21CW3026: Sustainable Water Augmentation Group Preliminary Engineering Report – Supplemental

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Prepared for the Sustainable Water Augmentation Group

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Cover page photo source: NASA view of San Luis Valley from International Space Station (https://eoimages.gsfc.nasa.gov/images/imagerecords/149000/149599/iss066e084577.jpg)

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I. Introduction

The Sustainable Water Augmentation Group (SWAG) has filed an application for a plan for augmentation to authorize the continued operation of SWAG member wells located within the Closed Basin in compliance with Colorado water law and the Rules Governing the Withdrawal of Groundwater in Water Division No. 3 (the Rio Grande Basin) and Establishing Criteria for the Beginning and End of the Irrigation Season in Water Division No. 3 for All Irrigation Water Rights. This Report will describe how SWAG's operations, as proposed in 21CW3206, will replace depletions to the Rio Grande River, prevent injury to surface water rights and achieve and maintain aquifer sustainability.

In order to address historical depletions to the aquifer that have resulted from SWAG's pumping, SWAG is in the process of purchasing a group of 37 parcels that will be fallowed. During operation of the plan for augmentation, pumping from Member Wells can cause depletions to streamflow, and SWAG members currently own supplies that will be used to augment depletions in the year of operations and in future years. Operations to replace depletions are described in more detail in the Clear Water Solutions Engineering Report for SWAG.

A. Definition of Terms

The following acronyms and terms are used in this report:

- AOP: Annual Operations Plan
- ARP: Annual Replacement Plan
- CDSS: Colorado Decision Support System
- Groundwater Rules: 2015CW3024 -- Rules Governing the Withdrawal of Groundwater in Water Division No. 3 (the Rio Grande Basin) and Establishing Criteria for the Beginning and End of the Irrigation Season in Water Division No. 3 for All Irrigation Water Rights
- Member Wells: Wells owned by members of SWAG
- NGWCU: Net Groundwater Consumptive Use
- NGWCU+RC: Net Groundwater Consumptive Use, Adjusted for Recharge Credits
- NGWD: Net Groundwater Deficit
- Plan Year: A consecutive period of 12 months from May through the following April
- RCL: Recovery Consumption Level
- RG1: Reach of the Rio Grande between Del Norte and the Excelsior Ditch headgate
- RG2: Reach of the Rio Grande between the Excelsior and Chicago Ditch headgates
- RG3: Reach of the Rio Grande downstream of the Chicago Ditch headgate
- RGDSS: Rio Grande Decision Support System
- RGDSS Model: RGDSS Groundwater Model
- SCL: Sustainable Consumption Level
- SWAG: Sustainable Water Augmentation Group
- SWAG Plan: SWAG's planned operations under the proposed Plan for Augmentation

II. Background Information

A. Participant Lands and Wells

SWAG members have historically irrigated a total of 17,317 acres in Alamosa, Rio Grande, and Saguache counties. SWAG members have historically used 257 irrigation wells in their operations, and the relevant details describing these wells are tabulated in **Appendix A** to this memorandum. All SWAG parcels are within the boundaries of Response Area 1 of the Rio Grande Decision Support System ("RGDSS") Groundwater Model[1] ("RGDSS Model"), as depicted in Figure 1.

In recent years, SWAG members have reduced their Net Groundwater Consumptive Use ("NGWCU"), which is the amount of groundwater withdrawn by SWAG Member wells which does not otherwise return to the unconfined aquifer, through reductions in irrigated acreage, changes in crop types, and other changes, in recognition of the depleted status of the unconfined aquifer in Response Area 1. This reduction in NGWCU has also led to a corresponding reduction in NGWCU+RC, which is the amount of groundwater withdrawn by SWAG Member wells which a) does not otherwise return to the unconfined aquifer and b) is not offset by artificial surface water recharge from other sources available to SWAG or its Members. The historical NGWCU+RC for the group, as determined from RGDSS Model outputs, was calculated for the years 1970-2010, and NGWCU+RC calculations for the years 2011-2019 were carried out using well pumping data, along with surface water recharge credits for those parcels served by the Farmers Union and Rio Grande Canals. The results of these calculations are listed in Table 1, and displayed in Fig2, along with corresponding values for Subdistrict 1 (SD1).

[1] References to the RGDSS Model in this memorandum refer to Model version X6A00P98

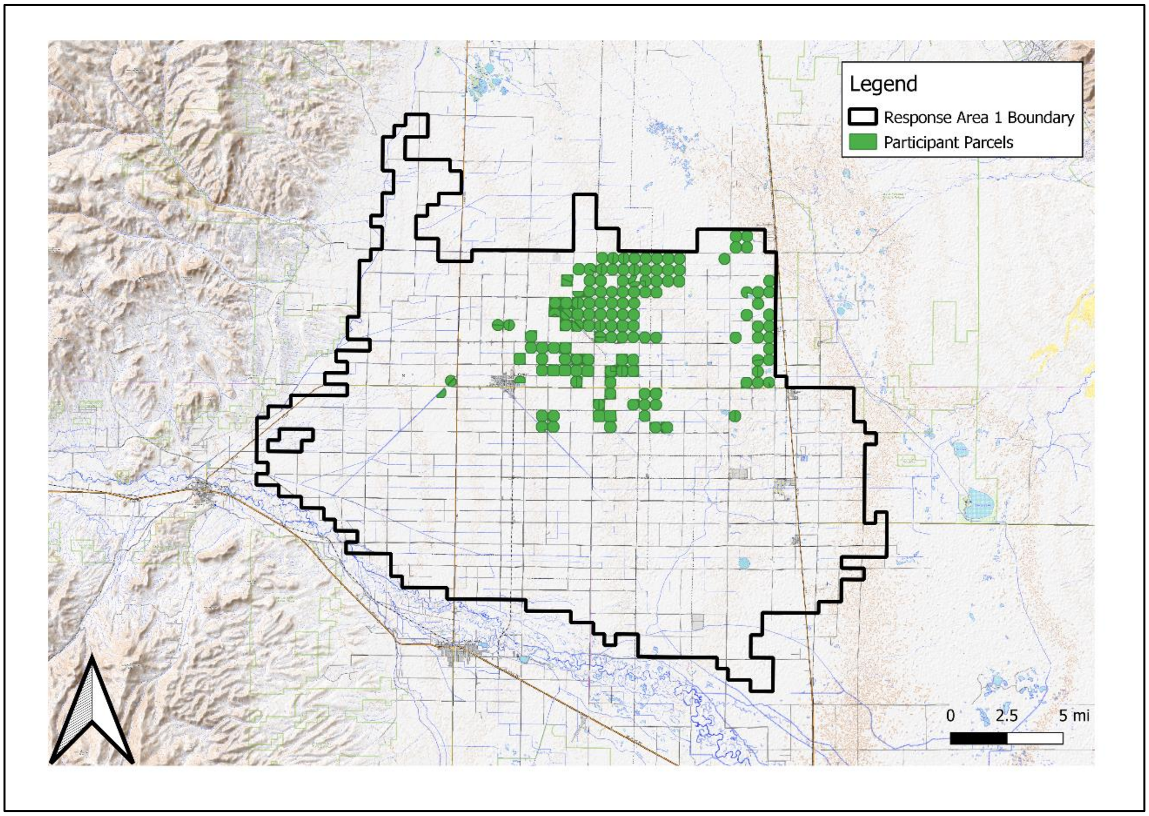

Figure 1. Participant Parcel Map

Table 1. Historical NGWCU+RC

Years	SWAG NGWCU+RC (AF)*	SD1 NGWCU+RC (AF)**
1970	24,227	101,276
1971	20,745	136,833
1972	23,480	169,370
1973	14,105	38,852
1974	25,622	223,630
1975	13,220	23,754
1976	16,739	65,761
1977	25,473	240,128
1978	18,742	155,494
1979	9,598	11,835
1980	15,269	63,874
1981	21,893	170,011
1982	16,780	36,228
1983	14,811	32,220
1984	18,878	40,219
1985	11,652	2,569
1986	13,166	(37,341)
1987	19,565	109,993
1988	25,242	177,159

Years	SWAG NGWCU+RC (AF)*	SD1 NGWCU+RC (AF)**
1989	23,776	169,479
1990	17,695	88,972
1991	15,940	46,446
1992	15,636	67,072
1993	10,907	(21,381)
1994	20,142	100,661
1995	10,981	(68,611)
1996	30,066	205,240
1997	13,023	(1,949)
1998	23,474	112,458
1999	12,675	(50,973)
2000	28,376	213,181
2001	18,913	65,823
2002	33,339	322,492
2003	26,947	234,276
2004	22,652	126,957
2005	19,876	70,344
2006	24,068	119,608
2007	15,692	23,117
2008	16,993	49,202
2009	13,760	(4,456)
2010	19,655	76,287
2011	26,757	162,320
2012	15,812	148,994
2013	14,435	95,197
2014	11,952	34,198
2015	8,644	(14,194)
2016	14,914	15,035
2017	14,915	(1,604)
2018	22,900	173,549
2019	10,568	(42,818)
2020	19,792	124,380
2021	17,276	70,535
1970-2010 Average	19,117	90,393
2011-2021 Average	16,179	69,599

*SWAG's NGWCU+RC values for 1970-2010 are derived from RGDSS Model outputs for well depletions and irrigation recharge, and 2011-2021 are calculated based upon observed data

**SD1's NGWCU values for 1970-2010 are derived from RGDSS Model outputs for well depletions and irrigation recharge, and 2011-2021 are tabulated values from the 2022 Annual Replacement Plan (ARP)

For the calculations of NGWCU+RC for 2011-2021 for SWAG, the metered well pumping for each of the 257 wells was obtained from CDSS, and the recharge credits for each parcel were calculated by computing the total recharge credits for each ditch, following the W-3979 and W-3980 decree calculations, and determining the proportional amount of recharge credit for the parcels.

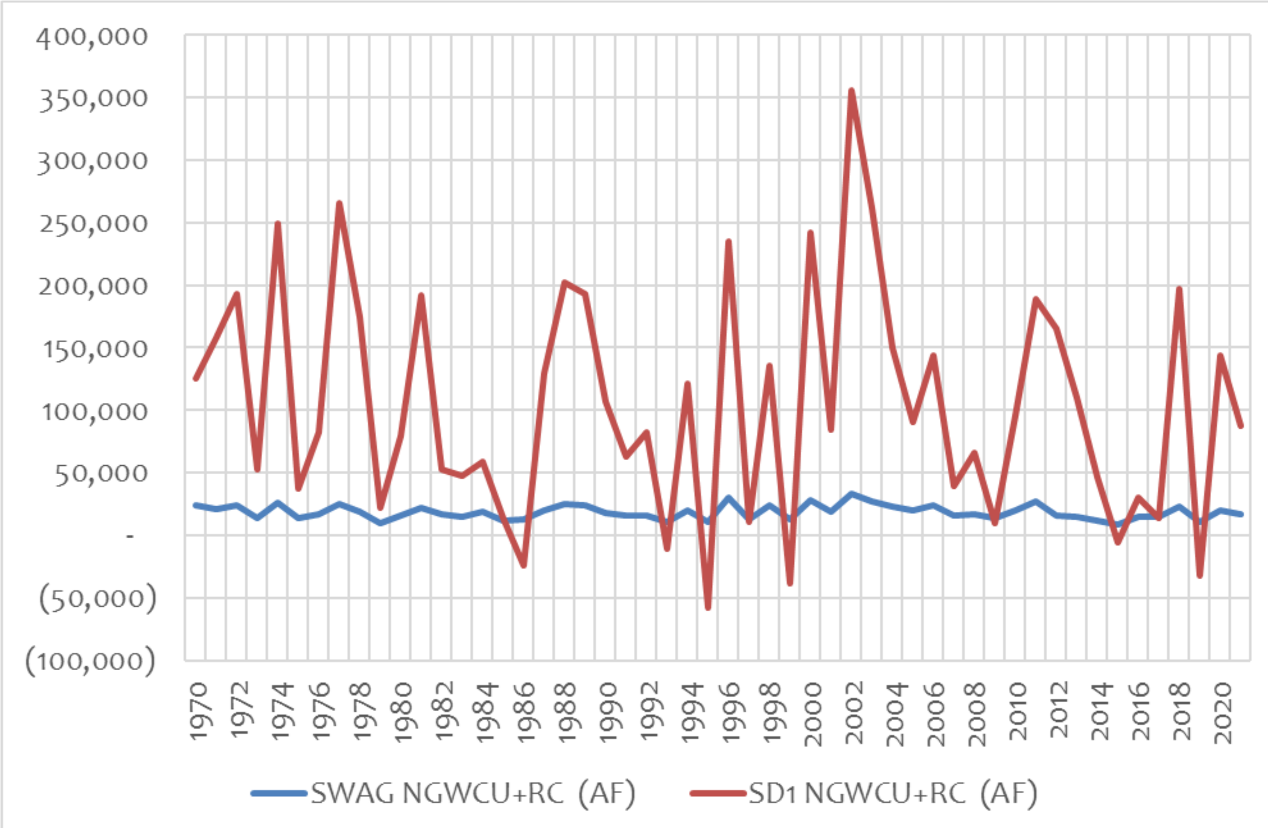

Figure 2. SWAG and SD1 NGWCU+RC Timeseries

The timeseries of NGWCU+RC for SWAG and the whole of Subdistrict 1 show notable differences, particularly in terms of variation. Relative standard deviation is a useful statistic for assessing variation, calculated as the standard deviation divided by the average value of a timeseries. For SWAG, the relative standard deviation of NGWCU+RC is 30.8%, and for Subdistrict 1 it is 99.5%. The relative standard deviation for Subdistrict 1 exceeding that of SWAG by more than a factor of 3 results from greater variability in surface water recharge availability for Subdistrict 1 as a whole, which can lead to years of significant aquifer decline when pumping is not adjusted downward in years with low recharge. Despite these differences, both SWAG and Subdistrict 1 as a whole can be seen to have reduced NGWCU in recent years in response to declining aquifer storage, a trend which will need to continue into the future to facilitate aquifer recovery.

