SAN GORGONIO PASS WATER AGENCY
1210 Beaumont Avenue, Beaumont, CA
Board of Directors Engineering Workshop
Agenda
January 13, 2020 at 1:30 p.m.

1. **Call to Order, Flag Salute and Roll Call**

2. **Public Comment:** Members of the public may address the Board at this time concerning items relating to any matter within the Agency's jurisdiction. To comment on specific agenda items, please complete a speaker's request form and hand it to the board secretary. Speakers are requested to keep their comments to no more than five minutes. Under the Brown Act, no action or discussion shall take place on any item not appearing on the agenda, except that the Board or staff may briefly respond to statements made or questions posed for the purpose of directing statements or questions to staff for follow up.

3. **Review of Draft 2018 Water Conditions Report* (Page 2)**

4. **Discussion of Signage and Naming of Fiesta Recharge Facility**

5. **Discussion of Maintenance of Agency Facilities**

6. **Discussion on Use of Agency Properties for Energy Production**

7. **Report on Citrus Reservoir Rhomboids**

8. **Announcement:**
   A. Office closed January 20, 2020 in observance of Martin Luther King Jr. Day
   B. Regular Board Meeting, **Tuesday**, January 21, 2020 at 1:30 p.m.
   C. Finance and Budget Workshop, January 27, 2020 at 1:30 p.m.
   D. Regular Board Meeting, February 3, 2020 at 1:30 p.m.

9. **Adjournment**

***Information included in Agenda Packet**

(1) Materials related to an item on this Agenda submitted to the Board of Directors after distribution of the agenda packet are available for Public inspection in the Agency's office at 1210 Beaumont Avenue, Beaumont during normal business hours. (2) Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection at the Agency's office, located at 1210 Beaumont Avenue, Beaumont, California 92223, during regular business hours. When practical, these public records will also be made available on the Agency's Internet Web site, accessible at http://www.sgpwa.com." (3) Any person with a disability who requires accommodation in order to participate in this meeting should telephone the Agency (951 845-2577) at least 48 hours prior to the meeting in order to make a request for a disability-related modification or accommodation.

SAN GORGONIO PASS WATER AGENCY

REPORT ON WATER CONDITIONS

DRAFT

Reporting Period 2018

San Gorgonio Pass Water Agency

Annual Report on Water Conditions

Reporting Period Calendar Year 2018

Prepared by

San Gorgonio Pass Water Agency
1210 Beaumont Avenue
Beaumont, CA 92223

January 2020

SAN GORGONIO PASS WATER AGENCY

Board of Directors

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On the cover:
Aerial view of construction of the Agency's Fiesta Recharge facility, scheduled to go online in late 2019.

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1.0 Background

The San Gorgonio Pass Water Agency is a State Water Contractor and wholesale water agency that provides imported water to retail water purveyors within its service area, which extends from Calimesa on the west to Cabazon on the east. Its service area covers approximately 228 square miles, most of which is in Riverside County but which includes two small areas in San Bernardino County. One of these is unpopulated, adjoining the San Bernardino National Forest, and the other, in Edgar Canyon south of Oak Glen, includes a few residences. The service area is depicted on **Figure 1.**

The Agency was created by the San Gorgonio Pass Water Agency Act, passed by the California Legislature in 1961 and signed by Governor Pat Brown on July 12, 1961. The first Board of Directors, appointed by the Riverside County Board of Supervisors, held its initial formal meeting on October 10 of that year. It had previously met briefly on September 22 to elect Ted Silverwood as the first President of the Agency. Lake Silverwood in the San Bernardino Mountains is named in his honor. The area had a population of approximately 21,000 at the time (today it is over 90,000, an increase of over 400%).

The San Gorgonio Pass is an elevated, relatively narrow land mass between the San Bernardino Mountains on the north and the San Jacinto Mountains on the south, connecting the San Bernardino Valley to the west and the Coachella Valley to the east. Both of these valleys are at much lower elevations than the Pass region. The region straddles two large watersheds. The western half of the service area is drained primarily by Little San Gorgonio Creek and Noble Creek, which are tributary to San Timoteo Creek and the Santa Ana River. The eastern half of the service area is drained by the San Gorgonio River, which is tributary to the Whitewater River which is part of the Colorado River Basin. A small portion of the region drains to the San Jacinto River which drains to Lake Elsinore, which is physically located in the Santa Ana watershed. **Figure 2** depicts the drainage basins and principal streams in the region.

This report, published annually by the Agency for over two decades, is intended to help monitor and make available to the public the quantity and quality of water in local groundwater basins. It is based on the Agency's extensive database, as well as data from other sources. It includes data from 2018 as well as historical data, which provide a basis to put the most recent data into historical context.

Tables 1, 2, and 3 are extraction (production) summaries of groundwater pumping and surface water diversions within the Agency's service area, hereinafter referred to as the region. These tables summarize annual production for the past 13 years, and represent the heart of this report. These data were obtained from the State Water Resources Control Board, Division of Water Rights (State Board); local sources; or in some cases estimated by the Agency. The Agency does not independently verify the data. The State Board does not require reporting for well owners who extract less than 25 acre feet per year (about eight million gallons). Also, it is possible that some well owners do not file as required. The data in these tables represent the Agency's best estimate of actual pumping, based on both actual data and production estimates. Most wells are not metered and therefore data from these wells must be estimated by various means. However, the largest wells, owned and operated by retail water agencies, are metered.

The report also includes water quality data from the State Water Project's sampling station at Devil Canyon in San Bernardino. Devil Canyon is the Agency's delivery point for State Water Project water, and the closest sampling station to the region. It is representative of the water that the Agency receives from the State Water Project. The data, summarized in **Table 5,** reflect that the water quality varies from year to year and from month to month. It is primarily a function of water quality conditions in the Sacramento/San Joaquin Delta and of runoff in watersheds tributary to the Delta. That water quality in turn is largely a function of hydrology. In wet years and during wet periods within dry and average years, fresh water from upland rivers drains to the Delta and improves overall water quality.

The water quality constituent of greatest interest to the Agency and other local water agencies is TDS, or total dissolved solids (also known as salinity or salts). Salinity is heavily regulated by Regional Water Quality Control Boards throughout the State, especially as water agencies around the state have implemented recycled water systems. In order to maintain reasonable TDS levels in the lower reaches of the Santa Ana watershed (primarily Orange County), the Santa Ana Regional Water Quality Control Board must set standards for TDS at relatively low concentrations in the upper reaches of the watershed, where the western portion of the Agency's service area is located. Salinity is less of an issue in the eastern portion of the region, which is part of the Colorado River watershed which is more sparsely populated and has higher native salt levels.

Sewage treatment plant effluent from Beaumont, Yucaipa, and Calimesa is discharged into tributaries to the Santa Ana River and is regulated by the Santa Ana Regional Board; effluent from Banning is currently regulated by the Colorado River Regional Board, though it is likely that the Santa Ana Regional Board may at some point regulate this discharge or portions thereof. This is due to the fact that the City of Banning has plans for a recycled water system, parts of which may overlie a portion of the Santa Ana watershed. While most of the City is in the Colorado Basin, a small portion of it is in the Santa Ana basin.

State legislation passed in 2009 requires more extensive groundwater level monitoring in basins throughout the State similar to what the Agency has performed for nearly two decades. The California Department of Water Resources has set up CASGEM (the California Statewide Groundwater Elevation Monitoring system). The Agency is the monitoring entity for the region. This represents a legislative mandate to perform the groundwater level monitoring that the Agency has performed on its own for many years. The data uploaded by the Agency to the CASGEM system represent a relatively small subset of the Agency's overall groundwater database.

Newer legislation passed in 2014 (the Sustainable Groundwater Management Act or SGMA) requires most groundwater basins in California to have a plan to be managed sustainably by 2022. This could have a long-term impact on how groundwater basins in the region are managed. A Groundwater Sustainability Plan, or GSP, must be developed for two of the three basins in the region by 2022. The Agency is playing an active role in implementing SGMA in the two groundwater basins that require GSP's—the Yucaipa and San Gorgonio Pass sub-basins. The San Timoteo sub-basin has been classified as very low priority by the State and therefore a GSP is not required in that sub-basin.

2.0 Water Supply Conditions

There are three principal sources of water in the region—groundwater, which begins as precipitation in the form of rain and snow in the local mountains; imported water through the State Water Project; and recycled wastewater. A fourth source—local runoff of surface water—accounts for a small but important portion of the local water supply portfolio, primarily in Edgar and Banning Canyons. Even most of this runoff is typically recharged into local groundwater basins where it becomes part of the groundwater supply.

Recycled water from Yucaipa Valley Water District is in use in Calimesa. Two other retail water agencies, including the Beaumont Cherry Valley Water District and the City of Banning, have plans to implement recycled water systems in the next few years and have begun planning, designing, and constructing the needed infrastructure for these systems. The Beaumont Cherry Valley Water District is working with the City of Beaumont, who owns the wastewater treatment plant and the treated wastewater, to develop a recycled water system in its service area. In 2018, progress was made by these two entities towards developing this system.

2.1 Precipitation

Annual precipitation in the Beaumont area since 1900 is shown on **Figure 4.** The long-term mean annual precipitation in Beaumont is approximately 17.4 inches. This average is down more than ½ inch in the past decade as the region has experienced a number of below normal years in precipitation. This figure depicts the variable nature of precipitation. Of the approximately 118 years of records, the precipitation in 46 years has exceeded the average, while 64 years have been relatively dry as compared to the average. The figure shows several periods—1900-1904, 1948-1952, 1960-1965, 1986-1992, 1999-2002, 2005-2009, and 2011-2018—with multiple consecutive dry years. The figure shows that 2007, 2009, 2013, 2014, and 2015 were among the driest on record in Beaumont (and in fact in all of Southern California), while 2010 was one of the wettest and the last eight were below normal. The figure indicates that, since 1999, there have been only three years that met or exceeded the long-term average rainfall. In fact, since 2005 there has been only one "wet" year. This is dramatic evidence of the drought that persisted in much of California and the West from 2012 through 2016. While 2017 was extremely wet in northern California, with a series of atmospheric rivers pounding the Bay Area and the Sierras, much of Southern California was slightly above to below long-term average precipitation rates. The figure shows that 2017 was even drier than 2016 in the Pass, with about 12-inches of rainfall in Beaumont. Data presented are for Beaumont because the National Weather Service's official weather station in the region is located in Beaumont.

Precipitation is highly variable, both spatially and temporally. The National Weather Service's official station is at an elevation of about 2600 feet. It is highly likely that higher elevations receive more precipitation, including snow, and lower elevations receive relatively less precipitation. In addition, storms, particularly summer storms, can be highly concentrated and impact one area, while another area a mile or two away may get little or no rain. Thus, while the long-term average rainfall may be approximately 17 inches in one part of the region, it could easily be an inch or two more or less at other locations in the same region. A rain gauge in Cabazon would show a lower average precipitation than a similar gauge in Calimesa. These gauges would show that climatic and hydrologic differences are present even within the region.

Local groundwater basins are able to naturally capture and store much, but not all, of the precipitation in wet years. During and after a rainfall event, runoff drains to streams where it runs into creeks and rivers. Some of this will recharge the local groundwater basins. During large storm events, much of the runoff will flow downstream. In the Pass region, it will either flow from San Timoteo Creek into the Santa Ana River in Redlands, or it will flow from the San Gorgonio River into the Whitewater River in the Coachella Valley. A small portion of runoff from the region flows to the San Jacinto River in Hemet, which eventually runs to Lake Elsinore, a natural low spot. Cities and water agencies in the region have begun planning how to capture additional stormwater that currently runs down the Santa Ana River to Prado Dam in Chino and eventually to the Pacific Ocean. Some small scale stormwater capture facilities either have been constructed or are in the process of being constructed.

Stormwater capture represents a potential new source of water to the region. While additional sources of local water are always good for a region, stormwater capture requires a lot of land, and thus has been found to be too expensive for large-scale development in many areas, particularly where land values are high. Large areas of land are required in order to construct ponds to settle out the particulate matter (silt and other dirt particles) that accompanies storm flows. Since large storms are not abundant every year, land acquired for large scale stormwater capture would not be used on a consistent basis, and therefore represents a large investment that does not reap benefits every year. A huge benefit in capturing stormwater is the fact that its salinity is very low, and any stormwater captured would improve the water quality of local groundwater basins.

2.2 The State Water Project

The San Gorgonio Pass Water Agency Act was signed by Governor Pat Brown in 1961, and the first Board of Directors held its initial meeting in September of that year. Within another year, the Agency had signed a contract with the State of California for 15,000 acre feet of water from what at the time was known as the Feather River Project. A year later, the Agency increased its contract amount, or Table A amount, to 17,300 acre-feet, an increase of 15%. The Agency's Board of Directors fought hard to get this additional amount, and made financial sacrifices to do so. The additional water increased the annual amount of debt service owed by the Agency, and the expenditure of these additional funds precluded the ability to begin construction on a pipeline from San Bernardino to take delivery of the water at that time.

The Agency began importing State Water Project water into the region in 2003, when Phase 1 of the East Branch Extension of the California Aqueduct was completed. Since that time, deliveries of State Water Project water within the region increased steadily until drought took hold. **Table 4** summarizes these deliveries. This table shows that the Agency delivered nearly 11,000 acre-feet in 2011 and 2012, dropping to less than 10,000 acre-feet in 2013, to just over 5,000 acre-feet in 2014, and under 4,000 acre-feet in 2015. This increased to just over 11,000 acre-feet in 2016, and nearly 16,000 acre-feet in 2017, a very wet year in northern California (though as noted above, an average one in Southern California and a relatively dry one in the Pass). The 85% allocation of Table A water in 2017 was the highest since an 80% allocation in 2011, and enabled the Agency to deliver water that not only met local water demands, but that added to local banked groundwater as well. In 2018, with an allocation of 35%, deliveries dropped slightly, to just over 13,000 acre-feet. Even though the 35% allocation of water in 2012 was considerably less than the 80% from the year before, the Agency was able to deliver virtually the same amount as in 2011 due to its ability to carry over water from the previous year. This number dropped in 2013 as the Agency had less carryover water to deliver. The 5% allocation in 2014 was one of the lowest on record.

In 2017, after five years of drought, the Agency negotiated an agreement with the Antelope Valley-East Kern Water Agency (AVEK) to lease 1700 acre-feet of 100% reliable water for 20 years, through 2036. This water was part of the nearly 16,000 acre-feet delivered in 2017 through the State Water Project. This new supply will go a long way toward drought-proofing the region for the next two decades and will ensure that local groundwater basins will continue to be replenished with imported water each year.

The annual State Water Project Table A allocation is a function of hydraulic conditions in the Sacramento/San Joaquin delta as well as northern California hydrology. The average long-term reliability of the State Water Project is approximately 60%. For the Agency, this represents a long-term annual supply of approximately 10,400 acre-feet, nearly 7,000 acre-feet less than its contracted amount. And, this reliability is expected to decrease over time for a number of reasons. This points out the importance of being able to store water in those years when the Table A allocation is high. The ability to import and store more water locally in wet years in the future will be a key to the sustainability of the region and to minimizing the amount of additional supplemental water that must be procured to meet projected water demands. The Department of Water Resources has proposed a Delta Conveyance Facility to improve the reliability of the State Water Project by improving the ability to move water across the Delta in average and wet years. The Agency strongly supports this project.

The Federal and State Endangered Species Acts govern the volume of water that can be pumped out of the Delta. The proposed Delta Conveyance Facility would help protect fisheries while enabling more water to be exported from the Delta in wet years. The proposed facility would have little or no impact in dry and average years.

With the completion of Phase 2 of the East Branch Extension in 2017, the Agency could finally import its entire Table A allocation when available, plus additional supplies. Completion of this $250 million project was a high priority for the Agency, the San Bernardino Valley Municipal Water District (Valley District), and the California Department of Water Resources, the Agency's partners in this project. With this project online, the region is better equipped to face future droughts due to its ability to import more water in extremely wet years. A description of the project may be found in the 2016 Report on Water Conditions.

The Agency is constructing a new groundwater recharge facility at the corner of Beaumont Avenue and Brookside Avenue in Beaumont. This facility, when completed, will nearly double the capacity to deliver water to the region from the East Branch Extension. While the conveyance facility itself has a capacity of 64 cfs, the Agency currently has the ability to deliver only 20 cfs out of the pipeline, since only one connection exists. This 20 cfs connection is in the process of being increased to 34 cfs. The new facility will include a new 20 cfs turnout. When completed, this facility, along with the completion of Phase 2 of the East Branch Extension and the procurement of the water from AVEK, will help ensure the long-term water sustainability of the region.

In addition to these projects, the Agency is considering purchasing capacity in the Valley District's proposed Bunker Hill Conjunctive Use Project, which would enable the Agency to store water in the Bunker Hill Basin in San Bernardino and deliver it to retail water agencies such as the Yucaipa Valley Water District and the South Mesa Water Company in dry years.

Overall, the Agency's actions related to procurement, delivery, and storage of imported water over the past several years have greatly improved the long-term water supply reliability of the region.

2.3 Wastewater

Three public agencies, plus one federally recognized Native American tribe, discharge treated wastewater in the region—the cities of Beaumont and Banning, the Yucaipa Valley Water District, and the Morongo Band of Mission Indians. The annual discharges since 1988 for the three public sewage treatment entities are shown on **Figure 5.** Figures for the Morongo plant are not available. Unlike precipitation and the State Water Project, which are highly variable from year to year, treated wastewater discharges from the region have consistently increased over time, as the region has developed. They have been relatively constant over the past five years, with the exception of Beaumont, which has shown an increase over that time. Wastewater treatment plant discharges are a function of indoor water use, not hydrology or exterior water use. Hence they are considered to be relatively more reliable and stable than imported water or local runoff or stormwater.

Thus, treated wastewater, or recycled water, is an important asset to the region, because it can be a reliable water source in the future. All three of the public agencies mentioned above are in various stages of implementing recycled and/or non-potable water systems for irrigation, golf courses, parks, medians, etc., or to recharge it into local groundwater basins. The Yucaipa Valley Water District received its permit to deliver recycled water in 2016.

As mentioned in Section 1.0, salinity is a growing concern in California, and recycled water is high in dissolved solids or salinity. While recycled water is a huge potential benefit to the region, its use as a water supply will require desalting. Desalting is an expensive operation that requires brine disposal, a costly process. The Yucaipa Valley Water District has constructed a desalination plant and brine disposal pipeline. It is now able to utilize recycled water in lieu of groundwater or imported water for non-potable uses, primarily irrigation and construction water. The District has plans to use recycled water for exterior water use in most new homes in Calimesa, reducing the amount of potable water required for each new home.

Use of recycled water either for direct non-potable use or for recharge requires a permit from the Santa Ana Regional Water Quality Control Board. Such permits will be granted only when the Regional Board is convinced that the permit holder will take all required steps to meet its standards for salinity and other constituents based on its current Basin Plan.

