Salinas Valley Basin
Groundwater Sustainability Agency

New Seawater Intrusion Project

TECHNICAL MEMORANDUM

New Seawater Intrusion Project Evaluation

March 2026 / FINAL

Salinas Valley Basin
Groundwater Sustainability Agency

New Seawater Intrusion Project

TECHNICAL MEMORANDUM

New Seawater Intrusion Project Evaluation

March 2026 / FINAL

Digitally signed by Anthony M. Cemo
Contact Info: Carollo Engineers, Inc.
Date: 2026.03.31 13:21:02-07'00'

Contents

Appendices

Tables

Figures

Abbreviations

180/400	180/400-Foot Aquifer Subbasin
AF	acre-feet
AFY	acre-feet per year
ASR	aquifer storage and recovery
B	billion
BOD	biochemical oxygen demand
BOD_5	5-day biochemical oxygen demand test
cfs	cubic feet per second
CSIP	Castroville Seawater Intrusion Project
ESDC	Engineering Services During Construction
GMP	Groundwater Extraction Management Program
gpm	gallons per minute
GSP	Groundwater Sustainability Plans
IWTF	Industrial Wastewater Treatment Facility
IWW	industrial wastewater
LGMA	Leafy Green Marking Association
M	million
M1W	Monterey One Water
MCWRA	Monterey County Water Resources Agency
memo	memorandum
MG	million gallons
mg/L	milligrams per liter
mgd	million gallons per day
mL	milliliters
MPN	most probable number
N/A	not applicable
NSIP	New Seawater Intrusion Project
NTU	nephelometric turbidity unit
O&M	operations and maintenance
PWM	Pure Water Monterey
RTP	regional treatment plant
SRDF	Salinas River Diversion Facility
study	feasibility study
SVBGSA	Salinas Valley Basin Groundwater Sustainability Agency
SVRP	Salinas Valley Reclamation Project
SWRCB	State Water Resources Control Board
TBD	to be determined

TDS	total dissolved solids
TSS	total suspended solids
µS/cm	microsiemens per centimeter
USGS	United States Geological Survey

SECTION 1 PURPOSE OF TECHNICAL MEMORANDUM

The Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) has been tasked with achieving groundwater sustainability within the six subbasins under its jurisdiction, and, working in conjunction with neighboring agencies, to sustainably manage reliable water supplies in the Salinas Valley. The Department of Water Resources has designated the 180/400-Foot Aquifer Subbasin (180/400) as critically over drafted due to seawater intrusion in this subbasin and the Eastside Aquifer Subbasin as a high priority. Figure 1 shows a vicinity map of the SVBGSA jurisdictional and subbasin boundaries.

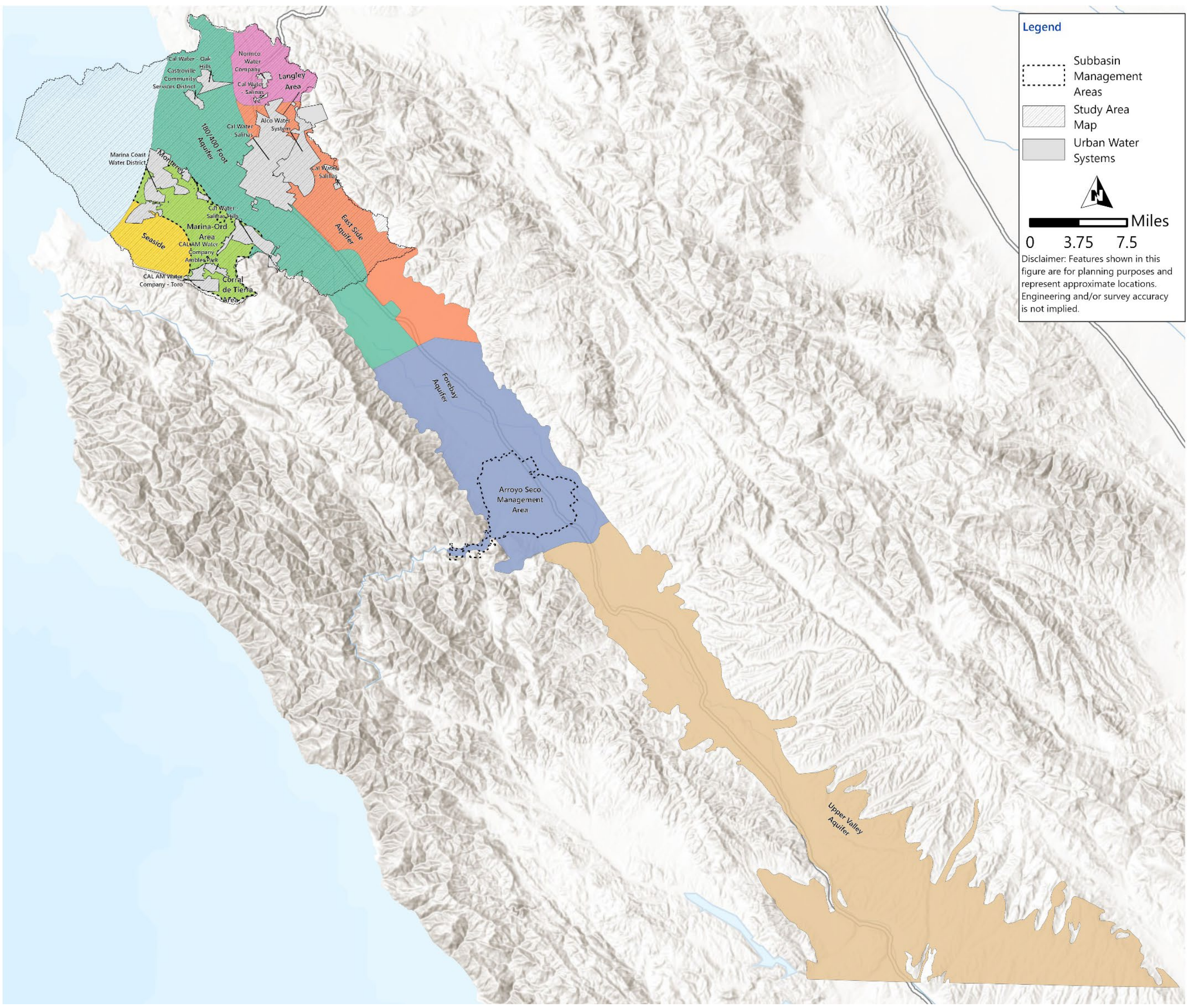


Figure 1 SVBGSA Jurisdictional and Subbasin Boundaries

The projects identified in the Groundwater Sustainability Plans (GSP) for these subbasins were developed with public and stakeholder input, hydrogeologic modeling and analysis, and incorporation of technical expert feedback. One of the projects identified in the GSP was an expansion of the Monterey County Water Resources Agency's (MCWRA) Castroville Seawater Intrusion Project (CSIP) to serve additional agricultural lands with new water supplies to offset groundwater use. Due to limitations within the existing CSIP infrastructure, the CSIP expansion project, now referred to as the New Seawater Intrusion Project (NSIP), could be either an expansion of CSIP infrastructure or a new, potentially separate distribution system from CSIP with its own dedicated infrastructure and supply sources.

This technical memorandum (memo) presents the feasibility of developing NSIP to serve existing agricultural users outside of the existing CSIP system and west of the City of Salinas to offset dependence on groundwater supplies for irrigation. The scope of this feasibility study (study) includes the following components:

- Investigate potential source water that can be utilized to supply NSIP.
- Identify and prioritize areas and users that could be served by the potential sources.
- Consider the ability to expand the delivery of established and new supplies to meet existing and future demands in areas at risk of seawater intrusion.
- Identify infrastructure systems that will be used for delivery and project alternative definition.
- Develop project alternatives for paired source water and infrastructure systems.

Through collaboration and coordination with the SVBGSA staff, the MCWRA, and other consultants working concurrently on other feasibility studies associated with the SVBGSA subbasins, three NSIP project scenarios were identified to address seawater intrusion in the 180/400 that are presented in this memo. These NSIP project scenarios included are summarized below:

- Maximum delivery to maintain existing irrigation demand for the entire NSIP area as a standalone system.
- Regions within the NSIP study area boundary that are within the seawater intruded regions of the 180/400-foot aquifers as defined by the existing isocontour of 500 milligrams per liter (mg/L) chloride levels.
- Phased implementation of the NSIP system as an expansion of the existing CSIP system.

SECTION 2 BACKGROUND

Seawater intrusion has been occurring in the Salinas Valley for decades. Figure 2 shows a historical progression of seawater intrusion in the 180 and 400-foot aquifer subbasins. Seawater intrusion has impacted existing agricultural and municipal wells (specifically in the Castroville area) making them unusable by exceeding drinking water and agricultural irrigation standards. CSIP, a pipeline distribution system, was approved in 1992 to deliver recycled water to agricultural fields near Castroville for irrigation, and began operating in 1998. The Salinas Valley Reclamation Project (SVRP) was approved and constructed at the Monterey One Water (M1W) regional treatment plant (RTP). The SVRP provides recycled water, which is then distributed through the CSIP distribution system. Surface water is also supplied to CSIP through the operations of the Nacimiento and San Antonio Reservoirs for rediversion at the Salinas River Diversion Facility (SRDF). The SRDF supplements water to the CSIP system. Implementation of CSIP has reduced groundwater pumping near the Castroville area in an attempt to slow progression of seawater intrusion. Figure 3 shows the CSIP service area boundary, existing distribution infrastructure, and supplemental wells. CSIP, SVRP, and SRDF are managed by MCWRA.

While CSIP has been successful in delivering alternative supplies, seawater intrusion has continued to impact the region. Many of the wells used by CSIP to supplement the surface water and recycled water supplies have been intruded. Of the 22 CSIP supplemental wells, all but 7 have now been destroyed primarily due to water quality related to seawater intrusion and 1 new well has been installed for a total of 8 operational wells. The regions adjacent to the CSIP service area boundary are also threatened by seawater intrusion. The region still heavily relies on groundwater supplies for municipal and agricultural supplies and groundwater overdraft has resulted in lowered groundwater levels that encourage seawater intrusion. Figure 4 shows that in the region between the City of Salinas, CSIP service area, and north of the Salinas River and south of the rural communities of Oak Hills and Prunedale (at the intersection of Highways 156 and 101) is heavily agricultural land use. Figure 5 delineates this region between CSIP and the City of Salinas as the study area for this study.

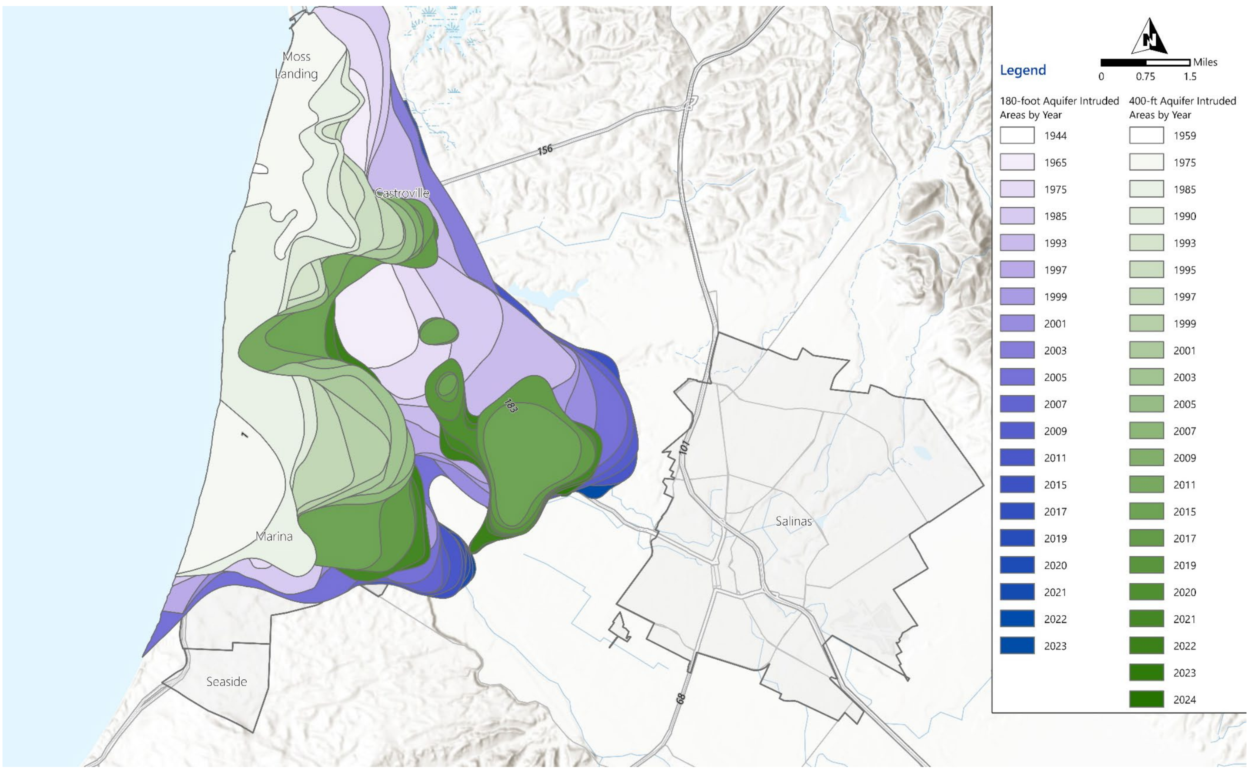


Figure 2 Historical Seawater Intrusion for Both 180-Foot and 400-Foot Aquifers

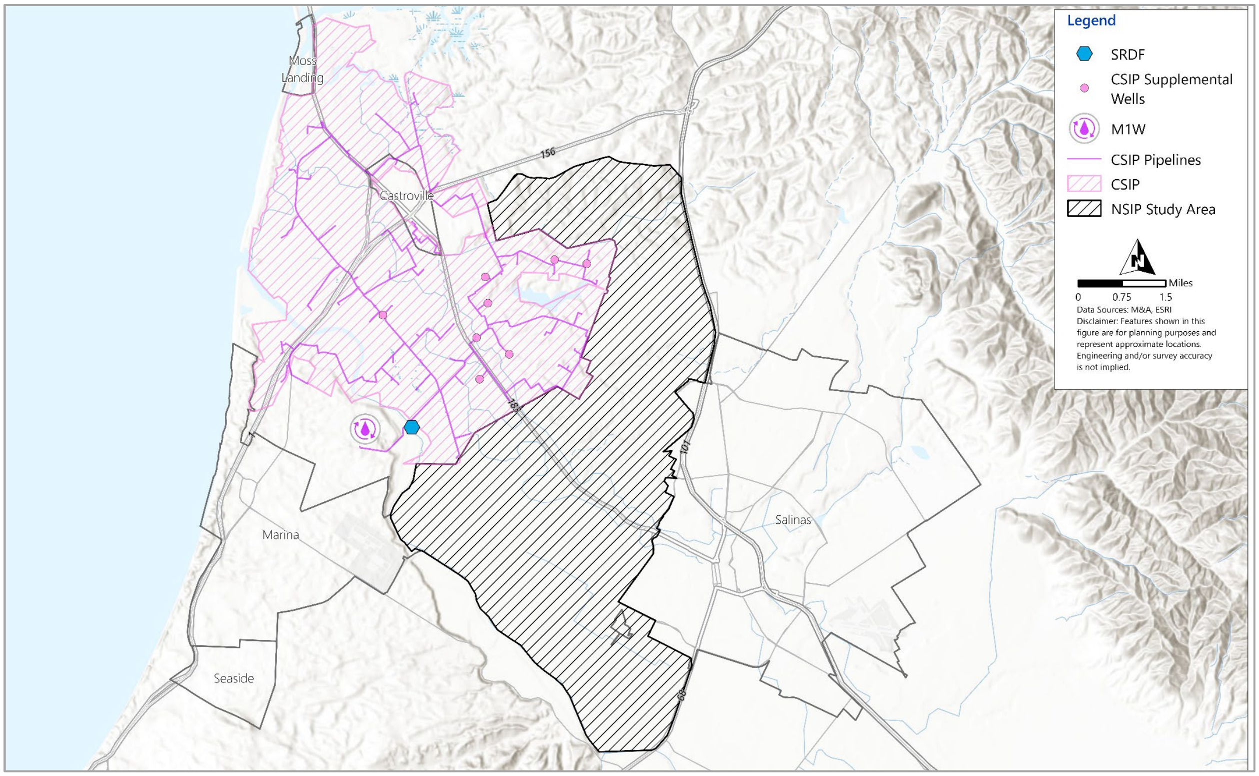


Figure 3 CSIP Service Area and Infrastructure

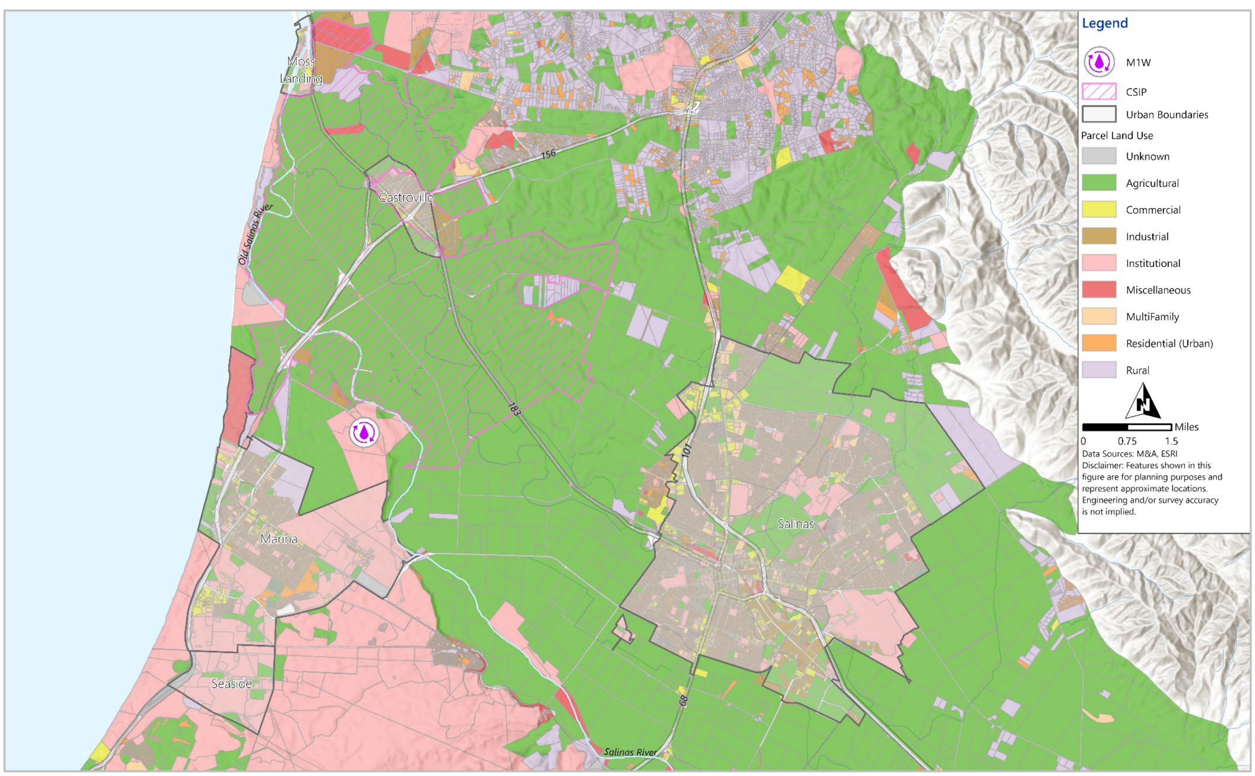


Figure 4 Parcel Land Use Within Region

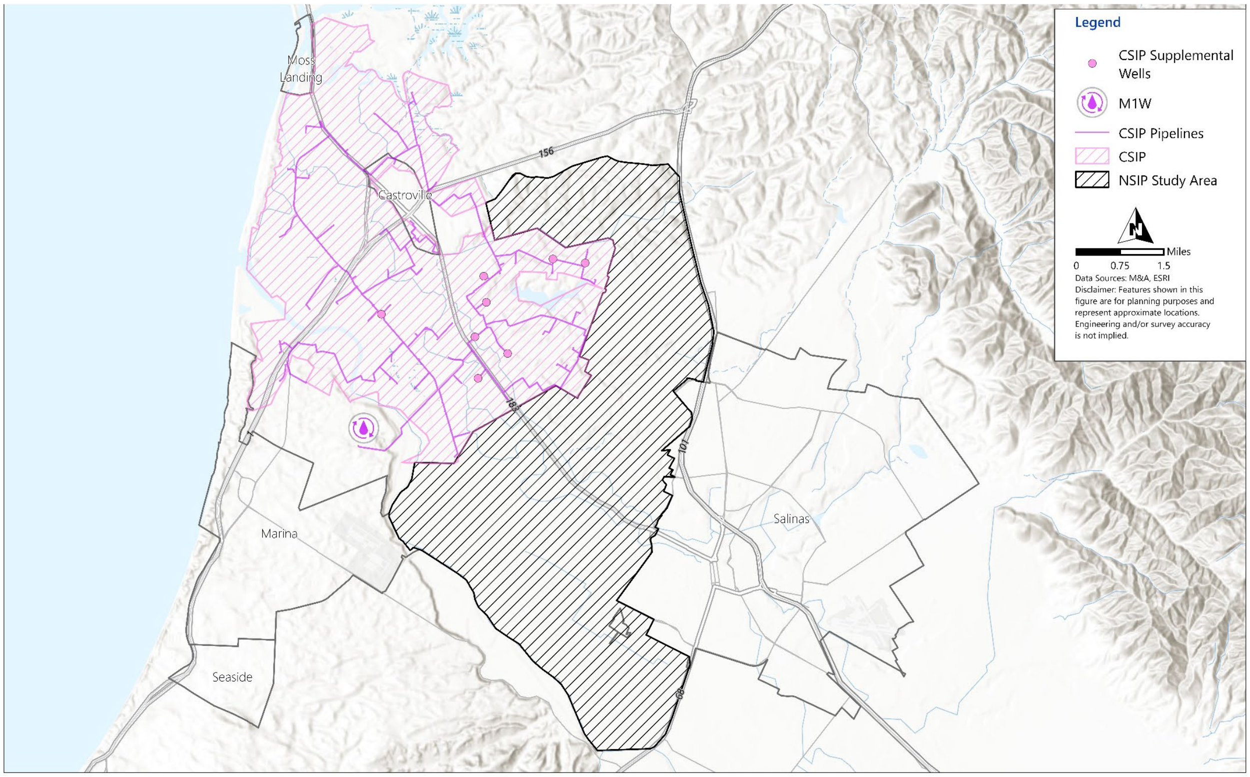


Figure 5 NSIP Study Area

The existing agricultural wells within the study area are included in the MCWRA Groundwater Extraction Management Program (GMP). There are 251 currently active wells within the study area. Of these, 249 wells are categorized as agricultural and the remaining 2 are for urban uses. For the purposes of this study, only agricultural wells will be considered for potential service by NSIP. Figure 6 shows the distribution of the 249 agricultural wells with respect to their source aquifer. The 400-foot and Deep aquifers are the primary source of water in this area due to the 180-foot aquifer being largely already seawater intruded and therefore of lesser quality (Figure 2). Note this information is approximated based on the GMP database records and could differ from actual.

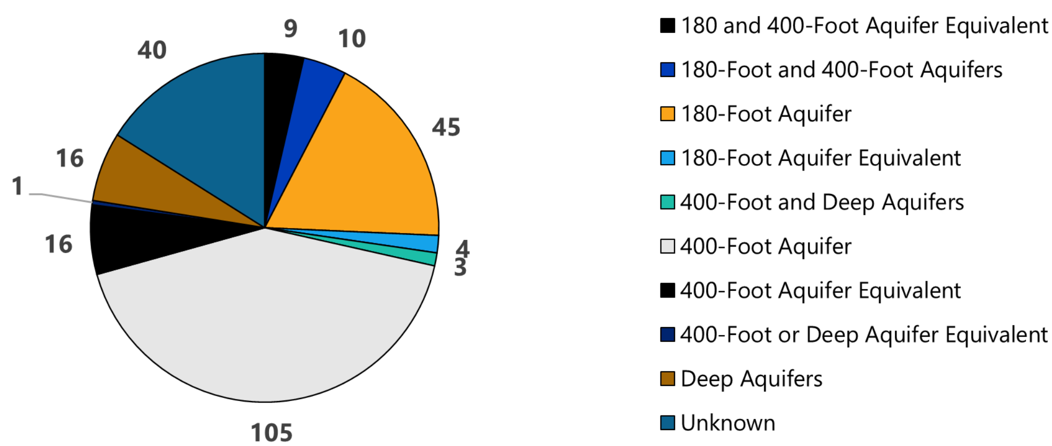


Figure 6 NSIP Study Area Agricultural Well Distribution by Aquifer

2.1 Problem and Need

Figure 2 showed that seawater intrusion has progressed significantly since 1944 and 1959 for both the 180-foot and 400-foot aquifers, respectively. Through the use of the CSIP system, growers found they could safely irrigate their crops and reduce pumping of seawater-tainted groundwater (MCWRA, 2026). Historical CSIP supply usage data shows that during drought conditions, agricultural irrigation relies more heavily on groundwater resources to offset lacking surface supplies This is shown in the corresponding drought conditions shown in Figure 7 to the CSIP supply usage in Figure 9.

Figure 7 shows Monterey County recorded drought conditions from 2000 through 2025 with exceptional periods of drought shown as dark red. The y-axis indicates the percentage of Monterey County that experienced the level of drought indicated in the legend. Figure 8 show gaps which indicate measurements of zero flow of the Salinas River at the Soledad streamflow gage with respect to measured precipitation for Monterey County from January 2010 through July 2024. The annual average precipitation depth in Monterey County is approximately 16.8 inches (2010 to 2024). Due to a lack of reservoir storage from ongoing drought conditions this led to reduced Salinas River flows; therefore, programs such as CSIP have less surface supply available and local agricultural users rely more heavily on groundwater to meet demand. Figure 9 shows the same timeline from 2010 to 2024 of supplies used by CSIP. During the drought period of January 2014 to January 2017, CSIP relied heavily on their supplemental wells and recycled water. This pattern was repeated from October 2021 through September 2022 (Water Year 2022) during another drought cycle.

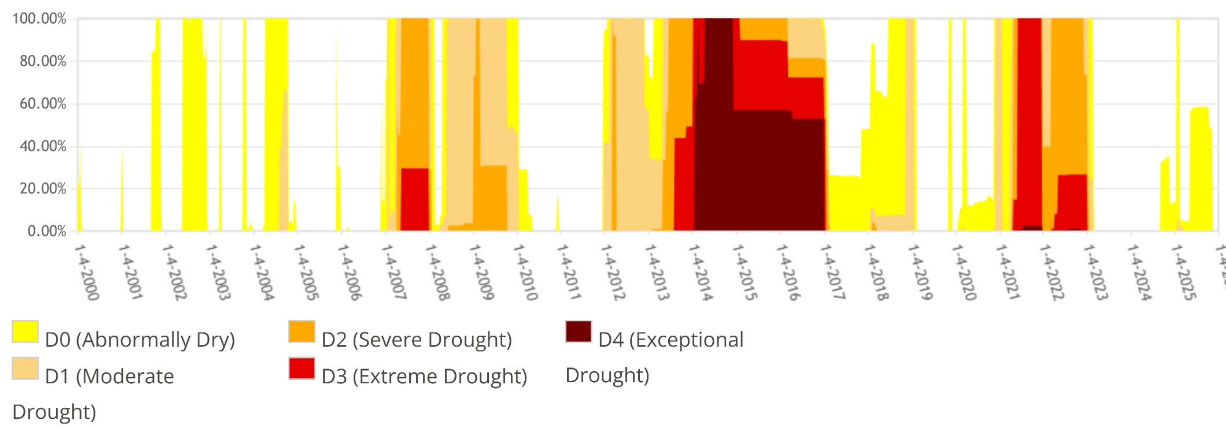


Figure 7 United States Drought Monitor Monterey County Drought Conditions

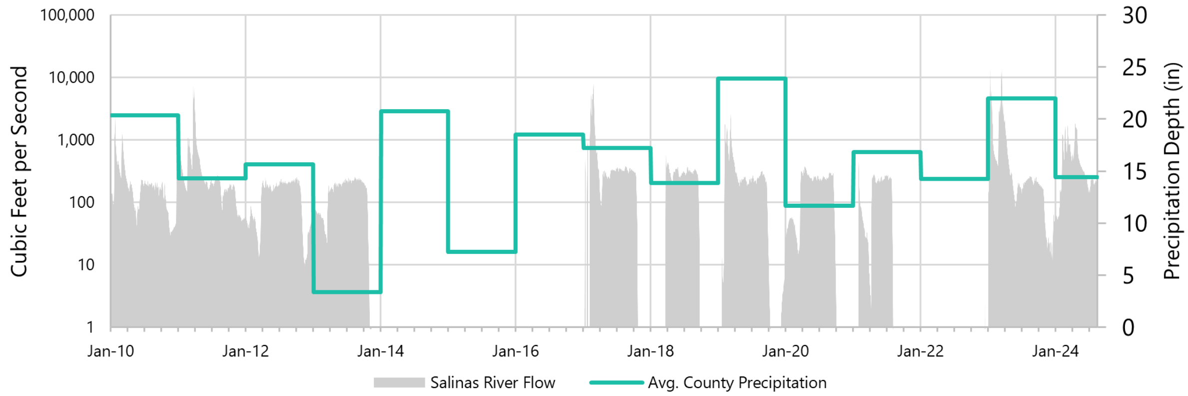


Figure 8 Salinas River Flows and Monterey County Average Precipitation

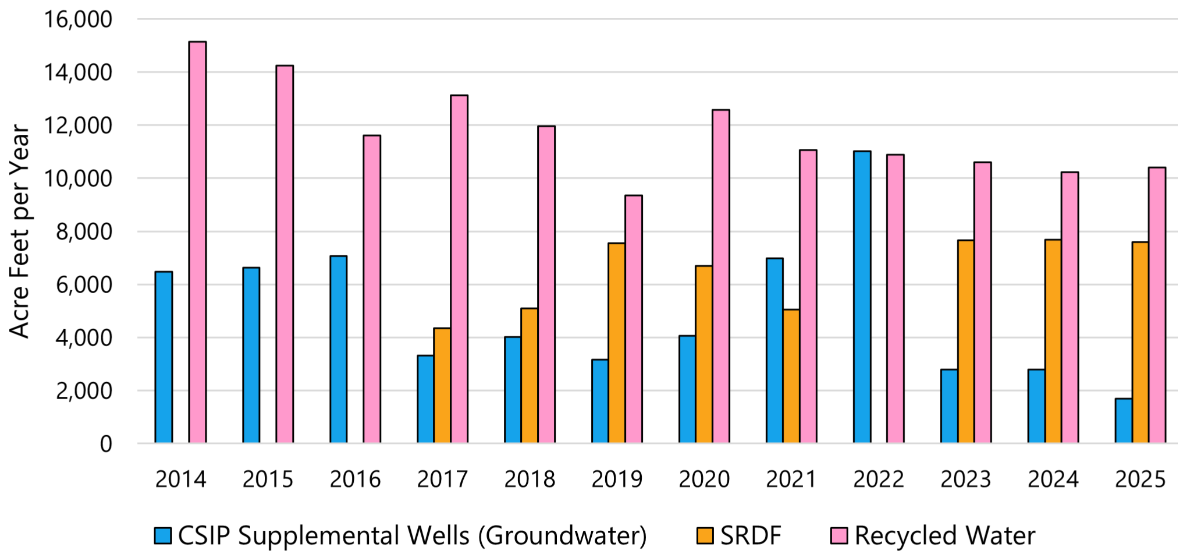


Figure 9 CSIP Supplies From 2010 to 2025

These data points indicate that in times of drought, when the upstream reservoirs lack adequate storage, the agriculture industry in addition to urban and domestic water users will need to rely on groundwater resources for irrigation. For agricultural users outside of CSIP, the primary, if not the only, source of irrigation supply is managed groundwater. During drought conditions, lack of seasonal rainfall requires more groundwater pumping to offset the lack of precipitation. Compared to CSIP users, recycled water or alternative supplies for irrigation are not available for users in the NSIP study area; therefore, groundwater extraction is increased. Historical pumping data in the NSIP area specifically shows that during drought periods, total groundwater demand was approximately 10 percent more than the average use between 2019 and 2023.

Continuing the current level of groundwater extraction in the future and increasing pumping demands during drought conditions will exacerbate the seawater intrusion progressing inland. Continuing with current irrigation practices could lead to the NSIP study area being completely intruded with groundwater quality that is unusable.

SECTION 3 STUDY AREA DEMAND

The range of total annual groundwater pumping from the wells within the study area over the past five years is between 27,000 and 30,000 acre-feet per year (AFY) with peak uses in the summer months between April to November. Figure 10 shows the monthly average use within the study area for a range of time periods. Average demands decrease in November through March due to lower water use for crops in the winter months. Wells throughout the study area have an average monthly usage of 4 acre-feet (AF) per month in the winter months and 15 AF per month in the summer months with the maximum single well use in July at 338 AF per month and minimum in January less than 1 AF per month (based on data available). Figure 11 shows the comparison in well use between the sequential three-year time periods from 2014 through 2023. Starting at 2014, groundwater demands have decreased approximately 3 percent a year representing a total difference of about 2,500 AF less groundwater used in 2023 than 2014; however, drought conditions in 2014 were drastically different than in 2023 which was a relatively wet year (see Figure 7). For the purposes of this study, the 2019 through 2021 time frame will be used as the basis of the demand of the NSIP study area to avoid extreme drought conditions which would inflate demands or wet years that would suppress the demands. The average annual demand for 2019 to 2022 was approximately 28,020 AFY.

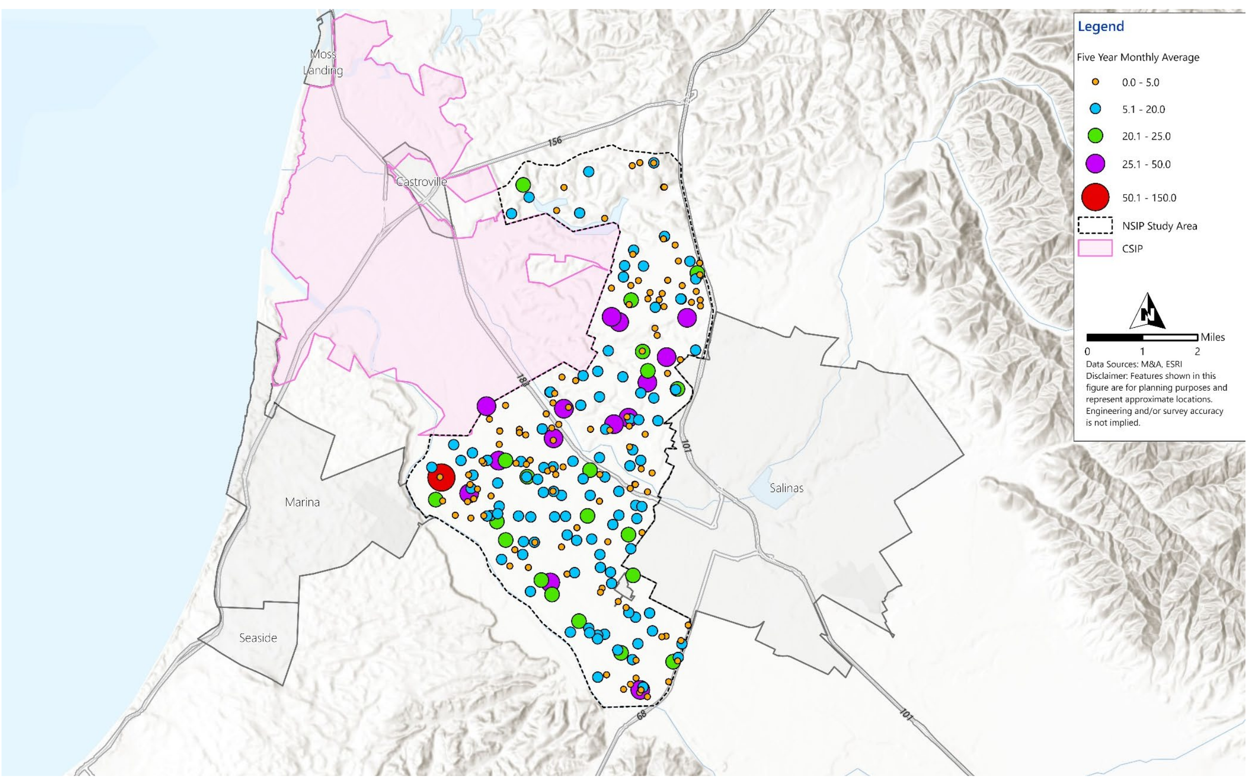


Figure 10 Five Year Monthly Average Demand of All Wells

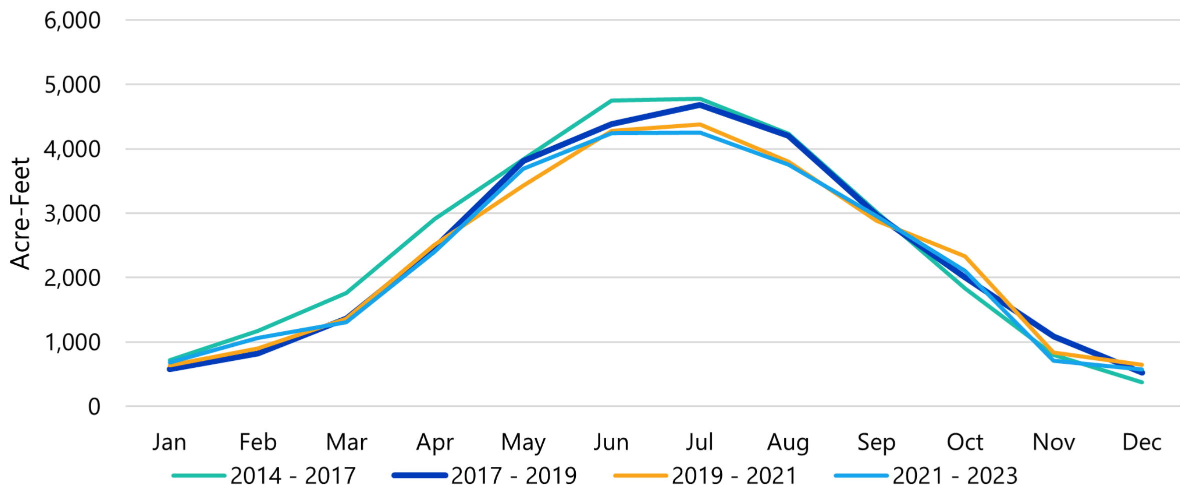


Figure 11 NSIP Study Area Total Demand

SECTION 4 STUDY AREA SUPPLY AVAILABILITY

The water supply evaluation for the NSIP project included identifying regional supply sources that could possibly serve as an annual or seasonal supply source to the wells within the study. MCWRA provided a water supply analysis of possible sources to consider. These sources represent water that is available after dedicated diversions and environmental requirements have been accounted for. This analysis is included in Appendix A of this memo. Figure 12 shows the water supply sources that could possibly supply NSIP wells to offset groundwater usage. The following sections describe each supply source.

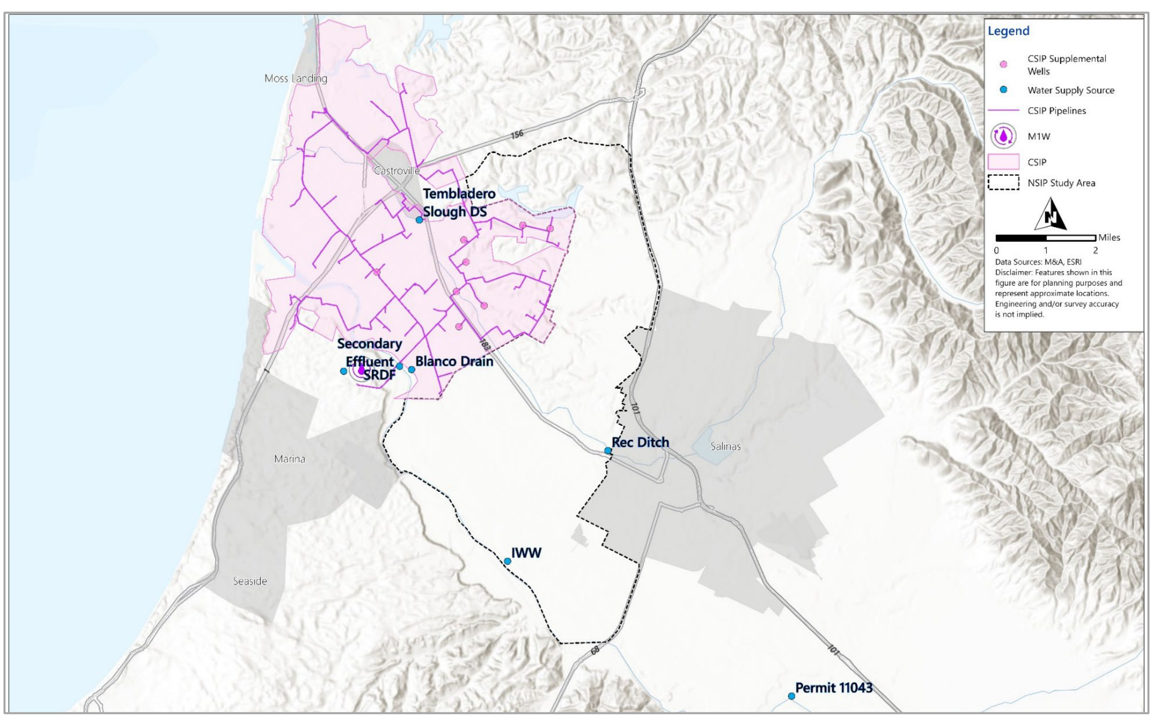


Figure 12 Supply Source Locations

4.1 Monterey One Water Secondary Effluent/Recycled Water

Recycled water is sourced from M1W RTP and the SVRP recycled water facilities. Wastewater flows to M1W's RTP from all its regional member agencies. The wastewater flows are treated at the RTP, which produces secondary effluent. The secondary effluent is then treated to tertiary standards through the SVRP and delivered to the CSIP distribution system as supply for agricultural irrigation. At times, the secondary effluent/recycled water is not fully utilized which could potentially be delivered to NSIP.