An integral component of the proposed Plan for Augmentation will be the immediate fallowing[2] of a group of participant parcels, and this fallowing program will be described in greater detail in Section III. As a precursor to that discussion, Figure 3 presents the locations of the lands to be fallowed, along with the surface water rights associated with each of the participant lands.

[2] In years prior to entering of a decree for the plan for augmentation, the participants would operate under coverage of Subdistrict 1, in which case fallowing would not occur.

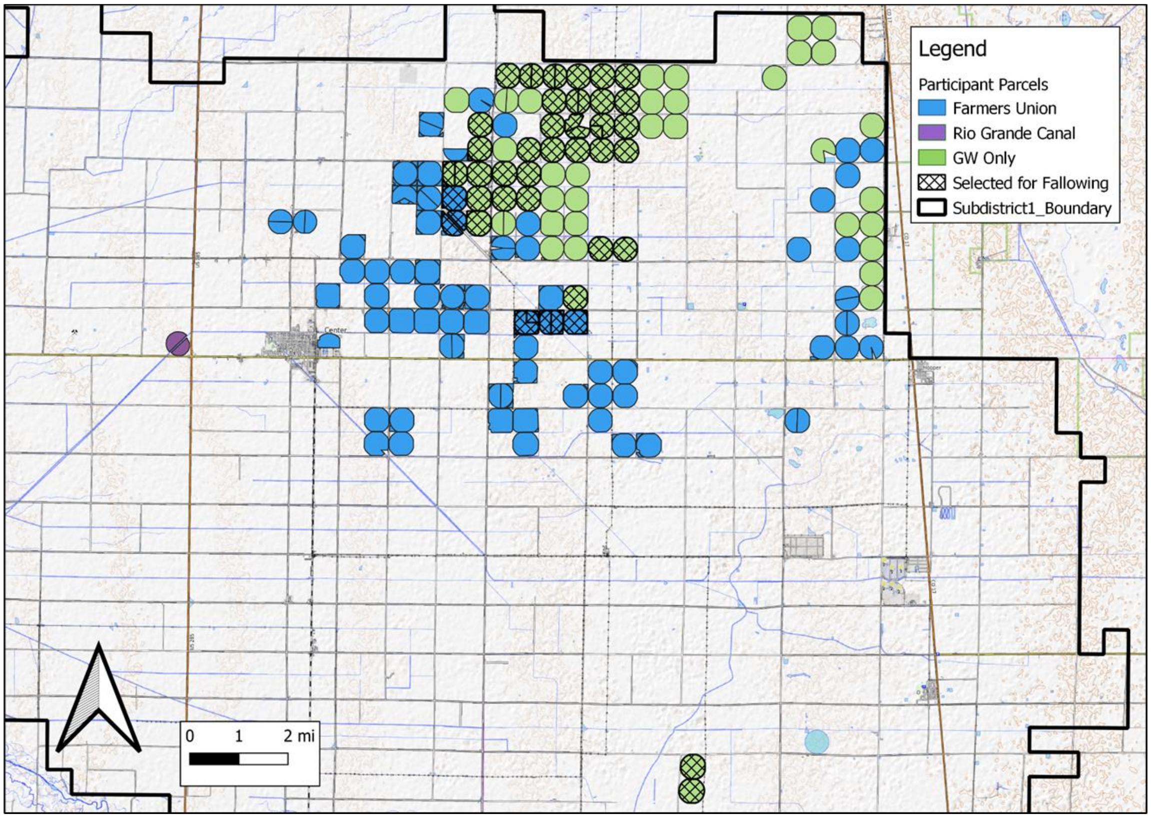

Figure 3. Surface Water Coverage and Parcels Selected for Fallowing

Over the last ten years, the NGWCU+RC of the group as a whole has been reduced from the 1970-2010[3] average by 21%, due to both reductions in irrigated acreage and changes in crop types and irrigation methods. In that same period, the wells used for irrigation of the 5,014 acres selected for fallowing have been responsible for an average of 5,370 Acre-Feet ("AF") of NGWCU+RC .

The lands selected for fallowing represent a total of 30.1% of the group's acreage, and 32.7% of the group's NGWCU+RC , which will significantly alter the composition of the group as a result of the fallowing. 67% of the participant lands that have not been selected for fallowing have associated surface water rights, with 98.7% of the non-fallowed surface water ownership being the Farmers Union Canal.

B. Aquifer Sustainability Calculations

The aquifer sustainability calculations carried out in support of the development of this plan for augmentation have been guided by the Rio Grande Groundwater Use Rules[4] ("Rules") and C.R.S. 37-92-501(4), and specifically by the following rules and statutory provisions:

[3] NGWCU for the 1970-2010 period was calculated based upon RGDSS groundwater model output
[4] RULES GOVERNING THE WITHDRAWAL OF GROUNDWATER IN WATER DIVISION NO. 3 (THE RIO GRANDE BASIN) AND ESTABLISHING CRITERIA FOR THE

Rule 3.4:

"These Rules also have as their objective the regulation of the use of the Confined and Unconfined Aquifers so as to maintain a Sustainable Water Supply in each aquifer system, with due regard for the daily, seasonal, and long-term demand for underground water."

Rule 5.9:

"Within the RGDSS Model Domain a Groundwater Model is presumed to be necessary to consider all the particular qualities and conditions of Unconfined Aquifers and the Confined Aquifer System and to determine whether withdrawals of groundwater affect the rate or direction of movement of water in either of these aquifers or flow in natural streams. A Groundwater Model is presumed necessary for determining Stream Depletions within the RGDSS Model Domain. Within the RGDSS Model Domain, the RGDSS Model is presumed to be the most reliable Groundwater Model currently available for these purposes."

Rule 5.11:

"In adopting these Rules, the State Engineer recognizes that within Response Areas all Well Users withdrawing groundwater pursuant to Rules 6.1.1-6.1.3 bear proportionally the obligation to replace or Remedy Injurious Stream Depletions and for achieving and maintaining a Sustainable Water Supply. The proportional division of the responsibility for achieving and maintaining a Sustainable Water Supply will be based upon each Well's past, present and future use, unless an approved Rule 6.1 Plan provides, or the Well Users agree among themselves on, another method of allocation of such responsibility."

CRS §37-92-501(4)(a)

"the state engineer shall have wide discretion to permit the continued use of underground water consistent with preventing material injury to senior surface water rights. Any reduction in underground water usage required by such rules shall be the minimum necessary to meet the standards of this subsection (4)."

The combined interpretation of these rules and statutes suggests that the application of the RGDSS Model is a useful tool to address questions of aquifer sustainability, because determination of the proportional responsibility for achieving and maintaining a Sustainable Water Supply while maintaining withdrawals of groundwater necessarily involves questions about the rate and direction of movement of water in the aquifers. Finally, because any curtailment of wells should be the minimum amount necessary to prevent injury and achieve and maintain a sustainable aquifer, and because determination of the minimum amount of curtailment is a nuanced question, it is evident that evaluation of that question could benefit from information derived from Model runs.

BEGINNING AND END OF THE IRRIGATION SEASON IN WATER DIVISION NO. 3 FOR
ALL IRRIGATION WATER RIGHTS. https://dwr.colorado.gov/services/well-metering/division-3-use-measurement-rules

Although explicit quantitative targets are not included in the Rules to define sustainability of the unconfined aquifer, reasonable targets can be derived from a qualitative application of the definition of sustainability provided by the Environmental Protection Agency ("EPA")[5]:

"To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations."

This definition of the pursuit of sustainability is particularly applicable to groundwater management in the San Luis Valley, where the twin goals of maintaining agricultural productivity and doing so in a manner that can be sustained into future generations are paramount. In order for future generations to continue to productively use the groundwater resources of this region, the trend in declining aquifer storage that has been observed over recent decades cannot continue and must be reversed.

In Section 1.22 of the Subdistrict 1 Amended Plan of Water Management, the following definition of a sustainable aquifer is provided:

'"Sustainable Aquifer" generally refers to a condition where withdrawals from the aquifer match recharge to the aquifer from all sources so that mining of the aquifer is not occurring on a long-term basis.'

This definition clearly indicates that a departure from sustainability has occurred in recent years, in consideration of the trend in declining aquifer storage that is evident in Figure 4, which depicts the results of the Davis Engineering Unconfined Aquifer Study for 1976-2020:

[5] https://www.epa.gov/sustainability/learn-about-sustainability

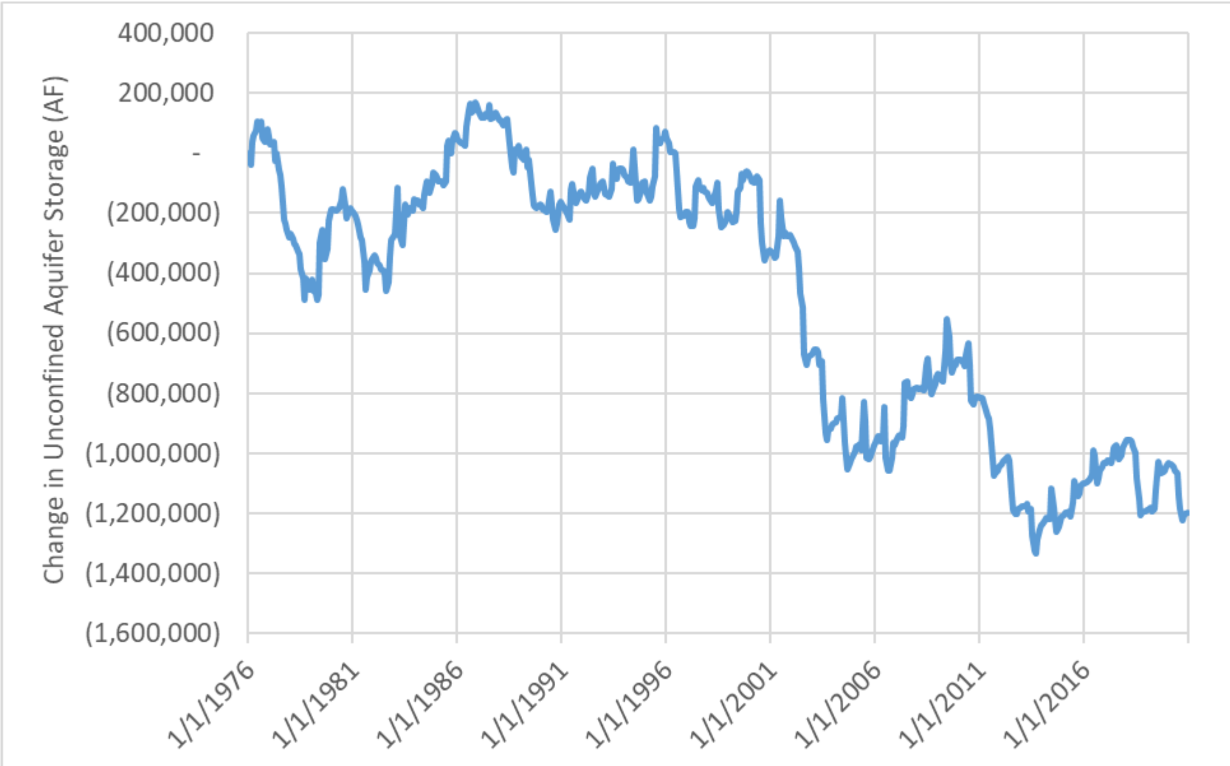

Figure 4. Unconfined Aquifer Study Results - Data from Davis Engineering

Review of the Unconfined Aquifer Study data that has been compiled by Davis Engineering since 1976 indicates that a period of aquifer recovery is currently necessary in order for groundwater management in Response Area 1 to be considered sustainable. The Plan of Water Management for Subdistrict No. 1 targets recovery of storage in the unconfined aquifer to a level of at most 400,000 AF below the storage that existed at the beginning of 1976, calculated on a 5-year average basis. The SWAG Plan bases its plan for achieving aquifer sustainability on this same target.

According to the Unconfined Aquifer Study, the last time that such a sustainable condition existed was January of 2004, due to a steep decline in aquifer storage beginning in 2002. In order to ensure that the calculations contained in this analysis are conservative in terms of appropriately quantifying the depletions to the aquifer that resulted in a departure from sustainability, this analysis focuses on changes beginning in 2002.

1. Simulated Decline in Aquifer Storage

As a first step towards assessing the SWAG impact on aquifer storage, paired simulations of the Model were compared, referred to as the "Impact Run" and the "Baseline Run". Comparison of these model runs is also the basis of the method for computing the stream depletions attributable to the group's operations. This process was also carried out for the entirety of Subdistrict 1, to allow for assessment of proportional impacts.

In the Impact Run for each group, net consumption of groundwater is set to zero for the group, which is achieved by matching pumped volumes to the sum of surface water recharge credits and the amount of return flow from application inefficiency. The decline in aquifer storage for these Impact Runs was compared to the decline in aquifer storage for the Baseline Run, which includes all historical pumping. The amount by which the decline in aquifer storage from the Baseline Run exceeds the amount of decline in the Impact Run was quantified as the Net Groundwater Deficit (NGWD) for each group.