3.0 Groundwater Conditions

Figure 3 shows the principal groundwater basins, sometimes referred to as storage units, in the region. The boundaries of these basins are as defined by the United States Geological Survey. It should be noted that these basins are different from the groundwater basins identified by the California Department of Water Resources in its Bulletin 118, which are the defined basins for implementation of CASGEM and SGMA. The Beaumont Basin is the largest and most productive of these local basins, is the only one that is adjudicated, and serves a large majority of the population in the region. An adjudicated basin is one in which a judge has ordered a limit on pumping. By the Bulletin 118 definition, the Beaumont Basin is partly in the San Timoteo Sub-basin of the Santa Ana Basin and partly in the San Gorgonio Pass Sub-basin of the Coachella Valley Basin. This emphasizes the point that the Agency's service area sits on a hydrologic divide for both groundwater and surface water.

The region is characterized by numerous faults, which make for complex geology. The Beaumont Basin is characterized by a number of smaller sub-basins, but can be viewed as one continuous basin, or storage unit, and has been modeled in that manner. East of the Beaumont Basin is the Banning Basin, and east of that is the Cabazon Basin. The Agency is in the process of expanding its model of the Beaumont Basin (developed by the United States Geologic Survey) eastward to include both the Banning and Cabazon basins, or storage units. This work should be completed and peer-reviewed by 2019.

The existing model is a tool that can be used to predict how various recharge scenarios will impact water levels in the Beaumont Basin.

As the Sustainable Groundwater Management Act (SGMA) is implemented by the Department of Water Resources, the Agency will place great emphasis on participating in Groundwater Sustainability Agencies (GSA's) for each of the basins within the Agency's service area. This will unfold over the next few years.

3.1 Groundwater Extractions (Production)

Table 1 summarizes groundwater production from the eleven basins in the region. **Table 2** summarizes reported production from each individual producer, whether public or private.

Table 3 provides a detailed breakdown of extractions by each reporting producer (including some based in San Bernardino County) for each basin for the thirteen most recent years of available data. Surface diversions from the Whitewater River are not included, as the Agency believes that the available data are not reliable enough to report. In addition, they are outside the region. These diversions serve as an important water source for both the Banning Bench (through the Banning Heights Mutual Water Company) and the City of Banning.

Figure 6 illustrates the long-term trend in reported groundwater production in the region since 1947. **Figure 7** summarizes the same data since 1997, about the time significant growth started. While **Figure 6** shows a distinct increasing trend in groundwater extractions over the long term, **Figure 7** shows that production has not increased greatly over the past 21 years. While production increased from 1997 through 2007, it has decreased since that time. In fact, 2007 remains the peak production year in the region. While the population has increased since 1997, water use has largely remained constant, which shows the impact of water conservation. The results of these recent years show a sharp reduction in local extractions from 2008 to 2010, followed by gradual increases over the next four years, in contrast to decades of increases prior to 2008. Perhaps the most striking element of these figures is the sharp decline in production in 2015, continued in 2016, also characterized in Tables 1, 2, and 3. Production increased significantly in 2017, perhaps due to a combination of growth in the region and the wet year in northern California.

Figure 6 indicates that extractions remained relatively constant from the early 1960's to the mid 1980's. Extractions increased gradually from that point until the mid-1990's, when they started to increase significantly. **Figure 7** shows a significant increase from 1998 to 2007 (from less than 25,000 AF to over 35,000 AF, an increase of over 40%), and a significant decrease since that time, from over 35,000 AF to just under 31,000 AF in 2014, just under 23,000 AF in 2015, and just over 24,000 AF in 2016, increasing to approximately 28,000 AF in 2018 (a decrease of about 20% over 11 years).

Figure 8 illustrates the percentage share for each basin's total production within the region in 2018. This is only slightly different from the 2017 percentages, with the primary change being a decrease in the Banning Canyon basin from 12.6% to 8.5%. This is likely due to the Banning Canyon basin having less runoff in 2018 than 2017. The Beaumont Basin production percentage increased from 56.2% in 2017 to 59.9% in 2018. In 2012, the Beaumont Basin represented only 48% of all extractions, compared to 57% in 2015, 56% in 2017, and nearly 60% in 2018. This increase was primarily at the expense of the Banning Canyon Basin (decreased from 12.6% to 8.5%), the Banning Bench Basin (decreased from 6% to 1%), and Edgar Canyon (reduced from 11% to 5%). The Beaumont Basin is the largest basin by far, with nearly 60% of all production. The Banning Canyon, Banning, and Edgar Canyon basins are next. The Banning Canyon Basin is fed largely by runoff from an interbasin transfer, the flows of which were greatly reduced during the drought. With smaller, shallower runoff-fed basins yielding less water, purveyors increased dependence on the Beaumont Basin, with its yield increasing from less than half to nearly 60% of all production during the five drought years.

Table 1 indicates that total production in the region increased about 6% from 2017 to 2018, after an 11% increase from 2016 to 2017. Compared to the peak year of 2007, when production totaled 35,474 acre-feet, this represents a 20% reduction in groundwater production over the past eleven years, with most of this decrease coming in one year—2015. It should be noted that, in 2015, the State Water Resources Control Board implemented mandatory water conservation measures throughout the State. This was the primary reason for the large decrease in production from 2014 to 2015. The fact that production increased only 6% in 2016 indicates that residents in the region were continuing their water conservation practices. The 11% increase from 2016 to 2017 could indicate that these practices were no longer as popular, or that there were a significant number of new residents, or a combination of both.

In the Beaumont Basin, the region's largest, production increased about 6%, from 15,049 to 16,973 acre-feet. As can be seen from Table 3, this was primarily a result of increases from the City of Banning, the Beaumont Cherry Valley Water District, and Plantation on the Lake. Oak Valley Management actually decreased its extractions during the year.

The Cabazon Basin presents an interesting data set. According to the data submitted to the Agency, extractions from this basin decreased by approximately 55% from 2007 to 2012, yet increased by over 80% in 2013 and decreased by 12% in 2014 and another 18% in 2015. These numbers lead to a question of whether the data are correct every year, especially in 2012, when the data showed extractions of 654 acre-feet, compared to 900 acre-feet in 2011 and 1226 acre-feet in 2013. In verbal discussions with the General Manager of the Cabazon Water District, there was an indication that these numbers are in fact correct, and reflect a rapidly decreasing demand for a number of years, followed by an increase in demand when the outlet malls expanded and began taking water deliveries from the District. The 12% reduction in production from 2013 to 2014 is not readily explained, while the 18% decrease from 2014 to 2015 is readily explained by the aforementioned water conservation regulations. The 32% increase in 2017, from 9667 to 1277 AF, is also not easily explained. Extractions from this basin have stabilized over the past two years at about 1,280 AF in both 2017 and 2018.

Table 2 summarizes overall production by owner, regardless of basin. In reviewing the production by the major water agencies and overliers, the data are relatively consistent, with most owners showing only minor increases or decreases in production. Two retail water agencies, the City of Banning and the Beaumont Cherry Valley Water District, show distinct increases of 5% and 7%, respectively, while the Yucaipa Valley Water District shows an increase of over 300%. This, however, remains a relatively small number. Plantation on the Lake represents a large percentage increase of nearly ten times its 2017 extractions. The reason for this is not known; its management has not shared information with the Agency.

An examination of the groundwater production data demonstrates that, overall, economic conditions, annual precipitation, and temperature play large roles in determining residential water demand in any given year. The gradual increase in water production in the region over the four years from 2011 to 2014 can be explained in large measure by a gradually recovering economy, which causes higher water use. Per capita reductions in water use in homes over the three years prior to that could be explained either by cutbacks due to economic conditions during that time, reduced usage due to higher water rates, or water conservation efforts on the part of local residents. A detailed study would have to be performed to determine the specific impacts of these issues on the reduction in water demand during that three year period. The increased use in 2018 is likely a strong function of overall population growth amid a strong economy, including the construction of new homes in the region.

The reduction in production due to decreased water demand from 2008 to 2010, and especially the dramatic drop in 2015 and continuing to 2016, point out a major issue within the water industry. As water demand falls, water sales revenues fall, making it difficult for water agencies to meet financial obligations, especially fixed costs. Most of their costs (primarily labor) are fixed and do not decrease when water demand falls. These agencies have to make up for these lost revenues in other ways, either by changing their rate structures, by increasing water rates, by reducing their costs, or by drawing from reserves. Over the past several years, water districts throughout California have gradually begun implementing tiered rate structures, which charge a higher rate for more water use. The Agency has held its wholesale water rate constant since 2009, one of the few water agencies in the state to be able to do so during the drought. It is considering increasing its water rate in 2019.

Review of the data for 2018 shows that mandatory water conservation measures imposed in 2015 are likely seen as old news for many people. Residents of the San Gorgonio Pass significantly decreased their water use in 2015 in response to the Governor's Executive Order and its implementation by the State Water Resources Control Board, and continued their water conservation efforts into 2016, but this did not continue into 2017 or 2018. With new legislation passed in 2018 that will make water conservation measures permanent, it remains to be seen if local residents (as well as residents throughout the state) can ramp down their per capita water use over time.

3.2 State of Overdraft

Overdraft of a groundwater basin refers to the amount of water pumped out in excess of its safe yield. Safe yield is the average annual replenishment of a basin through natural sources such as rainfall, runoff, snowmelt, and underflows from other groundwater basins, as well as man-made sources such as return flows from irrigation and septic tanks. Safe yield is difficult to establish and represents only an average. In a given year, natural replenishment of a groundwater basin could be more or less than the average safe yield, depending on local hydrology. As a basin changes, for example through development, or as its management changes, the safe yield can also change.

The Agency has been closely monitoring overdraft of the Beaumont Basin since at least 1988, when the Agency's first engineering investigation of the basin indicated that pumping significantly exceeded the basin's probable safe yield. Studies by the Agency have pointed to an estimated long-term average safe yield of about 5,000 to 6,100 acre feet per year for the Beaumont Basin (Boyle Engineering, 1995; Boyle Engineering, 2002). This is smaller than the safe yield of 8,650 acre feet that was defined in the 2004 Beaumont Basin Stipulated Judgment, a number which represents the sum of overlier water rights. Overlier water rights refer to rights based on historical production for water used on the land.

In order to remedy the possibility of long-term overdraft, the Judgment requires the Beaumont Basin Watermaster to "redetermine" the safe yield of the basin at least once every ten years, beginning ten years after the date of entry of the Judgment (no later than February 2014). If the redetermined safe yield were to be different from the 8,650 acre feet per year identified in the Judgment, it would change the amount of overdraft on an annual basis.

In April 2015, the Beaumont Basin Watermaster adopted a resolution determining the safe yield to be 6,700 acre-feet per year, after having a consultant model the basin. This is close to the Agency's earlier estimate of 6,100 acre-feet per year. This has broad-ranging implications for the future, as it means that less water will be able to be pumped out of the basin each year. However it also means that the Basin will be more sustainable in the long term, which will serve the region well.

According to the Judgment, the basin must be in balance after 2014. That is, the total amount pumped out in any given year cannot exceed the average safe yield as identified by the Watermaster unless it is drawn out of storage accounts already in place at that time, or replenished from additional sources, including State Water Project water, recycled water, stormwater, or some other source.

Total production in 2018 from the basin, as reported, was 16,973 acre-feet. Therefore, the Beaumont Basin experienced an apparent overdraft of about 10,273 acre-feet, assuming an average safe yield of 6,700 acre-feet. This was more than offset, however, by importing 13,174 acre-feet of supplemental water. This is the seventh time in nine years that the volume pumped out of the basin was less than the sum of average natural recharge plus imported water. This is the biggest impact of the Agency on local water resources—reducing and eliminating groundwater overdraft.

In years when production exceeds the average safe yield plus imported water, such as 2015, the "apparent" overdraft is in fact not a true overdraft, as the excess production comes out of storage accounts. That is, water that was previously purchased from the Agency and added to basin storage through recharge was drawn out of storage, thus not counting against the safe yield.

Selecting 1997 as a base year (the year when significant increases in production began in the region), the cumulative overdraft in the Beaumont Basin since that time (assuming the Agency's original estimated safe yield of 6,100 acre-feet) would be approximately 190,000 acre-feet, an average of 9,000 acre-feet per year over the past 20 years, without importation of State Water Project water. **Figure 9a** depicts this graphically. Through 2018, the Agency has imported over 111,000 acre-feet of supplemental water (**Table 4**). This offsets the cumulative overdraft and reduces it to approximately 80,000 acre-feet over the same time period. This is depicted in **Figure 9b.** The difference in these two figures shows the immense impact that the State Water Project and the Agency have had on the region since water importation began in earnest in 2006.

Although other local groundwater basins are at similar risk of overdraft, the state of the overdraft of the Beaumont Basin is far more apparent (in part because it has been studied more) and, due to the large population served by the basin, more critical to the region. Since the safe yields of other basins in the region have not yet been defined, it is difficult to determine whether or not they are in overdraft at this time. However, monitoring of water levels in these basins shows that levels are decreasing in at least some of the eleven basins in the region.

The Agency is continuing studies of the Cabazon Basin and at some point in the next few years will likely define an average safe yield for this basin. It is estimated that this is the second largest basin in the region based on storage volume. Other basins will require additional studies over time to better understand their geology and hydrology. It is believed that most of them have storage volumes and safe yields far smaller than the Beaumont and Cabazon basins.

With the advent of the Sustainable Groundwater Management Act, passed by the Legislature in 2014, management of groundwater basins in California will change significantly. Virtually all basins will be required to have a plan to be managed sustainably by 2022. This means that a plan must be in place to ensure that each basin is in long-term balance. Each plan must detail a method for implementing this, either through reductions in production or through artificial recharge (recharge of the basin with non-native water, recycled water, or stormwater), or better management of the basin, or a combination of all three. Adjudicated basins (such as the Beaumont Basin) are exempt from SGMA.

Implementation of SGMA will be by groundwater basins defined by the Department of Water Resources in its Bulletin 118. In that document, there are only two major groundwater basins in the Agency's service area—the San Gorgonio Pass sub-basin of the Coachella Valley Basin, and the San Timoteo sub-basin of the Santa Ana Basin. In addition, a small portion of the Yucaipa sub-basin is in the Agency's service area. As the Agency continues to publish this report every year, and as SGMA is gradually implemented over the next several years, some changes may be made in this report to reflect the fact that the DWR basin boundaries are the "official" groundwater basins of the State. In the meantime, the Agency will continue to report on the eleven separate and distinct groundwater basins within the region.

3.3 Groundwater Levels

The Agency monitors water levels in a large monitoring well network. Currently there are approximately 110 wells in the system, each of which is monitored for groundwater elevation twice a year, typically in May and November. The monitoring network is depicted on **Figure 10.**

Between Fall 2017 and Fall 2018, approximately 76 of the wells had water level changes, including a number of sites with multiple wells. Of these, three sites had wells that recorded a water level increase of more than five feet, 23 recorded a decline of more than five feet, and the remaining 50 recorded little or no change. Of the three wells showing a large increase in water levels, two are in the Beaumont Basin, while the third is in the South Beaumont Basin. Of the 23 wells showing declines of more than five feet, four of them are in the Beaumont Basin, while the rest are in basins in the eastern portion of the region—Banning Canyon Basin, Banning Bench Basin, Banning Basin, and Cabazon Basin. These are depicted on **Figure 11**. Overall, this figure shows the continual decline of water levels in the Cabazon Basin. It is thought that this is a natural phenomenon but more will be known as the SGMA process progresses.

As of 2011, the Agency is part of the California State Groundwater Elevation Monitoring (CASGEM) system. This is a formal statewide groundwater monitoring system initiated through 2009 legislation. The Agency is the formal monitoring entity for two basins—the San Timoteo sub-basin and the San Gorgonio sub-basin—which roughly correspond to the Agency's boundaries. As noted above, the state uses different basin names because it views the statewide geology and hydrology on a larger scale, and aggregates smaller basins into larger ones. What is known in the CASGEM system as the San Timoteo sub-basin is essentially the Beaumont Basin, the Singleton Basin, the South Beaumont Basin, and the San Timoteo Basin, and what CASGEM labels the San Gorgonio sub-basin is essentially the Cabazon Basin, the Banning Bench Basin, the Banning Canyon Basin, the Banning Basin, and the Millard Canyon Basin. While the boundaries are not exact, they are similar. The Agency files water level data for selected wells through the Department of Water Resources into the CASGEM database. These data are available on the CASGEM web site. At some point in the future, the CASGEM data reporting will disappear, as it will be superseded by implementation of SGMA, which has a higher standard of sustainable groundwater basins, as opposed to the CASGEM standard of simply reporting groundwater elevation data.

Figures 12 through 17 show time-series groundwater elevations (hydrographs) for selected wells in five different basins within the Agency service area. In general, these same wells have been depicted in this report for the past several years.

The two wells shown in **Figure 12** are Banning production wells in the Banning Basin. Each shows great variability in groundwater elevation from 2002 to 2006. Both of these wells showed a long-term trend of lower groundwater levels until recently. Both appear to be relatively stable over the past few years, with a slight increase in water levels over the past 2-3 years. The well depicted in **Figure 12a** appears to be holding at a water level between 350 and 400 feet below ground surface with a slight increasing slope. The well in **Figure 12b** is down about 75 feet since 1998, but appears to be stable at approximately 375 feet below ground surface. The latest data point indicates a possible increase in water level that will be closely monitored. The Banning Basin gets no artificial recharge.

The five wells depicted in **Figures 13-15** are in the Beaumont Basin. The wells in **Figures 13b and 15b** are in the same location, approximately 1000 feet east of Beaumont Avenue and 50 feet south of Cherry Valley Boulevard in Cherry Valley. This location is likely influenced by the past recharge at Little San Gorgonio Creek, and possibly by the recharge at Noble Creek. The upturn in water levels from 2008 to 2014 indicates that this is quite likely the case. The downturn since that time could be attributed to the fact that no water has been recharged at Little San Gorgonio during that time, or possibly to the drought during that time, in which less water was available for recharge at Noble Creek. Both wells show an increase in water level in 2018, when a lot of imported water was recharged into the Beaumont Basin at Noble Creek. The well in **Figure 13a** is on the Oak Valley Golf Course. After a steady drop over at least a decade, the water surface appears to be stabilizing over the past two years. This may be due to reduced production from Oak Valley Partners and/or Oak Valley Management, as indicated in **Table 2**.

The wells in **Figures 14 and 15a** are on Calimesa Boulevard near the western edge of the Beaumont Basin. These wells show continually falling water levels over the past decade and a half, with a possible leveling off since 2017. That portion of the Beaumont Basin would appear to not be influenced as yet by the ongoing recharge efforts and reduced production. While it is clear that ongoing recharge and reduced extractions have had an impact on at least some of the wells in the Beaumont Basin, water levels at other wells are still falling. There is some indication of some leveling out of the lengthy decline over the past year. It remains to be seen if this will be a trend or is simply an anomaly.

The well in **Figure 16** is in the Cabazon Basin and is a production well of the Mission Springs Water District. It shows a drop of more than 15 feet over the past ten years. These data would seem to indicate that water levels in the Cabazon Basin are dropping and have been for a number of years. This is somewhat surprising, given the decline in extractions from this basin over the past several years. This could mean that inflows to the basin have also declined over the same period of time. It could mean that any impact of reduced extractions just requires a longer response time before the impact is seen in wells. It certainly means that there are other factors at work in this basin that impact water surface elevations that are beyond the scope of this report. It is possible that this is part of a natural cycle for this basin, that it drops for many years and then in one large storm refills itself. The Agency and other parties will model this basin as part of SGMA implementation and in a few years should have a better idea how it works.