MCWRA acquired monthly flow data for effluent discharged to the ocean outfall from January 1997 to May 2025 from M1W. The data in the analysis included reverse osmosis concentrate, saline waste, secondary effluent, and total flow to the outfall. Starting in February 2020, the Pure Water Monterey (PWM) facility came online and reverse osmosis concentrate began being discharged in the outfall with excess secondary effluent. From February 2020 to present day, the available secondary effluent was calculated by subtracting the reverse osmosis concentrate and saline waste from the total flow to the outfall. From 2010 to 2024, 2010 experienced the highest average flow of 925 AF per month. 2021 experienced the lowest average flow of 241 AF per month. Secondary effluent discharges to the outfall occur year-round, though it increases during winter months and decreases during summer months. Recycled water is the primary source of water for the existing CSIP distribution system, so the volume available fluctuates with the seasonal irrigation demands.

While the available supply was determined from the volume of secondary effluent currently discharged to the ocean, this supply is assumed to be treated to tertiary Title 22 standards using the existing SVRP. Any other source supplies, that are not wastewater in origin, would need to meet the same treatment standards if they were mixed in the NSIP system. Therefore, for the scenarios evaluated in this study, the recycled water would not be conveyed or stored with other supplies but would be directly distributed to the NSIP system through the existing CSIP infrastructure.

4.2 Permit 11043 (Salinas River Diversions)

Permit 11043 is a surface water permit that is held by MCWRA. It authorizes the year-round diversion of 400 cubic feet per second (cfs) from the Salinas River for use within a portion of the Salinas Valley watershed for irrigation and municipal purposes. It has an annual diversion limit of 135,000 AF. The authorized two points of diversion are the Eastside Canal Intake near the City of Soledad and the Castroville Canal Intake, which is approximately 3 miles upstream of Spreckels. The most current version of Permit 11043 includes bypass flow requirements based on downstream demand and existence of natural flow (e.g., no diversions of previously withdrawn reservoir water). Bypass flow requirements must be met at the Salinas River near Soledad streamflow gage prior to diversion at either of the two authorized points of diversion.

Daily flow data was available from the Soledad stream gage on the Salinas River from October 1968 through June 2025. Data from January 2009 through December 2024 was used in this analysis to better represent current river conditions and reflect current reservoir operations, which were updated in 2010 as part of the Salinas Valley Water Project (one year of pre-startup data was included for baseline comparison). For this source water study, potentially divertible flows were estimated by applying the diversion limitations detailed in the water right. The analysis performed by MCWRA did not account for required fish flow passage flows under the Salinas River Flow Prescription and monthly bypass flow requirements from Permit 11043 were applied which range from 2.64 cfs in December to 24.02 cfs in July. Daily allowable water diverted was calculated as natural flow minus the applicable bypass requirement subject to the daily diversion cap. This is detailed in Source Water Analysis Memo provided by MCWRA in Appendix A.

Current use of Permit 11043 does not allow storage of diverted waters for more than 30 days. Therefore, scenarios that need longer-term storage will require revisions to the permit and its conditions. Potentially divertible flows and resulting volumes fluctuate with seasonal precipitation conditions, generally consisting of higher flows in the winter and spring, and lower or no flows during the summer and fall.

4.3 City of Salinas Industrial Wastewater

In 2025, the City of Salinas, M1W and MCWRA entered into the City of Salinas Industrial Wastewater Treatment Facility (IWTF) Effluent Interim Agreement. This allows for MCRWA to have priority use of industrial wastewater (IWW). All three parties have a long working relationship and share a commitment to provide cooperative water solutions for their citizens, businesses, and ecosystems. Several agreements exist between these parties and future agreements regarding the use of IWW may also be considered. The City of Salinas’ IWW is primarily sourced from 22 industries, which include local agricultural food processing (wash water) and packing, cardboard manufacturers, and a seafood processor.

IWW data from 2019 to 2024 was provided by MWCRA as monthly total flows of IWW to the IWTF and to the M1W shunt, which can divert IWW directly to the RTP rather than the IWTF. M1W can also take IWW to the RTP via the Pond 3 Pump Station at the end of the City’s IWTF ponds. Stormwater inflows to the IWTF were not counted and diversions by way of the Pond 3 Pump Station were not subtracted from the provided data. The IWTF data shows that the highest average flow of 251 AF per month occurred in 2021 and the lowest average flow of 192 AF per month occurred in 2019. Since this source of water is heavily influenced by the agricultural industry, the flow of IWW typically peaks during summer months and decreases during winter months. The location of the IWW source is adjacent to the Salinas River at the IWTF ponds, just northwest of S. Davis Road, approximately 2 miles outside of the City of Salinas, see Figure 12.

4.4 Reclamation Ditch

The Reclamation Ditch carries natural runoff, including from natural lakes and tributaries, and also carries agricultural drainage from the surrounding area. Specific water right permit diversions and details of how the available supply volumes were estimated are specified in Appendix A. The analysis of the Reclamation Ditch discharge was recorded at the United States Geological Survey (USGS) gage located at San Jon Road in Salinas. The discharge data was recorded from 2018 through 2025. The data was summarized to obtain a monthly average discharge by year which was used to produce estimates of water usability for 2018 to 2025.

A range of usable flow was established which provides monthly water volumes that would have been available for diversion while also observing the following minimum and maximum diversion limitations which include:

- **Maximum limitations:** Monthly average discharge exceeding 30 cfs are excluded. In addition, any estimated diversion is limited to 9,800 AFY.
- **Minimum limitations:** Estimated diversions are calculated to observe two different scenarios for discharge minimum requirements. 1) Fish bypass minimum requirements of 2 cfs is observed plus an assumed maximum diversion rate of 6 cfs diverted under Permit 213777, totaling 8 cfs that are discarded from the monthly water volume available for diversion. 2) Only the instream bypass requirement of 2 cfs required in Permit 213777 is observed and discarded from the water estimation.

The Reclamation Ditch experiences high flows during winter months and lower flows during summer months (hence the lack of available supply volume between April and October). The Reclamation Ditch intersects the Tembladero Slough just south of Castroville. The existing ditch infrastructure is assumed to be used to convey available supplies to the Tembladero Slough downstream confluence for pumping to the NSIP treatment facility.

4.5 Blanco Drain

MCWRA holds Permit 21376 and Application A03226D, which were filed as one larger water right application in 2014. Permit 21376 can divert up to 6 cfs and collect to storage up to 3,000 AF, not to exceed 3,000 AFY from the Blanco Drain system. A032263D can divert up to 30 cfs and collect to storage up to 9,800 AF annually. This water right was part of Application A032263D which was proposed to support the Coastal Sustainability Agricultural Project and includes Blanco Drain. The Blanco Drain is primarily sourced from stormwater runoff, agricultural runoff and tile drainage from the surrounding farmlands. No discharge data is available for recent years. Historical discharge data is limited to selected months between 2007 and 2013, where total irrigation and precipitation totals are correlated to the measured flows during those selected months. Details on how MCWRA estimated available supplies from the Blanco Drain are summarized in Appendix A. Blanco Drain seasonality is similar to other sources dependent on surface water (Permit 11043, Reclamation Ditch, Tembladero Slough) in that supplies are more available in the spring and winter rather than the fall and summer.

4.6 Excess Flows at the Salinas River Diversion Facility

MCWRA holds water rights License 7543, License 12624, and Permit 21089 for storage at Nacimiento and San Antonio Reservoirs, which also include a point of redivision at the SRDF. SRDF diversions began in 2010 as part of the Salinas Valley Water Project. These diversions supplement irrigation water deliveries through CSIP by mixing with treated water produced from the SVRP in the CSIP storage pond. Those combined flows are then distributed through the CSIP distribution pipeline system. The SRDF is permitted to operate from April 1 to October 31 but it is dependent on the availability of previously stored reservoir water at the point of rediversion and the demand for irrigation water. Reported SRDF diversion volumes were calculated using pressure transducers and a weir flow equation for the backflow prevention weir before chlorination. Details of SRDF supply availability are summarized in Appendix A.

The amount of potential rediversion for NSIP represents the total volume of reservoir water released from storage measured at the USGS Salinas River near Spreckels gage that could have been diverted with full continual use of the SRDF pumps. The maximum capacity of the SRDF pumps used for this analysis was 72 AF per day representing average full-time operation of three of the four pumps. Operation of all four pumps at SRDF (90 AF per day) would require facility modifications, so it was not used in this analysis.

4.7 Tembladero Slough

The Tembladero Slough existing point of diversion is located near the confluence of the Tembladero Slough and Merritt Channel within the Reclamation Ditch Watershed and is downstream of the USGS gage located at San Jon Road. MCWRA holds Applications A032263C and A032263D which were originally filed as one water right application in 2014. A062263C can divert up to 3 cfs of water and collect to underground storage up to 1,500 AFY combined by direct diversion and collection to storage.

The 2015 Reclamation Ditch Yield Study that was prepared by Schaaf and Wheeler found that the total watershed area at this point of diversion is 157 square miles and that the watershed has two significant tributaries that contribute flows, downstream of the USGS gage. The Reclamation Ditch diversion point is located upstream with a watershed area of approximately 109 square miles. Any upstream diversions could impact the access to divertible flows at the Tembladero Slough site.

The Tembladero Slough sources its water from agricultural drainage, natural runoff from the surrounding watershed, and urban runoff from the City of Salinas. In 2015, Denise Duffy & Associates, Inc. developed a project memo for MCWRA summarizing available water at the Reclamation Ditch, Tembladero Slough, and the Blanco Drain surface water diversions. This memo used a scaled flow calculation to estimate flows in the Tembladero Slough. The analysis found annual average flow rates of approximately 95 AF per month with spring peaks estimated at 154 AF per month and minimal flows in the fall (Denise Duffy & Associates, 2015). These flows were used to represent the supply availability of the Tembladero Slough as conservative estimates. It is recommended for future studies that a detailed flow monitoring system be implemented to gather relevant information to better determine available supplies from Tembladero Slough with respect to MCWRA's existing held water rights.

SECTION 5 SUPPLY SENSITIVITY EVALUATION

The supplies also have seasonal fluctuations due to variations in precipitation or use by other sources. For example, Permit 11043 availability is directly dependent on Salinas River natural flow from precipitation. Alternatively, secondary effluent is not directly dependent on precipitation, however changes seasonally due to the availability of wastewater at M1W and CSIP demands. The variation in availability of the supplies impacts when they can be used, which ultimately limits what demands can be served. Similar to the demands, a representative time period of the supplies was identified to be used in this analysis.

As described in Sections 4.1 through 4.7, data availability spanned from 2009 to 2024. Each supply average monthly total for an entire year was populated to account for an annual average volume. The sum of all the individual supplies was representative of a specific year's total annual average volume. Several time periods were identified in this evaluation that represent seasonal characteristics that would alter the supply availability of the sources as compared to Figure 7. These time periods are described below.

- **All years, 2009 to 2024:** This time periods represents the total annual averages across all of the data sets available and encompasses multiple drought and wet seasons.
- **10 year, 2015 to 2024:** This time period represents the 10-year total annual averages of all the supply data sets available. This dataset starts in 2015 and therefore does not include moderate and severe drought periods from 2013 through 2014. Total available supply is slightly higher than the all years data set.
- **5 year, 2019 to 2024:** This time period represents the most recent 5-year total annual averages of all the supply datasets available. This data set starts in 2019 and therefore does not include the moderate/severe drought period in 2013 and the exceptional drought period between 2014 and 2017. This dataset does include the 2021/2022 drought periods and the 2019 wet season. The total available supply is approximately 32 percent higher than the 10 year total annual average due to the significantly higher monthly averages from 2019.
- **Moderate Drought, 2017 to 2021:** This time period represents a moderate drought period that also includes a wet period followed by an abnormally dry and moderate drought period between 2017 through 2021. This data set represents a balanced look at supply availability with both dry and wet conditions which resulted in a total volume approximately 12 percent less than the 10 year total annual average.
- **Drought, 2012 to 2015:** This time period represents drought conditions with a balance of moderate, severe, and exceptional drought periods. This data set total is approximately 75 percent less than the 10 year total annual average.
- **Severe Drought 2014 to 2017:** Similarly to the 2012 to 2015 period, this time span includes the extended exceptional drought period from 2015 through 2017. The data set total is approximately 80 percent less than the 10 year total annual average.
- **Wet, 2023:** This time period represents a significant wet season experienced in California and throughout Monterey County. The data set is not representative of annual average supply availability

with significant volumes in the Salinas River. Total annual average supplies were almost 185 percent more than the 10 year total annual average.

- **Wet-normal, 2023 to 2024:** Similarly, this data set is to compare the single 2023 wet year with an average precipitation year to see if the data set would normalize. Although less than the previous described data set, this data set is still approximately 100 percent more than the 10 year total annual average.
- **Post 2019 (PWM online), 2019 to 2022:** This data set represents the time period following the implementation of PWM, therefore the secondary effluent (recycled water production) monthly average volumes are more conservative than prior to 2019. Furthermore, this dataset does not include any significant drought periods, but moderate and short severe drought periods with one above average precipitation year (2019). The total annual average volume was approximately 25 percent less than the 10 year total annual average.

As a result of this evaluation, the 2019 to 2022 time period was selected as the representative supply volumes for the sources described in Sections 4.1 through 4.7. Figure 13 shows the monthly average totals for 2019 to 2022. Table 1 shows the same values in tabular format. The total monthly averages of all the wells in the NSIP study area are shown in Table 2. The 2019 to 2022 scenario shows that total annual average supply volume is less than the 10-year average by approximately 25 percent and represent the secondary effluent volumes after the implementation of PWM. Furthermore, the supplies are recent enough to include usage patterns from agencies throughout the County (e.g., CSIP). This time frame does include three different seasonal periods; an above average precipitation, moderate drought, and severe drought periods.

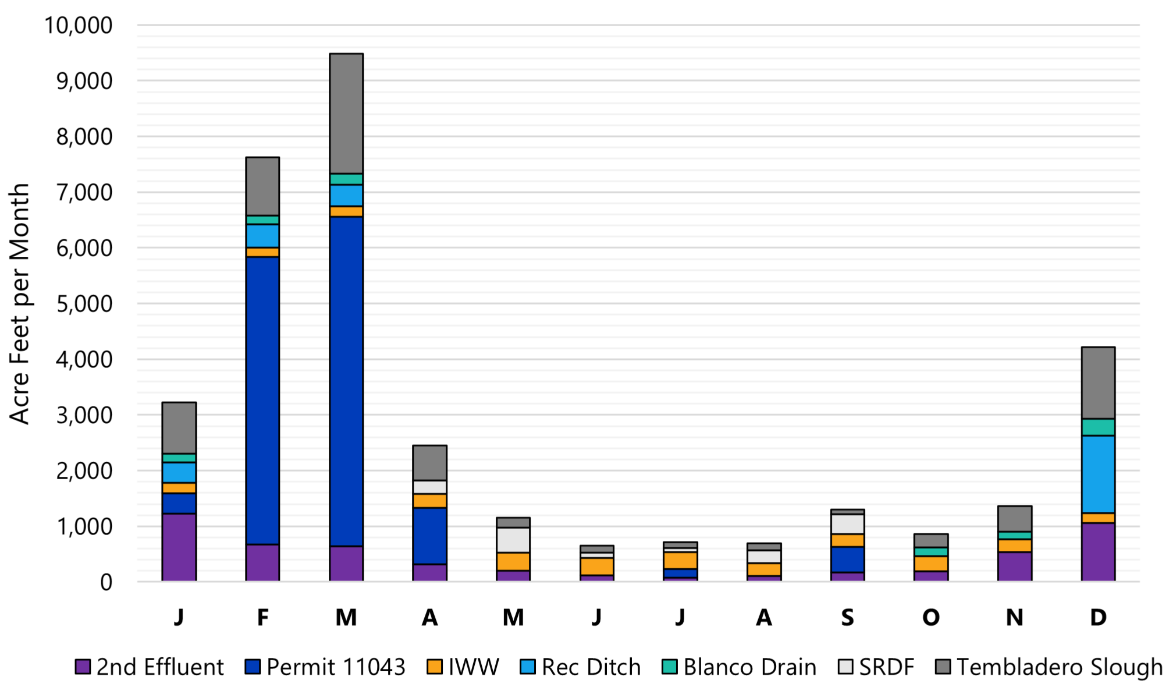


Figure 13 2019 – 2022 Monthly Average Supply Totals By Source (Graphical)

Table 1 2019 – 2022 Monthly Average Supply Totals by Source (Tabular)

Month	Secondary Effluent (Recycled Water)	Permit 11043	IWW	Rec Ditch	Blanco Drain	SRDF	Tembladero Slough
J	1,225	368	191	162	157	0	131
F	669	5,165	168	143	160	0	117
M	641	5,915	189	165	198	0	142
A	321	1,011	247	0	0	247	154
M	203	0	329	0	0	442	145
J	118	0	315	0	0	93	67
J	73	162	305	0	0	75	66
A	112	0	225	0	0	233	62
S	172	456	232	0	0	353	41
O	191	0	278	87	152	0	45
N	539	0	229	98	137	0	50
D	1,055	0	186	146	305	0	115

Notes:
(1) All values in AF per month. Supplies provided by MCWRA.

Table 2 Supply Sensitivity Total Monthly Averages

Description	All Years	10-Year	5-Year	Moderate Drought	Drought	Severe Drought	Wet	Wet-Normal	Post 2019
Time Period→ Month ↓	2009 - 2024	2015 - 2024	2019 - 2024	2017 - 2021	2012 - 2015	2014 - 2017	2023	2023 - 2024	2019 - 2022
J	5,478	4,799	6,173	3,124	1386	1,204	24,749	13,920	2,300
F	7,824	8,877	11,899	8,284	720	962	21,431	22,542	6,578
M	8,830	9,647	12,281	10,060	440	711	22,508	22,178	7,332
A	4,665	4,281	6,882	1,628	465	278	21,747		1,826
M	1,102	1,229	1,849	951	357	37	3,095	3,601	974
J	304	374	564	422	167	23	536	638	527
J	421	469	590	667	258	6	487	541	615
A	452	572	615	791	212	37	872	705	570
S	788	964	1,226	1,342	597	77	1,275	1,251	1,213
O	996	877	930	772	928	636	1,641	1,550	620
N	1,289	1,095	914	982	1222	1,614	794	933	904
D	2,541	2,033	2,428	2,192	1691	1,635	1,056	1,423	2,930
Total	**34,689**	**35,216**	**46,350**	**31,214**	**8,442**	**7,221**	**100,191**	**69,281**	**26,388**

Notes:
(1) All values are the total monthly averages for each time period of all wells in the NSIP study area.

5.1 Potential Supply Storage Considerations

Figure 11 shows the total average monthly demands distributed on an annual basis for all of the wells in the NSIP study area. Figure 13 shows the average monthly supply for a representative year within the NSIP study area. Comparing these two data sets indicates a lack of supply during the summer months and excess supply in the winter months. Theoretically the area between the two charts is the volume of supply required. The difference between demand and supply volume is approximately 16,500 AF. To meet the demands during the summer months, available source water supplies would need to be captured and stored to be used later when demands are high. For this study, three storage options were considered; aquifer storage and recovery (ASR), shallow storage ponds, and development of Merritt Lake Reservoir. The following sections describe each supply consideration.

5.1.1 Aquifer Storage and Recovery

ASR uses groundwater injection wells to recharge groundwater aquifers during times when surface water is available and utilizes the same wells to extract the stored groundwater for later use. Given the large volume of necessary storage (16,500 AF), ASR was considered since it would require less land than surface storage. The potential NSIP wells are all currently used for agricultural applications; therefore, water quality requirements are much less strict than drinking water standards. The disadvantage of ASR for storage for NSIP is that for ASR, injected water must be treated to drinking water standards to meet regulatory requirements for injecting water into a groundwater basin that supplies potable water. This treatment would likely require reverse osmosis which has a much higher capital and annual operations and maintenance costs than conventional treatment systems. The ASR option is not considered viable since treating to drinking water standards would significantly increase project costs to treat water to a level that is not necessary for agricultural applications. SVBGSA has considered ASR in a separate study (see Aquifer Storage and Recovery – Salinas Valley Basin Groundwater Sustainability Agency[1]).

5.1.2 Shallow Storage Ponds

Shallow storage ponds are commonly used in agricultural applications as storage facilities prior to distribution infrastructure. For example, the CSIP system has an 80-AF storage basin that holds recycled water, groundwater from the CSIP supplemental wells, and SRDF flows prior to delivery through the CSIP system. Similarly, on a smaller scale, some agricultural operations have a small ponding system for capturing diverted surface water deliveries and holding them until needed with their on-site pump stations. Considering a theoretical volume between the average monthly supply and demand curves, (≈16,500 AF), utilizing a traditional storage basin trapezoidal shape results in a total required surface area of over 800 acres.

Due to the significant amount of land area required for a shallow storage pond, this storage option was not further considered.

[1] https://svbgsa.org/aquifer-storage-and-recovery-2/.

5.1.3 Merritt Lake Reservoir Development

In 1998, MCWRA investigated alternatives for storing diverted Salinas River water at several sites within the region for both agricultural and municipal supply (MCWRA, 1998). Of the various sites evaluated, Merritt Lake is a large reservoir concept with the capacity to hold up to 15,600 AF combined between two different reservoirs. The 15,600 AF reservoir capacity uses a water storage elevation of 50 feet. The total acreage of both reservoirs is approximately 550 acres. Castroville, northwest of Salinas and directly North of Espinosa Lake. Figure 14 displays the location of the Merritt Lake concept site and the required dam facilities necessary to impound water with the surrounding topography. Merritt Lake offers a significant volume of storage that has already been evaluated by MCWRA as a potential option, has the benefit of being within the NSIP study area, and is nearby the surface water sources therefore requiring little raw water conveyance. For this study, Merritt Lake was selected as the storage site and location of a centralized treatment and distribution facility. It is recognized that this area is currently being farmed. Costs and considerations of this land being converted from farmland to storage have not been considered.

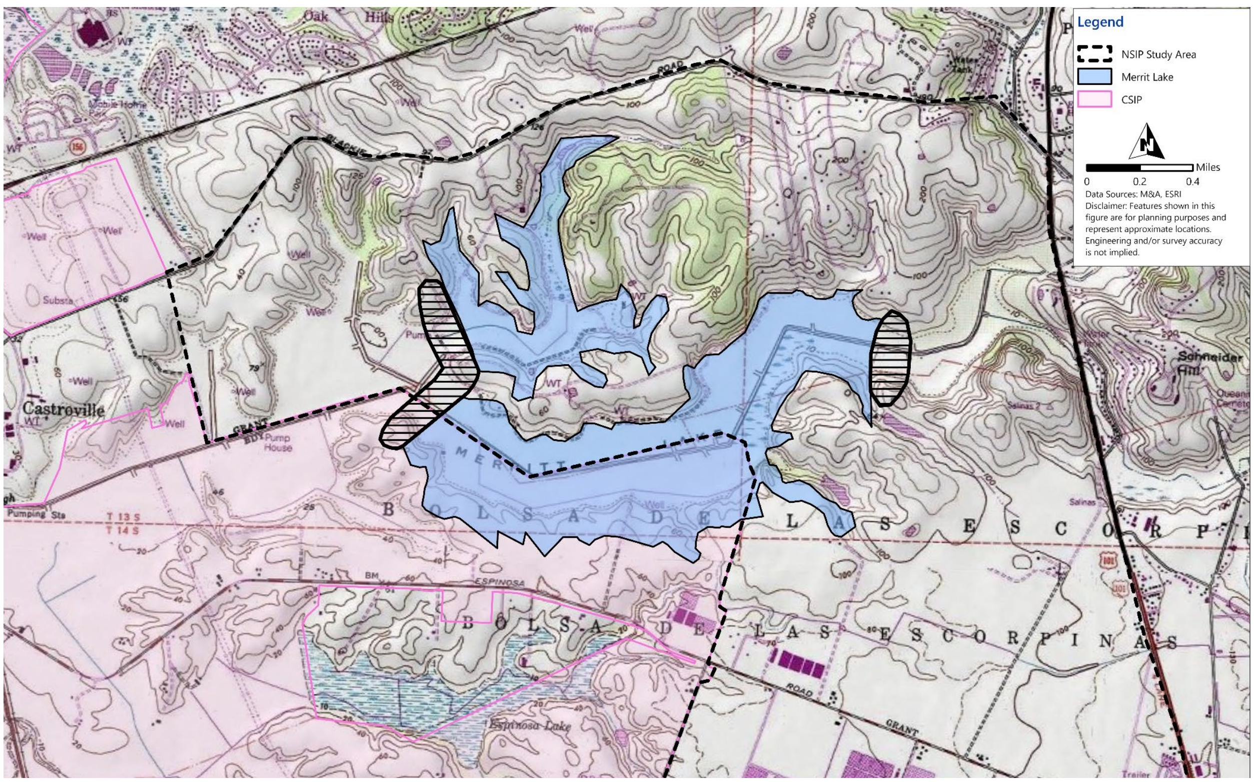


Figure 14 Merritt Lake Concept Site

SECTION 6 WATER QUALITY

The water quality for each surface water source was evaluated to identify the level of treatment that would be required for agricultural irrigation through the NSIP system. Water quality data was acquired from MCWRA and publicly available sources. MCWRA provided water quality data on the IWW, SRDF, and recycled water supplies. Permit 11403, Reclamation Ditch, and Blanco Drain were all acquired from public sources. The goal of this exercise was to identify required levels of treatment to meet agricultural irrigation water quality standards. Identifying constituents of concern will better inform the treatment process development for the project scenarios.

6.1 Water Quality Standards

For the NSIP project scenarios, it is assumed that water quality requirements for agricultural irrigation will be the primary standard to achieve for beneficial use of the water sources. The primary inhibitor to crop yield in the agricultural industry are salts. Salts are defined as soluble constituents such as sodium, calcium, magnesium, potassium, sulfate, and chloride dissolved from geologic materials with which the irrigation waters have been in contact (United States Department of Agriculture, 2019). In general, the total sum of these salts is typically identified as total dissolved solids (TDS). One of the leading issues in parts of California’s agricultural region is salt management. Salts can increase through the irrigation cycle; water (with salts) is extracted out of the ground, applied on land, comes into contact with more soluble geologic material (or others salts), evapotranspiration and evaporation cause salt accumulation on land, and water leeches accumulated salt eventually to percolate into the groundwater sources to repeat the cycle. Levels of salts in agricultural irrigation water does have an impact on the yield of crops. Some crops are more resistant than others to salinity concentrations. A relationship between crop yields and chloride is shown in Figure 15 for crops grown in the Salinas Valley (Maas EV, Hoffman GJ, 1977). This figure shows that higher chloride levels reduce crop yields, but that up to 500 mg/L would have no impact to crop yields. This 500 mg/L chloride limit also matches the levels at which the basin in considered seawater intruded and not useable.

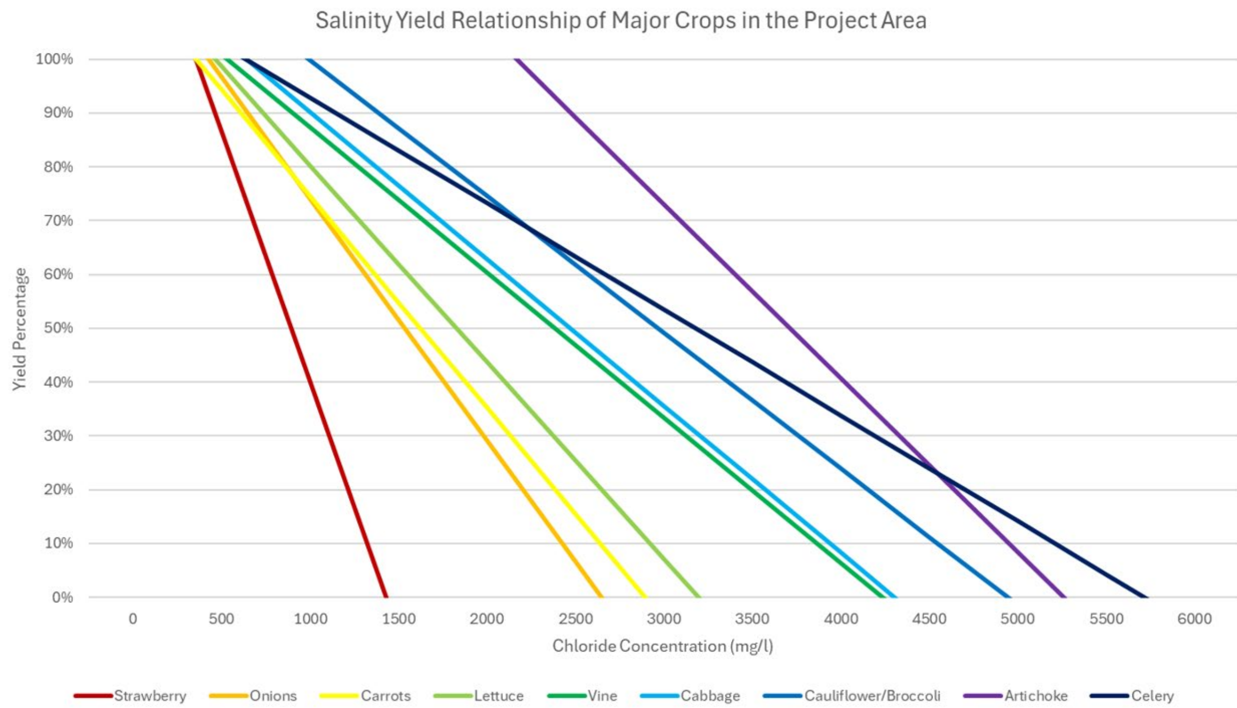


Figure 15 Salinity Yield Relationships of Major Crops in Project Area

The California Leafy Green Marking Association (LGMA) provides standard operating procedures for proper agricultural irrigation methods to prevent contamination of leafy greens and other crops from pathogens. Irrigation water is classified as Type A and Type B water. The LGMA Commodity Specific Food Safety Guidelines state Type A water must be used a minimum of 21 days prior to crop harvesting to prevent any type of contamination from irrigation water. Type B is allowed to be used during periods greater than 21 days prior to harvest. Type A water must have a sample average less than or equivalent to 10 most probable number (MPN) per 100 milliliters (mL) for generic coliform. Furthermore, Type B water must have a sample average less than or equal to 126 MPN/100 mL (LGMA, 2025). These standards will be applied to the NSIP project scenarios treatment processes to meet the LGMA water quality requirements.

Lastly, CSIP provided the required parameter limitations for their tertiary treated effluent from SVRP. These parameters are included in the water quality standards summary listed in Table 3. Assuming that NSIP would be operated similarly to or as an expansion of the existing CSIP system, these disinfected tertiary recycled water limitations will also be used as criteria for the NSIP treatment processes to achieve adequate agricultural irrigation water quality. Note that the TDS of the CSIP system has a limitation of 1,500 mg/L however for the NSIP water sources, a limit of 500 mg/L chloride will be used to reduce impact to crop yields as shown in Figure 15

Table 3 Water Quality Standards Summary

Source	Parameter	Units	Average Monthly	Maximum Daily
SWRCB (Maas EV, Hoffman GJ, 1977))	Chloride	mg/L	500	--
LGMA	Type A – Generic Coliform	MPN/100 mL	10*	--
LGMA	Type B – Generic Coliform	MPN/100 mL	126*	--
CSIP	BOD_5	mg/L	10	20
CSIP	TSS	mg/L	10	20
CSIP	TDS	mg/L	--	1,500

Notes:
BOD_5 - 5-day biochemical oxygen demand test; SWRCB - State Water Resources Control Board; TSS - total suspended solids.
(1) *Geometric mean of five samples.

6.2 Source Water Quality

The estimated water quality of the source waters was gathered from a desktop search of public sources as well as data provided by MCWRA. It should be noted that an up-to-date thorough water quality sampling of all available water sources is recommended to confirm source water quality prior to any further scenarios evaluation. Accurate source water quality will better inform treatment processes requirements to meet the agricultural irrigation water quality standards.

The combination of natural surface waters, urban runoff, and agricultural runoff means the range of water quality constituents present is very broad. Most of the natural supplies available during the wet season (Figure 13) and high flows tend to carry higher suspended solids from erosion causing higher turbidity. Urban runoff commonly accumulates debris, sediment, heavy metals, pathogens, petroleum products, and other constituents that are discharged to storm systems. Similarly, agricultural runoff leaches salts, fertilizers, and pesticides from agricultural environments which end up in the runoff (e.g., Blanco Drain).

With the available data for the supply sources, a composite water quality was developed that is a representation of the water quality parameters that are likely to be in the proposed source waters. This composite quality estimate is necessary to inform which treatment processes would be appropriate for meeting the agricultural irrigation water quality standards in Table 3. This composite or blended quality accounts for the source volumes as well as their constituent loading from the data available. Table 4 lists the composite influent water quality of all the sources in consideration (Section 5). It should be noted that secondary effluent or recycled water from M1W was not included in this blended water quality since this water is already treated at M1W to a tertiary Title 22 standard and would be directly delivered to the NSIP system through CSIP infrastructure or via a new pipeline to NSIP.

Table 4 Composite Water Quality

Constituents of Concern	Unit	Average	Maximum
Alkalinity	mg/L as $CaCO_3$	47.4	147.8
Arsenic	mg/L	0.7	1.5
BOD	mg/L	98.0	207.5
Boron	mg/L	0.7	1.3
Calcium	mg/L	323.9	676.9
Chloride	mg/L	342.0	480.1
Copper	mg/L	58.2	172.5
Hardness	mg/L as $CaCO_3$	45.7	99.7
Iron	mg/L	514.2	1120.8
Lead	mg/L	2.1	4.7
Magnesium	mg/L	154.3	304.7
Manganese	mg/L	61.5	133.7
Mercury	mg/L	0.8	1.7
Nickel	mg/L	4.8	10.5
Nitrate	mg/L as N	11.2	18.8
Nitrite	mg/L as N	0.1	0.2
Total Kjeldahl Nitrogen	mg/L as N	6.3	12.9
Total Nitrogen	mg/L as N	17.6	31.9
Organic Carbon	mg/L	3.7	8.3
Orthophosphate	mg/L	11.4	23.9
Oxygen	mg/L	11.5	21.1
pH	-	8.4	9.0
Phosphorus	mg/L	65.2	138.6
Potassium	mg/L	64.1	106.5
Silica	mg/L as SiO_2	0.0	0.0
Sodium	mg/L	53.6	107.9
Specific Conductance	uS/cm at 25C	636.4	1625.1
Sulfate	mg/L	55.2	103.4
TDS	mg/L	500.8	1157.7
TSS	mg/L	18.9	40.1
Turbidity	NTU	18.0	76.0

Notes:
BOD - biochemical oxygen demand; NTU - nephelometric turbidity unit; µS/cm - microsiemens per centimeter.
(1) All values included in this table are calculated from publicly available sources and sampled data provided by MCWRA. An up-to-date water quality sampling effort of all available water sources is recommended to confirm source water quality prior to any further scenario evaluation.

SECTION 7 SCENARIOS EVALUATED

This study includes a planning level assessment of utilizing existing available water supplies as described in earlier sections and provided by MCWRA in Appendix A. Furthermore, as stated in the previous section, water quality parameters considered were used as an estimate representation of existing water qualities for sizing treatment facilities. Cost estimates were developed for the treatment facilities and infrastructure needed for each scenario. The conceptual-level cost estimate's scope and level of accuracy correspond to an American Association of Civil Engineers International Class 5 estimate intended for concept screening and budgetary purposes. The following sections describe in detail each scenario included in this study.

7.1 CSIP Expansion – Recycled Water Direct Delivery

This scenario involves using only recycled water from M1W via SVRP to supply a portion of the NSIP wells. The CSIP system, SVRP, and M1W locations are shown in Figures 3 and 16 for reference. Using existing CSIP infrastructure could be achieved by directly connecting a new conveyance distribution system near the SVRP facility to pump recycled water to the NSIP distribution system or through connections to the existing CSIP system.

A separate study was conducted by Schaaf and Wheeler that considered a connection to NSIP from the existing CSIP system (see Appendix C). The CSIP system has extra recycled water supply during the off-season winter months to provide an average supply of approximately 10,000 gallons per minute (gpm) (≈1,330 AF per month) to NSIP, however, during the summer irrigation season, the existing CSIP infrastructure is unable to convey recycled water to the NSIP system, due to limitations in the CSIP system.

Given the limited capacity of the existing infrastructure, it was decided to assume that a new, single recycled water conveyance system directly from SVRP would be used to supply the NSIP system year-round with available recycled water supplies. This scenario was developed so that it could also be added to the other two scenarios as a direct delivery of recycled water to the NSIP system or as standalone project.

7.1.1 Supply and Demand

As shown in Figure 13, the volume of recycled water available during the representative year peaks in the winter months (most likely due to increased wastewater flows from inflow and infiltration in the municipal sewer systems) from December through March. Specifically, Table 5 shows the average monthly volumes of recycled water available on a monthly basis (for the representative water supply year) that were not used by the CSIP system. If not captured and reused, this volume would be discharged to the ocean as treated secondary effluent from M1W ocean outfall.

Table 5 Recycled Water Monthly Average Supply (AF)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Total**
1,225	669	641	321	203	118	73	112	172	191	539	1,055	**5,320**

With limited excess recycled water supply during the summer irrigation months, NSIP demands would minimally be met. However, there are significant supplies available in the winter months. For example, with the available recycled water, 50 percent of the NSIP area wells total demand between December and March can be met. Recycled water volumes available in the summer would only be able to serve approximately 19 percent of the NSIP system demand. Offsetting wells within specific aquifers was evaluated as part of this scenario demand analysis. This was not carried forward as a recommended approach since there was not enough supply to fully offset an entire aquifer solely with recycled water direct deliveries.

7.1.2 Storage Requirements

Long-term storage requirements for this scenario were not evaluated given that recycled water would be directly conveyed to the NSIP system. It is understood that the treatment at M1W varies throughout the day, therefore it is assumed that a short-term, 12-hour storage capacity, is included to equalize supplies prior to direct deliveries. MCWRA has identified that to expand CSIP to serve additional volume from its existing system it would require improvements to the existing storage reservoir.

7.1.3 Infrastructure

The distribution infrastructure included in this scenario are shown in Figure 16. To convey recycled water from M1W to the NSIP system would require a new transmission pipeline and pump station. It is assumed that the new infrastructure would be adjacent to the existing CSIP systems near the storage pond at M1W and would cross the Salinas River upstream of the SRDF rubber dam. Trenchless technology is assumed to be needed to cross the Salinas River to mitigate environmental impacts. The new pipeline would discharge into a short-term storage tank to equalize the supplies prior to delivery to the NSIP system along Highway 183. The short-term storage tank is assumed to be 3.5 million gallons (MG) accompanied by a booster pump station to distribute recycled water to pipelines within the NSIP area. An NSIP distribution system was developed accounting for wells that could take the entire recycled water supply available on an annual basis, this would require coordination of when deliveries would occur, because there is not enough instantaneous supply for all wells to receive water simultaneously nor fulfill 100 percent of their existing demands. This system is subject to change depending on which wells would receive water. This distribution system was approximately 6 miles of 18-inch pipeline and was able to serve approximately 18 wells. Using recycled water would only partially offset well's annual demands. Furthermore, the recycled water conveyance infrastructure to the NSIP system is included in the other scenarios under consideration.