This calculation differs from the calculation of Net Groundwater Consumptive Use (NGWCU+RC), in that it takes into account the entire regional water balance, including native groundwater inflows and evaporation from shallow groundwater. The NGWD results for Subdistrict 1 and SWAG are presented here as Figure 5, with calculations only carried out over the unconfined aquifer cells in the area covered by the Davis Engineering Unconfined Aquifer Study:

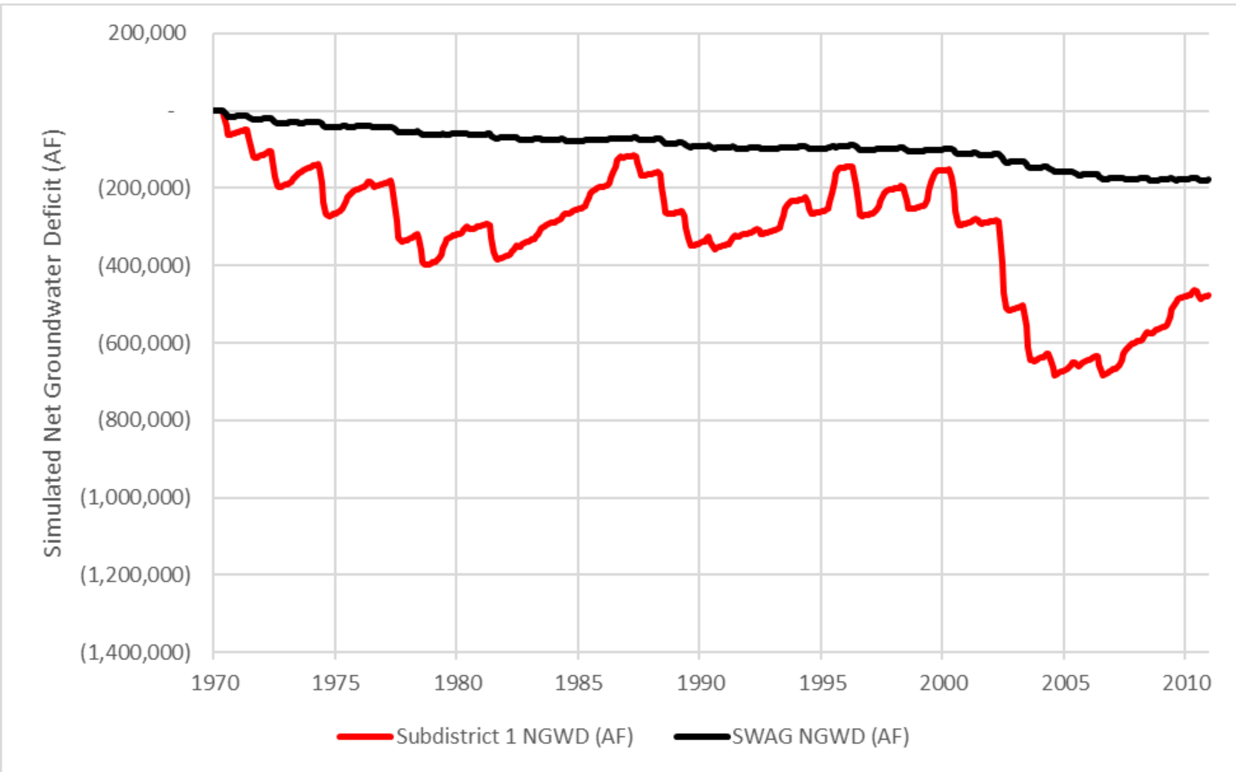

Figure 5. Simulated Net Groundwater Deficit, SWAG and Subdistrict 1

As evident in the figure, the NGWD generated by SWAG each year has been more consistent, whereas the Subdistrict 1 NGWD shows more variation, similarly to the NGWCU+RC timeseries for each entity presented previously in Figure 2. It is important to note, in examination of Figure 5 that the period of simulation for the model extends from 1970-on, which differs from the time period considered in the Unconfined Aquifer Study.

When the total simulated NGWD for SWAG is compared to the corresponding volume for Subdistrict 1 as a whole, the percentage is approximately 34%, but this percentage varies significantly if subsets of years from the period of model simulation are used as the basis of the calculation. As an example, SWAG's NGWD in 2002 is simulated to be 18,361 AF, which is only 7% of the 259,997 AF of NGWD simulated for Subdistrict 1 as a whole.

The simulated NGWD for SWAG from January 2002 through the end of December 2010 totals 65,119 AF and the average NGWCU+RC for the group over that same period was 20,422 AF/yr. In recognition that storage in the unconfined aquifer has continued to decline in the years since the end of the period of simulation for the model, a calculation was carried out to estimate the cumulative deficit in storage that SWAG should target for the aquifer recovery period of the group's operations.

Due to the lack of model results for 2011-present, the ratio between the recent NGWCU+RC for the group and the NGWCU+RC simulated for 2002-2010 was used as an adjustment factor for extrapolation of the group's NGWD:

$$Deficit\ (AF) = NGWD_{02-10} + NGWD_{02-10} * \left({NGWCU + RC_{11-21}} / {NGWCU + RC_{02-10}} \right) * 11/9 \qquad (1$$

Where:

- $NGWD_{02-10}$ = Simulated NGWD, 2002-2010 (AF) = 65,119 AF
- $NGWCU + RC_{02-10}$= Simulated NGWCU+RC, 2002-2010 (AF) = 21,433 AF
- $NGWCU + RC_{11-21}$= Calculated NGWCU+RC, 2011-2021 (AF) = 16,179
- 11/9 = ratio of years 2011-2021 to years from 2002-2010

The results of Equation 1 indicate a total deficit of **125,199 AF** that SWAG should target as a recovery volume during an initial period of operation where the group cuts back consumption of groundwater past the level that is sustainable in perpetuity, in order to facilitate aquifer recovery. Operations designed to recover this amount of aquifer storage are described in Section III. This targeted recovery volume is only used as a point of reference in the SWAG Plan, not as the definition of achievement of sustainability.

SWAG members will not consider their obligation to achieve sustainability met until observations as part of the Unconfined Aquifer Study indicate that the aquifer has recovered into the range of 200 KAF – 400 KAF below 1/1/1976 storage that defines achievement of sustainability in the Subdistrict 1 Plan of Water Management. Maintaining this shared definition of what is necessary for recovery into sustainable aquifer storage will allow the operations of SWAG and others to be cooperatively aligned towards a common goal during the upcoming period of aquifer recovery.

2. Sustainable Consumption Level

The sustainable amount of groundwater consumption for SWAG was calculated by comparing simulated NGWCU+RC and NGWD values across the entire period of the transient model run, following Equation 2:

$$SCL\ (AF) = NGWCU + RC_{70-10} - NGWD_{70-10} \quad \text{(AF)} \qquad (2$$

Where:

- SCL = Sustainable Consumption Level (AF) = 14,636 AF
- $NGWD_{70-10}$ = Simulated NGWD, 1970-2010 (AF) = 4,481 AF
- $NGWCU + RC_{70-10}$= Simulated NGWCU+RC, 1970-2010 (AF) = 19,117 AF

The results of Equation 2 correspond to the sustainable level of groundwater consumption, because the difference between the amount of historical groundwater consumption and the historical decline in aquifer storage is the amount of historical groundwater consumption that has not depleted aquifer storage. Therefore, consumption of groundwater that has not depleted aquifer storage is considered to be sustainable consumption of groundwater.

a) Observed Data Verification

Because the SCL was calculated using model outputs, the potential exists that a bias in the model could have caused the resulting value to not reflect actual hydrologic conditions, so an extra step was taken in order to verify the calculated value. The years 2014-2021 were chosen as the basis for this verification exercise, because of three primary considerations:

1. Relatively little total change in aquifer storage
    a. As illustrated in Figure 6, the trend in aquifer storage over these years has an R2 value of 0.0001, which corresponds to a lack of a significant trend
    b. The average annual decline in aquifer storage over these years, 787 AF/yr, was taken into account
2. Observed pumping data is available
    a. As a result of implementation of measurement rules, observed pumping data is available for all SWAG member wells for each year
3. Conservatively-dry hydrology
    a. As measured by annual flow at the Rio Grande near Del Norte streamflow gage[6], the years 2014-2021 were 6% drier than the 1970-2010 period of model output used for calculation of the modeled SCL

[6] Obtained from: https://waterdata.usgs.gov/nwis/dv?cb_00060=on&format=rdb&site_no=08220000&referred_module=sw&period=&begin_date=1970-01-01&end_date=2022-09-22

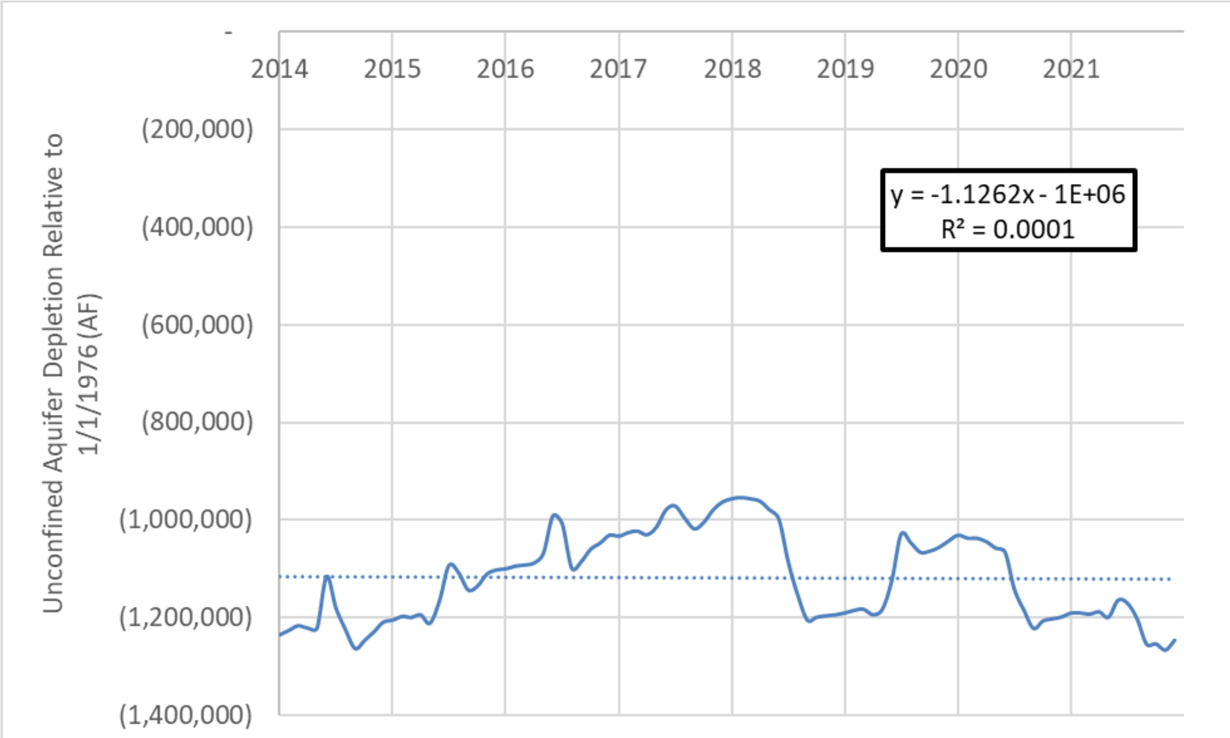

Figure 6. Unconfined Aquifer Depletion, 2014-2021

Over this 8-year period, SWAG's NGWCU+RC ranged from 8,644 AF to 22,900 AF, with an average annual NGWCU+RC of 15,120 AF, as illustrated in Figure 7. In these years, the average annual decline in aquifer storage was 787 AF/yr, and SWAG's NGWCU+RC represented 33.7% of the total NGWCU+RC in Response Area 1, so proportional attribution of the decline in aquifer storage suggests that SWAG's operations had caused a decline of 265 AF/yr. These values were used to calculate an observed SCL, as follows:

$$SCL\_obs\ (AF/yr) = NGWCU + RC_{14-21} - NGWD_{14-21} \quad \text{(AF/yr)} \qquad (3$$

Where:

- SCL_obs = Sustainable Consumption Level, observed (AF/yr) = 14,855 AF
- $NGWD_{14-21}$ = Observed NGWD, 2014-2021 (AF/yr) = 265 AF
- $NGWCU + RC_{14-21}$= Observed NGWCU+RC, 2014-2021 (AF/yr) = 15,120 AF

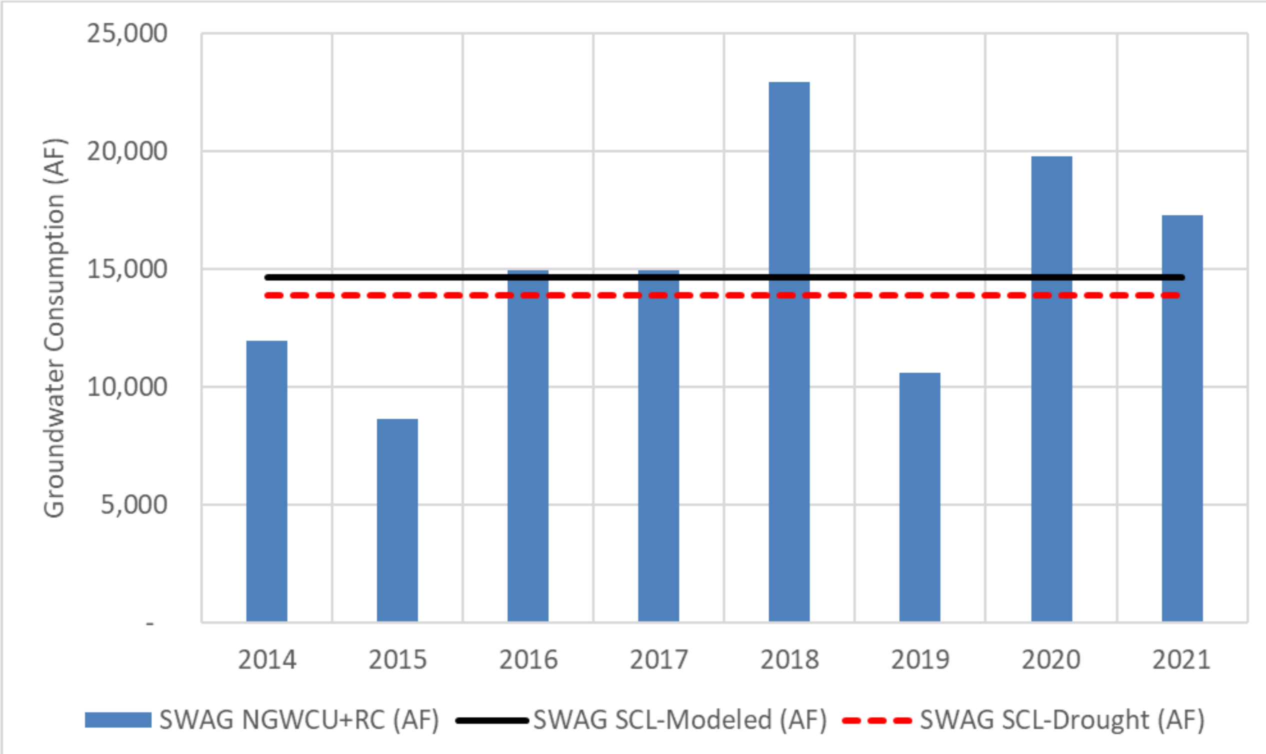

Figure 7. SWAG NGWCU+RC, 2014-2021 (AF)

Comparison of the results of these two methods for calculation of the SCL indicates that the model-simulated SCL is likely to be relatively conservative. While the years 2014-2021 are drier on average than the model simulation period of 1970-2010, they are 7% wetter on average than the recent 20-year drought spanning 2002-2021, based upon annual Rio Grande near Del Norte gage flow. Under the assumption that the SCL varies over time in proportion to Rio Grande near Del Norte gage flow, which uses the gage flow as an approximation for the rim inflows that physically result in an SCL, the observed SCL for 2002-2021 would have been **13,896 AF/yr**.

