report a monthly and yearly rate of change per geographic sub-basin were derived using a simple rate of change formula $R = \frac{\Delta X}{\Delta Y}$. Monthly rates of change are based on twelve months of groundwater level data at each monitoring location. The monthly rate of change per

monitoring well location were then aggregated and averaged per geographic sub-basin to establish a weighted sub-basin rate of change in the groundwater table².

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² Within each of the three sub-basin hydrographs, there may be gaps in some data series. These gaps are the result of instrumentation error and zero values being reported for that time period.

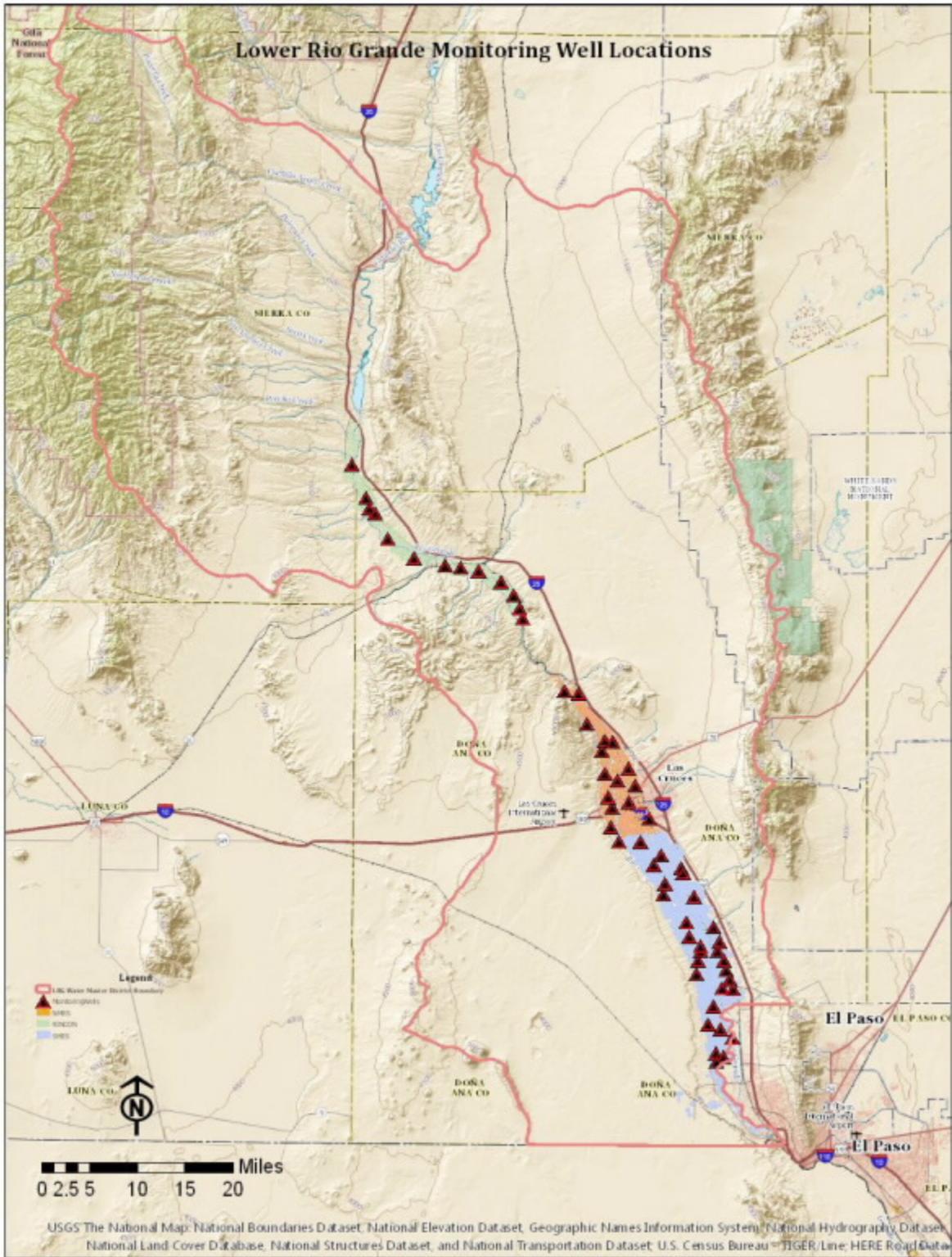
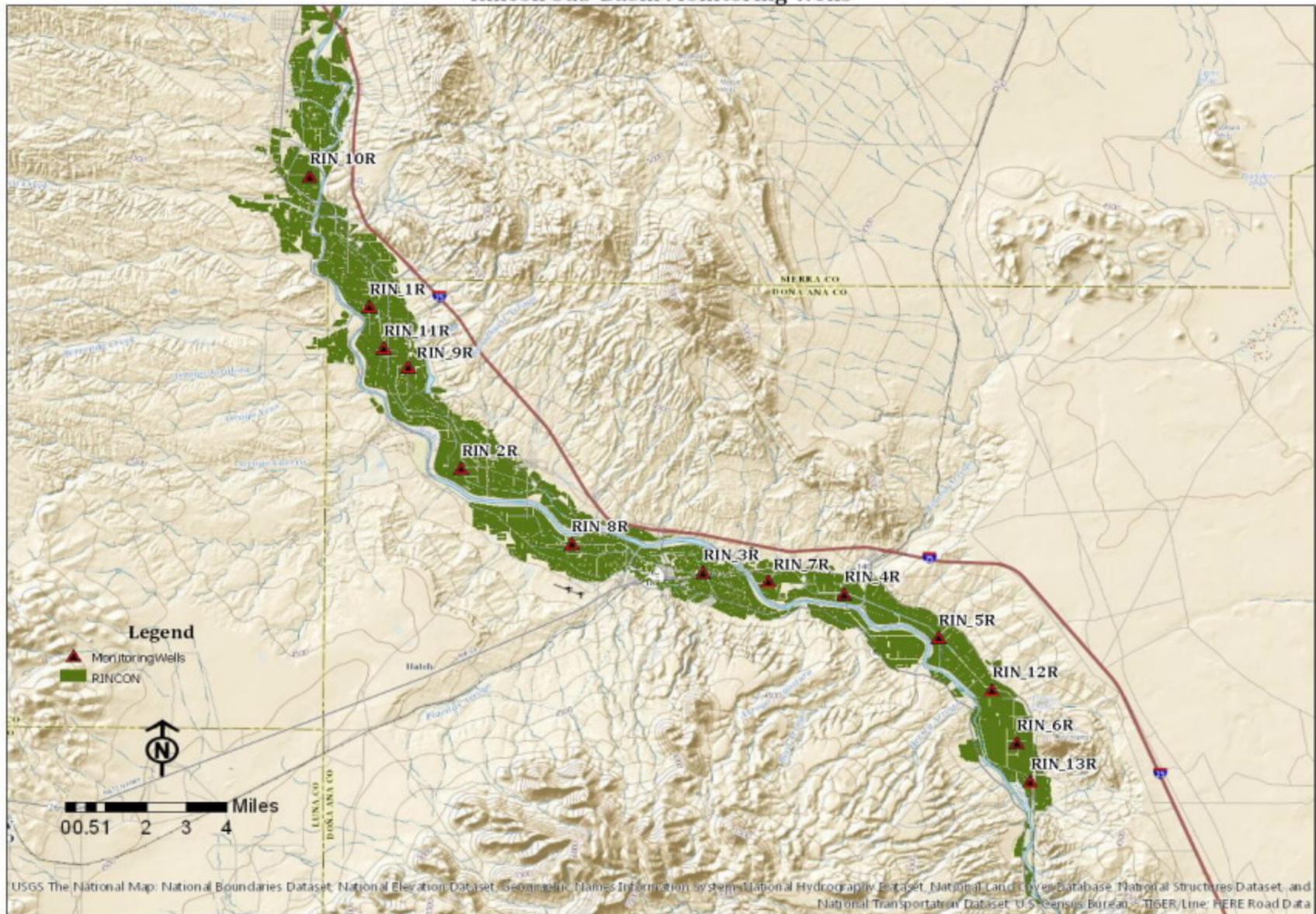
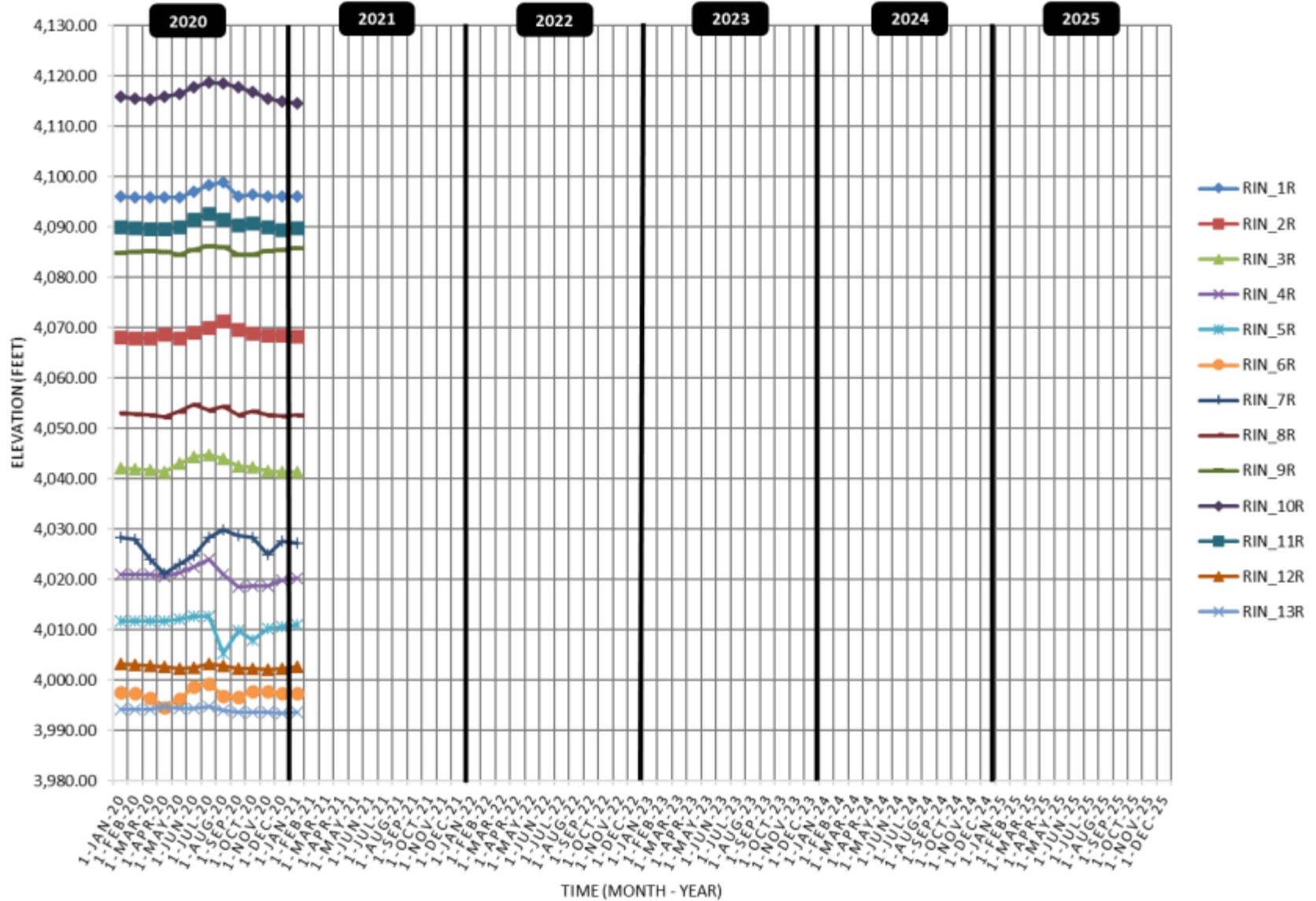