This significant drop in water levels is one reason that the Agency has worked with the United States Geological Survey to extend its model of the Beaumont Basin to the Cabazon Basin. The Agency wishes to learn more about the Cabazon Basin and how it reacts to various hydrologic events. The basin is an important regional resource as a water supply source and storage reservoir and the Agency is trying to better understand the detailed workings of it. Implementation of SGMA will lead to a better understanding of the basin.

The wells depicted in **Figure 17** are in the Calimesa and Banning Canyon Basins. The data in **Figure 17b** show clearly that the Banning Canyon Basin is a shallow basin, and that water levels fluctuate more in such basins. The year 2006 was a wet one locally, and the figure shows that groundwater levels in the basin came up nearly 15 feet that year. The next three years, on the other hand, were dry ones, and the water level dropped nearly seven feet in that time. The level in this well is influenced by the amount of water imported to the basin through a trans-basin transfer and conveyed by a flume system that is over 100 years old. The system has transported much less water in recent years; this could have an impact on the continually declining water level in this well. The data for the well in the Calimesa Basin show that groundwater levels increased in 2006 and have remained relatively constant since, with a slight downward trend over the previous 2-3 years that seems to have reversed itself this past year. This could have to do with the Yucaipa Valley Water District's filtration plant, which came online in 2006. This event reduced extractions from the Calimesa Basin and likely contributed to the stabilization of the water level. The slight drop from 2014-2017 could have to do with the drought from 2012-2016.

These figures represent only a small portion of all groundwater elevation data available in the region. These data indicate that, in general, groundwater elevations continue to decline except in certain areas where recharge of imported water or the switch to surface water is apparently stabilizing or even raising the water levels. Reductions in extractions over the past six years have in many cases slowed the rate of decline.

The implications of lower water levels are great. As water levels decline throughout the local basins, every well will have to pump water from a lower elevation, thus increasing power costs for well owners and rate payers. Some overliers' wells may be quite shallow, and as water levels decline further some of these wells may be in danger of going dry. This would necessitate a large expense to the overlier—either a new well, a deeper well, or connection to one of the water purveyors' systems.

In general, continually decreasing water levels can also lead to land subsidence (sinking) and the drying up of traditional wetlands or streambeds. In the region, most of these wet areas, to the extent that they existed, dried up decades ago. The Beaumont Basin Watermaster is charged with monitoring land elevations to determine if subsidence is occurring in the Beaumont Basin. As of this time, the Watermaster has not reported any appreciable land subsidence over the basin.

The Sustainable Groundwater Management Act (SGMA) will require Groundwater Sustainability Plans (GSP's) for all medium and high priority groundwater basins in California by 2022, with sustainability to be reached within 20 years after that time. It remains to be seen how SGMA may impact long-term groundwater levels, though it is likely that they will stabilize over the next two decades. This report will continue to monitor water levels in part to determine if implementation of these GSP's will impact all wells, or some fraction thereof.

4.0 Water Quality

4.1 State Water Project

The Agency takes delivery of its State Water Project water at the Devil Canyon hydroelectric facility in San Bernardino and conveys it through the East Branch Extension to various delivery points. Water quality is a very important component of the Agency's supplemental water supply program.

Table 5 shows six common constituents and their measured monthly concentrations from the SWP system at Devil Canyon over the past four years. TDS, or total dissolved solids, is perhaps the most significant constituent in this table. It represents salinity, which is important to water agencies in California. It can be seen that TDS was mostly below 300 parts per million (ppm) or milligrams per liter (mg/l) through 2013. In 2014, the third consecutive year of drought, a number of readings above 300 appear; this is to be expected in dry years. This continued in 2015, another dry year, as the monthly average was above 300 every month that year. In 2016, a somewhat wetter year, the monthly average is above 300 for six of the twelve months. Many readings from 2011 through 2013 are in the 240-250 ppm range, and there are a number of readings in the 220 range and below. In 2011, which was a relatively wet year in northern California, TDS readings were very low after January. This is significant because the ambient salinity concentration of the Beaumont Basin is approximately 280 ppm, so the great majority of the time, importation of SWP water reduces the overall concentration of salinity in the Beaumont basin. The numbers show that 2018 was an average year in Northern California, as the TDS numbers are average throughout the year. The monthly average ranges from a low of 212 ppm in September to a high of 295 ppm in November.

Figure 18 shows the monthly average salinity concentration at Devil Canyon since 2008, while **Figure 19** shows the annual average since 1992. **Table 5** and **Figure 18** clearly show an outlier salinity concentration in 2014 that is likely the result of an incorrect reading or analysis. The annual average shown in Figure 19 is useful because it indicates clearly that salinity is higher in dry years and lower in wet years (as measured in northern California). The two highest years, 1991 and 1992, were very dry and the last two years of a five year drought in California. The years 1996, 1997, 1998, 2006, 2011, and 2017 were all very wet years (in the case of 2011 and 2017, it was a wet year in northern California, where State Water Project water originates). Salinity in 2010 is significantly lower than the previous three years, which represented a three year drought in California. This inverse correlation between salinity and rainfall comes about because State Water Project water passes through the Sacramento/San Joaquin delta. In dry years, there is less fresh water available to flush out the system by pushing relatively more saline water to the ocean, so the fresh water/salt water interface is higher in the delta and hence salinity of SWP water is higher.

These figures also point out why it is advantageous to take more water in wet years when it is available—the water has a lower salinity in those years. In the long term, water quality (from a salinity standpoint) is helped by hydrology, as more water is typically delivered in wet years when salinity is lower, and less water is delivered in dry years when salinity is higher.

4.2 Groundwater

The Santa Ana Regional Water Quality Control Board's Basin Plan has a maximum benefit goal of 330 ppm of salinity for the Beaumont Management Zone, which includes the Beaumont Basin. The current ambient salinity concentration in the Beaumont basin is approximately 280 ppm. The Basin Plan requires local entities to begin planning desalters when the ambient TDS concentration increases to 320 ppm or if other conditions are met. These desalters must be online within seven years after that time. The City of Beaumont is developing a plan to construct a desalter within the next few years

Groundwater quality in the region is very high. There is no known historical industrial or mining activity in the region that has generated harmful plumes of pollutants. In addition to salinity or TDS, nitrate is the only other constituent that needs to be monitored closely. This too is regulated by the Regional Board, but nitrate concentrations are currently well within the maximum benefit standards. Over the past few years there have been isolated incidents of high nitrates at individual wells for short periods of time, typically after a large rainstorm that causes flushing of the system. However these have not proven to be a health hazard.

Nitrates in ambient groundwater do not necessarily translate to a danger in drinking water. Nitrates in drinking water are regulated by the California Department of Public Health, not the Regional Board. Nitrates in groundwater can effectively be managed if needed through dilution. If nitrates were to become a persistent problem in a particular location, the local purveyor may consider installing wellhead treatment for nitrates. Such treatment is costly. However, there is no evidence that such treatment is needed in the region at this time.

It should be noted that salinity in drinking water is regulated by a secondary water quality standard, while nitrate is regulated under a primary standard. Primary standards are for constituents that can directly impact human health. Secondary standards are for constituents that do not directly impact human health, but that may have aesthetic issues. Salinity is not harmful to human health and safety directly, while nitrate can be harmful at high concentrations, particularly to infants.

In 2013, the California Department of Public Health changed the maximum contaminant level (MCL) for chromium 6 in drinking water, lowering the standard. Because of this change in the standard, several wells in the region suddenly became unusable, as they produced water with chrome 6 that met the previous MCL, but not the new one. Chrome 6 is a naturally occurring contaminant that is present at some level in many areas of California, including the San Gorgonio Pass. Because of the more stringent standard, some wells owned by the City of Banning and the Beaumont Cherry Valley Water District were temporarily taken out of service, pending implementation of a fix to the problem. This water quality issue has had an impact on water supplies in the region, as those wells are now not able to produce potable water for those two purveyors. Those entities are currently taking steps to ensure that all drinking water served meets this more stringent standard, and plan to meet the State's timeline for doing so, thus ensuring that drinking water meets all water quality standards.

4.3 Emerging Contaminants

There is a relatively new class of chemical constituents that has recently been found in the environment and in drinking water known as emerging contaminants. These are primarily pharmaceuticals and personal care products (PPCP's) that pass through human or animal bodies or get flushed and end up in sewage or septic flows. They have become known because of the technological ability to measure concentrations at increasingly smaller concentrations (parts per billion or even parts per trillion). Because of their presence in the environment, the Santa Ana Regional Water Quality Control Board has required that dischargers (those entities that own and operate sewage treatment plants) monitor for these constituents on an annual basis.

There is no evidence that these constituents are harmful to humans in their current concentrations in the environment. Some groups have claimed that these products could harm animals in the environment and thus have called for their regulation. At this point in time they are not regulated. Water agencies in the watershed are developing a database so that the number and concentrations of these constituents can be monitored on an ongoing basis.

Emerging contaminants are mentioned in this report not because they have any immediate impact on water quality in the region, or even that they are expected to have an impact in the near future. They are included because they are mentioned increasingly in the literature and by regulators as a growing issue for the water industry to be aware of.

5.0 SUMMARY

Reported groundwater extractions within the region increased by 6% in 2018, following an 11% increase the previous year and the third consecutive increase following a 25% drop in 2015. Total extractions in 2018 were still 20% below levels for 2007, the peak historical year for extractions in the region. This is likely due to continued conservation efforts following mandatory water conservation regulations imposed by the State Water Resources Control Board in 2015 but does reflect increased usage as the region grows and as a five year drought gets further in the rear view mirror.

Local retail water purveyors continue to make progress in implementing recycled water systems. These systems are complex and expensive to complete, and funding and water quality (salinity) are key issues that require attention. Implementation of these systems over the next few years should reduce groundwater extractions significantly. Such reductions began in 2016, when the Yucaipa Valley Water District received a permit to deliver recycled water. The Regional Water Quality Control Board has adopted a Basin Plan Amendment which will have an impact on the proposed recycled systems by changing water quality rules.

Another factor leading to reduced withdrawals is the reduction in the safe yield of the Beaumont Basin, as published by the Beaumont Basin Watermaster in early 2015.

Based on data in this report, there is evidence that groundwater levels have increased slightly in portions of the region over the past three to five years. In other areas, the rate of groundwater decline has slowed. At the same time, groundwater levels continue to drop in some areas within the region. Future reports will determine the significance of these data. Lower groundwater levels in shallow basins in dry years is not a long-term concern; however, continued falling groundwater levels in larger, deeper basins would be cause for concern.

The Sustainable Groundwater Management Act, passed by the Legislature and signed by the Governor in 2014, will require most groundwater basins in California to have a plan to be managed sustainably by 2022. The Agency will actively participate in these plans for the required basins in the region. These plans will be required to reduce long-term groundwater mining and will require basins to be managed sustainably.

Over the past eight to ten years, retail water agencies in the region have done a good job of managing local water resources. The Yucaipa Valley Water District has built a surface water treatment plant in order to reduce its groundwater withdrawals, and also a desalter and brine line to facilitate use of recycled water for non-potable uses. The Beaumont Cherry Valley Water District has constructed a recharge facility in the Beaumont Basin and has purchased a large quantity of replenishment water from the Agency. The City of Banning has purchased water for replenishment as well, and is working with Southern California Edison, the Banning Heights Mutual Water Company, and the Agency to make improvements to a system that delivers runoff from the San Bernardino Mountains to the Banning Bench and the City of Banning. High Valleys Water District has replaced much of its old, leaky pipe, thus reducing its water losses significantly. The Cabazon Water District has also reduced its water losses significantly. The South Mesa Water Company has drilled a new, more efficient well. Several water purveyors have implemented tiered rate structures, which tend to reduce water usage. Three major recycled water systems are in the planning, design, or construction phase. These are all positive steps that will help extend and preserve local groundwater basins into the future.

During this same time period, the Agency has increased its imported water deliveries to such an extent that, in seven of the past nine years, more water was put into the Beaumont Basin than withdrawn from it. A three-year string was broken in 2014 and 2015 due to the fact that less water was available from the State Water Project, but in 2016 this trend returned. Since the completion of Phase I of the East Branch Extension in 2003, the Agency has increased its deliveries to the region every year, with the exception of 2005, 2013, 2014, 2015, and 2018 (three of the latter four being dry years). Overall, the Agency has delivered approximately 112,000 acre-feet of State Water Project water over the past sixteen years, either for replenishment, overdraft mitigation, or direct deliveries.

In the future, the local economy and local weather patterns will continue to play large roles in determining water demands each year. As new homes are constructed in the future, recent legislation will require lower water use landscaping. This should reduce per capita water consumption for future development, further extending the life of local water resources. Production data for 2015 and 2016 bear this out. The Legislature is considering mandating this reduced per capita usage through proposed legislation.

Based on data in this report and observation of ongoing events, it is apparent that the recession has long ago ended, and construction of new homes in the region is increasing, thereby increasing water demands. The Agency and retail water purveyors will need to work together to continue to meet the increasing water demands of the region.

A newly adopted MCL for chrome 6 has had a negative impact on local groundwater supplies. Purveyors impacted by this will have to determine how to address this issue so that these supplies may be brought back online or replaced with other sources.

San Gorgonio Pass Water Agency
Totals by Basin
Non-Verified Production Data
(in acre feet)

Basin	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Banning	1,787	2,512	1,999	2,787	1,782	1,845	1,715	1,759	2,180	1,734	2,607	2,651	2,963
Banning Bench	2,987	2,199	1,299	1,415	1,561	1,395	1,719	1,776	1,076	723	312	162	430
Banning Canyon	3,464	2,662	3,237	2,771	3,941	3,820	4,091	3,216	2,636	2,491	2,450	3,376	2,396
Beaumont	17,140	19,032	17,264	14,643	13,158	13,600	14,302	16,236	17,970	12,954	13,529	15,049	16,973
Cabazon	1,314	1,466	1,412	1,258	1,054	900	654	1,226	1,076	983	967	1,277	1,288
Calimesa (2)	1,445	1,532	1,133	1,315	1,114	993	1,169	950	853	767	943	904	927
Edgar Canyon (1)	3,872	3,085	3,140	2,784	3,100	3,467	3,313	2,813	2,502	1,460	1,457	1,402	1,496
Millard Canyon (3)	707	842	757	750	750	750	750	850	850	750	750	750	750
San Timoteo	1,904	1,384	1,533	1,367	1,329	1,297	1,312	1,062	982	722	751	784	712
Singleton	645	666	471	382	405	412	448	312	443	217	353	368	365
South Beaumont	83	94	79	97	119	115	102	92	103	34	31	31	30
Totals	**35,348**	**35,474**	**32,324**	**29,569**	**28,313**	**28,594**	**29,575**	**30,292**	**30,671**	**22,835**	**24,150**	**26,754**	**28,330**

Notes:
Amounts shown are rounded to nearest acre-foot
Amounts as reported to the SWRCB Division of Water Rights, made available by a purveyor, reported by Beaumont Basin Watermaster or estimated by SGPWA
Data revised to agree with basin boundaries as defined in USGS 2004 report
(1) Includes wells located in Upper Edgar Canyon in San Bernardino County
(2) Includes wells located in Riverside and San Bernardino County
(3) Estimate only

Table 1: Groundwater Production in San Gorgonio Pass Water Agency by Basin (2006 through 2018 as reported)

San Gorgonio Pass Water Agency
Totals by Owner
Non-Verified Production Data
(in acre feet)

Owner	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Albor Properties III, LP	170	175	200	193	174	177	4	51	7	7	6	6	2
Banning Heights Mutual Water Co.	21	22	31	4	17	13	45	69	78	29	21	8	55
Banning, City of (1)	10162	10223	9583	8996	8415	8454	8576	8743	8468	6722	7036	7575	7935
Beaumont-Cherry Valley Water District (1)	11748	13031	12744	10849	10975	11698	12153	12829	13284	10613	11507	12902	13764
Beckman, Dave	116	83	13										
Brinton, Barbara		10	10	10	10	10	10	10	10	10	10	10	10
Cabazon Water District	966	923	875	905	710	509	269	854	628	515	497	508	498
Dowling, Frances M. Jr.	83	94	79	72	96	92	79	69	80	11	8	8	7
El Casco LLC c/o Riv. Land Conserv(4)	165	165	165	165	165	160	165	10	10	10	10	10	0
Hudson, Merton Lonnie	435	445	435	430	430	410	485	521	540	130	130	**124**	60
Illy, Katharina	267	265	265	265	270	270	270	270	270	270	260	240	240
Lane, Christie													
Merlin Properties, LLC	100	100	150	175	100	150	200	5	5	10	10	10	10
Mission Spring Water District	190	206	164	162	144	150	146	148	155	146	145	156	152
Morongo Band of Mission Indians (3) (6)	2530	2326	1890	1908	1541	1634	1736	1949	2076	1649	1709	1741	1761
Oak Valley Management	965	742	781	753	546	573	821	597	625	512	377	748	539
Oak Valley Partners	312	312	311	311	311	12	12		24	24	24	2	24
Perisits, Jack													
Plantation on the Lake (2)	47	46	47	49	43	46	48	50	50	40	45	45	471
Rancho Calimesa Mobile Home Ranch	61	61	40	40	42	42	24	24	16	16	26	30	33
Riverside County Parks Department						50	50	50	50	50	50	50	0
Robertson's Ready Mix	158	337	373	191	200	241	239	224	293	322	325	613	638
Roman Catholic Bishop	70	70											
Sharondale Mesa Owners Association	189	183	196	154	131	133	145	147	130	94	84	118	88
Shiloh's Hill LLC	146	150	61	172	200	229	193						
South Mesa Water Co.	2711	2839	2681	2514	2222	2224	2376	1889	1918	1424	1705	1743	1734
Summit Cemetery District	65	65	65	90	88	88	88	88	88	88	88	88	88
Sun Cal Companies	555												
Sunny-Cal Egg & Poultry, Inc.	50	50	50	50	25	28	28		1	22			
Wildlands Conservancy, The	301	9	21	40	16	8	7	20	17	0			
Yucaipa Valley Water District	2422	2072	659	685	949	665	901	1266	1344	121	77	64	221
Totals	**0**	**35,004**	**31,889**	**29,183**	**27,820**	**28,066**	**29,070**	**29,883**	**30,167**	**22,835**	**24,150**	**26,799**	**28,330**

Notes:

Amounts shown are rounded to nearest acre-foot
Amounts as reported to the SWRCB Division of Water Rights, made available by a purveyor, reported by Beaumont Watermaster or estimated by SGPWA
Data revised to agree with basin boundaries as defined in USGS 2004 report
(1) Amount adjusted for production in 2006, 2007, 2008 & 2009 by BCVWD for City of Banning from co-owned wells
(2) 2010 Data not reported - Preceeding year (2009) data used
(3) Previous Well Owners - Arrowhead Mtn Spring Bottling Co. & East Valley Golf Club LLC
(4) El Casco Lake Ranch merged with Riverside Land Conservancy
(5) Desert Hills Premium Outlets merged with Cabazon Water District
(6) Estimate only