This value will be referred to as SCL-Drought in subsequent sections of this report. As this value is lower than the model-simulated SCL, it is considered to be a conservative estimate of the amount of groundwater that can be sustainably consumed by SWAG member wells, which leads to the use of the SCL-Drought value as the basis for development of plans for achieving and maintaining aquifer sustainability. Although comparisons have been made to model output for assessment of the reasonability of the SCL-Drought value, its derivation does not explicitly rely upon model output, which precludes any potential for inaccuracies within the calibration or application of the Model from introducing errors into the foundation of the SWAG Plan.

C. Simulated River Depletions

The river depletions that would be expected to result from SWAG's operations were updated from previous analyses to use the methodology outlined in the Groundwater Rules, which is based upon the existing Response Area 1 Response Functions. The following logic was applied to determine an appropriate method for applying the Response Area 1 Response Functions for SWAG:

- **Rule 4.21** states that the Response Functions are to be applied to quantify "the amount, timing, and location of Stream Depletions caused by groundwater withdrawals within a Response Area", which indicates that the Response Functions are not intended to be applied to geographical subsets of a Response Area.
- **Rule 5.11** states that "Well Users withdrawing groundwater pursuant to Rules 6.1.1-6.1.3 bear proportionally the obligation to replace or Remedy Injurious Stream Depletions".
- **Rule 6.4** states that the proportional obligation to remedy stream depletions is based upon "the Plan's Wells' proportionate Net Groundwater Consumptive Use in relation to the total Net Groundwater Consumptive Use of all Wells in the Response Area"
- **Rule 4.16** states that "Net Groundwater Consumptive Use" means the groundwater consumed by the operations of one or more wells and represents the difference between groundwater withdrawals less any groundwater that returns.."

Rule 4.16 does not reference surface water recharge in its definition of NGWCU, which makes it somewhat unclear whether the intent of the rule is to reference NGWCU or NGWCU+RC. Determination of whether Rule 4.16 is meant to be interpreted to use NGWCU or NGWCU+RC for calculation of proportionality can be logically deduced through consideration of hypothetical example scenarios. In these scenarios, recharge and pumping values have opposite signs due to their representation of opposing fluxes to/from aquifer storage.

1. Hypothetical SWAG Operations (for both Scenario A and Scenario B)
    a. SWAG Pumping = 14,000 AF
    b. SWAG Efficiency = 83.0%
    c. SWAG Recharge = -1,620 AF
2. Hypothetical Response Area 1 Totals
    a. **Scenario A**:
        i. RA1 Pumping = 245,000 AF
        ii. RA1 Efficiency = 82.5%
        iii. RA 1 Recharge = -201,125 AF
        iv. RA1 Total Depletions = 100 AF
    b. **Scenario B**:
        i. RA1 Pumping = 245,000 AF
        ii. RA1 Efficiency = 82.5%
        iii. RA 1 Recharge = -202,125 AF
        iv. RA1 Total Depletions = 100 AF

For each of these hypothetical scenarios, application of Rule 5.11 requires determination of the *Proportionality* in Equation 4)

$$SWAG\ Depletions\ (AF) = \ Proportionality\ x\ RA1\ Depletions\ (AF) \qquad (4$$

If *Proportionality* = (SWAG Pumping x SWAG Efficiency + SWAG Recharge) / (RA1 Pumping x RA1 Efficiency + RA1 Recharge), then:

1. For Scenario A
   a. *Proportionality* = (10,000 AF)/(1,000 AF) = 1000%
   b. SWAG Depletions = 1,000 AF
2. For Scenario B (negative values listed in red text)
   a. *Proportionality* = (10,000 AF)/(-1,000 AF) = -1000%
   b. SWAG Depletions = -1,000 AF

In both scenarios, the resulting depletions for SWAG are clearly erroneous using this definition of proportionality. In Scenario A, it doesn't make logical sense for SWAG's obligation to exceed the entire obligation for Response Area 1. In Scenario B, it doesn't make logical sense to attribute a large negative depletion (accretion) to SWAG. This leads to the conclusion that the definition of NGWCU in the Groundwater Rules doesn't take surface water recharge credit into account, e.g.:

Proportionality = (SWAG Pumping x SWAG Efficiency) / (RA1 Pumping x RA1 Efficiency), so:

1. For Scenarios A & B
   a. *Proportionality* = 5.75%
   b. SWAG Depletions = 5.75 AF

Utilizing this calculation for the implementation of the Proportionality requirement ensures that all injurious stream depletions from well pumping in Response Area 1 are replaced so as to prevent injury. Additionally, this calculation is generalizable and easily replicable in the event that other plans for augmentation are pursued by irrigators within Response Area 1.

1. Addressing Variability

Using the method of calculation of proportionality described above, based upon pumping multiplied by efficiency (Proportional Method), the volume of stream depletions for which SWAG would need to supply replacement water can vary significantly depending on operations of other irrigators in Response Area 1. In order to assess this variability and determine potential amounts of replacement water that may be needed to offset injurious stream depletions, a series of 100 hypothetical future scenarios was developed and analyzed.

Each of these hypothetical scenarios was developed by appending a random sequence of 20 years as the years 2023-2042, with 2022 and prior years represented in the Response Functions based upon Subdistrict 1's 2022 ARP. The random sequence of years in each scenario was developed by resampling from the years 2011-2022 with replacement. In each resampled year, the NGWCU value input into the Response Functions was adjusted from the historical NGWCU value to reflect SWAG's proposed operational limitations, which are described in greater detail in Section III.C of this report.

These scenarios were compared against each other primarily based upon the total annual depletion in the final year of the scenario, which includes impacts from a full 20 years of SWAG's proposed operations. The most extreme scenario (Max) was selected from these 100 scenarios for more detailed analysis. The selected scenario has the maximum total depletion of any of the 100 scenarios (137 AF). A more detailed analysis of these scenarios is included in the SWAG Surface Water Engineering Report (Clear Water Solutions, 2022).

The depletions in each of the 100 scenarios are displayed in Figure 8, where annual depletions in the RG1 administrative reach are plotted on the x axis, annual depletions in the RG2 administrative reach are plotted on the y axis, and annual depletions in the RG3 administrative reach are displayed using a color scale from light blue to dark blue. The Max scenario is noted on Figure 8, where it can be seen that the 137 AF of depletions results from 91 AF of RG2 depletions and 46 AF of RG1 depletions. Each of these scenarios has negative depletions in RG3, but the negative RG3 depletions don't impact the total depletions because only negative depletions (accretions) from upstream reaches can offset downstream depletions.

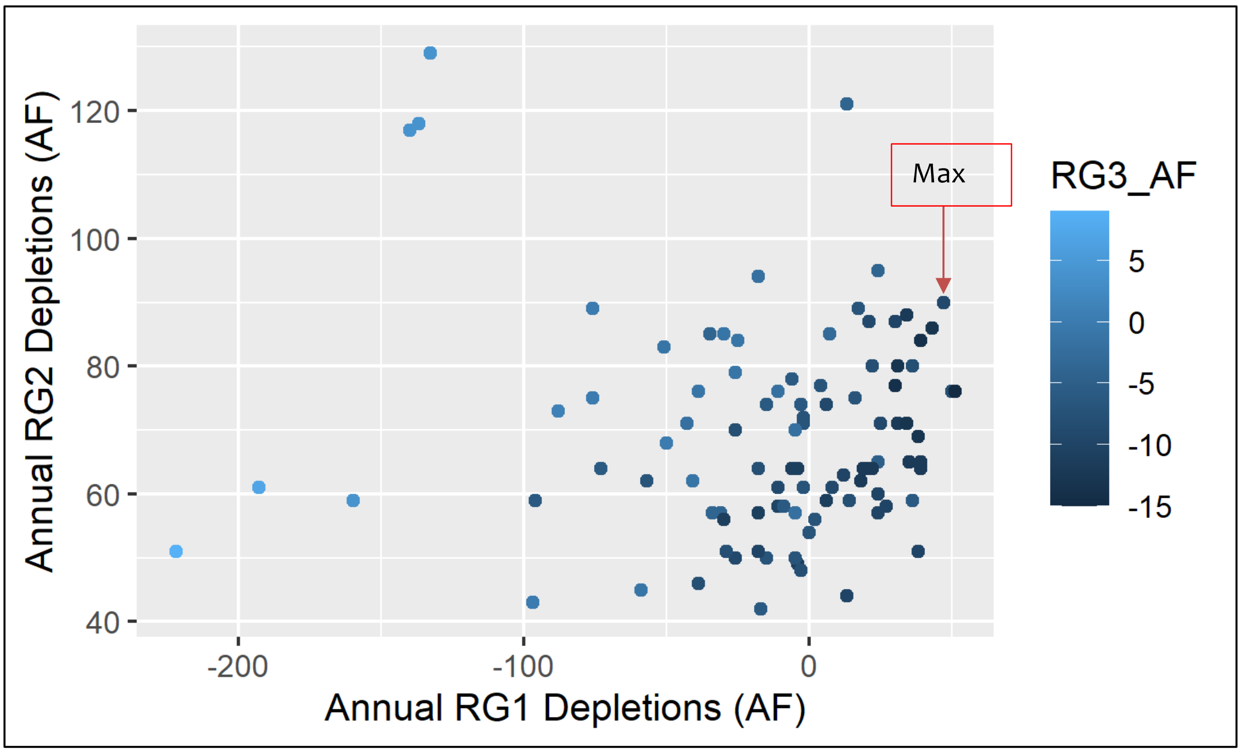

Figure 8. Annual Depletions by Administrative Reach

The depletions depicted in Figure 8 assume no action by irrigators other than SWAG Members to reduce groundwater consumption, which could potentially lead to overly-conservative estimation of the likely stream depletions. In order to assess the likely range of stream depletions that would be expected if groundwater consumption throughout Response Area 1 as a whole was reduced to match the sustainable consumption level, another series of 100 scenarios were developed.

In each of these scenarios, SWAG's operations were identical to the scenarios described above, and the remainder of Response Area 1 was adjusted by reducing NGWCU so that the total NGWCU+RC for

Response Area 1 matched the SCL-Drought value for Response Area 1. The SCL-Drought value for Response Area 1, calculated in an identical manner as described above in II.B.2.a, is 41,916 AF. Application of this reduction in NGWCU results in significantly lower depletions overall, bringing the average depletions for both SWAG and Response Area 1 as a whole below zero. The Max scenario from this group of 100 sustainable depletion scenarios is indicated in Figure 9.

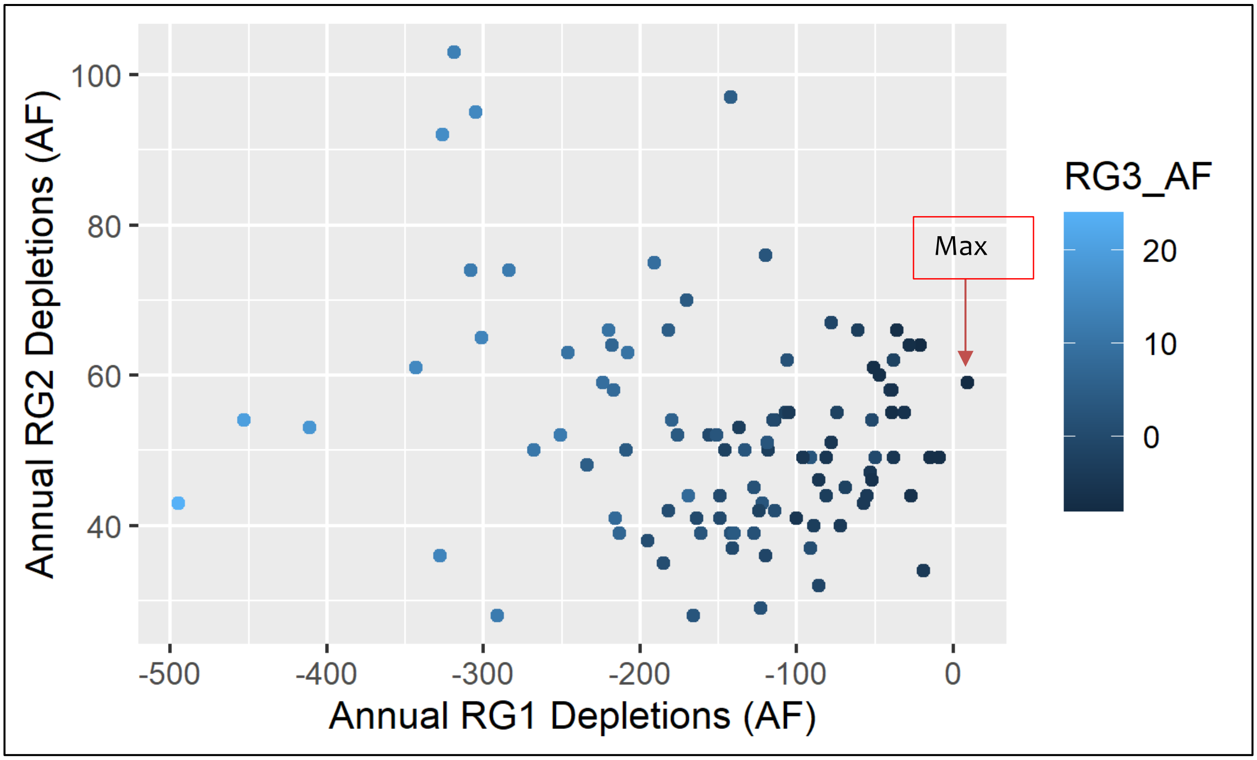

Figure 9. Annual Depletions by Administrative Reach - Sustainable Scenario

III. Operational Outline of Plan

A. Proposed Terms and Conditions

In order to ensure a period of Recovery towards aquifer sustainability, followed by a period of Maintenance of sustainability, the following Terms and Conditions are proposed:

1. SWAG's operations each year will be governed by an Annual Operations Plan (AOP) that will be submitted by April 15 for approval by DWR staff each year.
    a. The AOP will govern SWAG's operations from May 1 of each year through April 30 of the following year, which will be referred to herein as the Plan Year.
    b. The last two weeks of April will provide time for discussions with DWR staff and adjustments to the AOP.