7.1.4 Treatment

No additional treatment is required for this scenario since the existing SVRP would provide all treatment necessary for recycled water for unrestricted agricultural irrigation. The quality of water would be the same as CSIP and follow all relevant Title 22 requirements for use.

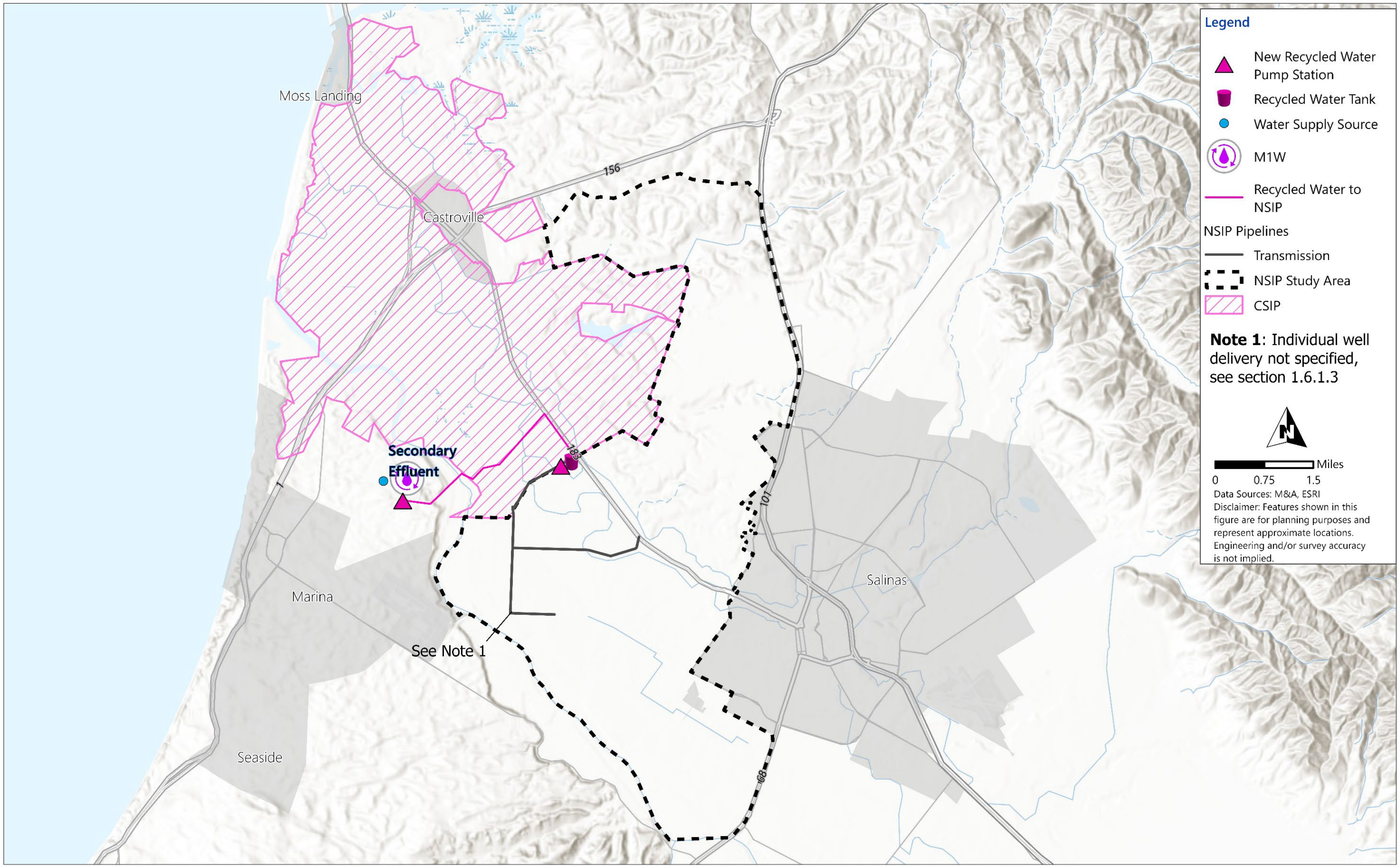


Figure 16 CSIP Expansion Scenario Infrastructure

7.1.5 Costs

The total capital cost for this scenario includes approximately 4 miles of new 24-inch pipeline, a trenchless river crossing, a 3.5-MG storage tank, booster pump stations, and appurtenances that would be included in the connection to the NSIP system. The booster pump capacity is approximately 9,500 gpm and able to pump the maximum average recycled water demand. The total construction cost is listed in Table 6. As described, this scenario can also be included in the larger scenarios evaluated, therefore, the costs of the infrastructure only associated with directly delivering the recycled water to an NSIP system are included.

Section 7.1.1 identifies that no treatment is required for this scenario; however, the cost of service from using existing M1W and SVRP treatment facilities to produce recycled water will need to be evaluated in a future evaluation and considered in this scenario. This cost of service would be considered an operations and maintenance (O&M) cost since the existing treatment infrastructure is already constructed.

The costs for this scenario are in present day dollars and include contingencies applied to the direct construction costs of 30 percent for construction, Monterey County sales tax of 7.75 percent applied to half the construction costs, and construction contractor general conditions, overhead, and mark-up of 15 percent. It is assumed that land purchase costs are not included in this estimate. Soft costs for this scenario are also listed in Table 6. Note that soft costs for this scenario differ from the other two given the scale of the project is much smaller and does not require the development of a large storage reservoir. Table 7 shows the estimated O&M costs of this scenario. The unit cost of this project scenario was estimated in a separate cost standardization analysis performed by the SVBGSA.

Table 6 CSIP Expansion Scenario Recycled Water Direct Delivery

Project Component	Cost
Recycled Water Transmission Cost and Appurtenances	$9,171,000
Recycled Water Pump Station	$2,063,000
3.6 MG Water Storage Tank	$9,199,000
Distribution Infrastructure	$7,068,000
Construction Subtotal	**$20,433,000**
Engineering Planning and Design	$2,751,000
Environmental Planning and Permitting	$551,000
Administrative and Legal	$276,000
Construction Management	$1,101,000
Soft Costs Subtotal	**$4,679,000**
Grand Total	**$32,180,000**

Notes:
(1) Includes 30 percent construction contingency, Monterey County sales tax of 7.75 percent applied to 50 percent of costs, and contractor general conditions, overhead, and mark-up contingency of 15 percent.
(2) Engineering planning and design – 10 percent, Environmental Planning and Permitting – 2 percent, Administrative and Legal – 1 percent, Engineering Services During Construction (ESDC) and Construction Management – 4 percent.

Table 7 CSIP Expansion Scenario Estimated O&M Costs

Project Component	Annual O&M Costs
Recycled Water Pump Station	
Power	$2,107,000
O&M	$116,000
Site O&M	$12,000
Subtotal	**$2,235,000**
Distribution System Infrastructure	
Power	$605,000
O&M	$38,000
Site O&M	$4,000
Subtotal	**$647,000**
Off-Site Infrastructure Costs	
O&M	$170,000
Tank O&M	$92,000
Subtotal	**$262,000**
Total Estimated Annual O&M Costs	**$3,144,000**

7.2 Maximum Size NSIP

This scenario includes a system sized to serve all wells within the NSIP area. The average annual total demand for the entire NSIP study area is approximately 28,020 AF. This scenario includes serving the existing 248 wells with an in lieu supply from a new distribution system. Figure 17 shows this scenario layout. It is assumed that this scenario would offset all well usage within NSIP. This scenario would require treatment and storage sized to meet the seasonal demands of the region. All water sources would be captured, stored, and treated, excluding recycled water. This scenario assumes 15,000 AF of storage at Merritt Lake needed to serve demands during the irrigation season. Figure 18 shows the conceptual process flow diagram. The operational concept for this scenario shows that water would be captured from the various sources in the study area and conveyed to Merritt Lake for raw water storage and then treated at a centralized treatment facility. Treated water would then be distributed to individual existing irrigation systems similar to the CSIP delivery system through a new distribution network. During times of full storage or excess flows, a portion of demands (e.g., up to 5 to 10 million gallons per day [mgd]) could be served by capturing and treating supplies directly to preserve stored volume (termed direct capture in sections below). The excess recycled water available from SVRP would be conveyed to the new distribution system in a separate line as discussed under the CSIP expansion scenario. To maintain sufficient reservoir volume to supply demands over consecutive years, a system of supply allocations or demand reductions of deliveries would need to be established or a system of using existing wells as supplemental supplies similar to CSIP's current operation.

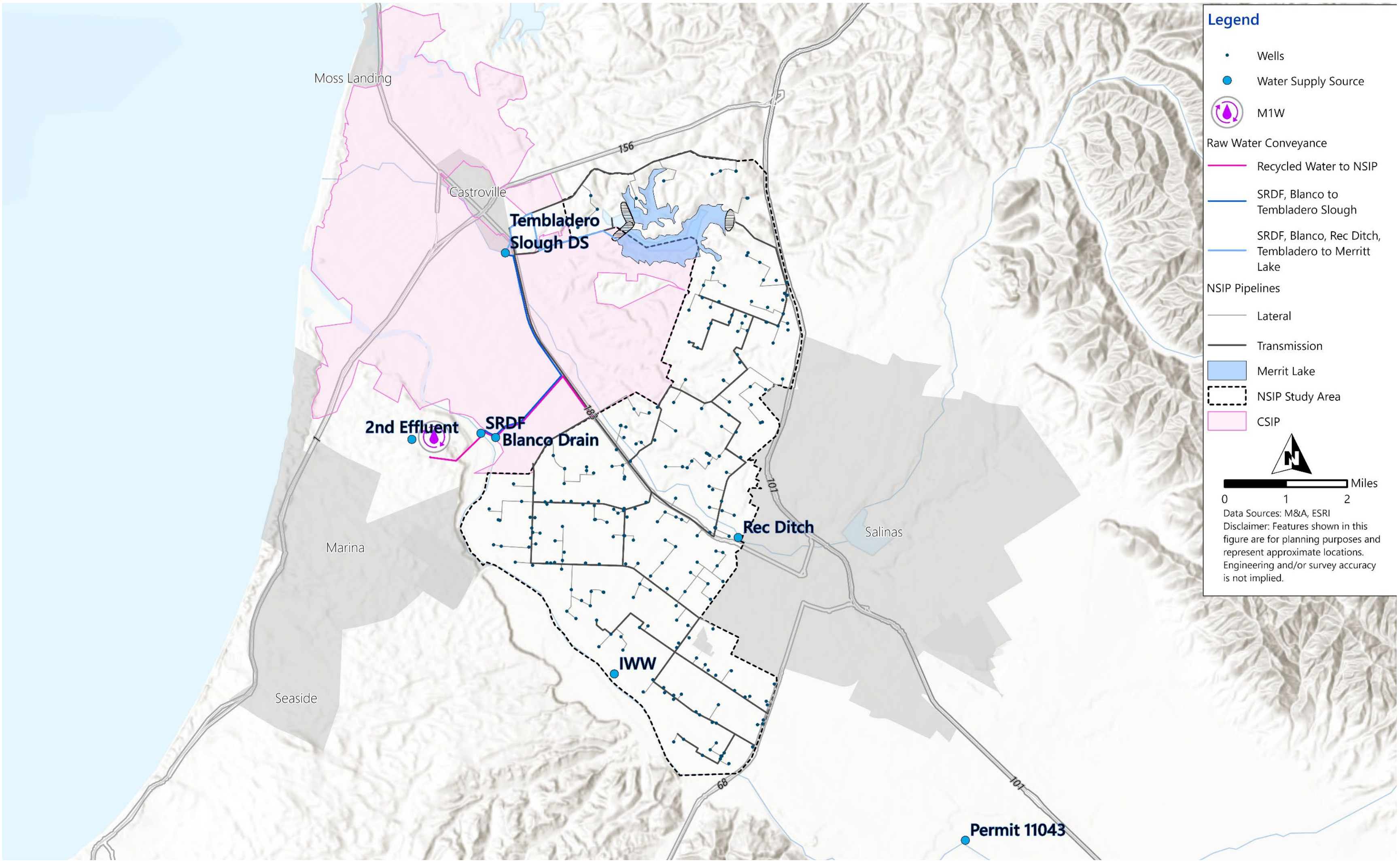


Figure 17 Max Size of NSIP

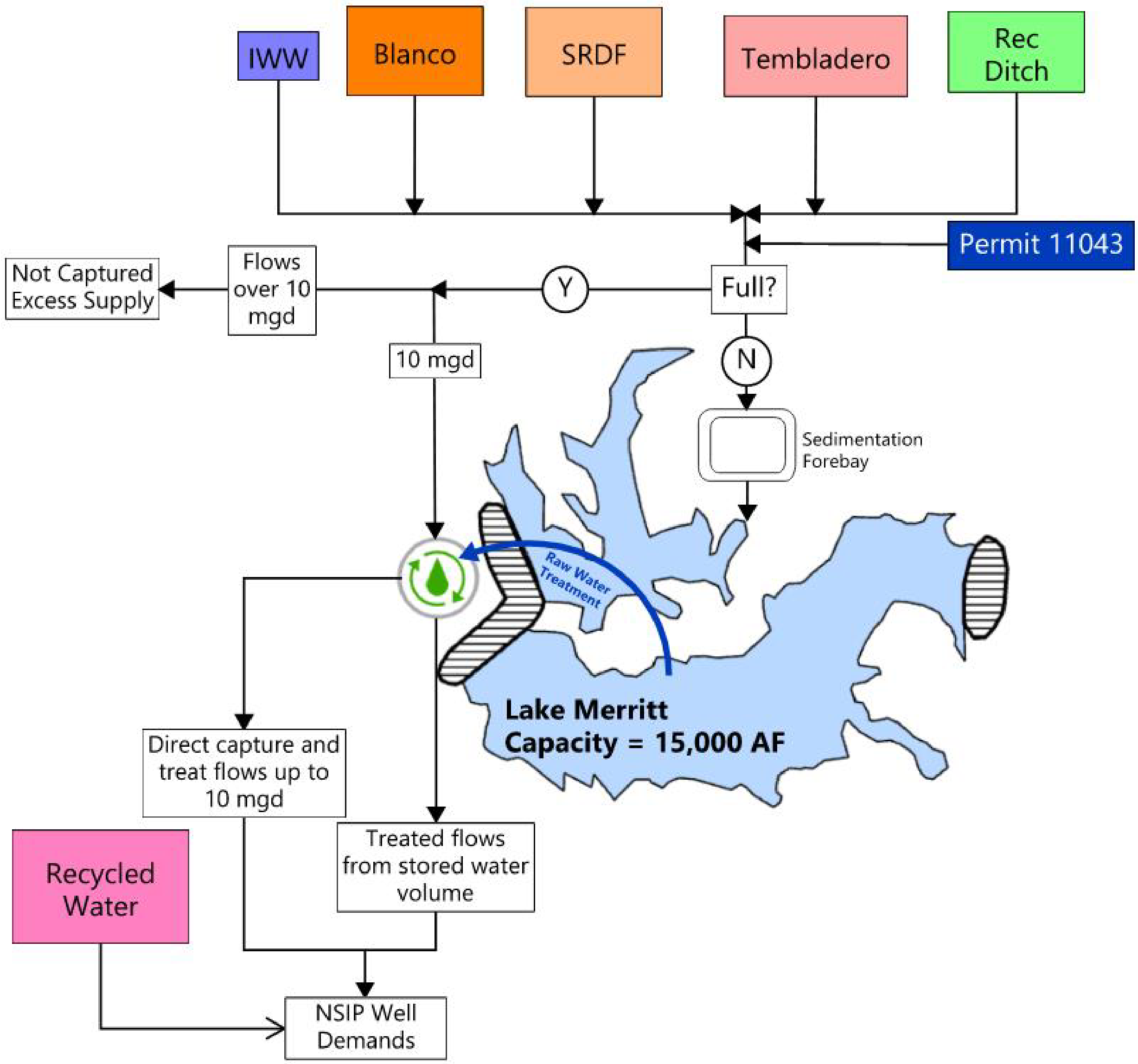


Figure 18 Max Size NSIP Flow Diagram

7.2.1 Supply and Demand

The 2019 to 2022 average annual demand volume for all wells within the NSIP study area is approximately 28,020 AF. Monthly demands tend to increase from the early spring, peak in July, and decrease through the end of the year. Figure 19 shows a monthly distribution of groundwater demand with respect to the different aquifer classifications within the study area. The peak monthly average demand in July is approximately 4,240 AF. The lowest demand is approximately 570 AF in December.

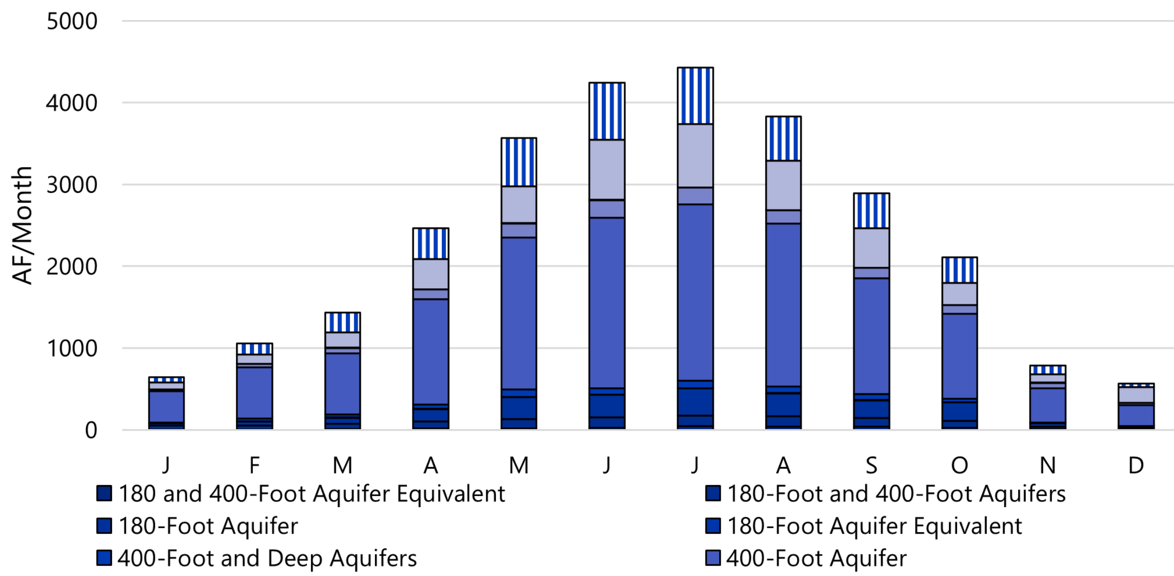


Figure 19 Max Size NSIP Monthly Demand

Figure 20 shows the supplies that would be used for the Max Size NSIP scenario. Three supply scenarios were developed to account for supply variability with respect to the total demand in the area.

- All available supplies.
- All available supplies without secondary effluent.
- Secondary effluent and varying Permit 11043.

Similar to the demand, the supplies are the monthly averages for the time period from 2019 to 2022. The total annual supply during this period is approximately 20,460 AF. However, it should be noted that the Permit 11043 supply from 2019 to 2022 is approximately 11 percent less than the 10-year average; therefore, this assumption is conservative and the potential for the supply availability to increase is likely.

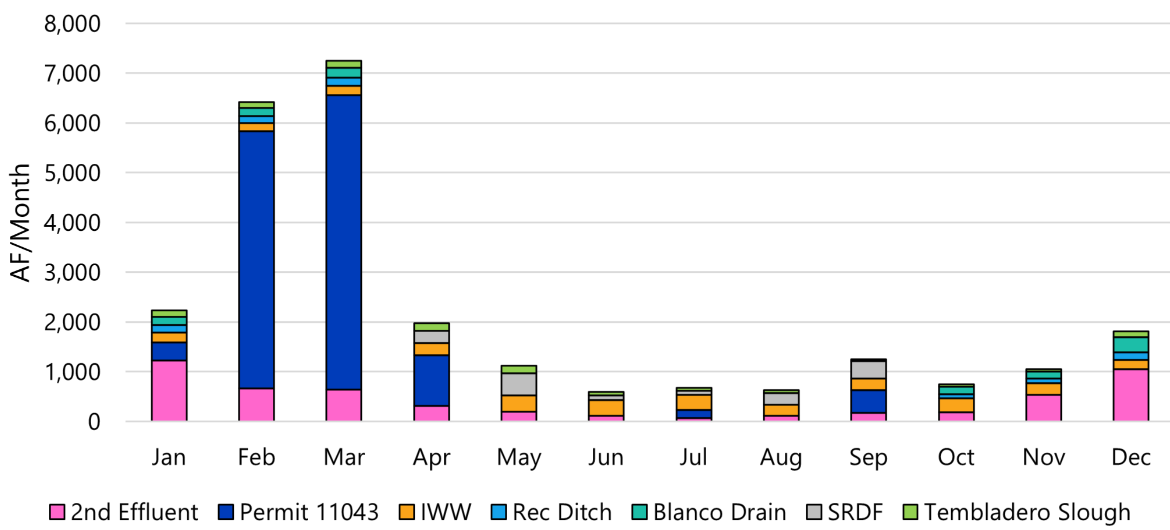


Figure 20 Representative Year Available Supplies

Comparing Figures 20 and 21, the peak water supply availability does not correlate to peak demands and therefore requires storage to meet peak irrigation season demands. If storage was not used, approximately 16,520 AF of total demand would not be able to be served. This is shown graphically in Figure 21.

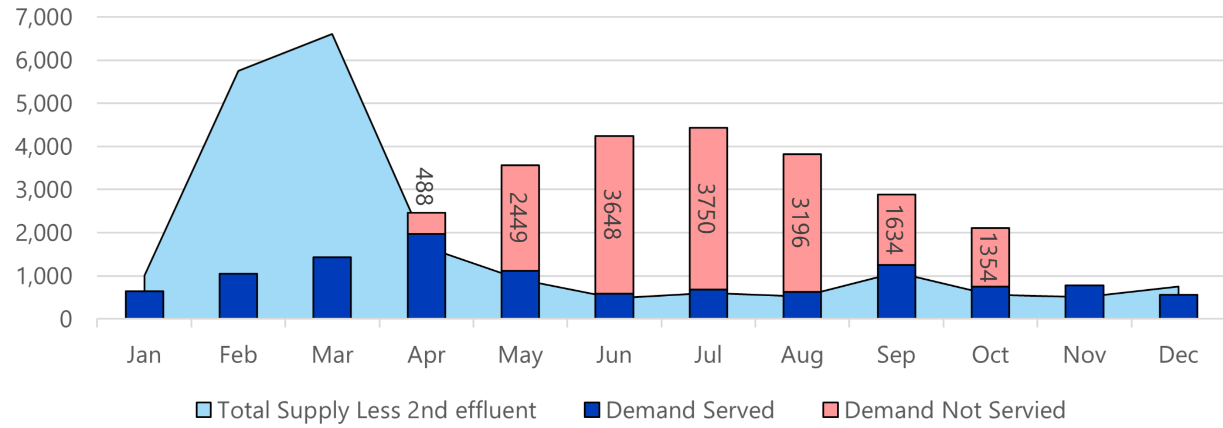


Figure 21 Max Size NSIP Supply and Demand

7.2.2 Storage Requirements and Sensitivity Analysis

As described in the previous section and shown in Figure 21, this scenario requires a storage volume to capture higher flow volumes during low demand periods. The process flow diagram shows raw water would be captured from sources within the study area and stored at Merritt Lake. Additionally, recycled water could be directly delivered to NSIP users within the NSIP study area. To accommodate the seasonality of supplies as well as varying availability from year to year, delivery allocations to end users would need to be adjusted to facilitate reservoir management. For the purposes of this study, the representative year shows a conservative average volume of water available based on historical records (see Section 5 for details). It is acknowledged that in some years more or less water would be available for capture, treatment, and delivery.

A four-year extended period reservoir management analysis was performed to identify if the combination of the representative annual water supply volumes (2019 to 2022), entire study area demand, and periodic allocation reductions resulted in a maintained positive reservoir volume. Three supply scenarios were developed and this analysis is detailed in Appendix B. Figure 22 shows a detailed example of the analysis used for these scenarios that are summarized in Figures 23 to 25. Storage at Merritt Lake is limited to 15,000 AF based on previous studies. The following sections describe the results of each analysis.

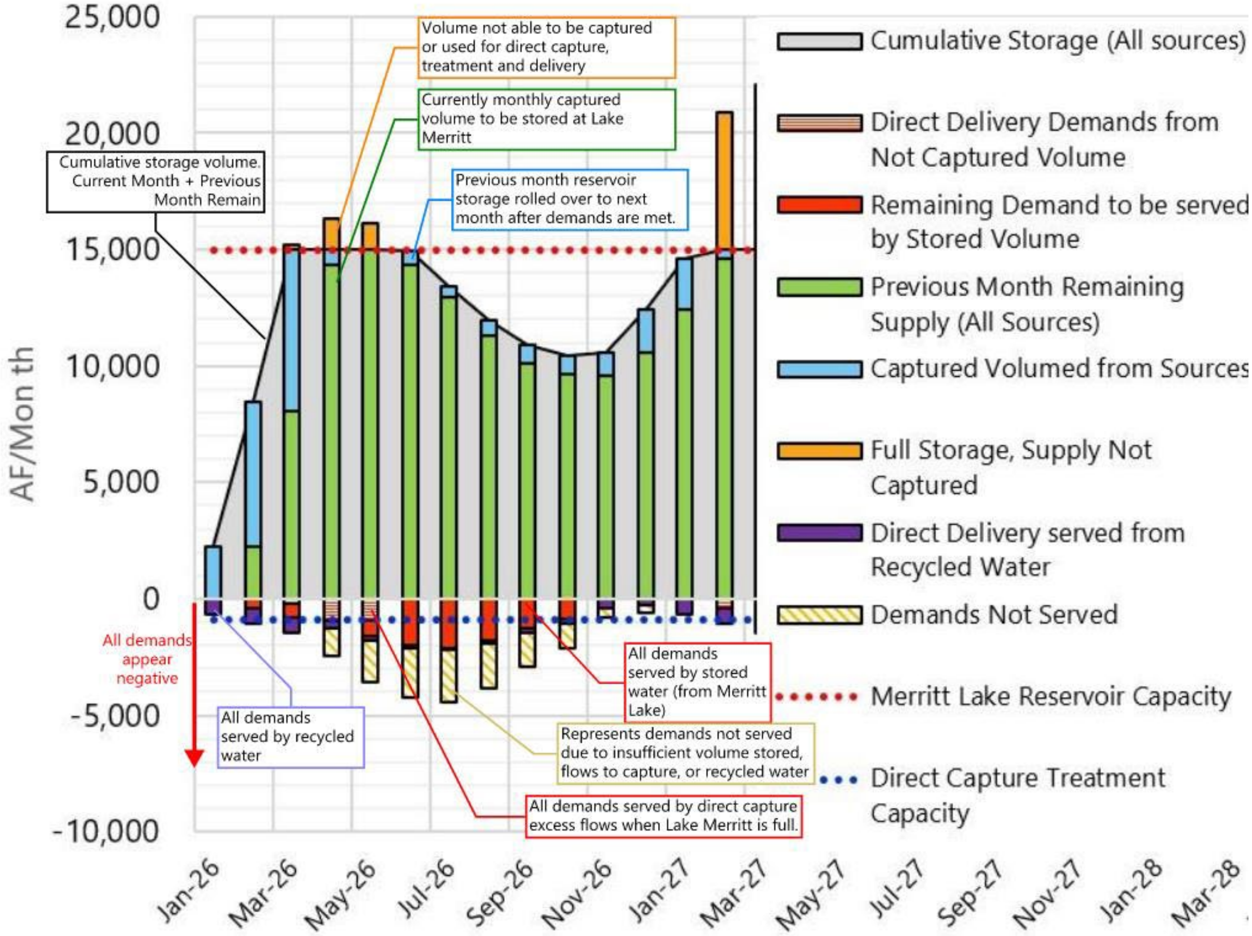


Figure 22 Storage Analysis Curve Example

7.2.2.1 All Supplies Available

The total annual supply is 25,780 AF and the total annual demand is 28,020 AF; therefore, this scenario has the smallest supply shortfall but is limited by available reservoir storage, which is set at 15,000 AF. Figure 23 shows over an extended period of the Max NSIP scenario that using recycled water will be used as a direct delivery to NSIP customers and direct capture and treatment capacity was limited to excess flows at approximately 10 mgd.

The recycled water is shown as the purple bar graph in Figure 23. When demands are low enough in the winter, demands can be met primarily with recycled water. When demands increase, additional sources to meet demands are needed. The demands can be met with direct deliveries from Permit 11043 and recycled water as they are available and will utilize stored volumes as needed. Utilizing the direct capture of excess supplies and recycled water during the winter and spring months allows the reservoir to fill. When excess flows and recycled water are not available (typically in summer), demands are met through stored water volumes from Merritt Lake. Figure 23 shows the volume of demands that cannot be met due to insufficient supplies and storage as the diagonally striped, yellow hatch bar. Year 1 shows roughly a large portion of demands are not met to allow for Merritt Lake to fill. Demand reductions are needed in the late spring and early fall months to allow for the summer irrigation season to receive 100 percent offset while also preserving reservoir volumes.

7.2.2.2 Excluding Recycled Water Deliveries

Figure 24 shows the Max NSIP scenario without using recycled water. Total annual supply is approximately 20,460 AF and the demand stays the same at 28,020 AF, therefore increasing the supply and demand gap. The reservoir volume and direct capture treatment capacity remained the same as the previous scenario. Figure 24 shows that more water was required to be treated from the stored volumes due to the lack of direct delivery supplied from recycled water. All solid red bars are demands treated from stored water volumes with the red bars being the primary source to meet demands starting in April rather than in June compared to previous scenario. This is due to the lack of directly serving demands from recycled water. Demand reductions had to be increased throughout the year due to more stored water being used and less total water supply available. By year 4 the demands had to be significantly reduced throughout the winter and spring to allow Merritt Lake to refill to meet next year’s irrigation demands in the summer.

7.2.2.3 Tertiary Treated Secondary Effluent With Varying Permit 11043 Available

Figure 25 shows an analysis of the Max NSIP scenario including recycled but varying availability of Permit 11043 volumes ranging between 0 percent and 100 percent. This is to represent season to season fluctuations in Permit 11043 availability based on climatological conditions (dry versus wet years). Total annual supply of all sources considered is approximately 12,700 (0 percent of Permit 11043 supply) to 25,780 AF (100 percent of Permit 11043 supply) and the demand stays the same as the prior two scenarios. The reservoir volume and direct capture treatment capacity remained the same as the previous scenarios. Permit 11043 was reduced by 75 percent in year 1, 0 percent in year 2, 100 percent in year 3, and 75 percent in year 4.

- Figure 20 shows demands served in the first year were heavily reliant on recycled water to allow all available sources to fill the reservoir.
- Year 2 had ample supply, therefore, allocations were increased through the summer; however, the demands quickly drained the reservoir.
- Year 3 started with a rollover supply from year 2. Therefore a 25 to 50 percent demand reduction was applied for the entire year, even though Permit 11043 was set at 0 percent.
- Year 4 started with minimal rollover storage, therefore, followed significant demand reductions similar to year 1 to build storage for the irrigation season.

7.2.2.4 Summary of Sensitivity Analysis

In summary, the analysis shows that if the intent is to maximize delivery of water to meet all demands in NSIP, all supplies must be utilized. Even with all supplies utilized, due to the variability of supplies under different climate conditions, a system of demand allocations and reductions of deliveries would need to be established. The reduction in deliveries in dry years could either be considered part of a demand management system if the NSIP area was no longer allowed to withdraw groundwater, or groundwater wells could be used as supplementary water during dry years similar to the way CSIP supplemental wells are used.

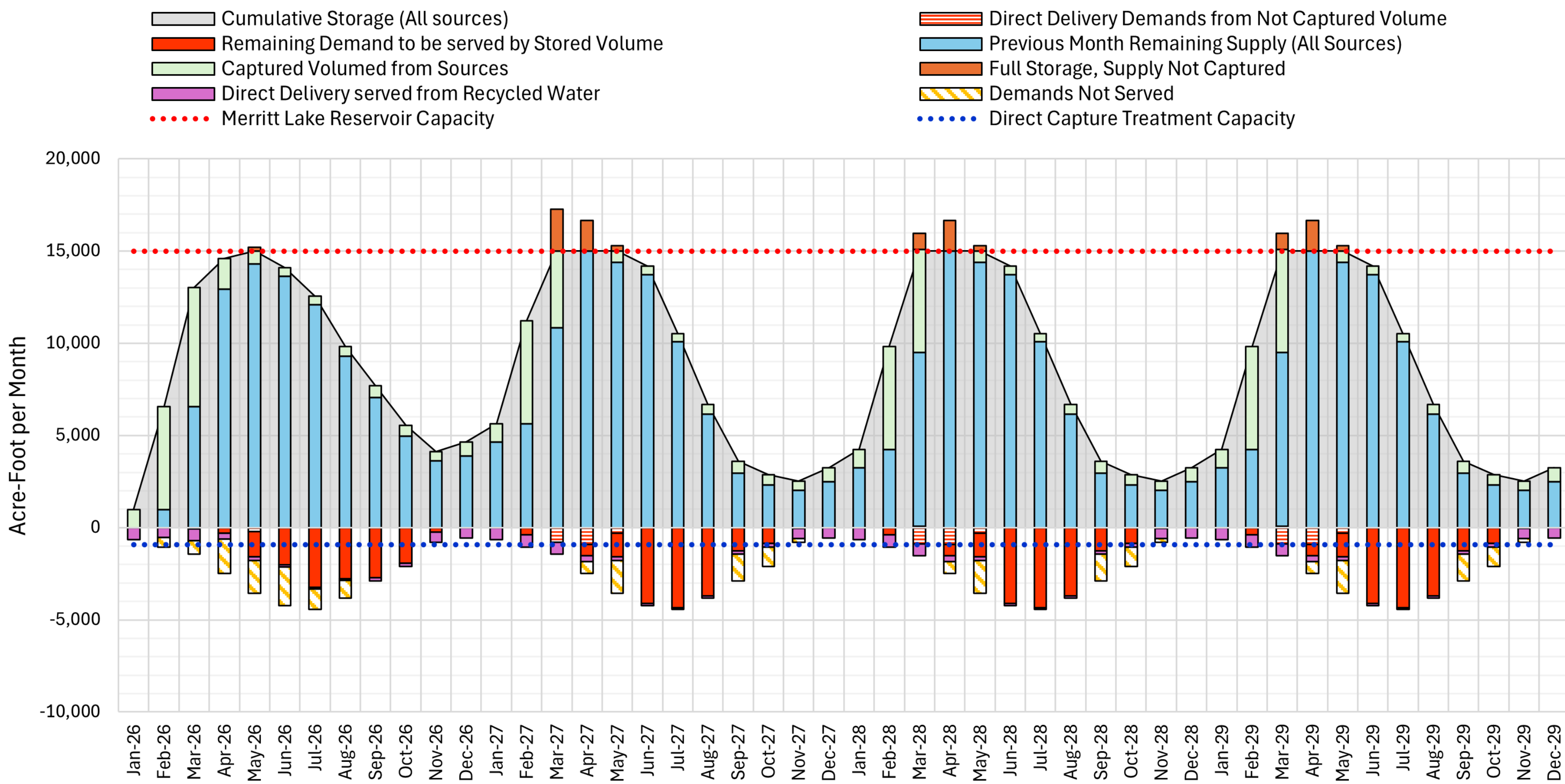


Figure 23 Extended Period Storage Analysis – All Sources

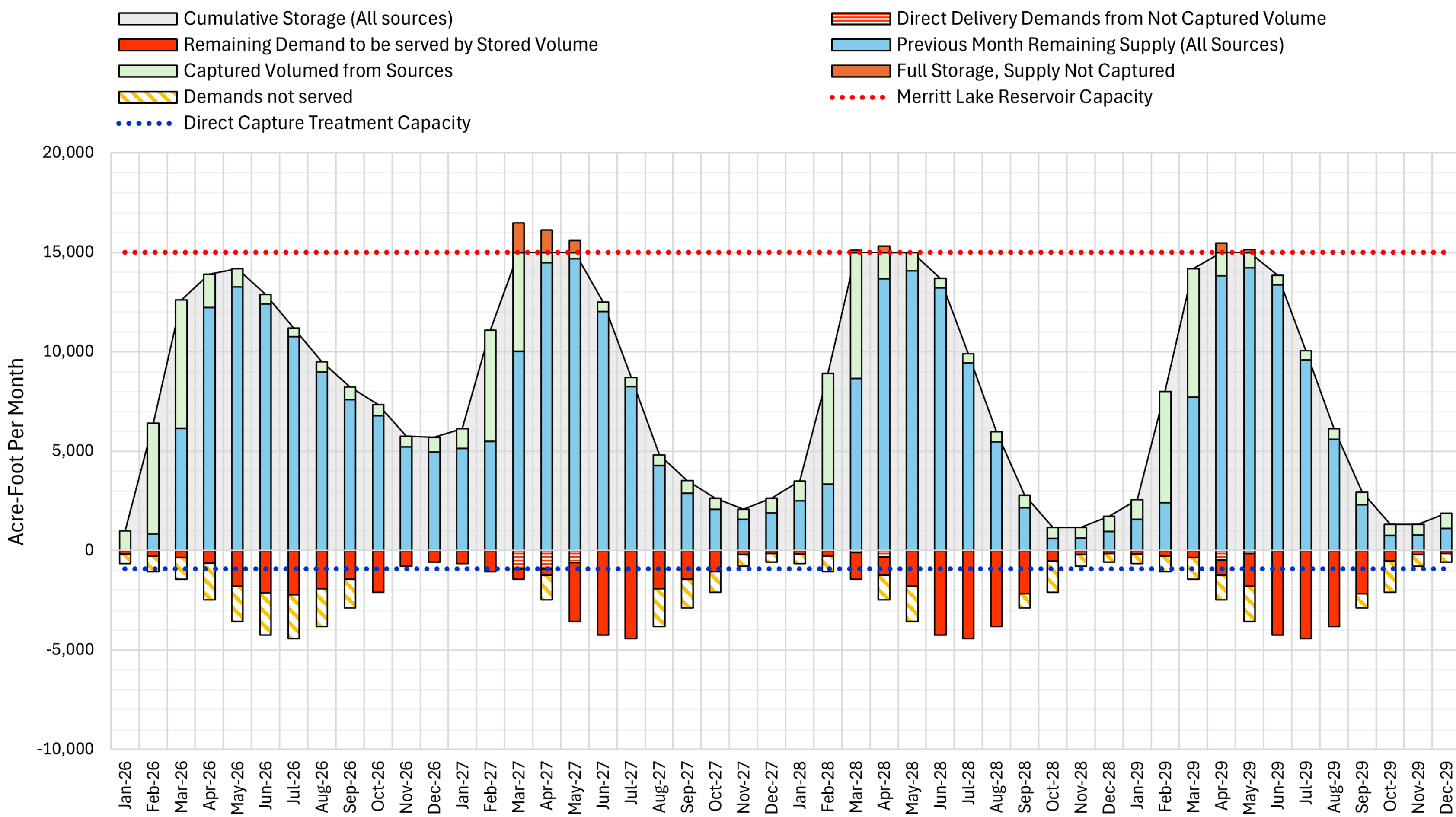


Figure 24 Extended Period Storage Analysis – Excluding Recycled Water

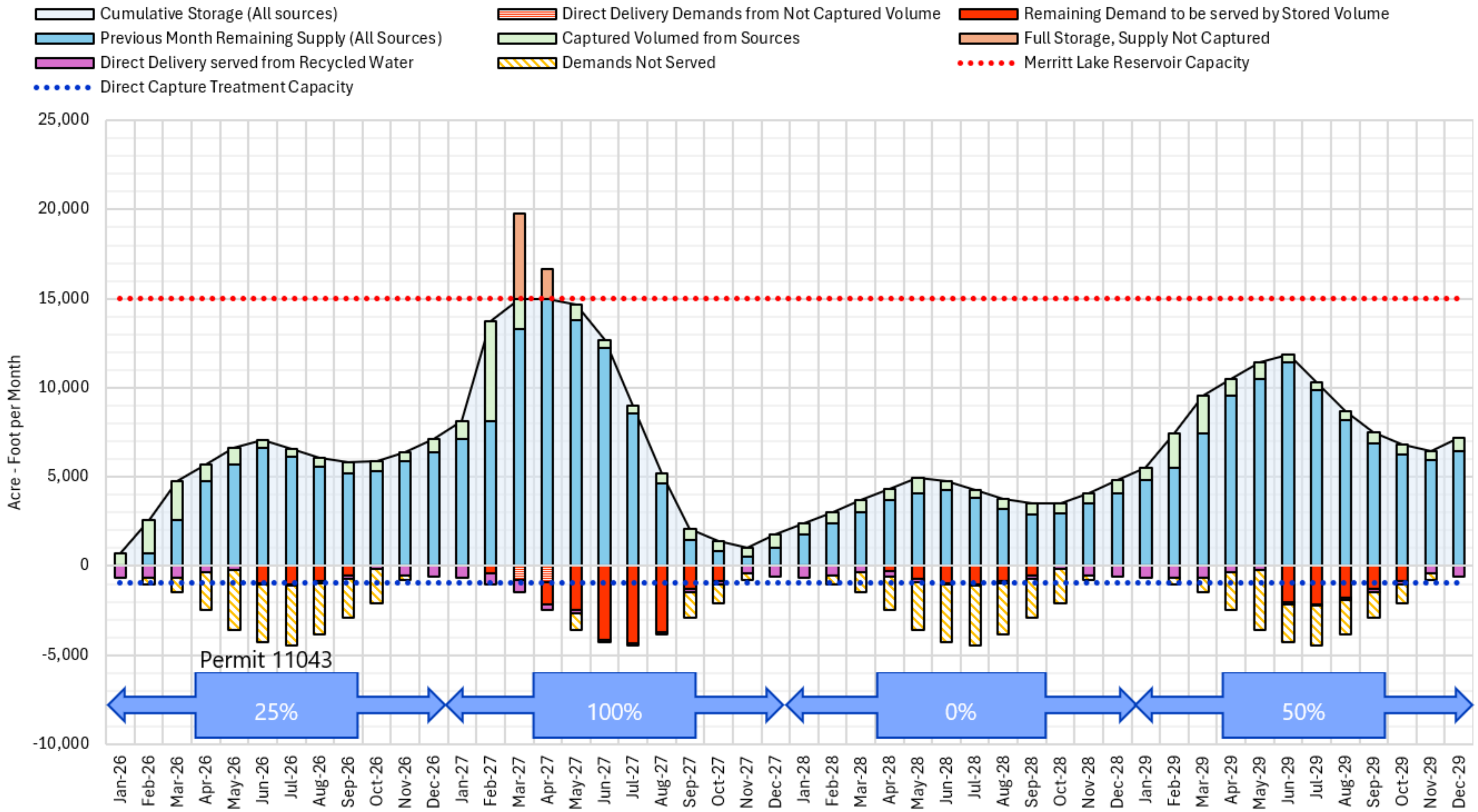


Figure 25 Extended Period Storage Analysis – Varying Permit 11043

7.2.3 Infrastructure

Under this Max NSIP scenario, there are approximately 38 miles of treated water transmission pipelines, 39 miles of laterals, and 14 miles of raw water pipelines. The pipe diameters for treated water transmission range from 12 to 42 inches and laterals were assumed to be 12 inches. The pipe diameters for raw water transmission are 16 and 24 inches. The routing for raw water transmission consists of three pipe segments and multiple pump stations to convey raw water supplies to each point:

- One pipe segment connects SRDF to Blanco Drain and goes along agricultural roads.
- The second pipe segment contains flow from SRDF, Blanco Drain, and IWW and goes to Tembladero Downstream. It travels along agricultural roads, crosses Nashua Road, and continues until it meets Castroville Road. Once there, it follows Castroville Road until it reaches an agricultural road on the left, just before a bridge. The pipeline continues along this road and it eventually crosses a waterway and railroad tracks. After crossing those railroad tracks, it will cross another waterway and connect with Tembladero Downstream.
- The third pipe segment which contains flow from SRDF, Blanco Drain, IWW, Secondary Effluent, Reclamation Ditch, and Tembladero Slough leads to Merritt Lake. It starts at Tembladero Downstream and follows an agricultural road until it can cross Merritt Street and follow Del Monte Avenue. It follows Del Monte Avenue and goes right when it reaches Blackie Road. It travels along Blackie Road until it reaches the first agricultural road on the right and it begins to follow that. It travels straight until it reaches the agricultural road that runs alongside a field and a waterway. It travels along this road until the waterway turns right. It crosses this waterway and travels alongside another agricultural road until it reaches Merritt Lake.