Table 2: Groundwater Production in San Gorgonio Pass Water Agency by Purveyor (2006 through 2018, as reported)

San Gorgonio Pass Water Agency
Totals by Owner by Basin
Non-Verified Production Data
(in acre feet)

Owner	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
BANNING BASIN													
Banning, City of	1,787	2,512	1,999	2,787	1,782	1,845	1,715	1,759	2,180	1,734	2,607	2,651	2,963
TOTALS FOR BANNING BASIN	1,787	2,512	1,999	2,787	1,782	1,845	1,715	1,759	2,180	1,734	2,607	2,651	2,963
BANNING BENCH BASIN													
Banning, City of	2,922	2,124	1,224	1,340	1,486	1,320	1,644	1,701	1,001	648	237	87	355
Brinton, Barbara	0	10	10	10	10	10	10	10	10	10	10	10	10
Summit Cemetery District	65	65	65	65	65	65	65	65	65	65	65	65	65
TOTALS FOR BANNING BENCH BASIN	2,987	2,199	1,299	1,415	1,561	1,395	1,719	1,776	1,076	723	312	162	430
BANNING CANYON BASIN													
Banning Heights Mutual Water Co.	21	22	31	4	17	13	45	69	78	29	21	8	55
Banning, City of	3,443	2,640	3,206	2,767	3,924	3,807	4,046	3,147	2,558	2,462	2,429	3,368	2,341
Lane, Christie	0	0	0	0	0	0							
TOTALS FOR BANNING CANYON BASIN	3,464	2,662	3,237	2,771	3,941	3,820	4,091	3,216	2,636	2,491	2,450	3,376	2,396
BEAUMONT BASIN													
Albor Properties III, LP	170	175	200	193	174	177	4	51	7	7	6	6	2
Banning, City of (1)	2,010	2,947	3,154	1,623	1,223	1,482	1,171	2,136	2,729	1,878	1,763	1,469	2,276
Beaumont-Cherry Valley Water District (1)	9,200	11,096	10,617	9,643	9,100	9,539	10,163	11,096	11,959	9,333	10,230	11,629	12,328
Dave Beckman	116	83	13	0	0	0	0	0	0	0	0	0	0
Merlin Properties, LLC	100	100	150	175	100	150	200	5	5	10	10	10	10
Morongo Band of Mission Indians (2)	1,823	1,484	1,133	1,158	791	884	986	1,099	1,226	899	959	991	1,011
Oak Valley Management, LLC	965	742	781	753	546	573	821	597	625	512	377	748	539
Oak Valley Partners	312	312	311	311	311	12	12	0	24	24	24	2	24
Plantation on the Lake	47	46	47	49	43	46	48	50	50	40	45	45	471
Rancho Calimesa Mobile Home Ranch	61	61	40	40	42	42	24	24	16	16	26	30	33
Roman Catholic Bishop	70	70	0	0	0	0	0	0	0	0	0	0	0
Sharondale Mesa Owners Association	189	183	196	154	131	133	145	147	130	94	84	118	88
Sunny-Cal Egg & Poultry, Inc.	50	50	50	50	25	28	28	0	1	22	0	0	0
Yucaipa Valley Water District	2,027	1,683	572	494	672	534	700	1,031	1,198	119	5	1	191
TOTALS FOR BEAUMONT BASIN	17,140	19,032	17,264	14,643	13,158	13,600	14,302	16,236	17,970	12,954	13,529	15,049	16,973
CABAZON BASIN													
Cabazon Water District	966	923	875	905	710	509	269	854	628	515	497	508	498
Mission Springs Water District	190	206	164	162	144	150	146	148	155	146	145	156	152
Robertson's Ready Mix	158	337	373	191	200	241	239	224	293	322	325	613	638
TOTALS FOR CABAZON BASIN	1,314	1,466	1,412	1,258	1,054	900	654	1,226	1,076	983	967	1,277	1,288

Table 3: Groundwater Production in San Gorgonio Pass Water Agency by Purveyor by Basin (2006 through 2018 as reported)

San Gorgonio Pass Water Agency
Totals by Owner by Basin
Non-Verified Production Data
(in acre feet)

Owner	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CALIMESA BASIN													
Illy, Katharina	267	265	265	265	270	270	270	270	270	270	260	240	240
South Mesa Water Co.	882	954	842	930	653	675	781	525	503	495	611	657	657
Yucaipa Valley Water District	296	313	26	120	191	48	118	155	80	2	72	30	30
TOTALS FOR CALIMESA BASIN	1,445	1,532	1,133	1,315	1,114	993	1,169	950	853	767	943	927	927
EDGAR CANYON BASIN													
Beaumont-Cherry Valley Water District	2,548	1,935	2,127	1,685	1,875	2,159	1,990	1,733	1,325	1,280	1,277	1,436	1,436
Hudson, Merton Lonnie	435	445	435	430	430	410	485	521	540	130	130	60	60
Riverside County Parks Department						50	50	50	50	50	50	0	0
TOTALS FOR EDGAR CANYON BASIN	2,983	2,380	2,562	2,115	2,305	2,619	2,525	2,304	1,915	1,460	1,457	1,496	1,496
MILLARD CANYON BASIN													
Morongo Band of Mission Indians (3) (4)	707	842	757	750	750	750	750	850	850	750	750	750	750
TOTALS FOR MILLARD CANYON BASIN	707	842	757	750	750	750	750	850	850	750	750	750	750
SAN TIMOTEO BASIN													
El Casco LLC c/o Riv Land Conserv	165	165	165	165	165	160	165	10	10	10	10	0	0
Morongo Band of Mission Indians (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
South Mesa Water Co.	1,184	1,219	1,368	1,202	1,164	1,137	1,147	1,052	972	712	741	712	712
SunCal Companies	555	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS FOR SAN TIMOTEO BASIN	1,739	1,219	1,368	1,202	1,164	1,137	1,147	1,062	982	722	751	712	712
SINGLETON BASIN													
South Mesa Water Co.	645	666	471	382	405	412	448	312	443	217	353	365	365
TOTALS FOR SINGLETON BASIN	645	666	471	382	405	412	448	312	443	217	353	365	365
SOUTH BEAUMONT BASIN													
Dowling, Frances M. Jr.	83	94	79	72	96	92	79	69	80	11	8	7	7
Summit Cemetery District				25	23	23	23	23	23	23	23	23	23
TOTALS FOR SOUTH BEAUMONT BASIN	83	94	79	97	119	115	102	92	103	34	31	30	30
TOTALS FOR ALL BASINS	**34,294**	**34,604**	**31,581**	**28,735**	**27,353**	**27,586**	**28,622**	**29,783**	**30,084**	**22,835**	**24,150**	**26,795**	**28,330**

Notes:

Amounts shown are rounded to nearest acre-foot

Amounts as reported to the SWRCB Division of Water Rights, made available by a purveyor, reported by Beaumont Basin Watermaster or estimated by SGPWA

Data revised to agree with basin boundaries as defined in USGS 2004 report

(1) Amount adjusted for production in 2006, 2007, 2008 & 2009 by BCVWD for City of Banning from co-owned wells

(2) Previous Well Owner - East Valley Golf Club LLC

(3) Previous Well Owner - Arrowhead Mountain Spring Water Bottling Co.

(4) Estimate only

Table 3: Groundwater Production in San Gorgonio Pass Water Agency by Purveyor by Basin (2006 through 2018 as reported)

State Water Project Deliveries to San Gorgonio Pass Water Agency Service Area

Calendar Year	Amount in Acre-Feet	Allocation
2003 (1)	116	90%
2004	814	65%
2005	687	90%
2006 (2)	4420	100%
2007 (2)	4815	60%
2008 (2)	4905	35%
2009 (2)	6609	40%
2010 (2)	8403	50%
2011 (2)	10,730	80%
2012 (2)	10,974	65%
2013 (2)	9,695	35%
2014 (2)	5,131	5%
2015 (2)	3,930	20%
2016 (2)	11,461	60%
2017 (2)	15,843	85%
2018 (2)	13,174	35%
TOTAL	***111,707***	

(1) Start Up / Partial Year

(2) Includes deliveries to Yucaipa Valley Water District

Deliveries to Beaumont Cherry Valley Water District began in September 2006

Source: San Bernardino Valley Municipal Water District Operations Manager

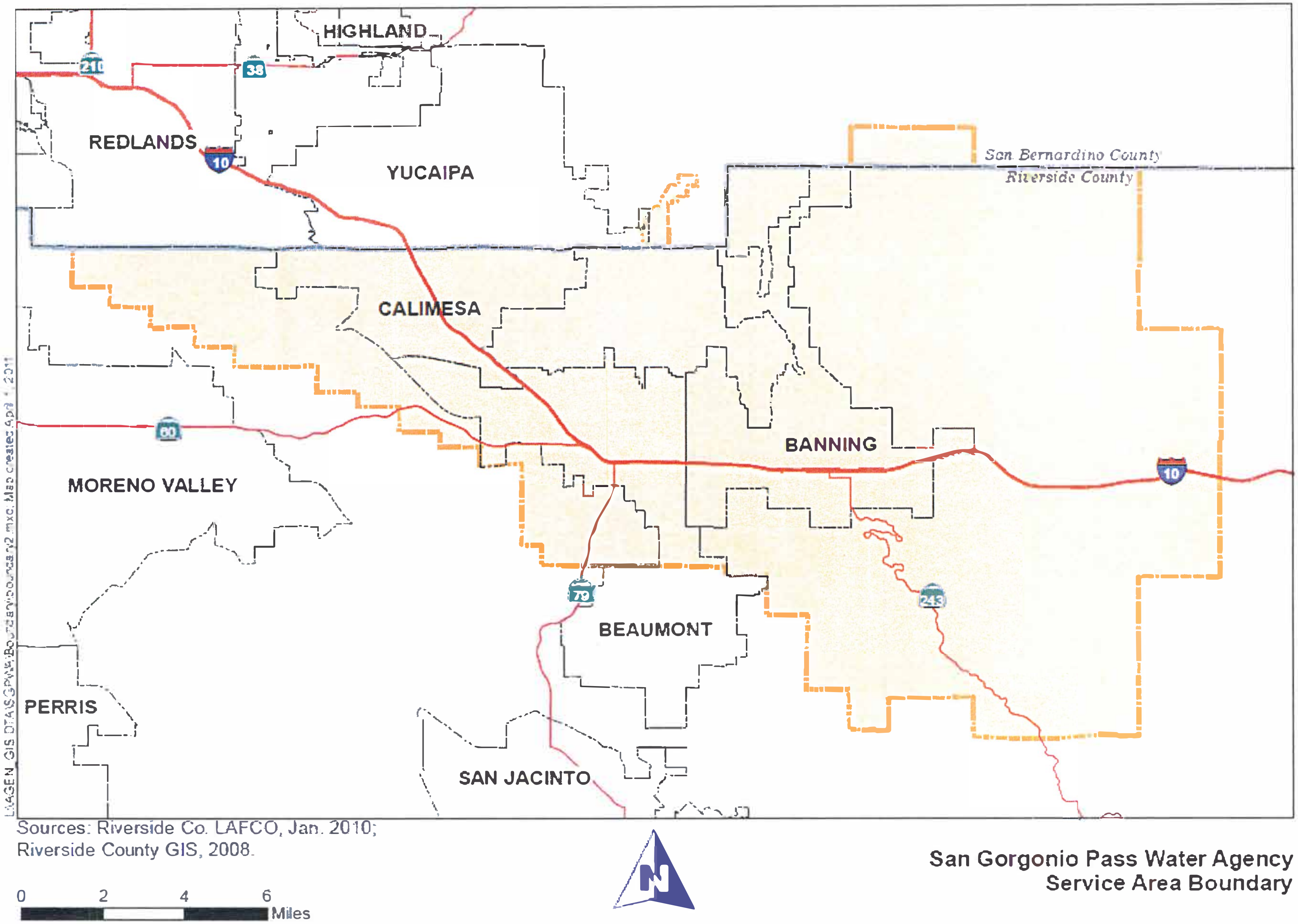
Table 4: State Water Project Deliveries to San Gorgonio Pass Water Agency Service Area

WATER QUALITY ANALYSIS AT DEVIL CANYON AFTERBAY

DATE	Chloride mg/L	Nitrate+Nitrite mg/L as N	Sodium mg/L	Sulfate mg/L	TDS mg/L	Nephelometric Turbidity Units
Jan-15	81	0.58	76	73	347	< R.L.
Feb-15	80	0.39	79	71	379	< R.L.
Mar-15	67	0.85	66	71	310	1
Apr-15	69	0.58	71	75	311	1
May-15	72	0.58	64	72	310	< R.L.
Jun-15	74	0.55	72	71	322	< R.L.
Jul-15	76	0.44	68	70	317	1.45
Aug-15	83	0.08	74	66	329	4.73
Sep-15	89	0.18	76	69	356	1.43
Oct-15	87	0.14	74	70	342	1.71
Nov-15	88	0.07	77	75	348	3
Dec-15	95	0.56	82	82	363	1.73
Jan-16	97	0.56	84	80	362	< R.L.
Feb-16	94	0.57	78	76	360	1
Mar-16	84	0.8	80	81	349	1.36
Apr-16	64	0.56	59	60	280	1.33
May-16	71	0.47	63	61	294	1.33
Jun-16	97	0.22	71	63	344	2.27
Jul-16	79	0.22	59	46	289	1.62
Aug-16	68	0.11	50	36	246	1.23
Sep-16	n/a	n/a	n/a	n/a	n/a	n/a
Oct-16	89	0.19	63	25	266	1.11
Nov-16	105	0.26	70	29	310	1.07
Dec-16	104	0.36	68	32	312	1.33
Jan-17	97	0.42	68	30	291	2.76
Feb-17	52	0.88	40	30	199	7
Mar-17	29	0.74	24	26	149	5
Apr-17	23	1.1	21	21	123	3
May-17	19	0.34	16	15	109	5.89
Jun-17	23	0.28	18	14	107	4
Jul-17	15	0.29	13	11	83	4
Aug-17	24	0.25	19	14	118	2.31
Sep-17	26	0.22	22	14	124	1.52
Oct-17	39	0.39	30	18	170	1.88
Nov-17	47	0.53	37	21	180	< R.L.
Dec-17	37	0.62	29	22	168	1.23
Jan-18	62	0.67	42	28	224	0.64
Feb-18	84	0.74	60	40	285	0.59
Mar-18	77	0.53	56	38	271	0.64
Apr-18	72	0.51	55	42	272	0.72
May-18	63	0.49	55	44	255	0.89
Jun-18	55	0.26	45	40	229	0.79
Jul-18	64	0.23	50	40	242	1.23
Aug-18	62	0.094	48	36	224	0.24
Sep-18	56	0.129	46.5	26.5	212	0.27
Oct-18	88	0.17	61	25	268	0.39
Nov-18	100	0.26	65	24	295	0.52
Dec-18	98	0.344	66.8	25.1	289	0.46

mg/L: milligrams per liter
Source: SWP/DWR Water Quality Data Reports
NR: Not Reported

Table 5: Water Quality Analysis at Devil Canyon Afterbay near San Bernardino
(Selected Constituents)