2. SWAG's Net Groundwater Consumptive Use (NGWCU) will be limited each year to result in a specified volume of NGWCU+RC, designed as the mechanism to achieve sustainability during the Recovery Period.
    a. The proposed limit for average NGWCU+RC for SWAG as a whole is **10,998 AF/yr** during the Recovery Period of SWAG's operations, which is referred to as the Recovery Consumption Level (RCL). This level of NGWCU+RC is significantly below the calculated SCL for SWAG (**14,636 AF/yr**), and also well below the more conservative, observation-based SCL-Drought value (**13,896 AF/yr**). Consuming significantly less groundwater than the SCL-Drought value is the mechanism that will generate progress towards aquifer storage recovery.
        i. This limitation will be applied based upon the long-term average NGWCU+RC during the operation of SWAG's Plan for Augmentation.
        ii. At the beginning of a Plan Year, if the long-term average NGWCU+RC is below the limit on average NGWCU+RC , NGWCU+RC in that year will be allowed to exceed the proposed limit in that year, and the limit will be defined as the amount that would bring the long-term average NGWCU+RC up to the proposed average NGWCU+RC limit.
        iii. A five-year period is proposed as the basis for calculation of the long-term average NGWCU+RC
    b. The limit will be adjusted downward if the NGWCU+RC for the previous Plan Year is found to have exceeded the targeted amount from the prior Plan Year's AOP. Retrospective NGWCU+RC accounting for the prior Plan Year will be included in each AOP as a point of reference for this calculation.

3. Each year's AOP will include a quantification of cumulative progress towards recovery of the aquifer, as a point of reference to confirm that the proposed mechanism for achievement of aquifer sustainability is functioning as anticipated.
    a. This quantification will begin in the first Plan Year with a cumulative deficit of **125,199 AF**.
        i. Adjustments to the initial deficit will be made based upon SWAG's operations in years prior to operation under the SWAG Plan, while the SWAG members continue to operate under coverage of the Subdistrict 1 ARP.
    b. In each subsequent year, the deficit will be adjusted by the difference between the prior Plan Year's NGWCU+RC and the SCL-Drought value, which is currently calculated to be **13,896 AF/yr**.
        i. The SCL-Drought value will be updated each year to reflect recent hydrology, as represented by the 20-year average flow at the Rio Grande nr Del Norte gage. The current calculated value is based upon average 2002-2021 calendar year flow, and updated values will be adjusted proportionally based upon the ratio of the previous 20-year average flow to the average flow from 2002-2021.

4. The Maintenance Period will begin when observations in monitoring wells made as part of the Unconfined Aquifer Study indicate that the aquifer has recovered to within the sustainable range of at most 400 KAF below storage on 1/1/1976 on a 5-year rolling average.
    a. This is considered likely to approximately coincided with the point in time when SWAG's entire 125,199 AF cumulative deficit has been remedied.

i. If observations indicate that the aquifer has reached the sustainable storage range prior to accounting calculations indicating that the fallowing program has remedied the entire cumulative deficit, a report will be prepared to assess whether the Maintenance Period can commence, subject to DWR approval.

b. Progress towards addressing the deficit will be tracked as a method to ensure that the fallowing mechanism proposed for addressing aquifer sustainability is functioning as intended.
   i. Progress will also be assessed using a Seasonal Mann-Kendall Trend Analysis[7] of unconfined aquifer storage, with a 10-year rolling window and monthly seasonality. The results of this analysis will be included in each year's AOP, and discussions of the trends with DWR staff will be carried out to determine if changes to limits on pumping are called for. This trend analysis would be carried out every five years, unless more frequent calculations are called for as determined by term 4.b.iv below.
   ii. If the trend shows that the aquifer is declining, then, absent a determination by the State Engineer that curtailment may be less, SWAG will implement a proportional partial curtailment of their well pumping that will be determined as follows:
      1. Reduce SWAG's RCL in proportion to the updated value for SCL-Drought
      2. Calculate the ratio of SWAG's 5-year average NGWCU+RC to SWAG's SCL-Drought value: SCL-Ratio = (NGWCU+RC)/SCL-Drought
      3. Perform the same calculation for Response Area 1 as a whole
      4. Reduce SWAG's pumping limit until SWAG's SCL-Ratio matches the SCL-Ratio for Response Area 1 as a whole
   iii. If the trend shows that the aquifer is improving, SWAG will have the option to propose an increase in the RCL with an upper bound on the proposed increase set based on the proportional increase in SCL-Drought in comparison to the initial SCL-Drought value
   iv. If the trend is not found to be statistically significant, no changes to the RCL will be made, and the trend analysis will be carried out again the following year, which will reset the 5-year period for trend re-calculation.

c. The proposed methods and calculations for limitation of NGWCU during the Maintenance Period will be identical to the methods and calculations outlined in Term 2 above, with the exception that the long-term average limitation will be the SCL-Drought value.
   i. Trend analysis during the maintenance period will be carried out for informational purposes during the Maintenance Period, but the pumping limit will not be adjusted from the limit corresponding to the SCL-Drought value in years where aquifer storage is within the sustainable range.

5. A recharge credit forecast will be generated for SWAG each year, which will be used as the basis for development of a pumping limit for that year's AOP.
   a. The forecast will use the procedures carried out in support of the development of the Annual Replacement Plan for Subdistrict 1.

[7] https://vsp.pnnl.gov/help/Vsample/Design_Trend_Seasonal_Kendall.htm

b. The projected recharge credits will be compared to the specified limit on the group's NGWCU+RC, defined in Terms 2 and 4, which will result in a limit on consumptive use for the Plan Year.
   i. This combined limit will be adjusted based upon the terms of the change of use for the confined aquifer well described in III.E.1. upon entry of the decree for that change of use.
c. This combined limit on consumptive use will be converted into a limit on pumping using an assumed efficiency of 83% for sprinkler application, and a resulting pumping limit for SWAG as a whole and for each specific member will be established prior to irrigation.

6. Each year's AOP will include a detailed Measurement Appendix, which will list all available measured data from the prior Plan Year for each of the wells included in the plan.
   a. The Measurement Appendix will also include all data and computations related to calculation of recharge credits.

1. Contingency Plans for Measurement Issues

The possibility exists that pump measurements would be unavailable for portions of the previous Plan Year for individual wells, due to malfunctioning well meters or other unforeseen circumstances. The Measurement Appendix to the AOP for years in which measurement errors have occurred in the prior Plan Year will include a special subsection to address the measurement issues. Missing measurements will be infilled with one of the following methods:

1. Analysis of metered power consumption for the well pump to estimate pumped volumes.
   a. Estimation of pumped volumes will be carried out following Equation 3:

$$P_{Pump}[W] = \frac{\rho_{water} \cdot g \cdot Q_{pump} \cdot \Delta h_{mano}}{\eta_{pump,motor}} \qquad (3)$$

Where:

$$\rho_{water} = 1000 \frac{\mathrm{kg}}{\mathrm{m}^3}$$

$$g = 9.81\ m/s^2$$

$$\Delta h_{mano} = manometric\ head\ difference\ [m]$$

$$\eta_{pump,motor} = combined\ pump\ \&\ motor\ efficiency$$

   b. The combined pump & motor efficiency will be calculated using all available overlapping records of power consumption and pumping volumes. These calibration calculations will allow for use of power records that include power consumed by devices other than the well, in cases where the same power meter measures multiple uses of power.
   c. The manometric head difference will be calculated based upon comparison of the elevation of the parcel and the water level in the nearest available monitoring well,

with an additional 25% added to the computed head to account for frictional losses, based upon literature review[8].

2. Analysis of evapotranspiration data from the OpenET[9] dataset and precipitation data from PRISM[10] to estimate pumped volumes.
    a. OpenET evapotranspiration data and PRISM precipitation data would be analyzed following the methods outlined in the SCS publication Irrigation Water Requirement Technical Release 21 (SCS TR-21) to compute the amount of water consumptively used from irrigation
    b. All available overlapping periods of metered pumping and OpenET evapotranspiration data would be used to calibrate the K_p coefficient in the Equation 4, which would be used to estimate pumped volumes where pumping records are missing:

$$Pumped\ Volume\ (AF) = K_p * IWR \qquad (4$$

Where:

K_p = Calibrated pumping coefficient

IWR = Irrigation Water Requirement (AF)

2. Infilling Method Determination

In cases where both methods for infilling missing data for pumped volumes can be carried out, the estimates for both methods will be computed and compared, and the average of the two values will be the final estimate. In cases where power records are not available, or complicating factors prevent development of the power consumption-based estimate, the OpenET method will be applied.

B. AOP Outline

The AOP for SWAG will govern each year's operation to ensure that the proposed terms and conditions are followed, thereby preventing injury to surface water rights and ensuring progress towards aquifer sustainability. The structure of the proposed SWAG's AOP is as follows:

- Determination of Pumping Limit
    - Forecast of Recharge Credits
    - Distribution of Pumping Limits Among Members and Special Cases
- Plan to Replace Stream Depletions
    - Response Function Calculations
    - Source of Replacement Water

[8] Irrigation Water Management Training Manual *Small-scale pumped irrigation: energy and cost*. United Nations Food and Agriculture Organization (UN-FAO), Rome, 1992.
[9] https://openetdata.org/
[10] https://prism.oregonstate.edu/

- Aquifer Recovery Accounting

The following Sections, III.C-D, illustrate examples of each component of the AOP.

C. Determination of Pumping Limit

The annual pumping limit for SWAG is a central component of the planned operations for SWAG, because application of the pumping limit will ensure that the irrigation operations of the members result in progress towards aquifer recovery. As outlined in the Section III.A, SWAG plans to limit NGWCU+RC for the group to a total of 10,998 AF on average during Aquifer Recovery. In the first year of SWAG's operations under the Plan, the NGWCU+RC limit would be set to the proposed average limit of 10,998 AF. As outlined in the following sections, this limit on NGWCU+RC would be combined with a forecast of recharge credits to generate a proposed limit on total pumping. That proposed limit on total pumping would be allocated among the members of SWAG to set proposed pumping limits for each individual member.

1. Forecast of Recharge Credits

In order to ensure comparability between the SWAG AOP and other irrigation operations in Division 3, SWAG will apply the same methodology used for forecasting recharge credits in the Subdistrict 1 ARP. To the extent possible, SWAG will coordinate with Subdistrict 1 and others in Response Area 1 in development of recharge credit forecasts. The most likely forecast of runoff in the Rio Grande at Del Norte, as predicted by the April 1 NRCS forecast will be input into regression equations that relate historical flow and historical recharge credits for prediction of likely recharge credits in the upcoming plan year.

As an example, had the SWAG Plan been operation in 2022, the most likely forecast of runoff from the April 1 NRCS forecast indicated a flow volume of 375 KAF. The forecast period covers the months of April through September, and over the years 1970-2021 flow in those months comprised 84.5% of average annual flow. 375 KAF is 84.5% of 443,684 AF, which leads to the use of 443,684 AF as the predicted annual flow for input into the regression equations. The predicted recharge volume for the Rio Grande Canal resulting from application of the regression equation listed for the Rio Grande Canal in Appendix D of Subdistrict 1's 2022 ARP is 83,388 AF, and the predicted recharge volume for the Farmers Union Canal resulting from application the Farmers Union regression equation in Appendix D of Subdistrict 1's 2022 ARP is is 9,277 AF.

The 10 shares of the Rio Grande Canal owned by members equates to 117.5 AF of predicted recharge credit, and the 10,720 acres of Farmers Union parcel ownership equates to 1,638 AF of predicted recharge credit. These amounts of recharge credit, added to the NGWCU limit of 10,998 AF result in a depletion limit of 12,753 AF. Assuming 83% efficiency for sprinkler application, the total proposed pumping limit for SWAG in 2022 would have been **15,366 AF**. Individual pumping limits for each member which sum to this proposed limitation would be provided to each member prior to the irrigation season so that each member can individually design their irrigation operations accordingly.

2. Distribution of Pumping Limits Among Members and Special Cases

A method for allocation of the total pumping limit described above among the members of SWAG has been developed and applied, so that each member is able to plan for irrigation operations that will combine to achieve the contemplated limit for the group as a whole. The proposed method for allocation of the total pumping limit is based upon the relative proportions of the group's recent 10-year average pumping total.

One of the Member Wells, with WDID 2705494, has historically pumped from the confined aquifer into a pond that is the source of water to a center pivot sprinkler. The pumping from this well exceeds the amount required for delivery to the sprinkler and replacement of evaporation significantly, which leads to an efficiency for the well that significantly differs from the assumed efficiency of 83%. Because of this, the proposed limitation for the use of this well is based upon the computed irrigation water requirement for the irrigated parcel added to the net evaporative losses from the holding pond.