The routing for treated water transmission consists of 20 pipe segments and a booster pump station with a capacity of the peak monthly average demand (≈33,600 gpm). It follows existing transmission lines or travels along agricultural road access corridors as shown in Figure 17.

7.2.4 Treatment

To meet the water quality parameters listed in Table 3, the treatment system for the Max NSIP scenario includes a facility with a capacity of 50 mgd including flocculation followed by sedimentation basins as the primary treatment process. Additionally, given the turbid nature of the existing water sources, any type of pre-treatment sedimentation is assumed to take place in Lake Merrit through either a forebay or a designated sedimentation area that can be cleaned to avoid accumulation and loss of storage capacity. For direct capture flows (flows not sent to Lake Merritt, see Figure 18) a concrete equalization basin is included to provide sedimentation and to provide equalization for the facility influent feed pumps. Following flocculation and sedimentation, sodium hypochlorite is injected into the finished water for disinfection prior to distribution to the NSIP system. The proposed treatment footprint is approximately 15 acres and contains a total of three 8.3 MG finished water storage tanks on site. Upon treatment water is stored in finished water tanks and pumped to the distribution through finished water pumps. The treatment process flow diagram is shown in Figure 26.

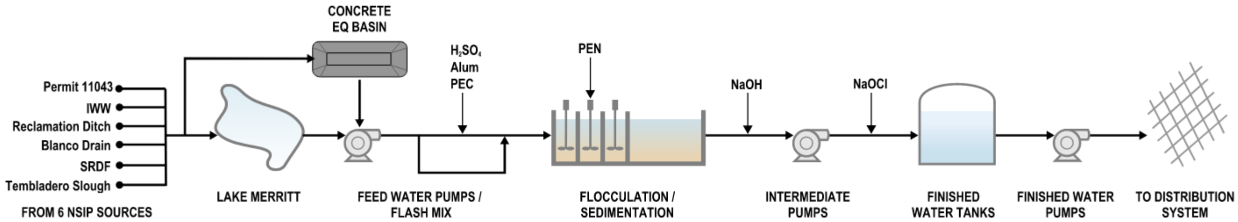


Figure 26 Max NSIP Scenario - Treatment Process Flow Diagram

7.2.5 Costs

The costs for this scenario include the estimated construction costs. The construction costs are separated into major infrastructure components of the project as described in Section 7.2.3. Storage costs include the estimated improvements required for Merritt Lake to build the necessary impoundments and infrastructure to accommodate the required storage. Treatment facility costs include all on-site treatment and infrastructure for the process components described in Section 7.2.4. The costs for this scenario are in present day dollars and include contingencies applied to the direct construction costs of 30 percent for construction, Monterey County sales tax of 7.75 percent applied to half the construction costs, and construction contractor general conditions, overhead, and mark-up of 15 percent. It is assumed that land purchase costs are not included in this estimate. A funding source for a project of this size would likely include an amortized repayment through a funding source (e.g., Clean Water State Revolving Fund or general bond purchasing). The lifecycle of this project is estimated at 40 years with an assumed inflation rate of 2.4 percent per year (Federal Reserve Bank of Cleveland, 2026) and a discount rate of 3.25 percent (Federal Register, 2026). A funding interest rate of 4 percent is assumed to reflect general obligation bond funding. A 30-year debt repayment schedule is assumed.

The unit cost of this project scenario was estimated in a separate cost standardization analysis performed by the SVBGSA. The total maximum size NSIP project costs are the sum of both the construction and soft costs shown in Table 8. Annual estimated O&M costs are included in Table 9.

Table 8 Max NSIP Estimated Construction Costs

Project Component	Construction Costs
Treated Water Distribution Transmission System	$75,675,000
Treated Water Booster Pump	$19,253,000
Raw Water Transmission Cost	$114,237,000
Raw Water Pump Station	$6,418,000
Recycled Water Delivery System Costs	$20,432,000
Individual Well Connection Costs	$82,242,000
Merritt Lake Storage Cost	$176,341,000
Water Treatment Plant Costs	$726,278,000
Construction Subtotal(1)	**$1,220,876,000**
Engineering Planning and Design(2)	$122,088,000
Environmental Planning and Permitting(2)	$24,418,000
Administrative and Legal(2)	$12,209,000
Construction Management(2)	$48,836,000
Soft Costs Subtotal	**$207,551,000**
Grand Total	**$1,428,427,000**

Notes:
(1) Includes 30 percent construction contingency, Monterey County sales tax of 7.75 percent applied to 50 percent of costs, and contractor general conditions, overhead, and mark-up contingency of 15 percent.
(2) Engineering planning and design – 10 percent, Environmental Planning and Permitting – 2 percent, Administrative and Legal – 1 percent, ESDC and Construction Management – 4 percent.

Table 9 Max NSIP Scenario Estimated Annual O&M Costs

Project Component	Annual O&M costs
Water Supply Conveyance Infrastructure	
Power	$3,344,000
Pump Station O&M	$2,146,000
Pipeline O&M	$1,056,000
Subtotal	**$6,546,000**
Treated Water Conveyance Infrastructure	
Power	$2,287,000
Pump Station O&M	$962,000
Pipeline O&M	$316,000
Subtotal	**$3,565,000**
Treatment Facility	**$11,450,000**
Total Estimated Annual O&M Costs	**$21,561,000**

7.3 NSIP Serving Wells Only Within 500 mg/L Chlorine Intruded Zones

This scenario includes a system sized to serve only wells within the existing 500 mg/L chloride intruded zones of the 180-foot and 400-foot aquifer. Figure 26 shows the grouping of wells within this region. There are approximately 88 wells within this area with a total annual average demand of approximately 11,020 AF. Figure 26 also shows the layout for this scenario. Similar to the Max NSIP scenario, treatment would be at a centralized facility near Merritt Lake. This scenario would also require storage to accommodate peak demands in the summer when supplies are least available. The total storage utilizes the 9,600 AF agricultural reservoir identified by the 1998 MCWRA study (MCWRA, 1998). Figure 27 shows the conceptual process flow diagram of this scenario. All raw water sources would be captured and conveyed to the Merritt Lake reservoir with the exception of the Permit 11043 supplies and recycled water from SVRP. Unlike the Max NSIP scenario, where we are assuming a change in Permit 11043 conditions to allow long term storage, this scenario assumes use of Permit 11043 under the current water rights conditions which does not allow for storage longer than 30 days. Therefore, if peak flows occur in the spring, stored volume for use in the summer is not allowed under this scenario. The Permit 11043 flows would instead be diverted and treated at the centralized treatment facility to meet demands up to 10 mgd (≈990 AF per month) within the current month to preserve stored flows for later use. The recycled water from SVRP would also be directly fed into the NSIP system since it is already being treated and ready for agricultural irrigation applications.

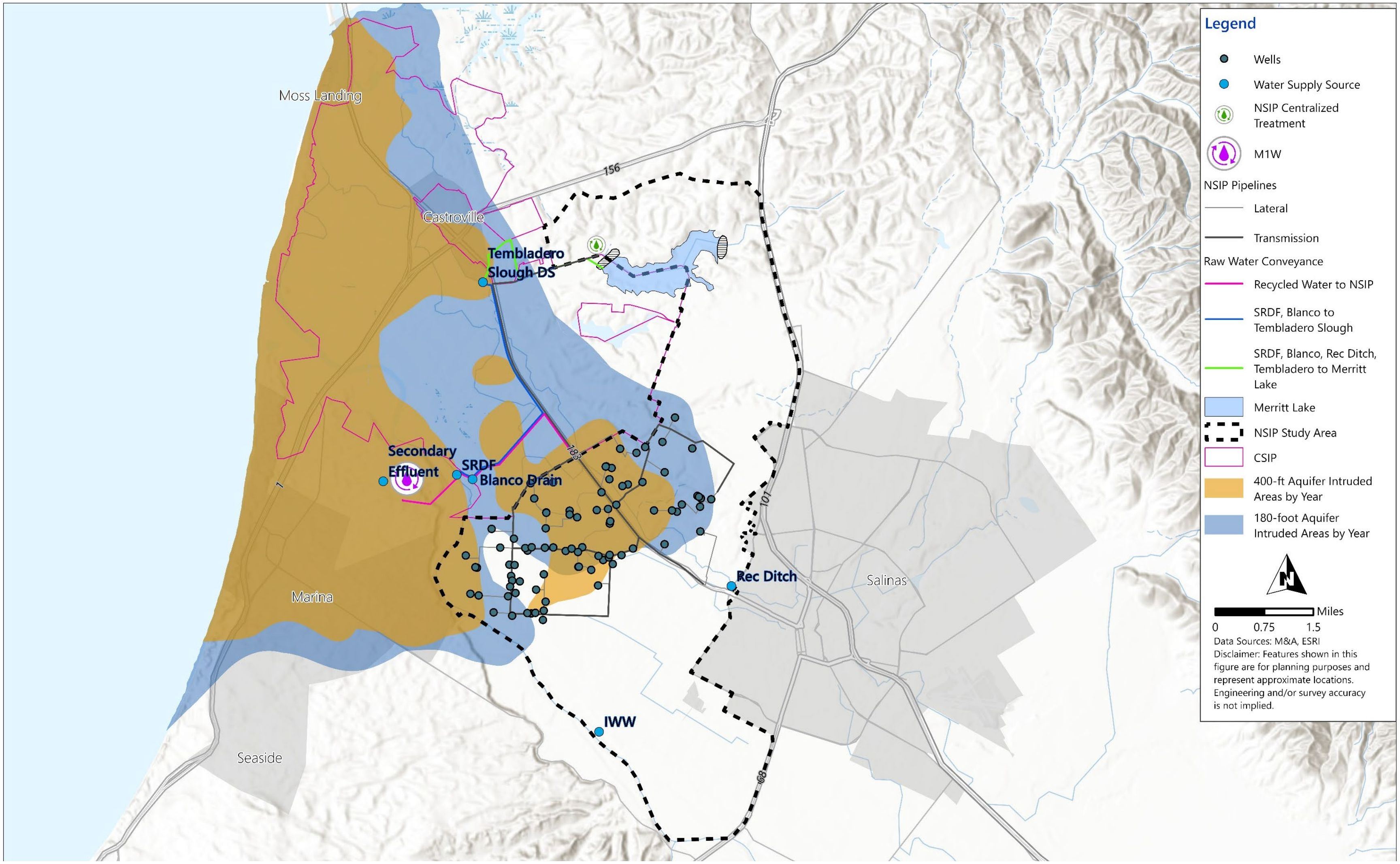


Figure 27 NSIP Serving Wells Only Within 500 mg/L Chlorine Intruded Zones

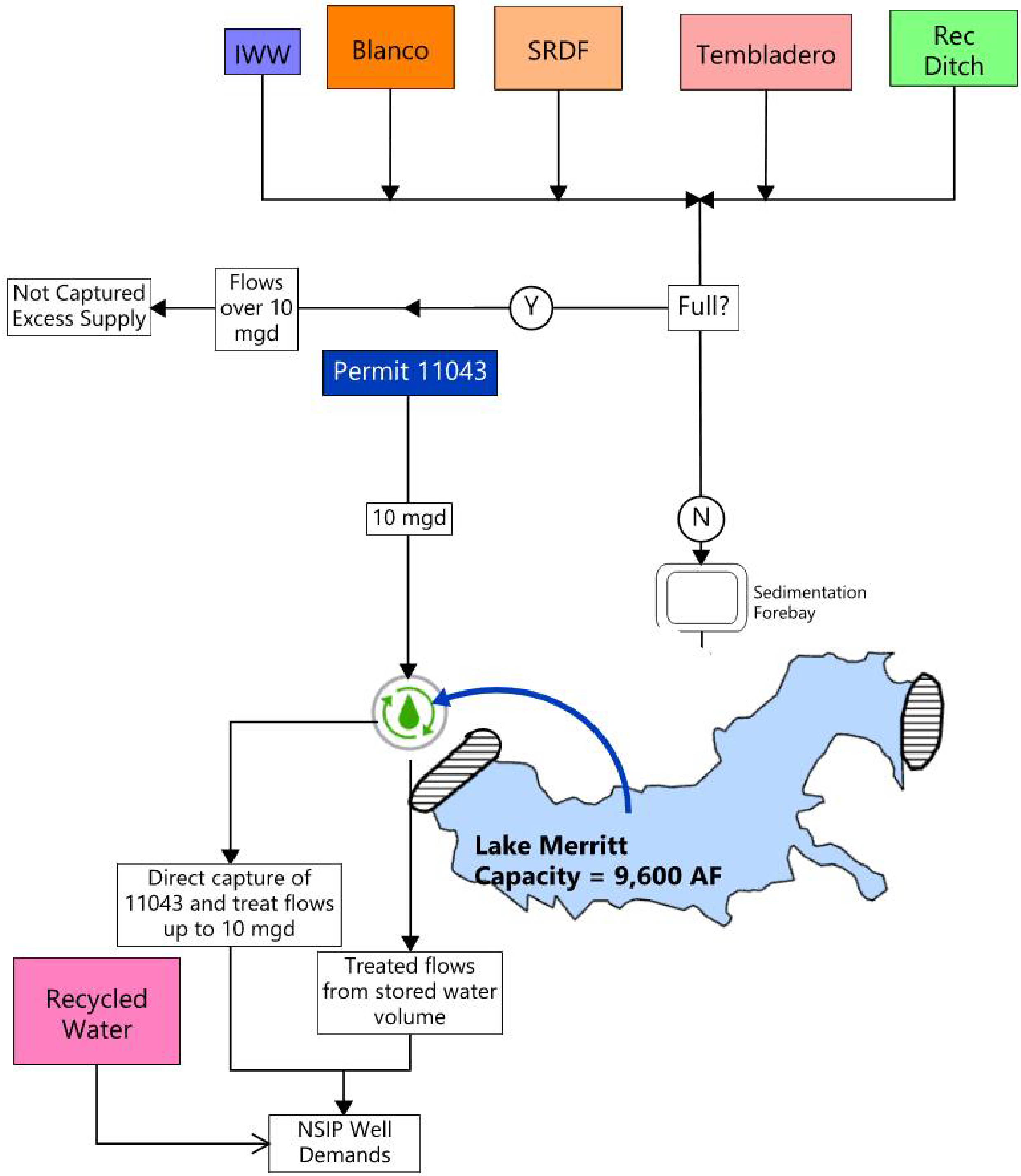


Figure 28 Intruded Wells Scenario NSIP Flow Diagram

7.3.1 Supply and Demand

The 2019 to 2022 average annual demands for all wells within the NSIP study area is approximately 11,020 AF. All the wells within the intruded zone are also in Max NSIP scenario, so monthly demand trends are consistent between both scenarios. Figure 28 shows a monthly distribution of groundwater demand with respect to the different aquifer classifications within the study area. The peak monthly average demand occurs in July at approximately 1,850 AF . The lowest demand occurs in January at approximately 210 AF. Potential available supplies for this scenario are the same values shown in Figure 19. Comparing the available supplies in Figure 19 and the demands shown in Figure 28, the resulting supply and demand chart is shown in Figure 29. This comparison results in approximately 5,100 AF of demands that cannot be met without including a storage element to the project.

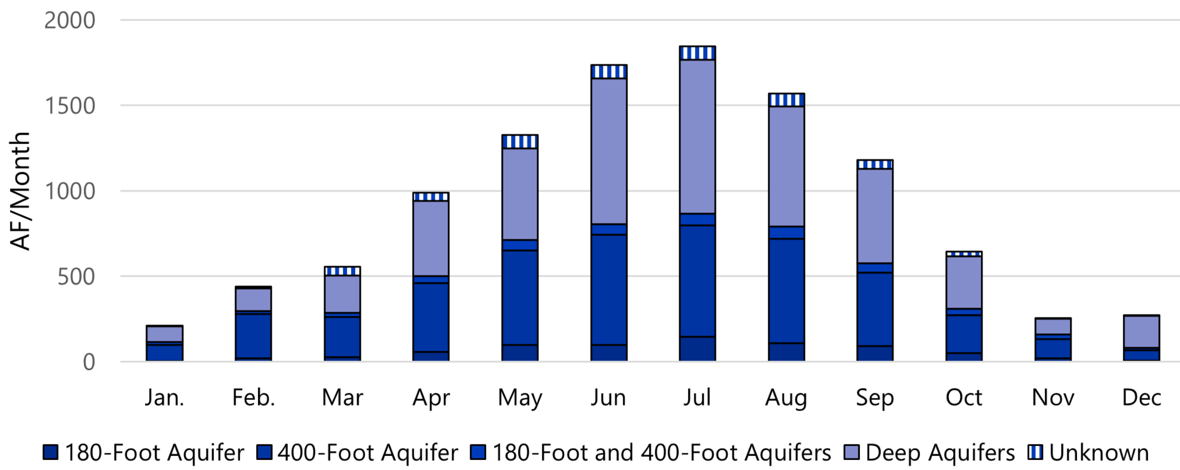


Figure 29 Intruded Wells Scenario Well Demand by Aquifer

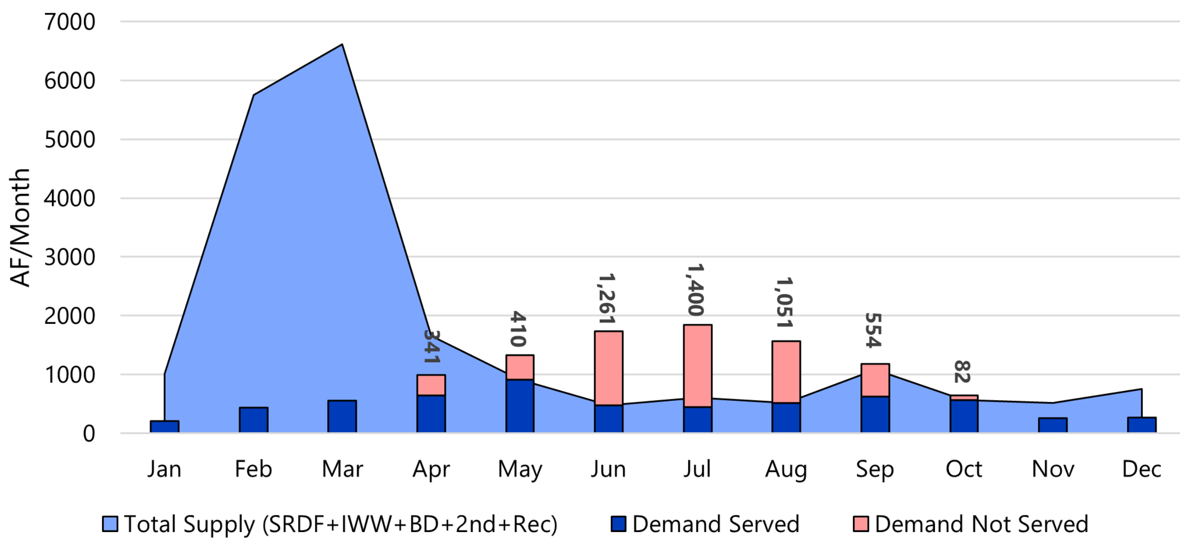


Figure 30 Intruded Well Scenario Supply and Demand

7.3.2 Storage Requirements and Sensitivity Analysis

This scenario also requires a storage volume to capture higher flow volumes during low demand periods, however, given the overall operational logic the storage requirement is less due to lower overall demands and not storing Permit 11043 volumes long term. Similarly, storage would require supply allocation reductions to initially fill the reservoir and allocations would be adjusted on an annual basis to accommodate fluctuations in raw water availability.

A five-year extended period reservoir management analysis was performed to identify if the combination of the representative annual water supply volumes (2019 to 2022), demand, and periodic demand reduction results in sustainable reservoir volumes over an extended period. Given that Permit 11043 was not relied upon for long term storage, only three supply scenarios were evaluated. These scenarios are all supplies available, all supplies without Permit 11043 volumes, and all supplies without recycled water. Note the total available supplies that can be stored for all three scenarios is approximately 7,380 AF.

Figures 31 and 33 show these extended storage evaluations. The initial reservoir evaluation was set at 9,600 AF based on the configuration of Merritt Lake identified in previous studies performed by MCWRA. The 9,600 AF reservoir was set as the maximum theoretical volume for this scenario. Direct capture of Permit 11043 volume would be treated to match the current monthly demands. If Permit 11043 flows are not available, then stored raw water would be treated and distributed accordingly to meet demands. The direct capture and treatment capacity was also limited to approximately 10 mgd. Additionally, recycled water would be supplied directly to the NSIP system through a standalone pipeline and pump station. The use of recycled water and Permit 11043 resulted in a smaller reservoir size than 9,600 AF, approximately 8,000 AF. The following sections describe the supply sensitivity analysis performed.

7.3.2.1 With Permit 11043 Volume Available

Figure 31 shows that the reservoir volume continues to be sustained over the course of five years by utilizing the direct deliveries of both recycled water and Permit 11043 volumes to allow for the other supplies to fill the reservoir. The yellow diagonal hatch bars show that demand deliveries had to be reduced in year 1 to allow for the reservoir to fill with the subsequent years showing adequate reservoir storage. The full 10 mgd (≈920 AF per month) of treatment capacity was not needed for this scenario due to the offset of monthly demands met by recycled water. The maximum supply the reservoir reached in this scenario was approximately 8,000 AF.

7.3.2.2 Without Permit 11043 Water Available

Figure 32 shows that if Permit 11043 supply is removed, then the recycled water deliveries will be utilized throughout each year (similar to the previous scenario), which allows for 100 percent of the well demand to be served for a short period of time. The total supplies are not adequate to sustain 100 percent of the well demand for the long term. Annual demand reductions would be needed to allow the reservoir to refill to an appropriate volume to deliver a larger volume of water for the coming years. Given that Permit 11043 was not included in this scenario the 10 mgd of direct capture and treatment was not included. The maximum supply the reservoir reached was approximately 8,000 AF.

7.3.2.3 Without Recycled Water Available

Figure 33 shows that if recycled water is removed, then the supply allocated to the wells must be reduced to maintain adequate reservoir storage. This is shown by the diagonal yellow bar that shows demand reductions throughout both year 1 and year 2. Permit 11043 supplies sustained demands in the winter months that allowed for the other available supplies to fill the reservoir. Compared to the first scenario, the full treatment capacity of Permit 11043 (10 mgd or 920 AF per month) was utilized when the Permit 11043 flows were available in the spring months. This is shown by the red and white striped bar nearing the dotted blue line in Figure 33. Longer term supplies are trending downward indicating that demand reductions will be required past the extended storage analysis time frame to allow for the reservoir to fill. The maximum supply the reservoir reached was approximately 8,000 AF.

7.3.2.4 Summary of Sensitivity Analysis

In summary, the analysis shows that if the intent is to maximize delivery of water to the existing 500 mg/L chloride intruded zone, all supplies must be utilized with a reservoir volume of approximately 8,000 AF. Similar to the Max NSIP scenario, even with all supplies utilized, due to the variability of supplies under different climate conditions, a system of demand allocations and reductions of deliveries would need to be established, and a decision would need to be made about use of groundwater for supplementing supplies versus demand management.

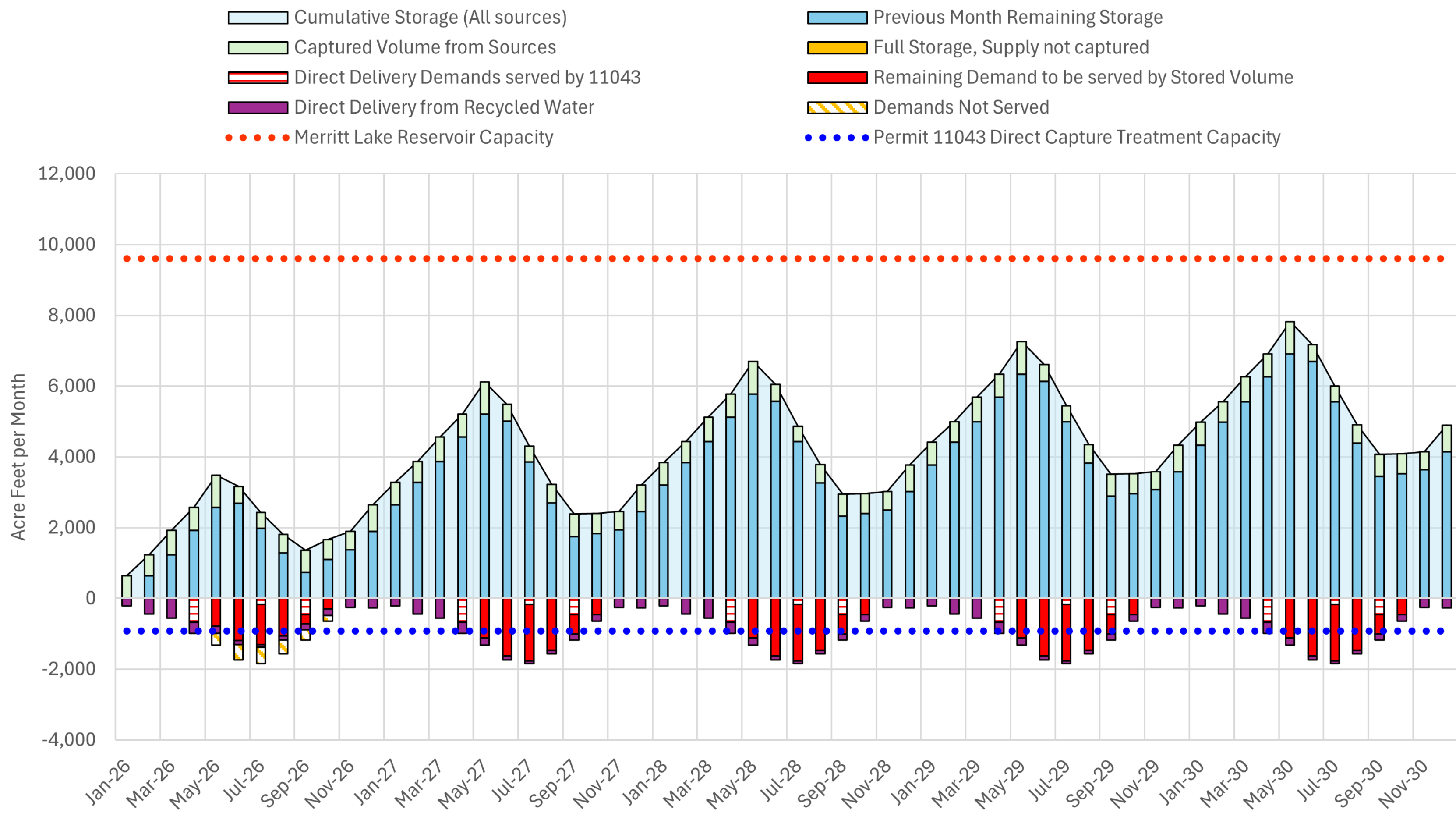


Figure 31 Intruded Well Scenario Storage With Permit 11043 Available

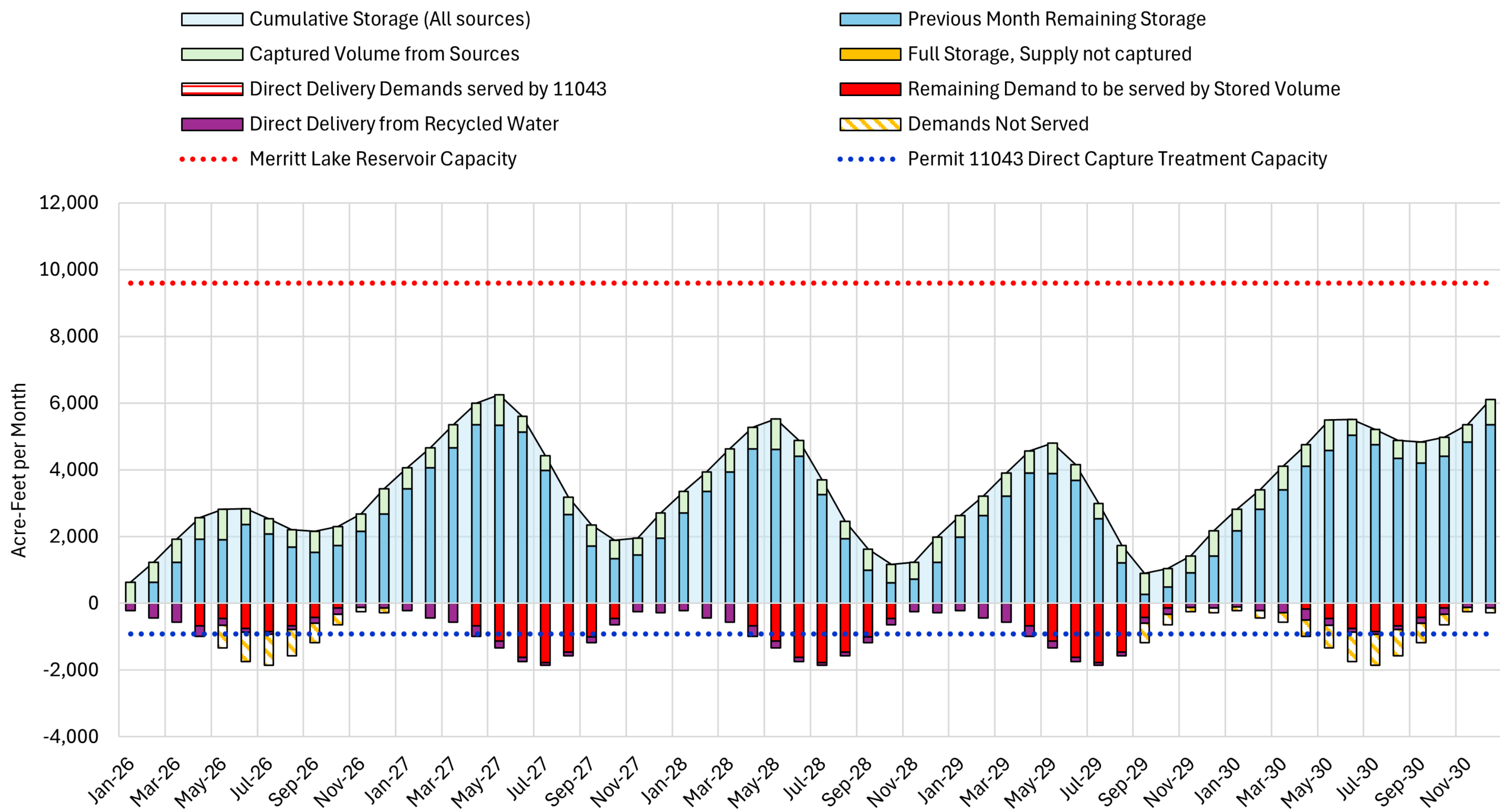


Figure 32 Intruded Well Scenario Storage Without Permit 11043

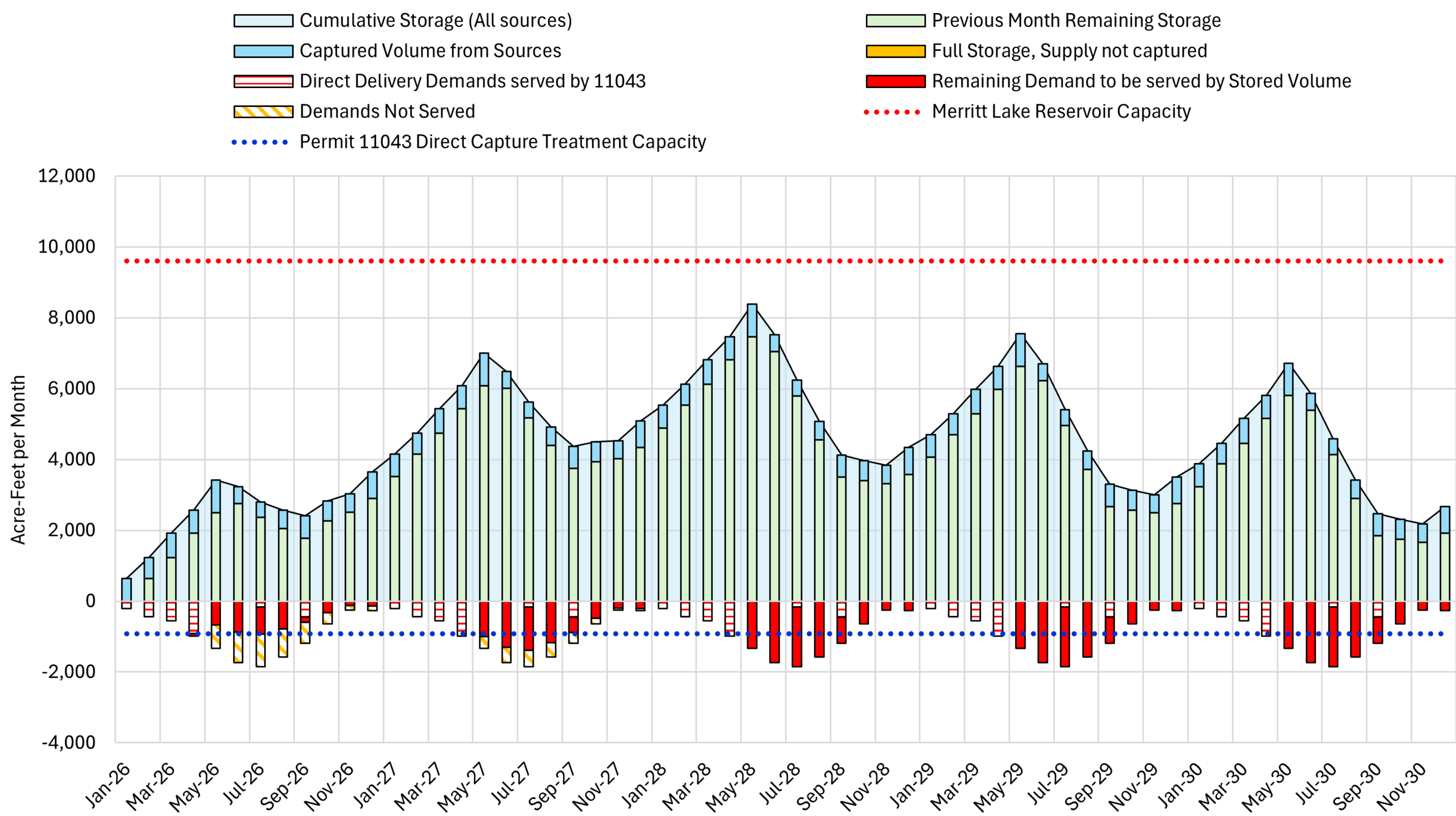


Figure 33 Intruded Well Scenario Storage Without Recycled Water

7.3.3 Infrastructure

Under this scenario, there are approximately 16 miles of treated water transmission pipelines, 12 miles of laterals, and 14 miles of raw water pipelines. The pipe diameters for treated water transmission range from 12 to 36 inches and laterals were assumed to be 12 inches. The pipe diameters for raw water transmission are 16 and 24 inches. The raw water transmission routing is the same as the Max NSIP scenario listed in Section 7.2.3. The distribution piping is the same as the Max NSIP scenario, however, it is limited to only the intruded wells and the diameters are smaller due to less volume delivered. The routing for treated water transmission consists of nine pipe segments and a booster pump station with a capacity of the peak monthly average demand (≈25,000 gpm). Two additional segments were added for looping the system.

7.3.4 Treatment

The treatment system for the Intruded Wells NSIP scenario is the same as the Max NSIP system except it is much smaller. The capacity of this facility is approximately 20 mgd. Similarly, it includes a flocculation followed by sedimentation basins as the primary treatment process and assumes any type of pre-treatment sedimentation will occur at Lake Merritt through either a forebay or a designated sedimentation area that can be regularly cleaned. For direct capture of Permit 11043 water a separate concrete equalization basin with approximately 200,000 gallons capacity is included for sedimentation and equalization prior to the facility influent feed pumps. Following sedimentation, sodium hypochlorite is injected into the finished water for disinfection prior to distribution. The proposed treatment footprint is approximately 8 acres and contains a total of two 5 MG finished water storage tanks on site. Upon treatment water is stored in finished water tanks and pumped to the distribution through finished water pumps. The treatment process flow diagram is shown in Figure 33

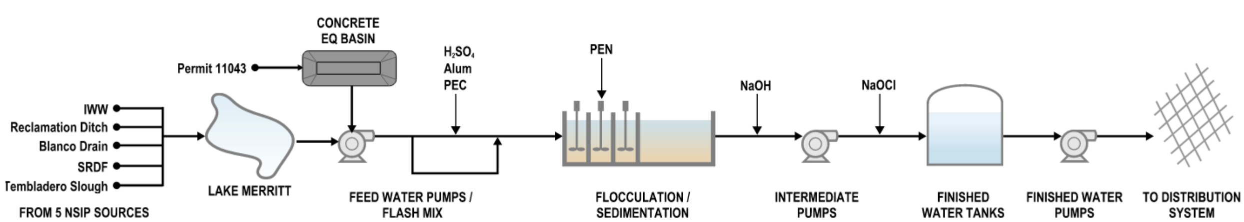


Figure 34 Intruded Well NSIP Scenario - Treatment Process Flow Diagram

7.3.5 Costs

Similar to the Max Size NSIP scenario, the construction costs are separated into major infrastructure components of the project as described in Sections 7.3.3 and 7.3.4. The costs for this scenario are in present day dollars and include the same contingencies and finance and funding terms included in Section 7.2.5. The unit cost of this project scenario was estimated in a separate cost standardization analysis performed by the SVBGSA. This scenario requires smaller infrastructure simply to accommodate a smaller demand, however, the significant reduction in required storage (Section 7.3.2) with strategic deliveries utilizing direct capture and treatment of Permit 11043 and recycled water save reservoir development costs. The total Intruded Well scenario project costs are the sum of both the construction and soft costs shown in Table 10. Annual estimated O&M costs are included in Table 11.