Albert A. WEBB Associates

Figure 1: San Gorgonio Pass Water Agency

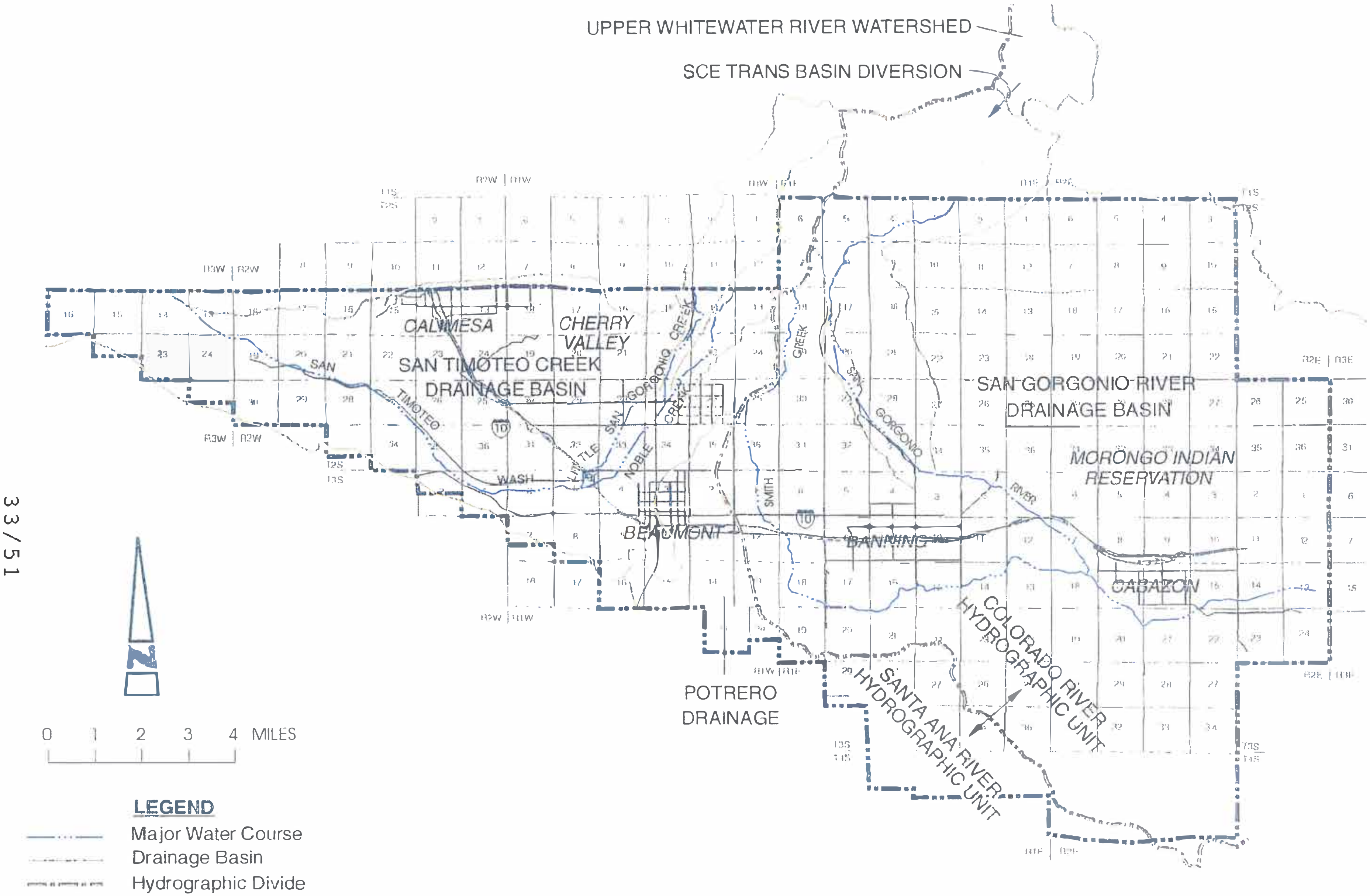


Figure 2: Drainage Basins and Principal Streams

Source USGS Scientific Investigations Report 2006-5026

Figure 3: Groundwater Storage Units

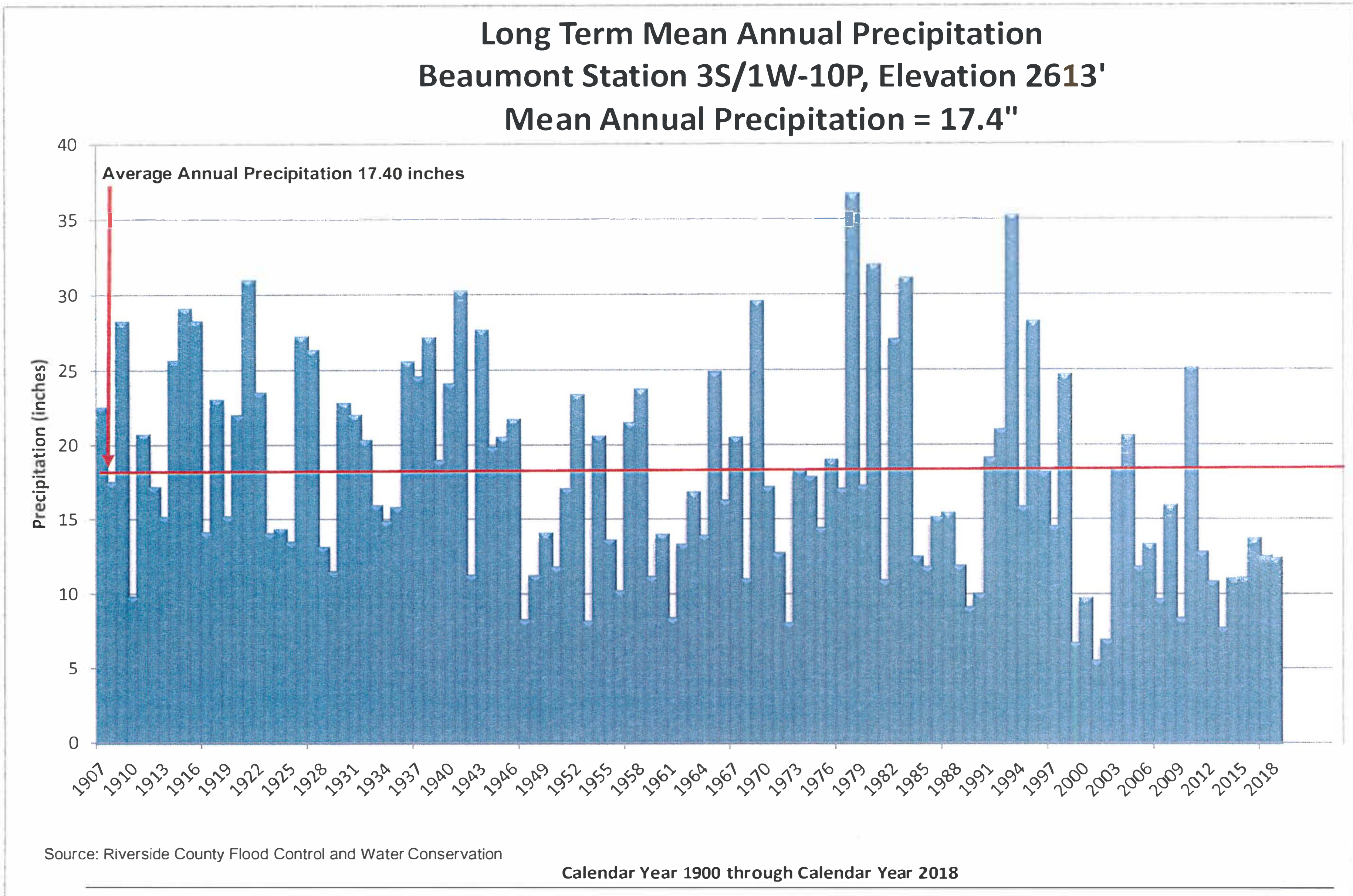


Figure 4: Long Term Mean Annual Precipitation at Beaumont

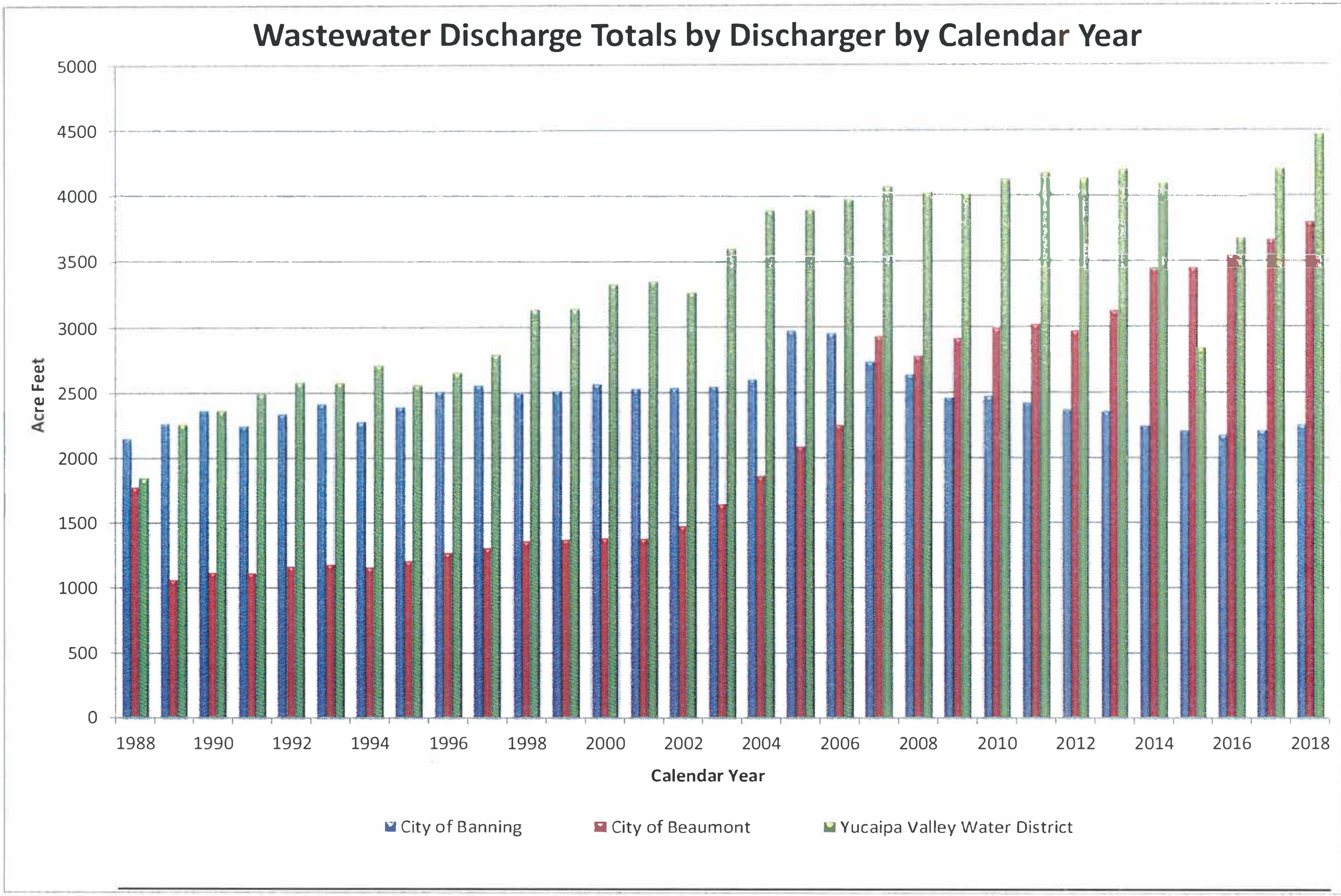


Figure 5: Wastewater Discharge Totals by Discharger by Calendar Year

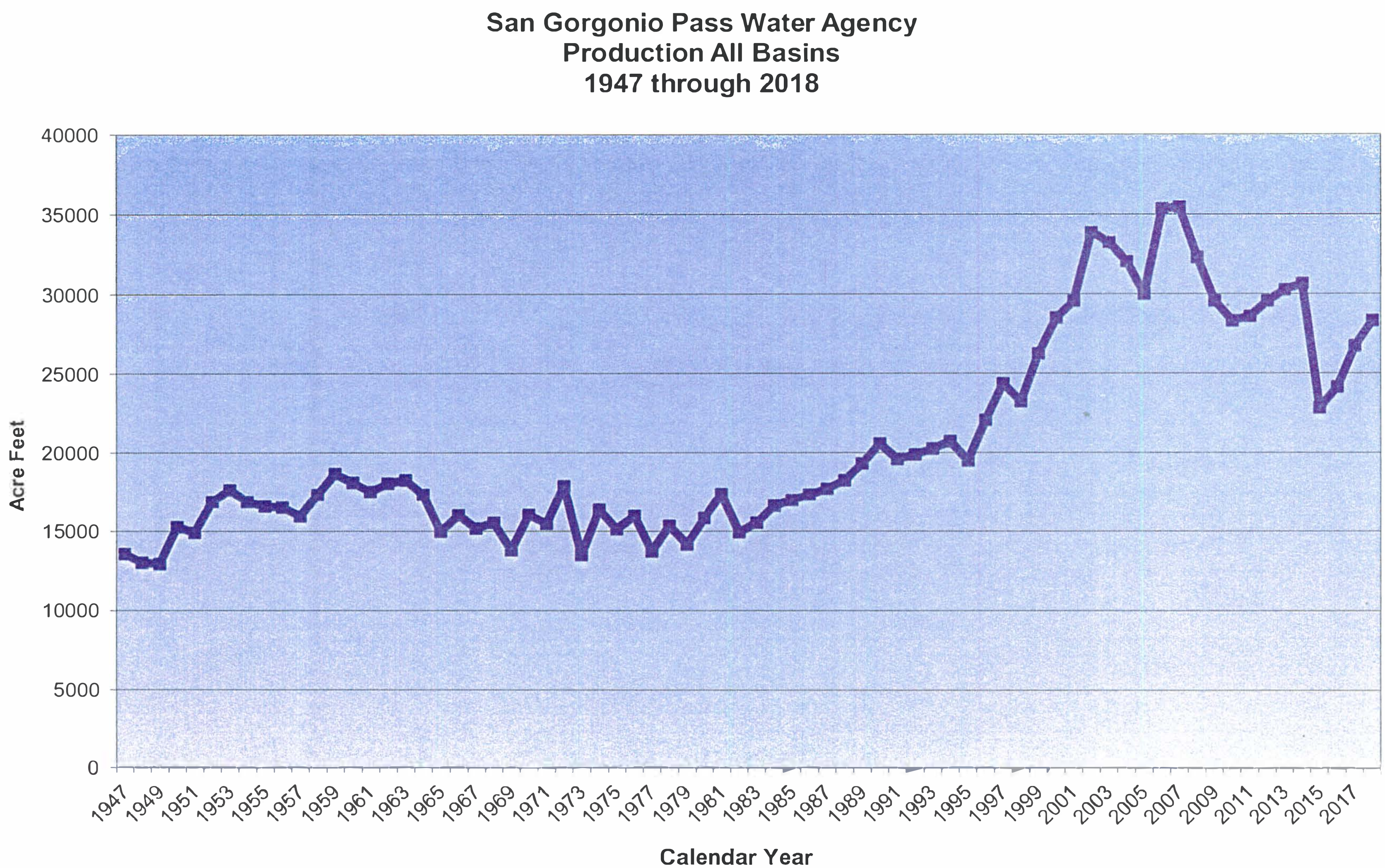


Figure 6: Historical Groundwater Production All Basins 1947 through 2018
(as reported)

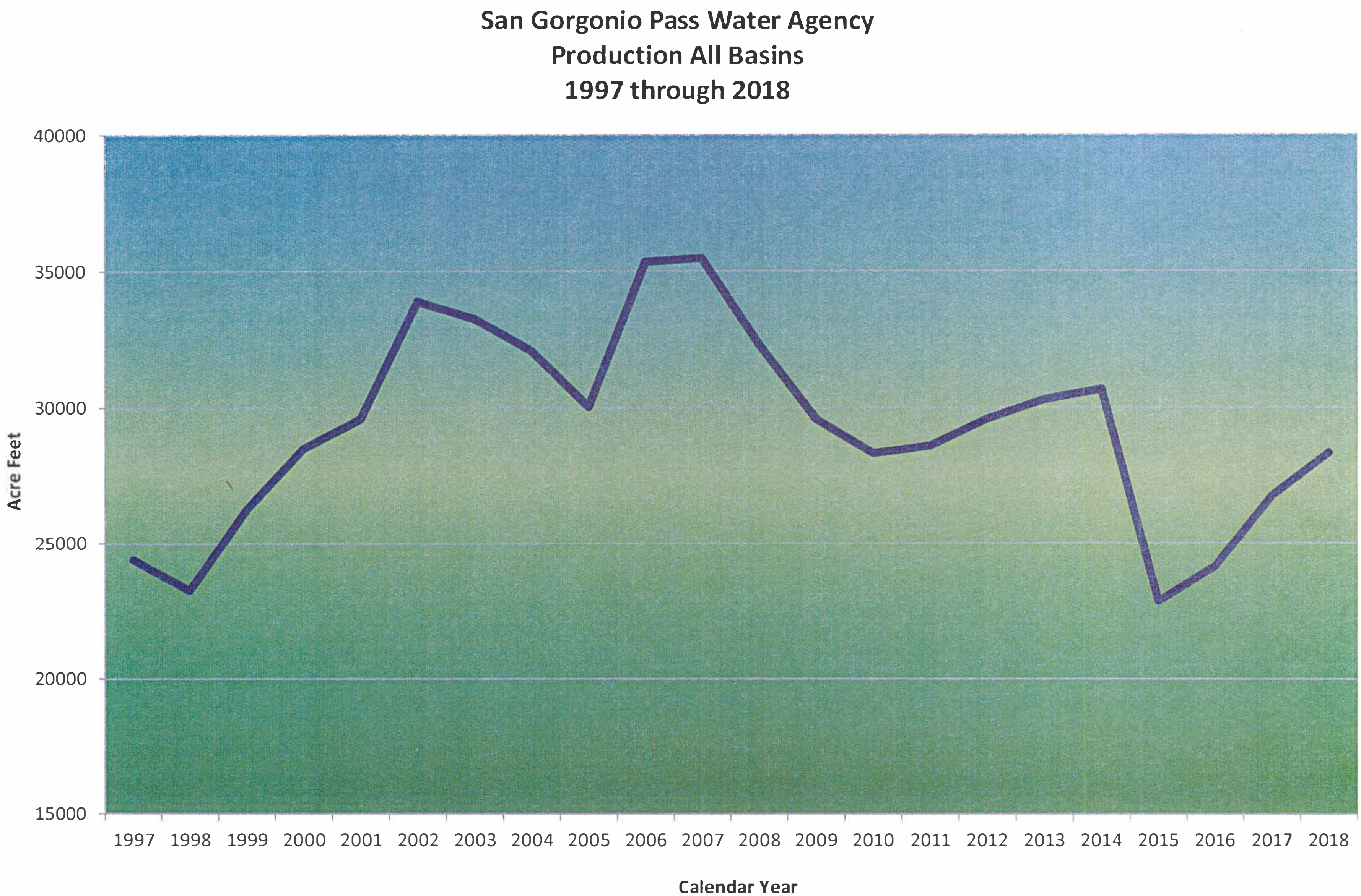


Figure 7: Historical Groundwater Production All Basins 1997 through 2018
(as reported)

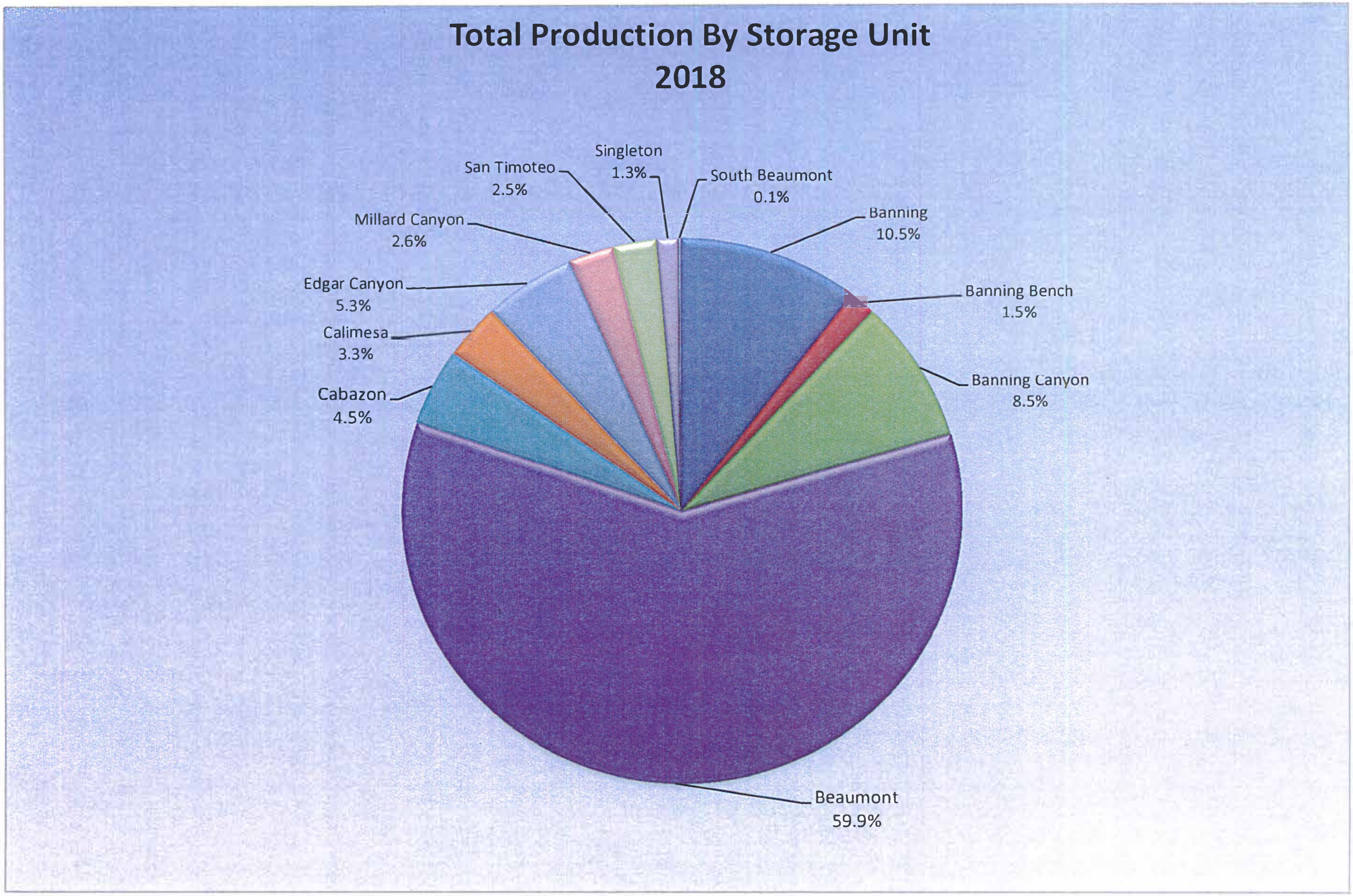


Figure 8: Total Production by Storage Unit in 2018 (as reported)