Evaporative losses for the pond and irrigation water requirements for the parcel are proposed to be calculated as the ensemble mean evapotranspiration value from the OpenET[11] dataset. Precipitation data used for calculation of irrigation water requirements and net evaporation are proposed to be retrieved from the PRISM[12] dataset. The pumping from WDID 2705494 for purposes of comparison to the pumping limit will be calculated following Equation 7:

$$WDID\ 2705494\ Pumping\ (AF) = \frac{IWR + Net\ ET, AF}{0.83} \qquad (7$$

Where:

IWR = Crop evapotranspiration for irrigated parcel – effective precipitation (AF)

Net ET = Open water evaporation volume – precipitation for pond (AF)

D. Plan to Replace Stream Depletions

1. Response Function Calculations

The proportional method for application of the Response Area 1 Response functions, which was described in the Section II.C, was applied to estimate projected 2022 depletions for SWAG. The proportionality factor for SWAG in 2022 was calculated to be 6.9%, based upon the ratio of the proposed depletion limit, 12,753 AF, to the groundwater consumption value listed in column 6 of Table 2.3 in Subdistrict 1's 2022 ARP, which is 185,466 AF. The depletions for SWAG were calculated by multiplying the total Response Area 1 depletions by 6.9%.

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[11] https://openetdata.org/#tool

[12] http://www.prism.oregonstate.edu

The resulting monthly depletions are listed in Table 2. These depletion values are lower than the Max scenario that is described in more detail in an accompanying report to this report by Clear Water Solutions[13] . In the report by Clear Water Solutions, the various sources of augmentation supply available to SWAG are shown to be sufficient for remedying depletions in the Max scenario, which indicates that these hypothetical 2022 depletions could also be remedied by those supplies.

Table 2. Plan Year Depletions to RG1, RG2, and RG3

Date	SWAG Depletions (AF)		
	RG1	**RG2**	**RG3**
May-22	(2.50)	6.24	(0.04)
Jun-22	(2.17)	4.87	(1.05)
Jul-22	(1.25)	3.86	(1.31)
Aug-22	(0.57)	3.73	(0.63)
Sep-22	(0.50)	3.68	(0.18)
Oct-22	(0.70)	4.39	(0.87)
Nov-22	(0.84)	6.02	(0.10)
Dec-22	(0.76)	6.60	0.20
Jan-23	(1.19)	6.77	(0.30)
Feb-23	(1.17)	6.47	(0.72)
Mar-23	(1.66)	7.37	(0.93)
Apr-23	(1.68)	6.14	(1.38)
Total	**(14.85)**	**66.08**	**(7.36)**

2. Sources of Replacement Water

For the 2022 Plan Year, augmentation of the projected stream depletions would have been carried out using the Atkins Ditch water right, and potentially some combination of the following sources:

1. Lease water from the Town of Del Norte
2. Lease water from CPW

E. Aquifer Recovery Accounting

As outlined in the Section II.B, the historical operations of SWAG members have resulted in a total volume of aquifer depletion equal to 125,199 AF, and the Sustainable Consumption Level -Drought (SCL-D) for the group is 13,896 AF/year. In the months following the 2022 irrigation season, SWAG would have prepared an annual accounting summary that lists pumping for each well, along with estimated consumptive use. The difference between the estimated consumptive use for the group

[13] Engineering Report for Sustainable Water Augmentation Group in support of the Application for Approval of a Plan for Augmentation Case No. 21CW3026. Clear Water Solutions, October 2022.

as a whole and the SCL-D will be added to the initial recovery volume to compute the Recovery Volume Initial Balance for the 2023 Plan Year, following Equation 8:

$$2023\ Recovery\ Volume\ Initial\ Balance\ (AF) = 125{,}199 - (13{,}896 - NGWCU + RC_{2022})(AF) \qquad (8$$

Based upon the proposed limitation on NGWCU+RC for the 2022 plan year, it is estimated that the Recovery Volume Initial Balance for 2023 would have been 122,301 AF. Appendix A lists all member wells, which would each be included in the accounting calculations. Appendix B illustrates examples of the types of measurement and reporting forms that members would complete each year to serve as the basis for accounting.

In the 2023 AOP for SWAG, the results of the Seasonal Mann-Kendall trend analysis would be included as a point of observed reference for assessment of aquifer recovery. The Seasonal Mann-Kendall analysis would be carried out using the most recent 10-year period of monthly aquifer storage data from the Davis Engineering Unconfined Aquifer Study. After the fifth year of operation under the SWAG Plan, if the results of the trend analysis indicate decline in aquifer storage and provided all other users of the unconfined aquifer are operating in manner to achieve sustainability, then SWAG would work collaboratively with DWR staff to adjust pumping limits in the SWAG plan accordingly. Adjustments to pumping limits would be considered at a 5-year recurrence interval, using the methods outlined above in III.A, throughout operation of the SWAG Plan, up until the point at which the Plan enters the Sustainability Maintenance phase of operations.

1. Confined Aquifer Well Recharge

SWAG will pursue a change of use for a confined aquifer well, WDID 2705734, which has historically been used for irrigation of one of the parcels that will be retired as part of the SWAG Plan. The change of use will allow for the historical consumptive use associated with that well to be used for augmentation and recharge of unconfined aquifer storage. Recharge of the unconfined aquifer will be achieved through withdrawal of confined aquifer water and subsequent recharge in an adjacent recharge pit, the details of which will be outlined in the change of use application for the well. Following acceptance of this change of use, the amount of recharge quantified each year will be incorporated into Equation 8 to account for this source of recharge to the unconfined aquifer. These operations will also allow for the continuation of recharge of the unconfined aquifer from the application inefficiency of water withdrawn from the confined aquifer that has historically occurred.

F. Opinion of Non-Injury

A summary of my professional opinions related to operation of the SWAG Plan is as follows:

1. Operation of the SWAG Plan will not result in material injury decreed water rights, both absolute and conditional.
2. The SWAG Plan includes reductions in consumption of groundwater that will be sufficient to eventually achieve and subsequently maintain aquifer sustainability.

3. The SWAG Plan is sufficiently generalizable such that it could be reconfigured to accept additional wells in the future, or to cover fewer wells.
    a. The generalizable nature of the SWAG Plan indicates that similar plans could be developed for other wells without adversely impacting the pursuit of sustainability or the existing plans to address stream depletions.
    b. Inclusion of additional wells or removal of wells currently in the Plan in the future would require adjustments to the calculated values of the SCL-Drought, and the targeted aquifer recovery volume. If wells are added or removed, the RCL would be adjusted in proportion to the change in the SCL-Drought value, which would maintain the qualitative outline of the Plan.

Appendix A – Member Wells

Table A-1. Member Wells

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705428	W1843 WELL NO SKY VLY 07	25353-F, 48338-F	Irrigation, Commercial, Evaporation	04CW0025, W1843	12/31/1950	NE-NE-13-41-8
2008552	W0140 WELL NO PUMP 05	6152-R	Irrigation	W0140	5/31/1956	SW-NE-34-41-8
2706088	W2983 WELL NO 109	7555-	Stock	W2983	12/10/1960	SW-SW-4-41-9
2706324	07CW17 WELL NO 2-R	11310-R-R	Irrigation	07CW0017	7/31/1948	SE-SE-1-41-8
2705769	W1365 WELL NO 04		Domestic, Stock	W1365	4/30/1910	SE-SE-1-41-8
2705087	W1912 WELL NO 11	8937-F	Irrigation	W1912	6/23/1958	SE-NW-20-41-9
2706144	W1912 WELL NO 03	7719-F	Irrigation	W1912	8/28/1957	SW-NW-17-41-9
2706325	07CW23 WELL NO 5-R	9346-F-R	Irrigation	07CW0023	12/31/1956	NW-SE-18-41-10
2012602	W2556 WELL NO 07	5565-F	Irrigation	W2556	7/15/1965	SW-NW-35-41-8
2705421	W1504 WELL NO 09	12185-R	Irrigation, Stock	W1504	6/30/1955	SW-SW-14-41-8
2705097	W1912 WELL NO 17	8933-F	Irrigation	W1912	9/18/1958	SW-SE-20-41-9
2008556	W0140 WELL NO PUMP 11	1723-R	Irrigation	W0140	5/31/1957	SW-SE-28-41-8
2706297	W1510 WELL NO IRR 04	22883-F, 22883-F-R	Irrigation	94CW0017	6/5/1958	SW-NW-8-41-9
2706289	PERMIT 37969-F-	37969-F	Irrigation	W1417	2/20/1957	NW-SW-21-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2706288	94CW017 WELL NO 4A	22882-F	Irrigation	94CW0017	9/10/1957	NW-SW-8-41-9
2706287	PERMIT 24304-F-	24304-F	Irrigation	W0854	6/26/1965	NE-NE-8-41-9
2706286	PERMIT 22885-F-	22885-F	Irrigation	W1912	8/21/1959	SE-NW-7-41-9
2706285	94CW017 WELL NO 16A	23242-F	Irrigation	94CW0017	12/9/1966	NE-SE-7-41-9
2706284	PERMIT 49700-F-	49700-F	Irrigation	W3721, W3722	4/30/1955	NE-SE-3-41-9
2706282	2004CW015 WELL NO. SKY VALLEY 5A	27105-F	Irrigation	04CW0015	9/30/1965	NW-NE-24-41-8
2706281	2004CW015 WELL NO. SKY VALLEY (2,4)A	44998-F	Irrigation	04CW0015	12/31/1950	NW-NW-24-41-8
2706280	2004CW015 WELL NO. SKY VALLEY 2A	41958-F	Irrigation	04CW0015	12/31/1950	NE-NW-24-41-8
2706271	PERMIT 23229-F-	23229-F	Irrigation	W1504	6/30/1942	NW-SE-14-41-8
2706270	PERMIT 23181-F-	23181-F	Irrigation		2/3/1978	SW-NW-14-41-8
2706269	2004CW14 WELL NO. SKY VALLEY 3A	27103-F	Irrigation	04CW0014	9/20/1955	NW-NW-13-41-8
2706268	2004CW016 WELL NO. SKY VALLEY 1B	45000-F	Irrigation	04CW0016	12/31/1950	NW-SE-13-41-8
2706267	2004CW016 WELL NO. SKY VALLEY 1A	44999-F	Irrigation	04CW0016	12/31/1950	NW-NE-13-41-8
2706266	2004CW026 WELL NO. SKY VALLEY 4A	27104-F	Irrigation	04CW0026	5/31/1965	NW-SW-13-41-8
2706265	PERMIT 24729-F-	24729-F	Irrigation	W0412	10/20/1964	SW-SW-12-41-8

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2706260	PERMIT 32518-F-	32518-F, 32518-F-R	Irrigation	07CW0017	4/25/1962	NW-SE-1-41-8
2706240	PERMIT 45382-F-	45382-F	Irrigation	82CW0118	1/9/1976	SW-SW-31-42-10
2706234	PERMIT 46081-F-	46081-F	Irrigation	90CW0032	8/22/1978	NW-SW-20-41-10
2706232	PERMIT 14571-R-	14571-R	Irrigation			SE-NE-19-41-10
2706224	PERMIT 485-RR	485-R-R	Irrigation	W227	3/25/1959	SW-NE-20-41-8
2706222	PERMIT 32517-F	32517-F	Irrigation	07CW0017	6/30/1957	NW-SW-1-41-8
2706190	2000CW023 WELL NOJUNE-S	51674-F	Irrigation	00CW0023	4/28/1980	SW-NE-8-41-10
2706189	2000CW023 WELL NO 1-S	51850-F	Irrigation	00CW0023	1/29/1975	SE-SW-19-41-10
2706188	2000CW023 WELL NO 5-S	51851-F	Irrigation	00CW0023	12/31/1956	NE-SE-18-41-10
2706187	2000CW023 WELL NO KATE-S	48299-F	Irrigation	00CW0023	4/28/1980	SW-SE-8-41-10
2706186	2000CW023 WELL NO 4-S	51848-F	Irrigation	00CW0023	7/28/1980	SW-NE-31-42-10
2706185	2000CW023 WELL NO 2-S	51849-F	Irrigation	00CW0023	1/9/1976	SW-SE-31-42-10
2706184	2000CW023 WELL NO LOIS-S	50607-F	Irrigation	00CW0023	4/28/1980	NW-NW-17-41-10
2706152	94CW034 WELL NO 08A	22884-F	Irrigation	94CW0034	9/10/1958	NW-SW-20-41-9
2706151	94CW034 WELL NO 03A	22881-F	Irrigation	94CW0034	8/28/1957	NW-NW-17-41-9
2706147	W2362 WELL NO 01	1285-R, 1285-R-R	Irrigation	W2362	5/31/1947	SW-NE-1-41-9
2706143	W1912 WELL NO 08	8934-F, 47224-F	Irrigation	W1912	9/10/1958	SW-SW-20-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2706142	W1028 WELL NO 05	11439-F	Irrigation	W1028	6/21/1968	SW-NE-19-41-9
2706114	W3967 WELL NO 28	1477-R	Irrigation	W3323	2/25/1957	NE-SW-21-41-9
2706008	W2289 WELL NO S 02	12460-R	Irrigation	W2289	8/11/1956	SW-SW-19-41-9
2705907	W1912 WELL NO 04	7720-F	Irrigation	94CW0017, W1912	9/10/1957	SW-SW-8-41-9
2705873	W1826 WELL NO 03		Irrigation	W1826	5/15/1955	SW-SE-12-41-8
2705797	W1504 WELL NO 14	13367-F	Irrigation	W1504	1/28/1969	SE-SW-14-41-8
2705755	W1129 WELL NO 01	15066-F	Irrigation	W1129	6/26/1971	SE-SW-8-41-9
2705754	W1028 WELL NO 03	13181-F	Irrigation	09CW0006, W1028	6/13/1969	SW-SE-18-41-9
2705745	W0904 WELL NO 01	930-R, 930-R-R	Irrigation	W0904	5/15/1948	NE-SW-17-41-10
2705744	W0903 WELL NO SKY VLY 04	6431-F	Irrigation	W0903	5/31/1965	SW-NW-24-41-8
2705734	W0854 WELL NO 06	3277-F	Irrigation	W0854	7/23/1961	SW-NE-6-41-9
2705733	W0854 WELL NO 05	3067-F	Irrigation	W0854	4/10/1961	SW-SE-6-41-9
2705712	W0755 WELL NO 01	6353-R	Irrigation	W0755	8/10/1956	SE-NW-11-41-8
2705574	82CW155 WELL HELEN	23355-F	Irrigation	82CW0155	4/28/1980	NW-SE-7-41-10
2705573	82CW118 WELL NO 04	25014-F, 25014-F-R	Irrigation	82CW0118	7/28/1980	SW-NE-31-42-10
2705572	82CW118 WELL NO 03	22602-F	Irrigation	82CW0118	7/11/1977	SW-NW-31-42-10
2705571	82CW118 WELL NO 02	20589-F	Irrigation	82CW0118	1/9/1976	NW-SE-31-42-10
2705570	82CW118 WELL NO 01	20588-F	Irrigation	82CW0118	1/9/1976	NW-SW-31-42-10