Table 10 Intruded Wells Only NSIP Scenario Project Costs

Project Component	Costs
Treated Water Transmission Mains	$38,263,000
Potable Water Booster Pump	$6,876,000
Raw Water Transmission Cost	$114,237,000
Raw Water Booster Pump Stations	$6,418,000
Recycled Water Delivery System Costs	$20,432,000
Individual Well Connection Costs	$27,027,000
Lake Merritt Storage Costs	$90,964,000
Water Treatment Plant Costs	$292,230,000
Construction Subtotal	**$596,447,000**
Engineering Planning and Design (10%)	$59,645,000
Environmental Planning and Permitting (4%)	$11,929,000
Administrative and Legal (2%)	$5,965,000
Construction Management (4%)	$23,858,000
Soft Costs Subtotal	**$101,397,000**
Grand Total	**$697,844,000**

Notes:
(1) Includes 30 percent construction contingency, Monterey County sales tax of 7.75 percent applied to 50 percent of costs, and contractor general conditions, overhead, and mark-up contingency of 15 percent.
(2) Engineering Planning and Design – 10 percent, Environmental Planning and Permitting – 2 percent, Administrative and Legal – 1 percent, ESDC and Construction Management – 4 percent.

Table 11 Intruded Wells Scenario Estimated Annual O&M Costs

Project Component	Annual O&M Costs
Water Supply Conveyance Infrastructure	
Power	$2,691,000
Pump Station O&M	$2,132,000
Pipeline O&M	$1,070,000
Subtotal	**$5,893,000**
Treated Water Conveyance Infrastructure	
Power	$1,585,000
Pump Station O&M	$344,000
Pipeline O&M	$639,000
Subtotal	**$2,568,000**
Treatment Facility	**$5,826,000**
Total Estimated Annual O&M Costs	**$14,287,000**

SECTION 8 HYDROGEOLOGIC MODELING

The NSIP project concept is evaluated using the Seawater Intrusion Model (SWIM) to assess its impact on both groundwater levels and seawater intrusion across the 180-Foot, 400-Foot, and Deep Aquifers. NSIP operates by eliminating groundwater pumping within the seawater intrusion area and providing an alternative water supply beginning in 2035. Appendix D includes the technical memorandum evaluating the hydrogeological impact by implementing the NSIP. This evaluation only included the hydrogeological analysis under the Max NSIP scenario.

SECTION 9 SUMMARY AND RECOMMENDED NEXT STEPS

A comparison of the scenarios considered in this study is summarized in Table 12. This study was conducted as a high level feasibility analysis. As discussed earlier, the CSIP expansion to NSIP could be considered a first phase to a larger NSIP project. Any of these projects could also be combined with other SBVGSA projects as long as there is no conflict in use of the available supplies. Next steps to be taken if these NSIP scenarios are to be further considered are shown in the preliminary schedule shown in Figure 35.

Table 12 Summary of NSIP Scenarios Considered

	Expansion of CSIP	Maximum NSIP	Intruded Wells Only
Number Wells Served	18	248	88
Demands Served, AFY	5,320	28,020	11,020
Supply Used	Recycled Water	All Supplies	All Supplies
Supply, AFY	5,320	25,080	25,780
Required Storage Volume	3.5 MG	≈ 15,000 AF	≈ 8,000 AF
Miles of Treated Water Transmission Lines	18	38	16
Miles of Raw Water Transmission Lines	6	14	14
Miles of Laterals	TBD	39	12
Treatment Size, mgd	N/A	50	20
Total Capital Costs	$23.9M	$1.4B	$698M
Total Annual O&M Cost	$6.8M	$19.8M	$14.8M

Notes:
B - billion; M - million; N/A - not applicable; MG – Million Gallons; AF – Acre-Foot

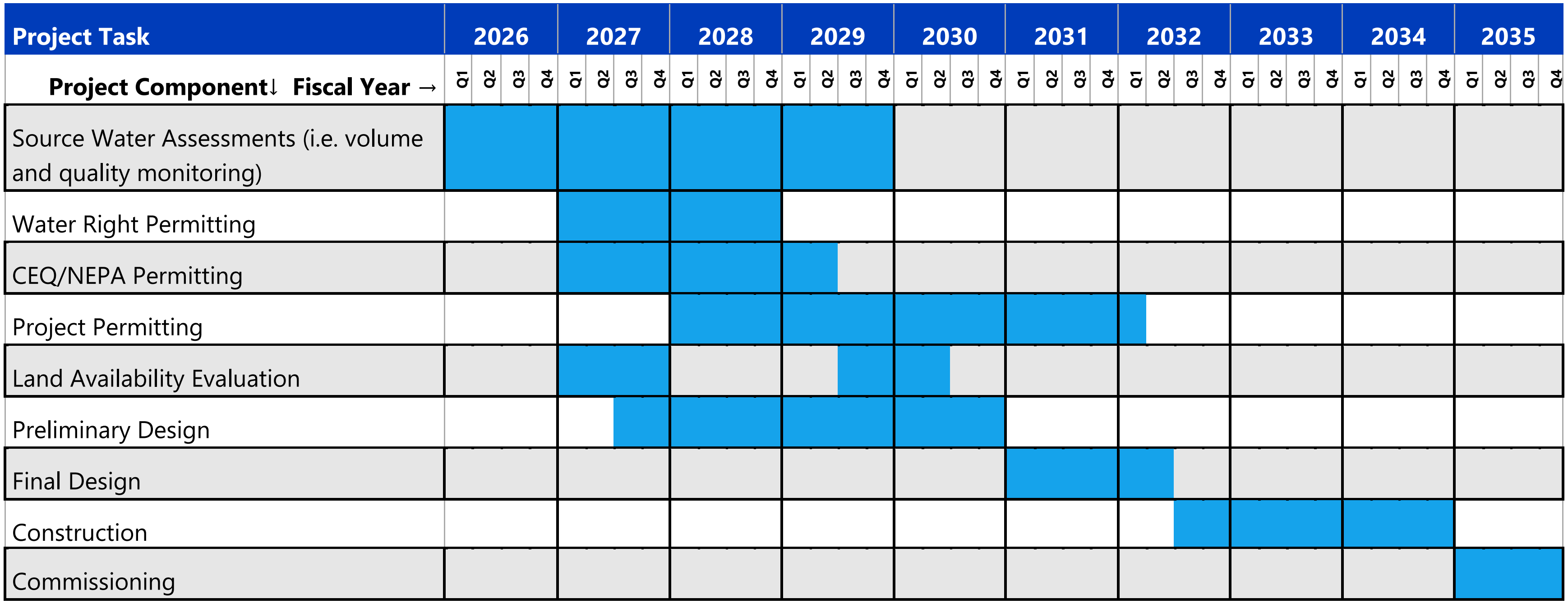


Figure 35 Preliminary NSIP Project Schedule

SECTION 10 REFERENCES

County of Monterey. 2026. “Monterey County Water Recycling Projects (CSIP/SVRP).” 3/20/2026. https://www.countyofmonterey.gov/government/government-links/water-resources-agency/projects-facilities/castroville-seawater-intrusion-project-salinas-valley-reclamation-project-csip-svip.

Montgomery Watson, RMC, Salinas Valley Water Project - Project Plan, Monterey County Water Resources Agency, 1998.

APPENDIX A

NSIP FEASIBILITY STUDY: SOURCE WATER USABILITY EVALUATION

Monterey County Water Resources Agency

DATE: March 19, 2026

Technical Memorandum

TO: Sarah Hardgrave, Salinas Valley Basin GSA, Deputy General Manager

FROM: Shaunna Murray, Deputy General Manager
Amy Woodrow, Senior Water Resources Hydrologist
Jason Demers, Senior Water Resources Engineer
Peter Vannerus, Associate Water Resources Engineer
Casey DeLay, Water Resources Hydrologist
Ricardo Carmona, Water Resources Hydrologist
Joey Klein, Water Resources Hydrologist

SUBJECT: New Seawater Intrusion Project (NSIP) Feasibility Study: Source Water Usability Evaluation

Introduction

The Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA), formed in 2017, has been tasked with achieving groundwater sustainability within the six Subbasins under its jurisdiction, and, working in conjunction with neighboring agencies, to sustainably manage reliable water supplies to the Salinas Valley. The California Department of Water Resources (DWR) has designated the 180/400-Foot Aquifer Subbasin (180/400) as critically over drafted and the Eastside Aquifer Subbasin (Eastside) as a high priority subbasin. The projects identified in the Groundwater Sustainability Plans (GSP) for these Subbasins were developed with public and stakeholder input, hydrogeologic modeling and analysis, and incorporation of technical expert feedback. One of the projects identified in the 180/400 and Eastside GSPs was an expansion of the Monterey County Water Resources Agency's (MCWRA) Castroville Seawater Intrusion Project (CSIP) to serve additional agricultural lands with new water supplies to offset groundwater use. Due to limitations within the existing CSIP infrastructure, the CSIP Expansion Project, now referred to as the New Seawater Intrusion Project (NSIP), would be a new, potentially separate distribution system with its own dedicated infrastructure (e.g. pipes, pumps, turnouts, and storage). Depending on the sources of water identified to serve this new system, diversion and treatment facilities are likely required.

SVBGSA was awarded a DWR Sustainable Groundwater Management Round 2 (SGM R2) Grant with funds dedicated to investigating the NSIP. SVBGSA and their consultants are performing this study in close coordination with MCWRA, with a specific request for MCWRA to investigate potential source waters that can be utilized for NSIP and identify the accessibility and complexity of using each source.

Source Water Usability Evaluation

MCWRA holds various source water rights, allocations and appropriations through different agreements, applications and permits. These source waters are in the vicinity of the area that would be served by NSIP and are currently being unused or underutilized by other MCWRA projects and programs. Therefore, the MCWRA developed a detailed analysis to determine how much source water may be usable for NSIP, based on the recent historical period from January 2009 through May 2025.

Source waters considered in this analysis include:

1. Secondary effluent from the Monterey One Water Regional Treatment Plant
2. City of Salinas Industrial Wastewater Treatment Facility effluent
3. Excess flows at the Salinas River Diversion Facility (SRDF) pursuant to Water Right License 7543, License 12624 and Permit 21089
4. Reclamation Ditch No.1665 flows pursuant to Water Rights Application A032263D
5. Tembladero Slough flows pursuant to Water Rights Applications A032263C and A032263D
6. Blanco Drain flows pursuant to Water Rights Application A032263D
7. Salinas River flows pursuant to Water Rights Permit 11043

Once the list of possible source waters and available data were identified, MCWRA staff began defining the volume and seasonality for each source water based on best available data, agreements, terms and conditions, other source water uses, and other factors related to the usability of each source. Due to data limitations, not all source water data was available for the selected historical period and so a smaller period of time was identified, from 2016 to 2025, which reduced some of those limitations. This smaller period included a variety of hydrologic conditions and reflected more current operational practices. This approach to use available historical data is somewhat conservative and future useability may differ based on a variety of factors such as variable hydrologic conditions, changes in operations and updated agreements. An overview of the methodology, available data, range of average volumes of the various supplies and a more detailed description for each of the source waters, is described in the following sections.

Secondary Effluent from the Monterey One Water Regional Treatment Plant

MCWRA and Monterey One Water (M1W) entered into the Amended and Restated Water Recycling Agreement (ARWRA) in 2015 which includes numerous source water allocations and priorities. The main source water allocation is the total wastewater flows to the M1W Regional Treatment Plant from all member agencies. MCWRA has access to the majority of those flows, minus certain allocations that are dedicated to Marina Coast Water District and M1W. The wastewater flows are treated at the Regional Treatment Plant, producing secondary effluent, which is then treated to tertiary standards, through the Salinas Valley Reclamation Project (SVRP) and delivered to the CSIP distribution system as irrigation supply. There are times when the secondary effluent is not fully utilized which provides an opportunity for NSIP to be the recipient of those flows.

Secondary effluent source water data were provided by M1W in the form of monthly flow records spanning January 1997 through May 2025. The dataset included reported volumes for Reverse Osmosis (RO) concentrate, saline waste, secondary effluent, and total flow to the outfall. For the purposes of this analysis, it was assumed that no brine hauling occurred prior to 2004, and all saline waste generated during that period was conveyed to the outfall. Beginning in February 2020, the Pure Water Monterey (PWM) facility came online, and RO concentrate volumes were documented. From February 2020 to present day, available secondary effluent was calculated by subtracting the RO concentrate and saline waste from the total flow to the outfall. This results in the volume of secondary effluent that was usable which is provided in Table 1.

Table 1: Secondary Effluent Source Water Summary

Water Year (WY)	WY Type	Minimum (AF/month)	Average (AF/month)	Maximum (AF/month)
2010	Wet	3	925	1,874
2011	Wet	5	743	1,833
2012	Dry	11	719	1,790
2013	Dry-Normal	10	536	1,843
2014	Dry	5	410	1,843
2015	Dry	<1	536	1,787
2016	Dry-Normal	9	717	1,693
2017	Wet	8	854	1,902
2018	Dry	4	375	1,376
2019	Wet	191	921	1,713
2020	Dry-Normal	7	439	1,563
2021	Dry	7	241	1,009
2022	Dry-Normal	2	278	974
2023	Wet	2	444	1,388
2024	Normal	0	328	1,186

City of Salinas Industrial Wastewater Treatment Facility Effluent

The City of Salinas, M1W and MCWRA entered into the City of Salinas Industrial Wastewater Treatment Facility Effluent Interim Agreement, most recently in 2025, which allows MCWRA the priority use of Industrial wastewater (IWW). The three parties have a long working relationship and shared commitment to providing cooperative water solutions for their citizens, businesses, and ecosystems. Several agreements exist between these parties and future agreements for the use of IWW may also be considered and therefore, the MCWRA included this source in the study for consideration.

IWW data were provided by the City of Salinas as monthly total flows of IWW to both the Industrial Wastewater Treatment Facility (IWTF), and to the M1W shunt. Stormwater inflows to the IWTF were not counted, and diversions by way of the Pond 3 Pump Station were not subtracted. Data was available from 2019 to 2024 and is shown in Table 2.

Table 2: Industrial Wastewater Treatment Facility Effluent Summary

Water Year (WY)	WY Type	Minimum (AF/month)	Average (AF/month)	Maximum (AF/month)
2019	Wet	0	192	407
2020	Dry-Normal	156	247	306
2021	Dry	138	251	376
2022	Dry-Normal	138	223	362
2023	Wet	91	218	322
2024	Normal	139	233	314

Excess Flows at the Salinas River Diversion Facility (SRDF) pursuant to Water Rights License 7543, License 12624 and Permit 21089

MCWRA holds Water Right License 7543, License 12624, and Permit 21089 for Nacimiento and San Antonio Reservoirs which include a rediversion point for use of stored water at the Salinas River Diversion Facility (SRDF). SRDF diversions, which began in 2010 as part of the Salinas Valley Water Project, supplement irrigation water deliveries through CSIP by mixing treated water produced from the SVRP in the CSIP storage pond. Those combined flows are then distributed through the CSIP distribution pipeline system. The SRDF is permitted to operate from April 1st to October 31st, dependent on availability of stored reservoir water, occurrence of low or non-existent natural flows in the Salinas River, and demand for irrigation water.

This source water study used MCWRA and United States Geological Survey (USGS) data to estimate the amount of excess water that was delivered via the Salinas River and made available for rediversion at the SRDF, but that was not diverted primarily due to a lack of real time demand (non-linear demand curve) and/or storage space for the water. Reservoir operations were not modified for this study. USGS data used in the analysis included streamflow at USGS Salinas River gages near Bradley, Soledad, Spreckels, Arroyo Seco below Reliz, Nacimiento River below Sapaque, and San Antonio River near Lockwood. Reservoir release data, SRDF diversion volume data, and SRDF bypass requirements were provided by MCWRA.

In this analysis, "Potential diversion" means the total volume of reservoir water released from storage that was measured at the USGS Salinas River near Spreckels gage, and which could have been rediverted with full continual use of SRDF pumps. The theoretical yield of full-time operation of three of four pumps at the SRDF is 72 acre-feet (AF) per day, under current conditions. Ninety AF/day is the theoretical yield of full-time operation of all four pumps at SRDF, which would require facility modifications, and was not used in this analysis. Reported SRDF rediversion volumes are calculated using pressure transducers and a weir flow equation for the backflow prevention weir prior to chlorination.

Analysis was only performed for years when the SRDF operated. Operational years included are: 2010, 2012, 2013, 2017, 2018, 2019, 2020, 2021, 2023, 2024. The operational year of 2011 was atypical and not representative of normal operations and therefore was excluded from the study results. The available data is shown in Table 3.

Table 3: Excess Stored Reservoir Water at SRDF

Water Year (WY)	WY Type	Minimum Excess Water (AF/month)	Average Excess Water (AF/month)	Maximum Excess Water (AF/month)
2010	Wet	0	384	1,005
2011	Wet	--	--	--
2012	Dry	0	560	1,228
2013	Dry-Normal	150	563	1,243
2014	Dry	--	--	--
2015	Dry	--	--	--

2016	Dry-Normal	--	--	--
2017	Wet	0	266	753
2018	Dry	15	552	1,150
2019	Wet	0	373	1,083
2020	Dry-Normal	0	334	777
2021	Dry	0	118	432
2022	Dry-Normal	--	--	--
2023	Wet	0	328	958
2024	Normal	0	430	820

Reclamation Ditch No. 1665 flows pursuant to Water Rights Application A032263D

MCWRA holds Permit 21377 and Application A032263D, which were originally filed as one larger water right application on May 19, 2014, and split into individual applications in November 2015. Permit 21377 was issued on March 17, 2017, to directly divert up to 6 cubic feet per second (cfs) of water and collect to storage up to 2,000 AF, not to exceed 2,000 AF per year combined by direct diversion and collection to storage. There are instream bypass flow requirements limiting diversions throughout the year. Permit 21377 is being utilized by M1W for PWM per the 2015 ARWRA.

Application A032263D is currently outstanding and has not yet been permitted. Application A032263D was proposed to support the Coastal Sustainability Agricultural Project and would add water sources to allow for the expansion of CSIP to serve additional areas and reduce dependance on groundwater wells. Application A032263D proposes to directly divert up to 30 cfs of water and collect to storage up to 9,800 AF, not to exceed 9,800 AF per year combined by direct diversion and collection to storage. The sources of water are Blanco Drain, Reclamation Ditch, and Tembladero Slough for year-round diversion.

The analysis of the Reclamation Ditch for this source water study uses the discharge data recorded at the USGS gage located at San Jon Road in Salinas, from 2018 through 2025. The gage measures discharge expressed in cubic feet per second at a frequency of four measurements per hour and is located downstream of the proposed diversion site.

The discharge data was summarized to obtain a monthly average discharge by year that was then evaluated to produce estimations of water usability for the 2018-2025 period. All water estimations were calculated for the first half of the water year (October 1 through March 31), as any discharge exceeding the current fish bypass requirement (2 cfs) required in Permit 21377 and below the 30 cfs maximum diversion rate allowed in Application A032263D. Estimated flows between April and September were assumed to be diverted under Permit 21377 and therefore not available to NSIP under Application A032263D. Permit 21377 has been operational since 2019 and annual water rights reporting show limited usage. Therefore, there is potentially additional water available for NSIP during the April to September season. This study established a range of usable flow, based on these operational conditions, shown in Table 4. Monthly water volumes that would have been available for diversion are estimated observing some minimum and maximum limitations:

- Maximum Limitations: Monthly average discharges exceeding 30 cfs are excluded; in addition, any estimated diversion is limited to 9,800 AF per year, as specified in Application A032263D.

- Minimum Limitations: Estimated diversions are calculated to observe two different scenarios for discharge minimum requirements:
  - Scenario 1: Fish bypass minimum requirement of 2 cfs is observed plus an assumed maximum diversion rate of 6 cfs diverted under Permit 21377; totaling 8 cfs that are discarded from the monthly water volume available for diversion.
  - Scenario 2: Only the instream bypass requirement of 2 cfs, required in Permit 21377, is observed and discarded from the water estimation.

Table 4: Reclamation Ditch Flow Summary

Water Year (WY)	WY Type	Minimum (AF/month)		Average* (AF/month)		Maximum (AF/month)	
		Opt. A	Opt. B	Opt. A	Opt. B	Opt. A	Opt. B
2018	Dry	0	0	247	493	582	951
2019	Wet	0	0	627	871	1,666	1,666
2020	Dry-Normal	0	0	394	535	1,845	1,845
2021	Dry	0	0	209	345	1,254	1,623
2022	Dry-Normal	0	0	307	387	1,845	1,845
2023	Wet	0	0	1,006	1,095	1,845	1,845
2024	Normal	0	0	613	797	1,726	1,726

Option A: Represents M1W diverting 6 cfs plus fish bypass minimum 2 cfs requirement
Option B: Represents only fish bypass minimum 2 cfs requirement
* Average based on 6 months (January-March and October-December)

Tembladero Slough flows pursuant to Water Rights Applications A032263C and A032263D

MCWRA holds Applications A032263C and A032263D, which were originally filed as one water right application on May 19, 2014, and split into individual applications in November 2015. These applications are currently outstanding and have not yet been permitted.

Application A032263C proposes to directly divert up to 3 cfs of water and collect to underground storage up to 1,500 AF, not to exceed 1,500 AF per year combined by direct diversion and collection to storage. The source of water is Tembladero Slough for year-round diversion, and water would be treated and then put underground via injection wells in the Seaside Groundwater Basin. The application was publicly noticed and was protested by the California Department of Fish and Wildlife (CDFW) and the National Marine Fisheries Service (NMFS). Part of the protest settlement agreement was that this application would not be pursued for the PWM Project but could be utilized for a future, new project.

As described above, Application A032263D was proposed to support the Coastal Sustainability Agricultural Project and includes the Tembladero Slough. Application A032263D proposes to directly divert up to 30 cfs of water and collect to storage up to 9,800 AF, not to exceed 9,800 AF per year combined by direct diversion and collection to storage.

The Tembladero Slough point of diversion is located near the confluence of the Tembladero Slough and Merritt Channel, downstream of the USGS gage located at San Jon Road, within the Reclamation Ditch Watershed. According to the 2015 Reclamation Ditch Yield Study prepared by Schaaf and Wheeler Consulting Civil Engineers[1], the total watershed area at this point of diversion is 157 square miles and the watershed has two significant tributaries contributing flows, downstream of the USGS gage. The Reclamation Ditch diversion point described in the previous section is located upstream with a watershed area of about 109 square miles. Any upstream diversions could impact the access to divertible flows at the Tembladero Slough site. Due to the limited data available for this analysis, some assumptions were made to develop source water estimates. Schaaf and Wheeler Consulting Civil Engineers evaluated instream bypass requirements and diversion rates of Permit 21377 and Application A032263C and made some estimates of yield. They did not consider higher diversion rates than what is allowed in Application A032263D. Since additional data was not available for this source water study supplementary studies should be conducted if this source water is pursued for NSIP. Figure 1 shows the locations of the points of diversion associated with A032263D.

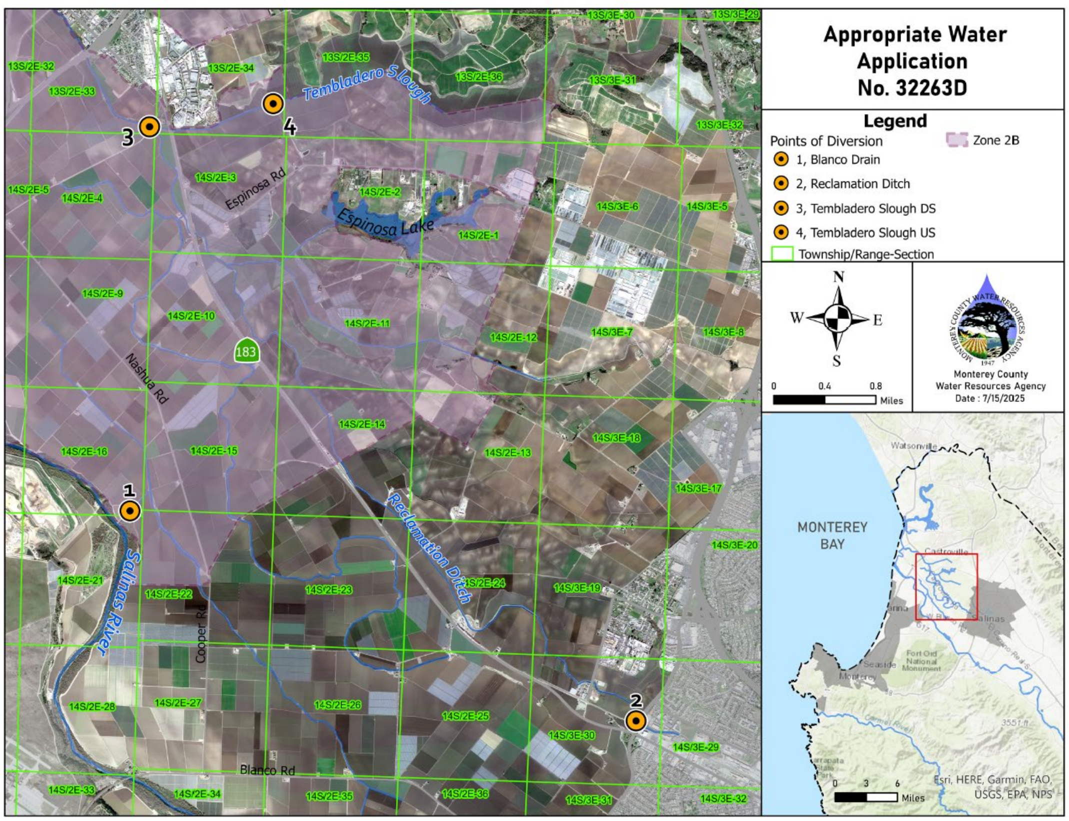


Figure 1: Water Rights Application A032263D Points of Diversion

Blanco Drain flows pursuant to Water Rights Application A032263D

MCWRA holds Permit 21376 and Application A032263D, which were originally filed as one larger water right application on May 19, 2014, and split into individual applications in November 2015. Permit 21376

[1] Draft Environmental Impact Report (Draft EIR) for the Pure Water Monterey Groundwater Replenishment Project. SCH#2013051094, Appendix P.

was issued on March 17, 2017, to directly divert up to 6 cfs of water and collect to storage up to 3,000 AF, not to exceed 3,000 AF per year combined by direct diversion and collection to storage. There are instream bypass flow requirements limiting diversions during very specific downstream conditions. Permit 21376 is being utilized by M1W for PWM per the 2015 ARWRA.

As described above, Application A032263D was proposed to support the Coastal Sustainability Agricultural Project and includes the Blanco Drain. Application A032263D proposes to directly divert up to 30 cfs of water and collect to storage up to 9,800 AF, not to exceed 9,800 AF per year combined by direct diversion and collection to storage.

There is no discharge data available for Blanco Drain in recent years and the historical discharge data is limited to selected months between 2007 and 2013. The best source water estimates available to the MCWRA are the 2014 Blanco Drain Yield Study prepared by Schaaf and Wheeler Consulting Civil Engineers[2]. This study analyzed the estimated total applied irrigation water and the precipitation totals and correlated those to the measured flows during said period. The statistical analysis in the study assumes that, as an average, 17% of the total applied irrigation water and precipitation in the 6000 acres of the Blanco Drain watershed area returns to Blanco Drain.

Due to the lack of stream gaging, the complexity of the instream flow requirements as well as the infrequent trigger of them, the instream flow bypass requirement was not considered in this evaluation. All water estimations were calculated for the first half of the water year (October 1 through March 31) using the 17% return rate of the combined precipitation and applied irrigation water as described above. Estimated flows between April through September were assumed to be diverted under Permit 21376 and therefore not available to NSIP under Application A032263D. Permit 21376 has been operational since 2020 and annual water rights reporting show the monthly usage. Table 5 summarizes the study data for Blanco Drain.

Table 5: Blanco Drain Flow Summary

Water Year (WY)	WY Type	Minimum (AF/month)	Average (AF/month)	Maximum (AF/month)
2018	Dry	112	190	284
2019	Wet	113	212	371
2020	Dry-Normal	71	182	345
2021	Dry	82	160	339
2022	Dry-Normal	45	171	349
2023	Wet	91	236	422
2024	Normal	98	237	395

Salinas River flows pursuant to Water Right Permit 11043

Permit 11043 is held by MCWRA for year-round direct diversion of 400 cfs from the Salinas River, with

[2] Draft Environmental Impact Report (Draft EIR) for the Pure Water Monterey Groundwater Replenishment Project. SCH#2013051094, Appendix Q.

an annual diversion cap of 135,000 AF, for the irrigation and municipal uses. Two points of diversion are authorized: 1) the Eastside Canal Intake near the city of Soledad and 2) the Castroville Canal Intake, approximately 3 miles upstream of the town of Spreckels. The places of use for both irrigation and municipal reference portions of Zone 2 of the MCWRA service area. The most current version of amended Permit 11043 includes multiple terms and limitations, including bypass flow requirements based on downstream demand and consideration of any reservoir releases. Bypass flow requirements must be met at the Salinas River near Soledad streamflow gage prior to diversion at either the East Side Canal Intake or Castroville Canal Intake. Permit 11043 describes how Salinas River natural flow shall be calculated, as described below.

For this source water study, daily flow data were obtained from the Soledad stream gage on the Salinas River (USGS gage 11151700) for the period October 1968 through June 2025. For purposes of this analysis, data from January 2009 through December 2024 were utilized to better represent current river conditions, reflecting current reservoir operations, which were updated in 2010 as part of the Salinas Valley Water Project, and including one year of pre-startup data for baseline comparison. Daily reservoir release data for both Nacimiento and San Antonio Reservoirs, with releases categorized by type, was also used to calculate the natural flow.

For this source water study, flows were assumed to be available for diversion when flows at the Soledad gage exceeded the combined total releases from both reservoirs, minus the required bypass. Additionally, flood releases and spills from both reservoirs were considered available for diversion and not subtracted from the total flow at the Soledad gage, during those very specific events and as documented in those release type categories. This interpretation is consistent with Water Rights requirements associated with the Nacimiento and San Antonio reservoirs.

This analysis does not account for required fish passage flows under the Salinas River Flow Prescription. In addition, monthly bypass flow requirements from Permit 11043 were applied, ranging from 2.64 cfs in December to 24.02 cfs in July. Natural flow was calculated as the three-day average flow at the Soledad gage minus total reservoir releases, then adding flood and spill releases back in. Daily allowable water diverted was calculated as natural flow minus the applicable bypass requirement, subject to the daily diversion cap. These results are shown in Table 6.

Table 6: Salinas River Flows pursuant to Permit 11043

Water Year (WY)	WY Type	Minimum (AF/month)	Average (AF/month)	Maximum (AF/month)
2010	Wet	0	4,636	18,860
2011	Wet	0	7,193	23,498
2012	Dry	0	123	321
2013	Dry-Normal	0	12	107
2014	Dry	0	17	200
2015	Dry	0	0	0
2016	Dry-Normal	0	0	0
2017	Wet	0	2,764	16,374

2018	Dry	0	324	1,977
2019	Wet	0	3,901	23,662
2020	Dry-Normal	0	156	1,314
2021	Dry	0	301	1,497
2022	Dry-Normal	0	0	0
2023	Wet	0	7,019	21,538
2024	Normal	0	4,725	20,208

Annual Source Water Volume and Seasonal Variability

After the study of the individual source waters was completed, MCWRA compiled the data from each and began looking at seasonality and annual totals to better understand the variability of the usable supply. This information will help inform the sizing of NSIP facilities, most importantly how much storage may be needed to address any discrepancies between the timing of the supply and demand, both seasonally and annually. It may also be used to guide in the selection of source waters by indicating which may be most reliable for future uses.

Year types and hydrologic conditions play a role in source water usability. In general, the drier year types resulted in less available water than in the wet year types for most of the sources. But in general, most source waters had a usable supply in all years included in the study's selected historical period from 2016 to 2025. The table below summarizes the annual results for the years when data was available. Blank cells represent years when no data was available. The data is also graphed in the figure below.

Table 7: Annual Total Source Water Summary

Water Year (WY)	WY Type	Source and Annual Total Source Water (AF)						
		Secondary Effluent	Permit 11043	Industrial Wastewater	Rec Ditch*	Rec Ditch**	Blanco Drain	SRDF
2010	Wet	11,098	55,623					2,301
2011	Wet	8,918	86,321					--
2012	Dry	8,633	1,477					3,357
2013	Dry-Normal	6,426	145					3,940
2014	Dry	4,916	200					--
2015	Dry	6,428	0					--
2016	Dry-Normal	8,603	0					--
2017	Wet	10,249	33,166					1,597
2018	Dry	4,502	3,891	0	740	1,478	570	3,866
2019	Wet	11,046	46,816	2,308	3,765	5,228	1,269	2,611
2020	Dry-Normal	5,262	1,877	2969	2,362	3,208	1,090	2,338
2021	Dry	2,896	3,617	3,009	1,254	2,067	958	823
2022	Dry-Normal	3,335	0	2,679	1,845	2,323	1,026	--
2023	Wet	5,331	84,232	2,620	6,036	6,568	1,419	1,967
2024	Normal	3,935	56,694	2,799	3,677	4,784	1,420	3,007

* M1W Diverting 6 cfs + fish bypass minimum 2 cfs

** Only fish bypass minimum 2 cfs

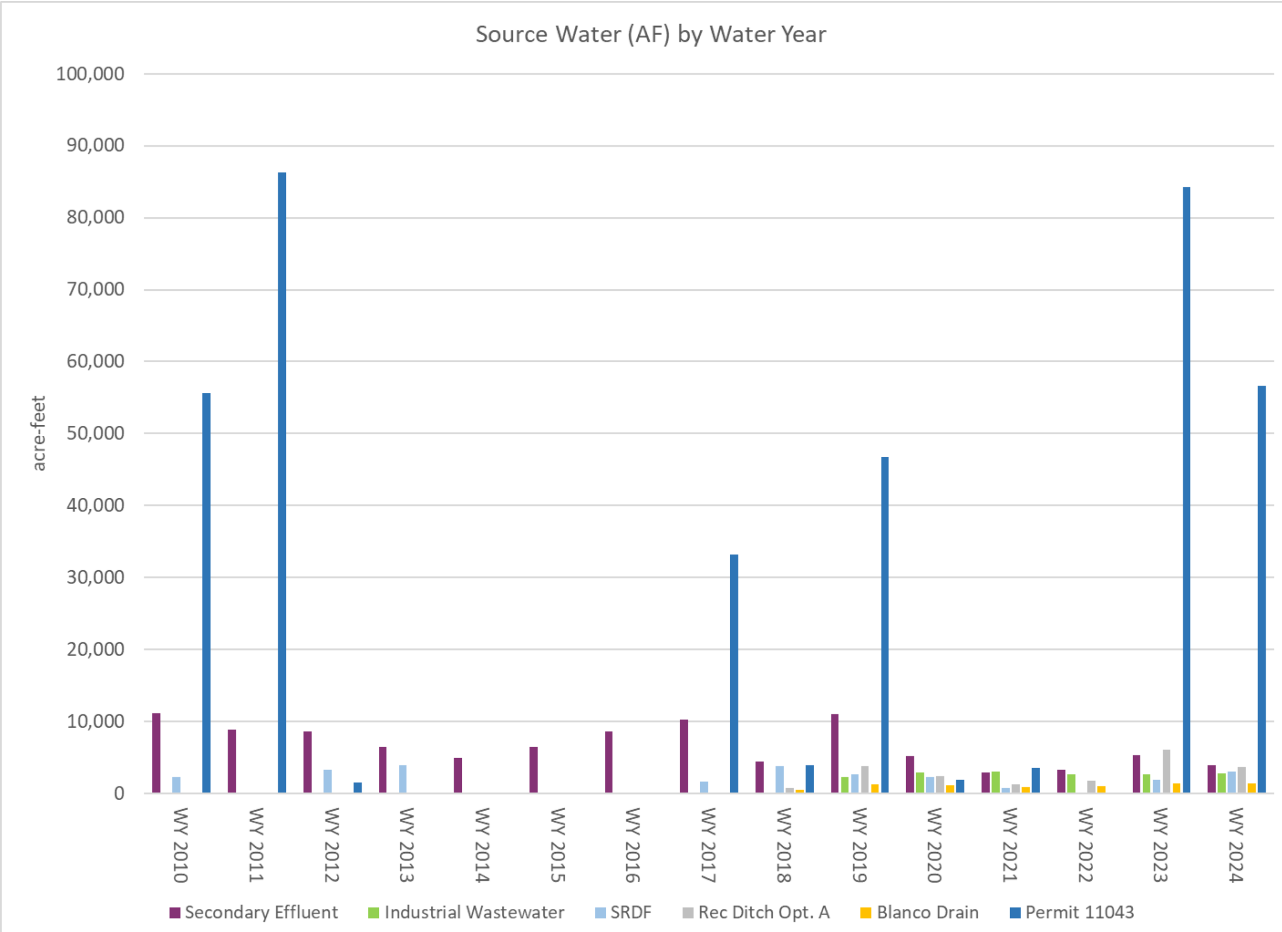


Figure 2: Annual Total Source Water Volumes by Water Year

There were clear patterns of more usable flows in the winter months and less available during the other half of the year, although there are some year-round sources available. This seasonality of usable source waters can be seen in the table and graph below which provides monthly average data available from 1/1/2018 through 5/1/2025.

The detailed data analyzed for this source water study and other monthly and annual summaries were provided to the SVBGSA in addition to this technical memorandum.