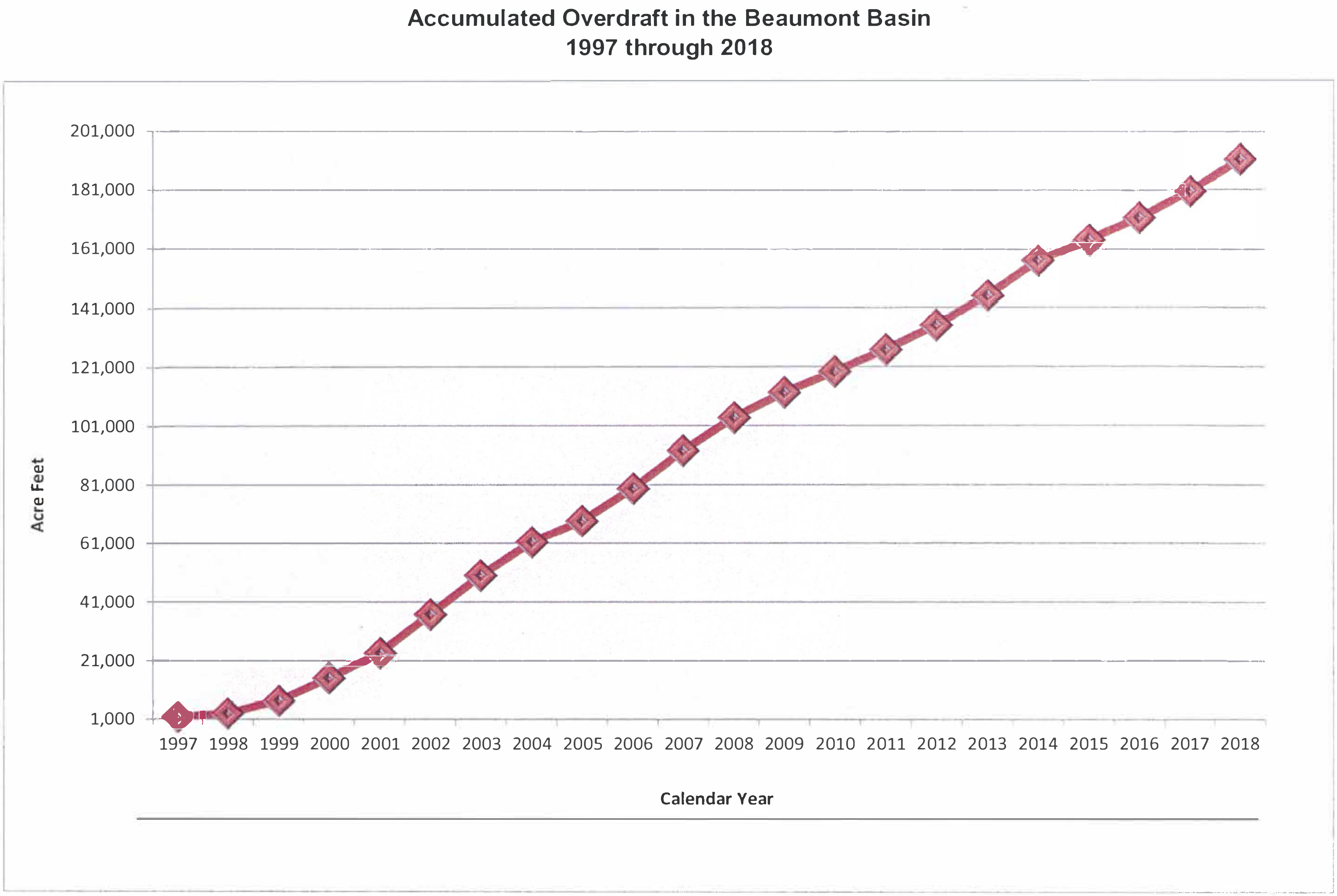


Figure 9a: Accumulated Overdraft in the Beaumont Basin 1997 through 2018

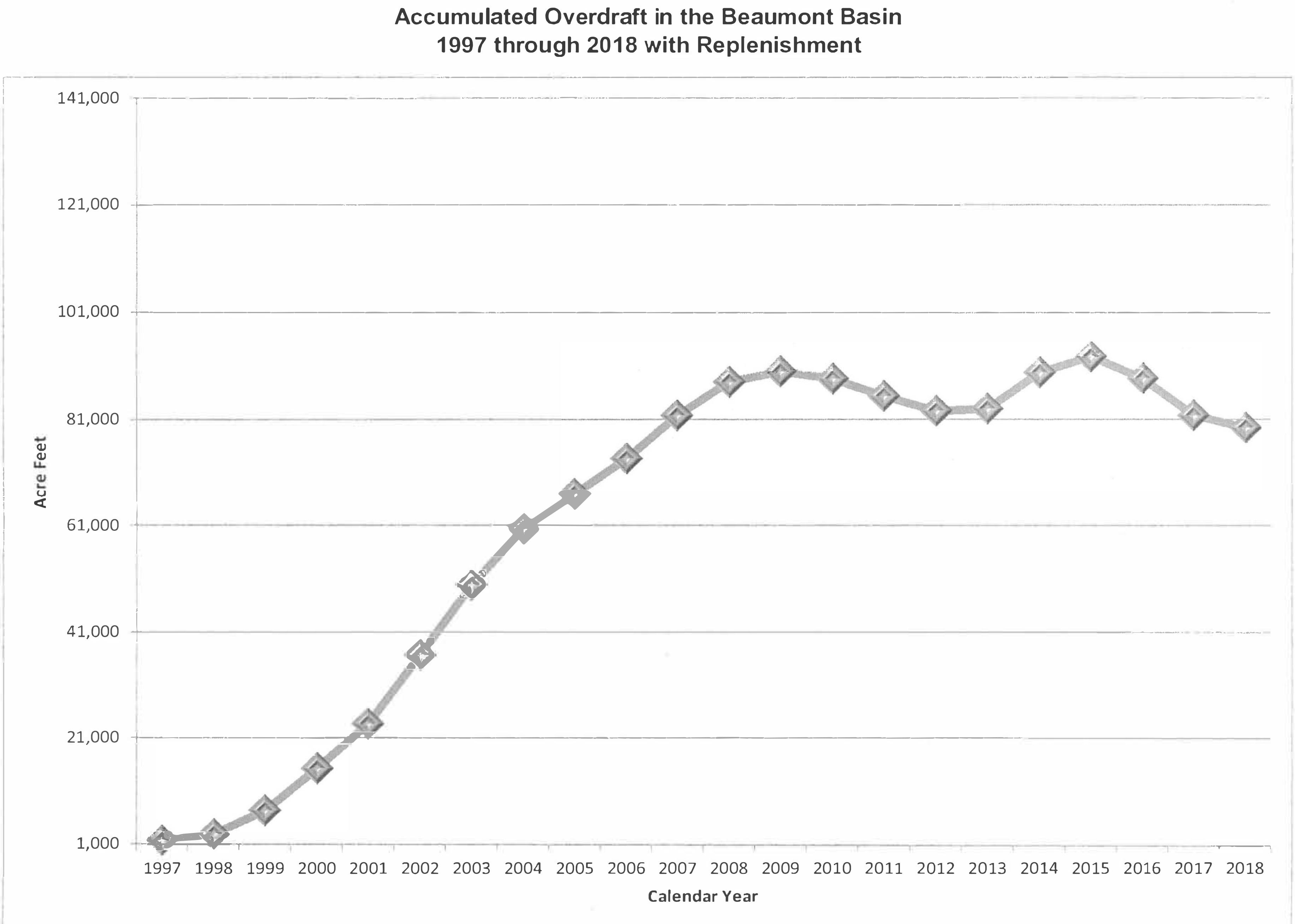
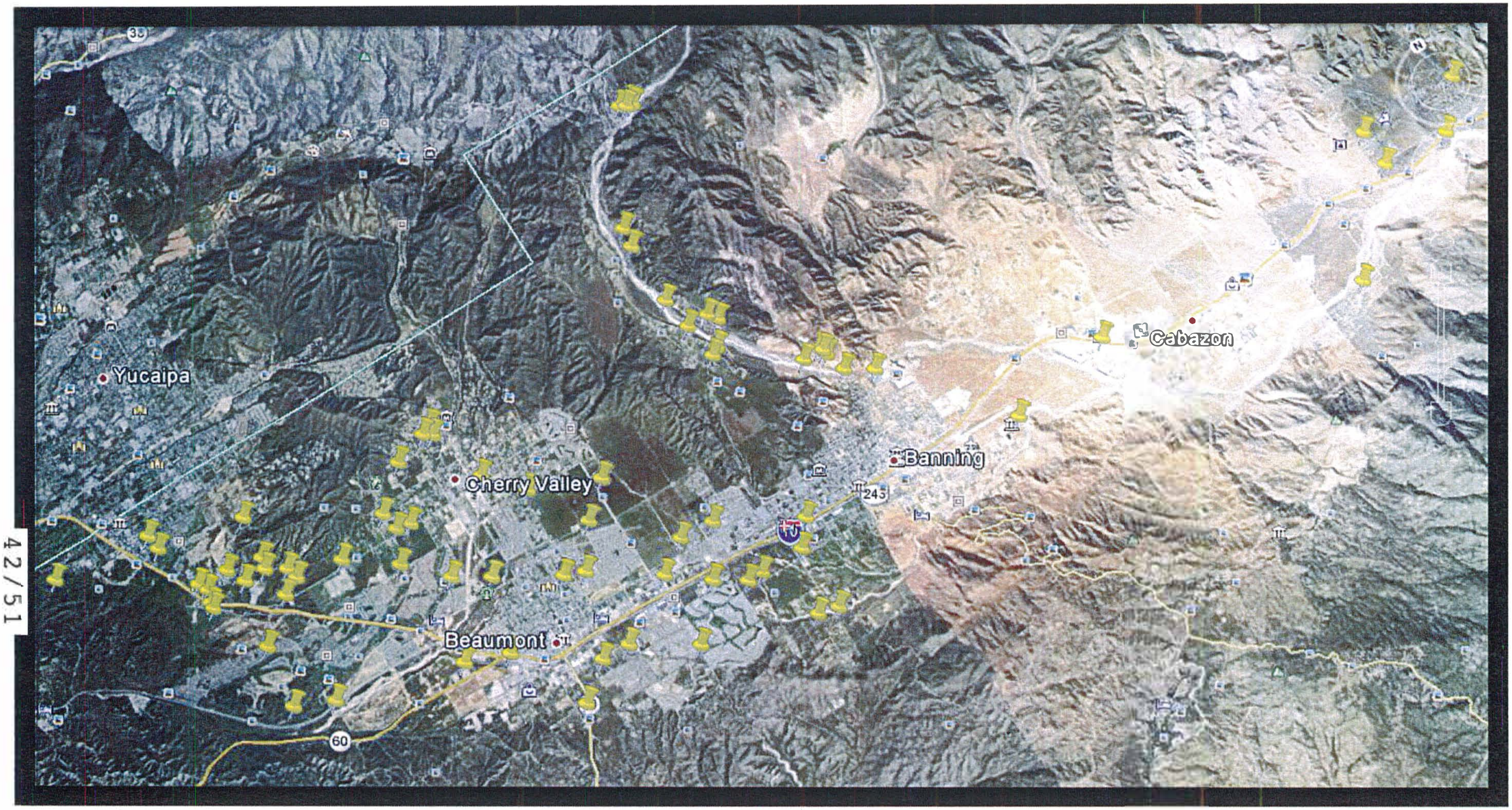


Figure 9b: Accumulated Overdraft in the Beaumont Basin 1997 through 2018 with Replenishment



SGPWA Monitoring Wells

Figure 10: San Gorgonio Pass Water Agency Monitoring Wells

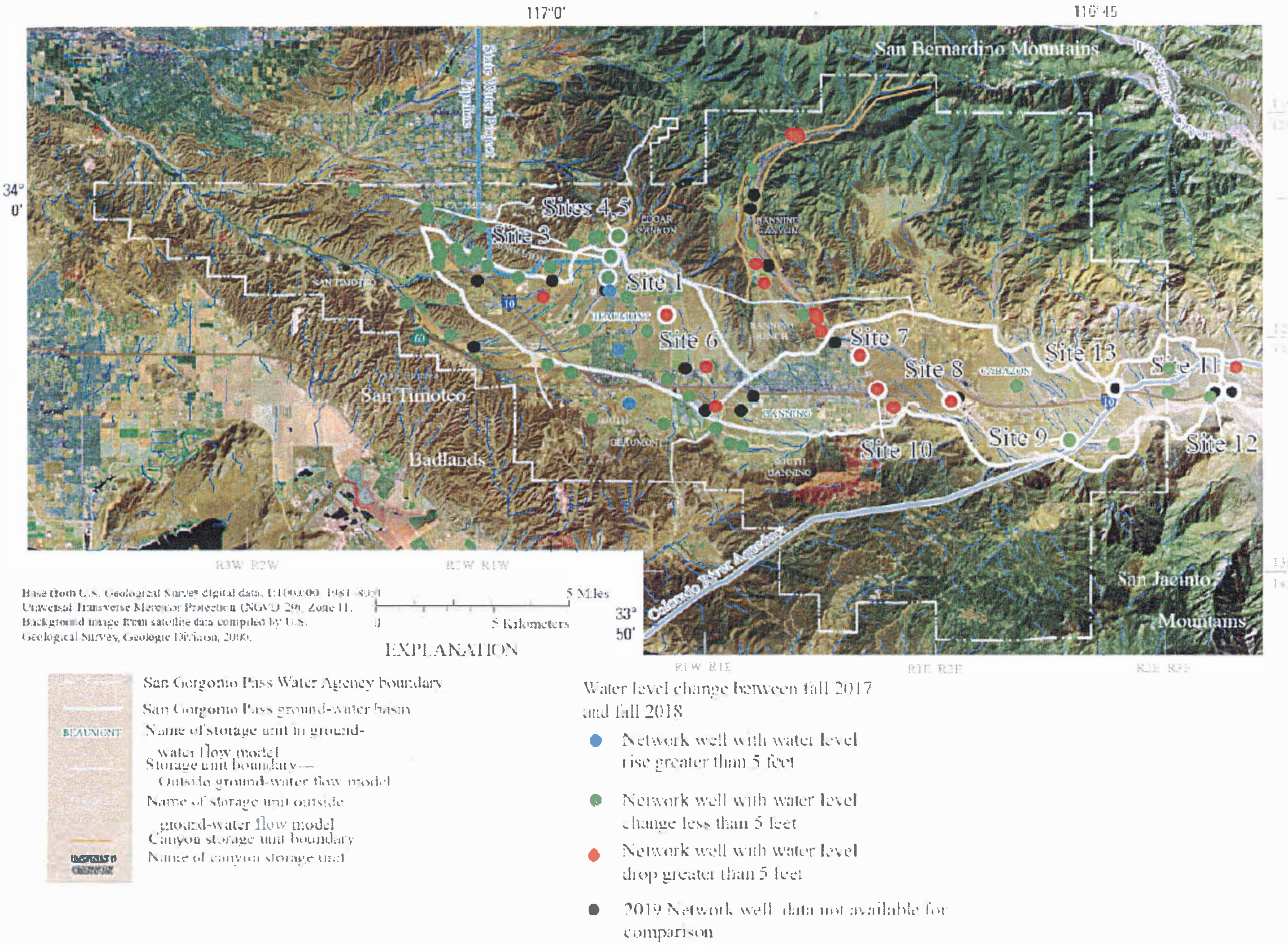
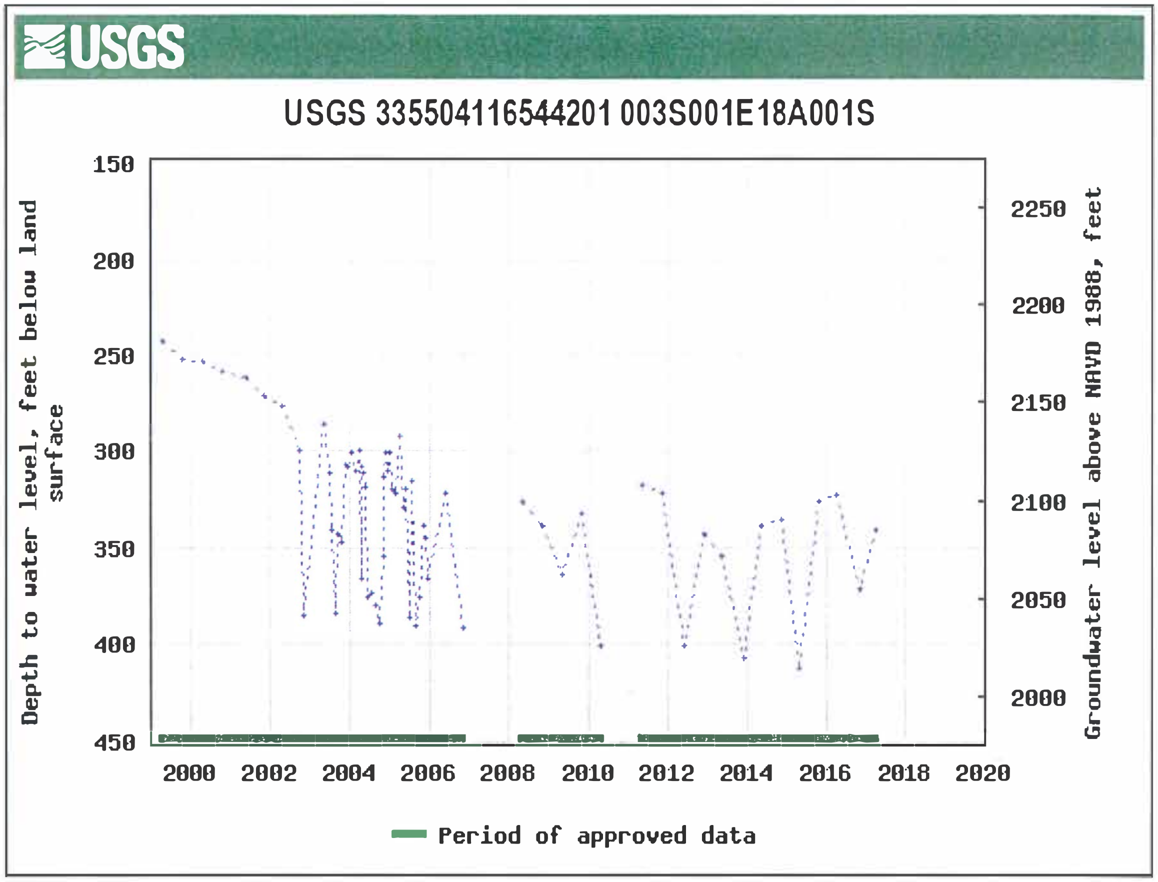


Figure 11. Map showing the water-level network and water-level change between fall 2017 and fall 2018 at selected wells.