Figure 5.

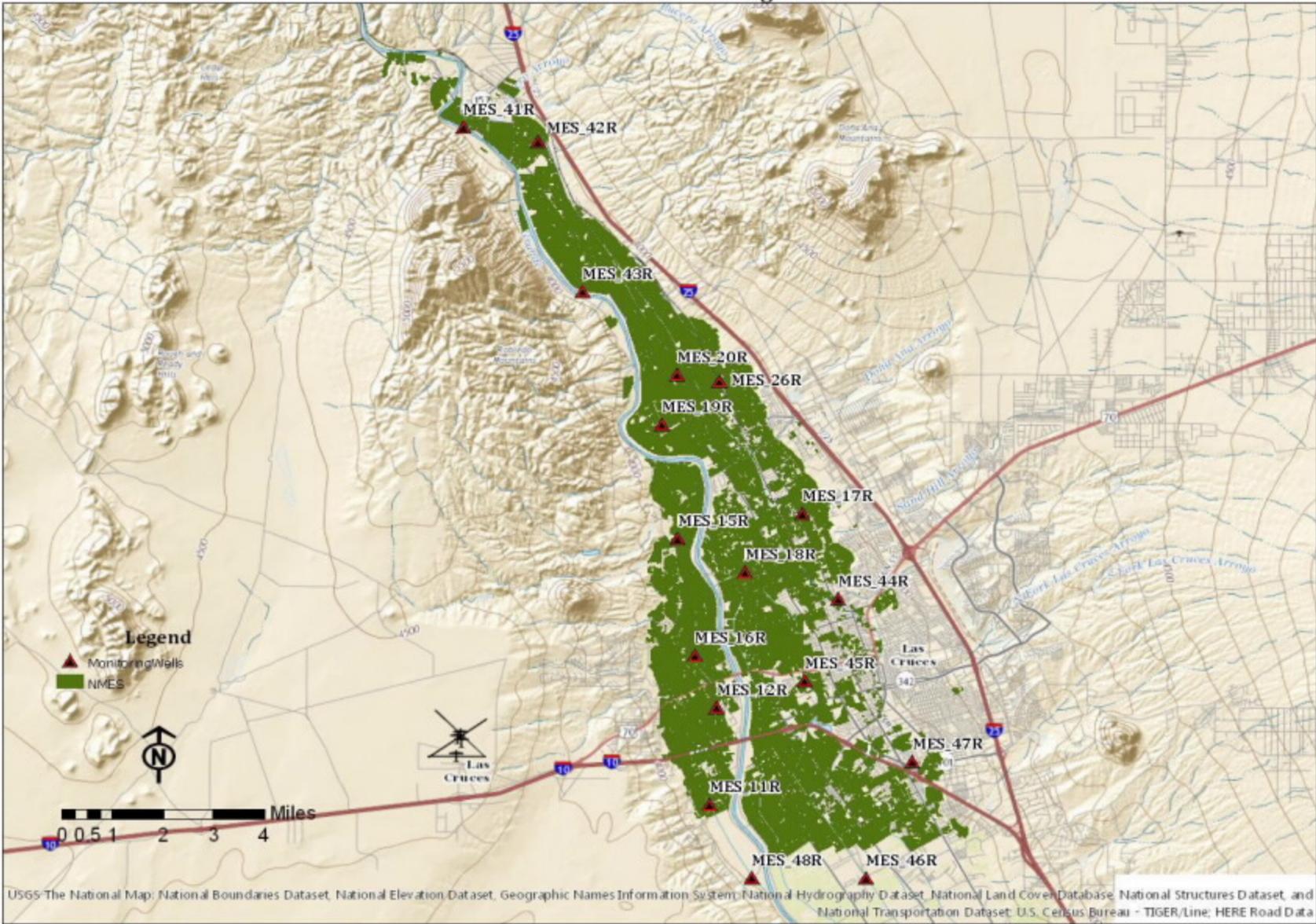
Rincon Sub-Basin Monitoring Wells



RINCON BASIN HYDROGRAPH

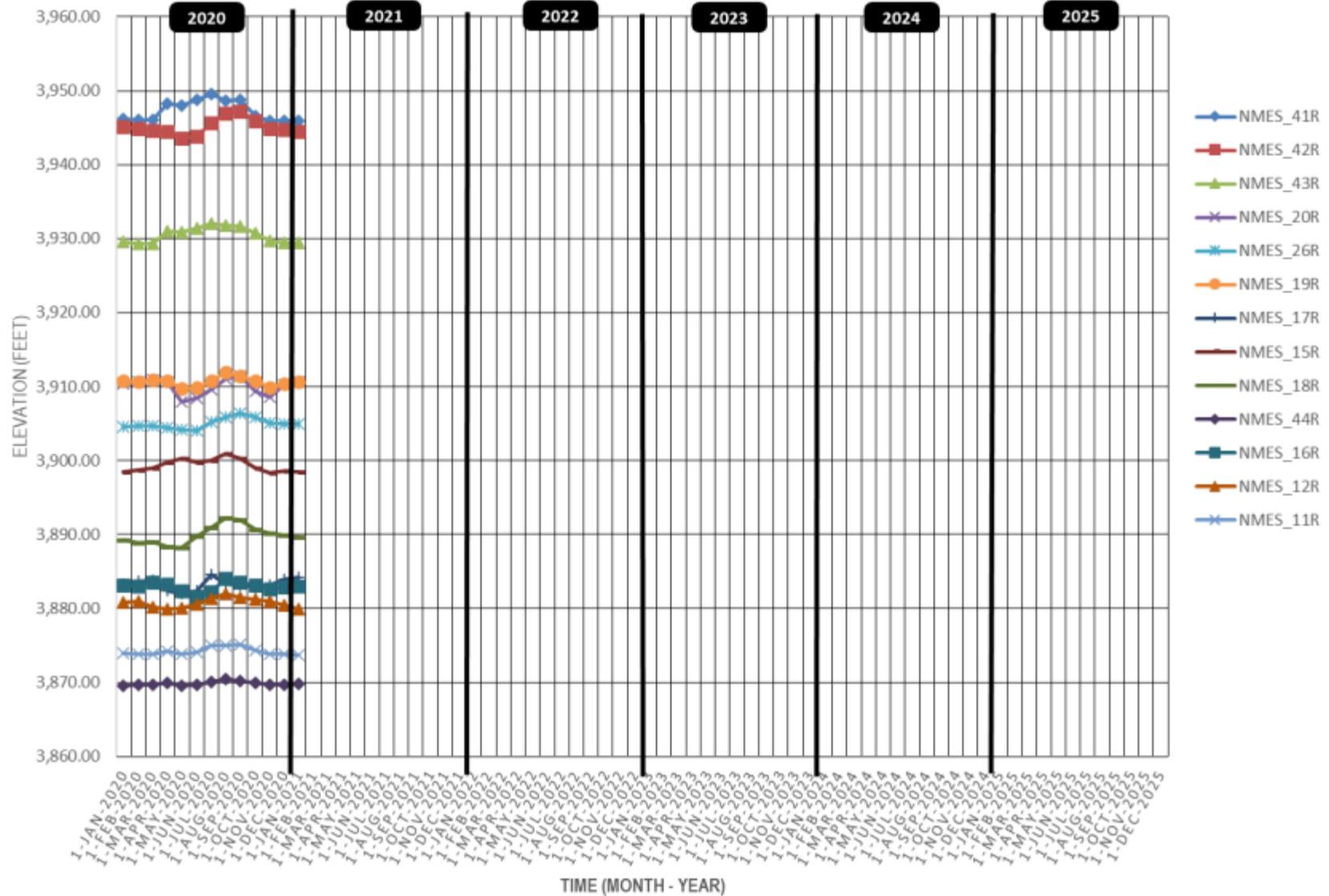


NMES Sub-Basin Monitoring Wells

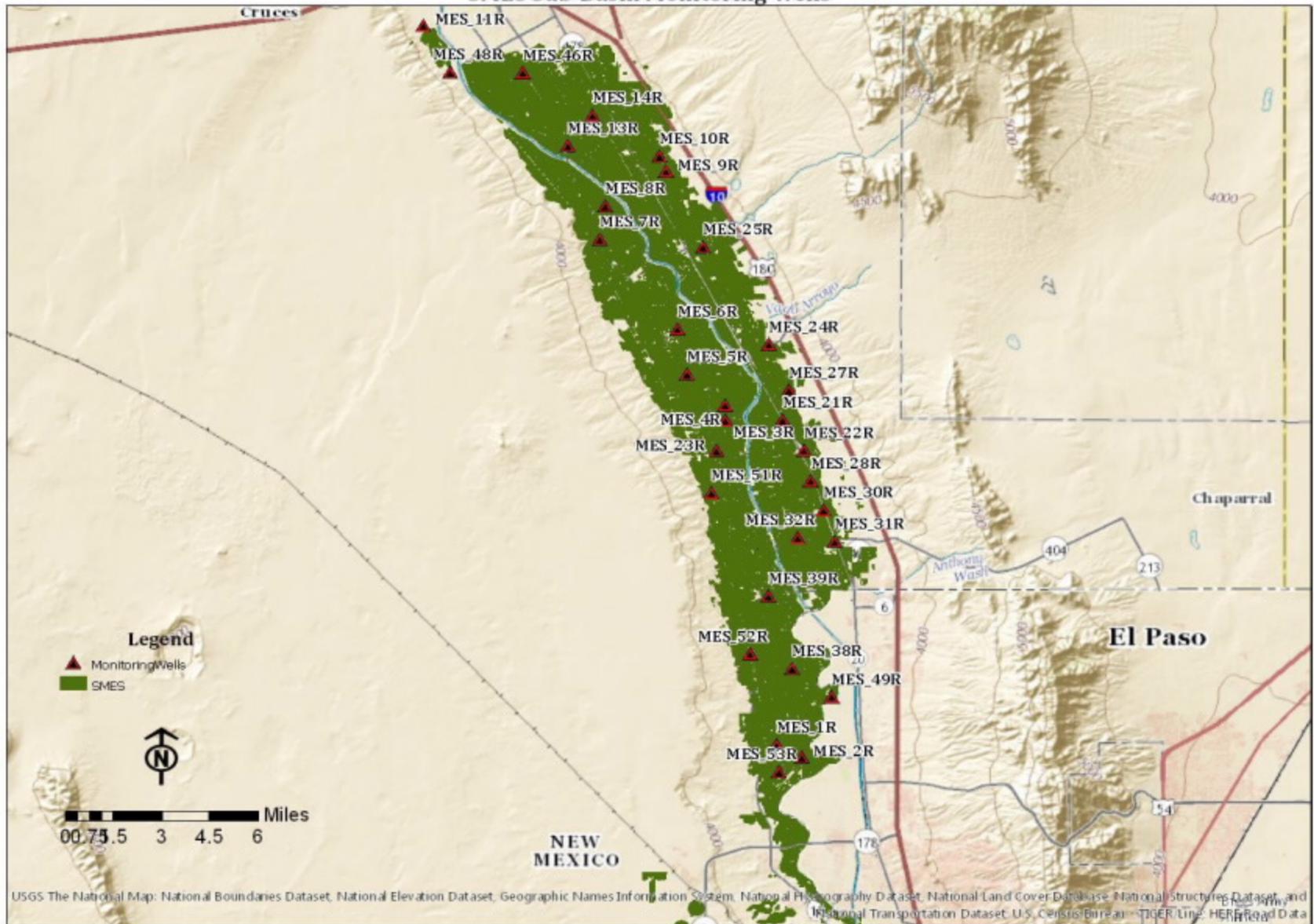


USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data

NORTHERN MESILLA BASIN HYDROGRAPH

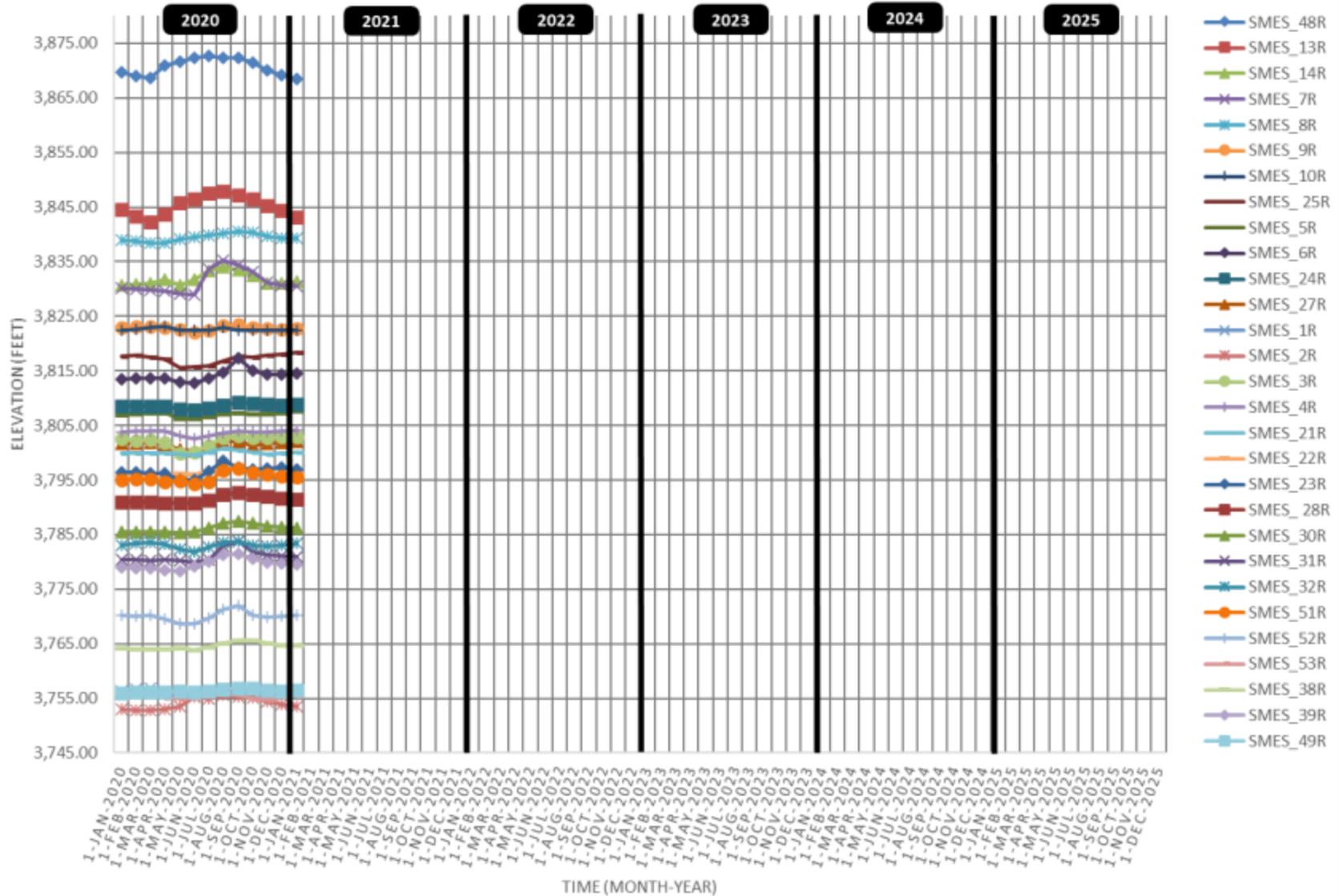


SMES Sub-Basin Monitoring Wells



USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset. U.S. Census Bureau - TIGER Line, HERE Road Data

Southern Mesilla Basin Hydrograph