Table 8: Average Monthly Source Water Summary

	Average Monthly (AF)											
Source Water	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Secondary Effluent	1190	779	634	222	129	69	44	73	149	215	589	1079
Industrial Wastewater	130	113	130	169	240	264	260	217	217	248	190	146
SRDF	0	0	0	128	416	190	214	404	555	154	0	0
Rec Ditch Opt. A	0	653	730	0	0	0	0	0	0	0	62	919
Blanco Drain	166	202	259	0	0	0	0	0	0	143	176	251
Permit 11043	2958	7587	8071	4678	746	0	92	0	386	134	0	0
Total	4444	9334	9823	5197	1532	523	610	694	1307	894	1017	2395

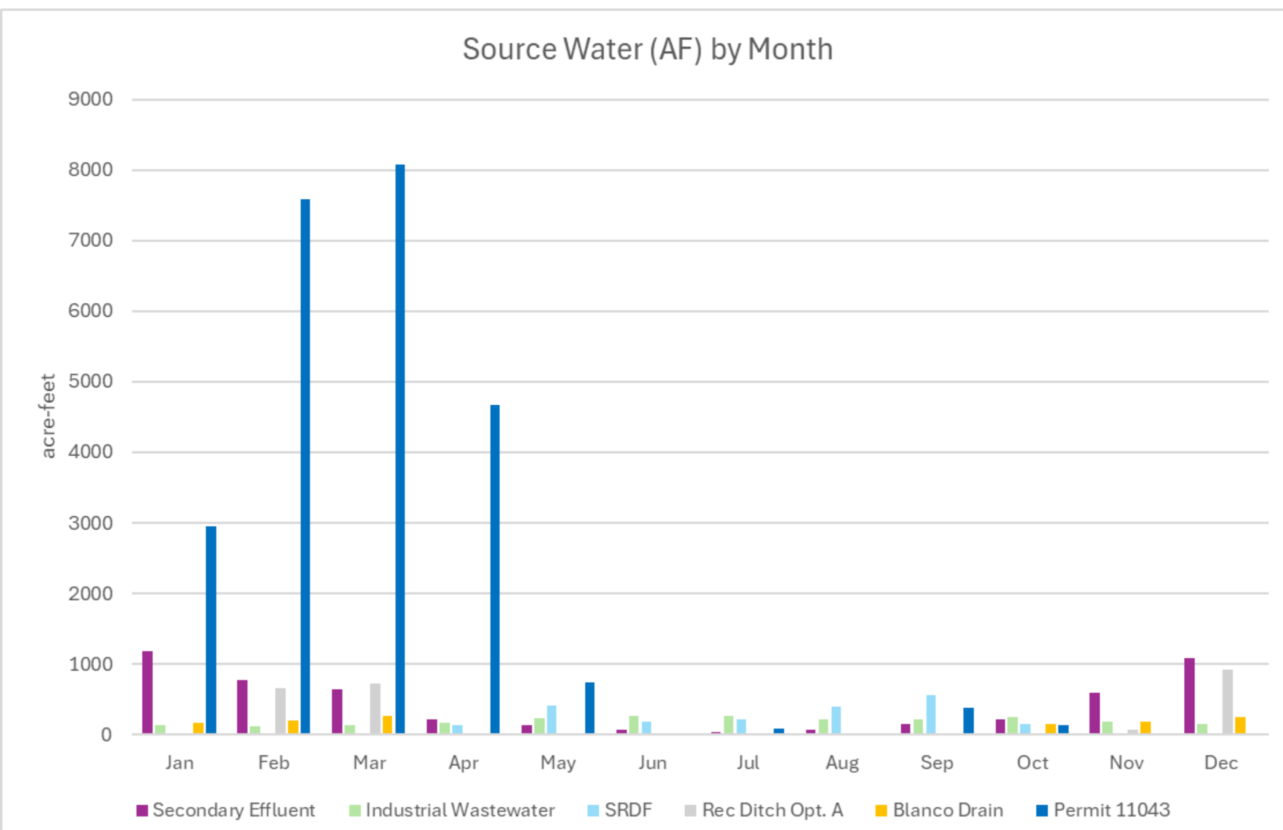


Figure 3: Average Monthly Source Water Volumes

APPENDIX B SCENARIO STORAGE SENSITIVITY ANALYSIS

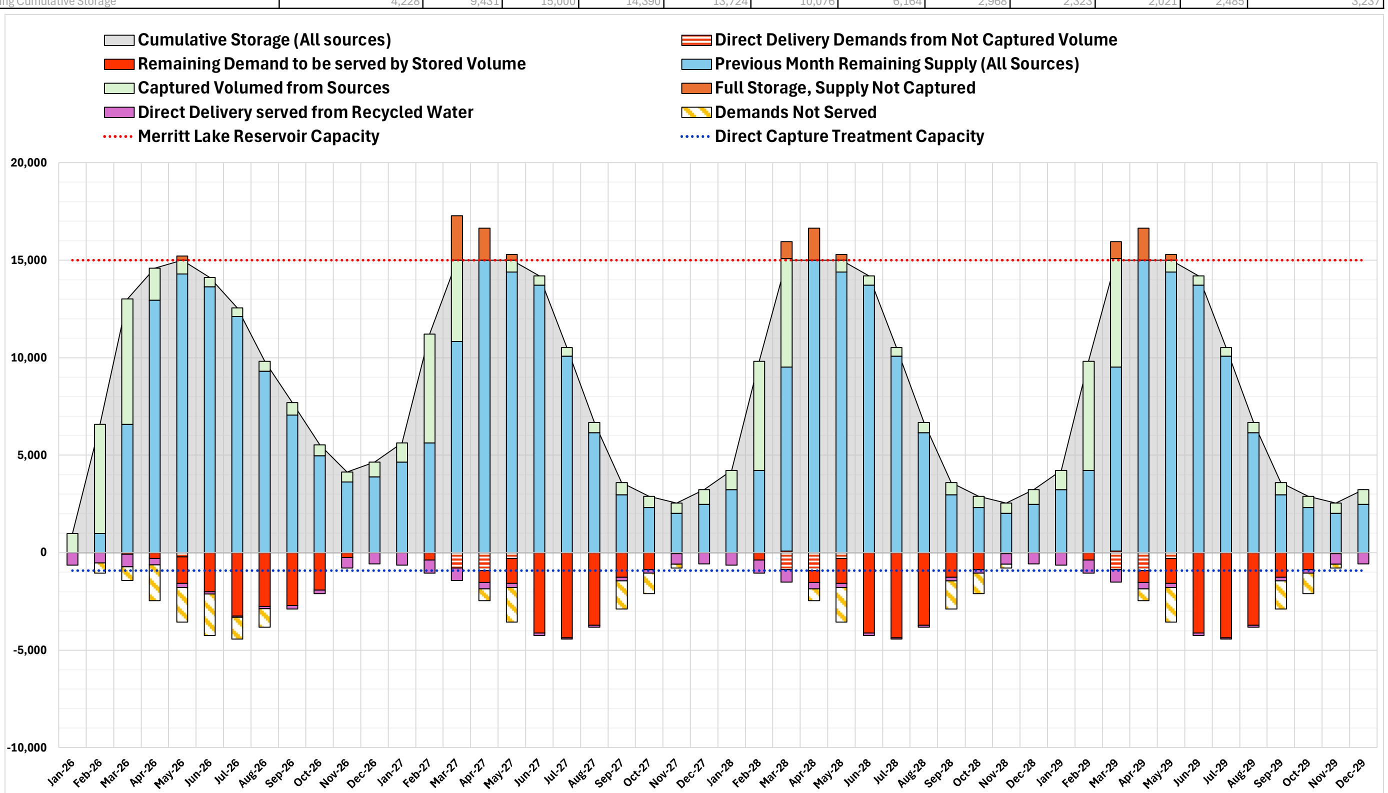
Max NSIP All Sources Available

Year 1												
Theoretical Date	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Supply (All Sources)	0	991	6,579	12,947	14,299	13,633	12,106	9,302	7,063	4,973	3,619	3,886
Captured Volumed from Sources	991	5,588	6,444	1,648	701	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	0	0	214	0	0	0	0	0	0	0
Cumulative Storage (All sources)	991	6,579	13,023	14,594	15,000	14,109	12,552	9,822	7,689	5,534	4,132	4,638
Demand Reduction Factor	100%	50%	50%	25%	50%	50%	75%	75%	100%	100%	100%	100%
Demands (2019-2022)	-644	-527	-718	-617	-1784	-2121	-3323	-2871	-2888	-2106	-784	-566
Direct Delivery served from Recycled Water	-644	-527	-641	-321	-203	-118	-73	-112	-172	-191	-539	-566
Remaining Demands to be served	**0**	**0**	**-77**	**-296**	**-1581**	**-2003**	**-3250**	**-2759**	**-2716**	**-1915**	**-246**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	-214	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	-77	-296	-1367	-2003	-3250	-2759	-2716	-1915	-246	0
Demands Not Served	0	-527	-718	-1851	-1784	-2121	-1108	-957	0	0	0	0
Remaining Cumulative Storage	991	6,579	12,947	14,299	13,633	12,106	9,302	7,063	4,973	3,619	3,886	4,638

Year 2												
Theoretical Date	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	4,638	5,629	10,832	15,000	14,390	13,724	10,076	6,164	2,968	2,323	2,021	2,485
Captured Volumed from Sources	991	5,588	4,168	0	610	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	2,276	1,648	305	0	0	0	0	0	0	0
Cumulative Storage (All sources)	5,629	11,217	15,000	15,000	15,000	14,200	10,522	6,684	3,594	2,884	2,535	3,237
Demand reduction factor	100%	100%	100%	75%	50%	100%	100%	100%	50%	50%	75%	100%
Demands (2019-2022)	-644	-1054	-1436	-1851	-1784	-4242	-4431	-3827	-1444	-1053	-588	-566
Direct Delivery served from Recycled Water	-644	-669	-641	-321	-203	-118	-73	-112	-172	-191	-539	-566
Remaining Demands to be served	**0**	**-385**	**-795**	**-1530**	**-1581**	**-4124**	**-4358**	**-3716**	**-1272**	**-862**	**-50**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	-795	-920	-305	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	-385	0	-610	-1276	-4124	-4358	-3716	-1272	-862	-50	0
Demands not served	0	0	0	-617	-1784	0	0	0	-1444	-1053	-196	0
Remaining Cumulative Storage	5,629	10,832	15,000	14,390	13,724	10,076	6,164	2,968	2,323	2,021	2,485	3,237

Year 3												
Theoretical Date	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3,237	4,228	9,431	15,000	14,390	13,724	10,076	6,164	2,968	2,323	2,021	2,485
Captured Volumed from Sources	991	5,588	5,569	0	610	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	875	1,648	305	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,228	9,816	15,000	15,000	15,000	14,200	10,522	6,684	3,594	2,884	2,535	3,237
Demand reduction factor	100%	100%	100%	75%	50%	100%	100%	100%	50%	50%	75%	100%
Demands (2019-2022)	-644	-1054	-1436	-1851	-1784	-4242	-4431	-3827	-1444	-1053	-588	-566
Direct Delivery served from Recycled Water	-644	-669	-641	-321	-203	-118	-73	-112	-172	-191	-539	-566
Remaining Demands to be served	**0**	**-385**	**-795**	**-1530**	**-1581**	**-4124**	**-4358**	**-3716**	**-1272**	**-862**	**-50**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	-875	-920	-305	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	-385	80	-610	-1276	-4124	-4358	-3716	-1272	-862	-50	0
Demands not served	0	0	0	-617	-1784	0	0	0	-1444	-1053	-196	0
Remaining Cumulative Storage	4,228	9,431	15,000	14,390	13,724	10,076	6,164	2,968	2,323	2,021	2,485	3,237

Year 3												
Theoretical Date	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3,237	4,228	9,431	15,000	14,390	13,724	10,076	6,164	2,968	2,323	2,021	2,485
Captured Volumed from Sources	991	5,588	5,569	0	610	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	875	1,648	305	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,228	9,816	15,000	15,000	15,000	14,200	10,522	6,684	3,594	2,884	2,535	3,237
Demand reduction factor	100%	100%	100%	75%	50%	100%	100%	100%	50%	50%	75%	100%
Demands (2019-2022)	-644	-1054	-1436	-1851	-1784	-4242	-4431	-3827	-1444	-1053	-588	-566
Direct Delivery served from Recycled Water	-644	-669	-641	-321	-203	-118	-73	-112	-172	-191	-539	-566
Remaining Demands to be served	**0**	**-385**	**-795**	**-1530**	**-1581**	**-4124**	**-4358**	**-3716**	**-1272**	**-862**	**-50**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	-875	-920	-305	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	-385	80	-610	-1276	-4124	-4358	-3716	-1272	-862	-50	0
Demands not served	0	0	0	-617	-1784	0	0	0	-1444	-1053	-196	0
Remaining Cumulative Storage	4,228	9,431	15,000	14,390	13,724	10,076	6,164	2,968	2,323	2,021	2,485	3,237



Max NSIP No Recycled Water

Year 1

Theoretical Date	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Supply (All Sources)	0	830	6,154	12,240	13,270	12,402	10,757	8,987	7,593	6,775	5,230	4,959
Captured Volumed from Sources	991	5,588	6,444	1,648	916	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	991	6,418	12,599	13,888	14,186	12,878	11,203	9,507	8,219	7,336	5,743	5,711
Demand Reduction Factor	25%	25%	25%	25%	50%	50%	50%	50%	50%	100%	100%	100%
Demands (2019-2022)	-161	-264	-359	-617	-1784	-2121	-2215	-1914	-1444	-2106	-784	-566
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	-161	-264	-359	-617	-1784	-2121	-2215	-1914	-1444	-2106	-784	-566
Demands not served	-483	-791	-1077	-1851	-1784	-2121	-2215	-1914	-1444	0	0	0
Remaining Cumulative Storage	830	6,154	12,240	13,270	12,402	10,757	8,987	7,593	6,775	5,230	4,959	5,145

Year 2

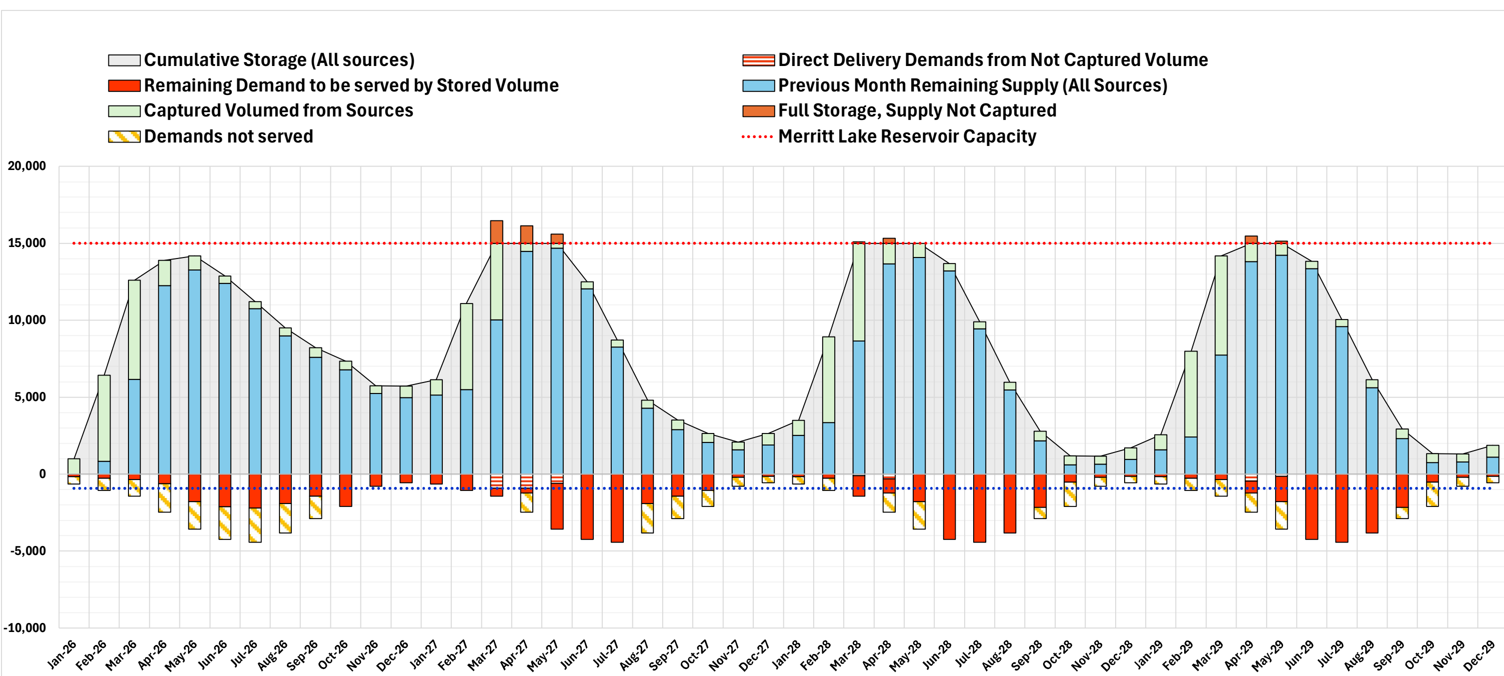
Theoretical Date	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	5,145	5,492	10,025	14,484	14,686	12,033	8,267	4,282	2,888	2,070	1,578	1,895
Captured Volumed from Sources	991	5,588	4,975	516	314	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	1,469	1,132	601	0	0	0	0	0	0	0
Cumulative Storage (All sources)	6,136	11,079	15,000	15,000	15,000	12,509	8,713	4,801	3,514	2,631	2,091	2,647
Demand reduction factor	100%	100%	100%	50%	100%	100%	100%	50%	50%	50%	25%	25%
Demands (2019-2022)	-644	-1054	-1436	-1234	-3568	-4242	-4430.9	-1914	-1444	-1053	-196	-142
Direct Delivery Demands from Not Captured Volume	0	0	-920	-920	-601	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	-644	-1054	-516	-314	-2967	-4242	-4430.9	-1914	-1444	-1053	-196	-142
Demands not served	0	0	0	-1234	0	0	0	-1914	-1444	-1053	-588	-425
Remaining Cumulative Storage	5,492	10,025	14,484	14,686	12,033	8,267	4,282	2,888	2,070	1,578	1,895	2,505

Year 3

Theoretical Date	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	2,505	3,336	8,660	13,668	14,082	13,213	9,447	5,462	2,154	614	649	966
Captured Volumed from Sources	991	5,588	6,340	1,332	916	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	104	316	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	3,497	8,923	15,000	15,000	14,997	13,689	9,893	5,981	2,780	1,175	1,162	1,718
Demand reduction factor	25%	25%	100%	50%	50%	100%	100%	100%	75%	25%	25%	25%
Demands (2019-2022)	-161	-264	-1436	-1234	-1784	-4242	-4431	-3827	-2166	-527	-196	-142
Direct Delivery Demands from Not Captured Volume	0	0	-104	-316	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	-161	-264	-1332	-918	-1784	-4242	-4431	-3827	-2166	-527	-196	-142
Demands not served	-483	-791	0	-1234	-1784	0	0	0	-722	-1580	-588	-425
Remaining Cumulative Storage	3,336	8,660	13,668	14,082	13,213	9,447	5,462	2,154	614	649	966	1,576

Year 3

Theoretical Date	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
Permit 11043 Capture	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	1,576	2,406	7,731	13,816	14,230	13,361	9,595	5,610	2,302	762	796	1,114
Captured Volumed from Sources	991	5,588	6,444	1,184	770	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	0	464	145	0	0	0	0	0	0	0
Cumulative Storage (All sources)	2,568	7,994	14,175	15,000	15,000	13,837	10,041	6,129	2,928	1,323	1,310	1,866
Demand reduction factor	25%	25%	25%	50%	50%	100%	100%	100%	75%	25%	25%	25%
Demands (2019-2022)	-161	-264	-359	-1234	-1784	-4242	-4431	-3827	-2166	-527	-196	-142
Direct Delivery Demands from Not Captured Volume	0	0	0	-464	-145	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	-161	-264	-359	-770	-1639	-4242	-4431	-3827	-2166	-527	-196	-142
Demands not served	-483	-791	-1077	-1234	-1784	0	0	0	-722	-1580	-588	-425
Remaining Cumulative Storage	2,406	7,731	13,816	14,230	13,361	9,595	5,610	2,302	762	796	1,114	1,724



Max NSIP Varying Permit 11043 Available

Year 1

Theoretical Date	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
Permit 11043 Capture (25%)	92	1,291	1,479	253								
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Supply (All Sources)	0	733	2,612	4,786	5,686	6,602	6,135	5,547	5,221	5,297	5,859	6,372
Captured Volumed from Sources	733	1,879	2,173	901	916	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	733	2,612	4,786	5,686	6,602	7,078	6,581	6,066	5,847	5,859	6,372	7,124
Demand Reduction Factor	100%	60%	45%	13%	6%	25%	25%	25%	25%	9%	68%	100%
Demands (2019-2022)	-644	-633	-639	-321	-202	-1061	-1108	-957	-722	-190	-533	-566
Direct Delivery served from Recycled Water	-644	-633	-639	-321	-202	-118	-73	-112	-172	-190	-533	-566
Remaining Demands to be served	**0**	**0**	**0**	**0**	**0**	**-942**	**-1034**	**-845**	**-550**	**0**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	0	-942	-1034	-845	-550	0	0	0
Demands Not Served	0	-422	-797	-2148	-3367	-3182	-3323	-2871	-2166	-1917	-251	0
Remaining Cumulative Storage	733	2,612	4,786	5,686	6,602	6,135	5,547	5,221	5,297	5,859	6,372	7,124

Year 2

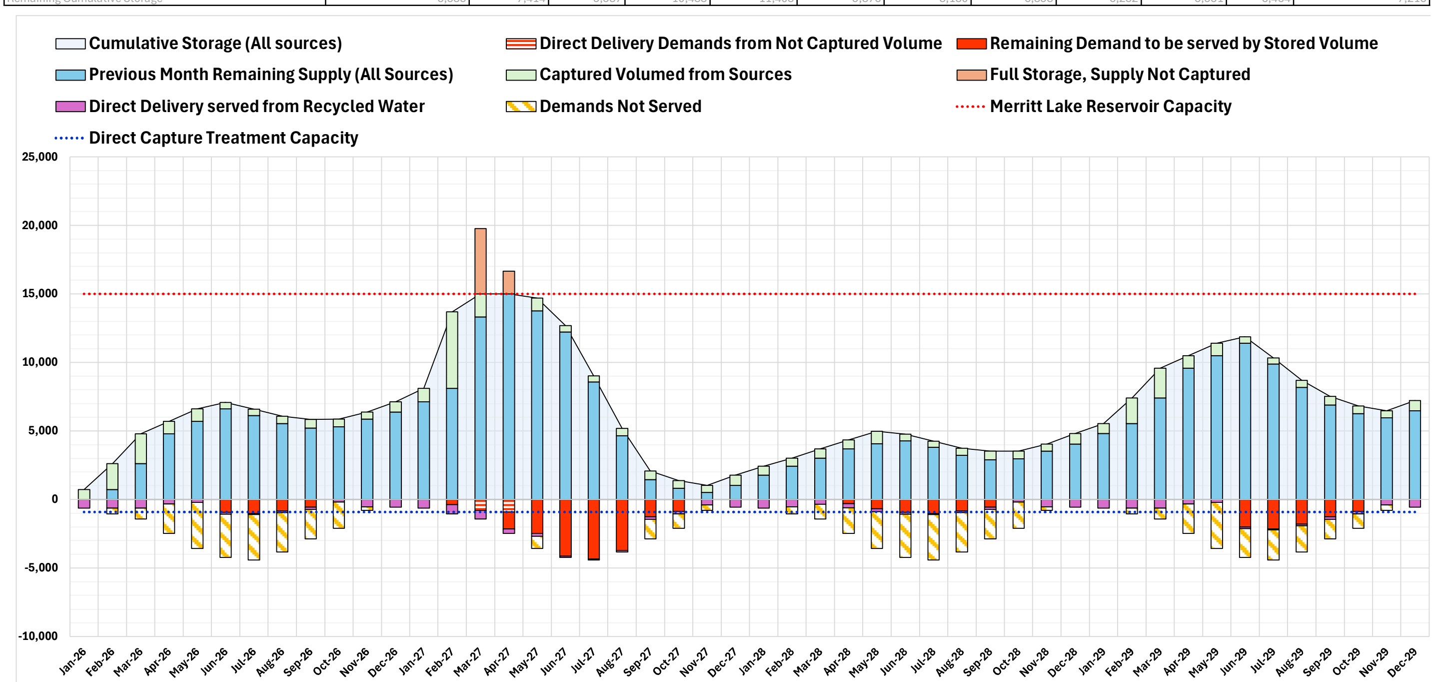
Theoretical Date	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27
Permit 11043 Capture (100%)	350	5,000	5,750	1,000	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	7,124	8,115	13,318	15,000	13,773	12,215	8,567	4,655	1,459	813	512	1,025
Captured Volumed from Sources	991	5,588	1,682	0	916	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	4,762	1,648	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	8,115	13,703	15,000	15,000	14,688	12,691	9,013	5,175	2,085	1,375	1,025	1,778
Demand reduction factor	100%	100%	100%	100%	75%	100%	100%	100%	50%	50%	50%	100%
Demands (2019-2022)	-644	-1054	-1436	-2469	-2676	-4242	-4431	-3827	-1444	-1053	-392	-566
Direct Delivery served from Recycled Water	-644	-669	-641	-321	-203	-118	-73	-112	-172	-191	-392	-566
Remaining Demands to be served	**0**	**-385**	**-795**	**-2147**	**-2473**	**-4124**	**-4358**	**-3716**	**-1272**	**-862**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	-795	-920	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	-385	0	-1227	-2473	-4124	-4358	-3716	-1272	-862	0	0
Demands Not Served	0	0	0	0	-892	0	0	0	-1444	-1053	-392	0
Remaining Cumulative Storage	8,115	13,318	15,000	13,773	12,215	8,567	4,655	1,459	813	512	1,025	1,778

Year 3

Theoretical Date	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
Permit 11043 Capture (0%)												
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	1,778	2,419	3,007	3,701	4,053	4,280	3,813	3,224	2,899	2,975	3,536	4,050
Captured Volumed from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	2,419	3,007	3,701	4,349	4,969	4,755	4,259	3,744	3,525	3,536	4,050	4,802
Demand reduction factor	100%	50%	25%	25%	25%	25%	25%	25%	25%	9%	68%	100%
Demands (2019-2022)	-644	-527	-359	-617	-892	-1061	-1108	-957	-722	-190	-533	-566
Direct Delivery served from Recycled Water	-644	-527	-359	-321	-203	-118	-73	-112	-172	-190	-533	-566
Remaining Demands to be served	**0**	**0**	**0**	**-296**	**-689**	**-942**	**-1034**	**-845**	**-550**	**0**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-296	-689	-942	-1034	-845	-550	0	0	0
Demands Not Served	0	-527	-1077	-1851	-2676	-3182	-3323	-2871	-2166	-1917	-251	0
Remaining Cumulative Storage	2,419	3,007	3,701	4,053	4,280	3,813	3,224	2,899	2,975	3,536	4,050	4,802

Year 3

Theoretical Date	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
Permit 11043 Capture (25%)	92	1,291	1,479	253	0							
IWW+Rec Ditch+Blanco+SRDF+Tembladero	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	4,802	5,535	7,414	9,587	10,488	11,403	9,876	8,180	6,898	6,252	5,951	6,464
Captured Volumed from Sources	733	1,879	2,173	901	916	476	446	520	626	561	513	752
Full Storage, Supply Not Captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	5,535	7,414	9,587	10,488	11,403	11,879	10,322	8,700	7,524	6,813	6,464	7,216
Demand reduction factor	100%	60%	45%	13%	6%	50%	50%	50%	50%	50%	50%	100%
Demands (2019-2022)	-644	-633	-639	-321	-202	-2121	-2215	-1914	-1444	-1053	-392	-566
Direct Delivery served from Recycled Water	-644	-633	-639	-321	-202	-118	-73	-112	-172	-191	-392	-566
Remaining Demands to be served	**0**	**0**	**0**	**0**	**0**	**-2003**	**-2142**	**-1802**	**-1272**	**-862**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	0	-2003	-2142	-1802	-1272	-862	0	0
Demands Not Served	0	-422	-797	-2148	-3367	-2121	-2215	-1914	-1444	-1053	-392	0
Remaining Cumulative Storage	5,535	7,414	9,587	10,488	11,403	9,876	8,180	6,898	6,252	5,951	6,464	7,216



Inturded Wells NSIP All Sources Available

STORAGE ANALYSIS Year 1

Theoretical Date	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
Permit 11043 Available for Capture	368	920	920	920	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	0	641	1229	1923	2571	2695	1987	1283	736	1106	1375	1889
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	641	1,229	1,923	2,571	3,487	3,171	2,433	1,803	1,362	1,667	1,889	2,641
Annual Reduction Factor	100%	100%	100%	100%	75%	75%	75%	75%	75%	75%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-995	-1302	-1385	-1178	-885	-482	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-792**	**-1184**	**-1311**	**-1066**	**-713**	**-292**	**0**	**0**
Direct Delivery Demands served by 11043	0	0	0	-668	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-792	-1184	-1150	-1066	-256	-292	0	0
Demands Not Served	0	0	0	0	-332	-434	-462	-393	-295	-161	0	0
Remaining Cumulative Storage	641	1,229	1,923	2,571	2,695	1,987	1,283	736	1,106	1,375	1,889	2,641

STORAGE ANALYSIS Year 2

Theoretical Date	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	2641	3282	3870	4564	5212	5005	3862	2696	1757	1832	1941	2454
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	3,282	3,870	4,564	5,212	6,128	5,480	4,308	3,216	2,383	2,393	2,454	3,206
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-1008**	**-452**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	-668	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1123	-1619	-1611	-1459	-551	-452	0	0
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	3,282	3,870	4,564	5,212	5,005	3,862	2,696	1,757	1,832	1,941	2,454	3,206

STORAGE ANALYSIS Year 3

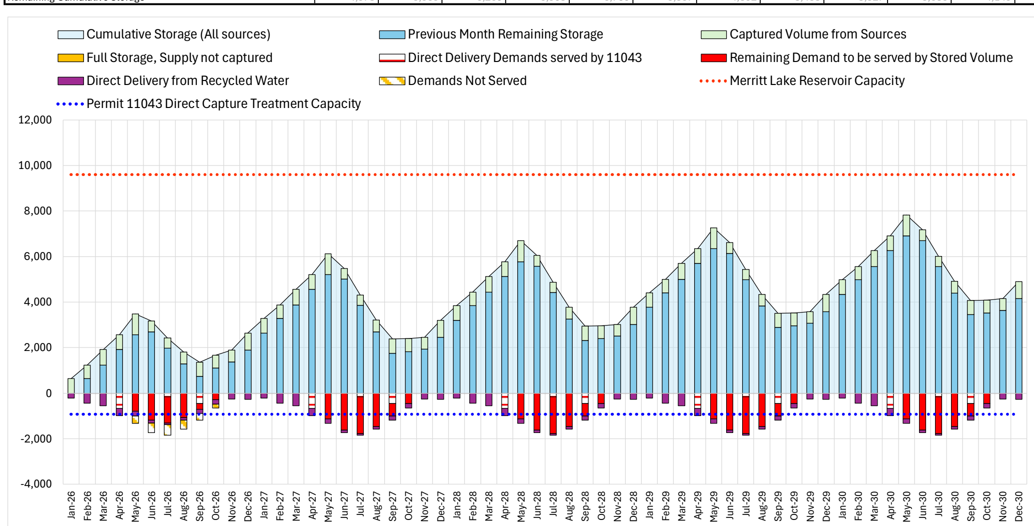
Theoretical Date	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3206	3847	4435	5129	5777	5570	4427	3262	2322	2397	2506	3019
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	3,847	4,435	5,129	5,777	6,693	6,046	4,873	3,781	2,948	2,958	3,019	3,771
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-1008**	**-452**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	-668	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1123	-1619	-1611	-1459	-551	-452	0	0
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	3,847	4,435	5,129	5,777	5,570	4,427	3,262	2,322	2,397	2,506	3,019	3,771

STORAGE ANALYSIS Year 4

Theoretical Date	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3771	4412	5000	5694	6342	6135	4992	3827	2888	2962	3071	3584
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,412	5,000	5,694	6,342	7,258	6,611	5,438	4,346	3,514	3,523	3,584	4,336
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-1008**	**-452**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	-668	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1123	-1619	-1611	-1459	-551	-452	0	0
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	4,412	5,000	5,694	6,342	6,135	4,992	3,827	2,888	2,962	3,071	3,584	4,336

STORAGE ANALYSIS Year 5

Theoretical Date	Jan-30	Feb-30	Mar-30	Apr-30	May-30	Jun-30	Jul-30	Aug-30	Sep-30	Oct-30	Nov-30	Dec-30
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	4336	4978	5565	6260	6908	6700	5557	4392	3453	3527	3636	4149
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,978	5,565	6,260	6,908	7,823	7,176	6,003	4,912	4,079	4,088	4,149	4,901
Reservoir Management Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-1008**	**-452**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	-668	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1123	-1619	-1611	-1459	-551	-452	0	0
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	4,978	5,565	6,260	6,908	6,700	5,557	4,392	3,453	3,527	3,636	4,149	4,901



Intruded Wells NSIP RW Not Available

STORAGE ANALYSIS Year 1

Theoretical Date	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26
Permit 11043 Available for Capture	368	920	920	920	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	0	641	1229	1923	2502	2755	2362	2046	1781	2273	2513	2899
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	641	1,229	1,923	2,571	3,418	3,230	2,808	2,566	2,407	2,834	3,026	3,651
Annual Reduction Factor	100%	100%	100%	100%	50%	50%	50%	50%	50%	50%	50%	50%
Demands (2019-2022)	-210	-441	-556	-989	-663	-868	-923	-785	-590	-322	-127	-136
Direct Delivery from Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demands to be Served	-210	-441	-556	-989	-663	-868	-923	-785	-590	-322	-127	-136
Direct Delivery Demands served by 11043	-210	-441	-556	-920	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-69	-663	-868	-762	-785	-134	-322	-127	-136
Demands Not Served	0	0	0	0	-663	-868	-923	-785	-590	-322	-127	-136
Remaining Cumulative Storage	641	1,229	1,923	2,502	2,755	2,362	2,046	1,781	2,273	2,513	2,899	3,515

STORAGE ANALYSIS Year 2

Theoretical Date	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3515	4157	4744	5439	6087	6008	5181	4404	3745	3943	4021	4345
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,157	4,744	5,439	6,087	7,002	6,483	5,627	4,923	4,371	4,504	4,535	5,097
Annual Reduction Factor	100%	100%	100%	100%	75%	75%	75%	75%	75%	75%	75%	75%
Demands (2019-2022)	-210	-441	-556	-989	-995	-1302	-1385	-1178	-885	-482	-190	-204
Direct Delivery from Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demands to be Served	-210	-441	-556	-989	-995	-1302	-1385	-1178	-885	-482	-190	-204
Direct Delivery Demands from Not Captured Volume	-210	-441	-556	-989	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-995	-1302	-1223	-1178	-429	-482	-190	-204
Demands Not Served	0	0	0	0	-332	-434	-462	-393	-295	-161	-63	-68
Remaining Cumulative Storage	4,157	4,744	5,439	6,087	6,008	5,181	4,404	3,745	3,943	4,021	4,345	4,893

STORAGE ANALYSIS Year 3

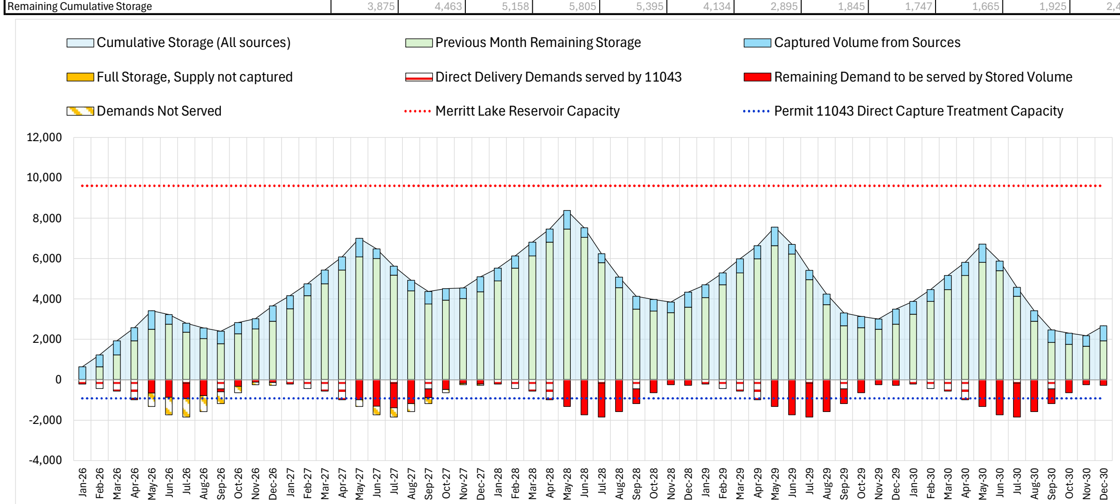
Theoretical Date	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	4893	5534	6122	6816	7464	7054	5793	4554	3503	3406	3323	3584
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	5,534	6,122	6,816	7,464	8,380	7,529	6,239	5,074	4,129	3,967	3,837	4,336
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demands to be Served	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery Demands from Not Captured Volume	-210	-441	-556	-989	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1326	-1737	-1685	-1571	-724	-643	-253	-272
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	5,534	6,122	6,816	7,464	7,054	5,793	4,554	3,503	3,406	3,323	3,584	4,064

STORAGE ANALYSIS Year 4

Theoretical Date	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	4064	4705	5292	5987	6635	6224	4964	3725	2674	2576	2494	2754
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,705	5,292	5,987	6,635	7,550	6,700	5,409	4,244	3,300	3,137	3,007	3,506
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demands to be Served	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery Demands from Not Captured Volume	-210	-441	-556	-989	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1326	-1737	-1685	-1571	-724	-643	-253	-272
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	4,705	5,292	5,987	6,635	6,224	4,964	3,725	2,674	2,576	2,494	2,754	3,234

STORAGE ANALYSIS Year 5

Theoretical Date	Jan-30	Feb-30	Mar-30	Apr-30	May-30	Jun-30	Jul-30	Aug-30	Sep-30	Oct-30	Nov-30	Dec-30
Permit 11043 Capture	210	441	556	989	0	0	162	0	456	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3234	3875	4463	5158	5805	5395	4134	2895	1845	1747	1665	1925
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	3,875	4,463	5,158	5,805	6,721	5,871	4,580	3,415	2,471	2,308	2,178	2,677
Reservoir Management Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demands to be Served	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery Demands from Not Captured Volume	-210	-441	-556	-989	0	0	-162	0	-456	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	0	-1326	-1737	-1685	-1571	-724	-643	-253	-272
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	3,875	4,463	5,158	5,805	5,395	4,134	2,895	1,845	1,747	1,665	1,925	2,405



Intruded Wells NSIP RW Not Available

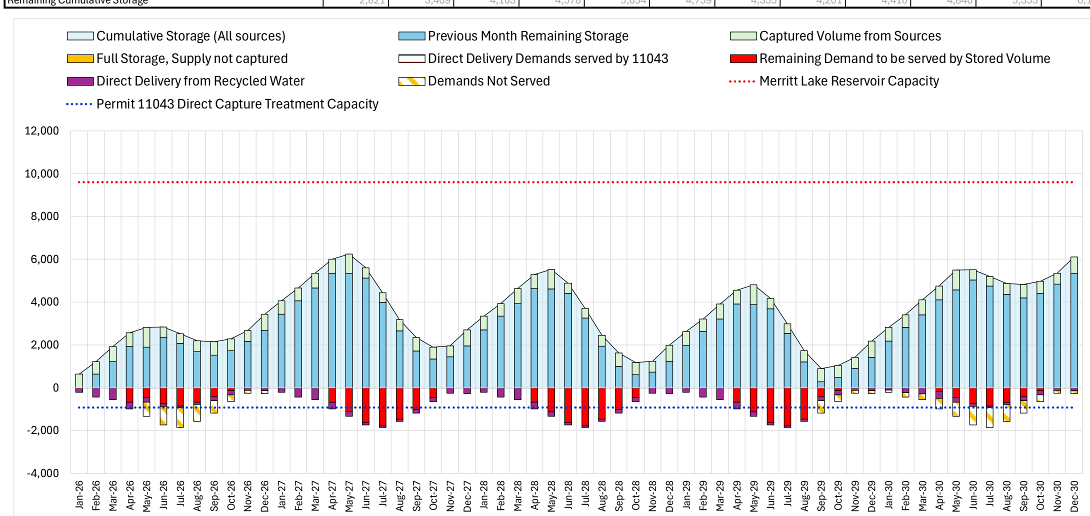
STORAGE ANALYSIS Year 1												
Theoretical Date	**Jan-26**	**Feb-26**	**Mar-26**	**Apr-26**	**May-26**	**Jun-26**	**Jul-26**	**Aug-26**	**Sep-26**	**Oct-26**	**Nov-26**	**Dec-26**
Permit 11043 Available for Capture	0	0	0	0	0	0	0	0	0	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	0	641	1229	1923	1903	2359	2084	1680	1527	1735	2165	2679
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	641	1,229	1,923	2,571	2,819	2,835	2,530	2,200	2,153	2,296	2,679	3,431
Annual Reduction Factor	100%	100%	100%	100%	50%	50%	50%	50%	50%	50%	50%	50%
Demands (2019-2022)	-210	-441	-556	-989	-663	-868	-923	-785	-590	-322	-127	-136
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-127	-136
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-460**	**-750**	**-850**	**-673**	**-418**	**-131**	**0**	**0**
Direct Delivery Demands served by 11043	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-668	-460	-750	-850	-673	-418	-131	0	0
Demands Not Served	0	0	0	0	-663	-868	-923	-785	-590	-322	-127	-136
Remaining Cumulative Storage	641	1,229	1,923	1,903	2,359	2,084	1,680	1,527	1,735	2,165	2,679	3,431

STORAGE ANALYSIS Year 2												
Theoretical Date	**Jan-27**	**Feb-27**	**Mar-27**	**Apr-27**	**May-27**	**Jun-27**	**Jul-27**	**Aug-27**	**Sep-27**	**Oct-27**	**Nov-27**	**Dec-27**
Permit 11043 Capture	0	0	0	0	0	0	0	0	0	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	3431	4072	4660	5354	5334	5126	3984	2656	1717	1336	1445	1958
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	4,072	4,660	5,354	6,002	6,249	5,602	4,429	3,176	2,343	1,897	1,958	2,710
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-1008**	**-452**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-668	-1123	-1619	-1773	-1459	-1008	-452	0	0
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	4,072	4,660	5,354	5,334	5,126	3,984	2,656	1,717	1,336	1,445	1,958	2,710

STORAGE ANALYSIS Year 3												
Theoretical Date	**Jan-28**	**Feb-28**	**Mar-28**	**Apr-28**	**May-28**	**Jun-28**	**Jul-28**	**Aug-28**	**Sep-28**	**Oct-28**	**Nov-28**	**Dec-28**
Permit 11043 Capture	0	0	0	0	0	0	0	0	0	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	2710	3351	3939	4633	4613	4406	3263	1936	997	615	724	1237
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	3,351	3,939	4,633	5,281	5,529	4,882	3,709	2,456	1,623	1,176	1,237	1,989
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-1180	-643	-253	-272
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-253	-272
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-1008**	**-452**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-668	-1123	-1619	-1773	-1459	-1008	-452	0	0
Demands Not Served	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Cumulative Storage	3,351	3,939	4,633	4,613	4,406	3,263	1,936	997	615	724	1,237	1,989

STORAGE ANALYSIS Year 4												
Theoretical Date	**Jan-29**	**Feb-29**	**Mar-29**	**Apr-29**	**May-29**	**Jun-29**	**Jul-29**	**Aug-29**	**Sep-29**	**Oct-29**	**Nov-29**	**Dec-29**
Permit 11043 Capture	0	0	0	0	0	0	0	0	0	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	1989	2631	3218	3913	3892	3685	2542	1215	276	484	915	1428
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	2,631	3,218	3,913	4,561	4,808	4,161	2,988	1,735	902	1,046	1,428	2,180
Annual Reduction Factor	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	50%	50%
Demands (2019-2022)	-210	-441	-556	-989	-1326	-1737	-1846	-1571	-590	-322	-127	-136
Direct Delivery from Recycled Water	-210	-441	-556	-321	-203	-118	-73	-112	-172	-191	-127	-136
Remaining Demands to be Served	**0**	**0**	**0**	**-668**	**-1123**	**-1619**	**-1773**	**-1459**	**-418**	**-131**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-668	-1123	-1619	-1773	-1459	-418	-131	0	0
Demands Not Served	0	0	0	0	0	0	0	0	-590	-322	-127	-136
Remaining Cumulative Storage	2,631	3,218	3,913	3,892	3,685	2,542	1,215	276	484	915	1,428	2,180

STORAGE ANALYSIS Year 5												
Theoretical Date	**Jan-30**	**Feb-30**	**Mar-30**	**Apr-30**	**May-30**	**Jun-30**	**Jul-30**	**Aug-30**	**Sep-30**	**Oct-30**	**Nov-30**	**Dec-30**
Permit 11043 Capture	0	0	0	0	0	0	0	0	0	0	0	0
Tembladero Slough+SRDF+IWW+BD+RD	641	588	694	648	916	476	446	520	626	561	513	752
Previous Month Remaining Storage	2180	2821	3409	4103	4578	5034	4759	4355	4201	4410	4840	5353
Captured Volume from Sources	641	588	694	648	916	476	446	520	626	561	513	752
Full Storage, Supply not captured	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Storage (All sources)	2,821	3,409	4,103	4,751	5,494	5,509	5,205	4,875	4,827	4,971	5,353	6,105
Reservoir Management Reduction Factor	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Demands (2019-2022)	-105	-220	-278	-495	-663	-868	-923	-785	-590	-322	-127	-136
Direct Delivery from Recycled Water	-105	-220	-278	-321	-203	-118	-73	-112	-172	-191	-127	-136
Remaining Demands to be Served	**0**	**0**	**0**	**-173**	**-460**	**-750**	**-850**	**-673**	**-418**	**-131**	**0**	**0**
Direct Delivery Demands from Not Captured Volume	0	0	0	0	0	0	0	0	0	0	0	0
Remaining Demand to be served by Stored Volume	0	0	0	-173	-460	-750	-850	-673	-418	-131	0	0
Demands Not Served	-105	-220	-278	-495	-663	-868	-923	-785	-590	-322	-127	-136
Remaining Cumulative Storage	2,821	3,409	4,103	4,578	5,034	4,759	4,355	4,201	4,410	4,840	5,353	6,105



APPENDIX C

CSIP HYDRAULIC IMPROVEMENTS STUDY

SCHAAF & WHEELER
CONSULTING CIVIL ENGINEERS

3 Quail Run Circle, Suite 101
Salinas, CA 93907
info@swsv.com

MEMORANDUM

March 25, 2026
To: Sarah Hardgrave (SVBGSA)
From: Leif Coponen, PE
Subject: SVBGSA / MCWRA CSIP and NSIP Hydraulic Modeling
Job #: SGSA.01.25

Introduction

Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) in cooperation with Monterey County Water Resources Agency (MCWRA) retained Schaaf & Wheeler Consulting Civil Engineers (S&W) to evaluate the hydraulic capacity of the Castroville Seawater Intrusion Project (CSIP) recycled water distribution system in support of the SVBGSA's New Seawater Intrusion Project (NSIP). SVBGSA is evaluating potential new agricultural water supply sources to serve areas experiencing, or at risk of, seawater intrusion outside of the existing CSIP service area shown in Figure 1. SVBGSA's consultant Carollo Engineers is preparing the overall NSIP feasibility study and has provided the conceptual NSIP system configuration and demands for Schaaf & Wheeler's use in the modeling analysis.