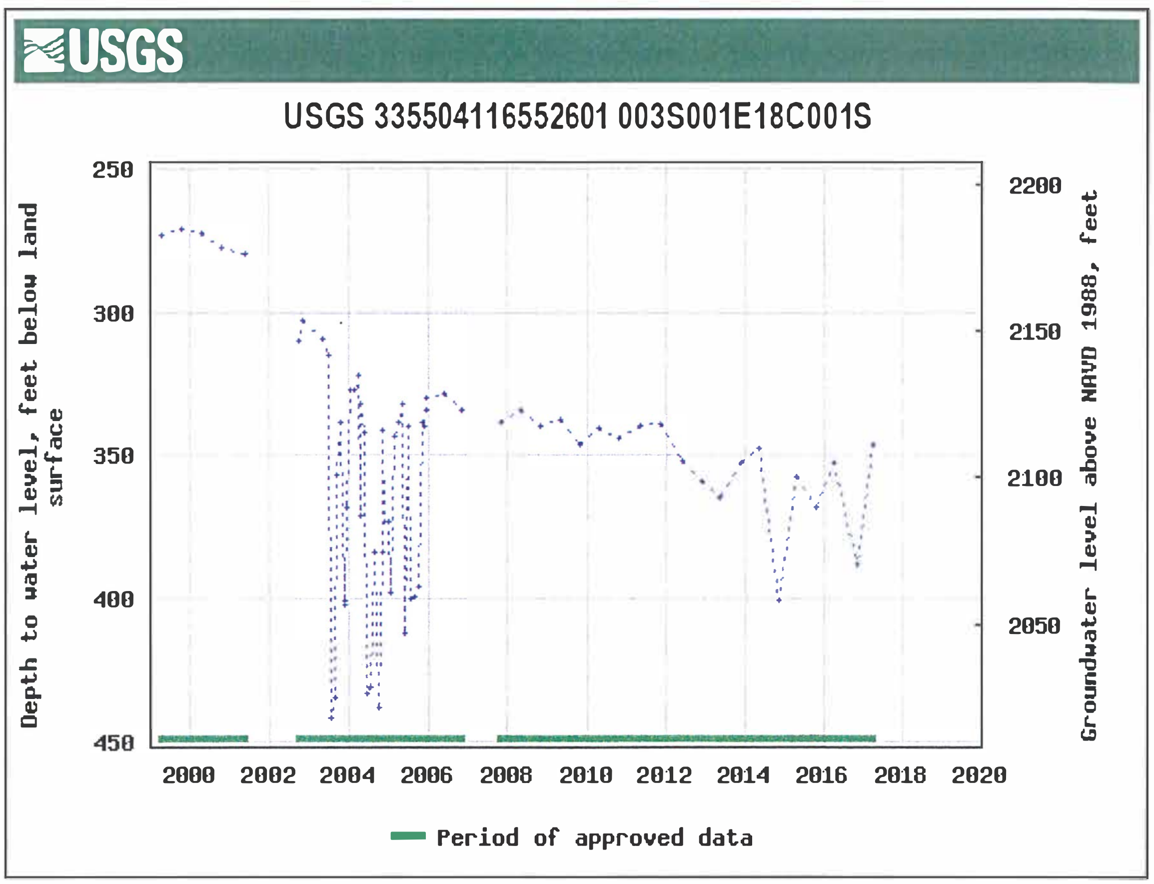
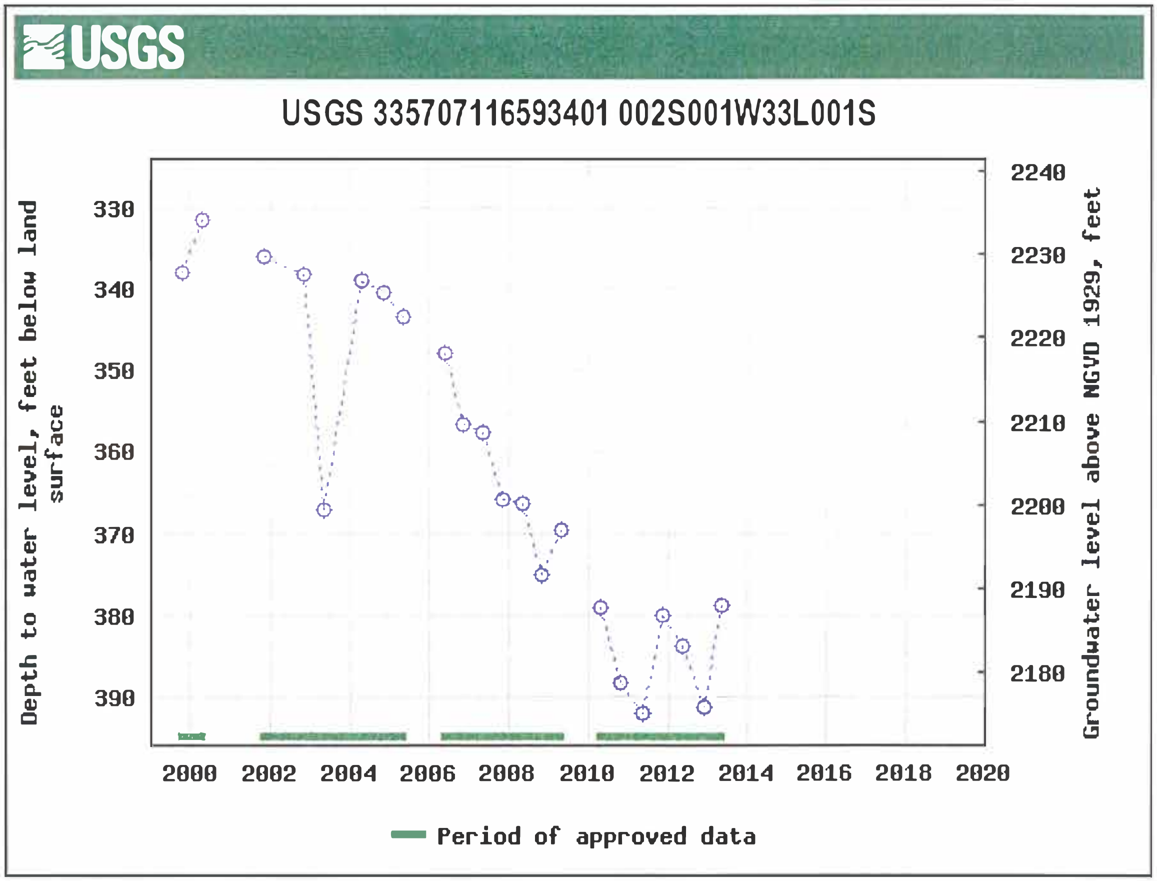


Figure 12: Groundwater Hydrographs – Banning Basin
3S/1E-18A01 and 3S/1E-18C01



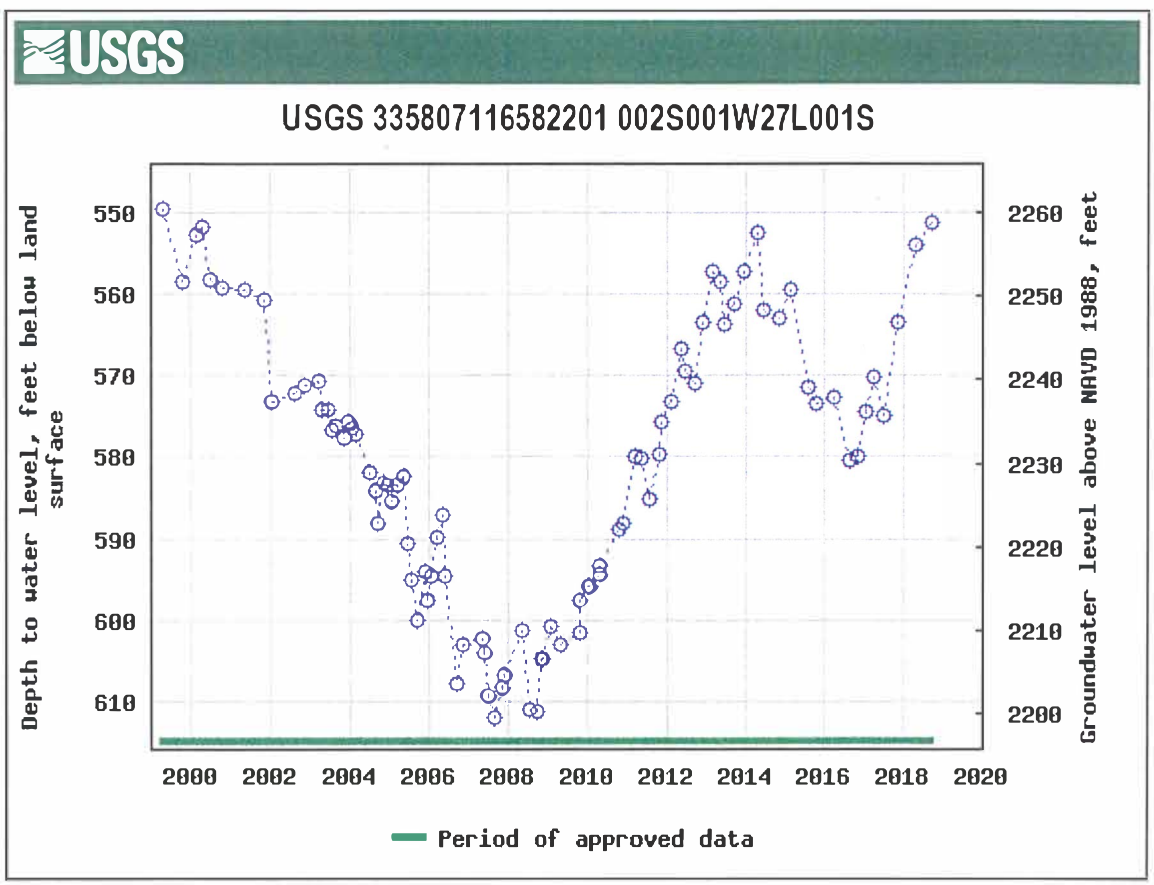


Figure 13: Groundwater Hydrographs – Beaumont Basin
2S/1W-33L01 and 2S/1W-27L01

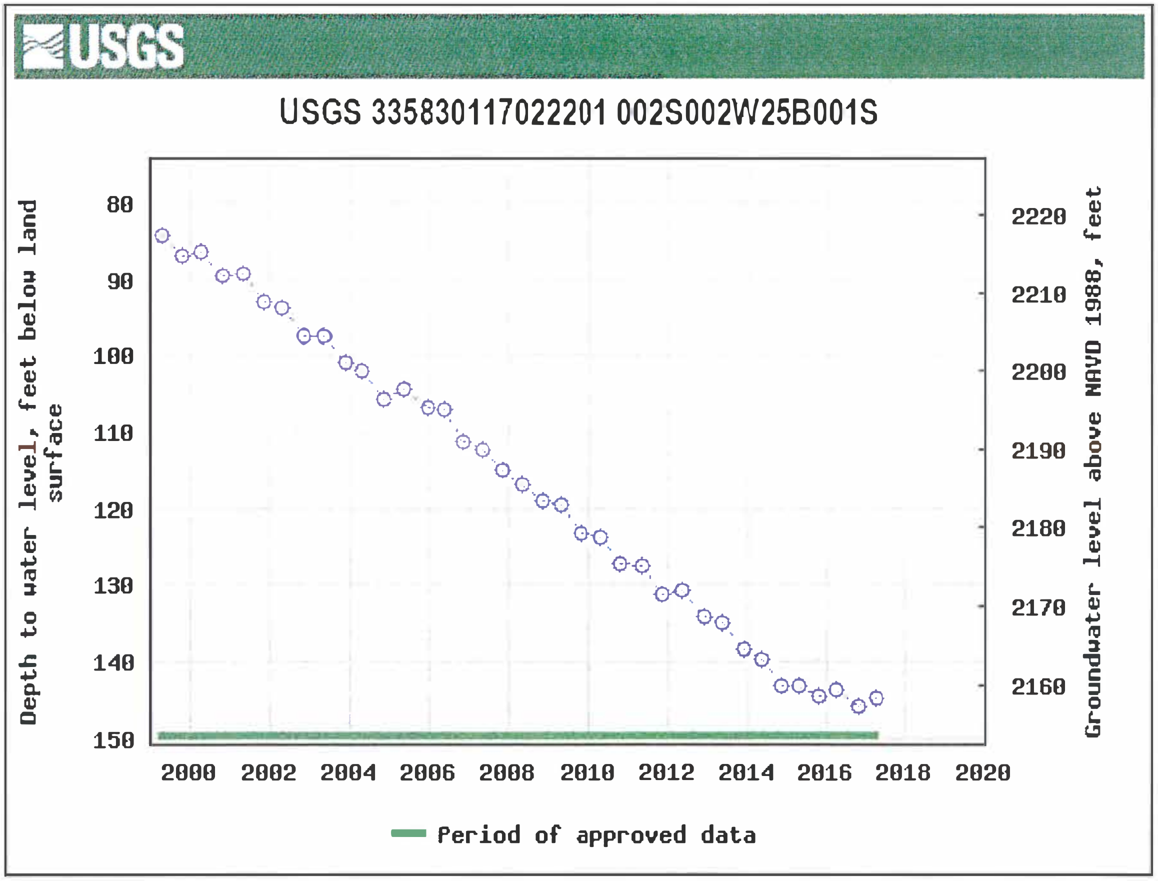
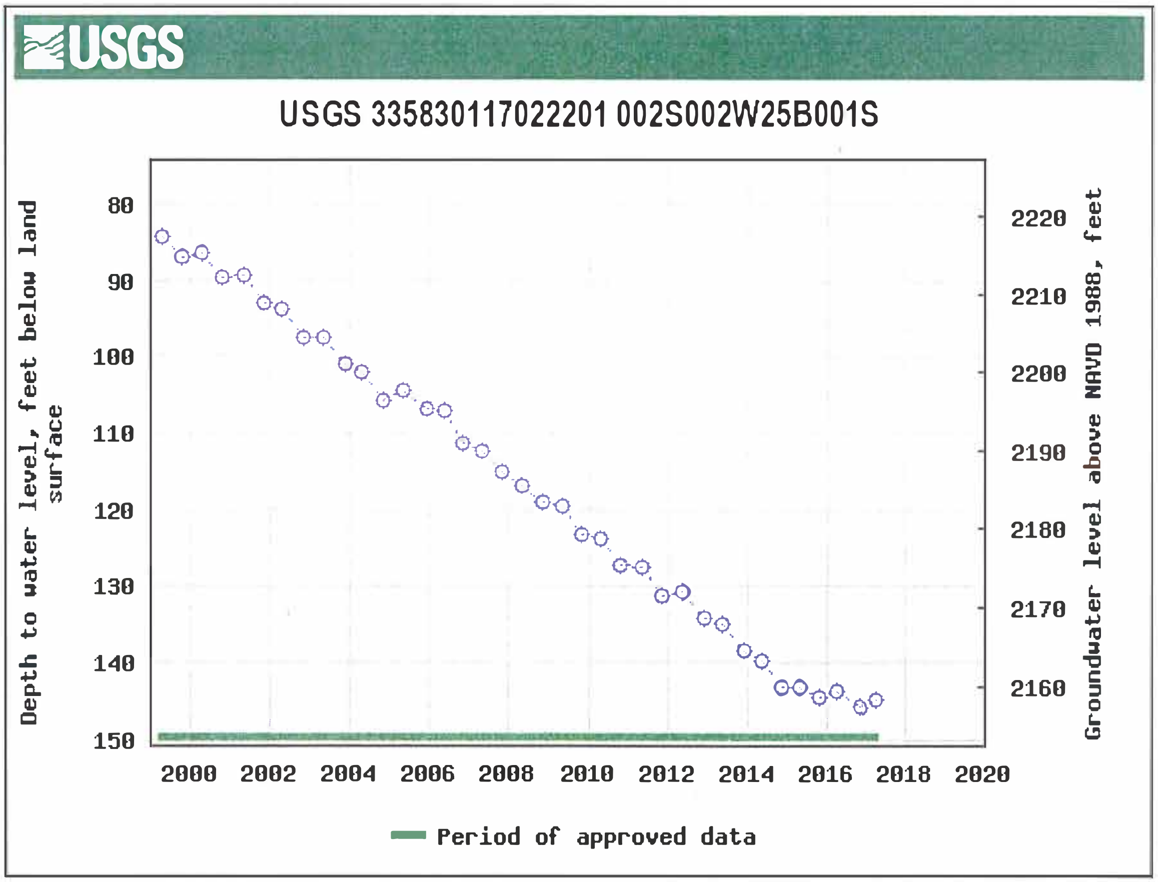