2021 ACCOUNTING YEAR OUTLOOK

At the time of this report, the United States Department of Agriculture's (USDA), Natural Resource Conservation Service (NRCS) website for the Upper Rio Grande Basin watershed was reporting a basin wide snow water equivalent index number of 65% of normal, or 35% below average. Additionally, the NRCS monthly *New Mexico Basin Outlook Report* for April 2021 forecasts stream flow and runoff at San Marcial to be 50% of normal between March and July of 2021. In terms of available surface water, this means that the Rio Grande Project should not expect to receive a significant boost in usable storage from the 2021 snowmelt runoff.

If this forecast holds true, then water users within the Lower Rio Grande Water Master district (particularly those with an irrigation purpose of use) should anticipate a 0.50 acre-foot per acre allotment or less via the Rio Grande Project and the EBID during the 2021 irrigation season. That will primarily be allotted based on current usable storage. The EBID Board of Directors has already (at the time of this report) discussed an initial allotment to its members of 3-6 acre-inches per acre or 0.25-0.50 acre-feet per acre. This equates to 8-16% of a full surface water supply year. Given similar surface water allotments in 2013 & 2014, it should be anticipated that ground water diversions for irrigation purposes will increase from last year up to the 280,000+ acre-foot range. All other uses not directly impacted by available surface water supplies should be expected to maintain their observed three-year averages, resulting in an anticipated total groundwater diversion in the 2021 accounting year of 300,000+ acre-feet.