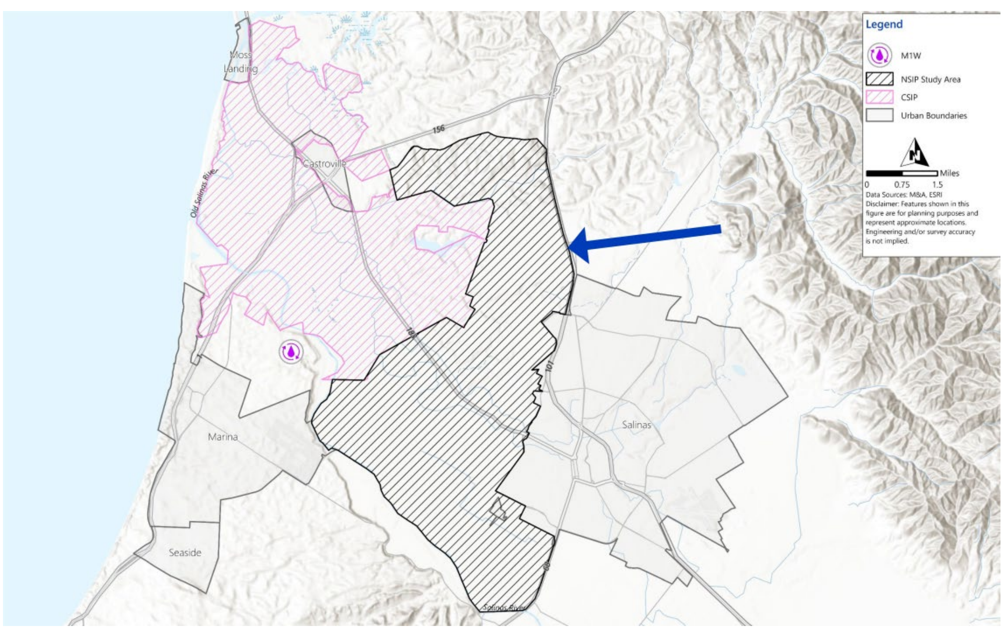


Figure 1: NSIP Study Area (Source: Carollo Engineers)

Basis of Study

One alternative source proposed under NSIP is the expansion of the existing CSIP system to the east to convey tertiary-treated recycled water and treated river water from the CSIP Storage

Pond to the NSIP service area during periods of low CSIP demand. As part of the larger NSIP planning effort, S&W is tasked with expanding the existing CSIP hydraulic computer model, originally developed under CSIP Hydraulic Modeling and Analysis Report (S&W, May 2025), to evaluate the hydraulics of an eastern NSIP connection and determine the maximum NSIP demand that can be delivered while maintaining service to existing CSIP system customers. This analysis focuses on distribution system conveyance hydraulics and does not evaluate CSIP water supply quantity or broader NSIP system demand planning. Results are intended to assess the hydraulic feasibility of conveying recycled water from the existing CSIP system to the proposed NSIP service area and to support SVBGSA's broader evaluation of potential NSIP supply sources.

As shown in Figure 2, elevations within the proposed NSIP service area range from approximately 25 to 99 ft, with the highest elevations located in the eastern portion of the service area. This analysis assumes NSIP demand is served using the existing CSIP infrastructure and does not include the addition of new NSIP pressure-boosting facilities (pump stations). As a result, system performance is constrained by the available hydraulic grade within the existing CSIP system, which may limit the pressure and flow that can be delivered to higher-elevation portions of the NSIP service area.

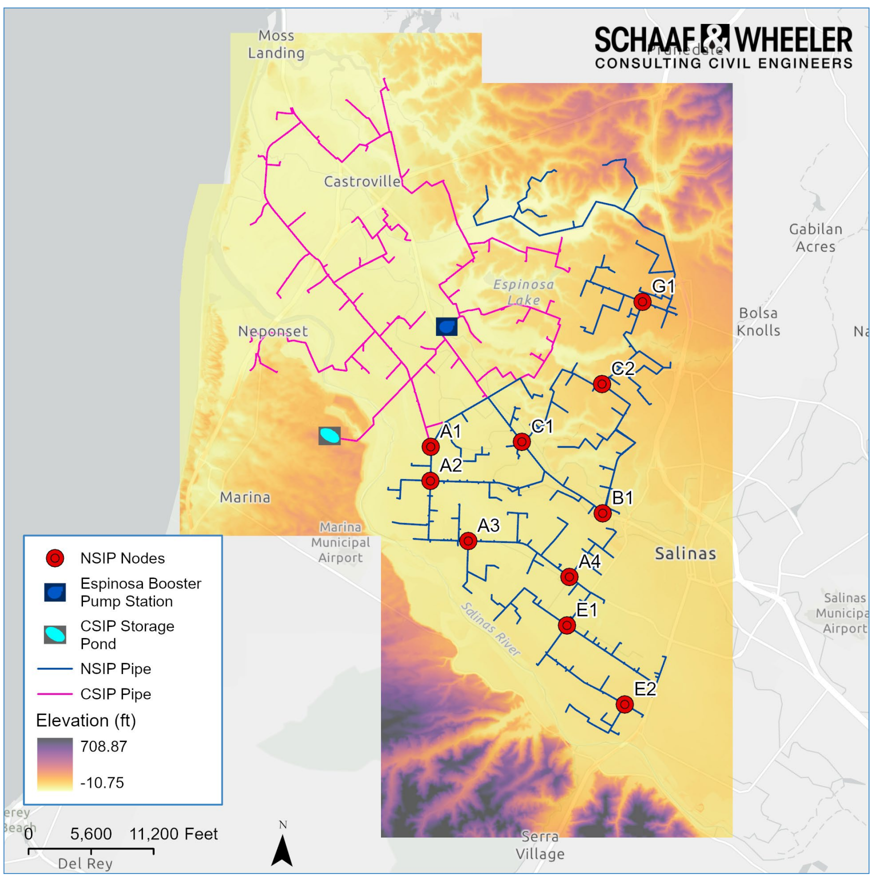


Figure 2: Topographic Elevation Map of NSIP Study Area (NAVD88)

The NSIP feasibility study is analyzing total demand volumes per month and year to determine viability of alternative water sources. In order to supply total demand volumes on a monthly or annual basis, daily peak demands also need to be met with the alternative supply. The water distribution system's conveyance capacity during peak daily demands is critically important when determining total supply capacity volumes for planning purposes. Accordingly, this analysis identifies the maximum hydraulic capacity that can be delivered to NSIP under peak conditions, establishing a planning benchmark independent of a defined time of year or season.

Modeling Scenarios and Analysis

Model Development

The scenarios developed for this analysis were modeled using the Bentley OpenFlows WaterCAD Version 10.04.00.108 model of the CSIP distribution system developed for the CSIP Hydraulic Modeling and Analysis Report (S&W, May 2025). CSIP Turnout nodes and supplemental groundwater wells are updated in coordination with MCWRA to reflect more current turnout demands and well capacities. Based on discussion with MCWRA, the base model for this analysis also includes CIP 1 from the 2025 study which proposes installation of a check valve along the 24-inch pipe located on the southern side of Rodgers Loop (FFO Loop) that crosses the Reclamation Ditch near Cooper Road and Castroville Road shown in Figure 3 below.

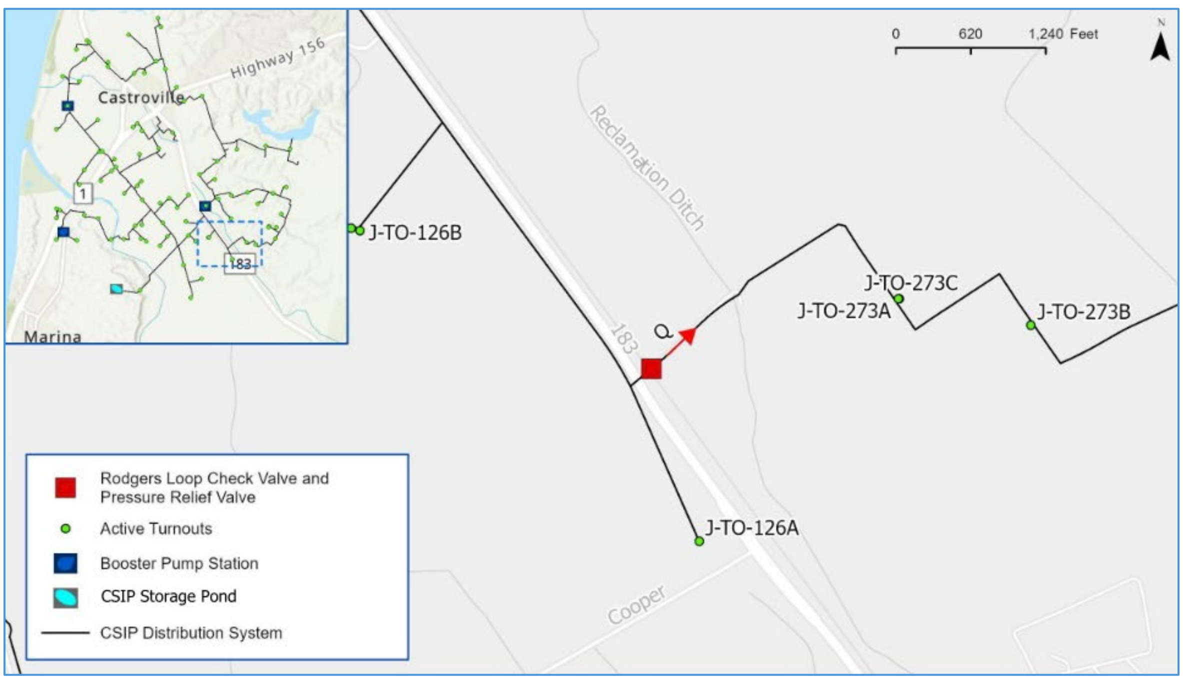


Figure 3: Proposed Rodgers Loop (FFO Loop) Check Valve and Pressure Relief Valve (CIP 1) Location

The NSIP distribution system is incorporated into the CSIP hydraulic model using shapefiles of the proposed alignment and specific demand nodes provided by SVBGSA's consultant, Carollo Engineers, shown in Figure 4. The shapefiles were modified as necessary to facilitate import into the OpenFlows WaterCAD modeling software. Nodes not included in the Carollo shapefiles are added based on a review of publicly available Association of Monterey Bay Area Governments (AMBAG) topographic datasets (NAVD88) relative to the proposed alignment to capture existing ground elevations along proposed pipe segments. Node elevations were assigned using AMBAG topography, consistent with the methodology used to develop the existing CSIP hydraulic model.

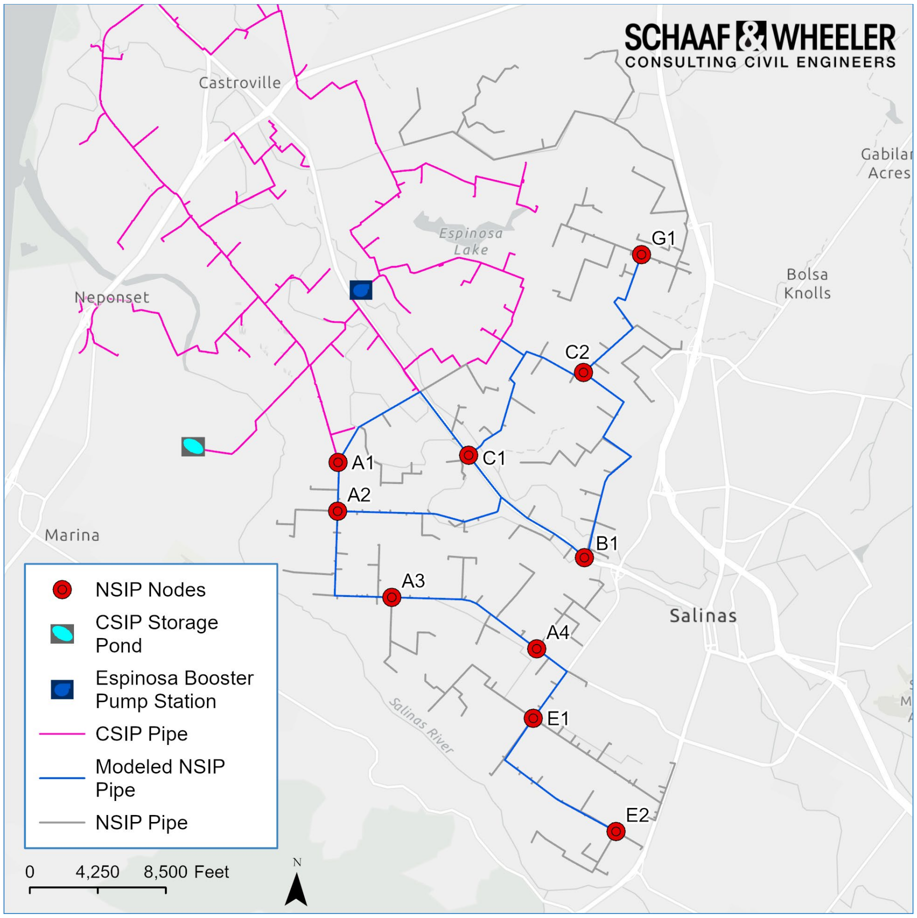


Figure 4: Modeled Network

NSIP to CSIP System Connections

Based on the proposed NSIP system geometry GIS provided by Carollo, Schaaf & Wheeler, in coordination with MCWRA and Carollo, identified three potential interconnection locations (see Figure 5) between the CSIP and NSIP systems:

- **Western FFO Loop Connection:** connection to CSIP FFO Loop 27-inch pipe segment
- **Eastern FFO Loop Connection:** connection to CSIP FFO Loop 21-inch pipe segment
- **A0 Lateral Connection:** connection to the CSIP A0 Lateral at either the 16-inch, 21-inch, or 24-inch pipe segment, or at the A0 Lateral tie-in to the 36-inch CSIP trunk main

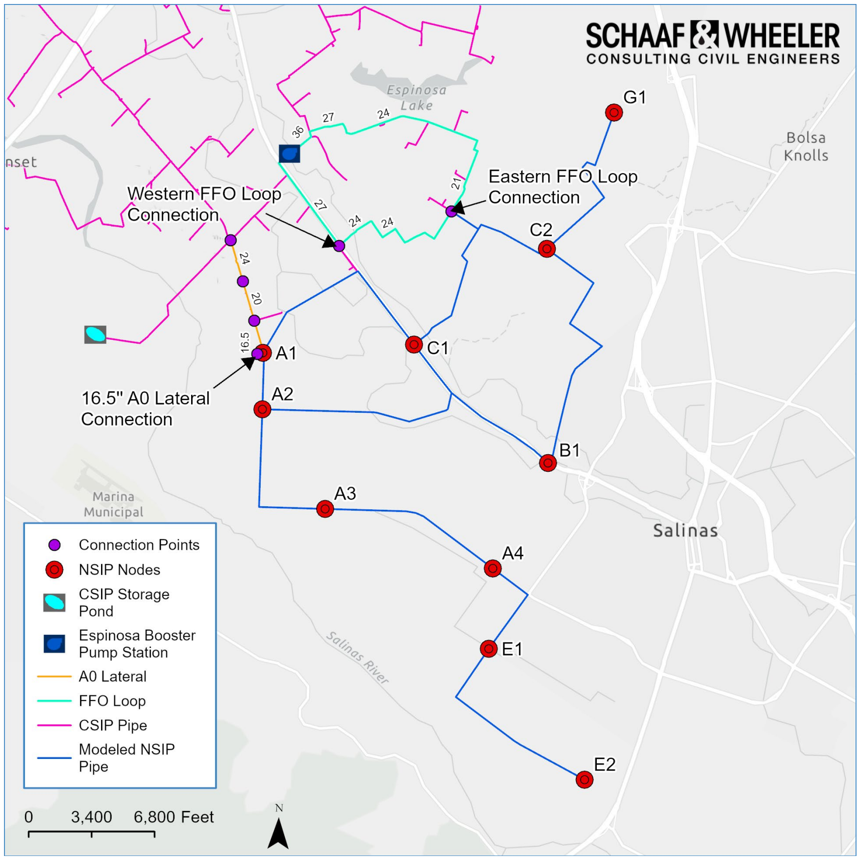


Figure 5: Studied NSIP to CSIP Connection Locations

These locations are selected to represent feasible tie-in points where NSIP could receive supply from the existing CSIP distribution system. Based on preliminary modeling, the two CSIP FFO Loop interconnections are not expected to be capacity-limiting under the modeled conditions, though are critical in serving the eastern demands (G1 and B2). The third connection, which routes supply through the CSIP A0 Lateral, which serves the majority of NSIP demands, is identified as the primary hydraulic constraint for supplying the NSIP system.

The A0 Lateral is representative of a typical CSIP lateral. Moving downstream along the lateral, the number of remaining turnouts decreases and cumulative CSIP demand is progressively reduced. Flow therefore decreases and the lateral transitions to smaller diameter pipe segments. The A0 lateral reduces from the 36-inch diameter CSIP trunk main to 24-inch, 21-inch, and ultimately 16-inch diameter segments. These progressively smaller pipe sizes limit the capacity available for additional NSIP deliveries at the end of the existing lateral, particularly because the proposed NSIP connection is located near the smallest diameter segment.

Accordingly, potential interconnection points are evaluated along each diameter segment to quantify how available capacity varies as pipe size decreases along the lateral. This approach also helps identify whether meeting a target NSIP demand would require extending a new NSIP connecting pipeline upstream to a larger diameter CSIP pipe segment with greater available capacity.

Demand Applications and Conditions

Each modeling scenario was evaluated under peak hourly demand conditions within the low-demand season, since this condition governs the maximum quantity of water that can be reliably delivered to NSIP while maintaining adequate service to existing CSIP customers. Based on MCWRA data, the average daily CSIP demand during the low-demand period is approximately 3,395 gpm (15 AF/day). To develop the peak hourly demand, S&W analyzed CSIP summer demand data provided by MCWRA at 5-minute intervals. A peaking factor of 2.53 was calculated by dividing the maximum observed demand by the average daily demand from the CSIP dataset. This peaking factor was applied to the average daily demand to estimate a peak hourly CSIP demand of 8,588 gpm for use in each scenario.

To represent this demand spatially across the CSIP system, CSIP demands are assigned to a subset of turnouts selected from the 30 most frequently used turnouts, based on S&W's analysis of June 2024 turnout data. Demands are applied to the selected turnouts until the total system demand equals the target peak demand. Table 1 summarizes the turnouts and associated demands used to represent peak CSIP conditions. Turnouts with active demands for each scenario are shown in Figure 6 below.

Table 1: CSIP Peak Demand Allocation

Turnout	TO Demand (gpm)
231	1,390
214	2,760
106	2,440
98	1,530
5*	468
Total CSIP Demand	8,588

*Represents 20% of CSIP Turnout 5 Total Demand (2,340 gpm)

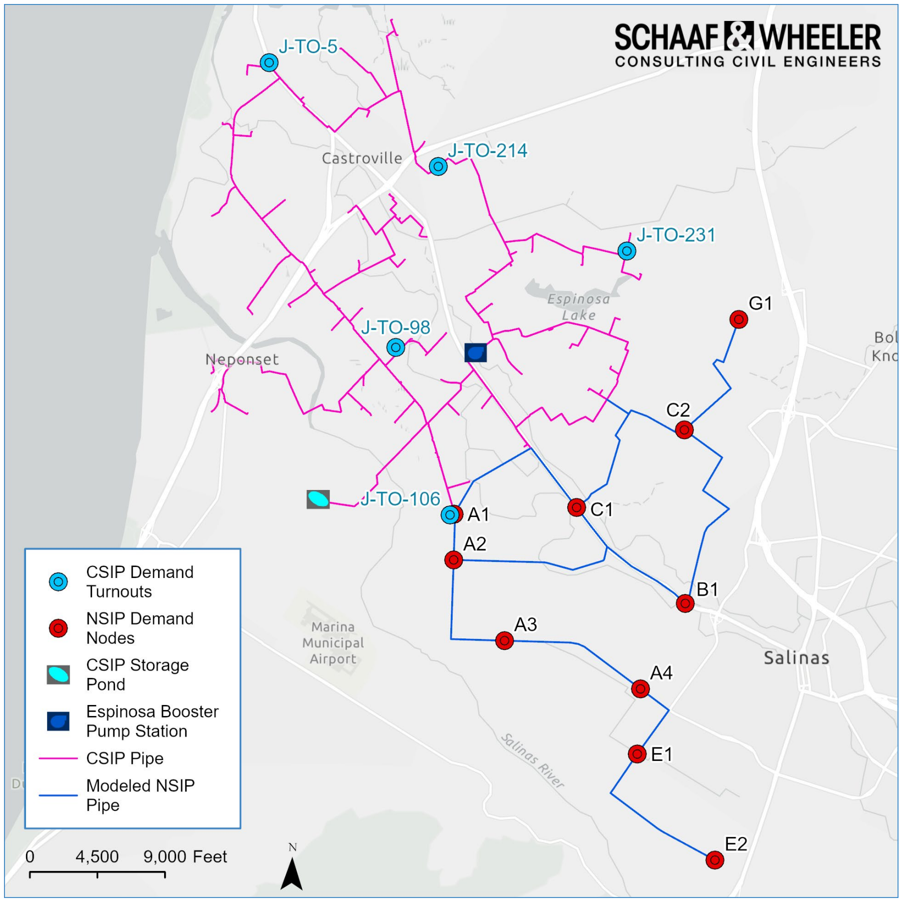


Figure 6: CSIP and NSIP Demand Node Locations

Based on the previous analysis of CSIP distribution hydraulics presented in the CSIP Hydraulic Modeling and Analysis Report (S&W, May 2025), the CSIP Storage Pond has an instantaneous peak supply capacity of approximately 26,000 gpm under gravity-only conditions at its minimum operating elevation of 120 ft NAVD. Because this analysis focuses on NSIP supply hydraulics and the NSIP service area is located farther from the CSIP Storage Pond, this instantaneous peak supply capacity constraint is used to establish the maximum NSIP demand evaluated in this analysis. Discussions with MCWRA indicate that total combined (NSIP + CSIP) demand may be conceptually allocated as one-third CSIP demand and two-thirds NSIP demand. Applying this demand split results in a target NSIP demand of approximately 17,200 gpm, which is used to evaluate system performance under peak hydraulic conditions. However, the total NSIP demand delivered in each modeling scenario varies depending on the selected CSIP connection location and the resulting hydraulic constraints.

NSIP demands were applied at demand nodes A1 through G1. To distribute NSIP demand across the modeled service area while allowing total demand to vary between scenarios, S&W developed node-specific scaling factors based on historical demand data developed by Carollo Engineeris. Carollo prepared average monthly demand estimates for the period 2015 through 2024, reported in average AF per month. S&W converted these values to gpm and calculated an average demand for the low-demand period (December through February) at each node. These low-season average demands were used to establish the baseline distribution of demand among the NSIP nodes. For each modeling scenario, the node demands were then proportionally scaled so that the relative distribution of demand remained consistent while the total NSIP demand varied based on the hydraulic capacity of the system. The resulting scaling factors applied to each NSIP demand node are presented in Table 2.

Table 2: NSIP Demand Node Allocations

NSIP Demand Node	Percent of Total NSIP Demand
A1	13
A2	11
A3	8
A4	8
B1	5
C1	16
C2	11
E1	10
E2	10
G1	8

NSIP Distribution Piping

NSIP distribution piping was conceptually sized to meet the maximum demand scenario, in which NSIP serves a total demand of 17,200 gpm. Pipe diameters are selected to limit friction losses in the system and maintain adequate hydraulic performance throughout the distribution network.

Prior to hydraulic modeling, pipes upstream of each NSIP node are conceptually sized using the Hazen-Williams headloss equation. A maximum headloss gradient of 0.001 ft/ft is established as the design criterion. Flow in each pipe (Q) is determined based on the portion of total NSIP demand conveyed through that pipe under the maximum demand scenario.

$$\frac{h_f}{L} = 4.73\frac{Q^{1.852}}{C^{1.852}D^{4.871}}$$

Where:
h_f= headloss (ft)
Q= flow rate (cfs)
C= Hazen-Williams roughness coefficient
D= pipe diameter (ft)
L= pipe length (ft)

Using these assumptions, the Hazen-Williams equation is applied to estimate the pipe diameter required to convey the assigned flow while maintaining the allowable headloss gradient. Consistent with the CSIP Design Criteria presented in the *CSIP Design Criteria Report* (Montgomery Watson, November 1993), a Hazen-Williams roughness coefficient of C = 135 was assumed for all pipes.

The resulting conceptual pipe sizes are summarized in Table 3, which presents the flow assigned to each pipeline segment and the corresponding pipe diameter required to meet the allowable headloss gradient. The table also presents the pipe diameters used in the hydraulic model, which reflect the nearest available ductile iron pipe (DIP) size with a minimum diameter of 16 inches.

Table 3: Modeled NSIP Distribution Pipe Sizing

Line to	Pipe Sized to handle (gpm)	Diameter Required (in)	Diameter Modeled (in)
A1	11,232	35.9	36
A2	9,019	33.1	36
A3	6,180	28.6	30
A4	4,869	26.1	30
B1	879	13.6	16
C1	5,968	28.3	30
C2	3,278	22.5	24
E1	3,537	23.2	24
E2	1,741	17.7	18
G1	1,327	16.0	16

The pipe diameters developed for the maximum demand condition are used in all modeling scenarios evaluated in this analysis. Pipe sizes are not reduced for scenarios with lower NSIP demand in order to maintain a consistent system configuration across all model runs.

These pipe sizes are conceptual and represent the infrastructure required to convey the maximum NSIP demand defined under this study at the allowable headloss gradient of 0.001 ft/ft. Pipe diameter directly affects friction losses in the system; reducing pipe diameter would increase headloss and may reduce the amount of supply that can be delivered to NSIP compared to the flows presented in this analysis. During detailed design, when the maximum system flow is determined, pipe diameters shall be reevaluated to confirm the system can convey the required flows while maintaining adequate pressure at system turnouts.

Boundary Conditions and Performance Criteria

To determine the maximum demand that NSIP can receive from the CSIP distribution system, the combined CSIP/NSIP system is evaluated under a minimum pressure criterion of 10 psi at all CSIP and NSIP demand turnouts. This performance criteria is consistent with current CSIP system operations as confirmed with MCWRA.

CSIP system boundary conditions for this analysis is established using a CSIP Storage Pond water surface elevation of 125 feet NGVD (127.5 feet NAVD). Each modeling scenario assumed that no supplemental groundwater wells are in operation and that the Molera and Lapis Booster Pump Stations are offline. Operation of the Espinosa Booster Pump Station is manually controlled within the model to satisfy target system performance criteria, including maintaining minimum pressure requirements at CSIP and NSIP turnouts.

Modeling Results

Controlling Demand Node and Pressure

Table 4 summarizes the maximum NSIP demand delivered for each evaluated CSIP A0 Lateral interconnection location and identifies the controlling hydraulic constraint for each scenario.

Table 4: Maximum NSIP Demand Delivered by A0 Lateral Interconnection Location

Pipe Connection Size (in)	Rough Distance from NSIP System to CSIP Connection (Feet)	Total NSIP Demand Delivered (gpm)	A0 Lateral Connection Flow (gpm)	Western FFO Loop Connection Flow (gpm)	Controlling Node
16.5 (TO 216)	650	12,220	2,142	7,750	E2 @ 10 psi
21	1,800	13,920	4,330	6,935	E2 @ 10 psi
24	4,300	15,955	7,422	5,491	E2 @ 10 psi
36 (CSIP Main Trunk)	6,650	17,200	11,407	2,515	E2 @ 12 psi

The results of this analysis indicate that the maximum NSIP demand that can be delivered from the CSIP system is strongly governed by the NSIP interconnection location along the A0 Lateral. The primary NSIP demand corridor extending from Node A1 to Node E2 represents approximately 40 percent of the total NSIP demand and therefore drives the limiting hydraulic condition.

The A0 Lateral also serves CSIP Turnout 106 near the downstream end of the lateral, therefore available conveyance capacity is constrained by both existing CSIP demands and the progressively decreasing pipe diameters along the lateral. As flow increases, headloss through the smaller downstream segments becomes significant, reducing the available hydraulic grade line to the eastern NSIP demand nodes. This condition increases reliance on supply from the western FFO Loop connection; however, the extended hydraulic path to Node E2 further compounds headloss. As a result, pressure at Node E2 consistently reaches the 10 psi minimum criterion before other nodes, indicating that the demand area served by Node E2 represents the controlling hydraulic condition for NSIP delivery capacity.

Accordingly, the A0 Lateral interconnection location represents the primary hydraulic control governing maximum NSIP delivery capacity. Selection of the final tie-in location along the A0 Lateral should therefore be based on the desired NSIP delivery target and the feasibility of extending the connection upstream to larger diameter CSIP facilities.

Looping Recommendations

As shown in Figure 7, two NSIP looping pipe segments were identified by Carollo. As part of this analysis, S&W evaluated these connections to determine the looping required to meet system performance criteria. Based on the modeling results, Loop Segment 1 is hydraulically recommended, as service to Node B1 was found to rely exclusively on the western FFO loop connection. Inclusion of this loop provides an additional conveyance path and improves hydraulic reliability to the area.

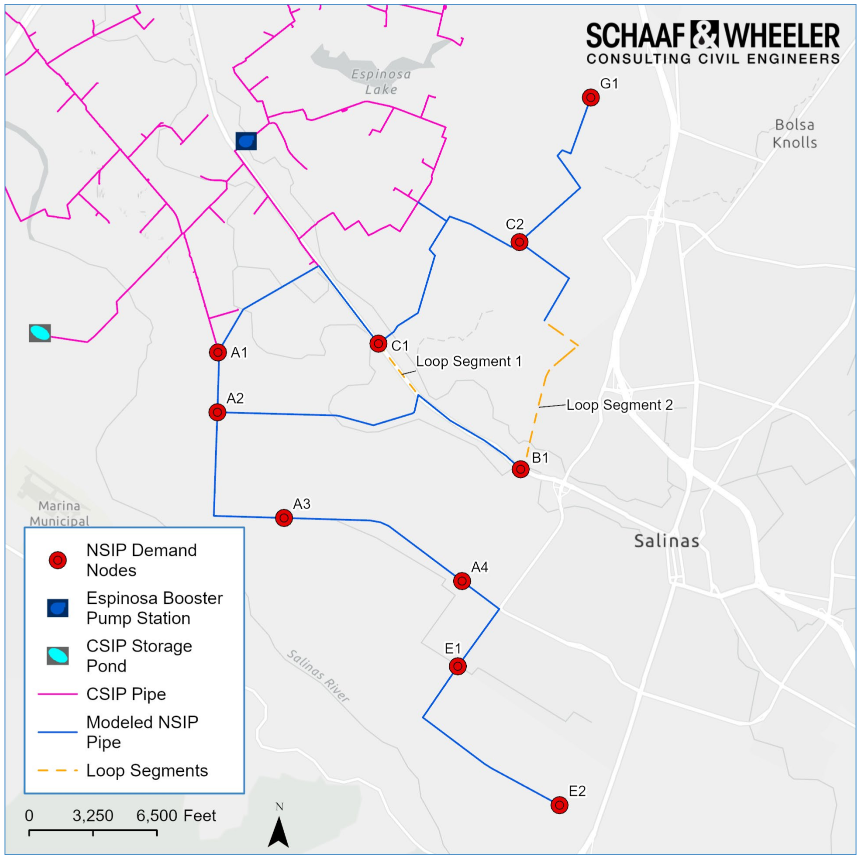


Figure 7: Looped NSIP Network Configurations

The analysis also determined that Loop Segment 2, connecting Nodes B1 and C2, does not provide a measurable hydraulic benefit under the evaluated conditions and is therefore not required to improve system hydraulics. Construction of this segment would only be necessary if required to serve turnouts located within that immediate area.

G1 Service Area Recommendations

Modeling results indicate that gravity supply from the CSIP system (without CSIP booster pump operation) is insufficient to reliably serve the G1 service area. Under gravity-only conditions, the elevation difference between the CSIP Storage Pond water surface (127.5 ft NAVD) and Node G1 (99 ft NAVD) provides limited differential head, resulting in pressures near the 10 psi minimum criterion even before accounting for system friction headloss. When friction losses associated with system demand are considered, pressures at G1 fall below the minimum allowable threshold. In addition, Node G1 serves parcels located at elevations higher than the node itself, further reducing available residual pressure.

As noted previously, this analysis assumes NSIP demand is served using the existing CSIP infrastructure and does not include the addition of new NSIP pressure-boosting facilities. To evaluate the ability of the existing system to support service to the higher-elevation G1 area, operation of the CSIP Espinosa Booster Pump Station is utilized to increase pressure within the eastern portion of the system.

Operation of the Espinosa Booster Pump Station serves the G1 service area through the northern G1 connection via the eastern FFO loop connection, which is located downstream of the pump station and provides the primary conveyance path for delivering boosted flow to the C2 and G1 service area as shown in Figure 8.

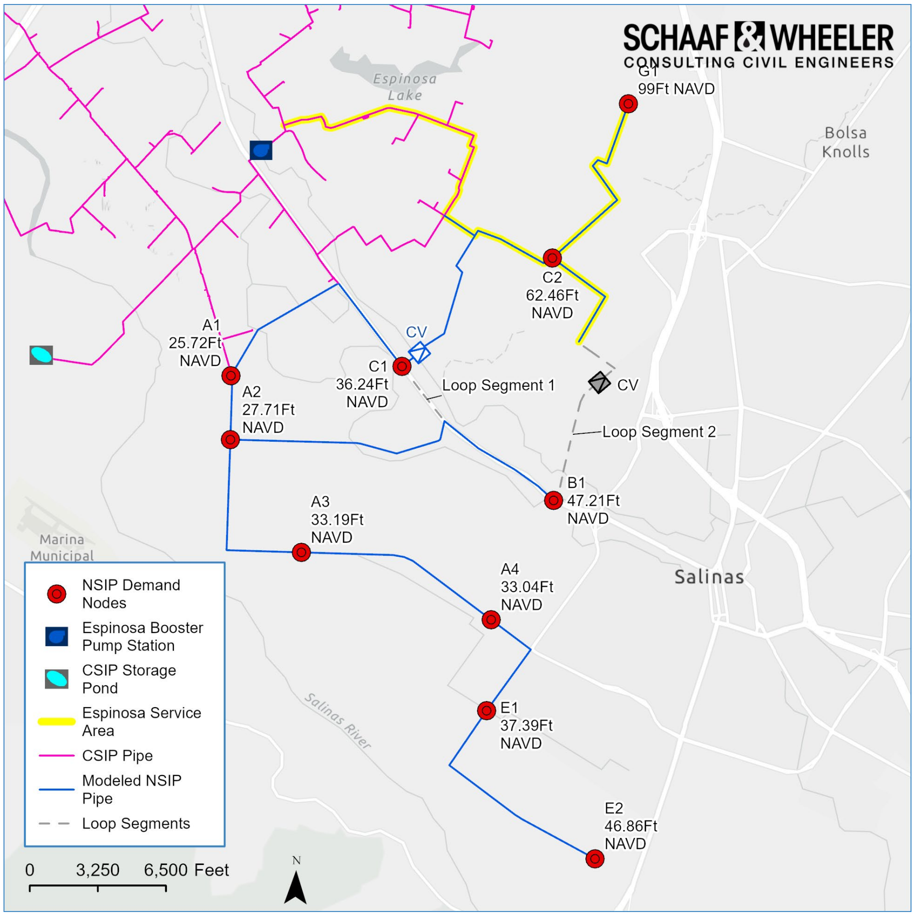


Figure 8: Espinosa Service to NSIP System

Initial modeling indicates that operation of the Espinosa Booster Pump Station with the proposed NSIP system configuration increases pressure through the eastern connection; however, a portion of the pumped flow preferentially travels west toward Node C1 and other lower-elevation demand nodes rather than toward Node G1. This creates a hydraulic short-circuiting effect, reducing the pump's ability to build pressure at the higher-elevation G1 service area and downstream customers.

To prevent this condition, a check valve is required on the pipe segment connecting Node C1 to the Eastern CSIP FFO Loop Connection, as shown in Figure 8, to maintain directional flow toward Nodes C2 and G1 and allow the booster station to maintain adequate pressure within the intended service area. If Loop Segment 2 is constructed, installation of a check valve on that segment would also be recommended to prevent a similar short-circuiting condition.

While operation of the Espinosa Booster Pump Station allows the existing CSIP system to support delivery to the G1 service area under the conditions evaluated in this analysis, installation of a dedicated NSIP booster pump station could also be considered during future design phases to provide a more direct means of supplying the higher-elevation portions of the NSIP service area.