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705536	90CW029 WELL NO 01	19427-F	Irrigation	90CW0029	1/29/1975	NE-SW-19-41-10
2705531	90CW032 WELL NO 06	23944-F	Irrigation	90CW0032	8/22/1978	SW-NW-20-41-10
2705530	90CW032 WELL NO 05	23945-F	Irrigation	90CW0032	8/22/1978	SW-SW-20-41-10
2705529	90CW032 WELL NO 04	24682-F	Irrigation	90CW0032	3/3/1980	NE-SE-20-41-10
2705528	90CW032 WELL NO 03	23946-F	Irrigation	90CW0032	8/22/1978	NW-SE-20-41-10
2705527	90CW032 WELL NO 02	24681-F	Irrigation	90CW0032	3/3/1980	NE-NE-20-41-10
2705526	90CW032 WELL NO 01	23947-F	Irrigation	90CW0032	8/22/1978	SW-NE-20-41-10
2705517	W3464 WELL NO 01	18335-F	Irrigation	W3464	12/6/1974	SW-NW-21-41-8
2705497	81CW178 JUNE	23356-F	Irrigation	81CW0178	4/28/1980	NW-NE-8-41-10
2705496	81CW178 KATE	23359-F	Irrigation	81CW0178	4/28/1980	NW-SE-8-41-10
2705495	81CW178 LOIS	23360-F	Irrigation	00CW0023, 81CW0178	4/28/1980	SW-NW-17-41-10
2705482	W1912 WELL NO 16	11302-F	Irrigation	W1912	12/9/1966	SW-SE-7-41-9
2705481	W1028 WELL NO 04	13164-F	Irrigation	W1028	6/7/1969	SW-SW-18-41-9
2705480	W3705 WELL NO 01	21919-F	Irrigation	W3705	9/15/1976	NE-NW-19-41-9
2705471	W3722 WELL NO C&W 05	19784-F, 19784-F-R	Irrigation	W3722	5/5/1975	SW-NE-10-41-9
2705470	W3967 WELL NO 25	23562-F	Irrigation	W3967	5/8/1978	SW-SE-8-41-9
2705469	W0854 WELL NO 01	11728-R	Irrigation	W0854	3/31/1955	SW-SW-6-41-9
2705468	W3967 WELL NO 28	23565-F	Irrigation	W3967	5/8/1978	NE-SE-6-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705467	W3967 WELL NO 27	23564-F	Irrigation	W3967	1/13/1965	NE-SW-5-41-9
2705465	W1417 WELL NO 01	11960-R	Irrigation	W1417	2/20/1957	SW-SW-21-41-9
2705460	W1912 WELL NO 09	2264-F	Irrigation	W1912	8/21/1959	SW-NW-7-41-9
2705458	W1912 WELL NO 05	8936-F-R	Irrigation	94CW0017, W1912	6/5/1958	SW-NW-8-41-9
2705453	W1028 WELL NO 08R	13496-F	Irrigation	W3405	6/23/1969	NE-NE-19-41-9
2705452	W1028 WELL NO 07R	13495-F	Irrigation	W3405	7/27/1969	NE-SE-19-41-9
2705451	W1028 WELL NO 06	11440-F	Irrigation	W1028	6/17/1968	SW-SE-19-41-9
2705449	W1365 WELL NO 01	3535-F	Irrigation	W1365	4/25/1962	SW-SW-1-41-8
2705445	W0412 WELL NO 01	6346-F	Irrigation	W0412	10/20/1964	SW-SW-12-41-8
2705441	W1504 WELL NO 03	14209-F	Irrigation	W1504	2/11/1970	SE-NW-11-41-8
2705427	W0903 WELL NO SKY VLY 03	14225-R	Irrigation	W0903	9/20/1955	SW-NW-13-41-8
2705426	W3906 WELL NO 10R	5843-R-R	Irrigation	W3906	12/31/1942	NW-NE-14-41-8
2705423	W1504 WELL NO 11	12183-R	Irrigation	W1504	6/30/1942	SE-SW-14-41-8
2705422	W1504 WELL NO 06	13362-F	Irrigation	W1504	2/1/1969	SW-NW-14-41-8
2705420	W1504 WELL NO 08	12184-R	Irrigation	W1504	6/30/1954	SW-SW-14-41-8
2705417	W2328 WELL NO 07	16407-R	Irrigation	W2328	7/31/1956	SE-NW-23-41-8
2705416	W3409 WELL NO 06R	6942-F-R	Irrigation	W3409	12/17/1965	NW-NE-23-41-8
2705415	W0903 WELL NO SKY VLY 01	14224-R, 14224-R-R	Irrigation	W0903	12/31/1950	SW-SW-13-41-8

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705414	W0903 WELL NO SKY VLY 06	6435-F	Irrigation	W0903	9/30/1965	NW-NE-24-41-8
2705413	W0903 WELL NO SKY VLY 05	6430-F	Irrigation	W0903	9/30/1965	SW-NE-24-41-8
2705407	W3409 WELL NO 17	19224-F	Irrigation	W3409	11/18/1974	NW-SW-22-41-8
2705406	W1493 WELL NO 02	677-R	Irrigation	W1493	6/30/1956	SW-SW-22-41-8
2705218	79CW042 WELL NO 02A	23498-F	Irrigation	79CW0042	5/1/1965	NW-SE-12-41-8
2705217	79CW042 WELL NO 01A	24383-F	Irrigation	79CW0042	5/1/1965	NW-NE-12-41-8
2705210	W3967 WELL NO 07A	23826-F	Irrigation	W3967	9/30/1961	NE-NE-6-41-9
2705209	W0854 WELL NO 03	11730-R	Irrigation	W0854	3/31/1956	SW-NW-6-41-9
2705208	W3967 WELL NO 03A	23825-F	Irrigation	W3967	3/31/1956	NE-NW-6-41-9
2705207	W0854 WELL NO 02	11729-R	Irrigation	W0854	3/31/1956	SW-SW-6-41-9
2705206	W3967 WELL NO 02A	23824-F	Irrigation	W3967	3/31/1956	NE-SW-6-41-9
2705205	W3967 WELL NO 33	23567-F	Irrigation	W3967	1/16/1965	NW-NE-5-41-9
2705204	W0854 WELL NO 09	6638-F	Irrigation	W0854	1/16/1965	SW-NW-5-41-9
2705203	W0854 WELL NO 08	6637-F	Irrigation	W0854	1/13/1965	SW-SW-5-41-9
2705202	W3967 WELL NO 32	23566-F	Irrigation	W3967	1/13/1965	NE-NW-5-41-9
2705201	W0854 WELL NO 10	6639-F	Irrigation	W0854	6/26/1965	SW-SE-5-41-9
2705200	W3967 WELL NO 26	23563-F	Irrigation	W3967	6/26/1965	NW-SE-5-41-9
2705178	W3705 WELL NO S 01A	21927-F	Irrigation	W3705	6/1/1956	NE-SW-19-41-9
2705174	W3720 WELL NO 08A	20973-F	Irrigation	W3720	6/30/1955	NW-NE-4-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705173	W1912 WELL NO 07	11336-R	Irrigation	W1912	6/30/1955	NW-SW-4-41-9
2705172	W3720 WELL NO 07A	20972-F	Irrigation	W3720	6/30/1955	NW-NW-4-41-9
2705170	W3720 WELL NO 06A	20971-F, 20971-F-R	Irrigation	W3720	6/30/1956	NW-SE-4-41-9
2705169	W1912 WELL NO 06	11337-R	Irrigation	W1912	6/30/1956	SE-SE-5-41-9
2705168	W3720 WELL NO 05A	20970-F	Irrigation	W3720	6/30/1956	NW-SW-4-41-9
2705167	W1494 WELL NO 02	10416-F	Irrigation	09CW0006, W1494	8/10/1966	SW-NE-18-41-9
2705166	W3720 WELL NO 04A	21026-F	Irrigation	W3720	8/10/1966	NE-NE-18-41-9
2705165	W1494 WELL NO 01	10415-F	Irrigation	07CW0024, 09CW0006, W1494	7/29/1966	SW-NW-18-41-9
2705164	W3720 WELL NO 03A	21025-F	Irrigation	07CW0024, 09CW0006, W3720	7/29/1966	NE-NW-18-41-9
2705162	W3720 WELL NO 02A	21024-F	Irrigation	07CW0036, W3720	10/31/1965	NE-SE-18-41-9
2705161	W1028 WELL NO 01	10623-F	Irrigation	07CW0036, W1028	9/30/1966	SE-SW-18-41-9
2705160	W3720 WELL NO 01A	20974-F	Irrigation	W3720	9/30/1966	NE-SW-18-41-9
2705159	W1912 WELL NO 01	7721-F	Irrigation	W1912	8/22/1957	SW-SW-7-41-9
2705158	W3753 WELL NO 01A	20868-F	Irrigation	W3753	8/22/1957	NE-SW-7-41-9
2705143	W1826 WELL NO 01	6432-F	Irrigation	W1826	5/1/1965	SW-NE-12-41-8
2705120	82CW143 WELL NO 07R	13361-F-R	Irrigation	82CW0143	12/31/1954	SW-SW-14-41-8
2705115	W3722 WELL NO C&W 09	21256-F	Irrigation	W3721, W3722	5/31/1956	NW-NE-3-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705114	W2588 WELL NO 18	21255-F	Irrigation	W3721, W3722	5/31/1956	NE-NW-3-41-9
2705113	W0240 WELL NO 02	13017-R	Irrigation	W0240	5/31/1956	NW-SW-3-41-9
2705112	W3722 WELL NO C&W 03	19780-F	Irrigation	W3721, W3722	4/30/1955	NW-SE-3-41-9
2705111	W3721 WELL NO 04A	20165-F	Irrigation	W3721	4/30/1955	NW-SW-3-41-9
2705110	W0240 WELL NO 01	13016-R	Irrigation	W0240	4/30/1955	SW-SW-3-41-9
2705109	W3722 WELL NO C&W 02	19779-F, 19779-F-R	Irrigation	W3721, W3722	8/31/1956	NW-SE-9-41-9
2705108	W3721 WELL NO 02A	20166-F	Irrigation	W3721	8/31/1956	SW-SW-9-41-9
2705107	W1562 WELL NO 05	11718-R	Irrigation	W1562	8/31/1956	SW-SW-9-41-9
2705106	W3722 WELL NO C&W 07	19786-F	Irrigation	W3721, W3722	8/31/1956	SE-NW-10-41-9
2705105	W3722 WELL NO C&W 01	19778-F	Irrigation	W3721, W3722	8/31/1956	SW-NE-9-41-9
2705104	W1562 WELL NO 04	11717-R	Irrigation	W1562	8/31/1956	SE-SE-8-41-9
2705103	W1028 WELL NO 03	20164-F	Irrigation	07CW0036, W3721	7/31/1955	SW-NW-9-41-9
2705102	W1562 WELL NO 01	11716-R	Irrigation	07CW0036, W1562	7/31/1955	SW-NW-9-41-9
2705098	83CW007 WELL NO 17A	25693-F	Irrigation	83CW0007	9/18/1958	NW-SE-20-41-9
2705096	W2983 WELL NO 101	25696-F	Irrigation	83CW0007	3/23/1961	SE-NE-8-41-9
2705095	W1912 WELL NO 15	2853-F	Irrigation	W1912	3/23/1961	SE-NW-8-41-9
2705094	83CW007 WELL NO 14A	25698-F	Irrigation	83CW0007	3/15/1961	NW-SE-17-41-9
2705092	83CW007 WELL NO 13A	25694-F	Irrigation	83CW0007	11/25/1957	NE-SW-17-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2705091	W1912 WELL NO 13	7795-F	Irrigation	W1912	11/25/1957	SE-SE-18-41-9
2705090	83CW007 WELL NO 12A	25697-F	Irrigation	83CW0007	6/8/1960	NW-NE-17-41-9
2705088	83CW007 WELL NO 11A	25695-F	Irrigation	83CW0007	6/23/1958	NW-NE-20-41-9
2705086	83CW007 WELL NO 10A	25692-F	Irrigation	83CW0007	6/17/1958	NW-NW-20-41-9
2705082	82CW093 WELL NO 03R	1287-R-R	Irrigation	82CW0093	5/31/1957	SW-NE-1-41-9
2014298	PERMIT 55396-F-	55396-F	Irrigation	W3706	7/12/1974	SW-SE-31-41-9
2014220	PERMIT 886-RR	886-R-R	Irrigation	W2093	11/27/1959	SW-SW-29-41-10
2014148	PERMIT 43262-F-	43262-F	Irrigation	W0969	5/31/1948	NW-SE-10-40-8
2013954	PERMIT 46318-F-	46318-F	Irrigation	81CW0052	7/8/1996	NW-NW-7-40-10
2013916	02CW0006 WELL NO. 1R5	65266-F	Irrigation	02CW0006	10/10/1949	NW-NE-26-41-8
2013856	2002CW034 WELL JORDE 1-B	59744-F	Irrigation	02CW0034	1/31/1956	SW-SE-29-41-9
2013842	W3442 WELL NO 1	18633-F, 18633-F-R	Irrigation	W3442	4/29/1974	SW-SW-32-41-10
2013679	93CW016 WELL NO 07S	42635-F	Irrigation	93CW0016	10/8/1974	NE-SE-4-40-9
2013678	93CW016 WELL NO 06S	42634-F	Irrigation	93CW0016	10/8/1974	SE-NE-4-40-9
2013676	93CW016 WELL NO 04S	42636-F	Irrigation	93CW0016	10/8/1974	NW-NW-9-40-9
2013675	93CW016 WELL NO 02S	42633-F	Irrigation	93CW0016	10/8/1974	SW-NW-4-40-9
2013674	93CW016 WELL NO 01S	42632-F	Irrigation	93CW0016	10/8/1974	SW-SW-4-40-9
2013673	93CW015 WELL NO YOWS 02S	42639-F	Irrigation	93CW0015	5/31/1940	SW-SE-5-40-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2013626	W3935 WELL NO 02	21862-F	Irrigation	W3935	11/1/1976	NW-NE-29-41-10
2013625	W3935 WELL NO 01	21863-F	Irrigation	W3935	11/1/1976	NW-SE-29-41-10
2013551	W3706 WELL NO 02	18637-F	Irrigation	W3706	7/12/1974	SW-SE-31-41-9
2013550	W3706 WELL NO 01	20095-F	Irrigation	W3706	7/22/1975	NW-SE-31-41-9
2013549	W3704 WELL NO 01R	14105-R-R	Irrigation	W3704	4/30/1949	SW-SW-10-40-9
2013534	W3686 WELL NO 07	22290-F	Irrigation	W3686	10/8/1974	SW-SE-4-40-9
2013533	W3686 WELL NO 06	22289-F	Irrigation	W3686	10/8/1974	SW-NE-4-40-9
2013531	W3686 WELL NO 04	22287-F	Irrigation	W3686	10/8/1974	NW-NW-9-40-9
2013529	W3686 WELL NO 02	22285-F	Irrigation	W3686	10/8/1974	SW-NW-4-40-9
2013528	W3686 WELL NO 01	22284-F	Irrigation	W3686	10/8/1974	SW-SW-4-40-9
2013346	W3409 WELL NO 16R	19431-F-R	Irrigation	W3409	5/18/1973	NW-NE-27-41-8
2013345	W3409 WELL NO 04R	2146-F-R	Irrigation	W3409	6/15/1959	SW-NW-26-41-8
2013344	W3409 WELL NO 03R	1643-R-R	Irrigation	W3409	5/31/1950	NW-SE-27-41-8
2012599	W2556 WELL NO 04	14151-R, 14151-R-R	Irrigation	W2556	12/31/1947	SW-NW-35-41-8
2012598	W2556 WELL NO 03	4264-F	Irrigation	W2556	6/8/1963	SE-SE-9-40-9
2012448	W2460 WELL NO 05	10764-F	Irrigation	W2460	6/27/1966	SE-SW-25-41-8
2012446	W2460 WELL NO 02	8727-R	Irrigation	W2460	2/1/1954	SW-SW-25-41-8
2012229	W2328 WELL NO 05	5235-F-R	Irrigation	W2328	4/7/1964	SW-NW-26-41-8