Figure 14: Groundwater Hydrographs – Beaumont Basin
2S/2W-25B01



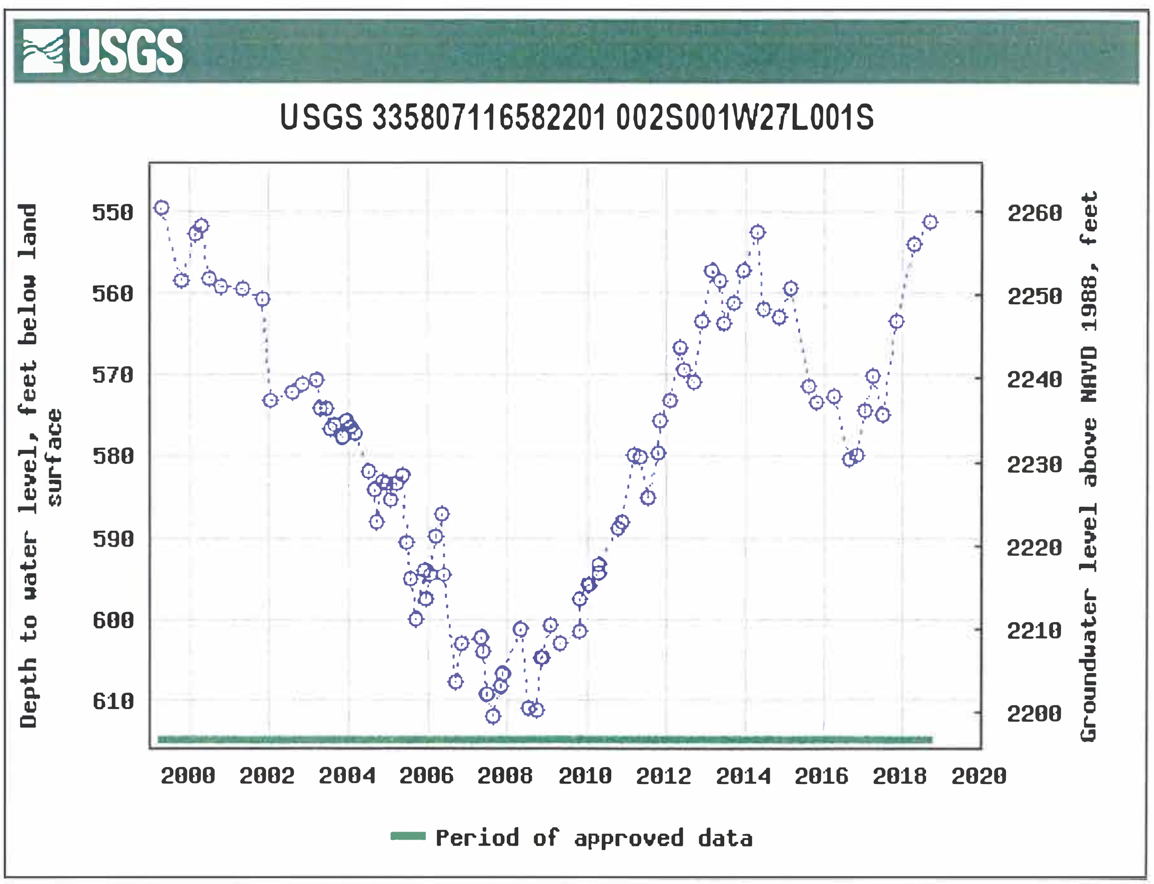


Figure 15: Groundwater Hydrographs – Beaumont Basin
2S/2W-25B01 and 2S/1W-27L01

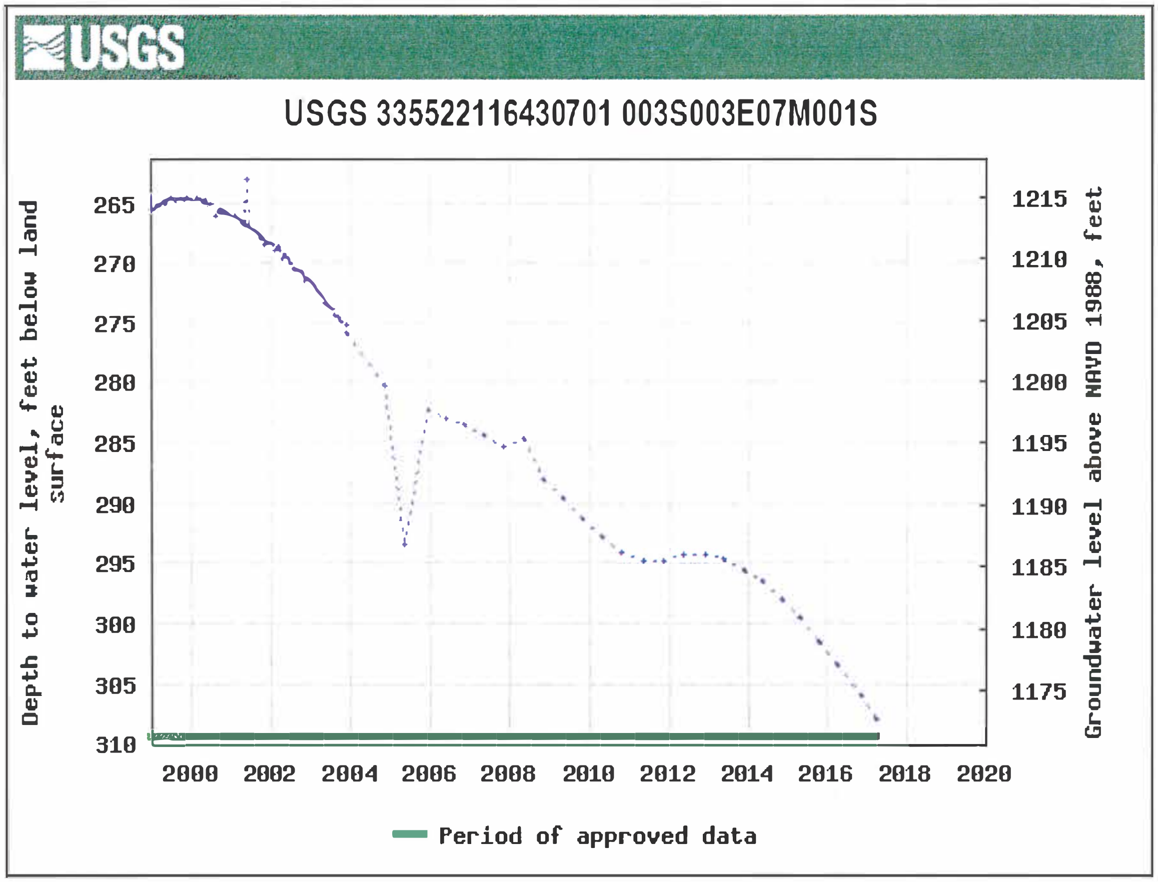
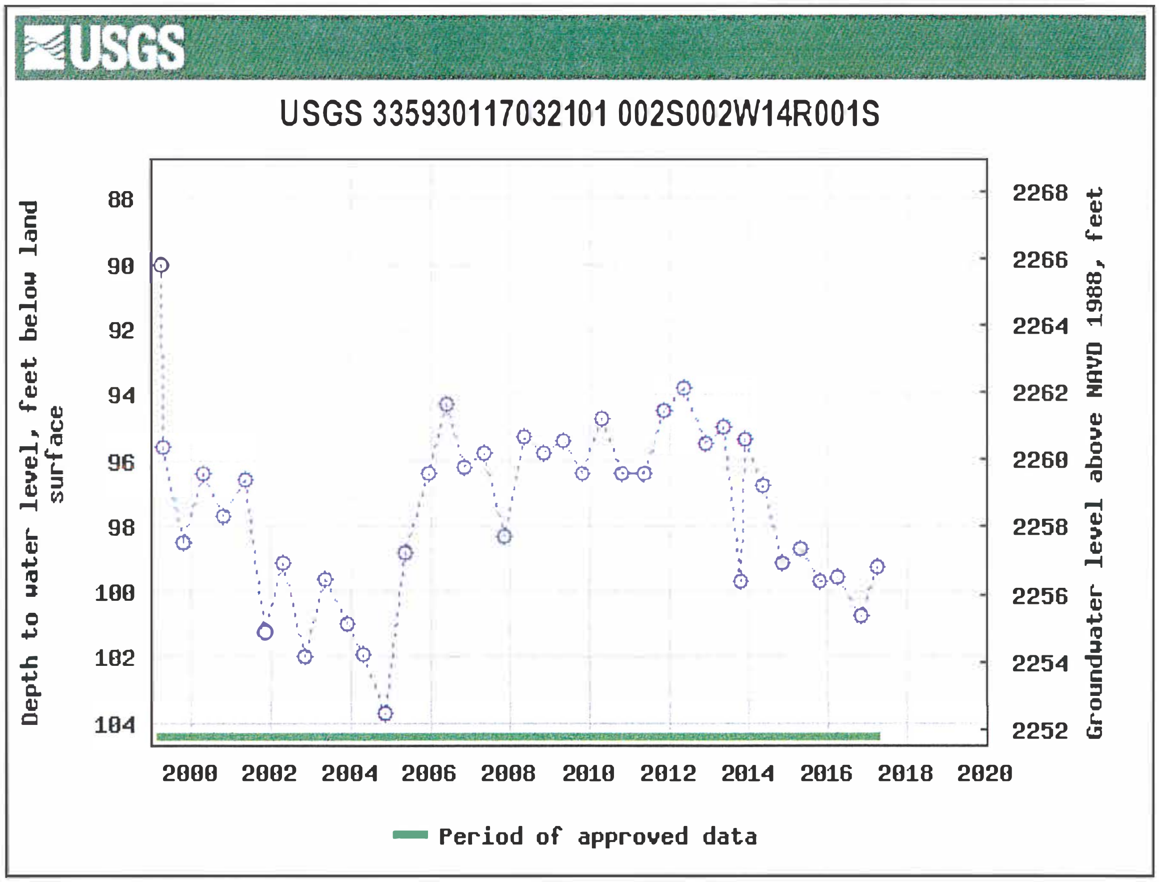


Figure 16: Groundwater Hydrographs – Cabazon Basin
3S/3E-07M01



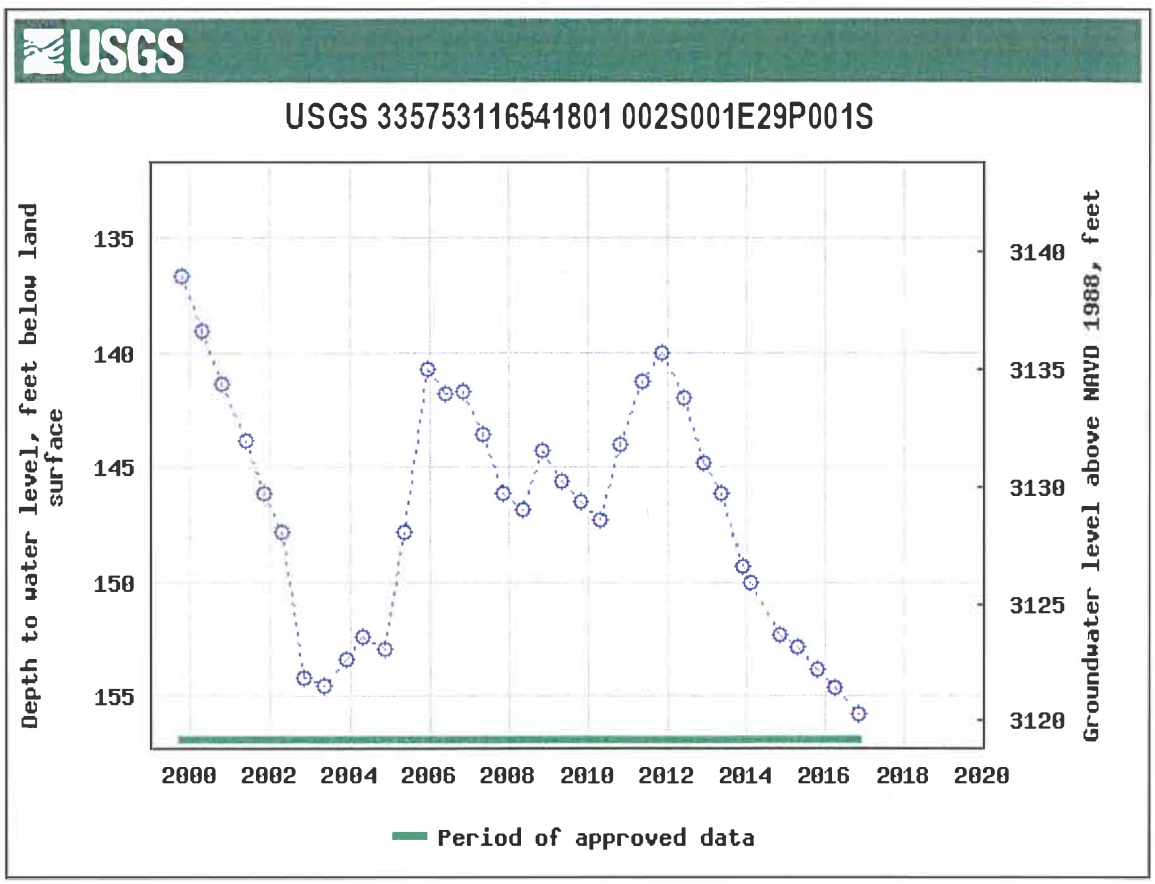


Figure 17: Groundwater Hydrographs – Calimesa and Banning Canyon Basins
2S/2W-14R [illegible] /1E-29P01

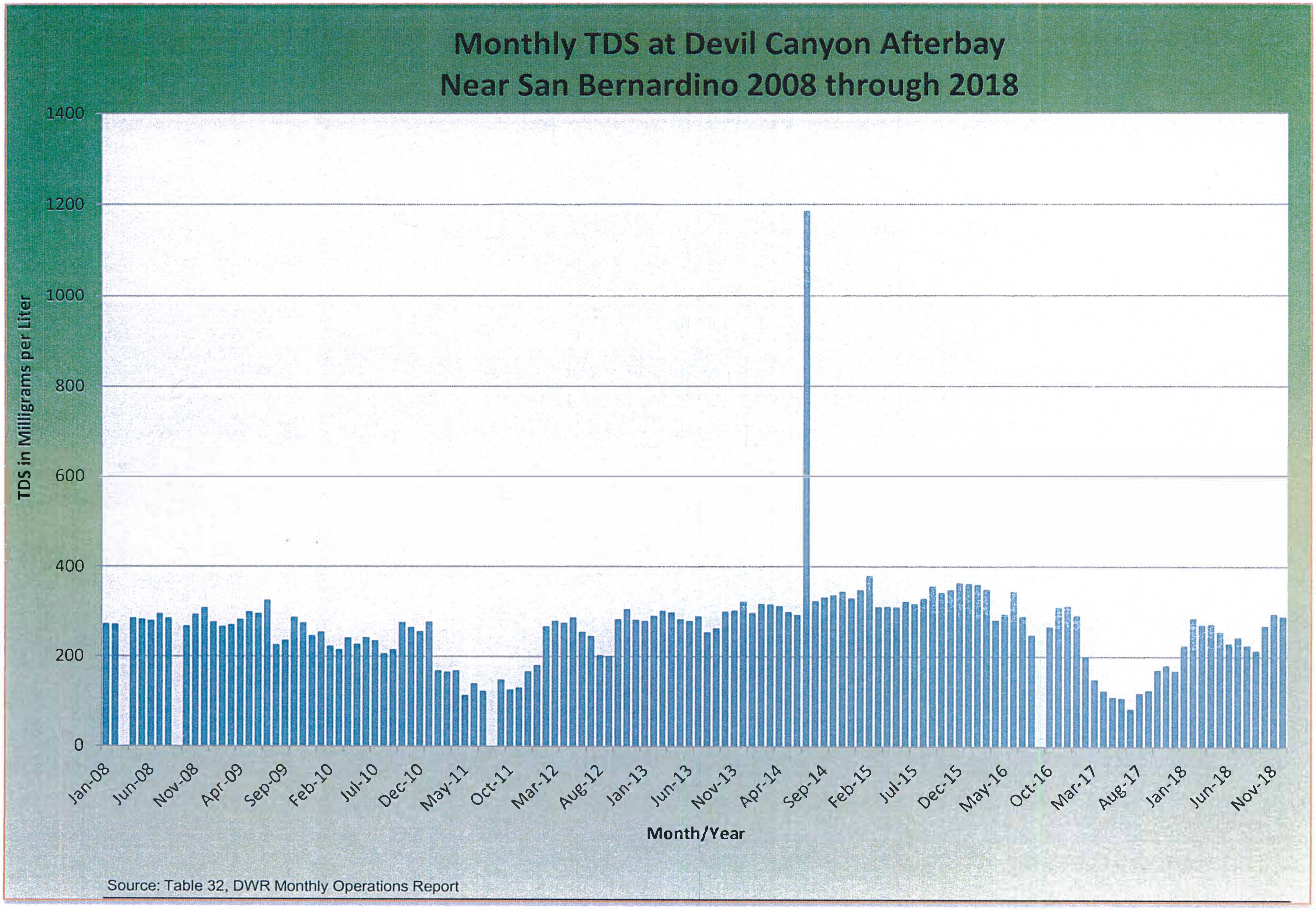


Figure 18: Monthly TDS at Devil Canyon Afterbay near San Bernardino 2008 through 2018

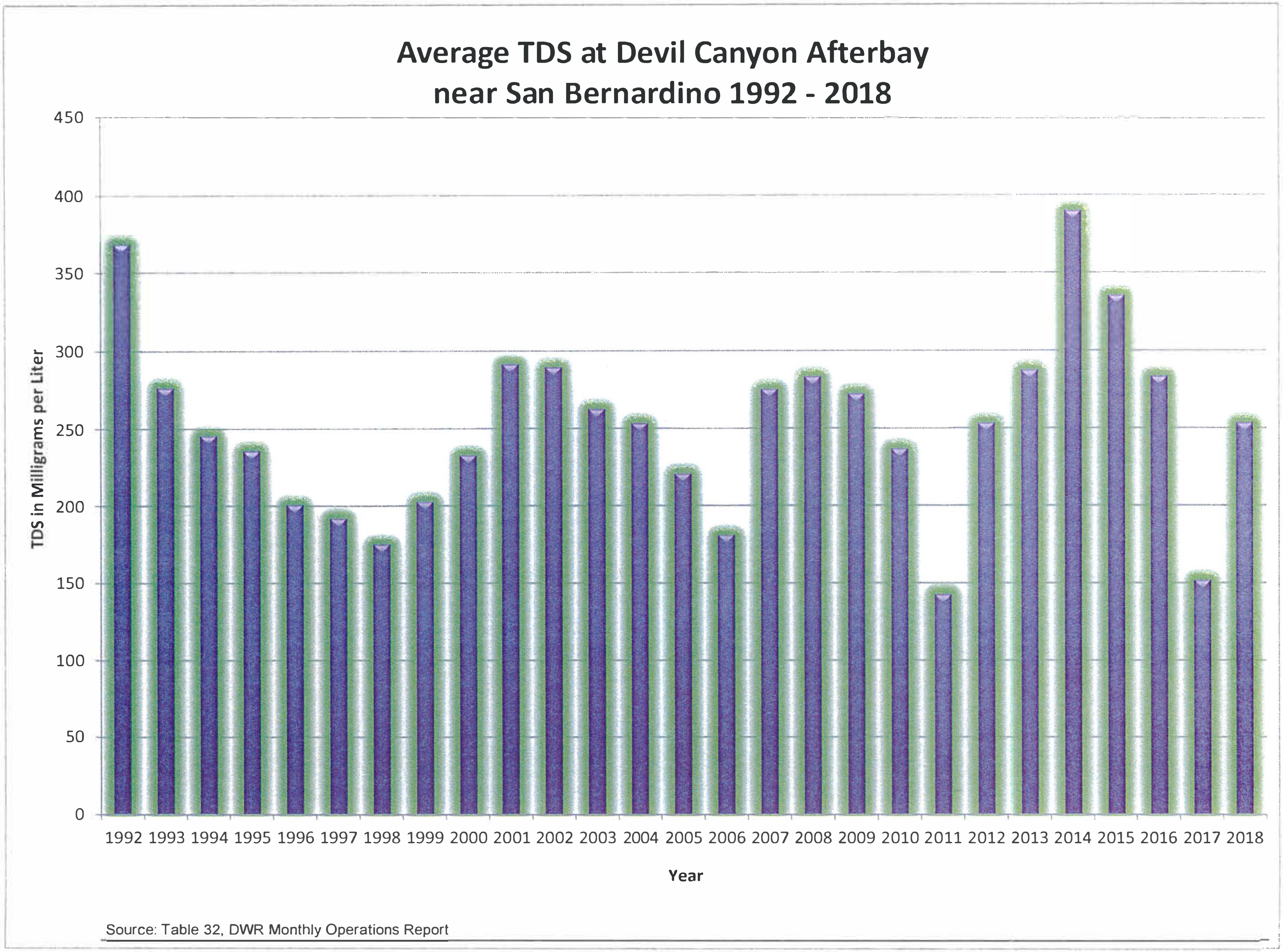


Figure 19: Average TDS at Devil Danyon Afterbay near San Bernardino 1992 through 2018