Average Supply Volumes

The peak NSIP demands identified in Table 4 therefore represent the maximum instantaneous supply that can be delivered while maintaining service to existing CSIP customers, assuming the NSIP distribution system is constructed with pipe sizes sufficient to convey the maximum demand scenario evaluated in this study. For planning purposes, the corresponding average NSIP supply volumes may be estimated using the CSIP peaking factor described previously. Based on the CSIP demand analysis, a peaking factor of 2.53 represents the relationship between average daily demand and peak hourly demand. Accordingly, the average NSIP supply associated with each scenario may be approximated by dividing the peak NSIP demand by 2.53, as summarized in Table 5. These average NSIP supply volumes assume that CSIP demand remains at or below the average low-season demand of approximately 4.9 MGD, allowing the remaining system conveyance capacity to serve the proposed NSIP service area.

Table 5: Modeled Peak NSIP Demand and Corresponding Average Supply Volumes

A0 Lateral Connection	Peak NSIP Demand (gpm)	Approx. Average NSIP Supply[1] (MGD)
16.5 in	12,220	7.0
21 in	13,920	7.9
24 in	15,955	9.1
36 in (CSIP Main Trunk)	17,200	9.8

1 Average supply volumes estimated as peak demand divided by the CSIP peaking factor of 2.53.

Conclusions

The hydraulic modeling performed for this study indicates that the CSIP distribution system can deliver recycled water to the proposed NSIP service area under the evaluated boundary conditions, with the maximum deliverable demand governed by the CSIP pipe diameter at the NSIP interconnection along the A0 Lateral. As the NSIP connection is extended upstream to larger diameter CSIP facilities, available conveyance capacity increases; however, pressure at Node E2 consistently reached the minimum pressure criterion first, establishing the eastern demand corridor as the controlling hydraulic condition.

Modeling results also indicate that selected system improvements are necessary to maintain reliable service to the NSIP distribution system. Loop Segment 1 is recommended to provide hydraulic redundancy to the B1 service area, while Loop Segment 2 did not provide a measurable hydraulic benefit under the evaluated conditions and would only be required to serve turnouts located within that area. Service to the higher-elevation G1 demand area requires additional pressure beyond what can be provided under gravity conditions and may be achieved through operation of the Espinosa Booster Pump Station or installation of a dedicated NSIP booster pump station. When booster pumping is utilized, check valves should be installed to prevent hydraulic short-circuiting of pumped flow and ensure that boosted pressure is directed toward the intended service areas.

As the NSIP project progresses through planning and design, the desired NSIP delivery targets and final CSIP interconnection location should be evaluated in conjunction with these hydraulic constraints to confirm that the CSIP distribution system can reliably meet performance requirements. The results presented in this analysis assume the conceptual NSIP distribution pipe sizes developed for the maximum demand scenario (presented in Table 3). In addition, the demands evaluated represent peak hydraulic conditions used to establish system conveyance capacity and should not be interpreted as allowable average delivery rates when determining monthly or seasonal total volumes.

APPENDIX D

NSIP HYDROGEOLOGIC MODELING TECHNICAL MEMORANDUM

MONTGOMERY
& ASSOCIATES
Water Resource Consultants

Groundwater experts since 1984

TECHNICAL MEMORANDUM

DATE: March 31, 2026 **PROJECT #:** 9100.78

TO: Salinas Valley Basin Groundwater Agency

FROM: Stephen Hundt

REVIEWER: Staffan Schorr and Abby Ostovar, Ph.D.

PROJECT: New Seawater Intrusion Project (NSIP) Evaluation

SUBJECT: NSIP Groundwater Modeling Results

INTRODUCTION

This appendix documents the groundwater modeling methods and assumptions used to evaluate the New Seawater Intrusion Project (NSIP) scenario. The NSIP concept is further described in the New Seawater Intrusion Project Evaluation (NSIP Evaluation) by Carollo Engineers (2026). The modeling was conducted to support planning-level assessment of how the NSIP could affect groundwater levels and seawater intrusion in the 180/400-Foot Aquifer (180/400) Subbasin. The scenario evaluated is the Maximum Size NSIP Scenario.

The study context and project description are provided in the main body of the NSIP Evaluation report (Carollo Engineers, 2026).

The sections that follow introduce the groundwater model used for this analysis and the assumptions used to represent the NSIP scenario and boundary conditions. Model simulations were designed to evaluate relative changes in groundwater levels and seawater intrusion response, rather than to predict precise future conditions.

GROUNDWATER MODELS

The NSIP scenario was simulated using the Seawater Intrusion Model (SWIM). The SWIM relies on boundary conditions derived from the Salinas Valley Operations Model (SVOM) Baseline Scenario. Both models are further described below.

Salinas Valley Operations Model (SVOM v1)

The Salinas Valley Operations Model (SVOM v1) was the primary groundwater model used to support the C&E project feasibility analysis. SVOM was used to develop the future Baseline Scenario from which the SWIM Baseline Scenario was derived.

SVOM v1 is based on the Salinas Valley Integrated Hydrologic Model (SVIHM) Version 1, an updated implementation of the original USGS SVIHM. SVIHM simulates coupled surface water and groundwater processes across the Salinas Valley using MODFLOW-OWHM Version 2, which represents dynamic interactions between water supply, water demand, and groundwater flow. Agricultural demands are estimated internally based on land use and climate inputs and are met through a combination of precipitation, groundwater pumping, surface water diversions and deliveries, and recycled water. For the C&E Study, all project scenarios were developed from a common future baseline simulation – Baseline Scenario – documented in Montgomery & Associates ([M&A] 2026), which is a status quo simulation with no additional projects or management actions. It assumes future conditions without incorporation of climate change.

The future Baseline Scenario employed the Surface Water Operations (SWO) module to dynamically simulate operations of Nacimiento and San Antonio Reservoirs in response to climatic inputs, reservoir operating rules, CSIP demands, and simulated Salinas River flows influenced by reservoir releases, tributary inflows, and surface water–groundwater exchange. For the NSIP scenario analysis, the SWO module was not active, and reservoir releases and Salinas River Diversion Facility (SRDF) diversions from the future Baseline Scenario were applied as fixed inputs. This approach isolates the groundwater system response to the proposed project while maintaining consistency in upstream reservoir operations. The rationale for this modeling choice, and its implications for interpretation of results, are discussed further in subsequent sections of this appendix.

Seawater Intrusion Model (SWIM)

The SWIM was used to evaluate the seawater intrusion and groundwater level response for the NSIP scenario and for the corresponding future baseline (status quo, no-project) condition. The SWIM was used because variable-density groundwater flow and simulation of seawater intrusion processes were required to assess the effect of pumping cessation on seawater intrusion.

The SWIM is a variable-density, regional groundwater flow model developed by M&A (2023; 2024) to simulate seawater intrusion in the 180/400 Subbasin. The model represents coupled groundwater flow and salinity transport at the basin scale and is used to evaluate changes in groundwater levels and chloride distributions under alternative future conditions. The SWIM covers the entire coastal Salinas Valley and extends south to Chualar.

The SWIM and SVOM are linked only for the future Baseline Scenario. In the baseline configuration, outputs from the SVOM future Baseline Scenario—including river flows, recharge, and pumping distributions—were used to define boundary conditions and stresses for the SWIM and develop a SWIM Baseline Scenario.

The NSIP scenario evaluated with the SWIM was derived directly from the Baseline Scenario with 1 adjustment: all wells within the NSIP area were set to have no pumping. All other inputs—including flows, recharge, and pumping derived from the SVOM future baseline—were held constant between the baseline and project scenarios.

MODEL SCENARIO SETUP

The NSIP scenario was compared to the SWIM Baseline Scenario. Non-project assumptions were maintained as in the Baseline Scenario to isolate the effect of the project. The NSIP was simulated to begin in 2035 (Water Year [WY] 2036).

Baseline Scenarios

The Baseline (status quo) Scenarios represents future groundwater and surface-water conditions assuming no new projects or management actions are implemented. This scenario is documented in M&A (2026) and is summarized in the main body of the C&E Study report. In brief, groundwater flow modeling was conducted using the SVOM and the SWIM to project groundwater levels, surface-water flows, reservoir operations, agricultural and municipal pumping, and seawater intrusion through 2072 under a representative historical climate sequence. The Baseline Scenario reflects current reservoir operating rules, projected demands, and existing management practices, and provides the reference condition against which all project scenarios are evaluated.

The projected hydrology used in the SVOM is a representative 25-year climate sequence based on historical hydrology, repeated twice over the projection period to support water budget analysis across a range of hydrologic conditions. The sequence corresponds to the hydrology of water years 1993, 2019, 1975, and 1999-2020 to best match observed recent conditions and provide a representative mix of wet and dry years. Actual future climate is unknown; however, this provides a representative estimate through which potential projects can be assessed. Additional modeling could evaluate different sequences of wet and dry years and climate change.

The NSIP scenario is built directly from the Baseline Scenario, duplicating its time period, spatial properties, climate sequence, and boundary conditions, with only the specific project-related modifications described below. The baseline serves primarily as a point of comparison for evaluating changes in groundwater levels, groundwater storage, and seawater intrusion attributable to the NSIP. In addition, baseline SVOM outputs are used to derive key inputs for the project analysis, including streamflows used to estimate water available for diversion under Permit 11043 (with additional constraints described in the main body and Appendix E), as well as reservoir releases and SRDF operations.

Reservoir operations in baseline and project scenarios

In the future Baseline Scenario, the SVOM SWO module was used to dynamically simulate reservoir releases and SRDF operations in response to climate, CSIP irrigation demands, and operating rules. In contrast, the SWO module was not active in the NSIP scenario; instead, reservoir releases and SRDF diversions from the baseline were applied as fixed inputs. This approach assumes that the project does not affect reservoir operating decisions and allows the analysis to focus on the direct effects of the project.

While this simplification supports clearer comparisons between the baseline and project scenarios, it does not account for potential changes in reservoir operations that could result from higher groundwater levels or increased baseflow. However, given the location of the NSIP scenarios, any such effects on reservoir operations are expected to be minimal. As a result, the approach is appropriate for this stage of analysis but may understate some secondary benefits of the project.

NSIP

The NSIP concept evaluates the diverting of Salinas River water under Permit 11043 and supplementing it with additional sources to provide treated replacement water to existing groundwater users within the seawater intrusion area. This project concept is further described in the New Seawater Intrusion Project Evaluation (NSIP Evaluation) by Carollo Engineers (2026), and this groundwater modeling is of the Maximum Size NSIP Scenario, as the other 2 NSIP scenarios do not rely on Permit 11043. Under the Maximum Size scenario, water is diverted near the SRDF, conveyed to surface storage at Merritt Lake, treated, and delivered through a proposed distribution system serving users historically reliant on pumping from the Deep Aquifers within or near the seawater intrusion front.

A single scenario was simulated in which NSIP begins operation in October 2035 and provides an alternative water supply for irrigation. Correspondingly, beginning in October 2035, all groundwater pumping within the NSIP area ceases, with no compensating increase in pumping elsewhere. The volume of pumping removed is approximately 32,000 AF/year, as NSIP would directly deliver irrigation supply water from a combination of Salinas River water diverted under Permit 11043 and other sources. The timing and amount of surface water derived from a 100 cfs diversion was calculated as described in the NSIP Evaluation (Carollo Engineers, 2026). The

NSIP Evaluation documents how this was combined with the other source waters, surface storage, and rate of distribution through the NSIP system.

Groundwater impacts were simulated using the SWIM. The SWIM Baseline Scenario was developed by M&A (2026b) using boundary conditions and fluxes derived from the SVOM future Baseline Scenario. The NSIP Scenario is identical to the SWIM Baseline Scenario except that pumping from all wells within the NSIP area was reduced to zero for all stress periods after October 2035.

Pumping removal implementation

Pumping cessation was implemented by modifying the Well (WEL) package only; all pumping rates for identified NSIP-area wells were set to zero beginning in October 2035. Many wells in SWIM are represented as screened across multiple model layers via the Connected Linear Network (CLN) module, with pumping drawn from the base of each well's CLN network. The CLN module was not modified, so inter-layer connections through each wellbore remain intact. This implementation is equivalent to assuming that wells cease pumping but are not decommissioned.

MODEL RESULTS

The NSIP scenario uses the SWIM to assess the effect on seawater intrusion in addition to groundwater levels. Results were analyzed in 3 main ways:

1. **Groundwater Level Difference from Baseline:** Groundwater level difference maps show which areas in each subbasin respond most to demand management. Difference maps are calculated for the average of November 2040 and 2041 water levels of the project scenario minus the baseline, so that positive values correspond to a relative increase in groundwater levels. The average of these 2 years is used because across the model area, it is representative of average conditions and close to the SGMA sustainability deadline. Groundwater level change is not shown for model layer(s) where the aquifer is less than 1 foot thick, as they are defined as pass through cells (M&A 2025).

2. **Seawater Intrusion Progression:** Maps of the 500 mg/L chloride isocontour at 2022, 2030, 2040, 2050, and 2060 show how seawater intrusion progresses over time in the 180-Foot Aquifer, 400-Foot Aquifer, and Deep Aquifers under the baseline and project scenarios.

3. **Comparison to Seawater Intrusion SMC:** Maps of the 500 mg/L isocontour in 2040 within the 400-Foot Aquifer for the baseline and project scenario show how close or far the project scenario comes to achieving sustainability.

NSIP

The modeled groundwater benefits for the NSIP Scenario are evaluated using the SWIM. Because the NSIP scenario targets both groundwater levels in the Deep Aquifers and seawater intrusion across multiple aquifers, results are reviewed for the 180-Foot, 400-Foot, and Deep Aquifers. The Seawater Intrusion SMC is represented by the inland position of the 500 mg/L chloride isocontour. Groundwater level changes and changes in groundwater storage and flow are also summarized.

Groundwater Level Change

Figure 1 shows the difference in simulated groundwater levels during the 2040–2041 evaluation period under the NSIP scenario relative to baseline for the 180-Foot, 400-Foot, and Deep Aquifers. In the figure, the aquifers shown are based on model layer extents and include stratigraphically equivalent aquifers within the same model layer, even if outside of the delineated extent of that aquifer. After groundwater extraction stops in 2035, groundwater levels rise, the most of which occurs in and near the area where extraction stopped. Relative water level increases exceed 20 feet in both the 180-Foot and 400-Foot Aquifers, with peak values of approximately 27 feet, and range from 1 to 5 feet in the Deep Aquifers. Changes in the Deep Aquifers are comparatively modest given that improved groundwater levels in those aquifers is a stated project goal. The increases are centered on the NSIP area but extend well beyond it, with changes greater than 1 foot reaching nearly to the model boundary near Chualar. Because fixed SWIM boundary conditions derived from the baseline simulation are used, this spatial extent suggests that relative increases farther upvalley may be suppressed, and results are likely most reliable near the NSIP area and coastward.

The largest relative increases in both the 180-Foot and 400-Foot Aquifers are concentrated northwest of the City of Salinas (Figure 1). The 400-Foot Aquifer exhibits the greatest and most widespread changes; the 180-Foot Aquifer shows similar peak values over a slightly smaller area; and the Deep Aquifers show comparatively modest changes. A pronounced step in the spatial pattern of relative increases occurs along the delineated edge of the alluvial fans to the east of the 180/400-Eastside Subbasin boundary, reflecting a transition to lower transmissivity to the east. This contrast appears to concentrate relative water level increases west of that transition, which may intensify the existing hydraulic gradient toward the northern Eastside groundwater depression. However, since groundwater levels to the east of this transition are already very low, the significance of this incremental change is uncertain relative to the pre-existing gradient.

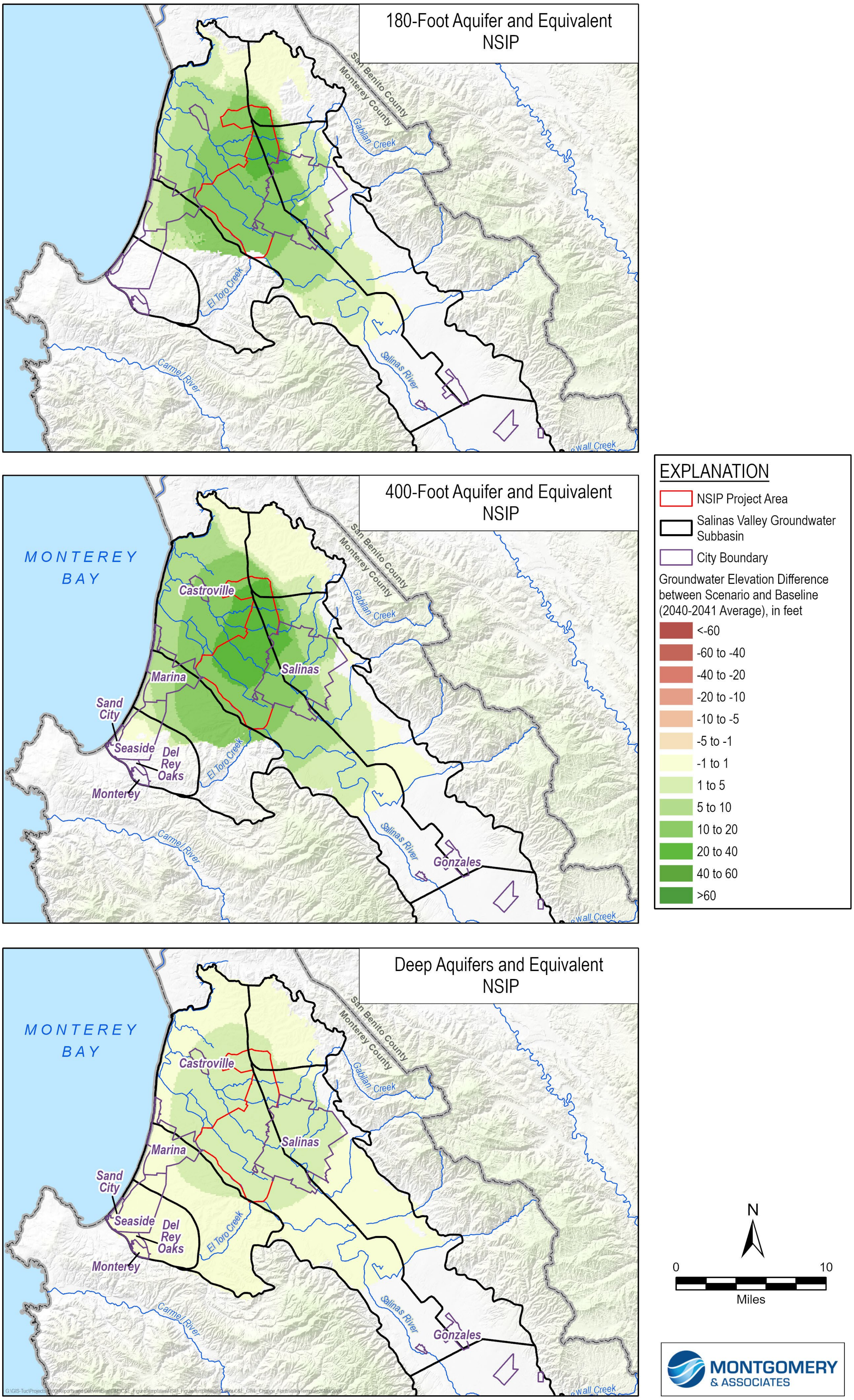
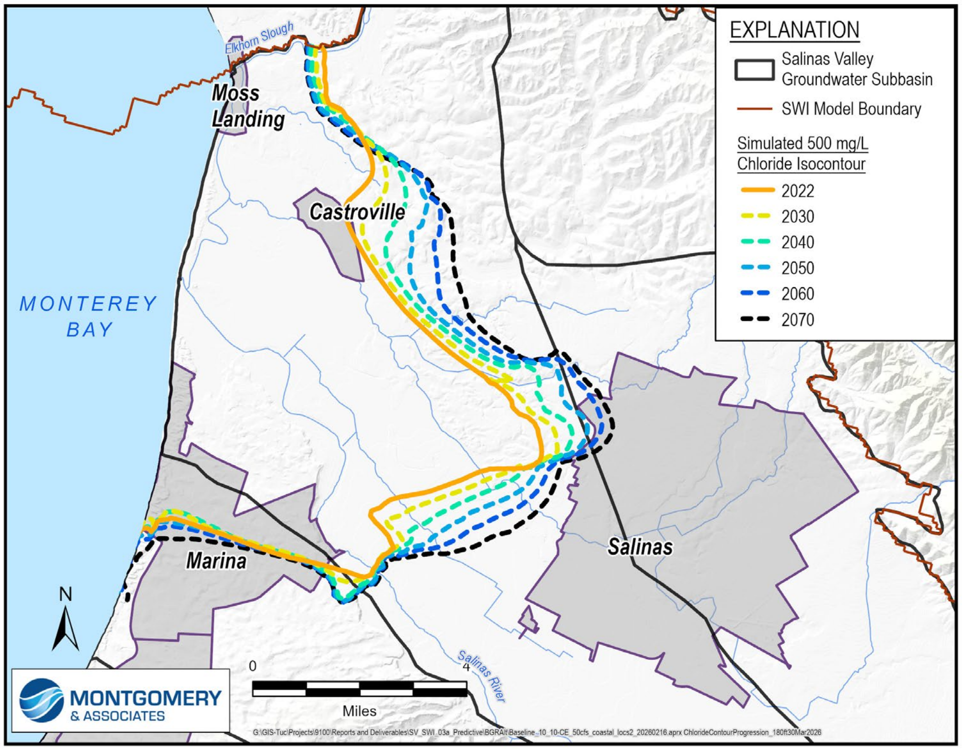


Figure 1. Difference Between NSIP Average November 2040-2041 Water Levels and Baseline Scenario for 180-Foot, 400-Foot, and DeepAquifers

Seawater Intrusion Progression

180-Foot Aquifer

The NSIP Scenario produces mixed results for seawater intrusion in the 180-Foot Aquifer and is not sufficient for meeting the seawater intrusion minimum threshold. (Figure 2). Along most of the front, seawater progression is modestly slowed relative to baseline, consistent with reduced landward head gradients across the NSIP area. However, the prominent bulge in the 500 mg/L isocontour presently located just west of the City of Salinas advances more rapidly under the NSIP scenario than under baseline conditions. This area lies within and east of the zone of greatest relative groundwater level increase—a region where seawater has already substantially intruded. Where the relative head increase occurs within the intruded zone rather than landward of the front—as seen on Figure 1 where the maximum relative head changes are shown—the effect may be analogous to a relative hydraulic ridge or peak with the potential to drive elevated-chloride water away from it. In this localized area, the inland component of that movement may contribute to the observed additional advance. Notably, the trajectory of this advance is directed toward a cluster of agricultural pumping wells situated within agricultural enclaves inside the urban footprint of the City of Salinas. These wells are represented consistently across all scenarios and are not responsible for the difference in intrusion progression between NSIP and baseline; however, within the model, the pumping at these wells creates a local groundwater low that may draw the simulated intrusion front preferentially toward this area.



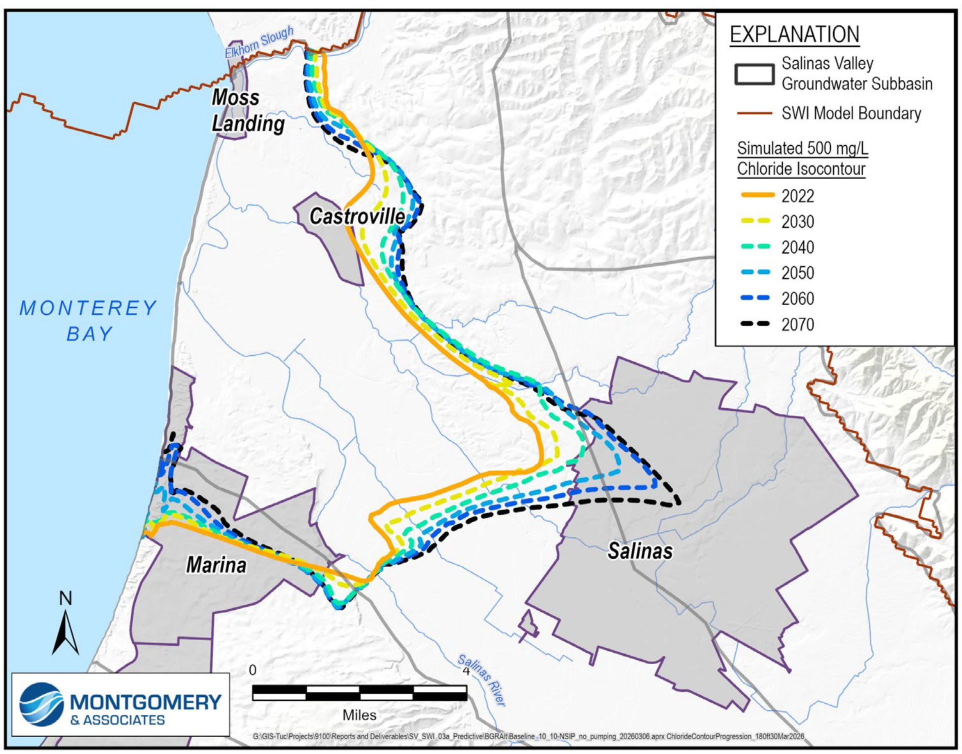


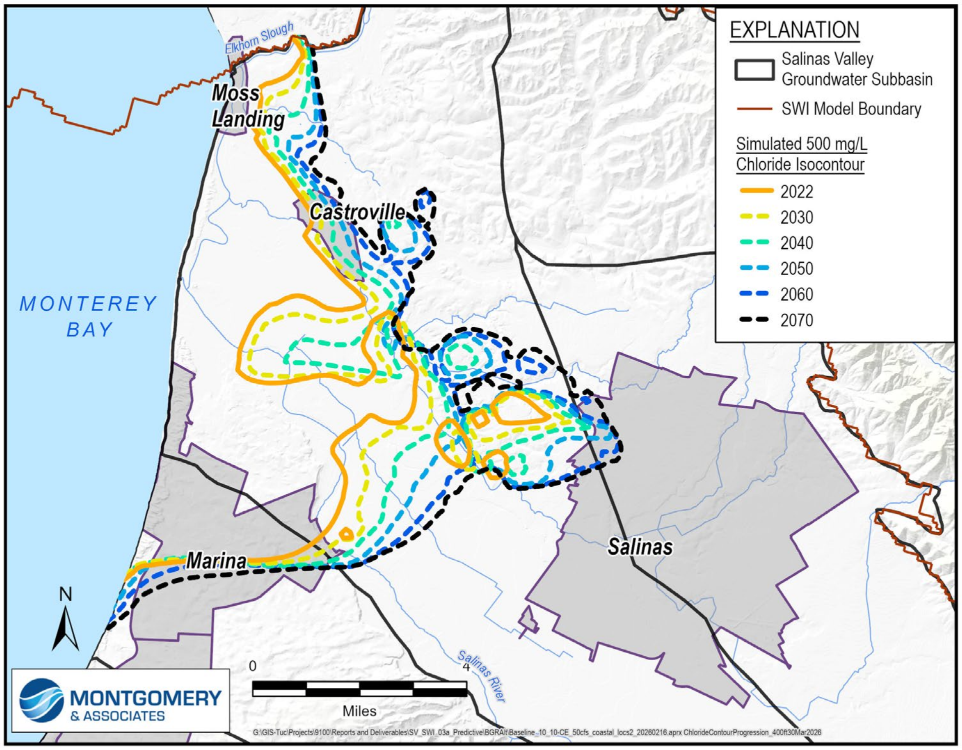
Figure 2. Simulated Progression of Seawater Intrusion in the 180-Foot Aquifer under the Baseline (top) and NSIP Scenarios (bottom)

400-Foot Aquifer

Changes in the 400-Foot Aquifer 500 mg/L isocontour under the NSIP scenario are more moderate than in the 180-Foot Aquifer (Figure 3). Differences from baseline are small throughout the simulation period. A slight additional advancement of chloride is apparent near the City of Salinas, consistent with the gradient dynamics described above, but its magnitude is substantially smaller than the corresponding change in the 180-Foot Aquifer.

Deep Aquifers

Seawater intrusion has not been observed in the Deep Aquifers of the 180/400 Subbasin. Under the NSIP scenario, there continued to be no intrusion in the Deep Aquifers.



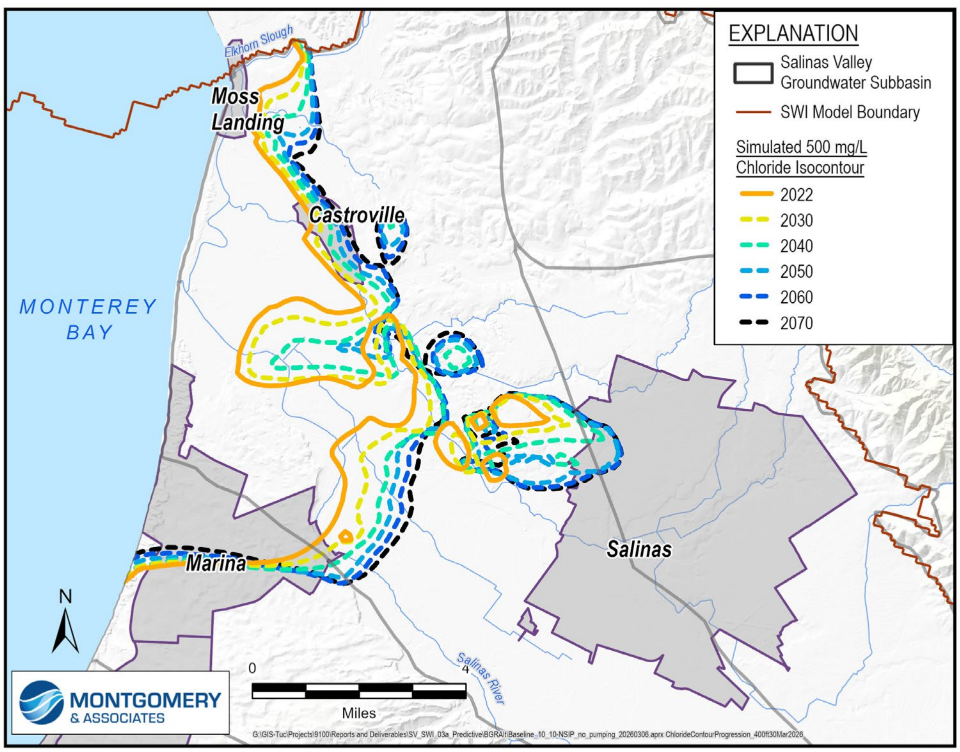


Figure 3. Simulated Progression of Seawater Intrusion in the 400-Foot Aquifer under the Baseline (top) and NSIP Scenarios (bottom)

Comparison to Seawater Intrusion SMC

The project is anticipated to come online in 2035, giving it only 5 years of operation before the first 2040 SGMA sustainability deadline. As can be seen in the Figure 4 and Figure 5, by 2040 the seawater intrusion 500 mg/L isocontour is minimally different from the Baseline Scenario in the 180-Foot and 400-Foot Aquifers. In both aquifers, the 500 mg/L isocontour is far from the minimum threshold in 2040. The scenarios diverge more over time. No difference is observed in the Deep Aquifers.

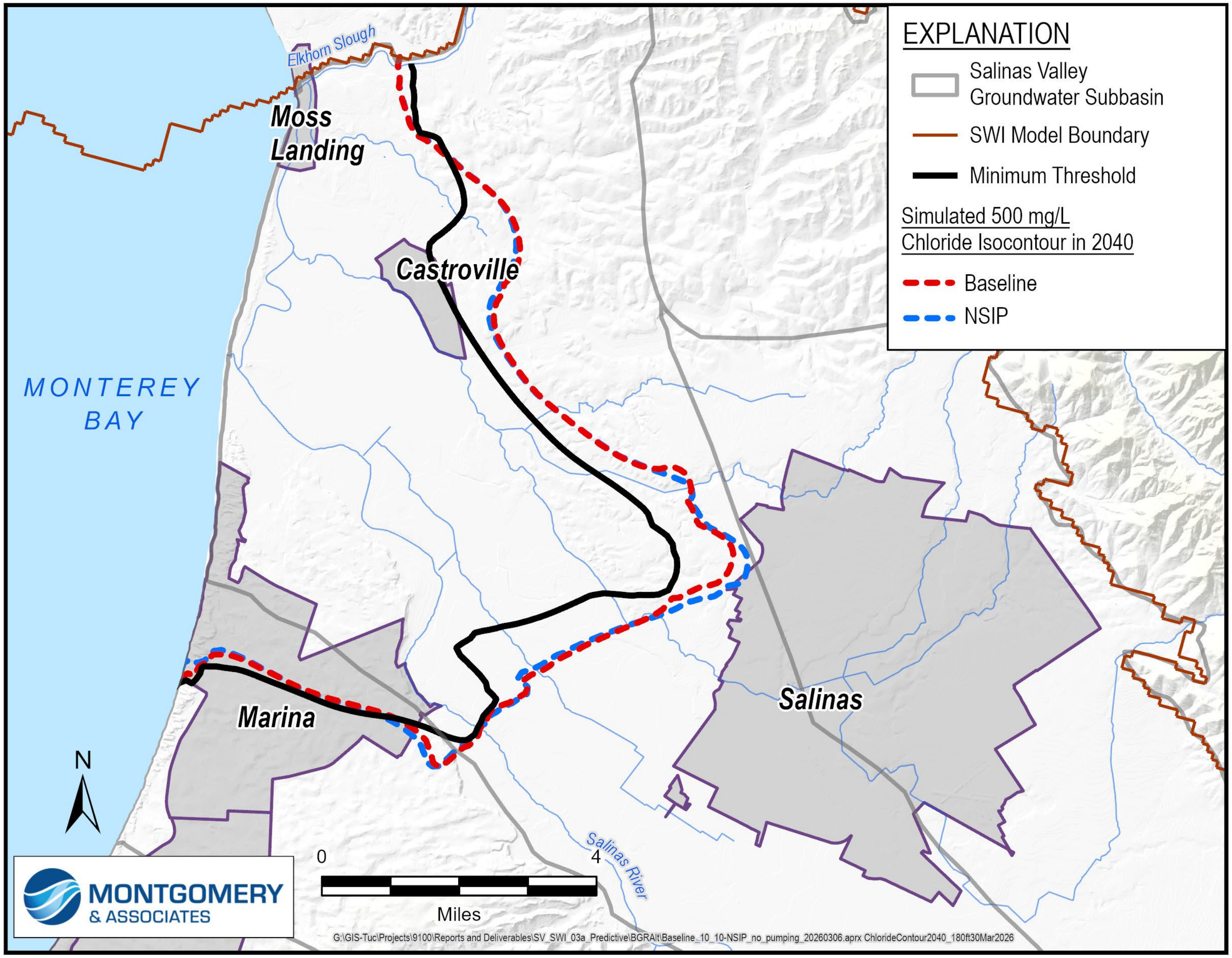


Figure 4. Simulated 500 mg/L Chloride Contour in the 180-Foot Aquifer in 2040 for the Baseline and NSIP Scenarios

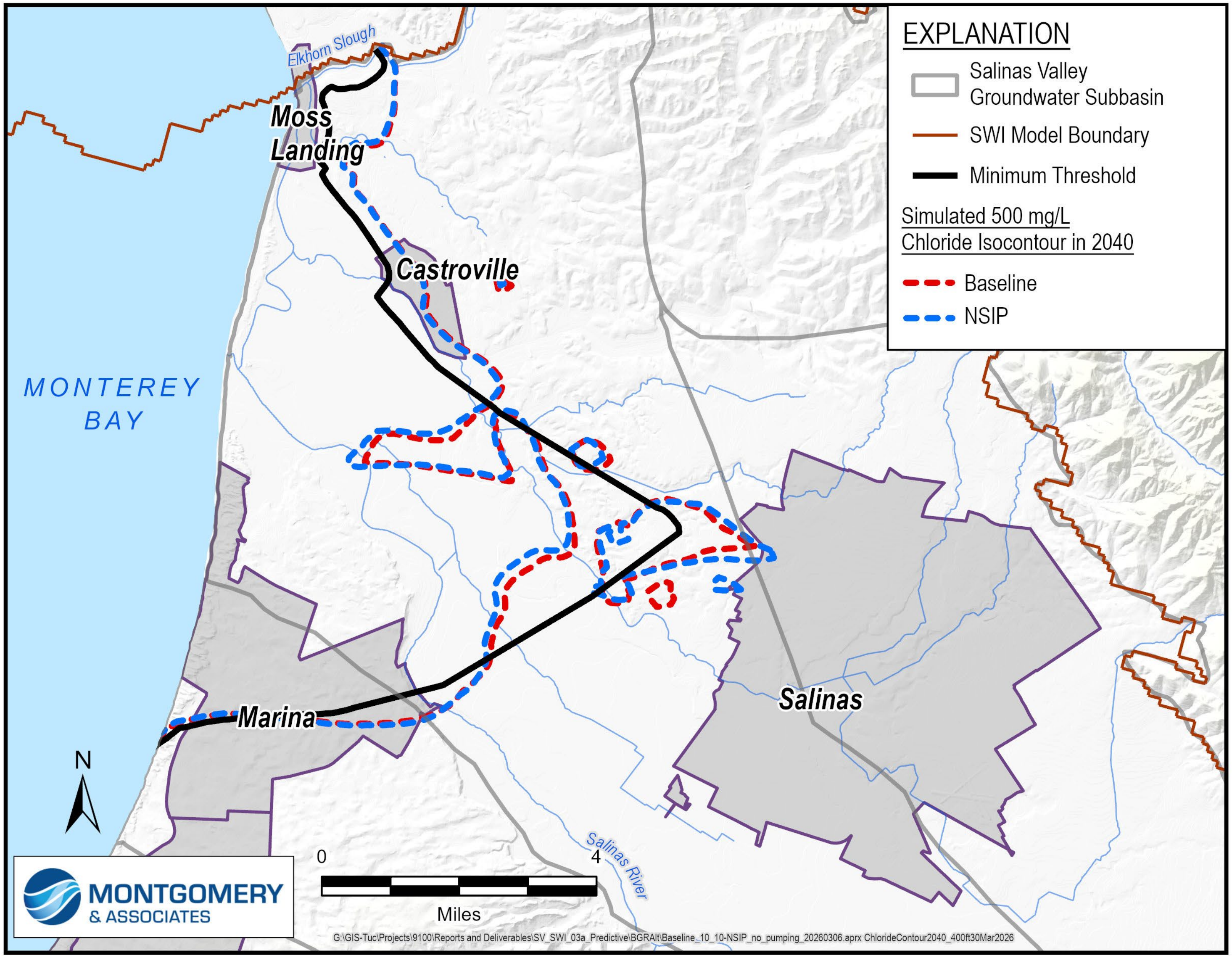


Figure 5. Simulated 500 mg/L Chloride Contour in the 400-Foot Aquifer in 2040 for the Baseline and NSIP Scenarios

DISCUSSION

NSIP

- The NSIP scenario produces large and spatially extensive groundwater level increases, with relative increases exceeding 20 feet in the 180-Foot and 400-Foot Aquifers across a broad area northwest of the City of Salinas. The spatial reach of these changes suggests that fixed SWIM boundary conditions may suppress simulated improvements further up-valley, and results are likely most reliable near the NSIP area and coastward. The comparatively modest response in the Deep Aquifers may also warrant consideration in the context of the project's goal of improving groundwater levels in those aquifers.

- Despite generating substantial groundwater level increases, the NSIP scenario appears to produce mixed outcomes for seawater intrusion. While higher groundwater levels may reduce landward gradients along much of the coastal front, relative head increases near the intrusion front locally intensify gradients in ways that drive chloride movement. In areas where intrusion already extends landward of the zone of greatest relative groundwater level increase, the effect may be analogous to a hydraulic ridge or peak forming within the intruded zone—potentially driving elevated-chloride water both seaward and, in this localized context, further inland toward the northern Eastside groundwater depression.

- The results also illustrate a fundamental distinction between groundwater level and seawater intrusion responses to recharge and pumping changes. Groundwater level changes propagate as pressure waves and are approximately additive— from a groundwater level standpoint, injecting a given volume near a pumping well is nearly equivalent to simply reducing pumping by that amount, regardless of source water quality or timing. Chloride concentration responses, however, are driven by flow paths, source water quality, and mixing and spreading processes in ways that are highly sensitive to the configuration and timing of sources (including recharge and pumping reductions) and sinks (continued pumping), meaning the details of location, timing, and water quality matter considerably for interventions targeting seawater intrusion.

LIMITATIONS

The modeling scenario described in this appendix provides an approximation of future groundwater conditions under the NSIP scenario. In addition to the limitations described in the SVOM Model Update and Projected Baseline Simulation (M&A, 2026b), several assumptions and limitations apply:

- Projections are based on a single baseline annual climate data series for estimated future conditions. While it provides an initial platform for assessing potential future conditions, projections are highly dependent on the years used for evaluation. Whether groundwater elevations at a particular RMS well are projected to be below the minimum threshold depends on the specified climate inputs to the baseline model. Further investigations could include the simulation of different potential baseline climate scenarios.

- The model does not simulate impacts of climate change. Future studies should evaluate if climate change could have significant implications.