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2012228	W2328 WELL NO 03	13753-F	Irrigation	W2328	9/2/1969	SW-NE-27-41-8
2012226	W2328 WELL NO 01	11916-R	Irrigation	W2328	7/31/1955	SW-NW-27-41-8
2012184	W2289 WELL NO 07	10433-F	Irrigation	W2289	3/31/1966	SE-SW-7-40-9
2011926	W2093 WELL NO 04	888-R-R	Irrigation	W2093	10/8/1959	SW-NE-29-41-10
2011925	W2093 WELL NO 03	885-R	Irrigation	W2093	3/21/1951	SW-SW-29-41-10
2011923	W2093 WELL NO 01	887-R, 887-R-R	Irrigation	W2093	1/15/1952	SW-SW-29-41-10
2011677	W1943 WELL NO 02	14316-R	Irrigation	W1943	5/31/1940	SW-SE-5-40-9
2011640	W1909 WELL NO 01	4831-F	Irrigation	W1909	12/7/1963	SW-SW-36-41-8
2011459	W1834 WELL NO 02	13222-R	Irrigation	W1834	6/30/1954	SE-NW-35-41-8
2011458	W1834 WELL NO 01	13221-R	Irrigation	W1834	6/30/1947	SE-NW-35-41-8
2010180	W1099 WELL NO 01	8768-R, 8768-R-R, 8768-R-R	Irrigation	11CW0014, W1099	3/28/1951	NW-SE-31-41-10
2009867	W0903 WELL NO JORDE 02	11967-R	Irrigation	W0903	12/31/1956	SW-NE-31-41-9
2009836	W0894 WELL NO 05	15512-F	Irrigation	W0894	5/20/1972	SW-SW-36-41-7
2009835	W0894 WELL NO 04	4460-F	Irrigation	W0894	7/19/1963	SW-SE-36-41-7
2009788	W0866 WELL NO 02	3508-F	Irrigation	W0866	5/10/1962	SW-NE-6-40-9
2009237	W0521 WELL NO 02	15040-R	Irrigation	W0521	5/31/1952	SE-NW-10-40-8
2008869	W0334 WELL NO 13	3108-F	Irrigation	W0334	5/10/1961	SW-SW-32-41-10
2008581	W0162 WELL NO 04	1644-R	Irrigation	W0162	5/31/1952	SW-SE-27-41-8

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2008567	W0148 WELL NO PUMP 05	6485-R	Irrigation	W0148	6/20/1957	SW-NW-11-40-8
2008566	W0148 WELL NO PUMP 03	6483-R-R	Irrigation	W0148	9/21/1935	SE-NW-11-40-8
2008553	W0140 WELL NO PUMP 08	5237-F	Irrigation	W0140	3/20/1964	SE-NW-7-40-9
2008551	W0140 WELL NO PUMP 02	6075-F	Irrigation	W0140	8/25/1964	SW-SE-33-41-8
2008317	W0011 WELL NO 01	1495-R-R	Irrigation	W0011	7/31/1942	SW-NW-36-41-8
2008262	83CW065 WELL NO 05	24397-F	Irrigation	83CW0065	1/3/1979	SE-NE-32-41-9
2008258	83CW030 WELL NO 02	24667-F	Irrigation	83CW0030	9/10/1979	NW-SE-9-40-9
2008238	82CW182 WELL NO 01	23238-F	Irrigation	82CW0182	12/22/1977	SW-SE-32-41-10
2008145	81CW052 WELL NO 02	25203-F	Irrigation	81CW0052	12/18/1980	SW-NW-7-40-10
2008144	81CW052 WELL NO 01	25204-F	Irrigation	81CW0052	12/18/1980	SW-NW-7-40-10
2008143	81CW042 WELL NO 02	25214-F	Irrigation	81CW0042	1/28/1981	NW-NW-32-41-10
2008142	81CW042 WELL NO 01	25213-F	Irrigation	81CW0042	1/28/1981	SW-NW-32-41-10
2008027	79CW084 WELL NO 01	22533-F	Irrigation	79CW0084	6/8/1977	SE-SW-31-41-10
2008011	79CW033 WELL NO 01R	675-R-R	Irrigation	79CW0033	7/31/1952	NE-NW-27-41-8
2006602	91CW002 WELL NO JORDY 1A	48906-F, 48906-F-R	Irrigation	91CW0002, 97CW0015	1/31/1956	NW-SE-29-41-9
2006601	W0903 WELL NO JORDE 01	11966-R	Irrigation	W0903	1/31/1956	SW-NW-32-41-9
2006588	88CW034 WELL NO 01S	34580-F	Irrigation	88CW0034	5/10/1955	SW-SW-29-41-9
2006587	88CW034 WELL NO 01R	20325-R	Irrigation	88CW0034	5/10/1955	NW-SW-29-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2006534	W3966 WELL NO 07A	24118-F	Irrigation	W3966	5/31/1935	SW-NW-7-40-9
2006516	W3908 WELL NO 01A	22919-F	Irrigation	W3908	8/31/1955	SW-NE-36-41-8
2006515	W0403 WELL NO 01	8678-R	Irrigation	W0403	8/31/1955	SE-NW-36-41-8
2006514	W3904 WELL NO 01A	22909-F	Irrigation	W3904	12/31/1950	NW-SE-26-41-8
2006513	W0081 WELL NO 01	7042-R, 7042-R-R	Irrigation	W0081	12/31/1950	SW-SE-26-41-8
2006512	W3903 WELL NO 01A	22908-F	Irrigation	W3903	7/31/1942	NW-NW-36-41-8
2006449	W3707 WELL NO 01A	21804-F	Irrigation	W3707	8/31/1953	SE-NE-6-40-9
2006420	W3585 WELL NO PUMP 10A	21115-F	Irrigation	W3585	5/31/1951	NE-SE-28-41-8
2006418	W3585 WELL NO PUMP 09A	21116-F, 44128-F	Irrigation	W3585	6/30/1955	NW-NE-7-40-9
2006416	W3585 WELL NO PUMP 04A	22135-F	Irrigation	W3585	12/31/1936	NE-NE-34-41-8
2006394	W3461 WELL NO 01A	19148-F	Irrigation	W3461	5/31/1947	SW-SW-36-41-8
2006362	W3357 WELL NO 01	17719-F	Irrigation	W3357	7/31/1939	SW-NE-10-40-8
2005803	83CW030 WELL NO 01R	8728-R-R	Irrigation	83CW0030	2/1/1954	NW-SW-25-41-8
2005723	83CW030 WELL NO 06A	25706-F	Irrigation	83CW0030	7/10/1967	SW-SE-9-40-9
2005717	83CW065 WELL NO JORDE 4A	26227-F	Irrigation	83CW0065	2/28/1957	NE-NW-32-41-9
2005716	W0903 WELL NO JORDE 04	11969-R, 11969-R-R	Irrigation	W0903	2/28/1957	SW-NW-32-41-9
2005715	83CW065 WELL NO 03A	26226-F	Irrigation	83CW0065	12/31/1956	SE-NE-31-41-9

WDID	Well Name	Permit No.	Type of Use	Decree	Appropriation Date	PLSS
2005714	W0903 WELL NO JORDE 03	11968-R	Irrigation	W0903	12/31/1956	SW-NE-31-41-9
2005617	80CW070 WELL NO 04R	10765-F-R	Irrigation	80CW0070	6/21/1966	NW-SE-25-41-8
2005524	81CW004 WELL NO 06A	24001-F	Irrigation	81CW0004	7/31/1954	NW-SE-7-40-9
2005339	W0969 WELL NO PUMP 10A	22283-F, 18980-F	Irrigation	W0969	12/31/1935	NW-SW-6-40-9
2005337	W0969 WELL NO PUMP 09	363-R, 363-R-R	Irrigation	W0969	3/31/1952	SW-SW-6-40-9
2005334	W0969 WELL NO PUMP 06	880-R-R	Irrigation	W0969	5/31/1948	NW-SE-10-40-8
2005053	W0148 WELL NO PUMP 04	6484-R	Irrigation	W0148	9/20/1953	SW-NW-11-40-8
2005052	W0148 WELL NO PUMP 02A	22282-F, 17720-F	Irrigation	W0148	3/31/1938	NW-SW-11-40-8
2005050	W0148 WELL NO PUMP 01	1272-R-R	Irrigation	W0148	3/31/1952	SW-SW-11-40-8
2005041	W0140 WELL NO PUMP 06	6783-R	Irrigation	W0140	4/20/1945	SW-NW-7-40-9
2009049	W0431 WELL NO 02	9440-F	Irrigation	W0431	6/24/1965	SW-NW-14-39-9
2014027	07CW18 WELL NO 2-S	47907-F	Irrigation	07CW0018	6/24/1965	SW-NW-14-39-9
2005571	W0431 WELL NO 01	9441-F, 9441-F-R	Irrigation	W0431	7/27/1965	NW-SW-14-39-9
2005572	82CW117 WELL NO 01A	25700-F, 25700-F-R	Irrigation	82CW0117, 11CW0013, 06CW0025	7/27/1965	NW-SW-14-39-9

Appendix B – Measurement and Reporting

		Consumptive Use Reporting Form - SWAG SWSP 2022				
Parcel Details	**Sub-Parcel 1**	**Sub-Parcel 2**	**Sub-Parcel 3**	**Sub-Parcel 4**		
Acreage:						
Crop Type:						
Planting Date:						
Harvest Date:						
Surface Water Rights:						
PLSS Legal Description:						
Well Details	**Well 1**	**Well 2**	**Well 3**	**Well 4**		
WDID:						
Beginning of Plan Year Meter Reading:						
End of Plan Year Meter Reading:						
Dates of Missing Pumping Records:						
Notes:						

Table B- 1. Consumptive Use Reporting Form Example

Each member of SWAG will complete and verify Consumptive Use Reporting Forms (CUR Forms) for all parcels and wells covered by SWAG's Plan. Each CUR Form will provide the details for an entire Farm Unit, which is defined as the group of parcels and sub-parcels that are collectively irrigated by a group of wells or an individual well. All CUR Forms for SWAG will be included, along with relevant documentation, in the Measurement Appendix for the following Plan Year's AOP.

The Measurement Appendix will also include two versions of a detailed accounting summary workbook. One accounting summary workbook will be a retrospective accounting workbook covering the operations of the prior Plan Year, with values that were projected or forecasted replaced with observed values. The projected accounting summary workbook for the Plan Year will also be included. A draft version of the structure of the detailed accounting workbooks is included as an Excel workbook attachment to this report, with the filename "SWAG_AccountingTemplate _12.12.2022.xlsx".